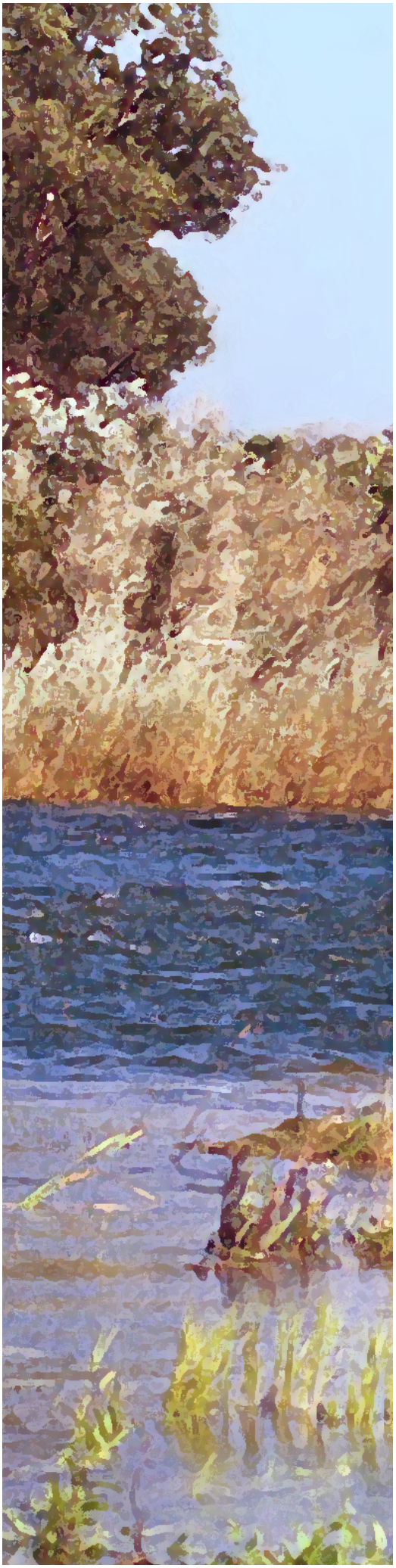

DRAFT ENVIRONMENTAL IMPACT REPORT

FOR THE FEATHER RIVER LEVEE REPAIR PROJECT

AN ELEMENT OF THE YUBA-FEATHER SUPPLEMENTAL FLOOD CONTROL PROJECT

VOLUME I: CHAPTERS 1–11

STATE CLEARINGHOUSE NO. 2006062071

PREPARED FOR

THREE RIVERS LEVEE IMPROVEMENT AUTHORITY

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ACRONYMS

°C	degrees Celsius
°F	degrees Fahrenheit
µg/L	micrograms per liter
µS/cm	microsiemens per centimeter
AADT	Annual Average Daily Traffic
AEP	annual exceedance probability
af	acre-feet
AQAP	air quality attainment plan
ARB	California Air Resources Board
ASB	Above Star Bend
ASTM	American Society for Testing and Materials
ATCM	Airborne Toxic Control Measure
BACT	Best Available Control Techniques
BMP	best management practice
BOSC	Board of Senior Consultants
BP	Before Present
BSB	Below Star Bend
CAA	Clean Air Act
CAAA	Clean Air Act Amendments of 1990
$CaCo_3$	calcium carbonate
Cal-EPA	California Environmental Protection Agency
CALFED	CALFED Bay-Delta Program
Caltrans	California Department of Transportation
CCAA	California Clean Air Act of 1988
CCR	California Code of Regulations
CDMG	California Division of Mines and Geology
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CNDDB	California Natural Diversity Data Base
CNEL	community noise equivalent level
CNPS	California Native Plant Society
CO	carbon monoxide

Corps	U.S. Army Corps of Engineers
County	Yuba County
CRHR	California Register of Historical Resources
CTR	California Toxics Rule
CWA	Clean Water Act
cy	cubic yards
dB	decibel
dBA	A-weighted dB
DEIR	draft environmental impact report
Delta	Sacramento–San Joaquin Delta
DFG	California Department of Fish and Game
DHS	California Department of Health Services
DO	dissolved oxygen
DSM	deep soil-mixing
DTSC	California Department of Toxic Substances Control
DWR	California Department of Water Resources
EC	electrical conductivity
EFH	Essential Fish Habitat
EIR	Environmental Impact Report
EPA	U.S. Environmental Protection Agency
ER-L	Effects Range–Low
ER-M	Effects Range–Median
ERP	Ecosystem Restoration Program
ESA	Endangered Species Act
ESU	evolutionarily significant unit
F-BRLSP	Feather-Bear Rivers Levee Setback Project
F-CO	Forecast-Coordinated Operations of Lake Oroville and New Bullards Bar Reservoir for Major Storms
FEIR	final environmental impact report
FEMA	Federal Emergency Management Agency
FIP	Federal Implementation Plan
FIRM	Flood Insurance Rate Map
FMMP	Farmland Mapping and Monitoring Program
fossils	paleontological resources
FRAQMD	Feather River Air Quality Management District
FRCRM	Feather River Coordinated Resource Management
FRLRP	Feather River Levee Repair Project
GPS	Global Positioning System

H:V	horizontal:vertical
HAP	hazardous air pollutant
Holocene	Recent
ITE	Institute of Traffic Engineers
kV	kilovolt
lb/day	pounds per day
LD	Levee District
LESA	Land Evaluation and Site Assessment
LOS	level of service
MACT	Maximum Available Control Technology
MBTA	Migratory Bird Treaty Act
MCL	maximum contaminant level
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MLD	Most Likely Descendant
mm	millimeter
mph	miles per hour
MRL	method reporting limit
MRZ	Mineral Resource Zone
msl	mean sea level
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NAWQA	National Water Quality Assessment
NCIC	North Central Information Center
NEHRP	National Earthquake Hazards Reduction Program
NEHRPA	National Earthquake Hazards Reduction Program Act
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for HAPS
ng/L	nanograms per liter
NGVD	National Geodetic Vertical Datum
NMFS	National Marine Fisheries Service
NO	nitric oxide
NO_2	nitrogen dioxide
NO_3	nitrogen trioxide
NOI	Notice of Intent
NOP	Notice of Preparation

NO_X	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSVAB	Northern Sacramento Valley Air Basin
NWS	National Weather Service
O_3	ozone
OES	Governor's Office of Emergency Services
OPUD	Olivehurst Public Utility District
PG&E	Pacific Gas and Electric Company
PIR	*Problem Identification Report, TRLIA Phase 4 Feather River and Yuba River Left Bank Levees, Reclamation District No. 784*
PL	Public Law
PLM	Project Levee Mile
PM	particulate matter
PM&E	protection, mitigation, and enhancement
PM_{10}	respirable particulate matter
$PM_{2.5}$	fine particulate matter
Porter-Cologne Act	Porter-Cologne Water Quality Control Act
ppm	parts per million
PRG	preliminary remediation goal
RBDD	Red Bluff Diversion Dam
RCRA	Resource Conservation and Recovery Act
RD	Reclamation District
RM	river mile
ROG	reactive organic gases
RWQCB	Regional Water Quality Control Board
SACOG	Sacramento Area Council of Governments
SIP	State Implementation Plan
SMARA	California Surface Mining and Reclamation Act
SO_2	sulfur dioxide
SOP	*Standard Operating Procedure Engineering Design Guidance 2003 (SOP EDG-03) for Geotechnical Levee Practice*
SR	State Route
SRFCP	Sacramento River Flood Control Project
SVP	Society of Vertebrate Paleontology
SWP	State Water Project
SWPPP	Storm Water Pollution Prevention Plan

SWRCB	State Water Resources Control Board
TAC	toxic air contaminant
T-BACT	Best Available Control Techniques for TACs
TDS	total dissolved solids
TMDL	total maximum daily load
TPY	tons per year
TRLIA	Three Rivers Levee Improvement Authority
UCMP	University of California Museum of Paleontology
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WDR	waste discharge requirement
WPIC	Western Pacific Interceptor Canal
YCWA	Yuba County Water Agency
Y-FSFCP	Yuba-Feather Supplemental Flood Control Project
Y-FWG	Yuba-Feather Work Group

CHAPTER 1 SUMMARY

1.1 INTRODUCTION

This document is a draft environmental impact report (DEIR) that has been prepared to evaluate the potential environmental effects of the Feather River Levee Repair Project (FRLRP), which is proposed for implementation by the Three Rivers Levee Improvement Authority (TRLIA). The DEIR has been prepared on behalf of TRLIA in accordance with the requirements of the California Environmental Quality Act (CEQA) (Public Resources Code Section 21000 et seq.) and the State CEQA Guidelines (14 California Code of Regulations [CCR] Section 15000 et seq.).

The FRLRP would improve flood protection in the Reclamation District (RD) 784 area of Yuba County. The project is an element of the Yuba-Feather Supplemental Flood Control Project (Y-FSFCP), which was initiated in 2001 by the Yuba County Water Agency (YCWA) using funding available through the Costa-Machado Water Act of 2000 (Water Act of 2000). The FRLRP DEIR incorporates by reference the programmatic environmental impact report (EIR) prepared for the Y-FSFCP, which was certified by YCWA in March 2004 (Yuba County Water Agency 2004) (see Section 2.5, "Type of EIR," in Chapter 2, "Introduction," of this document).

1.2 SUMMARY DESCRIPTION OF THE PROJECT ALTERNATIVES

The purpose of the proposed FRLRP is to correct deficiencies in the left (east) bank levees of the Feather and lower Yuba Rivers, and consequently to improve flood protection for the RD 784 area in Yuba County. The overall objectives of the project are:

- to secure flood protection for at least a flood event with a 0.5% (or 1-in-200) annual chance of exceedance,
- to help secure Federal Emergency Management Agency (FEMA) certification of the subject reaches of levee,
- to avoid increasing downstream flow and stage during peak-flow conditions,
- to achieve these objectives as soon as possible, and
- to incorporate environmental mitigation as appropriate.

The FRLRP project area is divided into three project segments, as shown in Figure 2-3, "FRLRP Project Area":

- Project Segment 1 consists of the existing Feather River left bank levee from Project Levee Mile (PLM) 13.3 to PLM 17.1 (from approximately RD 784 Pump Station No. 2 upstream to Star Bend).
- Project Segment 2 consists of the existing Feather River left bank levee from PLM 17.1 to PLM 23.6 (from approximately Star Bend upstream to west of the Yuba County Airport).

- Project Segment 3 consists of the existing Feather River left bank levee from PLM 23.6 to PLM 26.1, and the Yuba River left bank levee from PLM 0.0 to PLM 0.3 (west of the Yuba County Airport to the railroad crossing adjacent to the SR 70 bridge).

The proposed project consists of implementation of one of three potential alternatives, each evaluated at an equal level of detail in this DEIR and described in detail in Chapter 4, "Description of the Proposed Project." These potential alternatives are being designed and engineered to meet the project objectives listed above and to correct levee deficiencies for the Feather and lower Yuba Rivers in Yuba County:

- *Alternative 1 – The Levee Strengthening Alternative.* Under this alternative, repair and strengthening of the existing levees would be completed along the entire length of FRLRP project Segments 1, 2, and 3 (Figure 2-3, "FRLRP Project Area," in Chapter 2). Implementation of Alternative 1 would involve removing existing RD 784 Pump Station No. 3 and installing a new pump station farther east of the Feather River levee, which would correct seepage deficiencies related to the existing pump station location. Establishment of soil borrow areas and construction of a detention basin is also included in this alternative.

- *Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative.* Under this alternative, repair and strengthening of the existing levees would be completed along project Segments 1 and 3. Repair and strengthening activities in these segments would be the same as for Alternative 1. In project Segment 2, a setback levee would be constructed roughly following the Above Star Bend (ASB) setback levee alignment identified in the Y-FSFCP EIR. Establishment of soil borrow areas and construction of a detention basin would be required. As under Alternative 1, a pump station would be installed to replace Pump Station No. 3, in this case just east of the ASB setback levee.

- *Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative.* Under this alternative, the same levee repair and strengthening activities described for Alternatives 1 and 2 would be conducted in project Segments 1 and 3. In Segment 2, a modified setback levee alignment (i.e., intermediate alignment) would be used that would allow less land to be placed in the new floodway than under Alternative 2. The general design, construction, and operational characteristics of an intermediate setback levee under Alternative 3, including the replacement of Pump Station No. 3, would be same as for the ASB setback levee under Alternative 2.

These three potential alternatives are evaluated at an equal level of detail in this DEIR. These alternatives are described in detail in Chapter 4, "Description of the Proposed Project." It should be noted that in much of the EIR a single alignment is shown for the intermediate setback levee. However, for the portion of the intermediate setback levee that deviates from the ASB setback levee alignment, a specific route has not yet been confirmed and several options are being considered. The actual alignment could be located to the east or west of the alignment shown (as indicated by the area considered for the intermediate setback levee alignment shown in Figure 2-3). Considerations for final route selection include the suitability of underlying soil conditions for levee construction and the extent of flood control benefits (i.e., moving the alignment westward and reducing the size of the Feather River high-water channel would result in fewer

flood control benefits). The route in this EIR is considered to be representative of the various options considered for the intermediate setback levee alignment.

This EIR also evaluates a No-Project Alternative. The No-Project Alternative represents conditions that "would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services" (State CEQA Guidelines Section 15126.6[e][2]). In this case, the No-Project Alternative consists of a continuation of existing conditions. As required by CEQA, a No-Project Alternative has been included to allow TRLIA to compare the impacts of approving the proposed project (either Alternative 1, Alternative 2, or Alternative 3) with the impacts of not approving the proposed project.

Table 1-1, "Summary Comparison of Features of the FRLRP Alternatives," shows some of the main features of the three project alternatives.

MBK Engineers performed hydraulic modeling that predicts water surface elevations at locations along the Feather River under different categories of flood events. Table 1-2, "Summary Comparison of Feather River Water Elevations of the FRLRP Alternatives," shows water elevations at three locations along the Feather River within the project area for the three project alternatives.

Table 1-1
Summary Comparison of Features of the FRLRP Alternatives

Project Feature	Alternative 1	Alternative 2	Alternative 3
Potential Seepage Control Measures *(usage and locations of these measures would vary only in project Segment 2)*	► Existing levee strengthened at select locations along project Segments 1, 2, and 3 with: ▪ Cutoff trenches/slurry cutoff walls ▪ Seepage/stability berms ▪ Relief wells ► Erosion repair and protection measures at identified locations along project Segment 2 (see note below)	Existing levee strengthened at select locations along project Segments 1 and 3; same seepage control measures as for Alternative 1. New setback levee in Segment 2 constructed using modern construction techniques and built on a better foundation, with: ► Cutoff trenches/slurry cutoff walls ► Seepage/stability berms ► Relief wells	Existing levee strengthened at select locations along project Segments 1 and 3; same seepage control measures as for Alternative 1. New setback levee along a modified alignment in Segment 2 constructed using modern construction techniques and built on a better foundation, with: ► Cutoff trenches/slurry cutoff walls ► Seepage/stability berms ► Relief wells
Borrow Volume *(approximate)*	1.6 million cubic yards	3.3 million cubic yards	3.3 million cubic yards
Length of Setback Levee *(approximate)*	NA	5.9 miles	5.5 miles
Size of Levee Setback Area and Levee Footprint *(approximate)*	NA	1,600 acres	1,250–1,300 acres

Table 1-1
Summary Comparison of Features of the FRLRP Alternatives

Project Feature	Alternative 1	Alternative 2	Alternative 3
Other Project Elements	▸ Removal and relocation of Pump Station No. 3 east of the existing levee ▸ Construction of a detention basin northeast of Star Bend	▸ Removal and relocation of Pump Station No. 3 east of the setback levee ▸ Removal of portions of the existing levee in Segment 2 ▸ Construction of detention basin northeast of Star Bend ▸ Relocation/reinforcement of some utilities and other facilities in the levee setback area ▸ Removal of approximately 40 structures, including five to 10 residences	▸ Removal and relocation of Pump Station No. 3 east of the setback levee ▸ Removal of portions of the existing levee in Segment 2 ▸ Construction of detention basin northeast of Star Bend ▸ Relocation/reinforcement of some utilities and other facilities in the levee setback area ▸ Removal of approximately 30 structures, including five to 10 residences
Land Uses in the Levee Setback Area	NA	Farming operations and the potential for habitat restoration, consistent with the flood control function of the levee setback area, may be feasible in parts of the expanded Feather River floodway, which would total approximately 1,200 acres	Farming operations and the potential for habitat restoration, consistent with the flood control function of the levee setback area, may be feasible in parts of the expanded Feather River floodway, which would total approximately 900 acres

Notes: FRLRP = Feather River Levee Repair Project; NA = not applicable
If additional areas in the existing levee along project Segments 1 and 3 are found to have similar erosion conditions as those identified in Segment 2, erosion protection measures could be implemented in these locations as well.
If either Alternative 2 or Alternative 3 is selected for implementation, the seepage control system for the setback levee would be refined based on detailed field investigations and analyses, to be performed during detailed design.
Source: Data compiled by EDAW in 2006

Table 1-2
Summary Comparison of Feather River Water Elevations of the FRLRP Alternatives

Location	AEP	Alternative 1 – Water elevation (feet—NGVD)	Alternative 2 – Water Elevation (feet—NGVD)	Alternative 3 – Water Elevation (feet—NGVD)
Upper End of Levee Setback Area	1 in 100	68.8	66.9	67.4
	1 in 200	72.7	69.5	69.8
Confluence of Feather and Yuba Rivers	1 in 100	72.5	71.2	71.4
	1 in 200	76.2	74.7	75.0
Downstream of Levee Setback Area	1 in 100	59.4	59.5	59.5
	1 in 200	62.8	62.9	62.9

Notes: AEP = annual exceedance probability (the probability that a given flow will be exceeded in any year; for example, an AEP of 1 in 125 has a 1/125 or 0.8 percent probability of being exceeded in any year); NGVD = National Geodetic Vertical Datum
Conditions for Alternative 1 would be the same as those under the No-Project Alternative (i.e., hydrologic conditions in the Feather River channel would be unchanged under this alternative).
Source: Data provided by MBK Engineers in 2006

1.3 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

1.3.1 ENVIRONMENTAL EFFECTS OF THE PROPOSED PROJECT

Tables 1-3a, 1-3b, and 1-3c, "Summary of Impacts and Mitigation Measures" (included at the end of this chapter), provide a summary of the environmental impacts of the three project alternatives, the level of significance of each impact before mitigation, recommended mitigation measures, and the level of significance of each impact after implementation of the mitigation. They also list the significant cumulative impacts to which the levee repair and strengthening activities and alternative levee setbacks would contribute. As shown in Tables 1-3a, 1-3b, and 1-3c, implementation of Alternative 1, Alternative 2, or Alternative 3 could significantly affect a number of environmental resources, mainly during construction of project features, but mitigation is included that would ensure the reduction of most of these impacts to a less-than-significant level. In addition, the three project alternatives have the potential to provide a substantial reduction of flood risk in the RD 784 area.

1.3.2 EFFECTS THAT WOULD REMAIN SIGNIFICANT FOLLOWING MITIGATION

As shown in Tables 1-3a, 1-3b, and 1-3c, Alternatives 1, 2, and/or 3 would result in direct or indirect significant and unavoidable impacts for the following issues:

- conflicts with land use policies for the preservation of agricultural land in agricultural use in the levee setback areas,
- conversion of Important Farmland to nonagricultural use in the levee setback areas,
- temporary construction-related air emissions, and
- temporary construction-related noise effects on sensitive receptors near the project area.

Implementation of any of the three project alternatives would also contribute to significant and unavoidable cumulative impacts on air quality and noise (during construction) and on Important Farmland (permanent conversion to nonagricultural uses). Mitigation has been included to reduce these direct, indirect, and cumulative impacts, but would not be sufficient to reduce them to a less-than-significant level.

1.4 AREAS OF CONTROVERSY

The primary areas of potential controversy associated with the FRLRP are the purchase of private land or easements on private land for project implementation, and the removal of Important Farmland from agricultural use. Alternative 1 would result in conversion of up to approximately 180 acres of farmland to another use (e.g., detention basin, seepage/stability berm). Under Alternative 2, a total of approximately 1,600 acres would be included in the setback levee footprint and the levee setback area (new floodway), most of which is privately owned and currently in cultivation. Alternative 3 would include approximately 1,250–1,300 acres of private land for the setback levee footprint and the setback area, most of which is privately owned and currently in cultivation. Aside from the acreage in the setback levee footprints, continued farming operations may be feasible in many parts of the levee setback areas

under Alternatives 2 and 3. Alternative 3 would include construction of a setback levee that would affect fewer acres of existing agricultural land; therefore, the effect on continued farming operations would be less than under Alternative 2.

Although no specific plans for habitat restoration in the setback area are proposed at this time, future management plans for portions of the levee setback areas under either Alternative 2 or Alternative 3 could include restoration of habitat and wetland areas as a substitute for agricultural uses where opportunities are present. Converting agricultural land to riparian and wildlife habitat is controversial in some agricultural communities, especially in the Sacramento Valley, where extensive areas are being converted or are proposed for conversion from agricultural use to riparian habitat. County tax revenues also may change as a result of potential land use changes.

This project would help resolve a current area of known and long-standing controversy, namely, the existing risk of flooding impacts in the RD 784 area, as demonstrated by recent catastrophic flooding events. The FRLRP would also address the deficiencies in the Feather River levee that have led to uncertainty and controversy surrounding the planned and ongoing development in the RD 784 area, which is subject to a higher flood risk than previously believed.

Overall, the FRLRP would reduce the ongoing concern and controversy over flood protection in the nearby communities. Any continuing controversy surrounding the project would be related primarily to the direct effects of the proposed levee setbacks under Alternatives 2 and 3 on landowners in the levee setback areas and/or the loss of productive agricultural land in the project area.

1.5 ISSUES TO BE RESOLVED

TRLIA will need to decide which alternative to approve among the three alternatives evaluated at an equal level of detail in this EIR. The decision will be based on numerous factors besides environmental impacts, including cost, availability of financing, effects on landowners, the potential for regional flood control benefits, future permitting requirements, and implementation schedule.

Regardless of which alternative is selected for implementation, detailed design of project features and planning of construction will need to be coordinated with mitigation requirements so that sensitive resources in the project area are avoided where practicable. Where sensitive resources cannot be physically avoided, detailed plans for mitigation of the loss of these resources will need to be developed (e.g., compensation for the loss of jurisdictional wetlands; refer to Section 5.5, “Terrestrial Biological Resources,” for further discussion). Land uses in the levee setback area under Alternatives 2 and 3 could consist of agricultural operations and/or habitat restoration activities. Special operations and maintenance plans would need to be prepared and implemented to ensure the long-term maintenance of any agricultural and/or habitat areas, and to ensure that such areas would not conflict with the flood control function of the levee setback area. Any future management plans would require consultation with affected landowners, resource agencies, and other stakeholders.

Table 1-3a
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
5.1 Land Use			
LS-5.1-a: Conflicts with Land Use Planning and Policies Resulting from Levee Repairs and the Levee Setback. Levee repair and strengthening could result in the removal of up to approximately 30 acres of agricultural land from production through the placement of seepage/stability berms and other structures. Construction of a detention basin would be required to accommodate peak flows from relief wells. Construction of the detention basin could result in the removal of up to approximately 150 additional acres of agricultural land. These uses would conflict with County land use policies regarding the preservation of agricultural land. However, the proposed improvements to the flood control system would benefit thousands of acres of valuable agricultural lands in the adjacent floodplain by providing increased protection from future flood damages. Therefore, while the direct land use changes associated with Alternative 1 would conflict with policies related to protection of agricultural lands, in the long term this alternative would provide greater protection for agricultural lands and soils, consistent with these policies. Therefore, this impact would be **less than significant**.	LTS	No mitigation is required.	LTS
LS-5.1-b: Conversion of Important Farmland to Nonagricultural Uses Resulting from Levee Repairs and Strengthening. Installation of seepage/stability berms and other structures associated with levee repairs and strengthening could permanently convert up to approximately 30	S	**Minimize Losses of Important Farmland to the Extent Feasible.** To minimize direct losses and indirect adverse effects on important farmland, TRLIA shall ensure that the following measures are implemented where feasible and practicable: (a) Minimize the disturbance of Important Farmland and continuing agricultural operations during construction by	SU

Table 1-3a
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Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
acres of Prime Farmland to nonagricultural uses. Construction of the detention basin under Alternative 1 could convert up to an additional approximately 150 acres of Prime Farmland to nonagricultural uses. This impact would be **significant.**		locating construction laydown and staging areas on sites that are fallow, that are already developed or disturbed, or that are to be discontinued for use as agricultural land, and by using existing roads to access construction areas to the extent possible. (b) When selecting the site and configuration of the detention basin, minimize the fragmentation of agricultural lands and retain contiguous parcels of agricultural land of sufficient size to support their efficient use for continued agricultural production.	
5.2 Geology, Soils, and Mineral Resources			
LS-5.2-a: Risk of Geologic Hazards to the Levees. Characteristics of the soils along the existing Feather River and Yuba River levees could lead to structural deficiencies or failure of the levees if not addressed in construction design. Although no active faults are in the immediate vicinity of the existing levee alignments, some ground shaking is possible from earthquakes at distant sites. The levees would be strengthened according to geotechnical engineering recommendations that incorporate seepage control features, making them more stable than the existing levee and less likely to fail. Therefore, this would be a **beneficial** effect.	B	No mitigation is required.	B
LS-5.2-b: Soil Erosion Hazards Associated with Levee Repair and Strengthening Activities. Although levee repair and strengthening activities would disturb earth, thereby potentially accelerating erosion, construction disturbance would be temporary, and soils in disturbed areas would be vegetated or otherwise stabilized after construction	LTS	No mitigation is required.	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
is complete. In addition, part of Alternative 1 includes correction of existing erosion problem areas on the water side of the Feather River left bank levee in project Segment 2. Levee repair and strengthening activities would not expose persons or property to erosion hazards. This impact would be **less than significant**.			
5.3 Water Resources and River Geomorphology			
LS-5.3-a: Temporary Effects on Water Quality Associated with Levee Repair and Strengthening Activities. Ground-disturbing activities associated with repair and strengthening of the existing levees could cause soil erosion and sedimentation of local drainages and the Feather and Yuba River channels. Construction activities could also discharge waste petroleum products or other construction-related substances that could enter these waterways in runoff. Because the release of soil or other materials into these waterways could adversely affect river water quality, this impact would be **potentially significant.**	PS	**(1): Prepare a SWPPP, File an NOI, and Comply with the NPDES Stormwater Permit for Project Construction Activities.** Before the start of any project construction work, site grading, or excavation, TRLIA or its primary construction contractor shall prepare a SWPPP detailing measures to control soil erosion and waste discharges from construction areas and shall submit an NOI to the Central Valley RWQCB for stormwater discharges associated with general construction activity. TRLIA shall require all contractors conducting construction-related work to implement the SWPPP to control soil erosion and waste discharges of other construction-related contaminants. The general contractor(s) and subcontractor(s) conducting the work shall be responsible for constructing or implementing, regularly inspecting, and maintaining the measures in good working order. The SWPPP shall identify the grading and erosion control BMPs and specifications that are necessary to avoid and minimize water quality impacts to the extent practicable. Standard erosion control measures (e.g., management, structural, and vegetative controls) shall be implemented for all construction activities that expose soil. Grading operations shall be conducted to eliminate direct routes for conveying potentially contaminated runoff to drainage channels. Erosion control barriers such as silt fences and mulching material shall be installed, and disturbed areas shall be	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		reseeded with grass or other plants where necessary. The SWPPP shall contain specific measures for stabilizing soils at construction-related sites before the onset of the winter rainfall season. These standard erosion control measures shall be designed to reduce the potential for soil erosion and sedimentation of drainage channels. The following specific BMPs are recommended for implementation: ▪ Conduct all work according to site-specific construction plans that identify areas for clearing, grading, and revegetation so that ground disturbance is minimized. ▪ Avoid riparian and wetland vegetation wherever possible and identify vegetation to be retained for habitat maintenance (i.e., as identified through preconstruction biological surveys), cover cleared areas with mulches, install silt fences near riparian areas or streams to control erosion and trap sediment, and reseed cleared areas with native vegetation. ▪ Stabilize disturbed soils at all construction sites (e.g., levee repair areas, borrow areas) and staging areas before the onset of the winter rainfall season. ▪ Stabilize and protect stockpiles from exposure to erosion and flooding. The SWPPP also shall specify appropriate hazardous materials handling, storage, and spill response practices to reduce the possibility of adverse impacts from use or accidental spills or releases of contaminants. Specific measures applicable to the project include, but are not limited to, the following: ▪ Develop and implement strict on-site handling rules to keep construction and maintenance materials out of drainages and waterways.	

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THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		▪ Conduct all refueling and servicing of equipment with absorbent material or drip pans underneath to contain spilled fuel. Collect any fluid drained from machinery during servicing in leakproof containers and deliver to an appropriate disposal or recycling facility. ▪ Maintain controlled construction staging, site entrance, concrete washout, and fueling areas at least 100 feet away from stream channels or wetlands to minimize accidental spills and runoff of contaminants in stormwater. ▪ Prevent raw cement; concrete or concrete washings; asphalt, paint, or other coating material; oil or other petroleum products; or any other substances that could be hazardous to aquatic life from contaminating the soil or entering watercourses. ▪ Maintain spill cleanup equipment in proper working condition. Clean up all spills immediately according to the spill prevention and response plan, and immediately notify DFG and the RWQCB of any spills and cleanup procedures. **(2): Obtain a Use Permit from Yuba County and Comply with Permit Conditions for Erosion Control.** Before the start of any project-related grading, excavation, or fill activity, TRLIA or its primary construction contractor shall obtain a use permit from the Yuba County Planning Department in compliance with the Yuba County Ordinance Code. TRLIA shall require all contractors conducting construction-related work to implement the conditions of the permit. The general contractor(s) and subcontractor(s) conducting the work shall be responsible for constructing or implementing, regularly inspecting, and maintaining the required measures in good working order.	
LS-5.3-b: Changes in Groundwater Levels Resulting from Seepage Control Measures. Slurry cutoff walls that would be installed in	LTS	No mitigation is required.	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
segments of the existing Feather River and Yuba River levees to control seepage could restrict groundwater flow and affect groundwater levels. Potential consequences are localized changes in well water levels and/or high groundwater levels east and south of the locations where slurry cutoff walls are installed. Such changes are not expected to substantially affect water supply or adversely affect land uses. This impact would be **less than significant.**			
5.4 Fisheries			
LS-5.4-a: Loss of Fish Habitat during Levee Repair and Strengthening Activities. Construction-related increases in sediments, turbidity, and contaminants could adversely affect fish habitats immediately adjacent to and downstream of project construction activities, possibly resulting in adverse effects on fish species listed or proposed for listing as threatened or endangered under ESA. This impact would be **potentially significant**.	PS	**(1): Prepare a SWPPP, File an NOI, and Comply with the NPDES Stormwater Permit for Project Construction Activities.** This measure is identical to Mitigation Measure LS-5.3-a(1) in Section 5.3, "Water Resources and River Geomorphology." **(2): Obtain a Use Permit from Yuba County and Comply with Permit Conditions for Erosion Control.** This measure is identical to Mitigation Measure LS-5.3-a(2) in Section 5.3, "Water Resources and River Geomorphology."	LTS
LS-5.4-b: Loss of Overhead Cover and Instream Woody Material Associated with Levee Repair and Strengthening Activities. Small amounts of riparian vegetation (i.e., individual trees) may need to be removed or cleared at the waterside toe of the existing levee during repairs at erosion problem areas in project Segment 2. The loss of overhead cover for fish would be negligible and temporary, however, and revegetation would occur over time. Therefore, this impact would be **less than**	LTS	No mitigation is required.	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
significant.			
5.5 Terrestrial Biological Resources			
LS-5.5-a: Effects on General Biological Resources. Levee repair and strengthening and related activities would result in disturbance and/or loss of vegetation along the Feather and Yuba River levees and at staging areas and detention basin and borrow sites. These areas provide habitat for many common plant and wildlife species. Although local populations of common species could be affected, these species are locally and regionally abundant. This impact would be **less than significant.**	LTS	No mitigation is required.	LTS
LS-5.5-b: Effects on Sensitive Habitats. Levee repair and strengthening and related activities could result in disturbance and/or loss of sensitive habitats, including jurisdictional wetlands, other waters of the United States, and riparian habitats. This impact would be **significant.**	S	**Avoid Disturbance of Sensitive Habitats to the Extent Feasible and Comply with Corps and DFG Processes to Mitigate Unavoidable Effects.** Three Rivers Levee Improvement Authority (TRLIA) and its primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize potential project effects on sensitive habitats. As noted in the setting and impact discussions above, for purposes of this EIR the potential presence of sensitive habitats was assessed through reconnaissance surveys (where access was allowed) and literature review. The mapping and surveys identified below are intended to supplement and clarify these initial surveys and reviews by providing timely, detailed, and finely tuned biological information within the specific geographical areas subject to impact under the alternative selected for implementation. Each measure is accompanied by one or more performance standards to control the ultimate level of impact: (a) <u>Map potential waters of the United States and riparian habitat in the project area and, to the extent feasible and</u>	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		practicable, plan project features and construction activity to avoid direct effects on these areas. Before the beginning of any ground-disturbing project activities, a qualified biologist shall delineate potential waters of the United States and shall formally map all riparian habitat that could be affected by the proposed project. This activity will be performed following the requirements of a formal delineation of waters of the United States for CWA Section 404 permitting as described below. The primary engineering and construction contractors shall ensure, through coordination with the biologist, that the footprints of construction zones, borrow areas, staging areas, and access routes are designed to prevent disturbance of waters of the United States and riparian habitat to the extent feasible and practicable. All avoidable jurisdictional habitats that could potentially be affected by ground-disturbing project activity shall be protected during construction by temporary fencing and/or flagging, as appropriate. Qualified biological monitors shall be present during all construction activities that could potentially affect these protected habitats to ensure that project activity is excluded from these areas. (b) Complete the Section 404 permitting process, and mitigate the acreage of affected jurisdictional wetland on a "no-net-loss" basis. Before the initiation of any ground-disturbing project activities in areas that contain potentially jurisdictional wetlands, qualified biologists shall complete a delineation of wetlands and other waters of the United States that would be affected by the proposed project. The findings shall be documented in a detailed report and submitted to the Corps for verification as part of the formal Section 404 wetland delineation process. For all jurisdictional areas that	

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Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		cannot be avoided as described above, TRLIA shall secure authorization for fill of wetlands and alteration of waters of the United States from the Corps through the Section 404 permitting process before project implementation. The acreage of jurisdictional wetland affected shall be mitigated (e.g., through restoration, rehabilitation, enhancement, and/or replacement) on a "no-net-loss" basis in accordance with Corps regulations. Habitat restoration, rehabilitation, and/or replacement shall be at a location and by feasible methods agreeable to the Corps. TRLIA shall implement the feasible mitigation measures adopted through the permitting process. (c) Obtain a streambed alteration agreement from DFG and mitigate affected riparian habitat on a "no-net-loss" basis. Because project implementation would result in changes to the natural flow and bed and bank of a waterway (e.g., vegetated drainage canal, the Feather River), the project would likely require a Section 1602 streambed alteration agreement from DFG. If complete avoidance of identified riparian habitat is not feasible, the acreage of riparian habitat that would be removed shall be mitigated on a "no-net-loss" basis in accordance with DFG regulations and as specified in the streambed alteration agreement, if needed. Habitat mitigation (e.g., restoration, rehabilitation, and/or replacement) shall be at a location and by methods agreeable to DFG.	
LS-5.5-c: Loss of Special-Status Plants. Levee repair and strengthening and related activities could result in the loss of rose mallow and Wright's trichocoronis if they exist in areas that would be disturbed during these activities. This impact would be **potentially significant.**	PS	**Conduct Detailed Special-Status Plant Surveys and Establish Construction Buffers as Necessary to Minimize Effects on Special-Status Plants.** TRLIA and its primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize potential project effects on special-status plants:	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		(a) Conduct detailed special-status plant surveys and document the results. Before the initiation of any ground-disturbing project activities, a qualified botanist shall conduct detailed/focused surveys for rose mallow and Wright's trichocoronis in appropriate habitat within the project area, in accordance with USFWS and DFG guidelines and at the appropriate time of year when the target species would be in flower or otherwise clearly identifiable (June to September for rose mallow and May to September for Wright's trichocoronis). The findings shall be documented in a letter report that is retained by TRLIA. If rose mallow and Wright's trichocoronis are not found during focused surveys, no further action shall be required. (b) Establish buffers wherever possible to protect identified special-status plants from construction activity. If special-status plants are found during focused surveys, the primary engineering and construction contractors shall ensure, through coordination with a qualified biologist, that the footprint of project features and construction zones, staging areas, and access routes are designed such that any disturbance of the plants is prevented to the extent feasible and practicable. The botanist shall clearly identify the locations of special-status plant populations in the field by staking or flagging before construction. No project activities shall be allowed within the marked areas. (c) Compensate for losses of special-status plants. If populations or individuals of rose mallow and Wright's trichocoronis are found during implementation of item (a) above, and the individuals or populations cannot be avoided during implementation of item (b), a mitigation and monitoring plan for the affected species shall be developed and implemented. The plan shall be prepared by a qualified	

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THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		biologist. Before disturbance of the individuals or populations of the effected species, the mitigation and monitoring plan shall be submitted to TRLIA for review and approval. The plan shall be submitted concurrently to DFG for review and comment, and TRLIA may consult with DFG before approval of the plan. Possible mitigation for individuals or populations removed during construction includes: ▪ removing and stockpiling topsoil with intact roots, rhizomes, and seed bank in the disturbance area, and either replacing the soil in the same location after construction is complete or placing it in a new area with suitable habitat; or ▪ collecting plants, seeds, or other propogules in the area to be disturbed, and placing propogules or cultivating nursery stock in the disturbed area after construction is complete or in a new area with suitable habitat. Mitigation will be considered successful if populations of the affected species in mitigation areas are sustained for a minimum of 3 years and are of similar size and quality as the affected populations.	
LS-5.5-d: Effects on Valley Elderberry Longhorn Beetle. Levee repair and strengthening and related activities could result in the loss of blue elderberry shrubs that are occupied by valley elderberry longhorn beetle. This impact would be **potentially significant**.	PS	**Conduct Protocol-Level Surveys, Establish Buffers, and Implement a Mitigation Plan as Necessary to Minimize Effects on Valley Elderberry Longhorn Beetle.** TRLIA and its primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize potential project effects on valley elderberry longhorn beetles: (a) <u>Conduct protocol-level elderberry shrub surveys in the project area</u>. Before the beginning of ground disturbance within 100 feet of any area that may support elderberry shrubs, a qualified biologist shall conduct an elderberry	LTS

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Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		shrub survey consistent with USFWS protocols for conservation of valley elderberry longhorn beetle (U.S. Fish and Wildlife Service 1999). All elderberry shrubs with potential to be affected by project activities shall be mapped and the number of stems greater than 1 inch in diameter on each shrub that may require removal shall be counted. (Elderberry plants with no stems measuring 1 inch or greater in diameter at ground level are considered unlikely to be habitat for the beetle because of their small size and/or immaturity [U.S. Fish and Wildlife Service 1999].) (b) Protect elderberry shrubs from disturbance. The primary engineering and construction contractors, through coordination with the biologist, shall ensure to the extent feasible and practicable that the footprint of project features and construction zones, staging areas, and access routes are designed to ensure that no project activities would affect an elderberry shrub with stems measuring 1 inch in diameter at ground level. Buffers of at least 100 feet shall be established around all elderberry shrubs with stems greater than 1 inch in diameter at ground level that can be retained undisturbed on-site. The buffer shall be clearly identified in the field by staking or flagging. All project activity shall be prohibited within the buffer areas. If complete avoidance of these buffers is not feasible, consultation with USFWS shall be conducted as described below. (c) If effects on shrubs cannot be avoided, develop and implement a mitigation plan approved by USFWS. If maintaining 100-foot protection buffers or otherwise avoiding construction-related effects on elderberry shrubs with a stem greater than 1 inch in diameter at ground level is not feasible, consultation with USFWS will be required, and an incidental take permit may be required. During this	

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Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		consultation, an appropriate and feasible mitigation plan shall be developed and provided to USFWS for approval. The plan may include, but would not necessarily be limited to, reducing buffers around shrubs that would not be removed; transplanting shrubs to a conservation area; and planting additional seedling or cuttings at a ratio ranging from 1:1 or 1:6, depending on the number of stems greater than or equal to 1 inch in diameter and whether beetle exit holes are found on the shrubs on-site (U.S. Fish and Wildlife Service 1999).	
LS-5.5-e: Effects on Northwestern Pond Turtle. Levee repair and strengthening and related activities could result in disturbance and/or loss of suitable aquatic habitat for northwestern pond turtle and could result in direct loss of individuals. This impact would be **potentially significant**.	PS	**Conduct Surveys as Part of Dewatering Activities and Minimize Effects on Northwestern Pond Turtle.** TRLIA and its primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize potential project effects on northwestern pond turtles: (a) Conduct surveys after dewatering. A qualified biologist shall conduct surveys for northwestern pond turtles in aquatic habitats to be dewatered and/or filled during project construction and grading of aquatic habitat within the setback area. Surveys shall be conducted immediately after any dewatering and before any fill of aquatic habitat. If no pond turtles are found, no further mitigation will be required. (b) Capture and move turtles. If any pond turtles are found, the biologist shall capture them and move them to suitable habitat in the vicinity of the project site.	LTS
LS-5.5-f: Effects on Giant Garter Snake. Levee repair and strengthening and related activities would result in disturbance and/or loss of suitable aquatic and upland habitat for giant garter snake. Construction activities also have the potential to result in direct take of individuals. This impact	S	**Implement Applicable Take Minimization Measures and a Mitigation Plan as Necessary for Giant Garter Snake.** TRLIA and its primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize potential project effects on giant garter snakes:	LTS

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Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
would be **significant.**		(a) Verify potential habitat in the project area and, to the extent feasible and practicable, plan project features and construction activity to avoid direct effects on these areas. Before the initiation of any ground-disturbing project activities, a qualified biologist approved by USFWS's Sacramento Fish and Wildlife Office shall verify where suitable habitat conditions for giant garter snake occur in areas that could be affected by the proposed project. The primary engineering and construction contractors shall ensure, through coordination with the biologist, that the footprint of project features and construction zones, staging areas, and access routes are designed to prevent any disturbance of potential giant garter snake habitat to the extent feasible and practicable. (b) Designate areas to be avoided during construction. The primary engineering and construction contractors, through coordination with the biologist, shall designate giant garter snake habitat to be avoided during project construction as Environmentally Sensitive Areas. These areas shall be flagged by the biologist and avoided by all construction personnel. (c) Limit the timing of construction activity within potential habitat. All construction activities that must take place within potential giant garter snake habitat (aquatic habitat and adjacent upland habitat within 200 feet) shall be limited to the period of May 1 to October 1 to the extent feasible. (d) Follow guidelines for habitat dewatering. Dewatering of aquatic habitat shall not occur between October 1 and April 15. Any dewatered habitat must remain dry for at least 15 consecutive days after April 15 and before the excavation or filling of the dewatered habitat. (e) Inspect suitable habitat within 24 hours of beginning	

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Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		construction. Within 24 hours before the initiation of construction activities within suitable habitat, a qualified biologist who is approved by USFWS's Sacramento Fish and Wildlife Office shall conduct preconstruction surveys for giant garter snakes. These areas shall be reinspected whenever a lapse of construction activity within suitable habitat occurs for a period greater than 2 weeks. If a giant garter snake is found, all activity that could result in death or injury of giant garter snake shall be delayed until consultation with USFWS and DFG has been completed and authorization to proceed has been received from those agencies. (f) Minimize clearing of wetland vegetation. Clearing of wetland vegetation shall be confined to the minimum area necessary. Excavation of channel banks shall be accomplished by using equipment located on and operated from the top of the bank, with the least interference practical for emergent vegetation that would not be affected by the project. (g) Restrict movement of equipment. Movement of heavy equipment to and from the project site shall be restricted to areas outside the identified suitable habitat, unless the equipment is being moved on established roadways or in areas that have been inspected by a qualified biologist. (h) Participate in environmental awareness program. Construction personnel shall participate in a USFWS-approved worker environmental awareness program. Under this program, workers shall be informed about the presence of giant garter snakes and habitat associated with the species and that unlawful take of the animal or destruction of its habitat is a violation of ESA. (i) Restore disturbed areas. After completion of construction	

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Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		activities, any construction debris shall be removed and disturbed areas within potential giant garter snake habitat shall be restored to preproject conditions. (j) <u>If impacts cannot be avoided, develop and implement a feasible mitigation plan approved by USFWS</u>. Consultation with USFWS and DFG shall be required for impacts that cannot be avoided, and an incidental take permit may be required. During this consultation, an appropriate and feasible mitigation plan shall be developed and provided to USFWS and DFG for approval. The mitigation plan may include, but would not necessarily be limited to, applicable take minimization measures outlined above, or modifications of those measures, and compensation for unavoidable impacts through replacement of habitat. Compensation ratios may range from 1:1 to 3:1 (replaced aquatic habitat to affected habitat), depending on the amount of habitat lost and the duration of the impact. Replacement habitat shall include both upland and aquatic habitat components at a ratio of 2:1 upland habitat to aquatic habitat.	
LS-5.5-g: Effects on Swainson's Hawk and Other Nesting Raptors. Levee repair and strengthening and related activities would result in disturbance and/or loss of suitable nesting and/or foraging habitat for Swainson's hawk and other raptors and could result in loss of active nests. This impact would be **potentially significant**.	PS	**(1): Conduct Preconstruction Surveys and Protect Active Nests to Minimize Effects on Swainson's Hawk.** TRLIA and its primary construction contractor shall ensure that the following measures are implemented to minimize potential project effects on Swainson's hawk: (a) <u>Conduct preconstruction surveys</u>. Because project construction activity would occur during the Swainson's hawk breeding season (March 1 to September 15), a qualified biologist shall conduct preconstruction surveys to identify active nests in the nonorchard trees within 1/2 mile of construction areas (including staging and borrow areas). Because of the mostly linear nature of project construction, preconstruction surveys may be phased to accommodate	LTS

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THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		construction activities; suitable nesting habitat shall be surveyed only when construction activities would encroach within 1/2 mile of unsurveyed areas. Surveys shall be conducted no less than 14 days and no more than 30 days before construction activities may encroach within 1/2 mile of unsurveyed areas. To the extent feasible, guidelines provided in *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (Swainson's Hawk Technical Advisory Committee 2000) shall be followed. (b) Establish protective buffers around active nests. If an active nest is found, an appropriate buffer to avoid impacts shall be determined by a qualified biologist. No project activities shall commence within the buffer area until a qualified biologist confirms that the nest is no longer active. The size of the buffer may vary, depending on the nest location, nest stage, and construction activity. Monitoring of the nest by a qualified biologist may be required if the activity could adversely affect the nest. **(2): Conduct Preconstruction Surveys, Protect Occupied Burrows, and Relocate Individuals as Necessary to Minimize Effects on Burrowing Owl.** TRLIA and its primary construction contractor shall ensure that the following measures are implemented to minimize potential project effects on burrowing owl: (a) Conduct preconstruction surveys. Before project-related activities in the project area, a qualified biologist shall conduct focused surveys for burrowing owls within 250 feet of construction areas (including staging and borrow areas). Surveys shall be conducted no less than 14 days and no more than 30 days prior to initiation of project activities, and surveys shall be conducted in accordance with DFG protocol	

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		(California Department of Fish and Game 1995). (b) Establish protective buffers around occupied burrows. If occupied burrows are found, an appropriate buffer shall be established to avoid impacts on the burrows. A buffer of 165 feet would be required during the nonbreeding season (September 1 through January 31), and a buffer of 250 feet would be required during the breeding season (February 1 through August 31). To the extent feasible, project activity shall be excluded from within the buffer areas. (c) Relocate owls if necessary. If impacts on occupied burrows are unavoidable, on-site passive relocation techniques approved by DFG shall be used to encourage owls to move to alternative burrows outside the impact area. However, no occupied burrows shall be disturbed during the nesting season unless a qualified biologist verifies through noninvasive methods that the burrow is no longer occupied. **(3): Conduct Preconstruction Surveys and Protect Active Nests to Minimize Effects on Other Nesting Raptors.** TRLIA and its primary construction contractor shall ensure that the following measures are implemented to minimize potential project effects on other nesting raptors: (a) Conduct preconstruction surveys. Because project construction activity would occur during the raptor breeding season (February 15 to September 15), a qualified biologist shall conduct preconstruction surveys to identify active nests in the nonorchard trees within 500 feet of potential construction areas (including staging and borrow areas). Because of the linear nature of project construction, preconstruction surveys may be phased to accommodate construction activities; suitable nesting habitat shall be surveyed only when construction activities would encroach within 500 feet of unsurveyed areas. Surveys shall be	

Table 1-3a
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		conducted no less than 14 days and no more than 30 days before construction encroaches within 500 feet of unsurveyed areas. If no active nests are found, no further mitigation shall be required. (b) Establish protective buffers around active nests. If an active nest is found, an appropriate buffer to avoid impacts shall be determined by a qualified biologist. No project activities shall commence within the buffer area until a qualified biologist confirms that the nest is no longer active. The size of the buffer may vary, depending on the nest location, nest stage, and construction activity. Monitoring of the nest by a qualified biologist may be required if an activity could adversely affect the nest.	
LS-5.5-h: Effects on Other Special-status Birds. Levee repair and strengthening and related activities would result in disturbance and/or loss of potential nesting and/or foraging habitat for several special-status bird species. Special-status species are unlikely to nest in areas that would be affected, and large areas of nesting and foraging habitat of equal or higher quality are available elsewhere in the project area. Therefore, this impact would be **less than significant.**	LTS	No mitigation is required.	LTS
LS-5.5-i: Effects on Pacific Western Big-Eared Bat. Levee repair and strengthening and related activities would not affect the suitability of foraging habitat or result in loss of important roost or maternity sites. This impact would be **less than significant.**	LTS	No mitigation is required.	LTS
LS-5.5-j: Effects on Wildlife Corridors. Levee repair and strengthening and related activities would	LTS	No mitigation is required.	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
result in limited temporary disturbance of the Feather River and Yuba River habitat corridors but are not expected to affect overall use of these corridors by wildlife. This impact would be **less than significant.**			
5.6 Recreation			
LS-5.6-a: Temporary Changes in Recreational Opportunities during Levee Repairs. Construction noise could disrupt recreational uses in the project area, particularly in areas adjacent to the existing levee alignment. Some wildlife species present in or inhabiting natural areas are likely to be disturbed by noise and by the presence of project construction crews and equipment. Portions of the Feather River State Wildlife Area in project Segment 1 may need to be closed temporarily to hunting and other recreational activities for safety reasons while adjacent sections of the existing Feather River levee are being repaired. There would be no public access to the Star Bend Boat Launch and Fishing Access for several days while levee repairs were conducted in this area. Although these temporary disturbances may affect the recreation experience for bird-watchers, hunters, boaters, and other recreational users, displaced recreational uses could be accommodated by other nearby facilities (Whitmore, pers. comm., 2006). For this reason, and because of the temporary nature of this effect, this impact would be **less than significant**.	LTS	No mitigation is required.	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
LS-5.6-b: Long-Term Changes in Recreational Opportunities Resulting from Levee Repairs. In the long term, recreational opportunities along the left bank levee of the Feather River would not be adversely affected by levee repairs. Levee repair and strengthening of the existing levee would not change Feather River flood stage elevations, and hence would not alter the duration or frequency of inundation of recreational facilities relative to existing conditions. After completion of construction activities, the project site would be restored and reclaimed as appropriate to preexisting conditions. Recreational opportunities after project construction are expected to be available to the extent that these opportunities are available under preproject conditions. No substantial changes in recreational opportunities would be associated with levee repair and strengthening of the existing levee. This impact would be **less than significant**.	LTS	No mitigation is required.	LTS
5.7 Aesthetic Resources			
LS-5.7-a: Temporary Changes in Visual Resources Associated with Levee Repairs. Levee repair and strengthening activities would temporarily reduce the aesthetic qualities of views by introducing earthmoving equipment and other construction equipment, materials, and work crews into the viewshed of recreationists, motorists on SR 70 and Feather River Boulevard, workers in nearby farming areas, and residents of the area. However, the construction areas would typically be distant from and/or screened from most viewers. Where residents would be near the construction area (e.g.,	LTS	No mitigation is required.	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
in project Segment 3), construction would pass by these areas relatively quickly and changes in aesthetic conditions would be short term and temporary. For these reasons, this impact would be **less than significant.**			
LS-5.7-b: Changes in Light and Glare. There would be no substantial long-term sources of light or glare associated with levee repairs. However, equipment staging areas may be temporarily lit at night during construction, and portions of the construction areas may also need to be lit at night. Although such nighttime lighting may be visible from various residences, particularly in project Segment 3, in most locations views of the construction areas would be largely shielded by orchards, other vegetation, and structures. Where lit construction areas are visible, lighting would be short term and temporary. For these reasons, this impact would be **less than significant.**	LTS	No mitigation is required.	LTS
LS-5.7-c: Long-Term Modifications of Views from Levee Repairs. Levee repair and strengthening activities would not dramatically change the appearance of the project area, which is of low to moderate aesthetic value. There would be no substantial adverse effect on any scenic vista, and these repairs would not substantially alter the general character of views of the area. This impact would be **less than significant.**	LTS	No mitigation is required.	LTS
5.8 Cultural Resources			
LS-5.8-a: Damage to or Destruction of Resources Associated with Prehistoric Archaeological Sites	PS	**(1): Conduct Further Evaluation and Subsurface Testing to Determine Whether Proposed Levee Improvements Could**	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
CA-Yub-13 and CA-Yub-14. Prehistoric site CA-Yub-13 was previously documented adjacent to the water side of the levee in project Segment 1, and prehistoric site CA-Yub-14 was documented just west of Segment 1. The eligibility of these resources for CRHR and NRHP listing has not been determined. Prehistoric remains that may be considered significant resources under CEQA may still be present near the documented locations of these sites and could be damaged or destroyed by proposed levee repair and strengthening activities. This impact would be **potentially significant**.		**Damage Significant Resources Associated with Prehistoric Archaeological Sites CA-Yub-13 and CA-Yub-14.** If levee improvements would include activities that could disturb subsurface soils in the vicinity (within 1,000 feet) of the recorded location of either CA-Yub-13 or CA-Yub-14, TRLIA shall have a qualified archaeologist conduct an evaluation designed to assess the potential for damage to resources associated with the site(s) before initiation of project-related ground-disturbing activities in these areas. The evaluation may require assessment of the condition and data potential of specific areas of anticipated construction disturbance and/or determination of whether one or both of the sites are eligible for inclusion in the CRHR and/or NRHP. This evaluation shall include additional surveys, subsurface test excavations, analyses of any discovered archaeological materials, and (if necessary) data recovery. If the testing indicates the presence of cultural resources, a qualified archaeologist shall evaluate the significance of the finds and shall recommend further mitigation measures. Because of the critical need to remedy weaknesses in the existing levee in Segment 1, it is unlikely that avoidance of any resources directly within the construction footprint would be possible, and data recovery would likely be required. Efforts involving testing, excavation, and monitoring shall be conducted in consultation with appropriate Native American representatives identified by the NAHC. **(2): Monitor Ground-Disturbing Activities in the Vicinity of Prehistoric Archaeological Sites CA-Yub-13 and CA-Yub-14.** A qualified professional archaeologist and a Native American representative shall monitor all project-related ground-disturbing activities at and near the locations of prehistoric archaeological sites CA-Yub-13 and CA-Yub-14. If intact archaeological materials or human burials not recovered during the subsurface	

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Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		testing and excavation programs described in Mitigation Measure LS-5.8-a(1) are uncovered during project-related ground-disturbing activities, the archaeologist shall determine their possible significance and shall formulate appropriate mitigation measures. Appropriate mitigation may include no action, avoidance of the resource, and potential additional data and burial recovery.	
LS-5.8-b: Damage to or Destruction of Cultural Resources in Unsurveyed Areas. Potential borrow or staging areas have not been definitively identified and therefore have not been surveyed for cultural resources. Significant cultural resources could be present in these areas, and could be damaged by project-related ground-disturbing activities. This impact would be **potentially significant.**	PS	**Survey Unexamined Areas before Project Ground-Disturbing Activities and Implement Further Mitigation As Necessary.** A qualified professional archaeologist shall conduct focused surveys of all portions of the project area that were not adequately surveyed during past efforts or during surveys for the current effort. The survey shall be conducted before activities associated with project preparation or construction are initiated, and during a fallow period, if possible, in the case of areas currently covered in agricultural crops or grasses. If cultural resources are identified as a result of the survey, the archaeologist shall evaluate the significance of the finds and recommend appropriate mitigation measures for significant resources. TRLIA and its construction contractors shall implement these mitigation measures. Mitigation may include, but shall not necessarily be limited to, the avoidance of significant and potentially significant resources through changes in project design and/or subsurface testing and data recovery. Such efforts, particularly those involving testing and excavation, shall be conducted in consultation with appropriate Native American representatives identified by the NAHC.	LTS
LS-5.8-c: Damage to or Destruction of Undocumented Buried Archaeological Resources during Construction. Project construction and related activities could damage or destroy previously	PS	**Stop Work and Implement Measures to Protect Archaeological Resources If Discovered during Ground-Disturbing Activities.** If previously undocumented archaeological materials such as historic building or structure	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
unknown significant or potentially significant buried archaeological resources. This impact would be **potentially significant**.		remains; historic artifact deposits or scatters; or prehistoric artifacts such as stone tool flaking debitage, mortars, pestles, shell, or bone are encountered during project construction, all ground-disturbing activity shall be suspended temporarily within a 100-foot radius of the find or a distance determined by a qualified professional archaeologist to be appropriate based on the potential for disturbance of additional resource-bearing soils. A qualified professional archaeologist shall identify the materials, determine their possible significance, and formulate appropriate mitigation measures. Appropriate mitigation may include no action, avoidance of the resource, and potential data recovery. Ground disturbance in the zone of suspended activity shall not recommence without authorization from the archaeologist.	
LS-5.8-d: Damage to or Destruction of Undocumented Human Remains during Construction. It is possible that buried human remains could be unearthed during project-related ground-disturbing activities, causing damage to or destruction of such remains. This impact would be **potentially significant**.	PS	**If Human Remains Are Discovered during Ground-Disturbing Activities, Stop Work and Comply with State Laws Pertaining to the Discovery of Human Remains.** If human remains are uncovered during project construction, all ground-disturbing activities shall immediately be suspended within a 100-foot radius of the find or a distance determined by a qualified professional archaeologist to be appropriate based on the potential for disturbance of additional remains, and TRLIA or its designated representative shall be notified. TRLIA shall immediately notify the Yuba County Coroner and a qualified professional archaeologist, if one is not already on-site. The coroner shall examine the discovery within 48 hours. If the coroner determines that the remains are those of a Native American, he or she shall contact the NAHC by phone within 24 hours. The NAHC shall contact the Most Likely Descendant (MLD) of the remains. TRLIA or its appointed representative and the archaeologist shall consult with the MLD regarding the removal or preservation and avoidance of the remains, and the	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		parties shall rebury or preserve the remains as appropriate. Ground disturbance in the zone of suspended activity shall not recommence without authorization from the archaeologist.	
5.9 Air Quality			
LS-5.9-a: Temporary Emissions of ROG, NO_X, and PM_{10} during Construction. Maximum daily emissions of ROG, NO_X, and PM_{10} associated with levee repair and strengthening activities would exceed FRAQMD's recommended significance thresholds and contribute to existing nonattainment conditions for ozone and PM_{10} in the NSVAB. This impact would be **significant**.	S	**Implement FRAQMD Pollution-Control Measures to Minimize Temporary Emissions of ROG, NO_X, and PM_{10} during Construction.** FRAQMD's *Indirect Source Review Guidelines* and online CEQA guidance provide mitigation measures for reducing short-term air quality impacts. As recommended by FRAQMD, Three Rivers Levee Improvement Authority shall ensure that the following mitigation measures (summarized from FRAQMD guidance) are implemented during all project construction activities to the extent practicable. In addition, construction of the proposed project is required to comply with all applicable FRAQMD rules and regulations, in particular Rule 3.0 ("Visible Emissions"), Rule 3.16 ("Fugitive Dust Emissions"), and Rule 3.15 ("Architectural Coatings"). 1. Implement a Fugitive Dust Control Plan that includes the following measures (see Appendix E): ▪ All grading operations on a project should be suspended when winds carry dust beyond the property line despite implementation of all feasible dust control measures. Consideration should be given to suspending all project grading when winds exceed 20 mph to minimize the risk of dust being carried beyond the property line. ▪ Construction sites shall be watered as directed by the [Yuba County] Department of Public Works or FRAQMD and as necessary to prevent fugitive dust violations. ▪ An operational water truck should be on-site at all times.	SU

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		Apply water to control dust as needed to prevent visible emissions violations and off-site dust impacts. ▪ On-site dirt piles or other stockpiled particulate matter should be covered, wind breaks installed, and water and/or soil stabilizers employed to reduce windblown dust emissions. Incorporate the use of approved nontoxic soil stabilizers according to manufacturer's specifications to all inactive construction areas. ▪ All transfer processes involving a free fall of soil or other particulate matter shall be operated in such a manner as to minimize the free fall distance and fugitive dust emissions. ▪ Apply approved chemical soil stabilizers according to the manufacturers' specifications, to all inactive construction areas (previously graded areas that remain inactive for 96 hours) including unpaved roads and employee/equipment parking areas. ▪ To prevent track-out, wheel washers should be installed where project vehicles and/or equipment exit onto paved streets from unpaved roads. Vehicles and/or equipment shall be washed prior to each trip. Alternatively, a gravel bed may be installed as appropriate at vehicle/equipment site exit points to effectively remove soil buildup on tires and tracks to prevent/diminish track-out. ▪ Paved streets shall be swept frequently (water sweeper with reclaimed water recommended; wet broom) if soil material has been carried onto adjacent paved, public thoroughfares from the project site. ▪ Provide temporary traffic control as needed during all phases of construction to improve traffic flow, as deemed appropriate by the Department of Public Works	

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		and/or Caltrans [California Department of Transportation] and to reduce vehicle dust emissions. ▪ Reduce traffic speeds on all unpaved surfaces to 15 mph or less and reduce unnecessary vehicle traffic by restricting access. Provide appropriate training, on-site enforcement, and signage. ▪ Reestablish ground cover on the construction site as soon as possible and prior to final occupancy, through seeding and watering. ▪ No open burning of vegetative waste (natural plant growth wastes) or other materials (trash, demolition debris et al.) may be conducted at the project site. Materials also may not be hauled off-site for disposal by open burning. Vegetative wastes should be chipped or delivered to waste to energy facilities (permitted biomass facilities), mulched, composted, or used for firewood. 2. Construction equipment exhaust emissions shall not exceed FRAQMD Regulation III, Rule 3.0 (“Visible Emissions”) limitations (40% opacity or Ringelmann 2.0). Operators of vehicles and equipment found to exceed opacity limits shall take action to repair the equipment within 72 hours or remove the equipment from service. Failure to comply may result in a Notice of Violation. 3. The primary contractor shall be responsible to ensure that all construction equipment is properly tuned and maintained prior to and for the duration of onsite operation. 4. Limit vehicle and equipment idling times to 10 minutes—saves fuel and reduces emissions. 5. Use existing power sources (e.g., power poles) or clean fuel generators rather than temporary power generators.	

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		6. Develop and implement a traffic plan to minimize traffic flow interference from construction activities. The plan may include advance public notice of routing, use of public transportation, and satellite parking areas with a shuttle service. Schedule operations affecting traffic for off-peak hours. Minimize obstruction of through-traffic lanes. Provide a flag person to guide traffic properly and ensure safety at construction sites. 7. Portable engines and portable engine-driven equipment units used at the project work site, with the exception of on-road and off-road motor vehicles, may require ARB Portable Equipment Registration with the state or a local district permit. The owner/operator shall be responsible for arranging appropriate consultations with ARB or the District [FRAQMD] to determine registration and permitting requirements prior to equipment operation at the site. 8. The proponent shall assemble a comprehensive inventory list (i.e., make, model, engine year, horsepower, and emission rates) of all heavy-duty off-road (portable and mobile) equipment (50 horsepower and greater) that will be used an aggregate of 40 or more hours for the construction project and apply the following mitigation measure: *Reducing NO_X emissions from off-road diesel powered equipment* The project shall provide a plan for approval by FRAQMD demonstrating that the heavy-duty (equal to or greater than 50 horsepower) off-road equipment to be used in the construction project, including owned, leased and subcontractor vehicles, will achieve a projectwide fleet-average 20% NO_X reduction[1] and 45% particulate reduction compared to the most recent ARB fleet average at time of	

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THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		construction. The FRAQMD Fugitive Dust Control Plan is included in Appendix E. ——— [1] Acceptable options for reducing emissions may include use of late-model engines, low-emission diesel products, alternative fuels, engine retrofit technology (Carl Moyer Guidelines), after-treatment products, voluntary off-site mitigation projects, provide funds for air district off-site mitigation projects, and/or other options as they become available. The District [FRAQMD] should be contacted to discuss alternative measures.	
LS-5.9-b: Long-Term Changes in Emissions of ROG, NO_X, and PM_{10} Associated with Levee Repairs and Strengthening. The proposed levee repairs and strengthening are expected to contribute only minimally, if at all, to long-term emissions of pollutants through potential vehicle trips related to occasional maintenance activities. The resulting increase in long-term emissions would be small; therefore, this impact would be **less than significant.**	LTS	No mitigation is required.	LTS
LS-5.9-c: Exposure of Sensitive Receptors to Toxic Air Emissions. Emissions of TACs associated with construction or operations under Alternative 1 would not result in exposure of receptors to concentrations of TACs in excess of applicable thresholds. This impact would be **less than significant.**	LTS	No mitigation is required.	LTS
5.10 Noise			
LS-5.10-a: Temporary Increase in Noise Levels	S	**Limit Generation of Noise by Equipment during Project**	SU

Table 1-3a
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
during Construction. Noise levels associated with construction activities could exceed the maximum permissible noise limits at residences. Construction equipment may operate between the hours of 10 p.m. and 7 a.m., and could operate within 500 feet of a residential zone during these hours. Therefore, construction activities occurring between 10 p.m. and 7 a.m. could result in annoyance and/or sleep disruption of certain receptors within the project area. In addition, construction operations may result in a noticeable temporary increase (3 dBA or more) in ambient noise levels at these residences. Therefore, this impact would be **significant**.		**Construction.** Three Rivers Levee Improvement Authority (TRLIA) shall ensure that the primary construction contractor implements the following mitigation measures during construction activities: (a) To the extent practicable, construction activities shall be limited to the hours of 7 a.m. to 10 p.m. when operations occur within 500 feet of a residential or other noise-sensitive land use. Decisions as to whether nighttime construction is needed within 500 feet of residential or other noise-sensitive land uses shall only consider the need to complete project activities before the beginning of the flood season and the associated need to maintain human safety and the integrity of the flood control system. (b) All construction equipment shall be properly maintained and equipped with noise control, such as mufflers, in accordance with manufacturers' specifications. (c) To the extent feasible, the simultaneous operation of construction equipment within 50 feet of the project boundary shall be limited. In addition, TRLIA shall implement the following measure: (d) Before construction at each site near noise-sensitive receptors, TRLIA shall provide written notification to potentially affected receptors, identifying the type, duration, and frequency of construction operations. Notification materials will also identify a mechanism for residents to register complaints with TRLIA and Yuba County (the agency responsible for enforcement of the Yuba County noise ordinance) if construction noise levels are overly intrusive or construction occurs outside the permitted hours. TRLIA and/or Yuba County would then take corrective action.	

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THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
LS-5.10-b: Exposure of Sensitive Receptors to Excessive Groundborne Vibration During Construction. Construction-generated vibration levels would not result in levels above 0.2 in/sec PPV (Caltrans's recommended standard with respect to the prevention of structural building damage) or 80 VdB (FTA's maximum acceptable vibration standard with respect to human response at residential uses) at the nearest land uses. Thus, this impact would be **less than significant**.	LTS	No mitigation is required.	LTS
5.11 Transportation and Circulation			
LS-5.11-a: Increase in Traffic on Local Roadways near the Project Site during Construction. During the anticipated 20-month construction period, commute trips and haul truck trips associated with levee repair and strengthening activities would increase traffic on Feather River Boulevard, SR 70, and local roadways that provide access to the project alignment (e.g., Anderson Avenue, Country Club Avenue, Riverside Drive). However, construction-related trips would not exceed the thresholds established by ITE for temporary traffic increases and would not represent a substantial increase in traffic levels on these roadways or other local roads. This impact would be **less than significant.**	LTS	No mitigation is required.	LTS
LS-5.11-b: Increase in Traffic Hazards on Local Roadways near the Project Site during Construction. Construction-related traffic could track mud and gravel onto local roadways, and haul truck traffic could interfere with the flow of traffic on these roads. These conditions could pose hazards	PS	**Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways.** To reduce hazards to vehicles on local roadways, Three Rivers Levee Improvement Authority (TRLIA) shall ensure that its primary construction contractor implements the following	LTS

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Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
for travelers on local roadways. This impact would be **potentially significant.**		measures: (a) <u>Develop and implement a traffic safety plan in coordination with the County and Caltrans</u>. The construction contractor shall develop a plan for traffic safety assurance for the county roadways in the project vicinity. The contractor shall submit the plan to the County Public Works Department for approval before the initiation of construction-related activity that could adversely affect traffic on county roadways. A similar plan shall be prepared for SR 70 and submitted to Caltrans for review before initiation of construction-related activity that could adversely affect traffic on the highway. If both the County and Caltrans will accept the same traffic safety plan, then only one plan need be prepared. The plan(s) may call for the following elements, based on the requirements of each agency: ▪ posting warnings about the potential presence of slow-moving vehicles; ▪ using traffic control personnel when appropriate; ▪ scheduling truck trips outside of peak morning and evening traffic periods to the extent feasible; ▪ placing and maintaining barriers and installing traffic control devices necessary for safety, as specified in Caltrans's *Manual of Traffic Controls for Construction and Maintenance Works Zones* and in accordance with County requirements; and ▪ maintaining routes for passage of emergency response vehicles through roadways affected by construction activities. The contractor shall train construction personnel in appropriate safety measures as described in the plan(s), and shall implement the adopted plan(s).	

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THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		(b) Minimize the accumulation of mud and dirt on local roadways. All operations shall limit or expeditiously remove the accumulation of project-generated mud or dirt from adjacent public streets at least once every 24 hours when operations are occurring. The construction contractor shall sweep the paved roadways (water sweeper with reclaimed water recommended) at the end of each day if substantial volumes of soil material have been carried onto adjacent paved, public roads from the project sites. Also see a similar requirement under Mitigation Measure LS-5.9-a, "Implement FRAQMD Pollution-Control Measures to Minimize Temporary Emissions of ROG, NO_X, and PM_{10} during Construction."	
5.12 Public Services, Utilities, and Service Systems			
LS-5.12-a: Damage of Public Utility Infrastructure and Disruption of Service in the Project Area. Various aboveground and buried utility lines identified in the project area either are near or cross the Feather River and Yuba River levee segments planned for repair and strengthening and the area considered for a detention basin/soil borrow site. The potential exists for additional buried gas, electrical, cable television, or telephone lines that have not already been identified to be located near or to cross these areas. Construction activities associated with project implementation could cause minor damage to public utility infrastructure or temporarily disrupt utility service. However, detailed project design would include consultation with all potential service providers to identify utility line locations and appropriate protection measures, and consultation would	LTS	No mitigation is required.	LTS

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THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
continue during construction to ensure avoidance/protection of these utilities as construction proceeds. Implementation of Alternative 1 would not result in substantial interference with gas, electrical, cable television, or telephone service. This impact would be **less than significant.**			
LS-5.12-b: Damage of Water Supply and Drainage Facilities and Interference with Service in the Project Area. Various aboveground and buried water supply and drainage lines identified in the project area either are near or cross the Feather River and Yuba River levee segments planned for repair and strengthening and the area considered for a detention basin/soil borrow site. The potential exists for additional buried water supply and drainage facilities that have not already been identified to be located near or to cross these areas. Construction activities associated with project implementation could damage water supply and drainage infrastructure or temporarily disrupt service. However, detailed project design would include consultation with appropriate agencies and individuals responsible for water delivery and drainage facilities in the area to identify facility locations and appropriate protection measures, and consultation would continue during construction to ensure avoidance/protection of these utilities as construction proceeds. In addition, the project would be designed to maintain water supply and drainage service equivalent to existing conditions. Implementation of Alternative 1 would not result in	LTS	No mitigation is required.	LTS

Table 1-3a
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
substantial interference with water supply or drainage service. This impact would be **less than significant.**			
LS-5.12-c: Potential for Conflicts with Emergency Response Vehicles during Construction. Feather River Boulevard is an emergency-vehicle route. The increased traffic on Feather River Boulevard associated with levee repair and strengthening activities could increase emergency response times and otherwise make access to the area more difficult for emergency service providers. This impact would be **potentially significant.**	PS	**Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways.** This measure is identical to Mitigation Measure LS-5.11-b, "Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways," in Section 5.11, "Transportation and Circulation."	LTS
5.13 Paleontological Resources			
LS-5.13-a: Disturbance of Unknown Paleontological Resources during Earthmoving Activities. Portions of the project area and immediate vicinity are underlain by the Modesto and Riverbank Formations, which are paleontologically sensitive rock formations. Construction activities in the Modesto and Riverbank Formations associated with proposed levee strengthening (e.g., slurry cutoff walls, relief wells), use of the soil borrow area/detention basin location, and related activities (e.g., relocation of Pump Station No. 3) could adversely affect unknown subsurface paleontological resources. This impact would be **potentially significant.**	PS	**Conduct Training for Construction Personnel, Cease Work if Paleontological Resources are Encountered, and Implement an Appropriate Mitigation Strategy.** Three Rivers Levee Improvement Authority (TRLIA) or its primary construction contractor shall implement the following measures: (a) Before the start of construction activities, construction personnel involved with earthmoving activities shall be informed of the possibility of encountering fossils, the appearance and types of fossils likely to be seen during construction activities, and proper notification procedures should fossils be encountered. This worker training may either be prepared and presented by an experienced field archaeologist at the same time as construction worker education on cultural resources, or be prepared and presented separately by a qualified paleontologist. (b) If paleontological resources are discovered during earthmoving activities, the construction crew shall	LTS

Table 1-3a
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		immediately cease work within at least 25 feet of the find. TRLIA shall retain a qualified paleontologist to evaluate the resource and prepare a proposed mitigation plan in accordance with SVP guidelines (1995). The proposed mitigation plan may include a field survey, construction monitoring, sampling and data recovery procedures, museum storage coordination for any specimen recovered, and a report of findings. Recommendations determined by TRLIA to be necessary and feasible shall be implemented before construction activities can resume at the site where the paleontological resources were discovered.	
Cumulative Impacts			
Alternative 1, The Levee Strengthening Alternative, would also contribute to significant cumulative impacts related to conversion of Important Farmland to nonagricultural uses; emissions of ROG, NO_X, and PM_{10} during construction; and potentially noise during construction. The mitigation described above would not reduce the project's contributions to these impacts to less-than-significant levels.			

B	=	Beneficial effect	LTS	=	Less than significant
PB	=	Potentially beneficial effect	PS	=	Potentially significant
NI	=	No impact	S	=	Significant

Table 1-3b
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
5.1 Land Use			
ASB-5.1-a: Conflicts with Land Use Planning and Policies Resulting from Levee Repairs and the Levee Setback. Levee repair and strengthening of the existing levee in Segments 1 and 3 would result in removal of small areas of agricultural land from production associated with installation of seepage/stability berms and other structures. The setback levee footprint and levee easements in Segment 2 would cover approximately 240–250 acres of agricultural land, and setting back the levee could indirectly result in the removal of more land from agricultural production by dividing land parcels and allowing periodic flooding of agricultural land. Construction of a detention basin would be required to prevent adverse flooding effects on area properties, and this would likely occur on several hundred acres of existing agricultural land. These uses would conflict with County land use policies regarding the preservation of agricultural land and would be inconsistent with the current land use and zoning designations for the area. Because of these inconsistencies, this impact would be **significant**.	S	**Resolve Inconsistencies between Proposed Uses of the Levee Setback Area and Yuba County Zoning.** TRLIA shall coordinate with the County Planning Department to appropriately address inconsistencies between proposed land uses and County-planned land uses and zoning designations. Before permanent changes in allowable land uses in the levee setback area need to be established (i.e., before degradation of the existing levee at the latest), TRLIA shall apply for a general plan amendment if necessary and for appropriate rezoning, a zoning amendment, or other measures determined by the Planning Department to be necessary to ensure the consistency of proposed land uses with zoning. Consistency is defined as land uses and activities permitted by the County in the levee setback area, as reflected by zoning and other land use guidelines, that do not conflict with the flood control function of the levee setback area. The approach to resolving any land use planning inconsistencies shall be determined by, and conducted in coordination with, the County Planning Department. Any necessary modifications of general plan land use designations or of zoning, or placement of restrictions on existing zoning, will be determined by the Planning Department and approved by the County Planning Commission and Board of Supervisors as appropriate.	SU
ASB-5.1-b: Conversion of Important Farmland to Nonagricultural Uses Resulting from Levee Repairs and the Levee Setback. Levee repair and strengthening activities in project Segments 1 and 3 could permanently remove up to approximately 10 acres of Prime Farmland from production. Relocation of Pump Station No. 3 could potentially convert up to 1 acre of Prime Farmland in Segment	S	**Preserve the Agricultural Productivity of Important Farmland to the Extent Feasible.** It is not known at this time whether lands in the levee setback area would be retained in agricultural production, converted to habitat, or a mixture of both land uses. If lands classified as Important Farmland in the levee setback area are to be retained in agricultural production, the following measures would apply to these lands. To support the continued productive use of Important Farmland	SU

Table 1-3b
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
2 to nonagricultural use. The levee setback footprint and levee easements in Segment 2 would permanently convert approximately 210 acres of Prime Farmland, 35 acres of Farmland of Statewide Importance, and 2 acres of Unique Farmland to nonagricultural uses, and would potentially convert several hundred additional acres of Important Farmland for the proposed detention basin. The ASB levee setback could potentially result in the conversion of up to approximately 1,025 acres of Prime Farmland, 10 acres of Farmland of Statewide Importance, and 10 acres of Unique Farmland to nonagricultural uses. Implementation of the levee setback also may indirectly lead to the conversion of additional Important Farmland to nonagricultural uses because some properties would be divided by the setback levee, which could make continued farming of some crops, or on some parcels, impractical. This impact would be **significant**.		in the levee setback area in project Segment 2, TRLIA shall ensure that the following measures are implemented, to the extent feasible and practicable, in the design and implementation of the levee setback: (a) When selecting sites for borrow excavation, minimize the fragmentation of lands that are to remain in agricultural use. Where practical, retain contiguous parcels of agricultural land of sufficient size to support their efficient use for continued agricultural production. (b) Where the setback levee would transect agricultural properties and the continuation of agricultural use on the portions within the levee setback area would occur, ensure convenience of access to the levee setback properties sufficient to support ongoing agricultural operations. (c) Make the most productive salvaged topsoil from the levee footprint available to landowners with less productive agricultural lands in the vicinity of, but outside the levee setback area that could benefit from the introduction of good-quality soil. By agreement between TRLIA or landowners of affected properties and the recipient(s) of the topsoil, the recipient(s) would be required to work the topsoil into the agricultural lands where it is delivered. (d) Ensure that utilities currently in the levee setback area that are needed for ongoing agricultural uses, including wells, pipelines, and power lines, are appropriately relocated, replaced, or retrofitted to withstand flooding. Ensure that these systems and drainage systems are functioning as necessary after the project is in place so that agricultural uses are not unduly disrupted. In addition, TRLIA shall ensure that the following measures are implemented, to the extent feasible and practical, inside and/or	

Table 1-3b
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		outside the levee setback area: (a) Minimize the disturbance of Important Farmland and continuing agricultural operations during construction by locating construction laydown and staging areas on sites that are fallow, that are already developed or disturbed, or that are to be discontinued for use as agricultural land, and by using existing roads to access construction areas to the extent possible. (b) When selecting the site and configuration of the detention basin, minimize the fragmentation of agricultural lands and retain contiguous parcels of agricultural land of sufficient size to support their efficient use for continued agricultural production.	
ASB-5.1-c: Displacement of Existing Housing in the Levee Setback Area. Implementation of the ASB levee setback would result in the removal of five to 10 residences from the levee setback area. There are sufficient available residences in the area to accommodate these households; therefore, project implementation would not necessitate the construction of replacement housing elsewhere. Although CEQA does not require that economic and social effects be evaluated or considered significant impacts, it is acknowledged that displacement of five to 10 residences would have both economic and social effects on the occupants of these residences (finding replacement housing, moving to a new residence). However, appropriate compensation would be negotiated with landowners displaced by the project. In addition, eligible homeowners, renters/tenants, businesses, and farm operations would receive relocation assistance consistent with	LTS	No mitigation is required.	LTS

Table 1-3b
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
the Federal Uniform Relocation Act and the California Relocation Assistance Law. This impact would be **less than significant**.			
5.2 Geology, Soils, and Mineral Resources			
ASB-5.2-a: Risk of Geologic Hazards to the Levees. Characteristics of the soils along the proposed ASB setback levee alignment could lead to structural deficiencies or levee failure if not addressed in construction design. Although no active faults are in the vicinity of the existing levees or the setback levee alignment, some ground shaking is possible from distant sites. Effects on the stability of the proposed ASB setback levee would be no greater than effects on the existing levee. Construction according to design recommendations by the geotechnical engineers, independent reviews of the project design and construction by a Board of Senior Consultants (BOSC), and engineering review and approval by the Corps and The Reclamation Board would ensure the incorporation of appropriate features to address any potential structural instability of the levee. The setback levee would be engineered and constructed to modern standards with appropriate seepage control features and, therefore, would be more stable than the existing levee and unlikely to fail. This would be a **beneficial** effect.	B	No mitigation is required.	B
ASB-5.2-b: Soil Erosion Hazards Associated with Construction of the ASB Setback Levee. Although construction activities associated with levee repair and strengthening and installation of the ASB setback levee would disturb earth, thereby	LTS	No mitigation is required.	LTS

Table 1-3b
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
potentially accelerating erosion, construction disturbance would be temporary and soils in disturbed areas would be vegetated or otherwise stabilized after construction is complete. In addition, the levee setback area is nearly level and is well drained, and the risk of erosion and associated hazards is slight. Levee repair and strengthening activities and construction of the ASB setback levee would not expose persons or property to erosion hazards. This impact would be **less than significant**.			
ASB-5.2-c: Soil Erosion Hazards Associated with Flood Operations with the ASB Setback Levee. Floodwaters passing through the levee setback area could erode soil that is not currently subjected to flood flows on a frequent basis. However, levee construction would increase the width and decrease the depth and velocity of flood flows in the levee setback area, minimizing erosive forces. In addition, vegetative cover in the levee setback area (agriculture or habitat) would reduce the potential for erosion. This impact would be **less than significant.**	LTS	No mitigation is required.	LTS
5.3 Water Resources and River Geomorphology			
ASB-5.3-a: Temporary Effects on Water Quality Associated with Levee Repair and Strengthening Activities and Setback Levee Construction. Ground-disturbing activities associated with repairs and strengthening of the existing levees and construction of the ASB setback levee could cause soil erosion and sedimentation of local drainages and the Feather and Yuba River channels. Construction activities could also discharge waste	PS	**(1): Prepare a SWPPP, File an NOI, and Comply with the NPDES Stormwater Permit for Project Construction Activities.** This measure is identical to Mitigation Measure LS-5.3-a(1) above. **(2): Obtain a Use Permit from Yuba County and Comply with Permit Conditions for Erosion Control.** This measure is identical to Mitigation Measure LS-5.3-a(2) above.	LTS

Table 1-3b
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
petroleum products or other construction-related substances that could enter these waterways in runoff. Because the release of soil or other materials into these waterways could adversely affect river water quality, this impact would be **potentially significant.**			
ASB-5.3-b: Disruption of Local Drainage Systems by the Levee Setback. The ASB setback levee would cross existing drainage infrastructure and sever parts of the drainage system for the local area. Drainage patterns within the levee setback area could be changed by project implementation as well. Because interruption of drainage patterns could cause or exacerbate local flooding, this impact would be **significant.**	S	**Coordinate with RD 784 to Modify Drainage Facilities that Would Be Affected by the Levee Setback and Ensure Appropriate Functioning of the Local Drainage System.** TRLIA or its primary construction contractor shall coordinate with RD 784 to evaluate local drainage needs before and after construction of the setback levee and shall prepare and implement a plan for modification of the portion of the drainage system that would be affected by the levee setback. A drainage study shall be prepared that evaluates the effects on local drainage that would result from the levee setback and any proposed changes in land uses in the levee setback area. The study shall consider the design flows of the existing facilities that cross the proposed setback levee footprint (e.g., Lateral 7/8 and the Plumas Lake Canal). It shall develop appropriate plans for relocation or other modification of these facilities and construction of new facilities, as needed, to ensure equivalent functioning of the system during and after construction of the setback levee. Facility modification will include relocating Pump Station No. 3, and may include removing, filling, and/or rerouting drainage canals and culverts; regrading drainage alignments to redirect drainage; constructing new ditches and canals; and installing new culverts. The plan shall also consider the continuing and proposed uses of the levee setback area and shall incorporate appropriate drainage requirements for those uses to prevent any unintended flooding from stormwater runoff. The plan shall integrate environmental	LTS

Table 1-3b
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		mitigation requirements and drainage of restored borrow sites to the extent feasible and practical. The final plan shall be approved by RD 784. TRLIA and its construction contractor(s) shall ensure that the necessary modifications are implemented without interruption of the adequate functioning of the drainage system. TRLIA shall also ensure that any necessary environmental review requirements have been met before the drainage modifications are implemented.	
ASB-5.3-c: Changes in Local Flood Hydrology Resulting from the Levee Setback. Setting back the left bank Feather River levee along the ASB setback levee alignment would decrease flood stages on the river. The levee setback would also provide a well-designed, well-constructed levee that would be more reliable and less subject to seepage than the existing levee. These changes would improve local flood protection. This effect would be **beneficial.**	B	No mitigation is required.	B
ASB-5.3-d: Changes in Flood Hydrology Downstream of the Setback Levee. The ASB levee setback would lower water levels upstream of the levee setback area, which could increase flows downstream of project Segment 2. This condition could lead to increased flooding downstream of Segment 2 if flood events should occur. However, the passage of floodwaters downstream to the Feather River would increase floodwater elevation within adequately sized levees, and the increased potential for levee failure and flooding downstream would be very slight. In addition, the implementation of Forecast-Coordinated Operations of Lake Oroville and New Bullards Bar Reservoir	LTS	No mitigation is required.	LTS

Table 1-3b
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
would reduce peak flows in the Feather-Yuba River system, and hence downstream of the levee setback area. Therefore, this impact would be **less than significant.**			
ASB-5.3-e: Change in Water Demand and Available Water Supply Resulting from the ASB Levee Setback. Implementation of the ASB levee setback would remove approximately 240–1,300 acres of land from irrigated agricultural use along the proposed setback levee footprint and in the setback area. Alternative uses (e.g., levee, habitat restoration) are not expected to increase demand for water supply but, rather, are expected to decrease water use. This would be a **beneficial** effect.	B	No mitigation is required.	B
ASB-5.3-f: Changes in Groundwater Levels Resulting from Installation of Slurry Cutoff Walls and the Levee Setback. Slurry cutoff walls that would be installed to control seepage in the existing Feather River and Yuba River levees in project Segments 1 and 3 and in the ASB setback levee in Segment 2 could restrict groundwater flow and affect groundwater levels. Potential consequences are localized changes in well water levels and/or high groundwater levels east of the setback levee and east and south of the locations where slurry cutoff walls are installed in Segments 1 and 3. Such changes are not expected to substantially affect water supply or adversely affect land uses. This impact would be **less than significant.**	LTS	No mitigation is required.	LTS

Table 1-3b
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
ASB-5.3-g: Long-Term Effects on Water Quality Resulting from the Levee Setback. Potentially hazardous materials related to agricultural activities could be transported downstream when the levee setback area becomes inundated during flood events. These materials could contaminate floodwater and adversely affect river water quality. Because of the potential for adverse effects on water quality in the Feather River, this impact would be **potentially significant.**	PS	**(1): Conduct a Phase I Environmental Site Assessment for the Levee Setback Area and Implement Recommendations.** Before the start of any ground-disturbing construction activity, TRLIA or its primary construction contractor shall have a qualified hazardous waste specialist perform a Phase I Environmental Site Assessment of the levee setback area to identify potential sources of surface and buried contaminants, and provide a report of assessment findings. The assessment shall include the following: ▪ review of available information on property history, including, as appropriate, historical and current topographic maps, aerial photographs, property title and permit information, interviews of environmental regulatory agency and Yuba County personnel, and interviews of current occupants and landowners regarding the current and past uses of the land; ▪ review of federal, state, and county governmental records and databases to determine whether any sites in the area are listed as hazardous waste sites; and ▪ reconnaissance-level surveys to observe visual evidence of hazardous materials use. A written report on the findings of the assessment, including recommendations for the disposition of any identified hazardous waste sites or potential hazardous waste sites, shall be provided to TRLIA. TRLIA or its construction contractor(s) shall implement recommendations made in the Phase I report. If hazardous materials or wastes are identified, recommendations could include, but would not be limited to, a Phase II assessment or cleanup of known identified hazardous waste sites. Presence of hazardous wastes would be determined using waste classification protocols described in CCR Title 22.	LTS

Table 1-3b
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		(2): Evaluate Levee Borrow Material for Potential Contaminants in Coordination with the RWQCB. Before the start of construction, TRLIA or its primary construction contractor shall have a qualified hazardous materials specialist collect and evaluate representative soil samples from the existing levee sections that would be used as sources of borrow, and from potential borrow sites. The soil samples shall be evaluated for contaminant residues (e.g., trace metals, organochlorine pesticides, polychlorinated biphenyls) that may be encountered in excavation and grading activities. This evaluation shall be conducted to address any requirements of the Central Valley RWQCB as part of the RWQCB's permitting and approval process for the project (e.g., Section 401 certification). Wastes that are encountered at hazardous levels shall be treated in accordance with CCR Title 22 procedures for hazardous materials reporting and disposal. Where the evaluation of soil samples detects the presence of wastes that are not present at hazardous levels, the results of the evaluation shall be reported to the RWQCB for classification in the RWQCB's designated waste classification program, and the RWQCB will determine the acceptability of the material for levee construction based on the potential of the waste to impair water quality and public health. Borrow material used for construction of the waterside levee face or other features with soil exposure to the aquatic environment (e.g., new drainage channels) that is deemed unacceptable by the RWQCB shall be properly disposed of in a landfill or made available for other approved uses. **(3): Remove Nonhazardous Waste and Debris from the Levee Setback Area.** Before the beginning of the first season of potential flood operations with the setback levee in place, TRLIA or its primary construction contractor shall ensure the removal from the levee setback area of all large slash and wood piles, nonhazardous waste dumps, and other nonhazardous debris that	

Table 1-3b
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		could adversely affect water quality or create a hazard if carried downriver in flood flows. All removed materials shall be properly disposed of in approved off-site landfills.	
ASB-5.3-h: Changes in Floodplain Sediment Deposition Associated with the Levee Setback. Inundation of the ASB levee setback area would result in the transport and deposition of sediments in the setback area that may contain elevated concentrations of trace metals and/or organic constituents. Because it is unlikely that the sediment constituent concentrations resulting from inundation would be any higher than existing concentrations in the levee setback area, this impact would be **less than significant.**	LTS	No mitigation is required.	LTS
ASB-5.3-i: Changes in Geomorphic Processes Along the River Channels Resulting from the Levee Setback. Increasing the conveyance area of the Feather River floodway along the ASB setback levee alignment would alter water velocities and depths in the existing river channel and floodway in this area and upstream during flood events large enough to inundate the levee setback area (greater than an approximately a 3-year flow). These changes in velocities and depths could lead to decreased shear stresses from Star Bend to just below Shanghai Bend (project Segment 2) and slightly increased shear stresses at Shanghai Bend (Segment 3) and some distance upstream on both the Feather River and the Yuba River. Shear stresses would not change downstream of the levee setback area. Portions of the riverbanks and channel bed along the Feather and Yuba Rivers where shear	LTS	No mitigation is required.	LTS

Table 1-3b
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
stresses increase could experience minor increases in erosive forces. However, any increases would not be sufficient to result in a substantial increase in the mobilization and/or deposition of sediments. This impact would be **less than significant.**			
ASB-5.3-j: Changes in Geomorphic Processes Along the Project Levees Resulting from the ASB Levee Setback. Increasing the conveyance area of the Feather River floodway along the ASB setback levee alignment would alter water velocities and depths in the existing floodway in this area and upstream during flood events large enough to inundate the levee setback area (greater than an approximately a 3-year flow). These changes in velocities and depths would lead to decreased shear stresses along the right and left bank Feather River levees from Star Bend to just below Shanghai Bend (project Segment 2) and increased shear stresses along the levees at Shanghai Bend (Segment 3) and some distance upstream on both the Feather River and the Yuba River. Shear stresses along the levees would not change downstream of the levee setback area. Portions of the levee area along the Feather and Yuba Rivers where shear stresses increase could experience minor increases in erosive forces. Any increases in shear stresses would not be sufficient to result in a substantial increase in the mobilization and/or deposition of sediments or increase exposure of persons or private property to flood hazards (i.e., through damage to the levees). This impact would be **less than significant.**	LTS	No mitigation is required.	LTS

Table 1-3b
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
5.4 Fisheries			
ASB-5.4-a: Loss of Fish Habitat during Levee Repair and Strengthening Activities and Setback Levee Construction. Construction-related increases in sediments, turbidity, and contaminants could adversely affect fish habitats immediately adjacent to and downstream of project construction activities, possibly resulting in adverse effects on fish species listed or proposed for listing as threatened or endangered under ESA. This impact would be **potentially significant**.	PS	**(1): Prepare a SWPPP, File an NOI, and Comply with the NPDES Stormwater Permit for Project Construction Activities.** This measure is identical to Mitigation Measure LS-5.3-a(1) in Section 5.3, "Water Resources and River Geomorphology." **(2): Obtain a Use Permit from Yuba County and Comply with Permit Conditions for Erosion Control.** This measure is identical to Mitigation Measure LS-5.3-a(2) in Section 5.3, "Water Resources and River Geomorphology." **(3): Obtain and Comply with Terms and Conditions of a Streambed Alteration Agreement for Construction Activities Associated with the Setback Levee.** Three Rivers Levee Improvement Authority (TRLIA) or its representative shall consult with DFG regarding potential disturbance to fish habitat as part of the process for obtaining a streambed alteration agreement, pursuant to Section 1602 of the California Fish and Game Code, for construction work associated with the setback levee. TRLIA shall comply with conditions set forth in the streambed alteration agreement to protect fish habitat.	LTS
ASB-5.4-b: Loss of Overhead Cover and Instream Woody Material Associated with Setback Levee Construction. In project Segment 2, vegetation may need to be removed to allow drainage from the levee setback area to the river channel, or it may be cleared at the waterside toe of the existing levee to accommodate levee removal. The loss in overhead cover for fish would be limited and temporary, however, and revegetation would occur over time. Therefore, this impact would be **less than significant**.	LTS	No mitigation is required.	LTS

Table 1-3b
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
ASB-5.4-c: Effects on Habitat from Contaminants in Borrow Material. If contaminants are present in soil in the levee setback area or in borrow material used for the setback levee, they could be released when the area is inundated during flood events, resulting in harm to sensitive fish and habitat. This impact would be **potentially significant**.	PS	**(1): Conduct a Phase I Environmental Site Assessment for the Levee Setback Area and Implement Recommendations.** This measure is identical to Mitigation Measure ASB-5.3-g(1) in Section 5.3, "Water Resources and River Geomorphology." **(2): Evaluate Levee Borrow Material for Potential Contaminants in Coordination with the RWQCB.** This measure is identical to Mitigation Measure ASB-5.3-g(2) in Section 5.3, "Water Resources and River Geomorphology." **(3): Remove Nonhazardous Waste and Debris from the Levee Setback Area.** This measure is identical to Mitigation Measure ASB-5.3-g(3) in Section 5.3, "Water Resources and River Geomorphology."	LTS
ASB-5.4-d: Fish Stranding Following Flooding of the Levee Setback Area. Following construction of the setback levee, the levee setback area may contain depressions where water could pond following inundation and fish could become trapped as floodwaters recede to the main river channel. Stranded fish, particularly juvenile chinook salmon and steelhead, would be exposed to predators and increasing water temperatures; with no means to return to the river, they would inevitably die. This impact would be **significant.**	S	**Develop and Implement a Drainage and Grading Plan that Minimizes Loss or Incidental Loss of Fish from Stranding.** TRLIA and its primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize the potential for fish stranding in the levee setback area: (a) <u>Plan and implement drainage improvements</u>. TRLIA or its designated construction contractors, through a combination of grading and drainage improvements, shall minimize the potential for floodwater to pond in the levee setback area in such a way that substantial numbers of fish become stranded and consequently become exposed to hostile environments (warm water temperatures and increased predation). As part of the development of the final design for the levee setback area, TRLIA or its representatives shall determine the specific topographic and hydrologic characteristics of the levee setback area and shall define the anticipated flooding regime (depth, duration, and extent of flooding), drainage patterns, and potential for fish stranding risks there. The	LTS

Table 1-3b
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		final project design shall include recontouring as necessary to ensure complete drainage and provide fish passage back to the main river channel as floodflows recede from the levee setback area. Features with substantial stranding risk shall be identified for filling and/or grading. Complete drainage is important to reduce the risk of stranding; however, maintaining some seasonal aquatic habitat in the levee setback area and/or hydrologic connectivity to the Feather River may also be important features if enhancement of fish habitat and production is selected as a management activity in the levee setback area. Before the design of the setback levee and levee setback area is finalized, TRLIA or its representatives shall obtain the approval of DFG and NMFS indicating that the planned drainage and grading features are sufficient to address concerns about fish stranding potential, similar to the process used for the Feather-Bear Rivers Levee Setback Project currently under construction downstream. The features of the setback levee and levee setback area shall be constructed in accordance with the approved final design. (b) <u>Monitor the success of the drainage features and adjust if necessary</u>. A long-term mitigation monitoring plan shall be developed by a qualified biologist on behalf of TRLIA and shall be approved by DFG and NMFS before implementation of the levee setback. This monitoring plan shall evaluate the effectiveness of the grading and drainage features in the levee setback area in reducing the risk of fish stranding and the stability of the drainage features and shall determine the need for maintenance or modification. The monitoring plan shall include provisions for remediation should the design of the levee setback area prove to be unsuccessful in preventing fish stranding. These measures	

Table 1-3b
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		shall include, as appropriate, such activities as regrading or filling depressions in the levee setback area. The recommended monitoring scheme shall include annual monitoring for a period of 5 years following the removal of any part of the existing levee. Additional monitoring may be required for areas where remediation is necessary. Monitoring is recommended to include the following actions: ▪ Visual assessment of the levee setback area by a qualified biologist before the flood season (i.e., by October 31). This assessment should note any substantial changes in the overall structure since implementation of the final design for the area, including reestablishment of vegetation and the presence of "holes" or pits. ▪ A visual survey by a qualified biologist at the end of each event that floods the levee setback area (i.e., after the recession of waters that inundate the floodplain). This survey should identify whether there is any ponding that would result in fish stranding, or whether channels have formed that flow through completely to the low-flow channel of the Feather River. Following each flood season (i.e., after April 16), a letter report shall be submitted to NMFS and DFG summarizing the overall condition of the floodplain area and any changes that have occurred from the previous year(s). If any remediation measures are required, they shall be outlined in the letter report, along with a schedule specifying when the remediation activities will occur. Appropriate remediation measures shall be implemented as soon as is practicable to minimize the potential for fish stranding while maintaining the desired habitat values (if habitat enhancement is included	

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THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		in the floodplain area) and hydraulic characteristics of the area. The performance of the mitigation measure shall be considered successful if there is no isolated standing water and/or barriers to fish passage capable of resulting in substantial fish stranding following a flood event that inundates the levee setback area.	
ASB-5.4-e: Increased Aquatic and Riparian Habitat in the Levee Setback Area. Setting back the Feather River levee in project Segment 2 could allow the expansion of the available aquatic and riparian habitat corridor and could improve the success of fish species that use the area. This effect would be **potentially beneficial.**	PB	No mitigation is required.	PB
5.5 Terrestrial Biological Resources			
ASB-5.5-a: Effects on General Biological Resources. Levee repair and strengthening activities in project Segments 1 and 3 would temporarily disturb ruderal habitat on the levee slopes and adjacent riparian and agricultural land. Construction of the ASB setback levee in Segment 2 would result in loss of primarily agricultural land. Agricultural lands could also be lost at potential borrow and detention basin sites. These temporary impacts and potential permanent land use changes would affect habitat for many common plant and wildlife species. Although local populations would be reduced by these activities, these species are locally and regionally abundant. This impact would be **less than significant.**	LTS	No mitigation is required.	LTS

Table 1-3b
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
ASB-5.5-b: Effects on Sensitive Habitats. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities would result in disturbance and/or loss of sensitive habitats, including jurisdictional wetlands, other waters of the United States, and riparian habitats. This impact would be **significant.**	S	**Avoid Disturbance of Sensitive Habitat to the Extent Feasible and Comply with Corps and DFG Processes to Mitigate Unavoidable Effects.** This measure is identical to Mitigation Measure LS-5.5-b above.	LTS
ASB-5.5-c: Loss of Special-Status Plants. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities could result in the loss of rose mallow and Wright's trichocoronis if they are present in areas that would be disturbed during these activities. This impact would be **potentially significant.**	PS	**Conduct Detailed Special-Status Plant Surveys and Establish Construction Buffers as Necessary to Minimize Effects on Special-Status Plants.** This measure is identical to Mitigation Measure LS-5.5-c above.	LTS
ASB-5.5-d: Effects on Valley Elderberry Longhorn Beetle. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities could result in loss of blue elderberry shrubs that are occupied by valley elderberry longhorn beetles. This impact would be **potentially significant**.	PS	**Conduct Protocol-Level Surveys, Establish Buffers, and Implement a Mitigation Plan as Necessary to Minimize Effects on Valley Elderberry Longhorn Beetle.** This measure is identical to Mitigation Measure LS-5.5-d above.	LTS
ASB-5.5-e: Effects on Northwestern Pond Turtle. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities would result in disturbance and/or loss of suitable aquatic habitat for northwestern pond turtle and could result in direct loss of individuals. This impact would be **potentially significant.**	PS	**Conduct Surveys as Part of Dewatering Activities and Minimize Effects on Northwestern Pond Turtle.** This measure is identical to Mitigation Measure LS-5.5-e above.	LTS
ASB-5.5-f: Effects on Giant Garter Snake. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities would	S	**Implement Applicable Take Minimization Measures and a Mitigation Plan as Necessary for Giant Garter Snake.** This measure is identical to Mitigation Measure LS-5.5-f above.	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
result in disturbance and/or loss of suitable aquatic and upland habitat for giant garter snake. Construction activities also have potential to result in direct take of individuals. This impact would be **significant**.			
ASB-5.5-g: Effects on Swainson's Hawk and Other Nesting Raptors. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities would result in disturbance and/or loss of suitable nesting and/or foraging habitat for Swainson's hawk and other raptors and could result in loss of active nests. This impact would be **potentially significant**.	PS	**(1): Conduct Preconstruction Surveys and Protect Active Nests to Minimize Effects on Swainson's Hawk.** This measure is identical to Mitigation Measure LS-5.5-g(1) above. **(2): Conduct Preconstruction Surveys, Protect Occupied Burrows, and Relocate Individuals as Necessary to Minimize Effects on Burrowing Owl.** This measure is identical to Mitigation Measure LS-5.5-g(2) above. **(3): Conduct Preconstruction Surveys and Protect Active Nests to Minimize Effects on Other Nesting Raptors.** This measure is identical to Mitigation Measure LS-5.5-g(3) above.	LTS
ASB-5.5-h: Effects on Other Special-status Birds. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities would result in disturbance and/or loss of potential nesting and/or foraging habitat for several special-status bird species. Special-status species are unlikely to nest in areas that would be affected, and large areas of nesting and foraging habitat of equal or higher quality are available elsewhere in the project area. Therefore, this impact would be **less than significant**.	LTS	No mitigation is required.	LTS
ASB-5.5-i: Effects on Pacific Western Big-Eared Bat. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities would not affect suitability of foraging habitat or result in loss of important roost or	LTS	No mitigation is required.	LTS

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THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
maternity sites. This impact would be **less than significant**.			
ASB-5.5-j: Effects on Wildlife Corridors. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities would result in limited temporary disturbance of the Feather River and Yuba River habitat corridors and minor corridors associated with canals and ditches in the levee setback area. However, such disturbance is not expected to affect overall use of these corridors by wildlife. This impact would be **less than significant.**	LTS	No mitigation is required.	LTS
5.6 Recreation			
ASB-5.6-a: Temporary Changes in Recreational Opportunities during Levee Repairs and Setback Levee Construction. Construction noise could disrupt recreational uses in the project area, particularly in areas adjacent to the existing levee. Some wildlife species present in or inhabiting natural areas are likely to be disturbed by noise and by the presence of project construction crews and equipment. Portions of the Feather River State Wildlife Area in project Segment 1 may need to be closed temporarily to hunting and other recreational activities for safety reasons while adjacent sections of the existing Feather River levee are being repaired. There would be no public access to the Star Bend Boat Launch and Fishing Access for several days while levee repairs were conducted in this area. Although these temporary disturbances may affect the recreation experience for bird-watchers, hunters, boaters, and other recreational	LTS	No mitigation is required.	LTS

Table 1-3b
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
users, displaced recreational uses could be accommodated by other nearby facilities (Whitmore, pers. comm., 2006). For this reason, and because of the temporary nature of this effect, this impact would be **less than significant**.			
ASB-5.6-b: Long-Term Changes in Recreational Opportunities Resulting from Levee Repairs and Setback Levee Construction. Implementing levee repairs along project Segments 1 and 3 would have little or no effect on recreational uses in the Lake of the Woods Management Unit or along the Feather River channel in these project segments. Implementing the levee setback in Segment 2 would slightly modify Feather River flood stage elevations in the project vicinity during high flows, possibly affecting recreational uses, and could affect survival rates of wildlife following high-flow periods, which could temporarily affect associated wildlife-related recreation. The changes in Feather River flood stage elevations that would result from expansion of the Feather River floodway in Segment 2, however, would be infrequent, of short duration, and during periods when river stage is already high; therefore, no new effects on recreational uses are expected. Sections of the existing Feather River levee would be left in place as part of the proposed project, which would minimize losses of wildlife that could adversely affect long-term recreational activities. This impact would be **less than significant**.	LTS	No mitigation is required.	LTS

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THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
5.7 Aesthetic Resources			
ASB-5.7-a: Temporary Changes in Visual Resources Associated with Levee Repairs and Setback Levee Construction. Levee repair and strengthening activities and construction of the ASB setback levee would temporarily reduce the aesthetic qualities of views by introducing earthmoving equipment and other construction equipment, materials, and work crews into the viewshed of recreationists, motorists on SR 70 and Feather River Boulevard, workers in nearby farming areas, and residents of the area. However, the construction areas would typically be distant from and/or screened from most viewers. Where residents would be near the construction area (e.g., in project Segment 3), construction would pass by these areas relatively quickly and changes in aesthetic conditions would be short term and temporary. For these reasons, this impact would be **less than significant.**	LTS	No mitigation is required.	LTS
ASB-5.7-b: Changes in Light and Glare. There would be no substantial sources of light or glare associated with levee repairs or with the long-term presence of the ASB setback levee and detention basin. However, equipment staging areas may be temporarily lit at night during construction, and portions of the construction areas may also need to be lit at night. Although such nighttime lighting may be visible from various residences, particularly in project Segment 3, in most locations views of the construction areas would be largely shielded by orchards, other vegetation, and structures. Where lit	LTS	No mitigation is required.	LTS

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THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
construction areas are visible, lighting would be short term and temporary. For these reasons, this impact would be **less than significant.**			
ASB-5.7-c: Long-Term Modifications of Views from Levee Repairs and Installation of the Setback Levee. Levee repair and strengthening activities would not dramatically change the appearance of project Segments 1 and 3. Construction of the ASB setback levee would change the appearance of Segment 2. However, all three project segments are of low to moderate aesthetic value, there would be no substantial adverse effect on any scenic vista, and these changes would not substantially alter the general character of views of the area. This impact would be **less than significant.**	LTS	No mitigation is required.	LTS
5.8 Cultural Resources			
ASB-5.8-a: Damage to or Destruction of Prehistoric Archaeological Site CA-Yub-5. Prehistoric archaeological site CA-Yub-5, which may be eligible for listing in the CRHR and NRHP, could be damaged or destroyed by construction activities or by inundation or scouring when flood flows pass through the levee setback area. Because this site may be a significant cultural resource, this impact would be **potentially significant**.	PS	**Evaluate the Significance of Archaeological Site CA-Yub-5 and, If Determined to Be Significant, Protect the Site from Damage and/or Conduct Data Recovery Excavation.** TRLIA shall have a qualified archaeologist evaluate the extent and significance/eligibility for NRHP and CRHR listing of site CA-Yub-5 through test excavations and analysis of the site's stratigraphy and artifactual constituents. If the site is determined to lack eligibility for NRHP and CRHR listing and is not found to be a significant cultural resource under CEQA, the archaeologist shall report these findings in a site investigation report and ensure that all remains discovered at the site are recorded and reported in accordance with professional practices, and no further protective measures will be necessary. If intact stratigraphy, features, additional human remains, or	LTS

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THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		artifacts indicate that the site may be eligible for NRHP or CRHR listing and therefore a significant historical resource according to CEQA criteria, TRLIA shall implement one or both of the measures described below in consultation with a professional archaeologist familiar with CA-Yub-5 to ensure that no significant cultural resources are damaged there. Two basic approaches are described: protecting the site from damage and conducting data recovery at the site. All site testing shall be conducted in consultation with appropriate Native American representatives designated by the NAHC, and a Native American monitor shall be present for monitoring during any excavation. <u>Option 1: Protect CA-Yub-5 from Damage</u> CA-Yub-5 can be protected from direct construction damage if the setback levee is realigned such that the site is beyond the footprint of ground-disturbing levee construction activity. This would require moving the levee alignment to the east of the site boundaries, thus placing the entire site within the levee setback area. It would be highly impractical to move the alignment to the west to place the site outside the project site and thereby avoid damaging it. Based on characteristics observed during archaeological field surveys, it is estimated that the setback levee would need to be constructed approximately 500 feet west of the proposed alignment in the area of CA-Yub-5 to ensure complete avoidance of the site. Geotechnical considerations render such a western shift of the alignment unrealistic because it would place this portion of the levee on a far less stable foundation (old riverbed) than under the proposed alignment. Once situated within the levee setback area (i.e., the expanded floodway), the site should be protected from future erosion and scour from surface flows, as well as human disturbance, through the use of engineered features and/or strategic plantings. In addition, sufficient site data should be collected and analyzed to	

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THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		establish the important archaeological characteristics of the site. One of the most potentially significant characteristics of CA-Yub-5 is the presence of at least 12 inches of midden soil, which can be a source of information regarding the age of the site (through radiocarbon dating) and prehistoric diets and paleoenvironmental reconstruction (through microconstituent and chemical analyses). Because floodwaters passing through the levee setback area could alter the soil properties that permit accurate radiometric dating or hasten the degradation of macrobotanical and microbotanical remains, scientific data would need to be collected, recorded, and reported before the site is subjected to inundation. It has been previously suggested that the site may be protected from future damage by use of a protective covering that is impermeable to water, which is also termed “capping.” However, “capping” CA-Yub-5 to protect it from water damage would be very impractical, if not impossible. It would be necessary to have a clear definition of the horizontal and vertical boundaries of CA-Yub-5, and the site would need to be completely encased in the covering so that it would be protected from saturation from all sides, including rising groundwater from below. <u>Option 2: Conduct Data Recovery at CA-Yub-5</u> Data recovery through destructive excavation is considered an acceptable mitigation measure for damage to archaeological sites if other mitigation measures are less feasible or wholly infeasible. The purpose of data recovery is to obtain scientifically consequential information from an archaeological site that would be partially or completely destroyed. Although much of the work required for data recovery is similar to that conducted during test excavations, the requirements for data recovery call for more extensive manual and perhaps mechanical excavation. Recovered materials shall be subjected to laboratory analysis (e.g., stone tool	

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Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		analysis, faunal analysis, radiocarbon assays, and obsidian hydration studies), and a report and interpretive material shall be prepared that documents the site investigation and findings.	
ASB-5.8-b: Damage to or Destruction of Resources Associated with Prehistoric Archaeological Sites CA-Yub-13 and CA-Yub-14. This impact would be the same as Impact LS-5.8-a, described under Alternative 1 above. For the same reasons as described above, this impact would be **potentially significant**.	PS	**(1): Conduct Further Evaluation and Subsurface Testing to Determine Whether Proposed Levee Improvements Could Damage Significant Resources Associated with Prehistoric Archaeological Sites CA-Yub-13 and CA-Yub-14.** This measure is identical to Mitigation Measure LS-5.8-a(1) above. **(2): Monitor Ground-Disturbing Activities in the Vicinity of Prehistoric Archaeological Sites CA-Yub-13 and CA-Yub-14.** This measure is identical to Mitigation Measure LS-5.8-a(2) above.	LTS
ASB-5.8-c: Damage to or Destruction of Cultural Resources in Unsurveyed Areas. Portions of the project area could not be surveyed for cultural resources because of ground conditions and lack of site access, and potential borrow or staging areas also have not been surveyed. Significant cultural resources could be present in these areas, and could be damaged by project-related ground-disturbing activities. This impact would be **potentially significant**.	PS	**Survey Unexamined Areas before Project Ground-Disturbing Activities and Implement Further Mitigation As Necessary.** This measure is identical to Mitigation Measure LS-5.8-b above.	LTS
ASB-5.8-d: Damage to or Destruction of Undocumented Buried Archaeological Resources during Construction. This impact would be similar to Impact LS-5.8-c, described under Alternative 1 above. In addition, ground-disturbing activities associated with the proposed levee setback in project Segment 2, such as construction of the slurry cutoff wall and the setback levee foundation, have the potential to damage or destroy previously	PS	**Stop Work and Implement Measures to Protect Archaeological Resources If Discovered during Ground-Disturbing Activities.** This measure is identical to Mitigation Measure LS-5.8-c above.	LTS

Table 1-3b
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THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
unidentified archaeological resources in the setback levee construction area. For the same reasons as described for Alternative 1, this impact would be **potentially significant**.			
ASB-5.8-e: Damage to or Destruction of Undocumented Human Remains during Construction. This impact would be similar to Impact LS-5.8-d, described under Alternative 1 above. In addition, ground-disturbing activities associated with the proposed levee setback in project Segment 2, such as construction of the slurry cutoff wall and the setback levee foundation, have the potential to damage or destroy undocumented human remains in the setback levee construction area. For the same reasons as described for Alternative 1, this impact would be **potentially significant**.	PS	**If Human Remains are Discovered during Ground-Disturbing Activities, Stop Work and Comply with State Laws Pertaining to the Discovery of Human Remains.** This measure is identical to Mitigation Measure LS-5.8-d above.	LTS
5.9 Air Quality			
ASB-5.9-a: Temporary Emissions of ROG, NO_X, and PM_{10} during Construction. Maximum daily emissions of ROG, NO_X, and PM_{10} associated with levee repair and strengthening activities in project Segments 1 and 3 and construction of the Above Star Bend (ASB) setback levee in Segment 2 would exceed FRAQMD's recommended significance thresholds and contribute to existing nonattainment conditions for ozone and PM_{10} in the NSVAB. This impact would be **significant**.	S	**Implement FRAQMD Pollution-Control Measures to Minimize Temporary Emissions of ROG, NO_X, and PM_{10} during Construction.** This measure is identical to Mitigation Measure LS-5.9-a above.	SU
ASB-5.9-b: Long-Term Changes in Emissions of ROG, NO_X, and PM_{10} Associated with Levee Repairs and Strengthening and the Levee	PB	No mitigation is required.	PB

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Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Setback. The proposed levee repairs and strengthening in project Segments 1 and 3 and the ASB levee setback in Segment 2 would be expected to contribute only minimally, if at all, to long-term emissions of pollutants through vehicle trips related to occasional maintenance activities. The potential cessation of agricultural uses on some lands in the levee setback area could result in a decrease in long-term pollutant emissions in this area, particularly PM_{10} emissions associated with agricultural land disturbance and burning operations. Such a reduction would be a small **potentially beneficial** effect on air quality.			
ASB-5.9-c: Exposure of Sensitive Receptors to Toxic Air Emissions. Emissions of TACs associated with construction or operations under Alternative 2 would not result in exposure of receptors to concentrations of TACs in excess of applicable thresholds. This impact would be **less than significant.**	LTS	No mitigation is required.	LTS
5.10 Noise			
ASB-5.10-a: Temporary Increase in Noise Levels during Construction. Noise levels associated with construction activities could exceed the maximum permissible noise limits at residences. Construction equipment may operate between the hours of 10 p.m. and 7 a.m. and could operate within 500 feet of a residential zone during these hours. Therefore, construction activities occurring between 10 p.m. and 7 a.m. could result in annoyance and/or sleep disruption of certain receptors within the project area. In addition, construction operations may result	S	**Limit Generation of Noise by Equipment during Project Construction.** This measure is identical to Mitigation Measure LS-5.10-a above.	SU

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Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
in a noticeable temporary increase (3 dBA or more) in ambient noise levels at these residences. This impact would be **significant**.			
ASB-5.10-b: Exposure of Sensitive Receptors to Excessive Groundborne Vibration During Construction. This impact would be the same as Impact LS-5.10-b, described under Alternative 1 above. Construction processes under Alternative 2 would not occur any closer to sensitive land uses than discussed under Alternative 1, and no new construction equipment or processes that would generate additional groundborne vibration would be used. For the same reasons as described above, this impact would be **less than significant**.	LTS	No mitigation is required.	LTS
5.11 Transportation and Circulation			
ASB-5.11-a: Increase in Traffic on Local Roadways near the Existing Levee and Setback Levee Alignment during Construction. During the anticipated 20-month construction period, commute trips and haul truck trips associated with levee repair and strengthening activities and setback levee construction would increase traffic on Feather River Boulevard, SR 70, and local roadways that provide access to the project alignment (e.g., Anderson Avenue, Country Club Avenue, Riverside Drive). However, construction-related trips would not exceed the thresholds established by ITE for temporary traffic increases and would not represent a substantial increase in traffic levels on these roadways or other local roads. This impact would be	LTS	No mitigation is required.	LTS

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Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
less than significant.			
ASB-5.11-b: Increase in Traffic Hazards on Local Roadways near the Existing Levee and Setback Levee Alignment during Construction. Construction-related traffic could track mud and gravel onto local roadways, and haul truck traffic could interfere with the flow of traffic on these roads. These conditions could pose hazards for travelers on local roadways. This impact would be **potentially significant.**	PS	**Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways.** This measure is identical to Mitigation Measure LS-5.11-b above.	LTS
5.12 Public Services, Utilities, and Service Systems			
ASB-5.12-a: Damage of Public Utility Infrastructure and Disruption of Service in the Levee Repair and ASB Levee Setback Areas. Impacts related to utilities in project Segments 1 and 3 and the area considered for a detention basin/soil borrow site would be the same as those described above in Impact LS-5.12-a under Alternative 1. Most of the public utilities in the proposed ASB levee setback area in Segment 2 would no longer be needed and would be removed. However, a PG&E transmission line and two PG&E distribution lines cross this area and would remain in place under project implementation, and floodwaters could threaten the stability of the steel towers and wooden poles that support these lines. In addition, buried utilities could be present in locations that have not been identified in preliminary surveys and contact with service providers. Utilities infrastructure remaining in the levee setback area could be damaged by levee construction, by a proposed soil borrow area, or by floodwaters passing through the	PS	**Coordinate with Utility Providers to Remove, Reinforce, and Modify Public Utility Infrastructure in the ASB Levee Setback Area and Prevent Damage of Facilities.** TRLIA, the design engineers, or the primary construction contractor for the levee setback, as appropriate, shall implement the following measures before the beginning of construction to ensure that the levee setback does not adversely affect public utility infrastructure or result in interruption of utility service: (a) <u>Coordinate with PG&E to protect electrical lines that cross the levee setback area</u>. To maintain PG&E electrical service through the Bogue Loop 115-kV high-power transmission line and the two standard electrical lines that run along Ella Avenue and Country Club Avenue, TRLIA or its representative shall coordinate with PG&E to raise, relocate, or reinforce the steel towers and wood poles that stand in the proposed bypass area. (b) <u>Ensure that all utility lines in the setback area have been identified and removed or reinforced as necessary</u>. TRLIA or its representative shall ensure that any electrical, telephone, gas, and cable television lines within the levee setback area	LTS

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Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
setback area, possibly resulting in interruption of service. This impact would be **potentially significant.**		have been identified before the initiation of any ground-disturbing construction activity. Before the beginning of any construction-related ground disturbance, TRLIA or its representative shall coordinate with all potential service providers known to have, or potentially having, utility infrastructure in the levee setback area, including but not limited to PG&E, AT&T, Comcast, OPUD, and RD 784, to ensure that the utility lines are removed or reinforced as appropriate.	
ASB-5.12-b: Damage of Water Supply and Drainage Facilities and Interference with Service in the Levee Repair and ASB Levee Setback Areas. Impacts on water supply and drainage facilities in project Segments 1 and 3 and the area considered for a detention basin/soil borrow site would be the same as those described above in Impact LS-5.12-b under Alternative 1. Implementation of the levee setback would cut off local drainage systems and could damage privately owned water supply systems that serve agricultural uses. The preliminary design for the setback levee includes conceptual plans for abandoning, relocating, and modifying these systems. Three Rivers Levee Improvement Authority (TRLIA) and its design engineers would coordinate with RD 784 and local landowners to relocate pumps and replace wells and irrigation systems as necessary, as determined in final design. Effects of the levee setback on the drainage system are addressed in Section 5.3, “Water Resources and River Geomorphology.” The impact on water supply and drainage facilities would be **less than significant.**	LTS	No mitigation is required.	LTS

Table 1-3b
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
ASB-5.12-c: Potential for Conflicts with Emergency Response Vehicles during Construction. This impact would be similar to Impact LS-5.12-a described under Alternative 1 above. However, construction traffic on Feather River Boulevard would potentially be greater under Alternative 2 because of the greater number of truck haul trips associated with construction of the setback levee. For the same reasons as described above, this impact would be **potentially significant.**	PS	**Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways.** This measure is identical to Mitigation Measure LS-5.11-b, "Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways," in Section 5.11, "Transportation and Circulation."	LTS
5.13 Paleontological Resources			
ASB-5.13-a: Disturbance of Unknown Paleontological Resources during Earthmoving Activities. Portions of the project area and immediate vicinity are underlain by the Modesto and Riverbank Formations, which are paleontologically sensitive rock formations. Construction activities in the Modesto and Riverbank Formations associated with proposed levee strengthening (e.g., slurry cutoff walls, relief wells), construction of the ASB setback levee, use of the soil borrow area/detention basin location, and related activities (e.g., relocation of Pump Station No. 3) could adversely affect unknown subsurface paleontological resources. This impact would be **potentially significant.**	PS	**Conduct Training for Construction Personnel, Cease Work if Paleontological Resources are Encountered, and Implement an Appropriate Mitigation Strategy.** This measure is identical to Mitigation Measure LS-5.13-a.	LTS
Cumulative Impacts			
Alternative 2, The Levee Strengthening and ASB Setback Levee Alternative, would also contribute to significant cumulative impacts related to conversion of Important Farmland to nonagricultural uses; emissions of ROG, NO_X, and PM_{10} during construction; and potentially noise during construction. The mitigation described above would not reduce the project's contributions to these impacts to less-than-significant levels.			

B	=	Beneficial effect	LTS	=	Less than significant
PB	=	Potentially beneficial effect	PS	=	Potentially significant
NI	=	No impact	S	=	Significant

Table 1-3c
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 3)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
5.1 Land Use			
IS-5.1-a: Conflicts with Land Use Planning and Policies Resulting from Levee Repairs and the Levee Setback. Levee repair and strengthening of the existing levee in project Segments 1 and 3 could result in removal of small areas of agricultural land from production associated with the installation of seepage/stability berms and other structures. The setback levee footprint and levee easements in project Segment 2 would cover approximately 220–230 acres of agricultural land, and setting back the levee could indirectly result in the removal of more land from agricultural production by dividing land parcels and allowing periodic flooding of agricultural land. Construction of a detention basin would be required to prevent adverse flooding effects on area properties, and this would likely occur on several hundred acres of existing agricultural land. These uses would conflict with County land use policies regarding the preservation of agricultural land and would be inconsistent with the current land use and zoning designations for the area. Because of these inconsistencies, this impact would be **significant**.	S	**Resolve Inconsistencies between Proposed Uses of the Levee Setback Area and Yuba County Zoning.** This measure is identical to Mitigation Measure ASB-5.1-a above.	SU
IS-5.1-b: Conversion of Important Farmland to Nonagricultural Uses Resulting from Levee Repairs and the Levee Setback. Levee repair and strengthening activities in project Segments 1 and 3 could permanently remove up to approximately 10 acres of Prime Farmland from production. Relocation of Pump Station No. 3 could potentially	S	**Preserve the Agricultural Productivity of Important Farmland to the Extent Feasible.** This measure is identical to Mitigation Measure ASB-5.1-b above.	SU

Table 1-3c
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 3)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
convert up to 1 acre of Prime Farmland in Segment 2 to nonagricultural use. The levee setback footprint and levee easements in Segment 2 would permanently convert approximately 210 acres of Prime Farmland, 10 acres of Farmland of Statewide Importance, and 5 acres of Unique Farmland to nonagricultural uses, and would potentially convert several hundred additional acres of Important Farmland for the proposed detention basin. The intermediate levee setback area could potentially result in the conversion of approximately 700 acres of Prime Farmland, 10 acres of Farmland of Statewide Importance, and 10 acres of Unique Farmland to nonagricultural uses. Implementation of the levee setback also may indirectly lead to the conversion of additional Important Farmland to nonagricultural uses because some properties would be divided by the setback levee, which could make continued farming of some crops, or on some parcels, impractical. This impact would be **significant**.			
IS-5.1-c: Displacement of Existing Housing in the Levee Setback Area. This impact would be the same as Impact ASB-5.1-c, described under Alternative 2 above. Both Alternative 2 and Alternative 3 would result in the removal of five to 10 residences in the levee setback area. For the same reasons as described above, this impact would be **less than significant.**	LTS	No mitigation is required.	LTS
5.2 Geology, Soils, and Mineral Resources			
IS-5.2-a: Risk of Geologic Hazards to the Levees. This impact would be the same as Impact ASB-5.2-	LTS	No mitigation is required.	LTS

Table 1-3c
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 3)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
a, described under Alternative 2 above. For the same reasons as described above, this impact would be **less than significant**.			
IS-5.2-b: Soil Erosion Hazards Associated with Construction of the Setback Levee. This impact would be the same as Impact ASB-5.2-b, described under Alternative 2 above. For the same reasons as described above, this impact would be **less than significant**.	LTS	No mitigation is required.	LTS
IS-5.2-c: Soil Erosion Hazards Associated with Flood Operations with the Intermediate Setback Levee. This impact would be the same as Impact ASB-5.2-c, described under Alternative 2 above. For the same reasons as described above, this impact would be **less than significant**.	LTS	No mitigation is required.	LTS
5.3 Water Resources and River Geomorphology			
IS-5.3-a: Temporary Effects on Water Quality Associated with Levee Repair and Strengthening Activities and Setback Levee Construction. This impact would be the same as Impact ASB-5.3-a, described under Alternative 2 above. For the same reasons as described above, this impact would be **potentially significant.**	PS	**(1): Prepare a SWPPP, File an NOI, and Comply with the NPDES Stormwater Permit for Project Construction Activities.** This measure is identical to Mitigation Measure LS-5.3-a(1) above. **(2): Obtain a Use Permit from Yuba County and Comply with Permit Conditions for Erosion Control.** This measure is identical to Mitigation Measure LS-5.3-a(2) above.	LTS
IS-5.3-b: Disruption of Local Drainage Systems by the Levee Setback. The intermediate setback levee would cross existing drainage infrastructure and sever parts of the drainage system for the local area. Drainage patterns within the levee setback area could be changed by project implementation as well. Because interruption of drainage patterns could	S	**Coordinate with RD 784 to Modify Drainage Facilities that Would Be Affected by the Levee Setback and Ensure Appropriate Functioning of the Local Drainage System.** This measure is identical to Mitigation Measure ASB-5.3-b above.	LTS

Table 1-3c
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 3)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
cause or exacerbate local flooding, this impact would be **significant.**			
IS-5.3-c: Changes in Local Flood Hydrology Resulting from the Levee Setback. Setting back the left bank Feather River levee along the intermediate setback levee alignment would decrease flood stages on the river. The levee setback would also provide a well-designed, well-constructed levee that would be more reliable and less subject to seepage than the existing levee. These changes would improve local flood protection. This effect would be **beneficial.**	B	No mitigation is required.	B
IS-5.3-d: Changes in Flood Hydrology Downstream of the Setback Levee. The intermediate levee setback would lower water levels upstream of the levee setback area, which could increase flows downstream of project Segment 2. This condition could lead to increased flooding downstream of Segment 2 if flood events should occur. However, the passage of floodwaters downstream to the Feather River would result in a increase in floodwater elevation within adequately sized levees, and the increased potential for levee failure and flooding downstream would be very slight. In addition, implementation of the F-CO for Lake Oroville and New Bullards Bar Reservoir would reduce peak flows in the Feather-Yuba River system, and hence downstream of the levee setback area. Therefore, this impact would be **less than significant.**	LTS	No mitigation is required.	LTS
IS-5.3-e: Change in Water Demand and	B	No mitigation is required.	B

Table 1-3c
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 3)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Available Water Supply Resulting from the Intermediate Levee Setback. Implementation of the intermediate levee setback would remove approximately 220–950 acres of land from irrigated agricultural use along the proposed setback levee footprint and in the setback area. Alternative uses (e.g., levee, habitat restoration) are not expected to increase demand for water supply but, rather, are expected to decrease water use. This would be a **beneficial** effect.			
IS-5.3-f: Changes in Groundwater Levels Resulting from Installation of Slurry Cutoff Walls and the Levee Setback. This impact would be the same as Impact ASB-5.3-f, described under Alternative 2 above. For the same reasons as described above, this impact would be **less than significant.**	LTS	No mitigation is required.	LTS
IS-5.3-g: Long-Term Effects on Water Quality Resulting from the Levee Setback. Potentially hazardous materials related to agricultural activities could be transported downstream when the levee setback area becomes inundated during flood events. These materials could contaminate floodwater and adversely affect river water quality. Because of the potential for adverse effects on water quality in the Feather River, this impact would be **potentially significant.**	PS	**(1): Conduct a Phase I Environmental Site Assessment for the Levee Setback Area and Implement Recommendations.** This measure is identical to Mitigation Measure ASB-5.3-g(1) above. **(2): Evaluate Levee Borrow Material for Potential Contaminants in Coordination with the RWQCB.** This measure is identical to Mitigation Measure ASB-5.3-g(2) above. **(3): Remove Nonhazardous Waste and Debris from the Levee Setback Area.** This measure is identical to Mitigation Measure ASB-5.3-g(3) above.	LTS
IS-5.3-h: Changes in Floodplain Sediment deposition Associated with the Levee Setback. Inundation of the levee setback area would result in the transport and deposition of sediments in the	LTS	No mitigation is required.	LTS

Table 1-3c
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 3)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
setback area that may contain elevated concentrations of trace metals and/or organic constituents. Because it is unlikely that the sediment constituent concentrations resulting from inundation would be any higher than existing concentrations in the levee setback area, this impact would be **less than significant.**			
IS-5.3-i: Changes in Geomorphic Processes Along the River Channels Resulting from the Levee Setback. Increasing the conveyance area of the Feather River floodway along the intermediate setback levee alignment would alter water velocities and depths in the existing river channel and floodway in this area and upstream during flood events large enough to inundate the levee setback area (greater than an approximately 3-year flow). These changes in velocities and depths could lead to decreased shear stresses from Star Bend to just below Shanghai Bend (project Segment 2) and slightly increased shear stresses at Shanghai Bend (Segment 3) and some distance upstream on both the Feather River and the Yuba River. Shear stresses would not change downstream of the levee setback area. Portions of the riverbanks along the Feather and Yuba Rivers where shear stresses increase could experience minor increases in erosive forces. However, any increases would not be sufficient to result in a substantial increase in the mobilization and/or deposition of sediments. This impact would be **less than significant.**	LTS	No mitigation is required.	LTS

Table 1-3c
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 3)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
IS-5.3-j: Changes in Geomorphic Processes Along the Project Levees Resulting from the Intermediate Levee Setback. Increasing the conveyance area of the Feather River floodway along the intermediate setback levee alignment would alter water velocities and depths in the existing floodway in this area and upstream during flood events large enough to inundate the levee setback area (greater than an approximately a 3-year flow). These changes in velocities and depths would lead to decreased shear stresses along the right and left bank Feather River levees from Star Bend to just below Shanghai Bend (project Segment 2) and increased shear stresses along the levees at Shanghai Bend (Segment 3) and some distance upstream on both the Feather River and the Yuba River. Shear stresses along the levees would not change downstream of the levee setback area. Any increases in shear stresses would not be sufficient to result in a substantial increase in the mobilization and/or deposition of sediments or increase exposure of persons or private property to flood hazards (i.e., through damage to the levees). This impact would be **less than significant.**	LTS	No mitigation is required.	LTS
5.4 Fisheries			
IS-5.4-a: Loss of Fish Habitat during Levee Repair and Strengthening Activities and Setback Levee Construction. This impact would be the same as Impact ASB-5.4-a, described under Alternative 2 above. For the same reasons as described above, this impact would be **potentially significant**.	PS	**(1): Prepare a SWPPP, File an NOI, and Comply with the NPDES Stormwater Permit for Project Construction Activities.** This measure is identical to Mitigation Measure LS-5.3-a(1) in Section 5.3, "Water Resources and River Geomorphology." **(2): Obtain a Use Permit from Yuba County and Comply with Permit Conditions for Erosion Control.** This measure is	LTS

Table 1-3c
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 3)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		identical to Mitigation Measure LS-5.3-a(2) in Section 5.3, "Water Resources and River Geomorphology." **(3): Obtain and Comply with Terms and Conditions of a Streambed Alteration Agreement for Construction Activities Associated with the Setback Levee.** This measure is identical to Mitigation Measure ASB-5.4-a(3) above.	
IS-5.4-b: Loss of Overhead Cover and Instream Woody Material Associated with Setback Levee Construction. This impact would be the same as Impact ASB-5.4-b, described under Alternative 2 above. For the same reasons as described above, this impact would be **less than significant**.	LTS	No mitigation is required.	LTS
IS-5.4-c: Effects on Habitat from Contaminants in Borrow Material. If contaminants are present in soil in the levee setback area or in borrow material used for the setback levee, they could be released when the area is inundated during flood events, resulting in harm to sensitive fish and habitat. This impact would be **potentially significant**.	PS	**(1): Conduct a Phase I Environmental Site Assessment for the Levee Setback Area and Implement Recommendations.** This measure is identical to Mitigation Measure ASB-5.3-g(1) in Section 5.3, "Water Resources and River Geomorphology." **(2): Evaluate Levee Borrow Material for Potential Contaminants in Coordination with the RWQCB.** This measure is identical to Mitigation Measure ASB-5.3-g(2) in Section 5.3, "Water Resources and River Geomorphology." **(3): Remove Nonhazardous Waste and Debris from the Levee Setback Area.** This measure is identical to Mitigation Measure ASB-5.3-g(3) in Section 5.3, "Water Resources and River Geomorphology."	LTS
IS-5.4-d: Fish Stranding Following Flooding of the Levee Setback Area. Following construction of the setback levee, the levee setback area may contain depressions where water could pond following inundation and fish become trapped as floodwaters recede to the main river channel. Stranded fish, including chinook salmon and	S	**Develop and Implement a Drainage and Grading Plan that Minimizes Loss or Incidental Loss of Fish from Stranding.** This measure is identical to Mitigation Measure ASB-5.4-d above.	LTS

Table 1-3c
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 3)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
steelhead, would be exposed to predators and increasing water temperatures; with no means to return to the river, they would inevitably die. This impact would be **significant.**			
IS-5.4-e: Increased Aquatic and Riparian Habitat in the Levee Setback Area. Setting back the Feather River levee in project Segment 2 could allow the expansion of the available aquatic and riparian habitat corridor and could improve the success of fish species that use the area. This effect would be **potentially beneficial.**	PB	No mitigation is required.	PB
5.5 Terrestrial Biological Resources			
IS-5.5-a: Effects on General Biological Resources. This impact would be the same as Impact ASB-5.5-a, described under Alternative 2 above, although the extent of the impact would be slightly less because of the reduced setback area associated with the intermediate setback levee alignment. For the same reasons as described above, this impact would be **less than significant.**	LTS	No mitigation is required.	LTS
IS-5.5-b: Effects on Sensitive Habitats. This impact would be the same as Impact ASB-5.5-b, described under Alternative 2 above, although the extent of the impact would be slightly less because of the reduced setback area associated with the intermediate setback levee alignment. For the same reasons as described above, this impact would be **significant.**	S	**Avoid Disturbance of Sensitive Habitat to the Extent Feasible and Comply with Corps and DFG Processes to Mitigate Unavoidable Effects.** This measure is identical to Mitigation Measure LS-5.5-b above.	LTS

Table 1-3c
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 3)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
IS-5.5-c: Loss of Special-Status Plants. This impact would be the same as Impact ASB-5.5-c, described under Alternative 2 above, although the extent of the impact would be slightly less because of the reduced setback area associated with the intermediate setback levee alignment. For the same reasons as described above, this impact would be **potentially significant.**	PS	**Conduct Detailed Special-Status Plant Surveys and Establish Construction Buffers as Necessary to Minimize Effects on Special-Status Plants.** This measure is identical to Mitigation Measure LS-5.5-c above.	LTS
IS-5.5-d: Effects on Valley Elderberry Longhorn Beetle. This impact would be the same as Impact ASB-5.5-d, described under Alternative 2 above, although the extent of the impact could be slightly less because of the reduced setback area associated with the intermediate setback levee alignment. For the same reasons as described above, this impact would be **potentially significant.**	PS	**Conduct Protocol-Level Surveys, Establish Buffers, and Implement a Mitigation Plan as Necessary to Minimize Effects on Valley Elderberry Longhorn Beetle.** This measure is identical to Mitigation Measure LS-5.5-d above.	LTS
IS-5.5-e: Effects on Northwestern Pond Turtle. This impact would be the same as Impact ASB-5.5-e, described under Alternative 2 above, although the extent of the impact would be slightly less because of the reduced setback area associated with the intermediate setback levee alignment. For the same reasons as described above, this impact would be **potentially significant.**	PS	**Conduct Surveys as Part of Dewatering Activities and Minimize Effects on Northwestern Pond Turtle.** This measure is identical to Mitigation Measure LS-5.5-e above.	LTS
IS-5.5-f: Effects on Giant Garter Snake. This impact would be the same as Impact ASB-5.5-f, described under Alternative 2 above, although the extent of the impact would be slightly less because of the reduced setback area associated with the intermediate setback levee alignment. For the same	S	**Implement Applicable Take Minimization Measures and a Mitigation Plan as Necessary for Giant Garter Snake.** This measure is identical to Mitigation Measure LS-5.5-f above.	LTS

Table 1-3c
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 3)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
reasons as described above, this impact would be **significant.**			
IS-5.5-g: Effects on Swainson's Hawk and Other Nesting Raptors. This impact would be the same as Impact ASB-5.5-g, described under Alternative 2 above, although the extent of the impact would be slightly less because of the reduced setback area associated with the intermediate setback levee alignment. For the same reasons as described above, this impact would be **potentially significant.**	PS	**(1): Conduct Preconstruction Surveys and Protect Active Nests to Minimize Effects on Swainson's Hawk.** This measure is identical to Mitigation Measure LS-5.5-g(1) above. **(2): Conduct Preconstruction Surveys, Protect Occupied Burrows, and Relocate Individuals as Necessary to Minimize Effects on Burrowing Owl.** This measure is identical to Mitigation Measure LS-5.5-g(2) above. **(3): Conduct Preconstruction Surveys and Protect Active Nests to Minimize Effects on Other Nesting Raptors.** This measure is identical to Mitigation Measure LS-5.5-g(3) above.	LTS
IS-5.5-h: Effects on Other Special-status Birds. This impact would be the same as Impact ASB-5.5-h, described under Alternative 2 above, although the extent of the impact would be slightly less because of the reduced setback area associated with the intermediate setback levee alignment. For the same reasons as described above, this impact would be **less than significant.**	LTS	No mitigation is required.	LTS
IS-5.5-i: Effects on Pacific Western Big-Eared Bat. This impact would be the same as Impact ASB-5.5-i, described under Alternative 2 above, although the extent of the impact would be slightly less because of the reduced setback area associated with the intermediate setback levee alignment. For the same reasons as described above, this impact would be **less than significant.**	LTS	No mitigation is required.	LTS

Table 1-3c
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 3)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
IS-5.5-j: Effects on Wildlife Corridors. This impact would be the same as Impact ASB-5.5-j, described under Alternative 2 above. For the same reasons as described above, this impact would be **less than significant.**	LTS	No mitigation is required.	LTS
5.6 Recreation			
IS-5.6-a: Temporary Changes in Recreational Opportunities during Levee Repairs and Setback Levee Construction. Construction noise could disrupt recreational uses in the project area, particularly in areas adjacent to the existing levee. Some wildlife species present in or inhabiting natural areas are likely to be disturbed by noise and by the presence of project construction crews and equipment. Portions of the Feather River State Wildlife Area in project Segment 1 may need to be closed temporarily to hunting and other recreational activities for safety reasons while adjacent sections of the existing Feather River levee are being repaired. There would be no public access to the Star Bend Boat Launch and Fishing Access for several days while levee repairs were conducted in this area. Although these temporary disturbances may affect the recreation experience for bird-watchers, hunters, boaters, and other recreational users, displaced recreational uses could be accommodated by other nearby facilities (Whitmore, pers. comm., 2006). For this reason, and because of the temporary nature of this effect, this impact would be **less than significant**.	LTS	No mitigation is required.	LTS
IS-5.6-b: Long-Term Changes in Recreational Opportunities Resulting from Levee Repairs and	LTS	No mitigation is required.	LTS

Table 1-3c
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 3)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Setback Levee Construction. Implementing levee repairs along project Segments 1 and 3 would have little or no effect on recreational uses in the Lake of the Woods Management Unit or along the Feather River channel in these project segments. Implementing the levee setback in Segment 2 would slightly modify Feather River flood stage elevations in the project vicinity during high flows, possibly affecting recreational uses, and could affect survival rates of wildlife following high-flow periods, which could temporarily affect associated wildlife-related recreation. The changes in Feather River flood stage elevations that would result from expansion of the Feather River floodway in Segment 2, however, would be infrequent, of short duration, and during periods when river stage is already high; therefore, no new effects on recreational uses are expected. Sections of the existing Feather River levee would be left in place as part of the proposed project, which would minimize losses of wildlife that could adversely affect long-term recreational activities. This impact would be **less than significant**.			
5.7 Aesthetic Resources			
IS-5.7-a: Temporary Changes in Visual Resources Associated with Levee Repairs and Setback Levee Construction. Levee repair and strengthening activities and construction of the intermediate setback levee would temporarily reduce the aesthetic qualities of views by introducing earthmoving equipment and other construction equipment, materials, and work crews into the viewshed of recreationists, motorists on SR	LTS	No mitigation is required.	LTS

Table 1-3c
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 3)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
70 and Feather River Boulevard, workers in nearby farming areas, and residents of the area. However, the construction areas would typically be distant from and/or screened from most viewers. Where residents would be near the construction area (e.g., in project Segment 3), construction would pass by these areas relatively quickly and changes in aesthetic conditions would be short term and temporary. For these reasons, this impact would be **less than significant.**			
IS-5.7-b: Changes in Light and Glare. There would be no substantial long-term sources of light or glare associated with levee repairs or with the long-term presence of the intermediate setback levee and detention basin. However, equipment staging areas may be temporarily lit at night during construction, and portions of the construction areas may also need to be lit at night. Although such nighttime lighting may be visible from various residences, particularly in project Segment 3, in most locations views of the construction areas would be largely shielded by orchards, other vegetation, and structures. Where lit construction areas are visible, lighting would be short-term and temporary. For these reasons, this impact would be **less than significant.**	LTS	No mitigation is required.	LTS
IS-5.7-c: Long-Term Modifications of Views from Levee Repairs and Installation of the Setback Levee. Levee repair and strengthening activities would not dramatically change the appearance of project Segments 1 and 3. Construction of the intermediate setback levee	LTS	No mitigation is required.	LTS

Table 1-3c
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 3)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
would change the appearance of Segment 2. However, all three project segments are of low to moderate aesthetic value, there would be no substantial adverse effect on any scenic vista, and these changes would not substantially alter the general character of views of the area. This impact would be **less than significant.**			
5.8 Cultural Resources			
IS-5.8-a: Damage to or Destruction of Prehistoric Archaeological Site CA-Yub-5. This impact would be the same as Impact ASB-5.8-a, described under Alternative 2 above. For the same reasons as described above, this impact would be **potentially significant**.	PS	**Evaluate the Significance of Archaeological Site CA-Yub-5 and, If Determined to Be Significant, Protect the Site from Damage and/or Conduct Data Recovery Excavation.** This measure is identical to Mitigation Measure ASB-5.8-a above.	LTS
IS-5.8-b: Damage to or Destruction of Resources Associated with Prehistoric Archaeological Sites CA-Yub-13 and CA-Yub-14. This impact would be the same as Impact LS-5.8-a, described under Alternative 1 above. For the same reasons as described above, this impact would be **potentially significant**.	PS	**(1): Conduct Further Evaluation and Subsurface Testing to Determine Whether Proposed Levee Improvements Could Damage Significant Resources Associated with Prehistoric Archaeological Sites CA-Yub-13 and CA-Yub-14.** This measure is identical to Mitigation Measure LS-5.8-a(1) above. **(2): Monitor Ground-Disturbing Activities in the Vicinity of Archaeological Sites CA-Yub-13 and CA-Yub-14.** This measure is identical to Mitigation Measure LS-5.8-a(2) above.	LTS
IS-5.8-c: Damage to or Destruction of Cultural Resources in Unsurveyed Areas. Portions of the project area could not be surveyed for cultural resources because of ground conditions and lack of access, and potential borrow or staging areas also have not been surveyed. Significant cultural resources could be present in these areas, and could be damaged by project-related ground-disturbing activities. This impact would be **potentially**	PS	**Survey Unexamined Areas before Project Ground-Disturbing Activities and Implement Further Mitigation As Necessary.** This measure is identical to Mitigation Measure LS-5.8-b above.	LTS

Table 1-3c
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 3)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
significant.			
IS-5.8-d: Damage to or Destruction of Undocumented Buried Archaeological Resources during Construction. This impact would be the same as Impact ASB-5.8-d, described under Alternative 2 above. For the same reasons as described above, this impact would be **potentially significant**.	PS	**Stop Work and Implement Measures to Protect Archaeological Resources If Discovered during Ground-Disturbing Activities.** This measure is identical to Mitigation Measure LS-5.8-c above.	LTS
IS-5.8-e: Damage to or Destruction of Undocumented Human Remains during Construction. This impact would be the same as Impact ASB-5.8-e, described under Alternative 2 above. For the same reasons as described above, this impact would be **potentially significant**.	PS	**If Human Remains Are Discovered during Ground-Disturbing Activities, Stop Work and Comply with State Laws Pertaining to the Discovery of Human Remains.** This measure is identical to Mitigation Measure LS-5.8-d above.	LTS
5.9 Air Quality			
IS-5.9-a: Temporary Emissions of ROG, NO_X, and PM_{10} during Construction. This impact would be the same as Impact ASB-5.9-a, described under Alternative 2 above. For the same reasons as described above, this impact would be **significant**.	S	**Implement FRAQMD Pollution-Control Measures to Minimize Temporary Emissions of ROG, NO_X, and PM_{10} during Construction.** This measure is identical to Mitigation Measure LS-5.9-a above.	SU
IS-5.9-b: Long-Term Changes in Emissions of ROG, NO_X, and PM_{10} Associated with Levee Repairs and Strengthening and the Levee Setback. This impact would be the same as Impact ASB-5.9-b, described under Alternative 2 above. Potential beneficial effects on air quality could be slightly less because the levee setback area would be smaller, and, thus, slightly less agricultural land has the potential to be converted to nonagricultural use. However, operational emissions would still be	PB	No mitigation is required.	PB

Table 1-3c
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 3)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
negligible under Alternative 3. As a result, for the same reasons as described above, this impact would be **potentially beneficial.**			
IS-5.9-c: Exposure of Sensitive Receptors to Toxic Air Emissions. This impact would be the same as Impact ASB-5.9-c, described under Alternative 2 above. For the same reasons as described above, this impact would be **less than significant.**	LTS	No mitigation is required.	LTS
5.10 Noise			
IS-5.10-a: Temporary Increase in Noise Levels during Construction. This impact would be similar to Impact ASB-5.10-a, described under Alternative 2 above. Although the intermediate setback levee alignment is in a different location than the ASB alignment relative to some sensitive receptors, and traffic generation may be somewhat different based on needs for borrow material, the extent and nature of the impact would not be appreciably different. For the same reasons as described above, this impact would be **significant**.	S	**Limit Generation of Noise by Equipment during Project Construction.** This measure is identical to Mitigation Measure LS-5.10-a above.	SU
IS-5.10-b: Exposure of Sensitive Receptors to Excessive Groundborne Vibration During Construction. This impact would be the same as Impact LS-5.10-b, described under Alternative 1 above. Construction processes under Alternative 2 would not occur any closer to sensitive land uses than those discussed under Alternative 1, and no new construction equipment or processes that would generate additional groundborne vibration would be used. For the same reasons as described above, this	LTS	No mitigation is required.	LTS

Table 1-3c
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 3)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
impact would be **less than significant**.			
5.11 Transportation and Circulation			
IS-5.11-a: Increase in Traffic on Local Roadways near the Existing Levee and Setback Levee Alignment during Construction. During the anticipated 20-month construction period, commute trips and truck haul trips associated with levee repair and strengthening activities and setback levee construction would increase traffic on Feather River Boulevard, SR 70, and local roadways that provide access to the project alignment (e.g., Anderson Avenue, Country Club Avenue, Riverside Drive). However, construction-related trips would not exceed the thresholds established by ITE for temporary traffic increases and would not represent a substantial increase in traffic levels on these roadways or other local roads. This impact would be **less than significant**.	LTS	No mitigation is required.	LTS
IS-5.11-b: Increase in Traffic Hazards on Local Roadways near the Existing Levee and Setback Levee Alignment during Construction. Construction-related traffic could track mud and gravel onto local roadways, and haul truck traffic could interfere with the flow of traffic on these roads. These conditions could pose hazards for travelers on local roadways. This impact would be **potentially significant.**	PS	**Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways.** This measure is identical to Mitigation Measure LS-5.11-b above.	LTS
5.12 Public Services, Utilities, and Service Systems			
IS-5.12-a: Damage of Public Utility Infrastructure and Disruption of Service in the Levee Repair and Intermediate Levee Setback	PS	**Coordinate with Utility Providers to Remove, Reinforce, and Modify Public Utility Infrastructure in the Intermediate Levee Setback Area and Prevent Damage of Facilities.** This	LTS

Table 1-3c
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 3)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Areas. This impact would be similar to Impact ASB-5.12-a, described under Alternative 2 above. However, the extent of affected utilities would be somewhat less under Alternative 3 because the intermediate setback levee alignment is located farther to the west, resulting in a smaller setback area and effects on fewer facilities. For the same reasons as described above, this impact would be **potentially significant.**		measure is identical to Mitigation Measure ASB-5.12-a above.	
IS-5.12-b: Damage of Water Supply and Drainage Facilities and Interference with Service in the Levee Repair and Intermediate Levee Setback Areas. This impact would be similar to Impact ASB-5.12-b, described under Alternative 2 above. However, the extent of affected water supply and drainage facilities would be somewhat less under Alternative 3 because the intermediate setback levee alignment is located farther to the west, resulting in a smaller setback area and effects on fewer facilities. For the same reasons as described above, this impact would be **less than significant.**	LTS	No mitigation is required.	LTS
IS-5.12-c: Potential for Conflicts with Emergency Response Vehicles during Construction. This impact would be the same as Impact ASB-5.12-c, described under Alternative 2 above. For the same reasons as described above, this impact would be **potentially significant.**	PS	**Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways.** This measure is identical to Mitigation Measure LS-5.11-b, "Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways," in Section 5.11, "Transportation and Circulation."	LTS
5.13 Paleontological Resources			
IS-5.13-a: Disturbance of Unknown Paleontological Resources during Earthmoving Activities. Portions of the project area and	PS	**Conduct Training for Construction Personnel, Cease Work if Paleontological Resources are Encountered, and Implement an Appropriate Mitigation Strategy.** This measure is identical	LTS

Table 1-3c
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 3)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
immediate vicinity are underlain by the Modesto and Riverbank Formations, which are paleontologically sensitive rock formations. Construction activities in the Modesto and Riverbank Formations associated with proposed levee strengthening (e.g., slurry cutoff walls, relief wells), construction of the intermediate setback levee, use of the soil borrow area/detention basin location, and related activities (e.g., relocation of Pump Station No. 3) could adversely affect unknown subsurface paleontological resources. This impact would be **potentially significant.**		to Mitigation Measure LS-5.13-a.	
Cumulative Impacts			
Alternative 3, The Levee Strengthening and Intermediate Setback Levee Alternative, would also contribute to significant cumulative impacts related to conversion of Important Farmland to nonagricultural uses; emissions of ROG, NO_X, and PM_{10} during construction; and potentially noise during construction. The mitigation described above would not reduce the project's contributions to these impacts to less-than-significant levels.			

B	=	Beneficial effect	LTS	=	Less than significant
PB	=	Potentially beneficial effect	PS	=	Potentially significant
NI	=	No impact	S	=	Significant

CHAPTER 2 INTRODUCTION

2.1 PURPOSE AND PREPARATION OF THIS DOCUMENT

This document is a draft environmental impact report (DEIR) that has been prepared on behalf of the Three Rivers Levee Improvement Authority (TRLIA) to evaluate the potential environmental effects of the Feather River Levee Repair Project (FRLRP). TRLIA is a joint powers authority with the mission of advancing the flood safety of Yuba County, California. The FRLRP would improve flood protection in the Reclamation District (RD) 784 area of Yuba County, which is bounded by the Yuba, Feather, and Bear Rivers and the Western Pacific Interceptor Canal (WPIC). The project was initially considered by the Yuba County Water Agency (YCWA) as an element of the Yuba-Feather Supplemental Flood Control Project (Y-FSFCP), which YCWA initiated in 2001 using funding available through the Costa-Machado Water Act of 2000 (Water Act of 2000). As described later in this chapter, the FRLRP DEIR incorporates by reference the programmatic environmental impact report (EIR) prepared for the Y-FSFCP, which was certified by YCWA in March 2004 (Yuba County Water Agency 2004).

This DEIR has been prepared in accordance with the requirements of the California Environmental Quality Act (CEQA) (California Public Resources Code Section 21000 et seq.) and the State CEQA Guidelines (14 California Code of Regulations [CCR] Section 15000 et seq.). A state or local public agency must comply with CEQA when it undertakes an activity that may cause a direct or reasonably foreseeable indirect change in the physical environment. The proposed project may cause a direct or indirect change in the environment and is therefore subject to CEQA. As specified in State CEQA Guidelines Section 15367, the public agency that has the principal responsibility for carrying out or approving a project is the lead agency for CEQA compliance.

TRLIA began the CEQA environmental review process for the FRLRP by issuing a notice of preparation (NOP) of an EIR dated June 14, 2006 (see Appendix A). A public scoping meeting was held on June 29, 2006. Comments received in response to the NOP and at the scoping meeting are included in Appendix A. Comments pertinent to the scope and content of the EIR are reflected in this document.

An EIR is an informational document used to inform public agency decision makers and the general public of any significant environmental effects of a project, identify feasible ways to minimize the significant effects, and describe reasonable alternatives to the project that can reduce environmental impacts. TRLIA, as required by CEQA, will consider the information presented in the EIR when determining whether to approve the proposed project. Other public agencies with discretionary approval authority over aspects of the project, referred to under CEQA as “responsible agencies,” will also use the EIR when deciding whether to approve or permit the project (see Section 2.7, “Agency Roles and Responsibilities”).

2.2 PROJECT BACKGROUND

The FRLRP is proposed to provide increased protection from flooding from the Feather and lower Yuba Rivers in Yuba County. The regional setting of the FRLRP is shown in Figure 2-1, "Regional Setting."

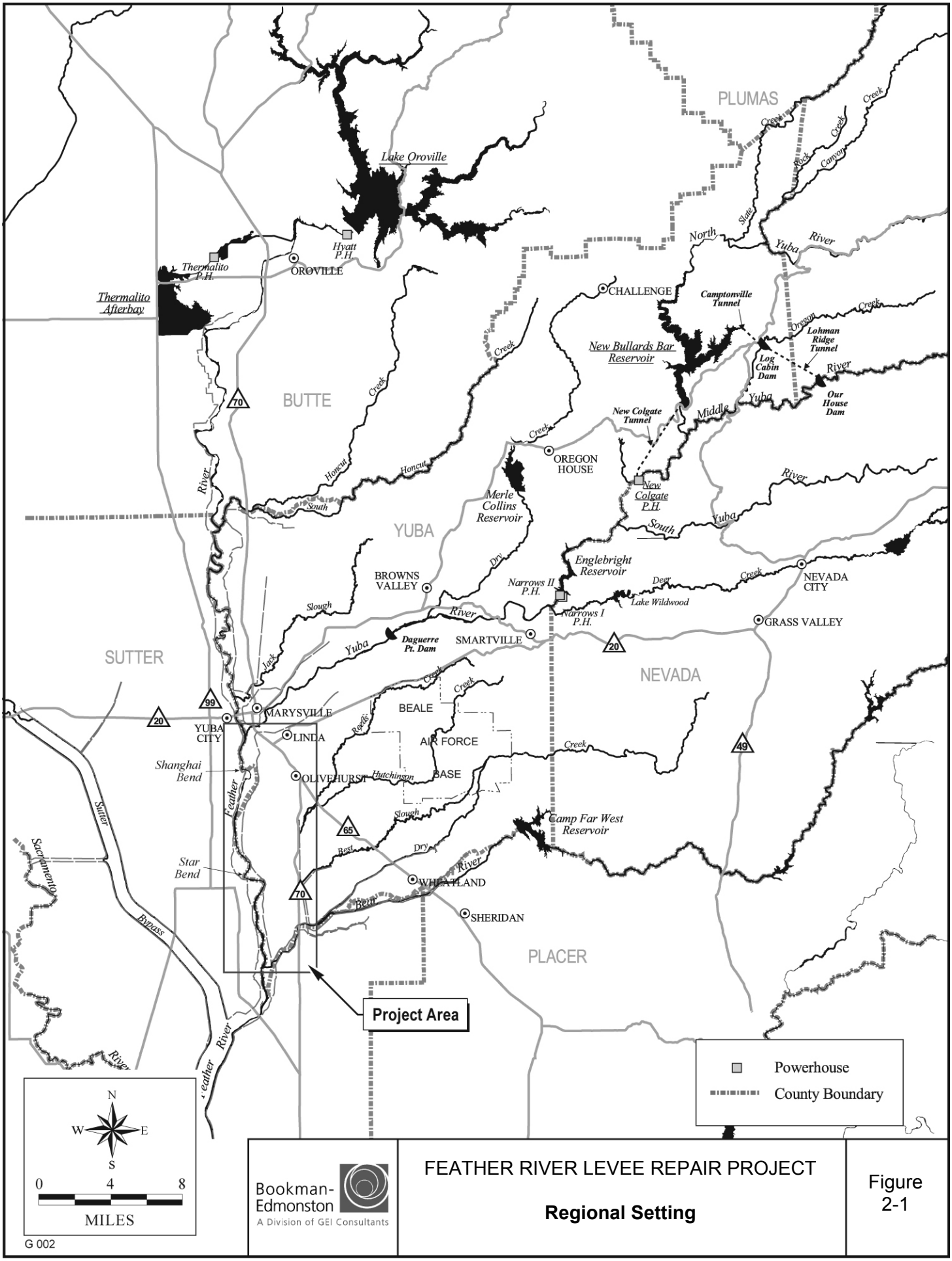
Catastrophic floods have occurred in Yuba County since the mid-1800s. Figure 2-2, "Areas Flooded in January 1997," shows flooding during the most recent such event—the 1997 flood. Following the 1997 flood, YCWA formed a flood control study team and initiated a study of measures that could provide a higher level of protection to supplement the flood protection system for Yuba County. With passage of the Water Act of 2000, the efforts of the study team focused on those measures that could be achieved within the budget provisions of this act. This ongoing effort, funded through Water Act of 2000 grant monies, is the Y-FSFCP.

A program-level DEIR for the Y-FSFCP was completed in October 2003 (Yuba County Water Agency 2003). It evaluated three flood control elements, including a setback of the left (east) bank levee (the levee on the left side of the river when facing downstream) of the Feather River below the Yuba River. The Y-FSFCP levee setback was proposed for two segments of the Feather River (referred to as Above Star Bend and Below Star Bend) upstream of the Bear River. Most issues related to the levee setback component of the Y-FSFCP were addressed in the EIR at a project level of detail, while some issues were addressed at a general, or "programmatic," level of detail where project description detail was not sufficient to support a more detailed analysis. The final EIR (FEIR) was completed and certified and the program of elements approved by the YCWA Board in March 2004 (Yuba County Water Agency 2004).

In 2003, while YCWA was finishing its first level of Y-FSFCP studies of a select group of flood control elements, the U.S. Army Corps of Engineers (Corps) in a separate effort identified several deficiencies in the Bear River and WPIC levees that prevent these levees from meeting the Federal Emergency Management Agency (FEMA) criteria for providing protection from a 100-year flood event. In addition, it was found that a 2,800-foot stretch of the Yuba River levee on the upstream side of State Route (SR) 70 does not meet slope stability requirements.

Since 2003, various studies have been completed by Reclamation District (RD) 784, YCWA, TRLIA, the Corps, and others to determine necessary actions for RD 784 levees to meet current FEMA criteria. Based on the results of these studies, flood control improvements were planned to be implemented in several phases. Priority was given to implementing improvements to the Yuba River levee above SR 70 (Phase 1); improvements to the upper Bear River, WPIC, and Yuba River levees, and the Olivehurst detention basin (Phase 2); and construction of a setback levee along the lower Bear River, tying into the Feather River levee just below Clark Slough (Phase 3). These projects are either completed or under construction. In November 2004, the EIR for the Feather-Bear Rivers Levee Setback Project (F-BRLSP) (Phase 3) was certified and construction was initiated in 2005. This project precludes the need to improve the Feather River left bank levee below Pump Station No. 2.

The project that is the subject of this DEIR, the FRLRP, is a modification of the Above Star Bend (ASB) levee setback that was previously proposed and evaluated in the Y-FSFCP EIR. The FRLRP consists of repairing and strengthening the Feather River left bank levee as well as a



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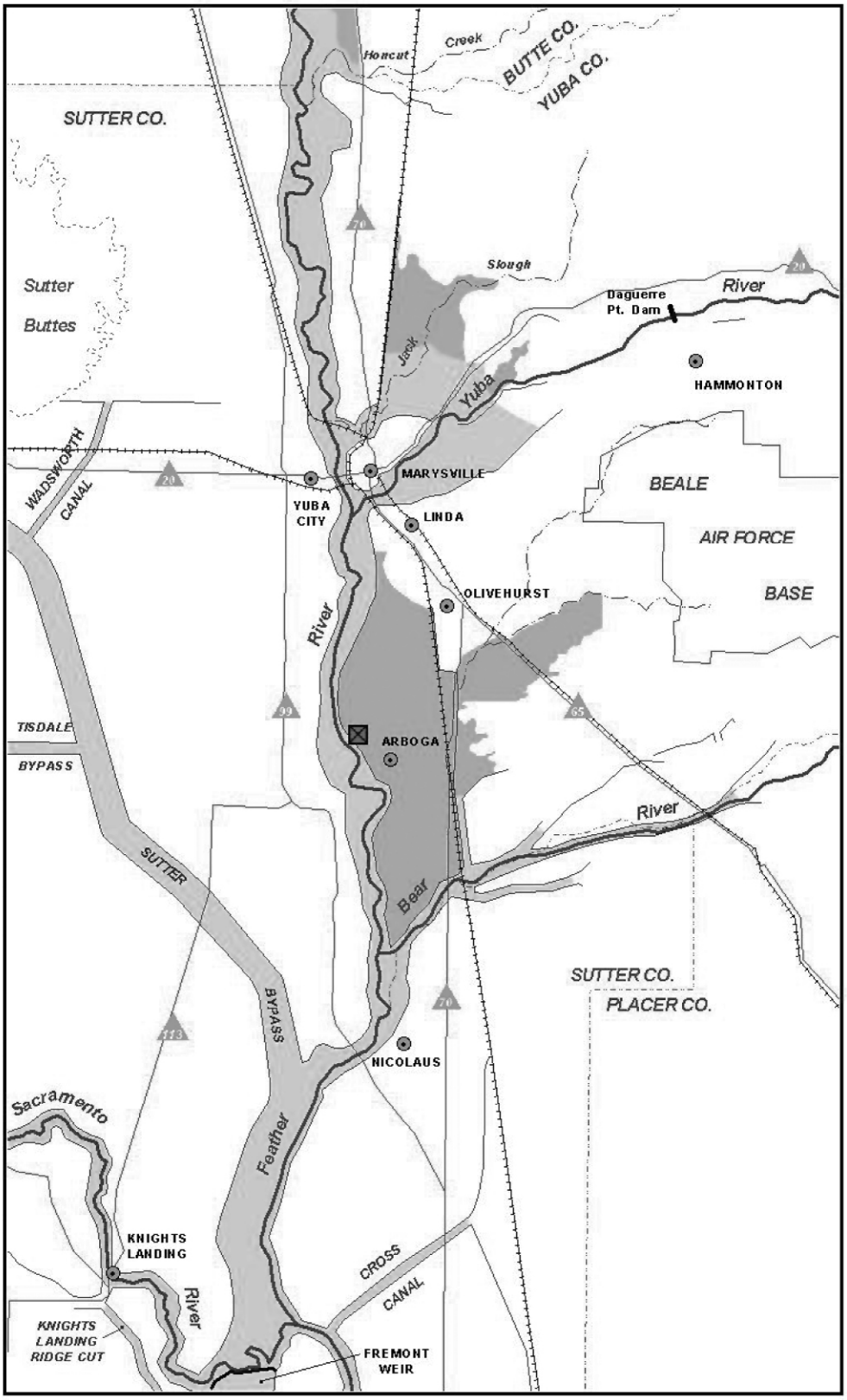
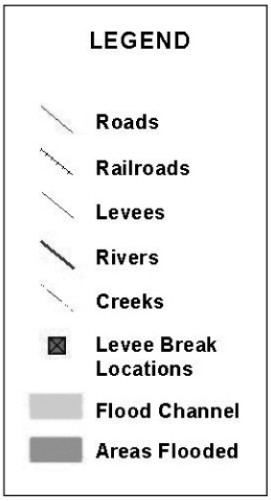
FEATHER RIVER LEVEE REPAIR PROJECT

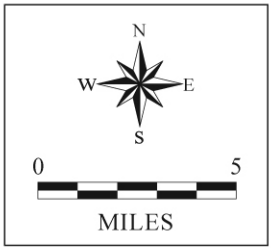
Regional Setting

Figure 2-1

Source: Yuba County Water Agency 2001







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FEATHER RIVER LEVEE REPAIR PROJECT

Areas Flooded in January 1997

Figure 2-2

G 003

Source: Yuba County Water Agency 2001

small portion of the left (south) bank levee of the lower Yuba River. An alternative approach to simply repairing and strengthening the existing levee is constructing a setback levee in the central portion of the project area following a modified version of the ASB levee setback alignment. The proposed FRLRP is described in summary form below and in detail in Chapter 4, "Description of the Proposed Project." The history and background of the FRLRP are described in detail in Chapter 3, "Project Purpose, Need, and Development."

2.3 SUMMARY DESCRIPTION OF THE PROPOSED PROJECT

The FRLRP project area is divided into three project segments, as shown in Figure 2-3, "FRLRP Project Area":

- Project Segment 1 consists of the existing Feather River left bank levee from Project Levee Mile (PLM) 13.3 to PLM 17.1 (from approximately RD 784 Pump Station No. 2 upstream to Star Bend).
- Project Segment 2 consists of the existing Feather River left bank levee from PLM 17.1 to PLM 23.6 (from approximately Star Bend upstream to west of the Yuba County Airport).
- Project Segment 3 consists of the existing Feather River left bank levee from PLM 23.6 to PLM 26.1, and the Yuba River left bank levee from PLM 0.0 to PLM 0.3 (west of the Yuba County Airport to the railroad crossing adjacent to the SR 70 bridge).

The proposed project consists of implementation of one of three potential alternatives, each evaluated at an equal level of detail in this DEIR. Under all project alternatives, it is anticipated that the detailed design of proposed activities in project Segments 1 and 3 would be completed in 2006 and that construction would take place in 2007. For activities in Segment 2, detailed design would occur from late 2006 through 2007, and construction is expected to take place in 2007 and 2008.

2.3.1 ALTERNATIVE 1 – THE LEVEE STRENGTHENING ALTERNATIVE

Under this alternative, levee repair and strengthening activities would be completed along the entire length of project Segments 1, 2, and 3. Levee repairs and strengthening would consist of various activities, including installation of slurry cutoff walls, relief wells, and stability/seepage berms and placement of buried cobble in areas where erosion of the levee embankment has been identified as a problem. RD 784 Pump Station No. 3 is located next to the existing levee (Figure 2-3). Implementation of Alternative 1 would involve removing Pump Station No. 3 and installing a new pump station east of the levee, which would correct seepage deficiencies related to the existing pump station. The capacity of Pump Station No. 3 would be increased to accommodate discharges from relief wells installed as part of levee repairs. A detention basin would also be constructed to temporarily hold relief well flows during peak discharge periods when discharge volumes could exceed the capacity of the new pump station.

2.3.2 ALTERNATIVE 2 – THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE

Under this alternative, levee repair and strengthening activities would be completed along project Segments 1 and 3. Repair and strengthening activities in these segments would be the same as for Alternative 1. In project Segment 2, a setback levee would be constructed roughly following the ASB setback levee alignment identified in the Y-FSFCP EIR. Setting back the levee along this alignment would provide a new levee constructed on a more stable foundation using the latest engineering methods. Various seepage control measures would be implemented along the setback levee. These could include zoned embankments, slurry cutoff walls, seepage/stability berms, and relief wells.

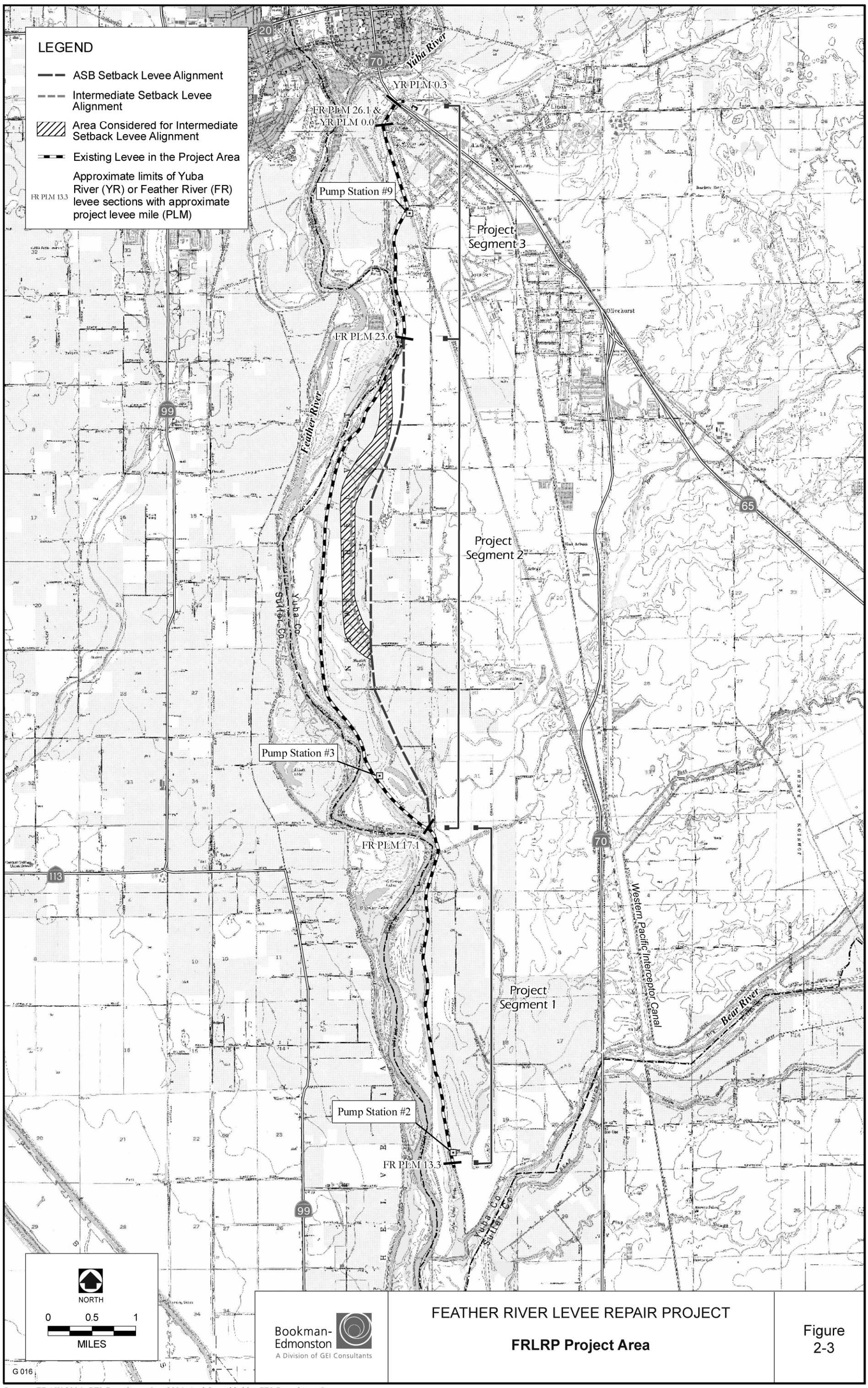
Portions of the existing levee along the setback alignment would be removed to allow water to flow into and out of the new floodway/setback area (i.e., the area between the existing levee and the setback levee) during high river stages. With removal of portions of the existing levee, approximately 1,600 acres of land would become part of the new floodway/setback area (i.e., the area between the existing levee and the new setback levee). This acreage includes residences and other structures; appropriate compensation would be negotiated with affected landowners. Removal or protection of utilities and wells in the floodway/setback area would also be required, and lands in this area would be contoured and managed to prevent fish stranding as high flows recede. Land uses in the levee setback area could consist of agricultural operations and/or habitat restoration activities that do not impede the flood flow function of the setback area. No specific plans for habitat restoration in the levee setback area are proposed at this time, although this is considered a potential future use.

In addition to providing a more structurally sound levee, a setback levee would improve flood protection by expanding the floodway and, consequently, lowering water surface elevations during high-flow events. However, the decision to remove any of the existing levee is a federal decision that would be made by the Corps, and the timing of such an action is uncertain. Therefore, the new levee may function as a “backup” levee for some time until this decision is made, during which time the hydraulic benefits of a setback levee (lowering of water surface elevation) would not be realized but the backup levee would provide the desired level of protection.

Because local drainage patterns would be changed by the setback levee, implementation of this project alternative would require construction of detention basins to prevent adverse flooding effects on nearby properties. Similar to Alternative 1, a pump station to replace Pump Station No. 3 would be installed. The new pump station would be located immediately east of the new setback levee.

2.3.3 ALTERNATIVE 3 – THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE

- FRLRP Alternative 3 is very similar to Alternative 2. The same levee repair and strengthening activities described for Alternatives 1 and 2 would be conducted in project



Sources: EDAW 2004; GEI Consultants, Inc. 2004; Aerial provided by GEI Consultants, Inc.

Segments 1 and 3. In Segment 2 a setback levee would be constructed. Approximately the southern one-third of this setback levee alignment would follow the ASB setback levee alignment identified in Alternative 2. However, in the vicinity of Anderson Avenue the setback levee would shift several hundred feet to the west of the alignment proposed under Alternative 2 (Figure 2-3). This westward shift would allow less land to be placed in the new floodway under Alternative 3 than under Alternative 2. Fewer houses, structures, and other facilities would be affected by levee construction or would need to be removed from the floodway/setback area. Approximately 1,300 acres of land would become part of the new floodway/setback area under Alternative 3.

Figure 2-3 shows a single alignment for the intermediate setback levee. However, for the portion of the intermediate setback levee that deviates from the ASB setback levee alignment, a specific route has not yet been confirmed and several options are being considered. The actual alignment could be located to the east or west of the alignment shown (as indicated by the area considered for the intermediate setback levee alignment shown in Figure 2-3). Considerations for final route selection include the suitability of underlying soil conditions for levee construction and the extent of flood control benefits (i.e., moving the alignment westward and reducing the size of the Feather River high-water channel would result in fewer flood control benefits). The route shown in Figure 2-3 and analyzed in this EIR is considered to be representative of the various options considered for the intermediate setback levee alignment.

The general design, construction, and operational characteristics of an intermediate setback levee under Alternative 3 would be same as for the ASB setback levee under Alternative 2, including land uses in the setback area, the relocation/replacement of Pump Station No. 3, and creation of detention basins. As described for Alternative 2, the setback levee could function temporarily as a “backup levee” while federal approval is sought for the removal of the existing levee in Segment 2.

2.4 PROJECT CONSISTENCY WITH REGIONAL FLOOD AND FLOODPLAIN MANAGEMENT EFFORTS

As described in the Y-FSFCP DEIR, in the last several years two major efforts have produced recommendations for regional flood and floodplain management activities in California. In 2002, the California Floodplain Management Task Force released its report on floodplain management in California (California Floodplain Management Task Force 2002). During that same year, the Corps and the State of California Reclamation Board (The Reclamation Board) drafted an integrated plan for flood damage reduction and environmental restoration for the Sacramento and San Joaquin River Basins in the Sacramento and San Joaquin River Basins California Comprehensive Study (Comprehensive Study) (U.S. Army Corps of Engineers and State of California Reclamation Board 2002). Because they provide an important part of the context of flood control planning in the Central Valley, the two efforts described in the Y-FSFCP are discussed again below.

2.4.1 CALIFORNIA FLOODPLAIN MANAGEMENT TASK FORCE

In 2000, Governor Davis signed Assembly Bill 1147, which recommended the creation of the California Floodplain Management Task Force. In February 2002, the governor delegated authority to the California Department of Water Resources to convene a Floodplain Management

Task Force. The newly formed task force sought to recommend floodplain management strategies designed to reduce flood losses and maximize the benefits of floodplains. The task force found that existing programs are inadequate to accomplish these goals and that time is of the essence in implementing improvements. The task force made recommendations to accomplish these goals in a report issued in December 2002 (California Floodplain Management Task Force 2002). The following recommendations are particularly relevant to the FRLRP:

- *Multiobjective Management Approach for Floodplains:* A multiobjective management approach to flood management projects should be promoted.
- *Flood Management Approaches to Ecosystem Restoration and Agricultural Conservation:* Flood management programs and projects, while providing for public safety, should maximize opportunities for agricultural conservation and ecosystem protection and restoration, where feasible.
- *Multijurisdictional Partnerships:* The state should encourage multijurisdictional partnerships when floodplain management projects are planned and implemented.
- *Proactive and Adaptive Management of Floodplains:* State and local agencies should manage floodplains proactively and adaptively by periodically adjusting to current physical and biological conditions, new scientific information, and knowledge.
- *Coordination among Agencies and Groups:* The state should encourage and create incentives for additional coordination among stakeholders.
- *Tools for Protection of Flood Compatible Land Uses:* The state should identify, develop, and support tools to protect flood-compatible land uses.

2.4.2 SACRAMENTO AND SAN JOAQUIN RIVER BASINS COMPREHENSIVE STUDY

The Comprehensive Study is a joint effort by The Reclamation Board and the Corps, in coordination with federal, state, and local agencies, and various groups and organizations in California's Central Valley. Responding to the flooding of 1997, the California Legislature and the U.S. Congress directed the Corps to develop a comprehensive plan for flood damage reduction and environmental restoration for the Sacramento and San Joaquin River Basins. This work is being performed in cooperation with The Reclamation Board.

In 2002, a draft interim report was released by the Comprehensive Study team (U.S. Army Corps of Engineers and State of California Reclamation Board 2002). The report identified the comprehensive plan as an approach to developing projects in the future to reduce damage from flooding and restore the ecosystem in the Sacramento and San Joaquin River Basins. The Comprehensive Study has proposed a set of guiding principles to govern implementation of projects that propose modifying the Sacramento or San Joaquin River flood control systems. These principles have been developed to ensure that projects proposed for implementation are consistent with the objectives established by the Corps and The Reclamation Board. The following are the Comprehensive Study's draft guiding principles:

- Recognize that public safety is the primary purpose of the flood management system.
- Promote effective floodplain management. Promote agriculture and open-space protection.
- Avoid hydraulic and hydrologic impacts.
- Plan system conveyance capacity that is compatible with all intended uses.
- Provide for sediment continuity.
- Use an ecosystem approach to restore and sustain the health, productivity, and diversity of the floodplain corridors.
- Optimize use of existing facilities.
- Integrate with the CALFED Bay-Delta Program and other programs.
- Promote multipurpose projects to improve flood management and ecosystem restoration.

The FRLRP lies in the Feather River Region of the Comprehensive Study. The draft interim report notes in the discussion of this region that:

> [l]evees along the Feather, Yuba, and Bear Rivers that are already set back from the river offer greater flexibility in accommodating flood management and ecosystem restoration. There are opportunities to widen selected reaches of the floodways to reduce constrictions and increase flow capacity. Reducing floodway constrictions along the lower Feather River would improve levee reliability in the Marysville–Yuba City urban area by reducing flood stage and could increase the opportunity for riparian habitat within the floodway.

2.4.3 PROJECT CONSISTENCY

The alternatives considered for the FRLRP have been designed to be consistent with federal and state flood management efforts. Applicable key recommendations and guiding principles listed above have been incorporated into one or more of the FRLRP alternatives in some form. While addressing local Yuba County needs for flood control, the FRLRP could provide opportunities for regional flood management. Although the FRLRP does not specifically include ecosystem restoration activities, habitat restoration/enhancement is identified as a potential land use in the expanded floodway area if a setback levee alternative is selected (i.e., Alternative 2 or Alternative 3). Coordination with numerous stakeholders through TRLIA participation in the Yuba-Feather Work Group (Y-FWG) has led to development of FRLRP alternatives with support from a diverse array of stakeholders. Coordination with the Corps is also ongoing, both through the Y-FWG and through separate briefings. Representatives from TRLIA have briefed The Reclamation Board on the regional benefits of ongoing flood management activities in Yuba County, including the FRLRP. By incorporating the flood and floodplain management recommendations and guidelines of federal and state agencies and seeking a broad coalition of support for the FRLRP, the local agencies have developed a proposed program that is consistent

with, and that promotes, regional flood management efforts in California, particularly in the Sacramento and San Joaquin River Basins.

2.5 TYPE OF EIR

This document is a "project" EIR. There is the potential to partially tier this FRLRP EIR from the Y-FSFCP EIR, which was certified by YCWA in March 2004. The CEQA concept of "tiering," as described in Section 15152 of the State CEQA Guidelines, refers to the analysis of environmental effects at a general level in one broad (i.e., first-tier) EIR, with subsequent (i.e., second-tier) environmental documents prepared for more defined projects. A second-tier document incorporates by reference the applicable general discussions from the broader, first-tier EIR and concentrates on the issues specific to the later project that warrant examination at a greater level of detail.

Partial tiering from the Y-FSFCP EIR (i.e., the first-tier document) is possible because the EIR evaluated the environmental effects of an ASB setback levee similar to that considered under Alternatives 2 and 3 in this FRLRP EIR (i.e., the second-tier document). However, because the FRLRP and Y-FSFCP EIRs have two different lead agencies under CEQA (TRLIA and YCWA, respectively), and because the Y-FSFCP EIR does not evaluate many of the levee strengthening components included in the FRLRP, it was determined that preparation of an independent project EIR for the FRLRP, rather than a tiered EIR, would be a clearer and more straightforward approach. However, much of the information in the Y-FSFCP EIR is still applicable to the FRLRP, and the Y-FSFCP EIR is incorporated by reference into the FRLRP EIR (see Section 2.8, "Documents Incorporated by Reference").

2.6 EIR SCOPE

Pursuant to CEQA and the State CEQA Guidelines, a lead agency may limit an EIR's discussion of environmental effects when such effects are not considered potentially significant (Public Resources Code Section 21002.1, State CEQA Guidelines Section 15143). A determination of which impacts would be potentially significant was made for this project based on reviews of the project proposal, information presented in the Y-FSFCP EIR, preliminary feasibility studies performed for the FRLRP, and comments received during a public scoping meeting and on the NOP issued for this EIR. See Chapter 3, "Project Purpose, Need, and Development," for a summary of the project scoping process.

It was determined that the FRLRP would not have the potential to result in significant impacts on mineral resources or on several elements related to population and housing, and that these resources would not require evaluation in this EIR. There are no known mineral resources in the project area or at other sites that could be affected by levee repairs or setback levee construction or by changes in hydrologic conditions under FRLRP implementation. The FRLRP would not involve the construction of new housing or require the addition of housing to accommodate workers. Project Alternatives 2 and 3 would result in the removal of five to 10 homes in the levee setback area. Displacement of housing is addressed in Section 5.1, "Land Use." The project would not bring into development any areas that are not already planned and approved for development. (Note that Chapter 7, "Other CEQA-Required Sections," includes a discussion of

growth inducement in relation to the FRLRP, including how increased flood protection provided by the project could remove an impediment to growth in the area.)

The EIR addresses potential impacts in the following resource areas:

- land use (including agricultural resources);
- geology, soils, and mineral resources;
- water resources and river geomorphology (including water quality and hazardous materials);
- fisheries;
- terrestrial biological resources;
- recreation;
- aesthetic resources;
- cultural resources;
- air quality;
- noise;
- transportation and circulation;
- public services, utilities, and service systems; and
- paleontological resources.

2.7 INTENDED USES OF THE EIR/AGENCY ROLES AND RESPONSIBILITIES

This EIR will be used by TRLIA and CEQA responsible agencies to fulfill the requirements of CEQA. It will also be used as an informational document by federal agencies that could have a permitting or approval authority for the project and by other local and state agencies, including CEQA trustee agencies that may have an interest in the project.

A CEQA responsible agency is a state agency, board, or commission or any local or regional agency, other than the lead agency, that has a legal responsibility for reviewing, carrying out, or approving aspects of a project. Responsible agencies must actively participate in the lead agency's CEQA process and review the lead agency's CEQA document. This EIR will be used by responsible agencies to ensure that they have met the requirements of CEQA before deciding whether to approve or permit project elements over which they have authority.

A trustee agency is a state agency that has jurisdiction by law over natural resources that are held in trust for the people of the State of California. Trustee agencies that have jurisdiction over resources potentially affected by the FRLRP are the California Department of Fish and Game (fish and wildlife resources) and the California State Lands Commission (navigable waterways).

The agencies that may have responsibility or jurisdiction over the implementation of aspects of the proposed project are listed below.

2.7.1 LEAD AGENCY

- Three Rivers Levee Improvement Authority: Overall project approval

2.7.2 RESPONSIBLE AGENCIES

- California Department of Fish and Game: California Endangered Species Act consultation and potential Section 2081 incidental take authorization; Section 1602 lake and streambed alteration agreement
- California Department of Water Resources: Possible administration of funds approved through state bonds
- Central Valley Regional Water Quality Control Board (Region 5): National Pollutant Discharge Elimination System permit pursuant to Section 402 of the federal Clean Water Act; water quality certification under Section 401 of the Clean Water Act
- State of California Reclamation Board: Encroachment permit
- California State Lands Commission: Possible land use lease; approval of work in the bed of a navigable waterway
- Reclamation District 784: Approval of levee modification through The Reclamation Board permit process
- Yuba County: Use permit for grading/excavation; other possible construction authorizations/permits and zoning changes
- California Department of Transportation: Possible authorization for Yuba River work in the vicinity of SR 70

2.7.3 FEDERAL AGENCIES WITH PERMITTING/APPROVAL AUTHORITY

- U.S. Army Corps of Engineers: Permitting under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act for discharge of fill into waters of the United States or work in, on, or under navigable waters of the United States; approval of project levee modification/setback and setback levee design; federal lead agency for the Yuba River Basin Project, which could incorporate the FRLRP as an element
- U.S. Fish and Wildlife Service: Federal Endangered Species Act (ESA) consultation and incidental take authorization
- National Marine Fisheries Service: ESA consultation and possible incidental take authorization

2.7.4 OTHER AGENCIES THAT MAY USE INFORMATION IN THE EIR

This EIR may be used for information by the following additional agencies that have responsibility for the protection of resources that could be affected by the proposed project:

- Feather River Air Quality Management District: Effects on air quality
- Native American Heritage Commission: Effects on Native American burials or artifacts

- State Office of Historic Preservation: Effects on historic and cultural resources

Compliance with the National Environmental Policy Act (NEPA) is also necessary when there is federal participation in a project; a federal discretionary permit, entitlement, or authorization or federal funding is required; or the project would occur on federal lands. Because the proposed project involves the modification of federal levees, it is expected to involve federal permitting, authorizations, and/or funding at some level. Project elements are also expected to require Corps permitting under Section 404 of the Clean Water Act. Therefore, the project is expected to require NEPA compliance, which would be undertaken separately from, but would be supported by, the CEQA review process.

2.8 NOTICE OF PREPARATION AND PUBLIC SCOPING

In a public involvement process that was begun by YCWA, TRLIA continues to coordinate with landowners; federal, state, and local agencies; organizations; and other parties to determine those parties' respective interests in implementing projects that are elements of the Y-FSFCP, including the FRLRP, and to guide further studies and actions. TRLIA issued an NOP on June 14, 2006, to inform public agencies and the general public of its intention to prepare an EIR on the FRLRP. The NOP initiated the public and agency scoping process and requested comments on the project alternatives and associated features. A scoping and informational meeting was held by TRLIA on June 29, 2006. The NOP and comments received on the NOP, including comments provided at the scoping meeting, are included in Appendix A. See Chapter 9, "Consultation and Coordination," for further information on public involvement.

2.9 DOCUMENTS INCORPORATED BY REFERENCE

In accordance with State CEQA Guidelines Section 15150, the following documents are incorporated by reference into this EIR, and relevant portions of these documents are summarized in this EIR:

- Yuba County Water Agency. 2003 (June). *Report on Feasibility, Yuba-Feather Supplemental Flood Control Project*, including supporting appendices. Marysville, CA. Prepared by Flood Control Study Team. Prepared for submittal to California Department of Water Resources, Sacramento, CA.

- Yuba County Water Agency. 2003 (October). *Draft Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project.* State Clearinghouse #2001072062. Marysville, CA. Prepared by EDAW, Jones & Stokes, and Flood Control Study Team.

- Yuba County Water Agency. 2004 (March). *Final Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project.* State Clearinghouse #2001072062. Marysville, CA. Prepared by EDAW, Jones & Stokes, and Flood Control Study Team.

- Three Rivers Levee Improvement Authority. 2004 (August). *Bear River and Western Pacific Interceptor Canal Levee Improvements Project Final Environmental Impact Report.* State Clearinghouse #2004032118. Marysville, CA. Prepared by Jones & Stokes, Sacramento, CA.

- Yuba County Water Agency and Three Rivers Levee Improvement Authority. 2004 (October). *Report on Feasibility of RD 784 Supplemental Flood Control Improvements of the*

Yuba-Feather Supplemental Flood Control Project. Marysville, CA. Prepared by Flood Control Study Team. Prepared for submittal to California Department of Water Resources, Sacramento, CA.

- Three Rivers Levee Improvement Authority. 2004 (September). *Draft Environmental Impact Report for the Feather Bear Rivers Levee Setback Project.* State Clearinghouse #2004072113. Marysville, CA. Prepared by EDAW and Flood Control Study Team.
- Three Rivers Levee Improvement Authority. 2004 (November). *Final Environmental Impact Report for the Feather Bear Rivers Levee Setback Project.* State Clearinghouse #2004072113. Marysville, CA. Prepared by EDAW and Flood Control Study Team.

2.10 ORGANIZATION OF THIS DOCUMENT

This DEIR is organized as follows:

- Chapter 1, "Summary," provides an overview of the findings and conclusions of this EIR.
- Chapter 2, "Introduction," provides an overview of the CEQA and EIR review process, summarizes the main features of the proposed project, outlines the scope and organization of this document, defines standard terms, and lists documents incorporated by reference.
- Chapter 3, "Project Purpose, Need, and Development," describes the purpose of and need for the FRLRP and explains the history of the project and the development of the project concept.
- Chapter 4, "Description of the Proposed Project," describes in detail the three project alternatives being considered and associated features.
- Chapter 5, "Environmental Analysis," describes—for the three proposed FRLRP alternatives and for each of the topics listed above in Section 2.6, "EIR Scope"—the regulatory background; environmental setting; less-than-significant, potentially significant, significant, and beneficial environmental effects; mitigation for potentially significant and significant effects; and any effects remaining significant after mitigation.
- Chapter 6, "Cumulative Impacts," describes the impacts of implementing the proposed FRLRP alternatives in combination with the impacts of related past, present, and reasonably foreseeable projects.
- Chapter 7, "Other CEQA-Required Sections," discusses growth-inducement potential of the project, known areas of controversy, irreversible and irretrievable commitment of resources, and unresolved issues.
- Chapter 8, "Alternatives," describes the alternatives that were considered but rejected for further evaluation, describes the alternatives carried forward for evaluation; compares the potential impacts of the three project alternatives evaluated in Chapter 5, "Environmental Analysis"; evaluates the No Project alternative; and discusses the "environmentally superior" alternative.

- Chapter 9, "Consultation and Coordination," describes the public and agency involvement effort associated with the project.
- Chapter 10, "References," lists the sources of information cited throughout the DEIR.
- Chapter 11, "Preparers of the Environmental Document," lists the individuals who contributed to preparation of the DEIR.
- Appendices provide background information.

2.11 STANDARD TERMINOLOGY

The DEIR uses several standard terms as follows:

- "Yuba-Feather Supplemental Flood Control Project," or "Y-FSFCP," is the set of flood control elements proposed by YCWA for implementation under the budget provisions of the Water Act of 2000.
- "Feather River Levee Repair Project," or "FRLRP," is the proposed project, an element of the Y-FSFCP, which would entail repairing and strengthening a portion of the Feather River and lower Yuba River left bank levees, and potentially constructing a setback levee along a portion of the Feather River using one of two possible alignment scenarios. Relocating and replacing RD 784 Pump Station No. 3 and constructing detention basins are also included in the project.
- "Feather-Bear Rivers Levee Setback Project," or "F-BRLSP," is an element of the Y-FSFCP that entails setting back a portion of the lower Bear River levee, as well as restoring riparian and other natural habitats in the levee setback area, removing the orchard from the lower Bear River floodway, and constructing detention basins. This project is currently under construction.
- "Proposed levee setback" means either the ASB levee setback or the intermediate levee setback, as evaluated in this EIR.
- "Proposed project" means any of the three project alternatives, consisting of levee repair and strengthening or a levee setback in conjunction with levee repair and strengthening, and associated features as summarized above in Section 2.3, "Summary Description of the Proposed Project," and described in detail in Chapter 4, "Description of the Proposed Project." Each of the three proposed project alternatives is evaluated at an equal level of detail in this EIR.
- "Project site" refers to all locations where project activities could occur, including but not limited to levee strengthening locations, setback levee alignments, the levee setback area, soil borrow areas, detention basins, construction staging areas, and pump station relocation sites.
- "Project area" generally means the project site (as defined above), areas immediately adjacent to the project site, and areas connecting portions of the project site, such as routes between soil borrow areas and the setback levee.

- "Project vicinity" generally refers to an area that is broader than the project area, and that encompasses all the lands that would be represented on a map depicting the project site.
- "No impact" means no change from existing conditions.
- "Less-than-significant impact" means no substantial adverse change in the physical environment (no mitigation needed).
- "Potentially significant impact" means a potential effect that may cause a substantial adverse change in the environment (mitigation is recommended, because in the CEQA process potentially significant impacts are treated as if they were significant impacts).
- "Significant impact" means a substantial adverse change in the physical environment (mitigation is recommended).
- "Significant and unavoidable impact" means a substantial adverse change in the physical environment that cannot feasibly be avoided, even with the implementation of mitigation.

2.12 PUBLIC PARTICIPATION AND ADDITIONAL STEPS IN THE CEQA REVIEW PROCESS

This DEIR is being distributed to interested agencies, stakeholder organizations, and individuals. This distribution ensures that interested parties have an opportunity to express their views regarding the environmental effects of the project, and to ensure that information pertinent to permits and approvals is provided to decision makers for the lead agency and CEQA responsible agencies. This document is available for review by the public during normal business hours at the office of the Yuba County Administrator at 915 Eighth Street, Suite 115, Marysville, California, as well as the Yuba County Library at 303 Second Street, Marysville, California.

The DEIR is being distributed for a 45-day review period that will end on September 18, 2006. Written comments should be sent directly to TRLIA by the close of business on September 18, 2006, at the following address:

Paul Brunner
Attn: Three Rivers Levee Improvement Authority
Government Center
915 Eighth Street, Suite 115
Marysville, CA 95901-5273
Fax: (530) 749-7312

Comments may also be provided via e-mail to pbrunner@co.yuba.ca.us. If comments are provided via e-mail, please include the project title in the subject line, attach comments in MS Word format, and include the commenter's U.S. Postal Service mailing address.

A public hearing on the DEIR will be held from 6:30 to 8:30 p.m. on September 6, 2006, in the Yuba County Government Center at 915 Eighth Street, Marysville. It is not necessary to provide testimony during the public hearing; comments on the DEIR will be accepted throughout the meeting and will be recorded at the public comment table. Comments may also be submitted throughout the comment period as described above.

Once all comments have been assembled and reviewed, responses will be prepared to address significant environmental issues that have been raised in the comments. The responses will be included in an FEIR.

CHAPTER 3 PROJECT PURPOSE, NEED, AND DEVELOPMENT

3.1 PROJECT PURPOSE AND OBJECTIVES

The Feather River Levee Repair Project (FRLRP), an element of the Yuba-Feather Supplemental Flood Control Project (Y-FSFCP), is proposed to increase flood protection in the Reclamation District (RD) 784 area of Yuba County. RD 784 is bounded by the Yuba River on the north, the Feather River on the west, the Bear River on the south, and the Western Pacific Interceptor Canal (WPIC) on the east. The proposed project would entail repairing and strengthening the existing Feather River left (east) bank levee from Project Levee Mile (PLM) 13.3 to PLM 17.1 and from PLM 23.6 to PLM 26.1, and repairing and strengthening the existing Yuba River left (south) bank levee from the confluence with the Feather River (PLM 0.0) upstream to PLM 0.3 (see Figure 2-3 in Chapter 2, "Introduction"). The segment of the Feather River left bank levee between PLM 17.1 and PLM 23.6 would either be repaired and strengthened in its current location, or set back following one of two possible alignment scenarios. Land uses in the levee setback area could consist of agricultural operations and/or habitat restoration activities that would be compatible with flood control objectives. However, no specific plans for habitat restoration in the setback area are proposed at this time.

The primary purpose of the proposed project is to correct identified deficiencies in the left bank levees of the Feather and Yuba Rivers, and consequently to improve flood protection for the RD 784 area of Yuba County. To a large extent, levee deficiencies in the project area relate to the potential for water to seep under (underseepage) and through (through-seepage) the levee soils during flood events, potentially leading to levee failure. The project design objectives focus on measures to bring the levees into compliance with Federal Emergency Management Agency (FEMA) geotechnical certification requirements for underseepage or through-seepage, as well as engineering and design standards of the State of California Reclamation Board (The Reclamation Board) and the U.S. Army Corps of Engineers (Corps). The proposed project is also intended to address areas along the Feather River levee where erosion of the levee is a concern. These specific project design objectives are consistent with the following overall project objectives:

- to secure flood protection for at least a flood event with a 0.5% (or 1-in-200) annual chance of exceedance,
- to help secure FEMA certification of the subject reaches of levee,
- to avoid increasing downstream flow and stage during peak-flow conditions,
- to achieve these objectives as soon as possible, and
- to incorporate environmental mitigation as appropriate.

The proposed actions to achieve these objectives are the subject of this environmental impact report (EIR). These objectives are consistent with the requirements in Section 15124(a) of the State CEQA Guidelines and were used in the development and assessment of project alternatives.

3.2 NEED FOR IMPROVED FLOOD PROTECTION

3.2.1 BACKGROUND

Yuba County has a long history of flooding. Several conditions combine to pose unique challenges for flood control operations in the Yuba-Feather River system. These conditions are described in detail in the *Draft Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project* (Yuba County Water Agency 2003). Historical accounts describe large floods on the Feather and Yuba Rivers in 1839-40, 1847, 1850, 1852, 1853, 1861-62, 1867-68, 1881, 1886, and 1889-90. Despite the construction of a system of flood control levees beginning in the early 20th century, recorded floods occurred in 1907, 1909, 1928, 1937, 1940, 1962, and 1963, and five major floods—in 1950, 1955, 1964, 1986, and 1997—caused substantial property damage and loss of life. (Yuba County Water Agency 2003.) The floods of 1986 and 1997 were especially catastrophic for Yuba County, inundating tens of thousands of acres, destroying thousands of homes and businesses, and causing loss of life. More than 100,000 people were evacuated from the region during the 1997 flood, the largest evacuation in California history.

Two major flood protection efforts resulted from the 1986 Central Valley floods. First, the Corps and California Department of Water Resources (DWR) initiated the System Evaluation Project, which restored federally constructed levees in RD 784 to current design standards and reestablished the 1957 design top-of-levee profile. (In general, on the Feather and Yuba Rivers, the 1957 design level for water surface elevation is greater than the water surface elevation for the FEMA-designated "100-year flood.") Most of the System Evaluation levee reconstruction work in RD 784 was completed in 1998 at a cost of approximately $32 million. This work consisted of 5.2 miles of toe drains and stability berms, 6.2 miles of slurry cutoff walls, and 7.5 miles of levee height restoration. Yuba County Water Agency (YCWA) paid an additional $2.2 million to deepen levee reconstruction slurry cutoff walls from the System Evaluation design to the Yuba River Basin Project design (Yuba County et al. 2004). The 1997 flood resulted in the identification of additional seepage problems, however, leading to the Corps' $6 million System Evaluation Site 7 Extension project, which was completed in 2004.

The second effort was YCWA's initiation in 1988 of the Yuba River Basin Project, which led to a Corps project designed to achieve what was then considered to be a "200-year" level of protection for RD 784 levees. The Yuba River Basin Project was approved by Congress in 1998, and a construction start was authorized in 2002. In 2003, new Corps underseepage guidelines led to reevaluation of the project, which substantially increased the estimated cost. Because of this cost increase, the Yuba River Basin Project must be reauthorized by Congress. A General Reevaluation Report is currently being prepared by the Corps to obtain a new project authorization and to initiate construction.

In general, levee strength and stability remains a significant concern throughout the RD 784 service area.

3.2.2 YUBA-FEATHER SUPPLEMENTAL FLOOD CONTROL PROJECT

In response to the catastrophic flood of 1997, YCWA initiated a seven-phase program of flood control studies to identify methods to achieve a higher level of protection, particularly for the areas in RD 784 that had been subject to flooding several times in the past. The goal of this effort was to substantially improve the flood protection that would be provided by the System Evaluation Project and the Yuba River Basin Project. As part of this effort, YCWA identified and evaluated 33 potential elements representing a comprehensive range of available technology that could provide portions or all of the objective flood control protection. These ranged from relatively minor operational changes providing only a small increment of flood volume reduction to large single-purpose and multipurpose dams with substantial flood volume reductions. These elements are described in Chapters 3 and 8 of the Y-FSFCP draft EIR (DEIR) (Yuba County Water Agency 2003).

Following the passage of the Costa-Machado Water Act of 2000 (Water Act of 2000) by California voters, YCWA's flood control study team turned the focus of its seven-phase study to those measures that could be achieved within the budget provisions of the Water Act of 2000, which provided for a total of $90 million in bond funds targeted for the Yuba-Feather River basin. This ongoing effort, funded through Water Act of 2000 grant monies, is the Y-FSFCP. Of the $90 million, $70 million was targeted for planning, design, and construction work and $20 million was targeted for environmental mitigation and enhancement.

As part of the Y-FSFCP studies, YCWA prepared a feasibility study, including a DEIR released in October 2003 (Yuba County Water Agency 2003). This study evaluated combinations of three flood control elements:

- an outlet capacity increase at New Bullards Bar Reservoir,
- forecast-coordinated operations of New Bullards Bar Reservoir and Lake Oroville, and
- a setback of the left (east) bank levee of the Feather River between Shanghai Bend and the Bear River.

The Y-FSFCP levee setback was proposed for two segments, which were referred to as the Above Star Bend (ASB) and Below Star Bend (BSB) levee setbacks. The ASB levee setback was proposed to extend approximately 5.2 miles along the Feather River, from southwest of the Yuba County Airport to 1 mile downstream of Star Bend. The BSB levee setback was proposed to extend approximately 3.4 miles, from 1 mile downstream of the ASB levee setback to 2,000 feet upstream of the confluence with the Bear River. It was assumed that the levee setbacks evaluated in the Y-FSFCP would include a habitat restoration component in the expanded floodway area, combined with some continuing agricultural uses. The final EIR (FEIR) for the Y-FSFCP was certified and the program of elements approved by the YCWA Board in March 2004.

3.2.3 FLOOD RISKS ALONG THE BEAR RIVER AND WESTERN PACIFIC INTERCEPTOR CANAL

In May 2003, while YCWA was completing this first level of Y-FSFCP studies, the Corps, in a separate draft floodplain mapping study for DWR on the Feather River and its tributaries, identified several deficiencies in freeboard on the Bear River and WPIC levees that prevent these

levees from meeting the FEMA criteria for protecting RD 784 from a "100-year" flood event. (The top of the levee must be at least 3 feet higher than the 100-year event.) This information was unexpected by Yuba County officials because the 1998 Corps Yuba River Basin study did not recommend any work for the Bear River and WPIC levees to achieve a 200-year level of protection for the RD 784 area. In addition, it was found that a 2,800-foot stretch of the Yuba River levee on the upstream side of State Route (SR) 70 did not meet slope stability requirements. These issues were seen as a major setback to the long-term plan to increase the level of flood protection to a 200-year and eventually greater level of protection.

In 1993, following the initiation of the System Evaluation Project and the Yuba River Basin Project, and before the most recent devastating flood (in 1997), Yuba County had approved the Plumas Lake Specific Plan, which provides for a 12,000-home development on 5,200 acres in the southern portion of the RD 784 area. Development was initiated in the Plumas Lake Specific Plan area in 2002. The results of the 2003 Corps floodplain mapping study indicate that the people and property in the RD 784 area, including homes that had already been built in the Plumas Lake Specific Plan area before the release of the Corps study, are subject to a much higher flood risk than previously believed. Without levee improvements that meet FEMA criteria, FEMA may issue new Flood Insurance Rate Maps (FIRMs) for the RD 784 area. Once the FIRMs are issued, flood insurance rates for the area would increase and carrying flood insurance would become mandatory. The ongoing economic development of the county could be jeopardized.

To avoid having RD 784 mapped into the FEMA 100-year floodplain, the RD 784 levees will need to be certified as meeting current FEMA criteria. Consequently, YCWA, RD 784, and Yuba County, in consultation with many landowners and developers in the south county, elected to move aggressively on a program for evaluating options for achieving FEMA certification of the RD 784 levees. One step was the formation of the Three Rivers Levee Improvement Authority (TRLIA), a joint powers authority composed of Yuba County and RD 784 that was formed to address funding and implementation of levee repairs for the RD 784 area.

RD 784 first completed a Problem Identification Study to determine the magnitude of the repair effort necessary to achieve FEMA certification and a higher level of protection on the WPIC and Bear River levees. A geotechnical engineering report was prepared in November 2003 that identified significant geotechnical problems with the levee foundations along most of the Bear River levee and several reaches of the WPIC levee. Areas of concern with regard to erosion were also identified. Subsequently, a more in-depth engineering study was initiated to develop design alternatives to meet the study objectives and develop plans and specifications for some of the selected construction elements that compose the resulting FEMA certification program. These construction elements—which are in different stages of planning and implementation—have been addressed in ongoing studies completed by RD 784, TRLIA, and others. Priority was given to these construction elements, which are all part of the Y-FSFCP:

- repairs and improvements to the Yuba River levee above SR 70,
- repairs and improvements to the upper Bear River and WPIC levees (described below),
- repairs and modification to RD 784 Pump Station No. 6,

- construction of the Olivehurst detention basin, and
- construction of a setback levee along the lower Bear River to tie into the Feather River levee below RD 784 Pump Station No. 2 (described below).

TRLIA prepared a study of repairs and improvements to the upper Bear River and WPIC levees and the lower Bear River levee, and issued findings in May 2004 in the EIR for the Bear River and Western Pacific Interceptor Canal Levee Improvements Project (Bear River Project) (Three Rivers Levee Improvement Authority 2004). The Bear River Project proposed implementing flood control improvements along the Bear River and the WPIC, including raising and strengthening the Bear River right (north) bank levee in place and completing various related improvements to provide protection from a 200-year flood event, such as seepage and erosion protection measures.

In September 2004, TRLIA prepared another EIR that evaluated alternatives to address identified levee deficiencies in the right bank levee of the lower Bear River. The Feather-Bear Rivers Levee Setback Project (F-BRLSP) DEIR evaluated two setback levee alternatives that would involve either setting back the left bank levee of the lower Feather River and the right bank levee of the lower Bear River or setting back only the right bank levee of the lower Bear River. The EIR prepared for the F-BRLSP resulted in selection of the lower Bear River levee setback as the preferred alternative. The FEIR for the F-BRLSP was completed and certified by the TRLIA Board in November 2004. As approved, this setback levee project involves setting back the right bank levee of the lower Bear River from the confluence with the Feather River, where the alignment ties in with the existing Feather River levee below RD 784 Pump Station No. 2, to approximately 1,400 feet southwest of SR 70. The Bear River setback levee precludes the need to improve the Feather River levee below Pump Station No. 2. (Other elements of the setback project are habitat restoration in the levee setback area, the removal of the orchard in the lower Bear River floodway and replacement with riparian habitat, and the construction of a detention basin outside the levee setback area.) This project replaces particular elements of the Bear River Project, including raising and strengthening of the lower Bear River levee. In addition to addressing identified deficiencies in the lower Bear River levee, setting back the lower Bear River levee will remove channel constrictions, thereby improving the level of flood protection for the RD 784 area by lowering upstream water surface elevations.

3.3 DEVELOPMENT OF THE FEATHER RIVER LEVEE REPAIR PROJECT

As described above, the proposed FRLRP is an element of the Y-FSFCP that would address the identified deficiencies in the left bank levees of the Yuba and Feather Rivers, and consequently would improve flood protection for the RD 784 area of Yuba County. Flood control elements examined in the feasibility study and the EIR prepared for the Y-FSFCP included a setback of the left bank levee of the Feather River between Shanghai Bend and the Bear River. The levee setback was proposed for two segments, which were referred to as the ASB and BSB levee setback areas. YCWA subsequently altered the BSB setback levee concept described in the Y-FSFCP programmatic EIR to incorporate a setback of the right (north) bank levee of the lower Bear River, which is the major component of the F-BRLSP. The levee setback component of the project that is the subject of this DEIR, the FRLRP, is a modification of the ASB levee setback that was previously proposed and evaluated in the Y-FSFCP EIR.

Ongoing engineering and technical feasibility studies have resulted in development of three project alternatives to meet the project objectives discussed above and to correct levee deficiencies for the Feather and lower Yuba Rivers in Yuba County:

- *Alternative 1 – The Levee Strengthening Alternative.* Under this alternative, levee repair and strengthening activities would be completed along the entire length of FRLRP project Segments 1, 2, and 3 (Figure 2-3 in Chapter 2, "Introduction"). Establishment of soil borrow areas and construction of a detention basin would be required. Implementation of Alternative 1 would involve removing existing RD 784 Pump Station No. 3 and installing a new pump station east of the Feather River levee, which would correct seepage deficiencies related to the existing pump station.

- *Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative.* Under this alternative, levee repair and strengthening activities would be completed along project Segments 1 and 3. Repair and strengthening activities in these segments would be the same as for Alternative 1. In project Segment 2, a setback levee would be constructed roughly following the ASB setback levee alignment identified in the Y-FSFCP EIR. Establishment of soil borrow areas and construction of a detention basin would be required. Similar to Alternative 1, a pump station to replace Pump Station No. 3 would be installed.

- *Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative.* Under this alternative, the same levee repair and strengthening activities described for Alternatives 1 and 2 would be conducted in project Segments 1 and 3. In Segment 2 a modified setback levee would be constructed that would allow less land to be placed in the new floodway than under Alternative 2. The general design, construction, and operational characteristics of an intermediate setback levee under Alternative 3 would be same as for the ASB setback levee under Alternative 2.

The proposed FRLRP consists of implementation of one of these three potential alternatives, each evaluated at an equal level of detail in this DEIR. These alternatives are described in detail in Chapter 4, "Description of the Proposed Project."

CHAPTER 4 DESCRIPTION OF THE PROPOSED PROJECT

4.1 INTRODUCTION

4.1.1 OVERVIEW

Most of the levee system in Yuba County was constructed during the 1920s using construction practices of that era. Studies by the California Department of Water Resources (DWR), the U.S. Army Corps of Engineers (Corps), Reclamation District (RD) 784, and Three Rivers Levee Improvement Authority (TRLIA) have found that several reaches of the levee system protecting the RD 784 area do not satisfy geotechnical criteria for seepage at the water surface elevation for the 100-year flood event. In addition, constrictions in the Feather and Bear Rivers have created backwater effects that raise the flood stage at upstream locations.

An analysis of the Feather River levee was performed by Kleinfelder and is described in *Problem Identification Report, TRLIA Phase 4 Feather River and Yuba River Left Bank Levees, Reclamation District No. 784* (PIR) (Kleinfelder 2006). The PIR addresses the Feather River left (east) bank levee from approximately Project Levee Mile (PLM) 13.3 near RD 784 Pump Station No. 2 to the beginning of the Yuba River left (south) bank levee at approximately PLM 26.1, and the Yuba River left bank levee from PLM 0.0 to PLM 0.3 (Figure 4-1, "FRLRP Project Features"). The purpose of the analysis described in the PIR was to perform a feasibility-level evaluation of subsurface geotechnical conditions and levee conditions in accordance with Federal Emergency Management Agency (FEMA) requirements. The conclusions of the PIR indicate that portions of the subject levee do not currently meet FEMA geotechnical certification requirements for through-seepage or underseepage.

To correct the deficiencies identified along the levee segments analyzed in the PIR, three project alternatives for the Feather River Levee Improvement Project (FRLRP) are being considered and are analyzed in this environmental impact report (EIR):

- Alternative 1—Repair and strengthen the existing Feather River left bank levee from PLM 13.3 to PLM 26.1 (from approximately Pump Station No. 2 to the mouth of the Yuba River), and the Yuba River left bank levee from PLM 0.0 to PLM 0.3 (from the confluence with the Feather River to the Union Pacific Railroad crossing at the State Route [SR] 70 bridge) (Figure 4-1). This alternative is referred to in subsequent sections of this EIR as either "Alternative 1" or "the Levee Strengthening Alternative."

- Alternative 2—Strengthen the existing Feather River left bank levee from PLM 13.3 to PLM 17.1 (the area below Star Bend) and from PLM 23.6 to PLM 26.1 (from Shanghai Bend to the confluence with the Yuba River), and the Yuba River left bank levee from PLM 0.0 to PLM 0.3. Construct a new setback levee (the "ASB setback levee") between Feather River PLM 17.1 and PLM 23.6, approximately following the 2003 Above Star Bend (ASB) setback levee alignment identified in the EIR for the Yuba-Feather Supplemental Flood Control Project (Y-FSFCP) (Yuba County Water Agency 2003a). This alternative is referred to in subsequent sections as either "Alternative 2" or "the Levee Strengthening and ASB Setback Levee Alternative."

- Alternative 3—Strengthen the existing Feather River left bank levee from PLM 13.3 to PLM 17.1 and from PLM 23.6 to PLM 26.1, and the Yuba River left bank levee from PLM 0.0 to PLM 0.3. (This is the same levee strengthening activity proposed under Alternative 2.) Construct a new setback levee (the "intermediate setback levee") along an intermediate alignment between approximately Feather River PLM 17.1 and PLM 23.6. This alternative is referred to in subsequent sections as either "Alternative 3" or "the Levee Strengthening and Intermediate Setback Levee Alternative."

Each of these three alternatives is analyzed at an equal level of detail in this EIR, and the EIR can support the approval and implementation of any one of these alternatives by TRLIA.

The area considered for levee improvements is divided into three project segments as follows:

- Segment 1—The existing Feather River left bank levee from PLM 13.3 to PLM 17.1 (from approximately Pump Station No. 2 to Star Bend) (Figure 4-1). Proposed improvements to this levee segment are identical for each project alternative and consist of repairing and strengthening the existing levee in place to correct seepage and/or stability deficiencies.

- Segment 2—The existing Feather River left bank levee from approximately PLM 17.1 to PLM 23.6 (from Star Bend to immediately south of Shanghai Bend [west of the Yuba County Airport]). Improvements proposed for this levee segment are different for each project alternative and are briefly described below.

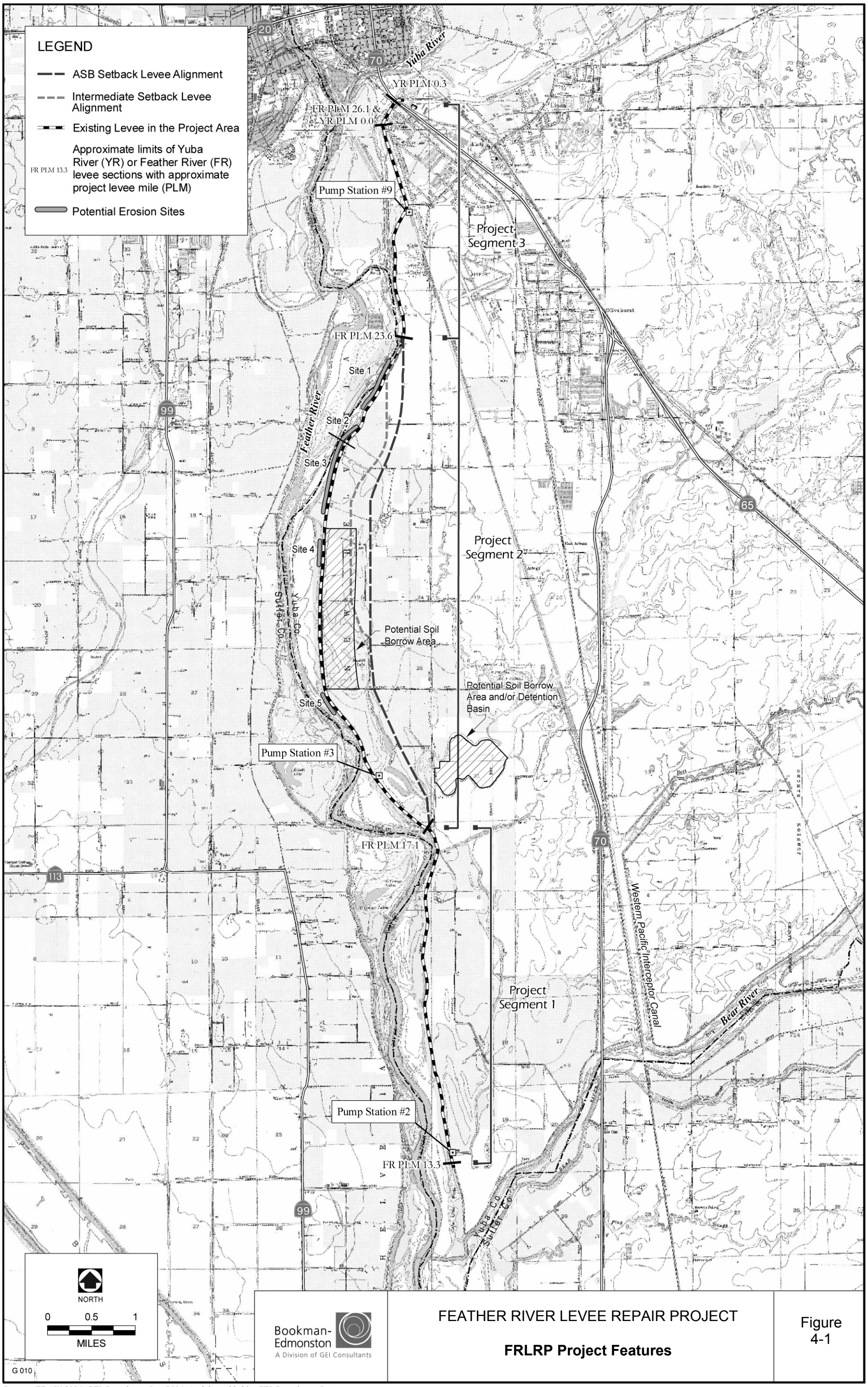
  - Alternative 1—Repair and strengthen the existing levee in place to correct seepage and/or stability deficiencies and address areas of the levee where erosion has been identified as a concern.

  - Alternative 2—Replace the existing levee with a new setback levee (the ASB setback levee) located approximately along the ASB setback levee alignment studied as part of the 2003 feasibility report.

  - Alternative 3—Replace the existing levee with a new setback levee (the intermediate setback levee), with the northern portion of this setback levee located mostly west of the 2003 ASB setback levee alignment.

  Relocation and replacement of the existing RD 784 Pump Station No. 3 is also included with Segment 2. The work would be similar for each alternative, although the location of the new pump station would depend on the alternative.

- Segment 3—The existing Feather River left bank levee from PLM 23.6 to PLM 26.1, and the Yuba River left bank levee from PLM 0.0 to PLM 0.3 (west of the Yuba County Airport to the railroad crossing at the SR 70 bridge). Improvements to this segment of the levee are identical for each alternative and would consist of repairing and strengthening the existing levee in place to correct seepage and/or stability deficiencies.



FEATHER RIVER LEVEE REPAIR PROJECT

FRLRP Project Features

Figure 4-1

Sources: EDAW 2004; GEI Consultants, Inc. 2004; Aerial provided by GEI Consultants, Inc.

Under Alternative 2 or Alternative 3, replacing the existing levee with a setback levee would allow for expansion of the floodway and associated benefits in the form of lowered water surface elevations during high-flow events. However, removal of the existing levee is subject to federal authorization through the Corps, and the timing of such authorization is uncertain. Until Corps authorization to remove the existing levee is received, it is possible that the existing levee in Segment 2 could be temporarily retained in its current condition in addition to a setback levee being constructed. In this case, the setback levee would more appropriately be described as a "backup levee," as it would provide a second level of flood protection behind the existing levee. In such a case, the area between the two levees would be inundated only if the existing levee were to breach. A backup levee would be constructed using the same methods and design as the setback levee, as described in this chapter.

It is anticipated that project design and construction will be phased as follows:

- Segments 1 and 3—Design 2006, construction 2007 (into 2008 for Alternatives 2 and 3)
- Segment 2—Design late 2006 and 2007, construction late 2007 through 2008

Under all alternatives, the construction period is considered to be 2 years (2007 and 2008). However, there would be little construction activity during the winter months due to restrictions associated with weather, soil conditions, and various agency regulations and guidelines. Therefore, the actual period of regular construction activity would be spring through late fall 2007 and spring through late fall 2008.

Section 4.1.3, "Level of Design Detail," below provides an overview of the level of design/planning detail for the three potential project alternatives evaluated in this EIR. Section 4.2, "Project Planning History," describes the background information taken into consideration in development of the three project alternatives. The three alternatives are described separately in Sections 4.3 (Alternative 1), 4.4 (Alternative 2), and 4.5 (Alternative 3). Section 4.6, "Implementation," provides additional details regarding the construction schedule and operations and maintenance activities for of the proposed project.

Please see Chapter 2, "Introduction," and Chapter 3, "Project Purpose, Need, and Development," for information related to all alternatives, such as regional setting, project objectives, a list of agencies expected to use the EIR, and a list of permits and other approvals required to implement the project.

4.1.2 GENERAL LEVEE DESIGN CRITERIA

The State of California Reclamation Board (The Reclamation Board) has primary jurisdiction for approval of levee design and construction. The standards of The Reclamation Board, found in Title 23, Sections 111–137 of the California Code of Regulations (CCR) (i.e., 23 CCR Sections 111–137), constitute the primary state standard. As stated in 23 CCR 120, levee design and construction must be in accordance with Corps Engineer Manual EM 1110-2-1913, *Engineering and Design—Design and Construction of Levees* (U.S. Army Corps of Engineers 2000). Additional criteria applicable to the Corps Sacramento District are contained in *Standard Operating Procedure Engineering Design Guidance 2003 (SOP EDG-03) for Geotechnical Levee Practice* (SOP), adopted by the Corps in August 2004. These documents are the primary

federal standards applicable to this project, as supplemented by additional prescriptive standards contained in 23 CCR Section 120. These additional standards prescribe minimum levee cross-sectional dimensions, construction material types, and compaction levels.

These requirements provide the basis for the design of the setback levee in FRLRP Segment 2 included in project Alternatives 2 and 3 (i.e., the ASB setback levee alignment and the intermediate setback levee alignment). Where these requirements can be applied to the existing Feather River and Yuba River levees in the project area, compliance or noncompliance with these requirements forms the basis for identifying needed repairs to levee segments to be improved in place under project Alternatives 1, 2, and 3.

Requirements for levee design and construction specified in 23 CCR Section 120 include the following:

- *Freeboard:* The levee must have a minimum of 3 feet of freeboard above the design floodplain.
- *Minimum cross section dimensions and slopes:* For a levee section on a main river channel, the following minimum dimensions are required:
  - crown width of 20 feet,
  - patrol road width of 12 feet,
  - waterside slope of 3:1 (horizontal:vertical) (H:V), and
  - landside slope of 2:1 H:V. (By comparison, the SOP, adopted by the Corps, specifies a landside slope of 3:1 H:V for new levees.)
- *Levee embankment materials:* "Impervious" material, as defined in 23 CCR Section 120, must be used for construction of new levees. Special construction details (e.g., 4:1 slopes, zoned embankments) may be substituted where these soil properties are not readily attainable. These requirements do not apply where the design of a new levee uses zones of various materials or soil types.
- *Foundation seepage control:* A cutoff trench must be excavated to an impervious stratum (where practical), where subsurface explorations disclose a pervious substratum underlying the location where a levee will be constructed.
- *Inspection trench:* An inspection trench, with a depth of 6 feet or greater and a bottom width of 12 feet or greater, must be excavated in the foundation along the length of a new or reconstructed levee.
- *Easements:* A 10-foot-wide easement must be provided adjacent to the landside levee toe, and the areas adjacent to the toe of the levee slopes must drain away from the levee for a minimum distance of 10 feet. (It should be noted, however, that the Corps's SOP specifies minimum waterside and landside easements of 15 feet and 20 feet, respectively. In addition,

permits recently issued by The Reclamation Board have included special conditions that require 50-foot-wide waterside and landside easements for new levee construction.)

Ditches, power poles, pipelines, and other structures must be situated a minimum distance of 10 feet beyond the levee toes. At locations where a drainage ditch or other seepage control facility is provided landward of the levee, the appropriate right-of-way for the feature must be included in the levee easement.

- *Additional geometric requirements:* The bottom of any nearby agricultural ditch must be located at an elevation above the projected downward extension of the landside levee slope.

4.1.3 LEVEL OF DESIGN DETAIL

Many of the project design details described in this EIR are the result of a preliminary project design process that has been completed for the three project alternatives. The general levee design criteria described above form the basis of the preliminary project design. The preliminary design effort also included collection and review of civil engineering, geological, and geotechnical data, as well as supplemental site exploration programs (see Section 4.1.4, "Preliminary Geotechnical Evaluation," below). The preliminary design concepts are based on limited subsurface investigations and data and include conservative assumptions, particularly regarding control of seepage underflow. Additional field data would be obtained during detailed design, which would include review by a Board of Senior Consultants (BOSC).

The structural features of the proposed levee repairs and of the setback levee included in Alternatives 2 and 3 have been developed to a level of detail sufficient for a complete "project-level" environmental analysis. As discussed above, detailed designs for levee repair activities in project Segments 1 and 3 are scheduled to occur in 2006. The detailed design process for these segments is taking place concurrently with the California Environmental Quality Act (CEQA) review process (i.e., with review of this EIR). Detailed designs for Segment 2 would occur in late 2006 and 2007, after the CEQA process is complete and a preferred project alternative has been selected.

4.1.4 PRELIMINARY GEOTECHNICAL EVALUATION

Preliminary geotechnical investigations were performed to provide a basis for the preliminary design of the proposed levee repairs/improvements and levee setback. The investigations included:

- a review of the available geological and geotechnical information,
- a geological reconnaissance of the existing and setback levee alignments,
- the drilling of test borings along the existing and setback levee alignments,
- laboratory index testing of selected soil samples, and
- the presentation of the preliminary geotechnical data and evaluations.

Geotechnical investigation data and results are presented in technical memoranda and reports on geotechnical conditions. These memoranda and reports are attached to or include *Report on Feasibility, Yuba-Feather Supplemental Flood Control Project* (Yuba County Water Agency 2003b) and the PIR (Kleinfelder 2006) described above in Section 4.1.1, "Overview." Based on

the results of the preliminary geotechnical evaluations, the levee repairs/improvements and setback levee alignments considered in the three proposed project alternatives are judged to be technically suitable, as long as appropriate measures are incorporated in the project design to minimize the potential for seepage-induced erosion problems and other issues that have plagued the existing levees in the past.

4.2 PROJECT PLANNING HISTORY

As discussed in Chapter 3, "Project Purpose, Need, and Development," the FRLRP is in part a modification and expansion of early work performed for TRLIA and Yuba County Water Agency (YCWA), as well as more recent analysis, described below. As part of the study and evaluation process, additional project alternatives beyond the three analyzed in the body of this EIR were considered but not analyzed further. These additional alternatives are discussed in Chapter 8, "Alternatives."

4.2.1 FEATHER RIVER LEVEE SETBACK

The preliminary design of the ASB Feather River setback levee was described previously in Appendix E, "Preliminary Design," of *Report on Feasibility, Yuba-Feather Supplemental Flood Control Project* (Yuba County Water Agency 2003b). The levee alignment was selected because it could achieve significant reductions in river stage along the Feather River while maintaining a Feather River floodway width that would be consistent with upstream and downstream reaches of the river. The location of the setback levee was aligned as much as possible along a topographically elevated area formed by older, more consolidated soils.

As described earlier, the ASB setback levee alignment for the FRLRP has been modified at the northern end from the alignment studied previously. The ASB setback levee alignment reflected in the FRLRP was developed, in part, through an alternatives identification process conducted in early 2006. Members of TRLIA's flood control study team participated in the identification, evaluation, and selection of alternatives to achieve desired flood protection results along the Feather River left bank levee and the lower Yuba River left bank levee (i.e., in the FRLRP project area). Through this process, the northern end of the previous ASB setback levee alignment was modified to replace a section of existing levee where seepage deficiencies had recently been discovered.

During the alternatives evaluation process, the intermediate setback levee concept was also identified. An intermediate setback levee was originally considered to allow a comparison between potential reductions in flood control benefits associated with providing a smaller levee setback area with the ability to reduce land acquisition costs and impacts in and adjacent to the setback area. Review of numerous intermediate setback levee options by the flood control study team resulted in the selection of the intermediate setback levee alignment included in this EIR analysis as a representation of the various alignment options available under the intermediate setback levee scenario.

The alternatives development and selection process is also discussed in Chapter 8 of this EIR.

4.2.2 FEATHER RIVER AND YUBA RIVER LEVEE REPAIR

An analysis of the Feather and Yuba River levees was performed by Kleinfelder and is described in the PIR (Kleinfelder 2006). The PIR addresses the Feather River left bank levee from approximately PLM 13.3 (near Pump Station No. 2) to the beginning of the Yuba River left bank levee at approximately PLM 26.1, and the Yuba River left bank levee from PLM 0.0 to PLM 0.3. The purpose of the analysis described in the PIR was to perform a feasibility-level evaluation of subsurface geotechnical conditions and levee conditions in accordance with FEMA requirements. The PIR indicates that portions of the subject levee do not currently meet FEMA geotechnical certification requirements for through-seepage or underseepage.

The results of the PIR precipitated the evaluation of levee repairs and strengthening because the Y-FSFCP and other past studies had not already identified a setback levee or other actions to correct the Feather River left bank levee segment north of PLM 23.6 and the Yuba River left bank levee segment from PLM 0.0 to PLM 0.3. In addition, because of the presence of numerous homes, businesses, and other facilities near or adjacent to the levee in these areas, these levee segments do not lend themselves to correction or repair via construction of setback levees. The approach of repairing existing levees in their current alignment was also applied to the levees in FRLRP project Segments 1 and 2 (Figure 4-1), as identified in the descriptions of each FRLRP project alternative below.

In early 2006, the *Three Rivers Levee Improvement Authority Phase IV Erosion Investigation* was completed (MBK Engineers 2006). The investigation identified several areas between Feather River PLM 17.1 and PLM 23.6 (all within FRLRP project Segment 2) where erosion of the left bank levee is a concern and where corrective action should be taken. Therefore, if this levee segment is repaired in place as part of the FRLRP rather than replaced with a setback levee, then the FRLRP includes repair of these erosion sites (see discussion of Alternative 1 below).

4.3 ALTERNATIVE 1—THE LEVEE STRENGTHENING ALTERNATIVE

4.3.1 PRELIMINARY DESIGN OF ALTERNATIVE 1

As described above, Alternative 1, The Levee Strengthening Alternative, would consist of repairing and strengthening each of the three levee segments under consideration:

- Segment 1—Feather River left bank levee from PLM 13.3 to PLM 17.1
- Segment 2—Feather River left bank levee from PLM 17.1 to PLM 23.6
- Segment 3—Feather River left bank levee from PLM 23.6 to PLM 26.1 and Yuba River left bank levee from PLM 0.0 to PLM 0.3

Repairs and strengthening would include seepage and stability mitigation measures identified in the PIR. Areas of erosion concern identified in the *Three Rivers Levee Improvement Authority Phase IV Erosion Investigation* (MBK Engineers 2006) would also be addressed. No setback levee is included in this alternative. The intended outcome of the repairs and strengthening is to ensure that all portions of the levee meet the engineering and design standards of The

7Reclamation Board and the Corps (described above) and that the levees meet FEMA geotechnical requirements for through-seepage and underseepage at the water surface elevation for the 200-year flood event.

In the following discussion, the preliminary designs of project Segments 1 and 3 are discussed together. This approach is taken because levee repair and strengthening activities would be the same across all three project alternatives in Segments 1 and 3. Therefore, the preliminary design characteristics for these segments discussed here for Alternative 1 would also apply to Alternatives 2 and 3. The preliminary design for Segment 2 is then discussed separately, as the approach to addressing flood control needs in this segment varies from alternative to alternative.

Segments 1 and 3—Seepage and Erosion Control

Seepage Control

Based on the performance history and the results of investigations at the existing Feather River and Yuba River levees, it is anticipated that seepage control measures would be required along significant portions of project Segments 1 and 3. Susceptibility of the existing levee embankments and foundation soils to seepage and internal erosion is the primary technical concern related to levee integrity and stability. Soils in the levee foundations, and also in the embankments themselves, include fine sands and fine silty sands. These permeable, cohesionless, and easily erodible soils have a high potential for undergoing internal erosion (a phenomenon referred to as “piping”) when subjected to moderately high hydraulic gradients that are sustained for more than several days. Animal burrows can exacerbate the situation by providing a shortened conduit for the initiation of seepage and internal erosion. Muddy seepage, boils, and sinkholes are external, landside manifestations of ongoing seepage and internal erosion processes that can occur when the levee is subjected to sustained high water levels. Internal erosion of levee embankment or foundation materials poses a threat to levee integrity during flood events. If unchecked, this progressive failure mechanism can eventually result in sudden, catastrophic failure of the levee.

The proposed preliminary designs for Segments 1 and 3 recognize these unfavorable soil conditions. They include the following seepage control measures to reduce the potential for seepage-induced erosion of the levee embankment and foundation soils:

- cutoff trenches/slurry cutoff walls,
- seepage/stability berms, and
- relief wells.

Information on the type, location, and extent of seepage control measures provided below is based primarily on recommendations included in the PIR (Kleinfelder 2006). Recommendations included in the PIR are considered preliminary. The maximum reaches in which seepage control measures may be required were identified for project budgeting purposes; however, definition of the reaches should be considered approximate at best. The seepage control system would be refined based on detailed field investigations and analyses, to be performed during detailed design.

Cutoff Trenches/Slurry Cutoff Walls

Because of the depths and thickness of pervious strata generally present along the Feather River and Yuba River levee alignments, the most practical method of constructing a cutoff trench is the slurry wall method. In the slurry wall method, a cutoff trench is excavated and filled with a bentonite slurry to keep the trench from caving during excavation; the trench is then backfilled with native soil mixed with cement-bentonite (for cutoff walls constructed through levees) or bentonite (for cutoff walls not installed through the levee) to provide a cutoff with reduced permeability.

An alternate method for constructing a deep cutoff wall is with the deep soil-mixing (DSM) method. In the DSM method, a cutoff wall is constructed by mixing in situ soils with bentonite or cement-bentonite using large-diameter augers. While the DSM method is more expensive than the slurry wall method for a given cutoff wall depth, it can be used to construct a cutoff wall in excess of the practical depth limit for the slurry wall method (about 80 feet). Therefore, the DSM method could be considered for cutoff walls deeper than about 80 feet.

A slurry cutoff wall would be provided along those portions of the levees where widespread strata of permeable sands and gravels exist in the foundations, and in locations where the levee embankments contain sand layers. Figure 4-2, “Preliminary Design for Levee Strengthening Measures,” shows a typical levee cross section with a slurry cutoff wall. Preliminary estimates of the locations, lengths, and depths of slurry cutoff walls based on the PIR (Kleinfelder 2006) are also shown in Figure 4-2. The purpose of the slurry cutoff wall is to dissipate the hydraulic gradients through the levee embankment and/or in the levee foundation and reduce seepage pressure and quantities. This would reduce the hydraulic gradient and seepage flows through the levee embankment and foundation soils adjacent to the slurry cutoff wall to safe levels. To achieve maximum effectiveness, the slurry cutoff wall must extend completely through the permeable strata and terminate some distance into an underlying, reasonably continuous layer with lower permeability.

Seepage/Stability Berms

Portions of the existing Feather River levee in project Segments 1 and 3 include stability berms constructed by the Corps during previous levee repair projects. For sections of levee with potential embankment through-seepage concerns, existing stability berms could be raised, or new stability berms provided, up to the 200-year water surface elevation. A stability berm of this height could be constructed in lieu of a slurry cutoff wall. However, stability berms would have limited application because they would not provide mitigation for foundation seepage. An evaluation of raising stability berms in lieu of providing a slurry cutoff wall in one or more locations will be conducted during detailed design. Figure 4-2 shows a typical levee cross section with a stability berm and also provides preliminary estimates for locations of stability berms based on the PIR (Kleinfelder 2006).

A seepage berm constructed along the landside toe of a levee can be an alternative to a slurry cutoff wall depending on soil conditions. A seepage berm does not reduce the hydraulic gradient through the foundation, nor does it reduce the seepage flows. However, it provides a weighted, filtered seepage path (i.e., the drainage blanket at the base of the berm) that allows seepage to occur but reduces the potential for boil formation and the associated erosion and loss of foundation material. Portions of the existing Feather River levee include seepage berms

constructed by the Corps during previous levee repair projects. An evaluation of thickening and/or lengthening the existing seepage berms, or adding new berms, in lieu of providing a slurry cutoff wall in one or more locations will be conducted during detailed design.

Relief Wells

Relief wells are another means of providing a filtered seepage path for reduction of water pressure in the foundation soils. Relief wells, however, can be prone to plugging and damage from vandalism, and they require operation (water removal) and periodic maintenance (flushing, cleaning, and replacement) to remain effective. Therefore, relief wells would be provided in locations where other measures are deemed to be insufficient or ineffective. Figure 4-2 shows the typical locations where a relief well might be installed relative to levees with and without seepage berms. The table in Figure 4-2 indicates possible locations where relief wells might be provided along the FRLRP alignment based on the PIR (Kleinfelder 2006).

Erosion Control

The *Three Rivers Levee Improvement Authority Phase IV Erosion Investigation* (MBK Engineers 2006) did not identify any erosion problems requiring action along the Feather River and Yuba River levees in project Segments 1 and 3. However, levee erosion will continue to be investigated during detailed design, and measures (e.g., placement of vegetation, buried cobble, or riprap on the waterside levee toe) will be developed if erosion deficiencies are discovered.

Segment 2—Seepage and Erosion Control

Seepage Control

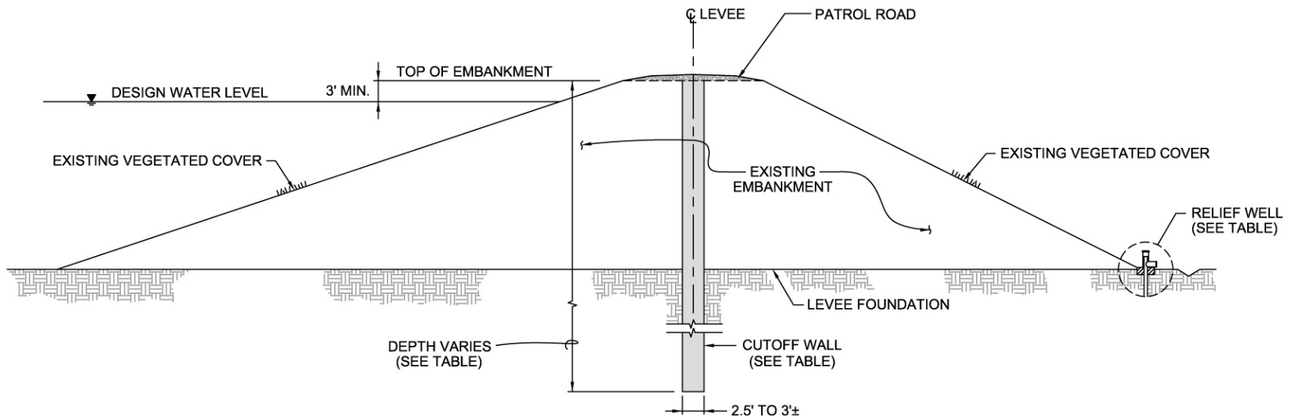
Seepage control measures for the Feather River levee in project Segment 2 would be similar to those described for the Feather River and Yuba River levees in Segments 1 and 3 above.

Seepage boils were identified in the vicinity of Pump Station No. 3 during high-water events in early 2006. The boils, located between PLM 17.1 and PLM 20.3 in a section of levee repaired by the Corps in 1997 with a deep slurry cutoff wall and waterside impermeable membrane, are in a location with a history of boils produced during high-water events. Although Kleinfelder's PIR did not identify mitigation requirements for this section of levee, the active seepage boils indicate that additional repairs are required.

Repairs to the levee in the vicinity of Pump Station No. 3 could include a deep cutoff wall, expansion of the existing seepage berm, relief wells, reconstruction of the existing levee, or a combination of these measures.

In addition, the existing Pump Station No. 3 would be removed and a replacement pump station would be constructed farther east (farther from the levee). The area between the old pump station and new pump station would be filled with material of low permeability to reduce seepage and increase levee stability. (Relocation of Pump Station No. 3 is discussed in more detail later in this section.)

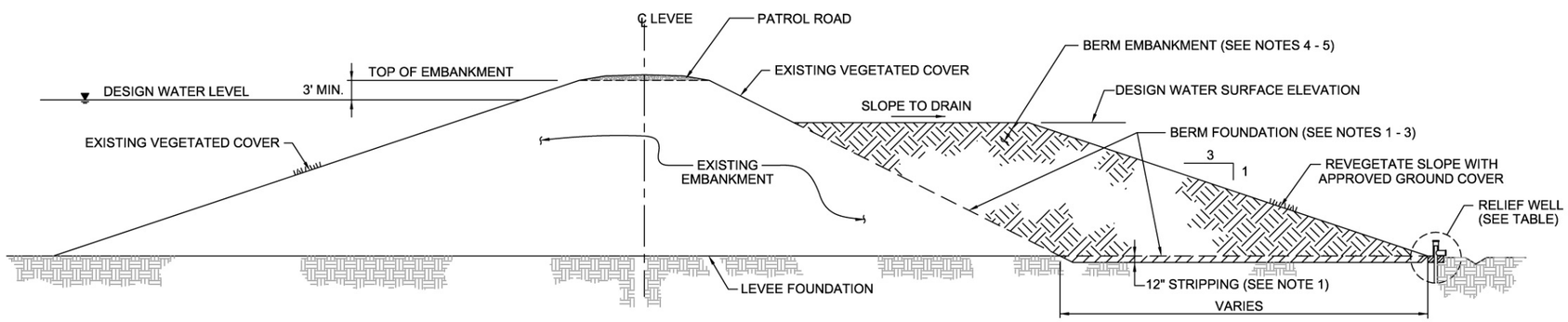
The table in Figure 4-2 presents a summary of preliminary design features proposed for repairing and strengthening the existing levee in the area encompassed by project Segment 2.



STRENGTHENING WITH
CUTOFF WALL OR RELIEF WELL

0 10 20
SCALE, FEET

PRELIMINARY LEVEE STRENGTHENING MEASURES (TO BE REFINED BASED ON DESIGN STUDIES)									
SEGMENT					STRENGTHENING OPTIONS				
LEVEE SEGMENT	PIR SECTION	BEGIN PLM	END PLM	LENGTH (ft)	CUTOFF WALL		BERM		RELIEF WELLS
1	1A	FR 13.3	FR 14.1	4,220	70 FT DEEP	OR	TO DESIGN WSE	_	–
	1B	FR 14.1	FR 15.1	5,280	70 FT DEEP	OR	TO DESIGN WSE	_	–
	2	FR 15.1	FR 16.0	4,750	60-70 FT DEEP	OR	TO DESIGN WSE	OR	@ 100-150 FT
	3	FR 16.0	FR 16.6	3,170	50-70 FT DEEP	OR	TO DESIGN WSE	_	–
	4A	FR 16.6	FR 17.1	2,640	–	–	–	–	–
2	4B	FR 17.1	FR 20.3	16,900	–	–	–	–	–
	5	FR 20.3	FR 23.6	17,420	70 FT DEEP	OR	TO DESIGN WSE	_	–
3	6	FR 23.6	FR 25.1	7,920	70 FT DEEP	OR	TO DESIGN WSE	_	–
	7	FR 25.1	YR 0.3	6,860	–	–	–	–	–
SOURCE: PROBLEM IDENTIFICATION REPORT, KLEINFELDER, FEB. 2006									



STRENGTHENING WITH
BERM AND/OR RELIEF WELL

0 10 20
SCALE, FEET

NOTES

FOUNDATION:

1. EXCAVATE BERM FOUNDATION AREA UP TO 12-IN BELOW EXISTING GROUND SURFACE. CLEAR AREA OF ROOTS, VEGETATION AND DELETERIOUS MATERIALS.
2. PREPARE FOUNDATION AREA BY REMOVING AND BACKFILLING SOFT SPOTS UP TO FOUNDATION GRADE LINES AND THEN COMPACT ENTIRE FOUNDATION WITH A SHEEPFOOT ROLLER.
3. WHEN CONNECTING BERM EMBANKMENT TO AN EXISTING EMBANKMENT PREPARE FOUNDATION AREA ON THE EXISTING EMBANKMENT AT A SLOPE NOT STEEPER THAN TWO (2) HORIZONTAL ON ONE (1) VERTICAL AND BENCH EXISTING EMBANKMENT.

EMBANKMENT:

4. EMBANKMENT MATERIAL: APPROVED LOW-PERMEABILITY MATERIAL.
5. PLACE AND COMPACT MATERIAL IN MAXIMUM 6-IN LIFTS AFTER COMPACTION.

NOTE:
LEVEE STRENGTHENING MEASURES ARE PRELIMINARY.

Bookman-Edmonston
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FEATHER RIVER LEVEE REPAIR PROJECT

Preliminary Design for Levee Strengthening Measures

Figure 4-2

G 017

Erosion Control

Following extreme high-water conditions in 1997, deep scour areas were observed along the waterside toe of portions of the Feather River levee in project Segment 2. Some of these areas undermined the waterside slope enough to require minor slope repair. The sites where scour is a problem typically have noncohesive soils (loose sand) at the surface. Maintenance of an access path at the toe of the levee prevents any vegetation from establishing.

The *Three Rivers Levee Improvement Authority Phase IV Erosion Investigation* (MBK Engineers 2006) included a two-dimensional hydraulic model of the 1997 flood event. Typically, calculated flow velocities along the toe of the levee were in the range of 5–6 feet per second or lower. For these velocities, and pending more detailed analysis during detailed design, it is anticipated that revetting the noncohesive soils with cobble-size rock would be sufficient to stabilize the affected areas. The locations where erosion repairs are anticipated are shown in Figure 4-1.

4.3.2 HYDROLOGY AND FLOOD CONTROL BENEFITS

FRLRP Alternative 1 would not alter the location or configuration of the existing levees and therefore would not provide any increased flood storage or conveyance capacity. Because Alternative 1 would not alter the hydraulic conditions in the Feather and Yuba Rivers, the hydrology during both normal flows and flood flow conditions would not be changed. However, the repairs and strengthening of the existing levees that would occur under Alternative 1 would provide flood control benefits. The levee segments included in the FRLRP would be more resistant to underseepage, through-seepage, and erosion, and less susceptible to catastrophic breaches. All portions of the levee would meet the engineering and design standards of The Reclamation Board and the Corps, as well as FEMA geotechnical requirements for through-seepage and underseepage at the water surface elevation of the 100-year flood event.

4.3.3 ALTERNATIVE 1—CONSTRUCTION

General Construction Plan

Levee repair and strengthening under Alternative 1 would be primarily a large civil construction project and would need to be planned accordingly, consistent with standards of The Reclamation Board as stated in 23 CCR Sections 111–157. Because the levee repair and strengthening activities do not involve breaching the existing levee, work that would not adversely affect the flood control function of the existing levee could commence before the end of the “flood season” (i.e., before April 15). As stated previously, construction work is planned to begin in 2007 and be completed in 2008.

Slurry Cutoff Wall

Construction of the slurry cutoff wall to the depths required along the existing levee would be accomplished with large modified backhoes. This equipment and the associated sequence of excavation, backfill preparation, and placement of backfill back into the slurry cutoff wall trench would require a work platform near the trench. The work platform would be established adjacent to the trench by partially degrading (cutting down) the top of the existing levee to provide adequate working width. The width of the working platform could be minimized if excavated

soil were hauled to a nearby mixing area rather than being mixed adjacent to the slurry cutoff wall trench.

The slurry cutoff wall is expected to be as much as 80 feet deep. If the depth of the required slurry cutoff wall exceeds 80 feet, the levee could be degraded in those locations to allow the excavator to reach a deeper level, or the DSM method (described previously) could be used. After installation of the slurry cutoff wall, compacted embankment material would be placed to restore the levee height. However, some time would be allowed for the backfill in the slurry cutoff wall to settle before the placement of fill in the overlying embankment would occur. The connection between the slurry cutoff wall and the embankment fill is a key feature and would be refined during detailed design. After the levee is restored, aggregate base would be placed on the levee crown patrol road, similar to existing conditions.

Stability/Seepage Berm Construction

Stability and/or seepage berms may be used in lieu of a slurry cutoff wall in select locations. Berms would be constructed as an engineered fill, with the fill placed in horizontal lifts consistent with the requirements for lift thickness and compaction densities specified in 23 CCR Section 120. Each lift would be moisture conditioned and compacted to the specified density using a suitable compactor, such as a sheepsfoot, tamping-foot, or rubber-tired roller.

Erosion Protection

Based on the results of the *Three Rivers Levee Improvement Authority Phase IV Erosion Investigation* (MBK Engineers 2006), five locations have been identified as erosion problem areas requiring additional erosion protection. These locations, shown in Figure 4-1, all occur on the Feather River left bank levee in project Segment 2. Erosion protection activities in these locations are anticipated to consist of the following steps:

(1) Clear vegetation, and strip and salvage the surface soil from the work area.

(2) Backfill any existing scour features using adjacent native soils. Place and compact the soil in thin lifts to develop a good foundation for cobble fill.

(3) Lay a geotextile filter fabric over the area to be protected.

(4) Place gravel/cobble fill with an approximate thickness of 1.5–2 feet over the geotextile fabric.

(5) Place the salvaged original surface soil over the gravel/cobble fill. Also replace any segments of levee maintenance roads that were disturbed.

(6) Seed the disturbed area (other than maintenance road alignments) with a seed mix of native grasses that does not include woody vegetation.

Erosion protection in these five locations would occur only under Alternative 1, as the existing levee segment where these problem areas occur would be replaced by a setback levee under Alternatives 2 and 3. If, during detailed project design, additional areas in the existing levee are

found to have similar erosion conditions as the five areas identified in Segment 2, similar erosion protection measures could be implemented in these locations.

Where soil along the waterside or landside surface of the existing Feather River levee is disturbed during project implementation, an approved grass cover would be placed for erosion protection. The same grass cover would be placed on stability berms where they are installed. Historical experience with the existing left bank Feather River levee in this area indicates that grass cover provides acceptable erosion protection against high water levels during flood flows.

Pump Station No. 3 Relocation

As stated previously, the current location of Pump Station No. 3 experiences excessive seepage and boils during high-water events, making it desirable to relocate the pump station out of this area. As part of Alternative 1, the existing pump station would be removed and a new/replacement Pump Station No. 3 would be constructed farther to the east adjacent to the Plumas Lake Canal. The exact location would be determined during detailed project design**.** Equipment and material from the existing pump station would not be reused at the new location.

The new Pump Station No. 3 would be a reinforced-concrete structure similar to the recently constructed Pump Station No. 2 and the new Pump Station No. 6, which is currently under construction. The segment of existing canal between the current and new locations of Pump Station No. 3 would be backfilled with material of low permeability. Pipelines through the Feather River levee to allow drainage from the new pump station into the river would be designed in accordance with standards of The Reclamation Board and Corps guidelines.

If relief wells are installed as part of Alternative 1, flows from these wells would be conveyed to the new Pump Station No. 3. The capacity of the new pump station would be increased to accommodate the relief well discharge based on the estimated flow rates. The specific capacity of the new Pump Station No. 3 would be determined during detailed project design.

Detention Basin Construction

As stated above in the discussion of Pump Station No. 3, the capacity of the new pump station could be increased to accommodate discharges from relief wells. However, even with increased capacity, it is possible that during peak discharge periods water from relief wells could exceed the capacity of the new Pump Station No. 3. To accommodate this circumstance, Alternative 1 includes construction of a detention basin to temporarily hold relief well flows during peak discharge periods. An area currently being considered for a detention basin, northeast of Star Bend, is shown in Figure 4-1 as a potential borrow area and/or detention basin. The basin would cover approximately 150 acres. It would be excavated to a depth of about 8–10 feet, or deeper if a permanent water feature is desired for mitigation/restoration or local land development considerations. Suitable soils excavated during construction of the detention basin would be used as borrow material for levee repairs and strengthening.

Borrow Material Requirements and Development of Borrow Areas

Sources and Quantities of Borrow

Borrow areas are sites where native materials (i.e., soil and rock) are obtained for required construction activities. Borrow material would be obtained locally, with primary sources being excavations for the planned detention basin and from borrow areas developed in the project vicinity.

Objectives for local borrow areas include:

- reducing the impact on land resources,
- shortening borrow haul distances to reduce impacts on air quality and traffic, and
- promoting the use of large off-road earthmoving equipment such as scrapers rather than trucks to reduce construction costs.

Requirements for borrow material would be less under Alternative 1 than under other alternatives, because the existing levee would be retained and soil for a setback levee would not be necessary. In addition, material excavated from the slurry cutoff wall trenches would be used to the extent practicable, reducing the need for borrow material from off-site sources. However, it is still estimated that a total of approximately 1.6 million cubic yards (cy) of borrow material would be required for levee repair and strengthening activities under Alternative 1. Activities requiring borrow would include constructing slurry cutoff walls, correcting erosion problem areas, and construction of seepage/stability berms. It is estimated that approximately 1.4 million cy of borrow material would be needed for levee repairs and strengthening in project Segment 2, and the remaining approximately 200,000 cy would be used in Segments 1 and 3. As stated above, a primary source of borrow material would be excavations conducted for construction of the planned detention basin. Additional borrow areas might also be developed in this general location. Other potential borrow sources include the borrow area site to the east of existing levee shown in Figure 4-1, abandoned sections of the Bear and Feather River levees left remnant from construction of the Feather-Bear Rivers Levee Setback Project (F-BRLSP), and an existing borrow area near Ella Road.

Aggregate base needed to surface the patrol road on the levee crown, drain rock required for berm construction, and rock slope facing would be obtained from commercial sand and gravel operations in the Marysville–Yuba City area and would be hauled to the levee alignment by truck.

A preliminary estimate of borrow material requirements for construction under Alternative 1 is provided in Table 4-1, “Summary of Borrow Material Requirements for Alternative 1.” A detailed investigation of suitable borrow areas would be conducted as part of the field investigation program for detailed design. The limits of borrow areas would be refined during this effort.

Table 4-1
Summary of Borrow Material Requirements for Alternative 1

Description	Volume Required (cubic yards)
Embankment fill	1,600,000
Caltrans Class 2 aggregate base	18,000
Revetment	20,000

Note: Caltrans = California Department of Transportation
Source: Data provided by GEI Consultants in 2006

Design and Treatment of Borrow Areas

As discussed above, demand for borrow material would be less under Alternative 1 than under Alternatives 2 and 3; therefore, the level of disturbance associated with development of borrow areas would also be less. The potential borrow areas shown in Figure 4-1 are much larger than the area necessary to implement Alternative 1, and only a fraction of these areas would be disturbed if they were used as a source of borrow material. Any borrow areas used during implementation of Alternative 1 would be on the land side of the existing levees.

Any borrow areas that are developed would be constructed as wide, shallow excavations rather than as deep trenches. At the conclusion of the work, the borrow areas could be graded to blend with the topography, leaving slopes flat enough to reduce erosion and promote conditions conducive to vegetative growth (slopes of 3:1 [H:V] or flatter). Borrow areas could also be graded in a manner consistent with the continuation of past land uses (e.g., agriculture), or consistent with permitted future land uses based on the property owners' preferences. The borrow areas could be revegetated to conform to the surrounding landscape, or in a manner consistent with past or permitted future land uses, again based on the landowners' preferences.

Relocation of Utilities and Removal of Structures

Other than the pump station relocation discussed above, it is not anticipated that existing utilities would need to be permanently relocated under Alternative 1. Pacific Gas and Electric Company (PG&E) power lines may need to be deenergized or temporarily relocated for clearance during excavation operations for the slurry cutoff wall. Levee penetrations (i.e., pipelines, conduits, or similar structures passing through the levee) related to the Plumas Mutual Water District pump station, PG&E natural gas pipelines, the Linda County Water District Wastewater Treatment Plant, and Pump Station Nos. 2 and 9 will need to be evaluated and upgraded as necessary.

Staging Areas

It is anticipated that several staging areas would be developed along the existing Feather River and Yuba River levee alignments to allow for efficient use and distribution of materials and equipment. Staging areas would be located along the landside toes of the levees. Additional staging areas would be located at other suitable locations, such as RD 784 property near Pump Station No. 2 (project Segment 1), on existing seepage berms, and other locations along the levee alignments. Specific staging areas would not be identified until the detailed design phase. Final

selection of staging areas would be based on contractor preference and environmental and land use constraints.

Disposal of Excess Materials

Because of the nature of the work under Alternative 1, it is expected that only a limited amount of excess materials (e.g., soil, cleared vegetation) would be generated. Excess excavated materials (organic soils, excess material excavated from the slurry cutoff wall trench, and excess slurry) would be placed in a local disposal area on-site, or hauled off-site and placed in a suitable disposal area. Debris from structure demolition (e.g., the existing Pump Station No. 3), piping, and other materials requiring disposal would be hauled off-site to a suitable landfill.

Stormwater Pollution Prevention

Temporary erosion/runoff control measures would be implemented during construction to minimize stormwater pollution resulting from erosion and sediment migration from the construction, borrow, and staging areas. These temporary control measures may include implementing construction staging in a manner that minimizes the amount of area disturbed at any one time; secondary containment for storage of fuel and oil; and the management of stockpiles and disturbed areas by means of earth berms, diversion ditches, straw wattles, straw bales, silt fences, gravel filters, mulching, revegetation, and temporary covers as appropriate. Erosion and stormwater pollution control measures would be consistent with National Pollutant Discharge Elimination System (NPDES) permit requirements and would be included in a Stormwater Pollution Prevention Plan (SWPPP). (See Section 5.3, "Water Resources and River Geomorphology," for a detailed discussion of NPDES permit requirements and SWPPPs.)

After completion of construction activities, the temporary facilities would be demobilized and the site would be restored and reclaimed as appropriate. Site restoration activities for areas disturbed by construction activities, including borrow areas and laydown/staging areas, may include regrading, reseeding, construction of permanent diversion ditches, use of straw wattles and bales, application of straw mulch, and other measures deemed appropriate.

Construction Equipment

Contractor plant equipment would include construction office and equipment trailers; slurry batch plants, including bentonite storage facilities, mixing tanks, pumps, and piping; warehousing and equipment maintenance facilities; and fuel pumps and fuel storage tanks.

Mobile equipment for the levee repair, berm construction (if needed), and Pump Station No. 3 construction may include the following typical equipment:

- two hydraulic excavators,
- six scrapers,
- three bulldozers,
- three graders,
- three self-propelled sheepsfoot or tamping-foot rollers,
- two water wagons,
- 20 highway dump trucks,

- a lubricating truck,
- a front-end loader,
- a truck-mounted crane, and
- numerous pickup trucks.

Mobile equipment specifically for slurry cutoff wall construction for three simultaneous headings may include the following:

- three long-stick hydraulic excavators,
- three low-ground-pressure bulldozers,
- three utility excavators, and
- three integrated tool carriers.

Additional equipment would include drill rigs to install new relief wells (if required), utility equipment to install power lines, an air compressor, welding equipment, pumps and piping, communications and safety equipment, erosion control materials, miscellaneous equipment customary to the mechanical and electrical crafts, and vehicles used to deliver equipment and materials.

Construction-Related Traffic

Personnel, equipment, and imported materials would reach the site via SR 70 and Feather River Boulevard, which are paved, all-weather roads, and suitable for the anticipated loads. The construction labor force is estimated to average about 50–60 persons over the construction period of 2 years. Peak staffing could be close to 100 depending on the contractor's schedule.

It is expected that about 40 trailer ("low-boy") truck round trips would be required to transport the contractor's plant and equipment listed above to the site. A similar number of round trips would be needed to remove the equipment from the site as the work is completed.

Necessary aggregate base and rock revetment material would be obtained from a commercial sand and gravel operation, most likely in the Marysville–Yuba City area. The construction contractor would select the specific supplier based on suitability and pricing. About 4,000 highway truck trips would be needed to bring the aggregate base and rock revetment material to the site from the quarry of origin. About 300 truckloads would be needed to bring dry bentonite to the site. The bentonite would probably be processed in Wyoming or South Dakota and transported to the Marysville–Yuba City area by rail. About 300 truckloads would be needed to bring cement to the site. Another 25–30 trailer truckloads would be required to bring other permanent materials to the site, such as geotextile fabric, erosion control materials, structural steel, piping, well casings, and ancillary equipment. About 100 concrete loads, transported by transit mixer truck, are also likely. In addition, about 100 highway truckloads may be needed to carry demolition debris, construction debris, and waste dump materials to a suitable landfill.

At the project site, the primary construction corridor would include the crests of the existing Feather River and Yuba River levees, landside toes of the existing levees, and roads used for access to the work area, including Feather River Boulevard. Access roads would consist mainly of the existing east-west lateral roads between SR 70, Feather River Boulevard, and the existing levees.

Within the construction areas, the main sources of construction traffic would be the installation of the slurry cutoff wall, required transport of material for the slurry cutoff wall (including borrow from borrow sites), and required transport of borrow material for berm construction and restoration of levee heights (e.g., where the tops of levees were cut down to provide a work surface for installation of the slurry cutoff wall). Transport of an estimated 1.6 million cy of borrow material would require approximately 80,000 haul trips if a load of 20 cy per trip is assumed. Larger haul unit sizes would reduce the number of trips and impacts on air quality. Dust control measures would be applied to roads and work areas on a systematic basis. Under Alternative 1, installation of the slurry cutoff wall would take place during both years (2007 and 2008) of the 2-year construction period (see "Construction Sequence and Scheduling Constraints" in Section 4.6, "Implementation," below regarding the construction schedule).

4.4 ALTERNATIVE 2—THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE

4.4.1 PRELIMINARY DESIGN OF ALTERNATIVE 2

As described previously, Alternative 2, The Levee Strengthening and ASB Setback Levee Alternative, would consist of the following:

- Segment 1—Levee repairs and strengthening along the Feather River left bank levee from PLM 13.3 to PLM 17.1
- Segment 2—A setback levee along the left bank of the Feather River from PLM 17.1 to PLM 23.6, following an alignment similar to the ASB setback levee alignment described in 2003 for the Y-FSFCP
- Segment 3—Levee repairs and strengthening along the Feather River left bank levee from PLM 23.6 to PLM 26.1 and the Yuba River left bank levee from PLM 0.0 to PLM 0.3

Activities along project Segments 1 and 3 would be exactly the same as described for Alternative 1, consisting of the same levee repair and strengthening elements and seepage control and stability measures identified in the PIR. These activities generally are not described further below.

The primary difference between Alternatives 1 and 2 relates to project construction activities along Segment 2. Under Alternative 1, the existing Feather River levee in Segment 2 would be repaired and strengthened; by contrast, under Alternative 2 a setback levee would be constructed in this project segment generally following the alignment of the previously identified ASB setback levee.

A preliminary design of the original ASB setback levee was described in 2003 in Appendix E, "Preliminary Design," of *Report on Feasibility, Yuba-Feather Supplemental Flood Control Project* (Yuba County Water Agency 2003b). The levee alignment identified in 2003 was selected because it could achieve significant reductions in river stage along the Feather River while maintaining a Feather River floodway width that would be consistent with upstream and downstream reaches of the river. The ASB setback levee alignment included here in Alternative 2 has been modified at the northern end (north of Pearson Road) from the alignment previously

studied, but otherwise it matches the 2003 ASB setback levee alignment (Figure 4-1). The modification to the northern portion of the setback levee alignment is included in Alternative 2, in part, to allow full replacement of an existing levee segment with known deficiencies.

Segments 1 and 3—Levee Strengthening

The levee repairs and improvements to the Feather River and Yuba River levees in project Segments 1 and 3 under Alternative 2 are identical to those described previously for Alternative 1 in Section 4.3.

Segment 2—ASB Setback Levee

Levee modifications in project Segment 2 (the Feather River left bank levee from PLM 17.1 to PLM 23.6) would consist of construction of a new setback levee (the ASB setback levee) as described below.

Setback Levee Alignment

The general location of the proposed ASB setback levee is shown in Figure 4-1. This setback levee alignment was selected to achieve substantial reductions in river stage while maintaining a Feather River floodway width that is consistent with upstream and downstream reaches of the river. A second consideration was to take advantage of the existing configuration of the levee system to identify constructible locations where the ASB setback levee could be tied into the existing levee. After the approximate alignment of the selected setback levee segment was defined by hydraulic modeling, the alignment was refined based on topographic, geologic, and socioeconomic considerations. The location of the ASB setback levee was aligned as much as possible along a topographically elevated area formed by older, more consolidated soils, and consideration was given to reducing impacts on occupied residential units.

The ASB setback levee would be approximately 5.9 miles long. The new levee segment would generally be set back approximately 0.5 mile to the east of the existing Feather River levee, except near the northern and southern ends, where it would join the existing levee. The area between the existing levee and the setback levee (the levee setback area) and the footprint of the ASB setback levee would include approximately 1,600 acres. It should be noted that the final alignment of the ASB setback levee may be adjusted slightly during detailed design to meet site-specific project needs.

The Existing Segment 2 Levee

The material in the existing Feather River left bank levee in Segment 2 would be reused as borrow material for the new ASB setback levee to the maximum extent possible. However, as discussed previously in Section 2.3.2, “Alternative 2–The Levee Strengthening and ASB Setback Levee Alternative,” in Chapter 2, the decision to remove any of the existing levee is a federal decision that would be made by the Corps, and the timing of such an action is uncertain. Therefore, the existing levee material may not be available as a source of borrow/embankment material for the setback levee. In addition, based on the timing of Corps authorization to degrade/breach the existing levee, it is possible that for some period of time the existing levee and the new ASB setback levee would be in place concurrently. During this period, the ASB

setback levee would function as a "backup" levee, providing a second line of levee protection if the existing levee in Segment 2 were to breach during a flood event.

Whether authorization to degrade/breach the existing levee in Segment 2 is provided concurrently with the construction of the ASB setback levee, or at some time after the setback levee is complete, portions of the existing levee in Segment 2 would be removed to achieve the maximum hydraulic benefits of the levee setback by allowing water to flow into and out of the levee setback area during high river stages. The specific amount and location of existing levee requiring removal would be determined during detailed design.

Some sections of the existing levee may be left in place to provide refuge for animals during high flows. Specific sections to be retained would be determined in final project design and would be based on factors that include possible mitigation value for project impacts on sensitive species. Those sections of the existing levee that would be left in place would not be maintained.

Levee Embankment Material

23 CCR Section 120 states that "impervious" material must be used for construction of new levees. Impervious material is defined using various soil property parameters, including particle size and plasticity. Plasticity is the ability of a soil to deform under pressure without crumbling and acts as a general index to the clay content of a soil. Special construction details (e.g., 4:1 slopes rather than 3:1 slopes) may be substituted where appropriate soil properties are not readily attainable. CCR Section 120 includes the qualification that not all impervious-material requirements may apply where the design of a new levee uses zones of various materials or soil types. For example, soils on the interior of the levee embankment may not meet all characteristics of impervious materials if a sufficiently sized zone of impervious material makes up the exterior portion of the embankment.

Because of economic, environmental, and hydraulic considerations, it is desirable to use locally available earth materials for construction of the ASB setback levee. Local sources of borrow materials could include borrow areas developed in the levee setback area, soil removed during construction of a detention basin, and soil from abandoned sections of the Bear River and Feather River levees left remnant from F-BRLSP construction. However, it is anticipated that a large proportion of the soils in the levee setback area and at the detention basin site would fall outside the plasticity requirements described in CCR Section 120 because of the low plasticity associated with the silty soils prevalent in the project area. Accordingly, it would not be economically feasible for all soil used in the setback levee embankment to meet the soil property parameters of CCR Section 120. For purposes of preliminary design, it has been estimated that zoning the levee section, as allowed by CCR Section 120, would be more economical than flattening the slopes. Through conversations with Corps staff, it is understood that the reasons for the specified plasticity requirements in Section 120 are twofold:

- to avoid placement of nonplastic soils on slope surfaces to reduce the potential for slope erosion, and
- to avoid placement of highly plastic clays on slope surfaces to reduce the potential for formation of deep shrinkage cracks and the associated shallow soil creep and sloughing that can occur when exceptionally heavy rains fall on cracked sloping ground.

As allowed by CCR Section 120, the ASB setback levee section has been zoned to address these concerns while allowing use of silty soil. The silty soil would be placed in an interior zone within the embankment, completely encapsulated by material meeting the plasticity requirements. Soil that meets the plasticity requirements would be in the landside and waterside zones to promote resistance against erosion and shallow sloughing.

Figure 4-3, "Preliminary Plan View and Typical Cross Sections for the ASB Setback Levee," presents the cross sections used for the preliminary design of the setback levee. Cross sections are shown for levee segments both with and without a slurry cutoff wall.

Soils with excessively high plasticity and soils stripped from the ground surface (i.e., containing organic materials) cannot be placed in the setback levee embankment; these soils would need to be disposed of on-site. The proposed design of the ASB setback levee allows for the construction of a waterside berm as a location for the placement of excess soil from required excavations (the berm is not shown in Figure 4-3). This nonstructural berm would be placed as engineered fill (in thin lifts) on a prepared foundation, but would be constructed to a lower compaction standard than the levee embankment. In coordination with the Corps and the BOSC, the height of the berm has been specified not to exceed 1/4 the height of the levee, and the access corridor along the waterside toe would be established over the top of this berm. The berm would be up to 300 feet wide.

Setback Levee Dimensions

The preliminary design of the ASB setback levee is shown in Figure 4-3. The proposed design of the levee section incorporates the design criteria outlined above in Section 4.1.2, "General Levee Design Criteria."

For preliminary design purposes, it is assumed that the design crown elevation of the ASB setback levee would be the same as the crown elevation of the existing levee at each given latitude along the alignment. A review of the available topographic data for the project vicinity developed as part of the Sacramento and San Joaquin River Basins Comprehensive Study indicates that the height of the ASB setback levee would generally range from about 20 to 30 feet above the existing ground surface. The most common levee height above the adjacent land would be about 25 feet. This height has been depicted in the cross sections presented in Figure 4-3.

The existing levee has been reconstructed by the Corps to provide a minimum of 3 feet of freeboard above the 1957 design profile. This design profile is above the current objective flow profile for this stretch of the Feather River. Because the levee setback would lower most flow profiles by widening the flow channel, it follows that the ASB setback levee, if constructed to the elevations described above, would have freeboard in excess of 3 feet above the 1957 design profile and additional freeboard above the objective flow profile.

Other anticipated dimensions of the ASB setback levee are:

- crown width of 20 feet,
- patrol road width of 12 feet, and
- waterside and landside slope of 3:1 (H:V).

Setback Levee Inspection Trench

An inspection trench with a minimum depth and bottom width of 6 feet and 12 feet, respectively, would be excavated in the foundation along the length of the setback levee, with the trench centerline located approximately under the outer edge of the waterside shoulder of the levee crown. The purpose of the inspection trench is to expose or intercept any undesirable underground features such as old irrigation pipes, animal burrows, buried logs, layers of unsuitable material, or other debris. The trench would be backfilled with tight, compacted backfill to intercept shallow seepage paths that may exist directly under the base of the embankment. Based on discussions with the Corps during the design phase for the Bear River setback levee in the F-BRLSP, it is assumed that the depth of the inspection trench could be reduced to about 3–4 feet wherever a cutoff wall is provided for seepage control (see "Setback Levee Seepage Control" below). The upper cross section shown in Figure 4-3 represents a typical levee section with an inspection trench.

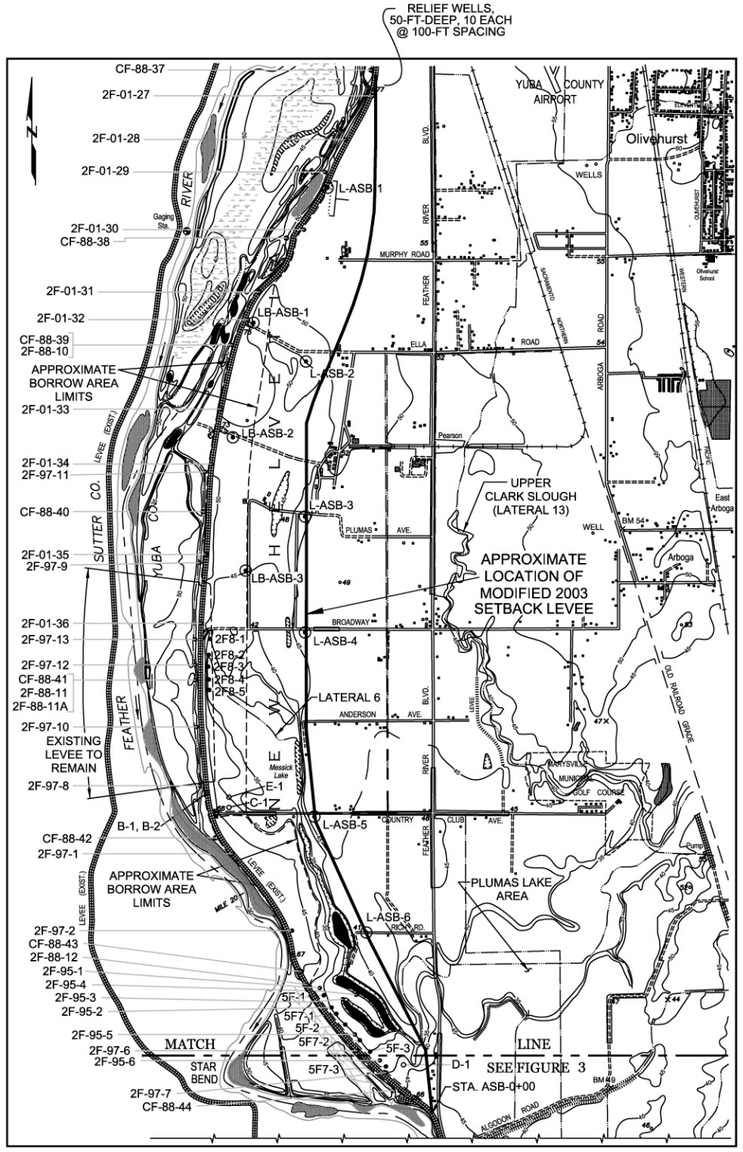
Setback Levee Easement

As illustrated in Figure 4-3, access easements would be provided adjacent to the landside and waterside toes of the ASB setback levee. These easements would be at least 50 feet wide. The areas adjacent to the setback levee would be graded to drain away from the levee toes for at least 10 feet. As required, the ASB setback levee easement would take into account the appropriate right-of-way for any drainage feature that lies landward of the levee. In addition, to meet the requirement in 23 CCR Section 120 that the bottom of any nearby agricultural ditch be located at an elevation above the projected downward extension of the landside levee slope, the toe of the ASB setback levee may need to be located farther than the required minimum of 10 feet from a deep ditch.

Setback Levee Seepage Control

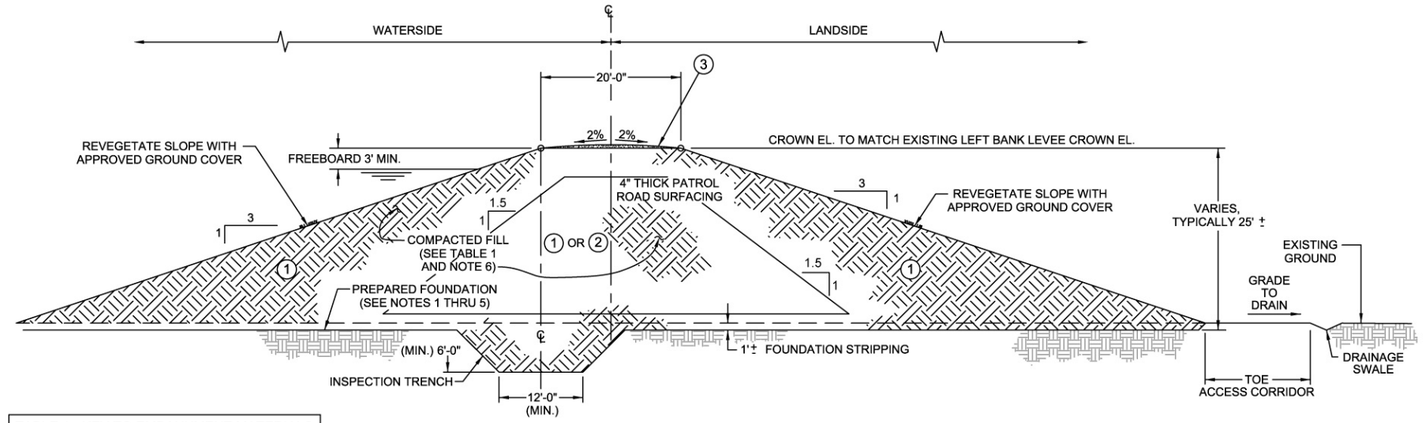
Based on the performance history of the existing levees and the results of investigations along the proposed ASB setback levee alignment, it is anticipated that seepage control measures would be required along significant portions of the setback levee. Susceptibility of the ASB setback levee embankment and foundation soils to seepage and internal erosion is the primary concern related to levee integrity and stability. Soils in the levee foundation would likely consist of fine sands and fine silty sands to a large extent. These permeable, cohesionless, and easily erodible soils have a high potential for undergoing internal erosion (a phenomenon referred to as "piping") when subjected to moderately high hydraulic gradients that are sustained for more than several days. Animal burrows can exacerbate the situation by providing a shortened conduit for the initiation of seepage and internal erosion. Muddy seepage, boils, and sinkholes are external landside manifestations of ongoing seepage and internal erosion processes that can occur when the levee is subjected to sustained high water levels. Internal erosion of levee embankment or foundation materials poses a threat to levee integrity during flood events. If unchecked, this progressive failure mechanism can eventually result in sudden, catastrophic failure of the levee.

The proposed preliminary design for the ASB setback levee recognizes these unfavorable soil conditions and includes appropriate provisions to reduce the potential for seepage-induced erosion of the levee embankment and foundation soils through the use of various seepage control measures, including cutoff trenches/slurry cutoff walls and relief wells.



PLAN VIEW

0 2,000 4,000
SCALE, FEET

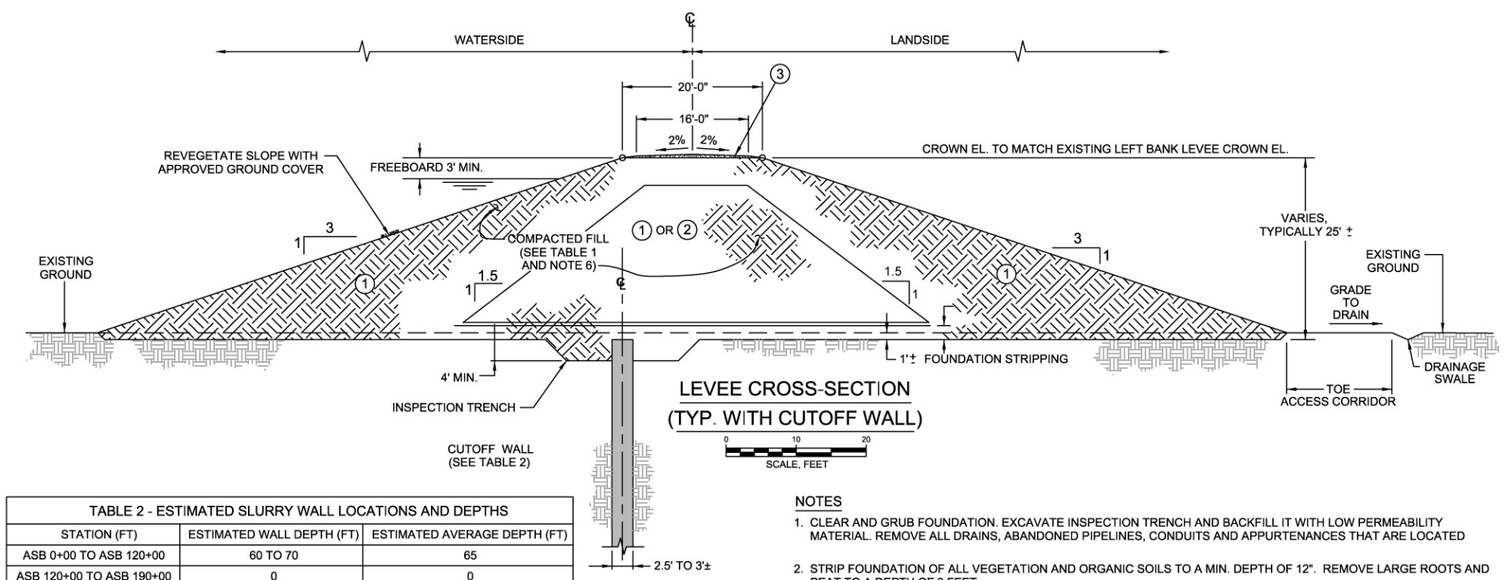


LEVEE CROSS-SECTION (TYP. WITHOUT CUTOFF WALL)

0 10 20
SCALE, FEET

TABLE 1 - KEY TO EMBANKMENT MATERIALS	
1	APPROVED LOW-PERMEABILITY MATERIAL
2	APPROVED LOW PERMEABILITY MATERIAL WITH REDUCED PLASTICITY
3	CALTRANS CLASS 2 AGGREGATE BASE

NOTE:
THE LEVEE SETBACK ALIGNMENT, CROSS-SECTION AND DETAILS ARE PRELIMINARY.



LEVEE CROSS-SECTION (TYP. WITH CUTOFF WALL)

0 10 20
SCALE, FEET

TABLE 2 - ESTIMATED SLURRY WALL LOCATIONS AND DEPTHS		
STATION (FT)	ESTIMATED WALL DEPTH (FT)	ESTIMATED AVERAGE DEPTH (FT)
ASB 0+00 TO ASB 120+00	60 TO 70	65
ASB 120+00 TO ASB 190+00	0	0
ASB 190+00 TO ASB 220+00	40 TO 70	50
ASB 220+00 TO ASB 310+00	0	0

NOTES

1. CLEAR AND GRUB FOUNDATION. EXCAVATE INSPECTION TRENCH AND BACKFILL IT WITH LOW PERMEABILITY MATERIAL. REMOVE ALL DRAINS, ABANDONED PIPELINES, CONDUITS AND APPURTENANCES THAT ARE LOCATED
2. STRIP FOUNDATION OF ALL VEGETATION AND ORGANIC SOILS TO A MIN. DEPTH OF 12". REMOVE LARGE ROOTS AND PEAT TO A DEPTH OF 3 FEET.
3. PROOF ROLL FOUNDATION TO ENSURE REMOVAL OF ALL SOFT SPOTS.
4. BACKFILL ALL HOLES, DEPRESSIONS AND DITCHES IN THE FOUNDATION WITH NATIVE MATERIAL AND COMPACT THE BACKFILL TO A DENSITY EQUAL TO THAT OF THE ADJACENT UNDISTURBED MATERIAL.
5. IMMEDIATELY PRIOR TO PLACING THE FIRST LIFT OF EMBANKMENT, SCARIFY AND MOISTURE CONDITION THE FOUNDATION SURFACE TO A DEPTH OF 4 INCHES.
6. PLACE THE FILL MATERIALS IN MAXIMUM 6" THICK LIFTS AFTER COMPACTION.

LEGEND

	EXISTING LEVEE
	MODIFIED 2003 SETBACK LEVEE
L-ASB-1	APPROX. GEI TEST BORING LOCATION (2002)
2F-97-7	APPROX. CORPS OF ENGINEERS TEST BORING LOCATION (1997)
CF-88-39	APPROX. CORPS OF ENGINEERS CONE PENETRATION TEST LOCATION (1988)
B-1, C-1, D-1	APPROX. WAHLER TEST BORING LOCATION (1986)
ASB	ABOVE STAR BEND

NOTE

Map is taken from U.S.G.S. Topographic 7.5 Minute Series Map of Olivehurst, California Quadrangle, Photorevised 1973. Datum is National Geodetic Vertical Datum of 1929 (NGVD).

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Preliminary Plan View and Typical Cross Sections for the ASB Setback Levee

Figure 4-3

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Because of the depths and thickness of pervious strata generally present along the setback levee alignment, the only practical method of constructing a cutoff trench is by the slurry wall method. As discussed above in the description of Alternative 1, in the slurry wall method a cutoff trench is excavated and filled with a bentonite slurry to keep the trench from caving during excavation; the trench is then backfilled with native soil mixed with bentonite to provide a cutoff with reduced permeability.

Construction of a slurry cutoff wall is proposed along those portions of the ASB setback levee where widespread strata of permeable sands and gravels exist in the foundation. The lower cross section in Figure 4-3 represents a typical levee cross section with a slurry cutoff wall. Information on the preliminary locations, lengths, and depths of slurry cutoff walls is also provided in Figure 4-3. The purpose of the slurry cutoff wall is to dissipate the hydraulic gradient in the levee foundation and reduce seepage quantities. This would reduce the hydraulic gradient and seepage flows through the foundation soils adjacent to the slurry cutoff wall to safe levels. To achieve maximum effectiveness, the slurry cutoff wall must extend completely through the permeable strata and terminate some distance into an underlying, reasonably continuous layer with lower permeability.

Relief wells are another means of providing a filtered seepage path for reducing water pressure in the foundation soils. Relief wells, however, can be prone to plugging and damage from vandalism, and they require operation (water removal) and periodic maintenance (flushing, cleaning, and replacement) to remain effective. Therefore, use of relief wells is typically proposed only for specific locations where other measures are deemed to be insufficient or ineffective. At this time the only location along the ASB setback levee alignment where relief wells are proposed is at the upstream tie-in point of the ASB setback levee with the existing levee. At this location relief wells would act as a supplemental seepage control method, to provide for relief of foundation seepage that may have a southerly flow component.

Although not included in the preliminary design for the ASB setback levee, a stability/seepage berm could be constructed along the landside levee toe along portions of the levee potentially susceptible to differential settlement, or where only relatively thin layers or lenses of permeable soils exist in the setback levee foundation. A seepage berm does not reduce the hydraulic gradient through the foundation, nor does it reduce the seepage flows. However, it provides a weighted, filtered seepage path (i.e., the drainage blanket at the base of the berm) that allows seepage to occur but reduces the potential for boil formation and the associated erosion and loss of foundation material.

Other potential seepage control measures were also given consideration as part of the design of the ASB setback levee. Impervious blankets on the river side of the levee were not pursued because of concerns about environmental impacts and effectiveness levels. In addition, the Corps apparently has not had good results from pervious (gravel-filled), trenched toe drains constructed in the project area because of the caving associated with excavation of trenches in very loose sandy soils. These soils have severely limited the depth to which toe trenches can be constructed and maintained economically. Toe drains in trenches have not been incorporated at any location along the ASB setback levee in the preliminary design.

Selection of the type and extent of seepage control measures for specific reaches of the ASB setback levee alignment is preliminary. For project budgeting purposes and for the evaluation of potential environmental effects, the maximum reaches over which seepage control measures may be required were identified; however, definition of the reaches should be considered approximate at best. If Alternative 2 is selected for implementation, the seepage control system for the ASB setback levee would be refined based on detailed field investigations and analyses, to be performed during detailed design.

4.4.2 HYDROLOGY AND FLOOD CONTROL BENEFITS

The ASB setback levee would work within the capacities of the current flood control system. The existing system design flow for the Feather River between the Yuba and Bear Rivers is 300,000 cubic feet per second (cfs). The upstream reservoirs operate to maintain flows in the Feather River at or below this design flow, insofar as possible. With the ASB setback levee in place along the Feather River, the reservoirs could continue to operate in the same manner as under current conditions. The levee setback would result in flood control benefits because it would lower water levels in the river during flood events and because the setback levee would be constructed in a more secure location than the existing levee, based on current engineering standards.

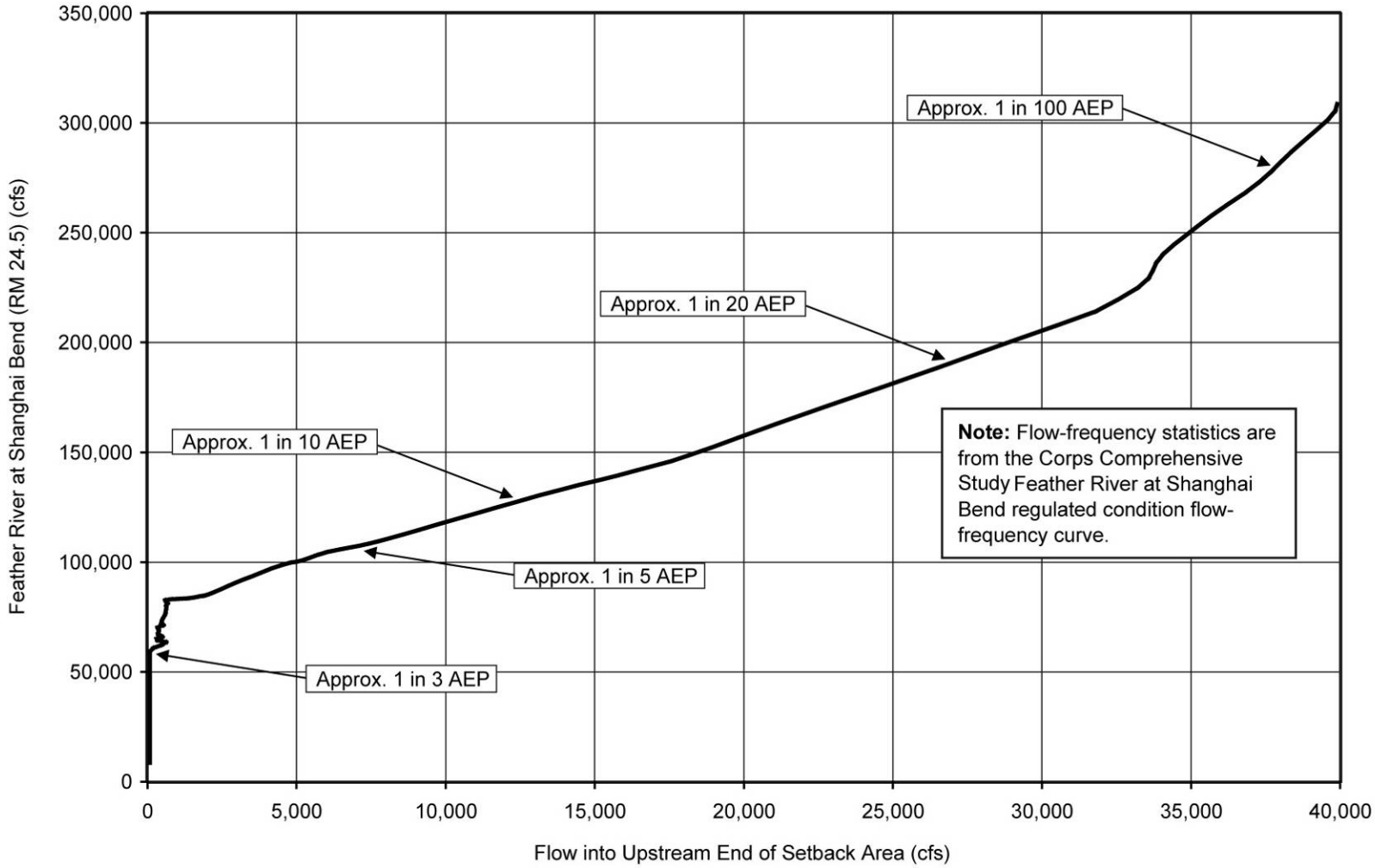
MBK Engineers performed hydraulic modeling of the proposed ASB levee setback. The following sections summarize the results of these modeling studies. Details regarding the modeling are provided in Appendix B.

Flooding of the ASB Levee Setback Area

Flows would enter the upstream end of the ASB levee setback area (i.e., the new floodway) when the river stage rises above the ground elevation at the current levee alignment, which is approximately 50 feet. Analysis performed by MBK Engineers indicates that flows passing downstream would enter the levee setback area approximately once in 3 years on average, when the rate of flow is somewhat higher than 50,000 cfs. Flooding would generally last for 3–5 days. This is similar to the frequency of flooding now experienced in areas that are within the currently leveed channel of the Feather River but are outside the low-flow channel. For the 1-in-100 annual exceedance probability (AEP) flood (i.e., the “100-year flood”) on the Feather River—a flow of approximately 300,000 cfs—the maximum depth of water in the levee setback area is expected to be about 20 feet, while the peak velocity is expected to fall in the range of 1–3 feet per second. For the 1-in-200 AEP flood on the Feather River (350,000 cfs), the maximum water depth in the levee setback area would be approximately 23 feet, and the peak velocity would fall in the range of 1–3 feet per second.

Table 4-2, “Feather River Flow Frequencies and Water Elevations in the ASB Levee Setback Area,” shows the approximate frequency of Feather River flood flows and corresponding water depths at the upstream end of the levee setback area.

Figure 4-4, “Expected Frequency and Magnitude of Flooding of the Levee Setback Areas from River Flows,” illustrates the expected frequency and magnitude of river flows through the ASB levee setback area.



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Consulting Civil Engineers

FEATHER RIVER LEVEE REPAIR PROJECT

Expected Frequency and Magnitude of Flooding of the Levee Setback Areas from River Flows

Figure 4-4

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Source: Countryman, pers. comm., 2002

Table 4-2
Feather River Flow Frequencies and Water Elevations in the ASB Levee Setback Area

AEP	Feather River Flow (cfs)	Water Elevation at Upper End of Levee Setback Area (feet—NGVD)	Height Above Ground at Upper End of Levee Setback Area (feet)
1 in 2.5	50,000	46.0	0
1 in 5	105,000	53.4	7
1 in 10	130,000	56.1	9
1 in 20	190,000	61.0	13
1 in 100	300,000	66.9	20
1 in 200	350,000	69.5	23

Notes: AEP = annual exceedance probability; ASB = Above Star Bend; cfs = cubic feet per second; NGVD = National Geodetic Vertical Datum
Source: Data provided by MBK Engineers in 2006

Reductions in River Stages

The hydraulic performance of the ASB setback levee was evaluated using an unsteady-flow model (HEC-RAS) originally developed by the Corps in support of the Lower Feather River Floodplain Mapping Study and subsequently modified and calibrated to the flow and high-water data from the 1997 flood by MBK Engineers. Simulations were performed for the 1-in-100 and 1-in-200 AEP events to assess the effect of the potential setback on river stages.

The results of the evaluation indicate that the ASB setback levee alignment would be effective in lowering water levels from Marysville–Yuba City to Country Club Lane, but would be ineffective in lowering water levels farther downstream at Star Bend because water levels at Star Bend are controlled by conditions downstream of this levee setback segment. The simulations show that the water levels would be lowered about 1.3 feet and 1.6 feet for the 1-in-100 and 1-in-200 AEP events, respectively, at the confluence of the Feather and Yuba Rivers in comparison with existing conditions. Within the ASB setback levee reach, the simulated maximum reductions in water surface elevations for the 1-in-100 and 1-in-200 AEP events are 2.6 feet and 3.0 feet, respectively, at river mile 23.5. The ASB setback levee would also lower water levels in the Yuba River above Marysville, but not by as much; for example, for the Yuba River 2.6 miles upstream of Marysville, MBK Engineers' evaluation showed that the ASB setback levee would lower the Yuba River stage by about 0.8 foot for the 1-in-100 AEP event and 1.2 feet for the 1-in-200 AEP event.

4.4.3 ALTERNATIVE 2—CONSTRUCTION

General Construction Plan—Segments 1 and 3

The construction plan for project Segments 1 and 3 under Alternative 2 would be similar to the construction plan for these same project segments under Alternative 1 presented in Section 4.3.3 above. Both alternatives include the same levee repair and strengthening activities in these two project segments.

General Construction Plan—Segment 2

Construction of the ASB setback levee under Alternative 2 would be primarily a large civil construction project and would need to be planned accordingly, consistent with standards of The Reclamation Board as stated in 23 CCR Sections 111–157. Section 112 stipulates that existing levees may not be excavated or left partially excavated during the flood season. The flood season for the Feather River, as defined in Section 112, extends from November 1 through April 15. This requirement sets milestone dates around which the project must be planned. Because the primary borrow sources would be borrow areas in the levee setback area and from excavation of a detention basin, embankment placement could begin before April 15, weather permitting. As described previously, the decision to remove the existing levee is a federal decision that would be made by the Corps, and the timing of such an action is uncertain. If the Corps were to permit degradation of the existing levee concurrently with construction of the ASB setback levee, any excavation of the existing levee would not occur until after a substantial portion of the setback levee is constructed. Levee excavation would need to occur after April 15, and the setback levee would need to be completed and approved by The Reclamation Board by November 1.

Key activities to be started ahead of construction of the setback levee embankment include construction of the slurry cutoff wall, excavation of the inspection trench, other work to prepare the levee foundation, and the removal or relocation of structures and utilities.

Slurry Cutoff Wall

Construction of the slurry cutoff wall to the depths required along the proposed ASB setback levee alignment would be accomplished with large modified backhoes. This equipment and the associated sequence of excavation, backfill preparation, and placement of backfill back into the slurry cutoff wall trench would require a 100-foot-wide work platform (20 feet along one side of the wall and 80 feet on the other side). The slurry cutoff wall is expected to be as much as 80 feet deep. Therefore, for each section of the ASB setback levee where a slurry cutoff wall is needed, the slurry cutoff wall would be installed before the levee embankment is constructed. In addition, the work platform would need to be at least 4–5 feet above the highest groundwater level to provide a stable base for the excavation equipment.

Before excavation for the slurry cutoff wall, a shallow (3-4 foot-deep) trench would be excavated and backfilled with material of low permeability to form a shallow cutoff. The slurry cutoff wall would be excavated through this shallow cutoff. Some time would be allowed for the backfill in the slurry cutoff wall to settle before the placement of fill in the overlying embankment would continue. The connection of the slurry cutoff wall to the embankment fill is a key feature and would be refined during detailed design.

Foundation Preparation

Preparation of the foundation of the ASB setback levee would involve a sequence of several activities. The setback levee footprint would be cleared and grubbed of all objectionable matter, such as trees, brush, vegetation, loose stone, abandoned structures, existing utilities, buried pipelines, and other deleterious buried materials that may exist within 10 feet of the levee toes. After clearing and grubbing, the setback levee foundation would be stripped to remove low-

growing vegetation and topsoil to a depth of at least 6 inches, although local areas with extensive tree roots or deep organic soils would require excavation to a depth of 3 feet or greater. The topsoil would be placed in a designated "unsuitable material" spoil area, consisting of a compacted waterside berm as described previously under "Levee Embankment Material." Overall, the depth of stripping is expected to average about 1–3 feet. After stripping, the inspection trench would be excavated, as described previously. The trench then would be backfilled and compacted.

Before placement of the embankment fill, the foundation surface would be proof-rolled, and any remaining soft materials would be removed and replaced with compacted fill, treated with lime stabilization, and strengthened with geogrid mesh. Just before the first lift of fill is placed, the foundation surface would be scarified to a depth of about 4 inches and moisture conditioned to help create a good bond between the foundation and the embankment fill.

Removal of the Existing Levee

Where the existing levee would be excavated for setback levee borrow and/or to allow flood waters to pass into and out of the levee setback area (assuming Corps authorization), the existing embankment would be excavated to the level of the adjoining ground surface. It is anticipated that vegetation would not be removed from the river side of the existing levee. However, some of this vegetation may need to be removed if drainage channels need to be constructed to allow borrow areas and other depressions to drain to the Feather River channel (see "Borrow Material Requirements and Development of Borrow Areas" below). If the construction of drainage channels is required, these channels would be located to minimize vegetation disturbance, fish stranding, and other environmental impacts. A site-specific drainage plan would be developed in final design.

Embankment Construction

Construction of the ASB setback levee embankment would begin in the spring as soon as weather conditions allow. The embankment would be constructed as an engineered fill, with the fill placed in horizontal lifts consistent with the requirements for lift thickness and compaction densities specified in 23 CCR Section 120. Each lift would be moisture conditioned and compacted to the specified density using a suitable compactor, such as a sheepsfoot, tamping-foot, or rubber-tired roller.

Erosion Protection

Once the setback levee embankment is completed, an approved grass cover would be placed on both the riverside and landside slopes of the levee for protection against erosion. Historical experience with the existing left bank Feather River levee in this area indicates that grass cover provides acceptable erosion protection against high water levels during flood flows.

Pump Station No. 3 Relocation and Replacement

The relocation and replacement requirements for Pump Station No. 3, and the characteristics of the new Pump Station No. 3, under Alternative 2 are similar to those described for Alternative 1

in Section 4.3 above. The only substantial difference is that the location of the new pump station would be farther to the east on the land side of the proposed ASB setback levee.

Detention Basin Construction

A portion of the stormwater runoff from the western portion of RD 784 passes into and through the ASB setback levee area. Drainage from this area is conveyed in the Plumas Lake Canal and pumped into the Feather River at Pump Station No. 3. When flows exceed the capacity of Pump Station No. 3, there are several areas where water may pond and be temporarily stored until flow rates decline. Construction of the ASB setback levee would cut off and remove some of the ponding area where excess drainage water is temporarily stored. Therefore, as part of Alternative 2, it may be necessary to create a detention basin to mitigate the lost storage capacity. An area currently being considered for a detention basin, northeast of Star Bend, is shown in Figure 4-1 as a potential borrow area and/or detention basin. The detention basin would be constructed adjacent to the Plumas Lake Canal to allow water to be diverted from the canal into the basin when needed. The basin would be excavated to a depth of about 8–10 feet, or deeper if a permanent water feature is desired for mitigation/restoration or local land development considerations. Suitable soils excavated during construction of the detention basin would be used as borrow material for construction of the setback levee**.**

Borrow Material Requirements and Development of Borrow Areas

Sources and Quantities of Borrow

Borrow areas are sites where native materials (i.e., soil and rock) are obtained for required construction activities. As noted previously, borrow material would be obtained locally from excavation of a detention basin and from borrow areas developed inside and outside the ASB levee setback area. The existing Feather River levee would also be used as a source of borrow to the maximum extent possible.

Objectives for local borrow areas include:

- reducing the impact on land resources,
- shortening borrow haul distances to reduce impacts on air quality and traffic, and
- promoting the use of large off-road earthmoving equipment such as scrapers rather than trucks to reduce construction costs.

A total of approximately 3.1 million cubic yards (cy) of borrow material would be required to construct the ASB setback levee in project Segment 2. An additional roughly 200,000 cy of material would be required for levee repair/strengthening in Segments 1 and 3. A preliminary estimate of borrow material requirements for construction under Alternative 2 is provided in Table 4-3, “Summary of Borrow Material Requirements for Alternative 2.”

Table 4-3
Summary of Borrow Material Requirements for Alternative 2

Material Type [a]	Description	Volume Required (cubic yards)
1 & 2	ASB setback levee embankment	3,100,000
1	Levee repairs in Segments 1 and 3	200,000
3	Levee crown surface	17,000
	TOTAL VOLUME	Approx. 3,317,000

[a] Material types are as shown in Figure 4-3; 1 = Approved low-permeability material; 2 = Approved low-permeability material with reduced plasticity; 3 = Caltrans Class 2 Aggregate Base.
Notes: ASB = Above Star Bend; Caltrans = California Department of Transportation
Source: Data provided by GEI Consultants in 2006

Figure 4-1 shows potential borrow areas for the ASB setback levee. The intent is that the borrow areas would be within the identified limits and would have a smaller footprint than the area shown in the figure. Additional potential borrow sources include the abandoned sections of the Bear and Feather River levees left remnant from construction of the F-BRLSP, the area between the setback levee and Feather River Boulevard, and an existing borrow area near Ella Road.

Two general objectives are important in the selection of borrow areas:

- To minimize haul distances to the ASB setback levee alignment and provide a continuous or nearly continuous borrow source. Minimizing haul distances is important to minimize project construction costs and air emissions.
- To reduce the potential for seepage impacts at the foundation of the ASB setback levee, maintain a distance of 500 feet or greater from the edge of the borrow area to the toe of the proposed levee unless there is an incised drainage channel between the setback levee alignment and the borrow area. If such an incised drainage exists, borrow excavation closer to the levee may be allowed, based on an evaluation of local site conditions. Borrow areas may also be developed closer than 500 feet from the toe of the setback levee if the borrow pit is to be subsequently backfilled.

In general, the borrow areas would be located such that the haul distance to the point of material placement would be minimized as much as possible.

A detailed investigation of suitable borrow areas for levee embankment materials would be conducted as part of the field investigation program for detailed design. The limits of borrow areas would be refined during this effort.

Design and Treatment of Borrow Areas

Standard practices for the design and treatment of borrow areas would be followed as described in guidance provided by the Corps in Engineer Manual EM 1110-2-1913, *Engineering and Design—Design and Construction of Levees* (U.S. Army Corps of Engineers 2000). This guidance recommends that riverside borrow areas be “wide and shallow” rather than “narrow and deep.” This configuration provides for improved underseepage, hydraulic, and

environmental conditions. To minimize subsequent scouring when pits are filled by flood flows, to promote the growth of vegetation, and to encourage silting where reclamation is possible, the Corps recommends that riverside borrow areas be located and excavated such that they will fill slowly on a rising river and drain fully on a falling river. The guidance therefore specifies that bottoms should be sloped to drain away from the levee, with culvert pipes provided through traverses, and foreshore areas ditched through to the river as needed for proper drainage. The guidance also recommends that minimum treatment of borrow areas after excavation (to satisfy aesthetic and environmental considerations) include topographic smoothing to remove any holes, trenches, and abrupt slopes and the promotion of conditions conducive to vegetative growth. The drainage of the borrow areas would also need to ensure fish movement out of the levee setback area into the main channel of the Feather River when flood flows recede following inundating flood events.

It is anticipated that borrow areas could be excavated to depths of 5–10 feet (i.e., above the groundwater table). (Groundwater levels along the existing Feather River levee were measured, in a limited number of exploration borings, to be 9–20 feet below ground surface above Star Bend.) Wide, shallow excavations (rather than deep trenches) are anticipated. At the conclusion of the work, the borrow areas would be graded to blend with the topography, leaving slopes flat enough to reduce erosion and promote conditions conducive to vegetative growth (slopes 3:1 [H:V] or flatter), or filled with material from removal of existing levees. If not filled, the bottom of the borrow areas would be regraded to drain away from the levee and toward the river or toward existing drainage ways. The borrow areas would be revegetated to conform to the surrounding landscape. The borrow sites would be reclaimed as appropriate. Some stockpiled topsoil, and other excess earth materials (organic soils, roots, and grass) from stripping of the existing levees, borrow areas, and ASB setback levee foundation, could be spread over borrow sites after excavation has been completed, or would be placed in spoil berms on the waterside toe of the setback levee. There may be opportunities for environmental enhancement if the development and reclamation of the borrow areas is coordinated with wetland mitigation efforts. These would need to be identified during further design of this element and would incorporate the findings of this EIR as appropriate.

Aggregate base needed to surface the patrol road on the levee crown would be obtained from commercial sand and gravel operations in the Marysville–Yuba City area and would be hauled to the setback levee alignment and levee repair areas by truck.

Relocation of Utilities and Removal of Structures

A preliminary survey of existing facilities and utilities in the ASB levee setback area was conducted in October 2002 associated with planning for the Y-FSFCP.

Implementation of Alternative 2 would necessitate the removal of all structures (houses, trailers, sheds, barns, other agricultural outbuildings) from the ASB levee setback area, which would be subject to periodic flooding following removal of the existing levee. The facilities surveys identified approximately 40 structures in the levee setback area. It is estimated that five to 10 of these are residences, including mobile homes. Appropriate compensation would be negotiated with landowners displaced by the project. In addition, all property acquisitions and relocations conducted as part of the project would be completed following both the Federal Uniform

Relocation Act and the California Relocation Assistance Law (see the discussion of these statutes in Section 5.1, "Land Use"). Eligible homeowners, renters/tenants, businesses, and farm operations would receive relocation assistance consistent with these federal and state statutes.

Three small waste dumps containing fruit waste and miscellaneous solid debris have been noted within the ASB levee setback area. If necessary, based on future study such as a Phase 1 Environmental Site Assessment (ESA), the dumps could be excavated and the materials placed in approved landfills, or other appropriate remediation could be implemented.

Some utilities and other facilities located in the ASB levee setback area would need to be relocated or reinforced with implementation of the levee setback. As discussed previously, RD 784 Pump Station No. 3 would be relocated to the land side of the proposed ASB setback levee. A PG&E 115-kilovolt (kV) transmission line called the Bogue Loop crosses the levee setback area on three towers. The foundations for these steel structures would probably need to be reinforced so that their integrity would be maintained during times of flood water inundation. Other steel towers along the same transmission line are located on the water side of the existing Feather River levee and are supported by elevated steel pile foundations.

Other existing facilities that may need to be abandoned, reinforced, or relocated include roads, power distribution lines, irrigation pipelines, drainage canals and structures, wells, fill stations, and communications lines. Several private irrigation lines would be cut off by the construction of the ASB setback levee, separating some lands on both sides of the setback levee that require irrigation from current water sources. During detailed design, and in coordination with landowners, appropriate water sources and irrigation infrastructure would be determined for lands where irrigation lines were cut off and that would continue to require irrigation water after project construction. Depending on site-specific conditions, wells and fill stations in the levee setback area could be removed or maintained. Private wells and fill stations in the levee setback area that would be abandoned would be removed and filled, and new wells would be dug and fill stations built outside the levee setback area to replace the abandoned facilities as appropriate. Wells and fill stations that would be retained in the levee setback area would be retrofitted to accommodate periodic flooding. New power lines and power poles would be required for any new wells and fill stations.

Individual utilities and conceptual plans for their abandonment, reinforcement, and relocation are described in more detail in Section 5.12, "Public Services, Utilities, and Service Systems."

Staging Areas

It is anticipated that several staging areas would be developed along the ASB setback levee alignment to allow for efficient use and distribution of materials and equipment. Staging areas would be located within the construction corridor (see "Construction-Related Traffic" below) and near active construction areas, so they may be relocated as construction progresses. Because the work area is essentially flat, suitable sites for construction staging are abundant. Specific staging areas would not be identified until the detailed design phase. Final selection of staging areas would be based on contractor preference and environmental and land use constraints.

Disposal of Excess Materials

Excess earth materials (organic soils, roots, and grass from stripping of the existing levees, borrow areas, and ASB setback levee foundation; excavated material that does not meet levee embankment criteria) would be used in the reclamation of borrow areas. Suitable excess material would also be placed in a compacted spoil berm along the waterside toe of the ASB setback levee as described previously. In addition, excess material could be used in the contouring of the setback area to facilitate drainage to the Feather River and prevent fish stranding. Cleared vegetation (i.e. trees, brush) would be hauled off-site. Debris from structure demolition, power poles, piping, and other materials requiring disposal would be hauled off-site to a suitable landfill.

Stormwater Pollution Prevention

Stormwater pollution prevention measures under Alternative 2 would be the same as those described previously for Alternative 1 (see Section 4.3.3, "Alternative 1—Construction"). These stormwater pollution prevention measures would need to be implemented over a larger area under Alternative 2 because of the increased level of ground disturbance associated with construction of the ASB setback levee, the increased need for borrow areas, and construction of the detention basin.

Construction Equipment

Contractor plant equipment would include construction office and equipment trailers; slurry batch plants, including bentonite storage facilities, mixing tanks, pumps, and piping; warehousing and equipment maintenance facilities; and fuel pumps and fuel storage tanks. Mobile construction equipment for levee repairs in project Segments 1 and 3, installation of a slurry cutoff wall in these segments, and berm construction (if needed) would be similar to the equipment listed previously for Alternative 1. However, the actual number of pieces of equipment may be somewhat smaller under Alternative 2 because of the reduced extent of levee repairs (i.e., two project segments rather than three segments).

Mobile equipment for construction of the ASB setback levee may include the following typical equipment:

- two hydraulic excavators,
- eight to 10 scrapers,
- four bulldozers,
- three to four graders,
- four self-propelled sheepsfoot or tamping-foot rollers,
- two water wagons,
- 20 highway dump trucks,
- a lubricating truck,
- a front-end loader,
- a truck-mounted crane, and
- numerous pickup trucks.

Mobile equipment for construction of a slurry cutoff wall for two simultaneous headings along the ASB setback levee alignment may include:

- two long-stick hydraulic excavators,
- two low-ground-pressure bulldozers,
- two utility excavators, and
- two integrated tool carriers.

Additional equipment would include drill rigs to abandon wells and install new wells, utility equipment to install power lines, an air compressor, welding equipment, pumps and piping, communications and safety equipment, erosion control materials, miscellaneous equipment customary to the mechanical and electrical crafts, and vehicles used to deliver equipment and materials.

Construction-Related Traffic

Personnel, equipment, and imported materials would reach the site via SR 70 and Feather River Boulevard, which are paved, all-weather roads suitable for the anticipated loads. The construction labor force is estimated to average about 60–70 persons over the 2-year construction period. Peak staffing could be close to 100 depending on the contractor's schedule.

It is expected that about 60–70 trailer ("low-boy") truck round trips would be required to transport the contractor's plant and equipment listed above to the site. A similar number of round trips would be needed to remove the equipment from the site as the work is completed.

Aggregate base, and similar aggregate and quarry materials as needed (e.g., drain rock, rock facing material) would be obtained from a commercial sand and gravel operation, most likely in the Marysville–Yuba City area. The construction contractor would select the specific supplier based on suitability and pricing. About 1,500 highway truck trips would be needed to bring the aggregate materials to the site from the quarry of origin. About 150 truckloads would be needed to bring dry bentonite to the site. The bentonite would probably be processed in Wyoming or South Dakota and transported to the Marysville–Yuba City area by rail. Another 40–50 trailer truckloads would be required to bring other permanent materials to the site, such as geotextile fabric, erosion control materials, structural steel, piping, utility poles, well casings, and ancillary equipment. About 30–40 concrete loads, transported by transit mixer truck, are also likely. In addition, about 750 highway truckloads may be needed to carry demolition debris, construction debris, and waste dump materials to a suitable landfill.

At the project site, the primary construction corridor for project Segments 1 and 3 would include the existing Feather River and Yuba River levee crests, the landside toes of the existing levees, and roads used for access to the work areas, including Feather River Boulevard. The primary construction corridor for Segment 2 would include the work area bounded by the waterside toe of the existing Feather River levee to the west and the landside toe of the ASB setback levee to the east, as well as roads used for access to the work area, including Feather River Boulevard. Access routes for construction of the ASB setback levee would consist mainly of the existing east-west lateral roads between SR 70, Feather River Boulevard, and the existing Feather River

levee. These access roads may need to be supplemented by new temporary access roads from the borrow areas and existing levee to the new setback levee.

Within the construction area, the main source of construction traffic would be the required transport of borrow material from the points of excavation at the borrow areas to the placement area at the ASB setback levee. A total volume of about 3.1 million cy would require about 155,000 haul unit trips if a load of 20 cy per trip is assumed. Larger haul unit sizes would reduce the number of trips and the impact on air quality. Dust control measures would be applied to roads and work areas on a systematic basis. This transport of material would take place over an approximately 8- to 9-month (spring through fall) construction season (see "Construction Sequence and Scheduling Constraints" in Section 4.6, "Implementation," below regarding the construction schedule). Borrow placement would need to average at least 11,500–15,000 cy per day for the work to be completed in approximately 210–230 work days.

4.5 ALTERNATIVE 3—THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE

4.5.1 PRELIMINARY DESIGN OF ALTERNATIVE 3

As described previously, Alternative 3, The Levee Strengthening and Intermediate Setback Levee Alternative, would consist of the following:

- Segment 1—Levee repairs and strengthening along the Feather River left bank levee from PLM 13.3 to PLM 17.1.
- Segment 2—A setback levee along the left bank of the Feather River from PLM 17.1 to PLM 23.6 following an alignment similar to the ASB setback levee alignment described for Alternative 2, but with a portion located farther to the west.
- Segment 3—Levee repairs and strengthening along the Feather River left bank levee from PLM 23.6 to PLM 26.1 and the Yuba River left bank levee from PLM 0.0 to PLM 0.3.

Activities along project Segments 1 and 3 would be exactly the same as described for Alternatives 1 and 2, consisting of the same levee repair and strengthening elements and seepage control and stability measures identified in the PIR. These activities generally are not described further below.

The primary difference between Alternative 3 and the other alternatives relates to project construction activities along Segment 2. Under Alternative 1 the existing Feather River levee in Segment 2 would be repaired and strengthened; by contrast, under Alternatives 2 and 3 a setback levee would be constructed in this project segment. The setback levee to be constructed under Alternative 3 would follow an alignment similar to that described for Alternative 2. However, a portion of the alignment would be moved farther to the west to minimize effects on existing properties and reduce the area placed on the water side of the levee.

For most parameters of the project description Alternative 3 is the same as or not substantially different from Alternative 2. The description below focuses on those areas where Alternative 3 differs.

Segments 1 and 3—Levee Strengthening

The levee repairs and improvements to the Feather River and Yuba River levees in project Segments 1 and 3 under Alternative 3 are identical to those described previously for Alternative 1 in Section 4.3.

Segment 2—Intermediate Setback Levee

Levee modifications in project Segment 2 (the Feather River left bank levee from PLM 17.1 to PLM 23.6) would consist of construction of a new setback levee (the intermediate setback levee) as described below.

Setback Levee Alignment

The general location of a potential intermediate setback levee is shown in Figure 4-1. However, for the portion of the intermediate setback levee that deviates from the ASB setback levee alignment, a specific route has not yet been confirmed and several options are being considered. The actual alignment could be located to the east or west of the alignment shown. Considerations for final route selection include the suitability of underlying soil conditions for levee construction and the extent of flood control benefits (i.e., moving the alignment westward and reducing the size of the Feather River high-water channel would result in fewer flood control benefits). The route shown in Figure 4-1 and described below is considered to be representative of the various alignment options available under the intermediate setback levee scenario.

The characteristics of the intermediate setback levee are similar to those of the ASB setback levee described in Section 4.4. However, the intermediate setback levee alignment was selected as a project alternative, in part, to minimize effects on existing land uses. Because a portion of the setback levee alignment would be farther west than the ASB setback levee alignment, less land area would be placed in the flood zone (i.e., between the setback levee and the river) if the intermediate setback levee were built. In addition, several structures that would be placed in the flood zone under Alternative 2, and hence would have to be removed, would remain on the land side of the levee under Alternative 3.

The intermediate setback levee alignment more closely follows some property parcel lines than the ASB setback levee alignment, reducing the splitting of parcels by the setback levee. Because existing parcel configurations would be more closely maintained, these parcels would remain large enough to cost effectively continue agricultural operations. Under the ASB setback levee alignment, by contrast, portions of these parcels would be separated or split by the setback levee, resulting in a smaller land area that may not be large enough to cost effectively continue agricultural operations.

The intermediate setback levee would be approximately 5.5 miles long. The new levee segment would generally be set back approximately 0.5 mile to the east of the existing Feather River levee in the southern portion of the alignment, and approximately 0.3 mile to the east of the existing levee in the northern portion. The exception is at the northern and southern ends of the alignment, where the setback levee would join the existing levee. The area between the existing levee and the setback levee (the levee setback area) and the footprint of the intermediate setback levee would include approximately 1,250–1,300 acres. It should be noted that the final alignment

of the intermediate setback levee may be adjusted slightly during detailed design to meet site-specific project needs.

The Existing Segment 2 Levee

Under Alternative 3 the existing Feather River left bank levee in project Segment 2 would be treated in the same manner as described previously for Alternative 2 (see Section 4.4.1, "Preliminary Design of Alternative 2").

Levee Embankment Material

Under Alternative 3, embankment materials used for the setback levee would have the same characteristics and would be used in the same manner as described previously for Alternative 2 (see Section 4.4.1, "Preliminary Design of Alternative 2"). Preliminary design cross sections for the intermediate setback levee are shown in Figure 4-5, "Preliminary Plan View and Typical Cross Sections for the Intermediate Setback Levee."

Setback Levee Dimensions

The preliminary cross sections for the intermediate setback levee are shown in Figure 4-5. The dimensions of the intermediate setback levee would be similar to the dimensions of the ASB setback levee described in Section 4.4.1, "Preliminary Design of Alternative 2."

Setback Levee Inspection Trench

The inspection trench for the intermediate setback levee would be similar to the inspection trench for the ASB setback levee described in Section 4.4.1. The upper cross section shown in Figure 4-5 represents a typical levee section with an inspection trench.

Setback Levee Easement

The easement requirements for the intermediate setback levee would be the same as those described for the ASB setback levee in Section 4.4.1.

Seepage Control

Seepage control measures for the intermediate setback levee would be very similar to measures for the ASB setback levee described in Section 4.4.1.

The lower cross section in Figure 4-5 represents a typical intermediate setback levee cross section with a slurry cutoff wall. Information regarding the preliminary locations, lengths, and depths of slurry cutoff walls for the intermediate setback levee alignment is also provided in Figure 4-5.

As with the ASB setback levee alignment, at this time the only location along the intermediate setback levee alignment where relief wells are proposed is at the upstream tie-in point of the setback levee with the existing levee. At this location relief wells would act as a supplemental

seepage control method, to provide for relief of foundation seepage that may have a southerly flow component.

Selection of the type and extent of seepage control measures for specific reaches of the intermediate setback levee alignment is preliminary. The maximum reaches over which seepage control measures may be required were identified for project budgeting purposes and for the evaluation of potential environmental effects; however, definition of the reaches should be considered approximate at best. The seepage control system would be refined based on detailed field investigations and analyses, to be performed during detailed design.

4.5.2 HYDROLOGY AND FLOOD CONTROL BENEFITS

The intermediate setback levee would work within the capacities of the current flood control system. The existing system design flow for the Feather River between the Yuba and Bear Rivers is 300,000 cfs. The upstream reservoirs operate to maintain flows in the Feather River at or below this design flow, insofar as possible. With the intermediate setback levee in place along the Feather River, the reservoirs could continue to operate in the same manner as under current conditions. The levee setback would result in flood control benefits because it would lower water levels in the river during flood events and because the setback levee would be constructed in a more secure location than the existing levee, based on current engineering standards.

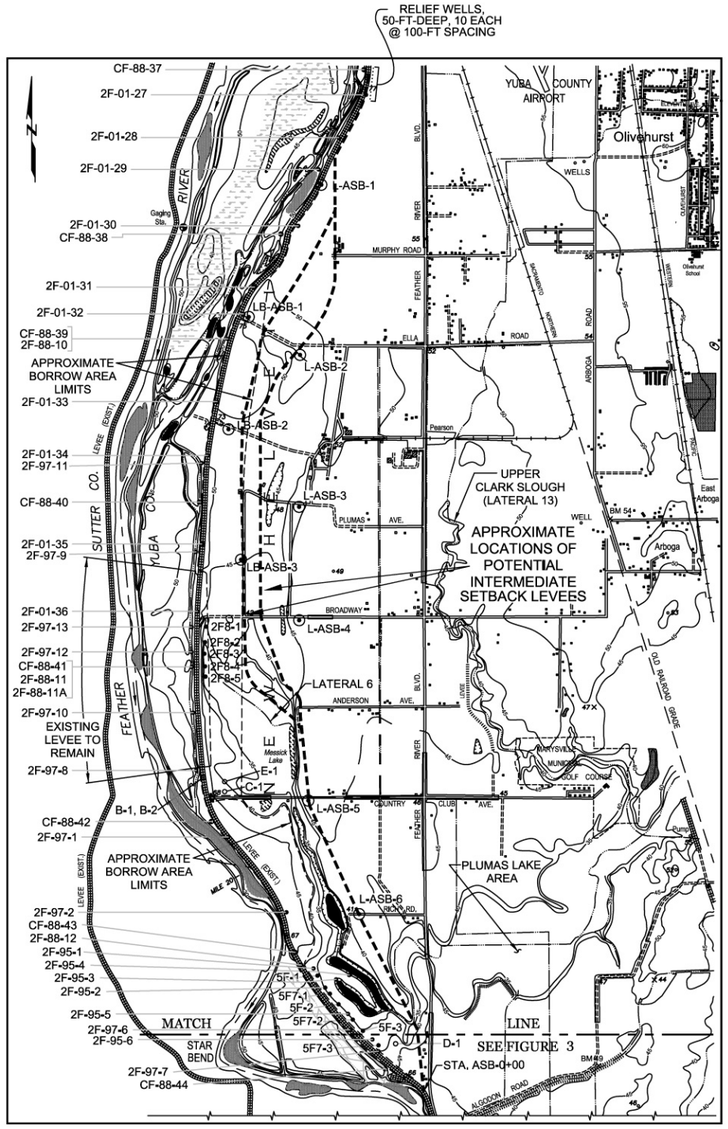
MBK Engineers performed hydraulic modeling of the proposed intermediate levee setback. The following sections summarize the results of these modeling studies. Details regarding the modeling are provided in Appendix B**.**

Flooding of the Intermediate Levee Setback Area

Flows would enter the upstream end of the intermediate levee setback area (i.e., the new floodway) when the river stage rises above the ground elevation at the current levee alignment, which is approximately 50 feet. Analysis performed by MBK Engineers indicates that flows passing downstream would enter the levee setback area approximately once in 3 years on average, when the rate of flow is somewhat higher than 50,000 cfs. Flooding would generally last for 3–5 days. This is similar to the frequency of flooding now experienced in areas that are within the currently leveed channel of the Feather River but are outside the low-flow channel. For the 1-in-100-AEP flood (i.e., the “100-year flood”) on the Feather River—a flow of approximately 300,000 cfs—the maximum depth of water in the levee setback area is expected to be about 20 feet, while the peak velocity is expected to fall in the range of 1–3 feet per second. For the 1-in-200 AEP flood on the Feather River (350,000 cfs), the maximum water depth in the setback area would be approximately 23 feet and the peak velocity is expected to fall in the range of 1–3 feet per second.

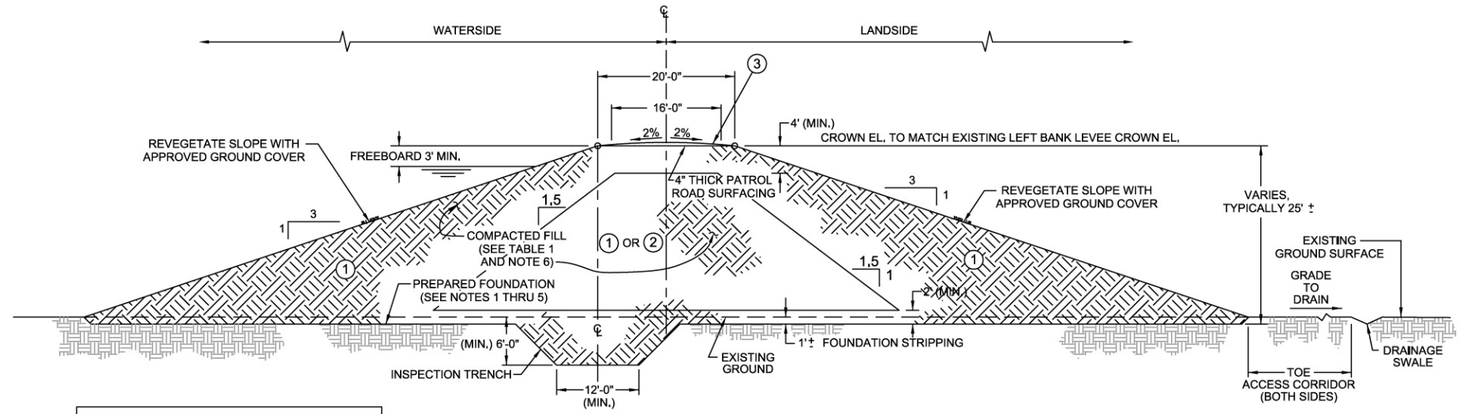
Table 4-4, “Feather River Flow Frequencies and Water Elevations in the Intermediate Levee Setback Area,” shows the approximate frequency of Feather River flood flows and corresponding water depths at the upstream end of the levee setback area.

Figure 4-4 illustrates the expected frequency and magnitude of river flows through the intermediate levee setback area.



PLAN VIEW

0 2,000 4,000
SCALE, FEET

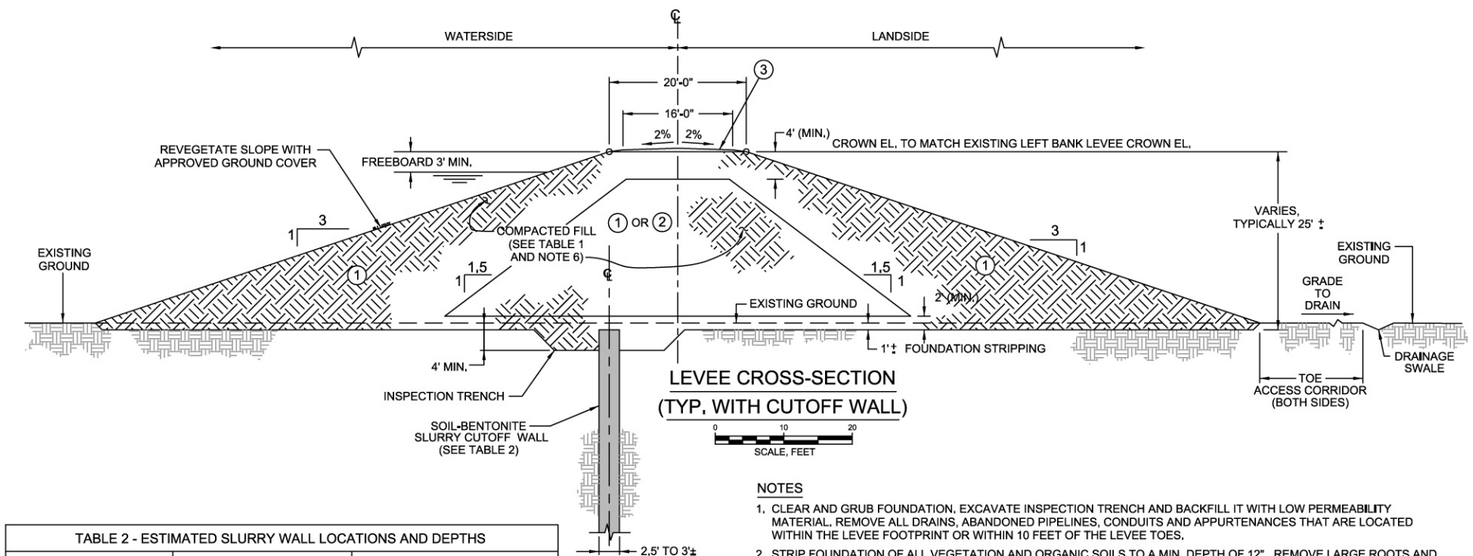


LEVEE CROSS-SECTION (TYP. WITHOUT CUTOFF WALL)

0 10 20
SCALE, FEET

TABLE 1 - KEY TO EMBANKMENT MATERIALS	
1	APPROVED LOW-PERMEABILITY MATERIAL
2	APPROVED LOW PERMEABILITY MATERIAL WITH REDUCED PLASTICITY
3	CALTRANS CLASS 2 AGGREGATE BASE

NOTE:
THE LEVEE SETBACK ALIGNMENT, CROSS-SECTION AND DETAILS ARE PRELIMINARY.



LEVEE CROSS-SECTION (TYP. WITH CUTOFF WALL)

0 10 20
SCALE, FEET

TABLE 2 - ESTIMATED SLURRY WALL LOCATIONS AND DEPTHS		
STATION (FT)	ESTIMATED WALL DEPTH (FT)	ESTIMATED AVERAGE DEPTH (FT)
ASB 0+00 TO ASB 310+00	40 TO 70	60

NOTES

1. CLEAR AND GRUB FOUNDATION. EXCAVATE INSPECTION TRENCH AND BACKFILL IT WITH LOW PERMEABILITY MATERIAL. REMOVE ALL DRAINS, ABANDONED PIPELINES, CONDUITS AND APPURTENANCES THAT ARE LOCATED WITHIN THE LEVEE FOOTPRINT OR WITHIN 10 FEET OF THE LEVEE TOES.
2. STRIP FOUNDATION OF ALL VEGETATION AND ORGANIC SOILS TO A MIN. DEPTH OF 12". REMOVE LARGE ROOTS AND PEAT TO A DEPTH OF 3 FEET.
3. PROOF ROLL FOUNDATION TO ENSURE REMOVAL OF ALL SOFT SPOTS.
4. BACKFILL ALL HOLES, DEPRESSIONS AND DITCHES IN THE FOUNDATION WITH NATIVE MATERIAL AND COMPACT THE BACKFILL TO A DENSITY EQUAL TO THAT OF THE ADJACENT UNDISTURBED MATERIAL.
5. IMMEDIATELY PRIOR TO PLACING THE FIRST LIFT OF EMBANKMENT, SCARIFY AND MOISTURE CONDITION THE FOUNDATION SURFACE TO A DEPTH OF 4 INCHES.
6. PLACE THE FILL MATERIALS IN MAXIMUM 6" THICK LIFTS AFTER COMPACTION.

LEGEND

▬▬▬	EXISTING LEVEE
- - - -	INTERMEDIATE SETBACK LEVEE
⊙ L-ASB-1	APPROX. GEI TEST BORING LOCATION (2002)
• 2F-97-7	APPROX. CORPS OF ENGINEERS TEST BORING LOCATION (1997)
• CF-88-39	APPROX. CORPS OF ENGINEERS CONE PENETRATION TEST LOCATION (1988)
○ B-1, C-1, D-1	APPROX. WAHLER TEST BORING LOCATION (1986)
ASB	ABOVE STAR BEND

NOTE

Map is taken from U.S.G.S. Topographic 7.5 Minute Series Map of Olivehurst, California Quadrangle, Photorevised 1973. Datum is National Geodetic Vertical Datum of 1929 (NGVD).

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FEATHER RIVER LEVEE REPAIR PROJECT

Preliminary Plan View and Typical Cross Sections for the Intermediate Setback Levee

Figure 4-5

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Table 4-4
Feather River Flow Frequencies and Water Elevations in the Intermediate Levee Setback Area

AEP	Feather River Flow (cfs)	Water Elevation at Upper End of Levee Setback Area (feet—NGVD)	Height Above Ground at Upper end of Levee Setback Area (feet)
1 in 2.5	50,000	46.0	0
1 in 5	105,000	53.6	7
1 in 10	130,000	56.4	9
1 in 20	190,000	61.5	13
1 in 100	300,000	67.4	20
1 in 200	350,000	69.8	23

Notes: AEP = annual exceedance probability; cfs = cubic feet per second; NGVD = National Geodetic Vertical Datum
Source: Data provided by MBK Engineers in 2006

Reductions in River Stages

The hydraulic performance of the intermediate setback levee was evaluated using an unsteady-flow model (HEC-RAS) originally developed by the Corps in support of the Lower Feather River Floodplain Mapping Study and subsequently modified and calibrated to the flow and high-water data from the 1997 flood by MBK Engineers. Simulations were performed for the 1-in-100 and 1-in-200 AEP events to assess the effect of the potential setback on river stages.

The results of the evaluation indicate that the intermediate setback levee alignment would be effective in lowering water levels from Marysville–Yuba City to Country Club Lane but would be ineffective in lowering water levels farther downstream at Star Bend because water levels at Star Bend are controlled by conditions downstream of this levee setback segment. The simulations show that the water levels would be lowered by about 1.0 feet and 1.2 feet for the 1-in-100 and 1-in-200 AEP events, respectively, at the confluence of the Feather and Yuba Rivers in comparison with existing conditions. Within the intermediate setback levee reach, the simulated maximum reductions in water surface elevations for the 1-in-100 and 1-in-200 AEP events are 2.1 feet and 2.4 feet, respectively, at river mile 23.5. The intermediate setback levee would also lower water levels in the Yuba River above Marysville, but not by as much; for example, for an index point 2.6 miles upstream of Marysville, MBK Engineers' evaluation showed that the intermediate setback levee would lower the Yuba River stage by about 0.6 foot for the 1-in-100 AEP event and 1.0 foot for the 1-in-200 AEP event.

4.5.3 ALTERNATIVE 3—CONSTRUCTION

General Construction Plan—Segments 1 and 3

The construction plan for project Segments 1 and 3 under Alternative 3 would be similar to the construction plan for these same project segments under Alternative 1 presented in Section 4.3.3 above. Both alternatives include the same levee repair and strengthening activities in these two project segments.

General Construction Plan—Segment 2

The general plan for construction of the intermediate setback levee under Alternative 3 would generally be the same as the plan for construction of the ASB setback levee under Alternative 2, described previously in Section 4.4.3, "Alternative 2—Construction." Locations of project elements would differ, but methods of constructing the slurry cutoff wall, foundation preparation, removal of the existing levee, embankment construction, erosion protection, relocation and replacement of Pump Station No. 3, and detention basin construction would be the same for the two alternatives.

Borrow Material Requirements and Development of Borrow Areas

Sources and Quantities of Borrow

Factors driving the need for borrow material and the selection of borrow areas are the same for Alternative 3 as described previously for Alternative 2 in Section 4.4.3, "Alternative 2—Construction." The two potential soil borrow areas shown in Figure 4-1, and other potential borrow sources identified for the ASB setback levee, if used, could provide borrow material for either the ASB or intermediate setback levee. It is estimated that a total of approximately 3.1 million cy of borrow material would be required to construct the intermediate setback levee in project Segment 2. An additional 200,000 cy of material would be required for levee repair/strengthening activities in Segments 1 and 3. A preliminary estimate of borrow material requirements for construction under Alternative 3 is provided in Table 4-5, "Summary of Borrow Material Requirements for Alternative 3."

Design and Treatment of Borrow Areas

The design and treatment of borrow areas under Alternative 3 would be the same as described previously for Alternative 2 in Section 4.4.3, "Alternative 2—Construction."

Table 4-5
Summary of Borrow Material Requirements for Alternative 3

Material Type [a]	Description	Volume Required (cubic yards)
1 & 2	Intermediate setback levee embankment	3,100,000
1	Levee repairs in Segments 1 and 3	200,000
3	Levee crown surface	17,000
	TOTAL VOLUME	Approx. 3,317,000

[a] Material types are as shown in Figure 4-5; 1 = Approved low-permeability material; 2 = Approved low permeability material with reduced plasticity; 3 = Caltrans Class 2 Aggregate Base.

Notes: ASB = Above Star Bend; Caltrans = California Department of Transportation

Source: Data provided by GEI Consultants in 2006

Relocation of Utilities and Removal of Structures

A preliminary survey of existing facilities and utilities in the intermediate levee setback area was conducted in October 2002.

Implementation of Alternative 3 would necessitate the removal of all structures (houses, trailers, sheds, barns, other agricultural outbuildings) from the intermediate levee setback area, which would be subject to periodic flooding following removal of the existing levee. The facilities surveys identified approximately 30 structures in the levee setback area. It is estimated that five to 10 of these are residences, including mobile homes. Appropriate compensation would be negotiated with landowners displaced by the project. In addition, all property acquisitions and relocations conducted as part of the project would be completed following both the Federal Uniform Relocation Act and the California Relocation Assistance Law (see the discussion of these statutes in Section 5.1, "Land Use"). Eligible homeowners, renters/tenants, businesses, and farm operations would receive relocation assistance consistent with these federal and state statutes.

Three small waste dumps containing fruit waste and miscellaneous solid debris have been noted within the intermediate levee setback area. If necessary, based on future study such as a Phase 1 ESA, the dumps could be excavated and the materials placed in approved landfills, or other appropriate remediation could be implemented.

Some utilities and other facilities located in the intermediate levee setback area would need to be relocated or reinforced with implementation of the levee setback. As discussed previously, RD 784 Pump Station No. 3 would be relocated to the land side of the proposed intermediate setback levee. A PG&E 115-kV transmission line called the Bogue Loop crosses the levee setback area on three towers. The foundations for these steel structures would probably need to be reinforced so their integrity would be maintained during times of flood water inundation. Other steel towers along the same transmission line are located on the water side of the existing Feather River levee and are supported by elevated steel pile foundations.

Other existing facilities that may need to be abandoned, reinforced, or relocated include roads, power distribution lines, irrigation pipelines, drainage canals and structures, wells, fill stations, and communications lines. Several private irrigation lines would be cut off by the construction of the intermediate setback levee, separating some lands on both sides of the setback levee that require irrigation from current water sources. During detailed design, and in coordination with landowners, appropriate water sources and irrigation infrastructure would be determined for lands where irrigation lines were cut off and that would continue to require irrigation water after project construction. Depending on site-specific conditions, wells and fill stations in the levee setback area could be removed or maintained. Private wells and fill stations in the levee setback area that would be abandoned would be removed and filled, and new wells would be dug and fill stations built outside the levee setback area to replace the abandoned facilities as appropriate. Wells and fill stations that would be retained in the levee setback area would be retrofitted to accommodate periodic flooding. New power lines and power poles would be required for any new wells and fill stations.

Individual utilities and conceptual plans for their abandonment, reinforcement, and relocation are described in more detail in Section 5.12, "Public Services, Utilities, and Service Systems."

Staging Areas

The use and treatment of staging areas under Alternative 3 would be the same as described previously for Alternative 2 in Section 4.4.3, "Alternative 2—Construction."

Disposal of Excess Material

The types of excess material generated during construction of the intermediate setback levee (e.g., organic soil, roots, cleared vegetation, excavated material that does not meet levee embankment criteria, debris from structure demolition) and the methods of disposing of this material would be the same as described previously for Alternative 2 in Section 4.4.3, "Alternative 2—Construction."

Stormwater Pollution Prevention

Stormwater pollution prevention measures under Alternative 3 would be the same as those described previously for Alternative 1 (see Section 4.3.3, "Alternative 1—Construction"). These stormwater pollution prevention measures would need to be implemented over a larger area under Alternative 3 than under Alternative 1 because of the increased level of ground disturbance associated with construction of the intermediate setback levee, the increased need for borrow areas, and construction of the detention basin.

Construction Equipment

The types and numbers of construction equipment used to implement Alternative 3 would be similar to those described previously for Alternative 2 in Section 4.4.3, "Alternative 2—Construction."

Construction-Related Traffic

The types and numbers of construction-generated vehicle trips under Alternative 3 would be similar to those described previously for Alternative 2 in Section 4.4.3, "Alternative 2—Construction."

4.6 IMPLEMENTATION

4.6.1 IMPLEMENTATION SCHEDULE

Completion of project-level environmental compliance, detailed engineering design, equipment procurement, permitting, design review and approval, and construction under both construction contracts are anticipated to take place over 3 years, ending in winter 2008. The anticipated activities and their durations are described below. The information provided below applies to all project alternatives unless otherwise noted.

Preconstruction Activities

Detailed engineering for project Segments 1 and 3 is expected to take approximately 12 months, while detailed engineering for Segment 2 is expected to take approximately 16 months. Main engineering activities would include:

- detailed surveying and topographic mapping of the existing Feather River and Yuba River levees and the potential ASB and intermediate levee setback corridors;
- additional geotechnical field investigations and laboratory testing of levee foundations and borrow areas;
- stability, settlement, and seepage evaluations and designs;
- preparation of construction drawings and specifications; and
- preparation of contract documents and issuance of the bid package.

It is assumed that federal, state, and local permitting and National Environmental Policy Act (NEPA) reviews would be completed concurrently with detailed design activities (see Chapter 2, "Introduction," for a list of the permits and authorizations that are likely to be required).

A BOSC would be convened to provide TRLIA with periodic independent reviews of design and construction progress. It is assumed that TRLIA and its engineering team would interact with the key reviewing agencies (DWR, The Reclamation Board, the Corps, and RD 784) throughout the design period, particularly at times of critical design milestones and construction review meetings. A 1-month period at the conclusion of the detailed design phase is anticipated for final reviews and approvals by the agencies, together with any final design modifications that may be required to satisfy agency requirements.

It is assumed that contractor selection would take place soon after the approval of the final detailed design. It is also expected that acquisition of right-of-way (e.g., temporary construction rights-of-way, right-of-way for a setback levee if Alternatives 2 or 3 are selected) would begin after certification of all CEQA documents for the project and could take up to approximately 15 months in some locations. Acquisition could proceed concurrent with the completion and approval of the final detailed design and contractor selection.

Completion of these preconstruction activities for all project segments is expected to take a total of approximately 20 months, although preconstruction activities for Segments 1 and 3 could be completed well before such activities for Segment 2.

Construction Sequence and Scheduling Constraints

Possible construction sequences applicable to the various project segments and alternatives are presented below.

Project Segments 1 and 3—Levee Repair and Strengthening (Alternatives 1, 2, and 3)

A construction period of about 6 months is assumed in project Segments 1 and 3, beginning in May 2007. Schedule highlights are as follows:

- *Mobilization:* Mobilization would include setting up construction offices and the slurry batch plant and transporting heavy earthmoving equipment to the site. These activities may take about 1 month.
- *Slurry cutoff wall installation:* This activity would begin soon after mobilization with construction of the work pad. Assuming two headings, construction would take approximately 5 months.
- *Construction of seepage/stability berms:* Seepage/stability berms would be constructed concurrently with installation of the slurry cutoff wall.
- *Utilities:* Any required utility relocation would be conducted concurrent with construction of the slurry cutoff wall.
- *Relief wells:* Relief wells would probably be installed toward the end of the construction period to reduce the likelihood of damage by construction traffic.

Project Segment 2—Levee Repair and Strengthening (Alternative 1)

A construction period of about 8 months, beginning in March 2008, is assumed for levee repair and strengthening in project Segment 2 if Alternative 1 is implemented. Schedule highlights are as follows:

- *Mobilization:* Mobilization would include setting up construction offices and the slurry batch plant and transporting heavy earthmoving equipment to the site. These activities may take about 1 month.
- *Installation of the slurry cutoff wall:* This activity would begin soon after mobilization with construction of the work pad. Assuming two headings, construction would take approximately 6 months.
- *Construction of seepage/stability berms:* Seepage/stability berms would be constructed concurrently with installation of the slurry cutoff wall.
- *Correction of erosion problem areas:* Correction of existing erosion problem areas would occur after construction of the slurry cutoff wall. This activity would take approximately 1 month.
- *Utilities:* Any required utility relocation would be conducted concurrent with construction of the slurry cutoff wall.
- *Relief wells:* Relief wells would probably be installed toward the end of the construction period to reduce the likelihood of damage by construction traffic.

Project Segment 2—Construction of ASB or Intermediate Setback Levee (Alternatives 2 and 3)

Construction of a setback levee in project Segment 2, if Alternative 2 or Alternative 3 is implemented, would occur over two seasons beginning in August 2007 and ending in winter 2008. Most construction activities would take place in the spring, summer, and fall months. During the winter months limitations on construction activities associated with weather, soil conditions, and agency guidelines would significantly reduce construction activity. Schedule highlights are as follows:

- *Mobilization:* Mobilization would include setting up construction offices and a slurry batch plant and transporting heavy earthmoving equipment to the site. These activities may take about 1 month.

- *Setback levee foundation*: Preparation of the foundation would begin soon after mobilization and could continue as weather and other factors permit through the winter of the first construction year (anticipated to be winter 2007/2008). Locations near environmentally sensitive areas (e.g., sensitive habitats, known cultural resources sites) would be given priority; preparation of the foundation at these sites could be initiated in summer/fall 2007.

- *Installation of the slurry cutoff wall:* This activity would follow preparation of the foundation and would precede construction of the embankment. Assuming two headings, installation of the slurry cutoff wall is anticipated to take about 3–4 months. Depending on weather conditions and other factors, this activity could occur through the winter of the first construction year (anticipated to be winter 2007/2008).

- *Construction of the setback levee embankment:* Setback levee embankment construction could begin as soon as weather conditions allow in 2008, and after the foundation has been prepared and construction of the slurry cutoff wall has been initiated. Seepage/stability berms, if required, would be constructed along with the levee embankment. The detention basin would be constructed at the same time as the setback levee embankment.

- *Utilities:* Construction of the new Pump Station No. 3 and removal and relocation of some utilities would likely be completed during the first construction season in 2007. Continued removal and relocation of utilities and reinforcement/retrofitting of utilities to be retained in the setback area (e.g., three 115-kV electrical towers) would continue through the second construction season in 2008. Utility work would be coordinated so as to not interrupt needed irrigation, drainage, or electrical service.

- *Relief wells:* Relief wells would probably be installed toward the end of the construction period to reduce the likelihood of damage by construction traffic.

4.6.3 OPERATION AND MAINTENANCE

The ASB setback levee under Alternative 2 or the intermediate setback levee under Alternative 3 would entirely replace the corresponding existing Feather River levee as a project levee in the Sacramento River Flood Control Project. The State of California, through the Sacramento–San Joaquin Drainage District, would obtain an easement that would allow the construction,

operation, and maintenance of the setback levee. Existing levee segments that would be repaired under the FRLRP would remain under the existing easements for operation and maintenance.

As is the current practice, landowners would be assessed fees for levee operation and maintenance, which would be performed by RD 784 under the supervision of DWR. The only substantial difference between the operation and maintenance of the repaired levee segments and/or the new setback levee and current practice would be that the proposed preliminary design for each alternative includes the use of relief wells. Relief wells can be prone to plugging and damage from vandalism, and they require operation (water removal) and periodic maintenance (flushing, cleaning, and replacement) to remain effective over the long term. It is assumed that seepage from the wells would be removed by the relocated Pump Station No. 3. RD 784 could contract out the well maintenance or perform it with its own forces.

If Alternative 2 or Alternative 3 is implemented, TRLIA may acquire land through fee-title or obtain flowage easements. Ownership of properties in the levee setback area that are acquired by TRLIA for project implementation and are not part of the setback levee footprint could be transferred to a resource agency or land conservancy for future management. Special operations and maintenance plans would need to be prepared and implemented to ensure the long-term maintenance of any habitat areas, and to ensure they do not conflict with the flood control function of the levee setback area. Similarly, if lands in the levee setback area are retained in agricultural production, agricultural operations plans would need to be developed and implemented to ensure that ongoing agricultural activities do not conflict with the flood control function of the levee setback area.

CHAPTER 5 ENVIRONMENTAL ANALYSIS

INTRODUCTION

This draft environmental impact report (DEIR) for the Feather River Levee Repair Project (FRLRP) evaluates three potential alternatives, each of which would correct identified deficiencies in the left (east) bank levee of the Feather River and the left (south) bank levee of the Yuba River. (References to the "left" or "right" bank levee indicate the left or right side of the river when facing downstream.) The alternatives evaluated are as follows:

- *Alternative 1 – The Levee Strengthening Alternative.* Under this alternative, levee repair and strengthening activities would be completed along the entire length of FRLRP project Segments 1, 2, and 3 (Figure 2-3, "FRLRP Project Area," in Chapter 2, "Introduction").

- *Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative.* Under this alternative, levee repair and strengthening activities would be completed along project Segments 1 and 3. Repair and strengthening activities in these segments would be the same as for Alternative 1. In project Segment 2, a setback levee would be constructed roughly following the Above Star Bend (ASB) setback levee alignment identified in the environmental impact report (EIR) for the Yuba-Feather Supplemental Flood Control Project (Y-FSFCP).

- *Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative.* Under this alternative, the same levee repair and strengthening activities described for Alternatives 1 and 2 would be conducted in project Segments 1 and 3. In Segment 2, a setback levee would be constructed along an alignment between the ASB setback levee and the existing levee, allowing less land to be placed in the new floodway than under Alternative 2. The general design, construction, and operational characteristics of an intermediate setback levee under Alternative 3 would be the same as for the ASB setback levee under Alternative 2.

The environmental impacts of the three alternatives are analyzed in this chapter at an equal level of detail. The impacts of Alternative 1 are discussed first, followed by the impacts of Alternatives 2 and 3. For each section in this chapter, where impacts of Alternatives 2 and/or 3 are similar to those described under an earlier impact discussion within the section, this is noted in the text.

As described in Chapter 2, "Introduction," this document is a "project" EIR. There is the potential to partially tier this FRLRP EIR from the Y-FSFCP EIR, which was certified by Yuba County Water Agency (YCWA) in March 2004. Partial tiering from the Y-FSFCP EIR (i.e., the first-tier document) is possible because the EIR evaluated the environmental effects of an ASB setback levee similar to that considered under Alternatives 2 and 3 in this FRLRP EIR (i.e., the second-tier document). However, because the FRLRP and Y-FSFCP EIRs have two different lead agencies under the California Environmental Quality Act (CEQA) (Three Rivers Levee Improvement Authority [TRLIA] and YCWA, respectively), and because the Y-FSFCP EIR does not evaluate many of the levee strengthening components included in the FRLRP, it was determined that preparation of an independent project EIR for the FRLRP, rather than a tiered

EIR, would be a clearer and more straightforward approach. However, much of the information in the Y-FSFCP EIR is still applicable to the FRLRP, and the Y-FSFCP EIR is incorporated by reference into the FRLRP EIR (see Section 2.8, "Documents Incorporated by Reference").

ORGANIZATION OF THIS CHAPTER

This chapter is divided into 13 sections, each evaluating a separate resource topic:

5.1 Land Use
5.2 Geology, Soils, and Mineral Resources
5.3 Water Resources and River Geomorphology
5.4 Fisheries
5.5 Terrestrial Biological Resources
5.6 Recreation
5.7 Aesthetic Resources
5.8 Cultural Resources
5.9 Air Quality
5.10 Noise
5.11 Transportation and Circulation
5.12 Public Services, Utilities, and Service Systems
5.13 Paleontological Resources

Each of these sections includes the following subsections:

- "Regulatory Setting" describes pertinent federal, state, and local laws and regulations that may apply to the FRLRP.
- "Environmental Setting" presents the existing regional and local environmental setting in accordance with Section 15125 of the State CEQA Guidelines. This information constitutes the baseline conditions with which the effects of the proposed levee strengthening and, for Alternatives 2 and 3, levee setback and associated features are compared.
- "Environmental Impacts" is organized as follows:
  - "Thresholds of Significance" identifies the significance thresholds used to determine the significance of potential impacts. While the thresholds are generally based on CEQA guidance, they also encompass the factors taken into account under the National Environmental Policy Act (NEPA) to determine the significance of an action in terms of its context and the intensity of its effects. Thus, this EIR can be used as the basis of NEPA documentation that may be required in association with federal authorizations for the project.
  - "Impact Analysis" describes the analysis method and discusses the potential effects of the three project alternatives, with emphasis on significant impacts, in accordance with Sections 15126.2(a) and 15143 of the State CEQA Guidelines. Project impacts are numbered sequentially for the three project alternatives in each resource section, with "LS" denoting an impact of The Levee Strengthening Alternative (Alternative 1), "ASB" denoting an impact of The Levee Strengthening and ASB Setback Levee Alternative

(Alternative 2), and "IS" denoting an impact of The Levee Strengthening and Intermediate Setback Levee Alternative (Alternative 3).

- "Mitigation Measures" describes mitigation measures recommended to reduce potentially significant effects to less-than-significant levels, in accordance with Sections 15002(a)(3), 15021(a)(2), and 15091(a)(1) of the State CEQA Guidelines. The number of each mitigation measure is identical to the number of the impact to which it applies. When the same mitigation measure would apply to more than one impact, the mitigation measure is repeated with the number of each impact to which it applies.

- "Impacts Remaining Significant after Mitigation" discusses whether any impacts identified as significant before mitigation would remain significant after the recommended mitigation is implemented.

SECTION 5.1 LAND USE

This section addresses the effects of the Feather River Levee Repair Project (FRLRP) as they relate to consistency with existing land uses in the project area and with policies intended to express the planning goals of applicable jurisdictions, including policies and goals related to agricultural land uses. This section also addresses the displacement of people and housing resulting from project implementation.

5.1.1 REGULATORY SETTING

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

Farmland Protection Policy Act

The Farmland Protection Program and the Land Evaluation and Site Assessment (LESA) system were established under the Farmland Protection Policy Act (U.S. Code [USC] Title 7, Section 4201 et seq.; Public Law 97-98). The Natural Resources Conservation Service (NRCS), a federal agency within the U.S. Department of Agriculture, administers the Farmland Protection Program, a voluntary program that provides matching funds to state, local, or tribal government entities and nongovernmental organizations with existing farmland protection programs to purchase conservation easements. The LESA system helps state and local officials make sound decisions about land use and rank lands for suitability and inclusion in the Farmland Protection Program. LESA evaluates several factors, including soil potential for agriculture, climate, location, market access, and adjacent land use. These factors are used to numerically rank land parcels based on local resource evaluation and site considerations.

Federal Uniform Relocation Act

The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (42 USC 4601 et seq.), is commonly referred to as the Federal Uniform Relocation Act. The overall intent of the act is to establish a uniform policy for the fair and equitable treatment of persons displaced as a direct result of programs or projects undertaken by a federal agency or with federal financial assistance. The primary purpose of the act is to ensure that such persons shall not suffer disproportionate injuries as a result of programs and projects designed for the benefit of the public as a whole and to minimize the hardship of displacement on such persons. Entities that may qualify for assistance under the Federal Uniform Relocation Act include homeowners, renters/tenants, businesses, and farm operations. Eligible displaced entities may receive various forms of assistance including reasonable moving expenses; compensation for actual direct losses of tangible property; reasonable expenses associated with searching for a replacement home, rental property, business, or farm; and reasonable expenses associated with reestablishing a displaced farm or business.

Section 103 of the Federal Uniform Relocation Act allows the head of a federal agency to delegate implementation of the act's requirements to a state agency if implementation of similar state laws will meet the requirements of the federal act. In California, the California Relocation Assistance Law (Government Code Section 7260 et seq.) mirrors the Federal Uniform

Relocation Act and allows state agencies to provide relocation assistance required under the federal act.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

Farmland Mapping and Monitoring Program

The Farmland Mapping and Monitoring Program (FMMP), administered by the Division of Land Resource Protection of the California Department of Conservation, produces maps and statistical data used to analyze farmland conversion impacts within the state. Agricultural land is rated according to soil quality and irrigation status. Agricultural land that meets the specified criteria is placed in one of the four following "Important Farmland" categories (California Department of Conservation 2006):

- *Prime Farmland.* Prime Farmland has the best combination of physical and chemical features able to sustain long-term agricultural production. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. The land must have been used for irrigated agricultural production at some time during the 4 years before the mapping date.

- *Farmland of Statewide Importance.* This farmland is similar to Prime Farmland but has minor shortcomings, such as greater slopes or less ability to store soil moisture. The land must have been used for irrigated agricultural production at some time during the 4 years before the mapping date.

- *Unique Farmland.* Unique Farmland has lesser quality soils used for the production of the state's leading agricultural crops. This land is usually irrigated, but may include nonirrigated orchards or vineyards as found in some climatic zones in California. Land must have been cropped at some time during the 4 years before the mapping date.

- *Farmland of Local Importance.* This is land of importance to the local agricultural economy as determined by each county's board of supervisors and a local advisory committee.

In addition, agricultural lands that do not meet the above definitions can be classified as Grazing Land. Grazing Land consists of lands on which the existing vegetation is suited to the grazing of livestock. The minimum mapping unit for Grazing Land is 40 acres.

Williamson Act

Application of the California Land Conservation Act of 1965, commonly referred to as the Williamson Act, is the principal method for encouraging the preservation of agricultural lands in California. The Williamson Act enables local governments to enter into contracts with private landowners who agree to maintain specified parcels of land in agricultural or related open space use in exchange for tax benefits. Yuba County (County) has chosen not to participate in the Williamson Act. Instead, farmland resource protection is addressed by policies in the Agriculture Element of the *Yuba County General Plan* and by the Yuba County Zoning Ordinance, as described below.

California Relocation Assistance Law

As described above in the discussion of the Federal Uniform Relocation Act, the California Relocation Assistance Law (Government Code Section 7260 et seq.) mirrors the federal act. Much of the language in the federal act is replicated in the California law. The California law not only allows state agencies to provide relocation assistance to qualifying entities affected by federal actions, but requires that qualifying entities affected by state actions (regardless of federal involvement) be provided the same forms of relocation assistance.

LOCAL PLANS, POLICIES, REGULATIONS, AND LAWS

Yuba County General Plan

Construction of the proposed project would occur in unincorporated Yuba County, with at least portions occurring on privately owned agricultural lands that are under the County's land use planning authority. Every county and city in California is required by state law (Government Code Section 65300 et seq.) to adopt a general plan, which is the policy basis for all land use decisions in the county. The *Yuba County General Plan*, adopted by the County in 1994 and 1996, is the comprehensive plan for growth and development in the unincorporated areas of the county.

The *Yuba County General Plan* includes goals, policies, and objectives that guide land use decisions in Yuba County. The following goals and objectives may be relevant to the FRLRP:

- 2–Land Use Goal. Retain the most productive agricultural lands in agricultural use, and clearly define areas suitable for urbanization and other forms of non-agricultural development.
- 16–Land Use Objective. Recognition of a farmer's right to farm.
- 9–Land Use Objective. Avoidance of Resource Conservation Service Capability Class I and II soils when establishing Community Boundaries or otherwise reviewing proposals for non-agricultural development projects.
- 16–Open Space and Conservation Goal. Protect productive agricultural land.

Class I soils are defined as "soils that have few limitations that restrict their use"; Class II soils are defined as "soils that have moderate limitations that reduce the choice of plants or that require moderate conservation practices" (Natural Resources Conservation Service 1998).

The land use diagram in the *Yuba County General Plan* assigns land use designations, which define appropriate land uses in the designated areas, for all parcels in the County's jurisdiction. The land use designations for the FRLRP project area are described below under "Land Use Designations and Zoning" in Section 5.1.2, "Environmental Setting."

In support of the general plan, the County uses a variety of land use controls, including the zoning ordinance, the subdivision ordinance, the building code, and improvement standards. These codes, ordinances, and standards are used to implement the policies and provisions of the general plan.

Yuba County Zoning Ordinance

State law (Government Code Section 65800 et seq.) authorizes counties and cities to adopt zoning ordinances that implement general plan goals, policies, and maps; to establish zoning districts; and to establish the basic regulations governing the use of land, buildings, or structures within the zoning districts. Zoning is required by state law to be consistent with the adopted general plan. The zoning maps show each land parcel and its designated zoning districts.

The Yuba County Zoning Ordinance was adopted for all unincorporated parcels in the county that are not owned by the federal or state government and are not designated tribal lands. The zoning ordinance consists of a zoning map and various designations that regulate land uses, permitted uses, and other standards. The zoning designations (i.e., districts) define the land uses that are allowed or not allowed on these lands. Some of the allowed land uses require conditional use permits, the approval of which requires a public hearing and other administrative procedures. A zoning variance, a zoning district boundary amendment, or zoning ordinance amendments are required before land uses prohibited within a particular zoning district can be approved. Additional administrative procedures, such as public hearings, a finding of special circumstances, approval from the Planning Commission, and/or approval from the County Board of Supervisors, are required before a variance or amendment can be granted.

The zoning designations for the FRLRP project area are described under "Land Use Designations and Zoning" below.

5.1.2 ENVIRONMENTAL SETTING

SOURCES OF INFORMATION

The information in this section is based primarily on review of the following documents:

- the *Yuba County General Plan* (Yuba County 1994, 1996);
- the Yuba County Zoning Ordinance;
- the *Draft Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project* (Yuba County Water Agency 2003); and
- the *Draft Environmental Impact Report for the Feather-Bear Rivers Levee Setback Project* (Three Rivers Levee Improvement Authority 2004).

Information included in this analysis is also based on field observations made in May 2006.

REGIONAL CONTEXT

Land use in Yuba County consists mainly of agriculture, forested land, open space/grazing lands, urban uses, and a military installation (Beale Air Force Base). Agriculture is the predominant land use in the county and the most important contributor to the local economy (Yuba County 1994). The major agricultural crops produced in the county are rice, plums, peaches, walnuts, kiwifruit, field crops, and almonds. Pastureland for grazing of beef and dairy cattle is also a

major agricultural land use. In the valley portion of the county, land use is dominated by agriculture (rice, field crops, and orchards), Beale Air Force Base, and urbanized areas.

Yuba County's urban centers are in the western portion of the county. The urbanized areas are the incorporated cities of Marysville and Wheatland and the unincorporated communities of Linda and Olivehurst. Substantial development is also ongoing in the Plumas Lake Specific Plan area, which occupies approximately 5,300 acres west of State Route 70 between Olivehurst and the Feather River. The specific plan allows for 12,000 dwelling units and approximately 600 acres of commercial and industrial uses. Residential development has already begun in the specific plan area.

FRLRP PROJECT AREA

Land Ownership and Jurisdiction

The existing Feather River and Yuba River levees in all three project segments are part of the federal-state Sacramento River Flood Control Project (SRFCP) within an easement obtained by the State of California through the Sacramento–San Joaquin Drainage District. The levees were constructed by the U.S. Army Corps of Engineers (Corps) and are maintained by Reclamation District 784 under the supervision of the State of California Reclamation Board (The Reclamation Board).

All lands in the project area are in unincorporated Yuba County. The County has land use planning jurisdiction over privately owned land in this area.

In addition to the County, several entities have authority over land uses in the project vicinity. The 698-acre Lake of the Woods Unit of the Feather River State Wildlife Area, owned by the State of California and managed by the California Department of Fish and Game (DFG), is located along the existing left (east) bank levee of the Feather River immediately adjacent to project Segment 1 (Figure 5.1-1, "Conservation Areas in the Project Vicinity"). The Star Bend Boat Launch and Fishing Access, owned by DFG and maintained by the County Public Works Department, is located north of the Lake of the Woods Unit at Star Bend in Segment 1. West of the left bank Feather River levee in project Segment 2, the 76-acre Marysville-Yuba City Mitigation Area, a mitigation site with seasonal wetlands and riparian vegetation, is maintained by the Corps. These land uses are described in further detail in Section 5.6, "Recreation."

Local Land Uses

Lands in the project area are particularly suited for agriculture, although parts of the area have suffered flood events that have resulted in crop damages. As of 2004, there were approximately 230,412 acres of agricultural land in Yuba County: 42,678 acres of Prime Farmland, 11,094 acres of Farmland of Statewide Importance, and 33,108 acres of Unique Farmland, and 143,533 acres of Grazing Land (California Department of Conservation 2004). (It is important to note that Grazing Land is considered agricultural land, but not Important Farmland.) FMMP mapping of Important Farmland in the project area is shown in Figure 5.1-2, "Important Farmland Map." The project area includes Important Farmland (Prime Farmland, Farmland of Statewide Importance, and Unique Farmland), as well as Grazing Land and Other Land as classified by the California Department of Conservation. The *Soil Survey of Yuba County, California* identifies

Class I and II soils in the vicinity of the existing Feather River levee in all three project segments, and in the proposed Above Star Bend (ASB) and intermediate levee setback areas in Segment 2 (Natural Resources Conservation Service 1998).

Most of the land in the project vicinity is currently under cultivation, with the majority of the acreage planted in orchards. Some row crops are also planted. Despite a major flood event in 1997 that destroyed some of the trees in the orchards, the current land use pattern is substantially similar to that of the recent past. Crops grown in orchards in the project vicinity consist of walnuts, peaches, prunes, apples, persimmons, and pears, with prunes and walnuts making up the greatest percentage. The trees are of various ages and are irrigated in a variety of fashions, including traditional flood, furrow, contour irrigation practices, and state-of-the art irrigation techniques such as drip and micro drip systems (Three Rivers Levee Improvement Authority 2004). Typical row crops planted in the area include cantaloupe, honeydew melon, and wheat. Several industrial facilities supporting agricultural operations are also located in the project vicinity, such as produce packing plants.

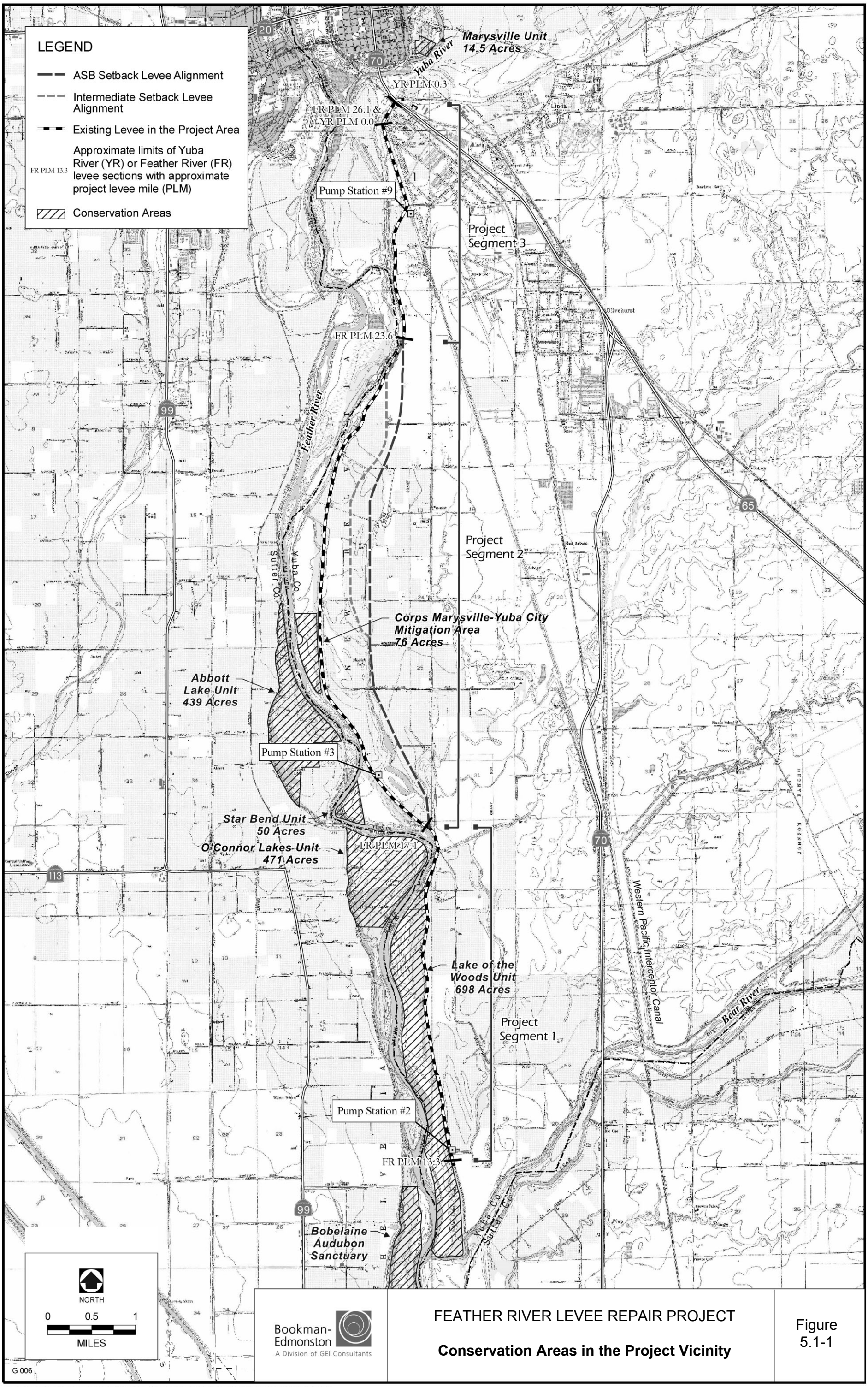
An initial facility survey found approximately 40 structures located along project Segment 2 between the ASB setback levee alignment and the existing levee. Approximately five to 10 of these structures are residences (including mobile homes). Between the intermediate setback levee alignment and the existing levee there are approximately 30 structures, with five to 10 being residences (including mobile homes). The density of residences in the project vicinity increases substantially as one moves north along the project alignment. Homes at densities typical of suburban or rural residential areas occur between Feather River Boulevard and the existing levee in Segment 3, mostly north of the Yuba County Airport. Many of these residences and structures are located near the levee toe. There are no structures along Segment 1.

Along the left bank Feather River levee adjacent to project Segment 1, the land between the low-flow channel and the existing levee contains a substantial riparian corridor in the DFG-managed Lake of the Woods area, where hunting and fishing are permitted (Figure 5.1-1). Several other DFG-managed units of the Feather River State Wildlife Area where hunting, fishing, and bird watching are permitted are also located along the river corridor west of Segment 1.

The Star Bend Boat Launch and Fishing Access, a public-access boat ramp and picnic area, is located on the east bank of the Feather River at Star Bend, near the intersection of Feather River Boulevard and Algodon Road in Segment 1. As stated previously, these recreation areas are discussed in more detail in Section 5.6, “Recreation.”

LAND USE DESIGNATIONS AND ZONING

The general plan land use designation for the project area and adjacent lands east of the Feather River and south of the Yuba River is Valley Agriculture. The Valley Agriculture designation is used to identify areas on the valley floor outside of community boundaries that are suitable for commercial agriculture and where it is desirable to retain agriculture as the primary land use; to protect the agricultural community from encroachment of unrelated uses that would injure the physical and economic well-being of the agricultural community; and to encourage the preservation of productive and potentially productive agricultural land, which is identified as state-designated Important Farmlands and/or lands having NRCS-classified Class I and II soils.

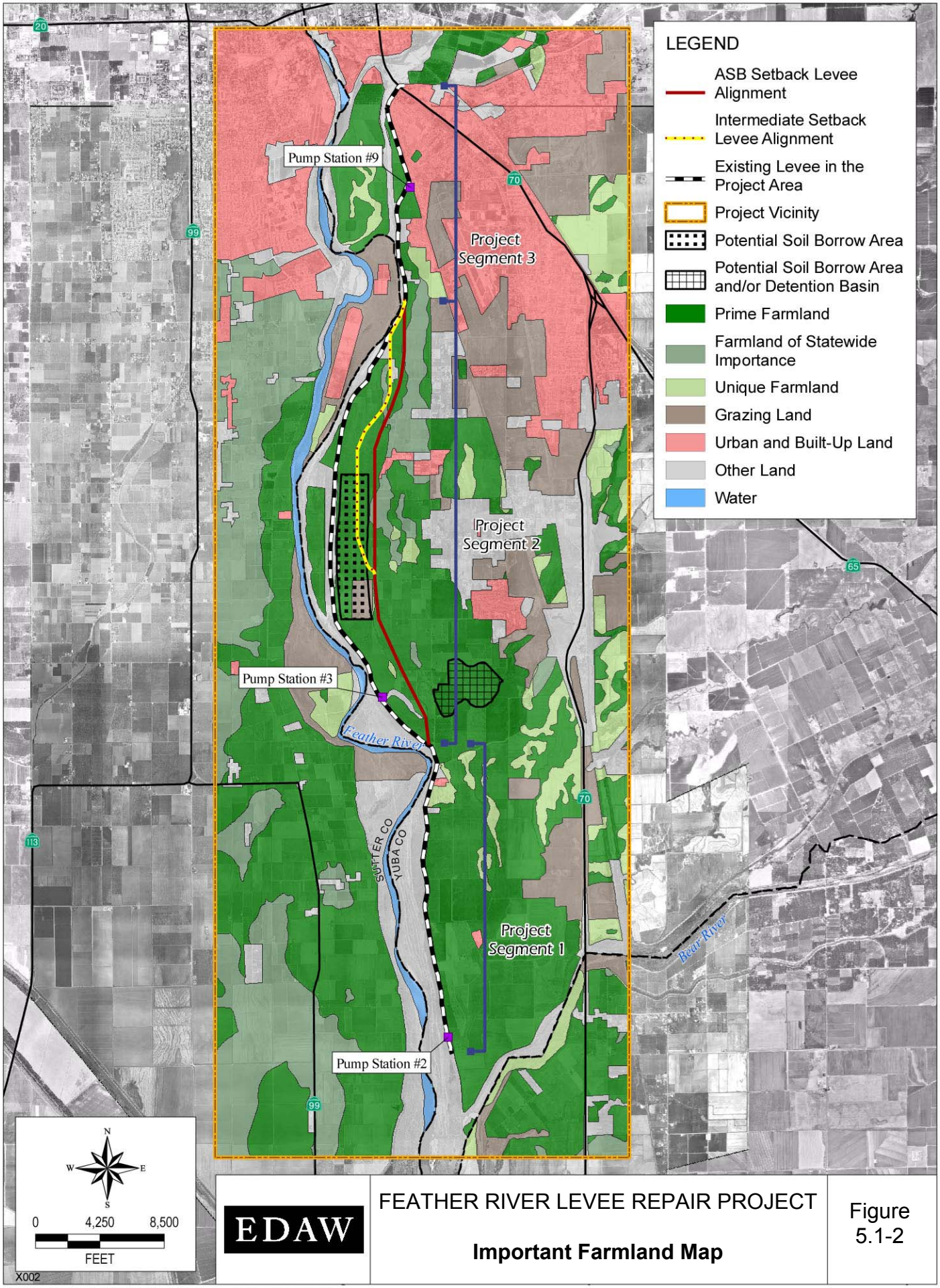


FEATHER RIVER LEVEE REPAIR PROJECT

Conservation Areas in the Project Vicinity

Figure 5.1-1

Sources: EDAW 2004; GEI Consultants, Inc. 2004; Aerial provided by GEI Consultants, Inc.



EDAW

FEATHER RIVER LEVEE REPAIR PROJECT

Important Farmland Map

Figure 5.1-2

Sources: EDAW 2004, GEI Consultants, Inc., 2004, FMMP 2004

The lands between the ASB and intermediate setback levee alignments are zoned Exclusive Agricultural (Yuba County 2005). The purpose of the Exclusive Agricultural zone is to eliminate the encroachment of land uses that are incompatible with the agricultural uses of the land and to prevent the unnecessary conversion of agricultural land to urban uses. In addition to agricultural uses such as crop cultivation and livestock raising, this zoning designation allows for low-density residential use, accessory buildings for residences, game preserves, family day-care homes, kennels, and farm produce stands, among other uses. Numerous other uses may be allowed with a conditional use permit.

5.1.3 ENVIRONMENTAL IMPACTS

THRESHOLDS OF SIGNIFICANCE

Thresholds for determining the significance of impacts related to land use and agricultural resources were based on the environmental checklist form in Appendix G of the California Environmental Quality Act Guidelines (State CEQA Guidelines). A project alternative would have a significant impact on land use (including displacement of housing) or agricultural resources if it would:

- physically divide an established community;
- conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect;
- conflict with any applicable habitat conservation plan or natural community conservation plan;
- conflict with existing zoning for agricultural use or a Williamson Act contract;
- convert or result in the conversion of Important Farmland (i.e., Prime Farmland, Unique Farmland, or Farmland of Statewide Importance) to nonagricultural uses; or
- displace substantial numbers of existing persons or housing, necessitating the construction of replacement housing elsewhere. (In assessing the displacement of people and housing, economic impacts of a project are not treated as significant impacts to the environment under CEQA; however, such information may be considered in determining the significance of impacts. Although the physical change in the environment from the displacement by itself may not be significant, the lead agency may consider whether the economic and social impacts that result in, or from such a physical change influence the significance conclusion.)

None of the three project alternatives would result in the physical division of a community. Repairing and strengthening the existing levee would not create a new barrier between various portions of the project area. In project Segment 2, where the ASB or intermediate setback levee could create a new barrier between lands to the east and west of the setback levee, the area is dominated by agricultural lands and residences are not clustered or located within an identified community. Therefore, no impacts related to the physical division of communities would result from implementation of a project alternative, and this issue is not discussed further in this section.

No habitat conservation or natural community conservation plans are in effect that would apply to the project area. In addition, the County does not participate in the Williamson Act, so no lands are under Williamson Act contract in the project area. Therefore, the third and fourth significance thresholds do not apply to this project.

The discussion below addresses the potential of the project alternatives to conflict with land use plans, policies, or regulations; to result in the conversion of Important Farmland to nonagricultural uses; and to displace substantial numbers of people or existing housing. Consistent with the direction provided in the State CEQA Guidelines, this impact analysis addresses the significance of direct and indirect physical changes in the environment that would be caused by the project (i.e., the conversion to nonagricultural use of land classified by the FMMP as Prime Farmland) and does not consider economic or social effects alone as significant effects on the environment (State CEQA Guidelines Sections 15064[d] and 15131[a]). It is recognized that the conversion of Important Farmland in the project area to nonagricultural uses could have economic effects that should be considered in the decision-making process along with environmental impacts and numerous other factors. Three Rivers Levee Improvement Authority (TRLIA) shall take economic effects into account when selecting a preferred alternative among the alternatives considered in this environmental impact report.

Alternative 1 – The Levee Strengthening Alternative

Impact LS-5.1-a

Conflicts with Land Use Planning and Policies Resulting from Levee Repairs and the Levee Setback. Levee repair and strengthening could result in the removal of up to approximately 30 acres of agricultural land from production through the placement of seepage/stability berms and other structures. Construction of a detention basin would be required to accommodate peak flows from relief wells. Construction of the detention basin could result in the removal of up to approximately 150 additional acres of agricultural land. These uses would conflict with County land use policies regarding the preservation of agricultural land. However, the proposed improvements to the flood control system would benefit thousands of acres of valuable agricultural lands in the adjacent floodplain by providing increased protection from future flood damages. Therefore, while the direct land use changes associated with Alternative 1 would conflict with policies related to protection of agricultural lands, in the long term this alternative would provide greater protection for agricultural lands and soils, consistent with these policies. Therefore, this impact would **be less than significant**.

The current land use designation for the project are in the *Yuba County General Plan* is Valley Agriculture, and the area is zoned Exclusive Agriculture. This land use designation and zoning are intended to support Land Use Goal 2, Land Use Objective 9, and Open Space and Conservation Goal 16 of the general plan, which promote protecting productive agricultural lands in Class I and II soils in productive agricultural use.

It is expected that levee repairs and strengthening under Alternative 1 would require construction of seepage/stability berms on the land side of the existing levee. Although exact locations for these berms have not been confirmed, it is known that a majority of the seepage/stability berms would be placed along the levee in project Segment 2. Current estimates indicate that all berms combined would cover approximately 30 acres of land area. Although it is unlikely that the entire 30 acres would cover agricultural land, for this analysis it is assumed that construction of seepage/stability berms under Alternative 1 would remove up to approximately 30 acres of agricultural land from production.

As part of Alternative 1 the existing Pump Station No. 3 would be removed and a new pump station would be constructed farther to the east on up to 1 acre of land. The specific location of the pump station would be determined based on the results of field investigations conducted during detailed design. For this analysis it is assumed that Pump Station No. 3 could be relocated on 1 acre of existing farmland, and that pump station relocation would remove this agricultural land from production.

Construction of a detention basin is included as part of Alternative 1 to accommodate flows from relief wells during peak discharge periods. It is estimated that the detention basin would cover up to approximately 150 acres. Although a location for the detention basin has not been confirmed, the primary area being considered at this time is some portion of the site identified in Figure 5.1-2 as a potential soil borrow area/detention basin. Whether constructed at this location or elsewhere, the detention basin would likely occur on agricultural land, resulting in the removal of this land from agricultural production.

Because these activities would result in the removal of land from agricultural production, implementation of Alternative 1 could conflict with the *Yuba County General Plan* and Yuba County Zoning Ordinance and with the goals and objectives identified previously. However, the proposed improvements to the flood control system would benefit thousands of acres of valuable agricultural lands in the adjacent floodplain by providing increased protection from future flood damages. Therefore, while the direct land use changes associated with Alternative 1 would conflict with the policies cited above, in the long term this alternative would provide greater protection for agricultural lands and soils, consistent with these policies. It should also be noted that agricultural operators would receive appropriate compensation for any temporary disturbance or permanent loss of agricultural lands associated with project implementation. In addition, all property acquisitions and relocations conducted as part of the project would be completed following both the Federal Uniform Relocation Act and the California Relocation Assistance Law (see the discussion of these statutes in Section 5.1.1, “Regulatory Setting”). Eligible farm operations would receive relocation assistance consistent with these federal and state statutes. This impact would be less than significant.

Impact LS-5.1-b

Conversion of Important Farmland to Nonagricultural Uses Resulting from Levee Repairs and Strengthening. Installation of seepage/stability berms and other structures associated with levee repairs and strengthening could permanently convert up to approximately 30 acres of Prime Farmland to nonagricultural uses. Construction of the detention basin under Alternative 1 could convert up to an additional approximately 150 acres of Prime Farmland to nonagricultural uses. This impact would be **significant**.

It is expected that levee repairs and strengthening under Alternative 1 would require construction of seepage/stability berms on the land side of the existing levee. Current estimates indicate that all berms combined would cover approximately 30 acres of land area, although a majority of the seepage/stability berms would be located in project Segment 2. The exact locations of the berms would be confirmed during detailed project design. However, because a majority of the lands adjacent to the existing levee alignment are identified as Prime Farmland (Figure 5.1-2), it is assumed for this analysis that construction of the seepage stability berms would result in the removal of up to approximately 30 acres of Prime Farmland from agricultural production.

As part of Alternative 1 the existing Pump Station No. 3 would be removed and a new pump station would be constructed farther to the east on up to 1 acre of land. The specific location of the pump station would be determined based on the results of field investigations conducted during detailed design. For this analysis it is assumed that Pump Station No. 3 could be relocated on 1 acre of Prime Farmland, and that pump station relocation would remove this agricultural land from production.

Construction of a detention basin is included as part of Alternative 1 to accommodate flows from relief wells during peak discharge periods. It is estimated that the detention basin would cover up to approximately 150 acres. Although a location for the detention basin has not been confirmed, the primary area being considered at this time is some portion of the site identified in Figure 5.1-2 as a potential soil borrow area/detention basin. This entire approximately 690-acre area is identified as Prime Farmland (Figure 5.1-2). Whether the detention basin is constructed at this location or elsewhere, it is assumed for this analysis that construction of the detention basin under Alternative 1 would remove up to 150 acres of Prime Farmland from agricultural production.

It is anticipated that several staging areas and temporary-access haul roads would be developed on agricultural lands in the project area during project construction. Land at construction staging areas and haul roads classified as Important Farmland could be temporarily converted for up to approximately 20 months to accommodate preconstruction and construction activities, although in most locations the time frame would be shorter. These areas would be returned to preproject conditions and agricultural uses could resume once construction is completed. Therefore, there would be no direct conversion of Important Farmland to nonagricultural uses.

Because implementation of Alternative 1 could convert up to approximately 180 acres of Important Farmland to nonagricultural uses, this impact would be significant.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impact ASB-5.1-a

Conflicts with Land Use Planning and Policies Resulting from Levee Repairs and the Levee Setback. Levee repair and strengthening of the existing levee in Segments 1 and 3 could result in removal of small areas of agricultural land from production associated with installation of seepage/stability berms and other structures. The setback levee footprint and levee easements in Segment 2 would cover approximately 240–250 acres of agricultural land, and setting back the levee could indirectly result in the removal of more land from agricultural production by dividing land parcels and allowing periodic flooding of agricultural land. Construction of a detention basin would be required to prevent adverse flooding effects on area properties, and this would likely occur on several hundred acres of existing agricultural land. These uses would conflict with County land use policies regarding the preservation of agricultural land and would be inconsistent with the current land use and zoning designations for the area. Because of these inconsistencies, this impact would be **significant**.

As discussed for Impact LS-5.1-a, described for Alternative 1 above, construction of seepage/stability berms and related structures under Alternative 1 could result in the removal of up to approximately 30 acres of agricultural land from production. However, most seepage/stability berms would be placed in project Segment 2, and these would be replaced by a setback levee under Alternative 2. A relatively small portion of seepage/stability berms would be placed adjacent to the existing levees in project Segments 1 and 3. The precise extent and

location of seepage/stability berms would be determined during detailed project design. For this analysis it is assumed that up to approximately 10 acres of seepage/stability berms could be placed adjacent to the existing levee in Segments 1 and 3 under Alternative 2, resulting in the removal of up to 10 acres of agricultural land from production. Under Alternative 2, the existing Pump Station No. 3 in project Segment 2 would be removed and a new pump station would be constructed east of the ASB setback levee alignment, converting up to 1 acre of land to nonagricultural use.

The ASB setback levee footprint and levee easements in project Segment 2 would cover approximately 240–250 acres of agricultural land, and setting back the levee could indirectly result in the removal of more land from agricultural production by dividing land parcels and allowing periodic flooding of agricultural land in the levee setback area. Construction of a detention basin is included as part of Alternative 2. Although a location for the detention basin has not been confirmed, the primary area being considered at this time is the site identified in Figure 5.1-2 as a potential soil borrow area/detention basin. The specific size and location of the detention basin would be determined during detailed project design. However, whether it is constructed at the location shown in Figure 5.1-2 or elsewhere, the detention basin under Alternative 2 would likely be located on agricultural land, resulting in the removal of several hundred acres of this land from agricultural production. Because the proposed levee is not a permitted use under the existing land use designation and zoning and would result in the removal of land from agricultural production, the levee setback could conflict with the *Yuba County General Plan* and Yuba County Zoning Ordinance and with the goals and objectives identified previously. However, the proposed improvements to the flood control system would benefit thousands of acres of valuable agricultural lands in the adjacent floodplain by providing increased protection from future flood damages. Therefore, while the direct land use changes associated with the proposed levee setback would conflict with the policies cited above, in the long term the setback levee would provide greater protection for agricultural lands and soils, consistent with these policies. It should also be noted that agricultural operators would receive appropriate compensation for any temporary disturbance or permanent lost of agricultural lands associated with project implementation. In addition, all property acquisitions and relocations conducted as part of the project would be completed following both the Federal Uniform Relocation Act and the California Relocation Assistance Law (see the discussion of these statutes in Section 5.1.1, “Regulatory Setting”). Eligible farm operations would receive relocation assistance consistent with these federal and state statutes.

The land use designation for the land in the project area is Valley Agriculture. The use of the ASB levee setback area in project Segment 2 as a floodway would be inconsistent with the Valley Agriculture designation and with various uses allowed under the Exclusive Agricultural zoning. For example, residential dwellings and accessory structures and agricultural buildings are allowed under the Exclusive Agricultural zoning; following the construction of the setback levee, however, buildings and various land uses within the levee setback area would be prohibited by regulations of The Reclamation Board, and existing structures would be removed. The proposed use of the lands in the levee setback area, therefore, conflicts with existing land use and zoning designations and with the associated allowed uses of these lands.

Because the proposed land uses in project Segment 2 would be inconsistent with County policies for the preservation of agricultural land and with the current permitted uses, this impact would be significant.

Impact ASB-5.1-b

Conversion of Important Farmland to Nonagricultural Uses Resulting from Levee Repairs and the Levee Setback. Levee repair and strengthening activities in project Segments 1 and 3 could permanently remove up to approximately 10 acres of Prime Farmland from production. Relocation of Pump Station No. 3 could potentially convert up to 1 acre of Prime Farmland in Segment 2 to nonagricultural use. The levee setback footprint and levee easements in Segment 2 would permanently convert approximately 210 acres of Prime Farmland, 35 acres of Farmland of Statewide Importance, and 2 acres of Unique Farmland to nonagricultural uses, and would potentially convert several hundred additional acres of Important Farmland for the proposed detention basin. The ASB levee setback could potentially result in the conversion of up to approximately 1,025 acres of Prime Farmland, 10 acres of Farmland of Statewide Importance, and 10 acres of Unique Farmland to nonagricultural uses. Implementation of the levee setback also may indirectly lead to the conversion of additional Important Farmland to nonagricultural uses because some properties would be divided by the setback levee, which could make continued farming of some crops, or on some parcels, impractical. This impact would be **significant**.

It is anticipated that several staging areas and temporary-access haul roads would be developed on agricultural lands in the project area during project construction. Additional land in the area generally identified for agricultural use could be needed for borrow material. (Potential borrow areas are shown in Figure 5.1-2. Details on development of borrow areas are included in Chapter 4, "Description of the Proposed Project.") At borrow sites, the proposed construction practice includes preserving the topsoil from the borrow sites and using it in the restoration of borrow areas. Land at construction staging areas, haul roads, and borrow sites classified as Important Farmland could be temporarily converted for up to approximately 20 months to accommodate preconstruction and construction activities, although in most locations the time frame would be shorter. These areas would be returned to preproject conditions and agricultural uses could resume once construction is completed. Therefore, there would be no direct conversion of Important Farmland to nonagricultural uses in these locations.

As discussed for Impact LS-5.1-b, described for Alternative 1 above, construction of seepage/stability berms and related structures under Alternative 1 could result in the removal of up to approximately 30 acres of Prime Farmland from production. However, most seepage/stability berms would be placed in project Segment 2, and these would be replaced by a setback levee under Alternative 2. A relatively small portion of seepage/stability berms would be placed adjacent to the existing levees in project Segments 1 and 3. The precise extent and location of seepage/stability berms would be determined during detailed project design. For this analysis it is assumed that up to approximately 10 acres of seepage/stability berms could be placed adjacent to the existing levee in Segments 1 and 3 under Alternative 2, resulting in the removal of up to 10 acres of Prime Farmland from production. Pump Station No. 3, currently located within project Segment 2, could be relocated on existing Prime Farmland, resulting in the conversion of up to 1 acre of Prime Farmland to a nonagricultural use.

The ASB levee footprint and levee easements in project Segment 2 would permanently convert a total of approximately 210 acres of Prime Farmland, 35 acres of Farmland of Statewide Importance, and 2 acres of Unique Farmland to nonagricultural uses. Construction of a detention basin is included as part of Alternative 2. Although a location for the detention basin has not

been confirmed, the primary area being considered at this time is some portion of the site identified in Figure 5.1-2 as a potential soil borrow area/detention basin. This entire approximately 690-acre area is identified as Prime Farmland (Figure 5.1-2). The specific size and location of the detention basin would be determined during detailed project design. However, whether it is constructed at the location shown in Figure 5.1-2 or elsewhere, the detention basin under Alternative 2 would likely be located on some category of Important Farmland, resulting in the removal of several hundred acres of this land from agricultural production.

Land uses in the levee setback area could consist of agricultural operations and/or habitat restoration activities that are compatible with flood control objectives. No specific plans for habitat restoration in the setback area are proposed at this time, although this is considered a potential future use. For purposes of this analysis, and to assess the highest level of impacts on agricultural lands, it is conservatively assumed that the entire levee setback area would be used for habitat restoration, and would therefore include the conversion of approximately 1,025 acres of Prime Farmland, 10 acres of Farmland of Statewide Importance, and 10 acres of Unique Farmland to nonagricultural uses.

Additionally, the new setback levee would transect several properties, and continued farming on the portions of those lands that remain outside of the levee setback area may be difficult or impractical, resulting in indirect temporary or long-term conversion of additional Important Farmland to nonagricultural land uses. The acreage of Important Farmland that may be indirectly converted as a result of the levee setback cannot be quantified at this time, but it would likely be much less than the acreage of the levee setback area.

Because it is expected that implementation of Alternative 2 would both directly and indirectly convert Important Farmland to nonagricultural uses, this impact would be significant. It should be noted, however, that any lands that might be converted to habitat may not be lost in perpetuity from agricultural use, as occurs with urban development. While the conversion from agriculture to habitat would be long term, it would not necessarily be permanent. This would not be the case if the conversion to habitat were tied to a permitting or mitigation requirement, or if there were some other legal mechanism in effect calling for the habitat to be retained in perpetuity.

Impact ASB-5.1-c

Displacement of Existing Housing in the Levee Setback Area. Implementation of the ASB levee setback would result in the removal of five to 10 residences from the levee setback area. There are sufficient available residences in the area to accommodate these households; therefore, project implementation would not necessitate the construction of replacement housing elsewhere. Although CEQA does not require that economic and social effects be evaluated or considered significant impacts, it is acknowledged that displacement of five to 10 residences would have both economic and social effects on the occupants of these residences (finding replacement housing, moving to a new residence). However, appropriate compensation would be negotiated with landowners displaced by the project. In addition, eligible homeowners, renters/tenants, businesses, and farm operations would receive relocation assistance consistent with the Federal Uniform Relocation Act and the California Relocation Assistance Law. This impact would be **less than significant**.

If the ASB setback levee were constructed, the area between the setback levee and the existing levee would become part of the Feather River floodplain and all existing buildings in this area would be removed as part of the project. Based on initial reviews of the project area,

implementation of the ASB levee setback under Alternative 2 would result in the removal of approximately 40 structures between the setback levee and the existing levee, with five to 10 of these structures being residences. Homeowners and tenants in these residences would need to be relocated. Removal of five to 10 existing residences and relocation of occupants would not necessarily be considered a substantial displacement of persons or housing. The displacement of persons and housing could be considered a significant impact if it resulted in the need to provide replacement housing, the construction of which would likely result in significant physical environmental effects. However, in this case, displacement of five to 10 residences in the project area would not necessitate the construction of replacement housing elsewhere. U.S. Census Bureau data from the 2000 Census identifies 2,101 vacant housing units in Yuba County, with 312 of these units in the Marysville area (U.S. Census Bureau 2006). Between 2000 and 2005, approximately 1,900 new housing units were added in Yuba County (Yuba County Economic Development Department 2006). These data indicate that there are sufficient existing housing units available in the project area to accommodate residents displaced by the proposed project, without necessitating the need to construct replacement housing elsewhere.

As noted previously in the description of thresholds of significance, economic and social impacts of a project in and of themselves are not treated as significant impacts on the environment under CEQA. However, such information may be considered in determining the significance of impacts. For example, if a freeway were constructed through the center of a community, the physical effect of building a freeway could result in a social effect of dividing a community, and the social effect can be used to help determine if the physical effect is significant. In the case of the FRLRP, although the physical change in the environment from the displacement of people and housing by itself may not be significant, the lead agency may consider whether the economic and social impacts that result in, or from such a physical change influence the significance conclusion. Given these considerations, it is acknowledged that displacement of five to 10 residences would have both economic and social effects on the occupants of these residences (finding replacement housing, moving to a new residence). If residents were displaced from their homes without appropriate compensation or means to find replacement housing, the economic and social effects on these individuals could be considered significant. However, all property acquisitions and relocations conducted as part of the project would be completed following both the Federal Uniform Relocation Act and the California Relocation Assistance Law (see the discussion of these statutes in Section 5.1.1, “Regulatory Setting”) and appropriate compensation would be negotiated with landowners displaced by the project. Eligible homeowners, renters/tenants, businesses, and farm operations would receive relocation assistance consistent with these federal and state statutes. Given these conditions, impacts related to the displacement of existing housing are considered less than significant. That said the displacement of five to 10 residences remains an important issue for consideration by TRLIA in the selection of a project alternative for implementation.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impact IS-5.1-a

Conflicts with Land Use Planning and Policies Resulting from Levee Repairs and the Levee Setback. Levee repair and strengthening of the existing levee in project Segments 1 and 3 could result in removal of small areas of agricultural land from production associated with the installation of seepage/stability berms and other structures. The setback levee footprint and levee easements in project Segment 2 would cover approximately 220–230 acres of agricultural land, and setting back the levee could indirectly result in the removal

of more land from agricultural production by dividing land parcels and allowing periodic flooding of agricultural land. Construction of a detention basin would be required to prevent adverse flooding effects on area properties, and this would likely occur on several hundred acres of existing agricultural land. These uses would conflict with County land use policies regarding the preservation of agricultural land and would be inconsistent with the current land use and zoning designations for the area. Because of these inconsistencies, this impact would be **significant**.

The potential removal of agricultural land in Segments 1 and 3 would be the same as in Impact ASB-5.1-a, described under Alternative 2 above. It is assumed for this analysis that up to approximately 10 acres of agricultural land could be removed by installation of seepage/stability berms and related structures. Under Alternative 3, the existing Pump Station No. 3 would be removed and a new pump station would be constructed east of the intermediate setback levee alignment, converting up to 1 acre of land to nonagricultural use.

The intermediate setback levee footprint and levee easements in project Segment 2 would cover approximately 220–230 acres of agricultural land, and setting back the levee could indirectly result in the removal of more land from agricultural production by dividing land parcels and allowing periodic flooding of agricultural land in the levee setback area. Construction of a detention basin is included as part of Alternative 3. Although a location for the detention basin has not been confirmed, the primary area being considered at this time is the site identified in Figure 5.1-2 as a potential soil borrow area/detention basin. The specific size and location of the detention basin would be determined during detailed project design. However, whether it is constructed at the location shown in Figure 5.1-2 or elsewhere, the detention basin under Alternative 2 would likely be located on agricultural land, resulting in the removal of several hundred acres of this land from agricultural production.

These proposed land uses are inconsistent with the goals and objectives for preservation of productive agricultural land and soils identified previously. However, the proposed improvements to the flood control system would benefit thousands of acres of valuable agricultural lands in the adjacent floodplain by providing increased protection from future flood damages. Therefore, while the direct land use changes associated with the proposed levee setback would conflict with the policies cited above, in the long term the setback levee would provide greater protection for agricultural lands and soils, consistent with these policies. It should be noted that agricultural operators would receive appropriate compensation for any temporary disturbance or permanent loss of agricultural lands associated with project implementation. In addition, all property acquisitions and relocations conducted as part of the project would be completed following both the Federal Uniform Relocation Act and the California Relocation Assistance Law (see the discussion of these statutes in Section 5.1.1, “Regulatory Setting”). Eligible farm operators would receive relocation assistance consistent with these federal and state statutes.

The land use designation for the land in the project area is Valley Agriculture. The use of the intermediate levee setback area as a floodway in project Segment 2 would be inconsistent with the Valley Agriculture designation and with various uses allowed under the Exclusive Agricultural zoning. For example, residential dwellings and accessory structures and agricultural buildings are allowed under the Exclusive Agricultural zoning; following the construction of the setback levee, however, buildings and various land uses within the levee setback area would be

prohibited by regulations of The Reclamation Board, and existing structures would be removed. The proposed use of the lands in the levee setback area, therefore, conflicts with existing land use and zoning designations and the associated allowed uses of these lands.

Because the proposed land uses in project Segment 2 would be inconsistent with County policies for the preservation of agricultural land and with the current permitted uses, this impact would be significant.

Impact IS-5.1-b

Conversion of Important Farmland to Nonagricultural Uses Resulting from Levee Repairs and the Levee Setback. Levee repair and strengthening activities in project Segments 1 and 3 could permanently remove up to approximately 10 acres of Prime Farmland from production. Relocation of Pump Station No. 3 could potentially convert up to 1 acre of Prime Farmland in Segment 2 to nonagricultural use. The levee setback footprint and levee easements in Segment 2 would permanently convert approximately 210 acres of Prime Farmland, 10 acres of Farmland of Statewide Importance, and 5 acres of Unique Farmland to nonagricultural uses, and would potentially convert several hundred additional acres of Important Farmland for the proposed detention basin. The intermediate levee setback area could potentially result in the conversion of approximately 700 acres of Prime Farmland, 10 acres of Farmland of Statewide Importance, and 10 acres of Unique Farmland to nonagricultural uses. Implementation of the levee setback also may indirectly lead to the conversion of additional Important Farmland to nonagricultural uses because some properties would be divided by the setback levee, which could make continued farming of some crops, or on some parcels, impractical. This impact would be **significant**.

Impacts on Important Farmland related to levee repairs in project Segments 1 and 3; relocation and replacement of Pump Station No. 3; and use of staging areas, temporary-access haul roads, and soil borrow areas would be the same as in Impact ASB-5.1-b, described under Alternative 2 above.

The intermediate levee setback footprint and levee easements in project Segment 2 would permanently convert approximately 210 acres of Prime Farmland, 10 acres of Farmland of Statewide Importance, and 5 acres of Unique Farmland to nonagricultural uses. Construction of a detention basin is included as part of Alternative 3. Although a location for the detention basin has not been confirmed, the primary area being considered at this time is some portion of the site identified as a potential soil borrow area/detention basin in Figure 5.1-2. This entire approximately 690-acre area is identified as Prime Farmland (Figure 5.1-2). The specific size and location of the detention basin will be determined during detailed project design. However, whether constructed at the location shown in Figure 5.1-2 or elsewhere, the detention basin under Alternative 2 would likely be located on some category of Important Farmland, resulting in the removal of several hundred acres of this land from agricultural production.

Land uses in the levee setback area could consist of agricultural operations and/or habitat restoration activities that are compatible with flood control objectives. No specific plans for habitat restoration in the levee setback area are proposed at this time, although this is considered a potential future use. For purposes of this analysis, and to assess the highest level of impacts on agricultural lands, it is conservatively assumed that the entire levee setback area would be used for habitat restoration, and would therefore include the conversion of approximately 700 acres of Prime Farmland, 10 acres of Farmland of Statewide Importance, and 10 acres of Unique Farmland to nonagricultural uses.

Additionally, the new setback levee would transect several properties, and continued farming on the portions of those lands that remain outside of the levee setback area may be difficult or impractical, resulting in indirect temporary or long-term conversion of additional Important Farmland to nonagricultural land uses. The acreage of Important Farmland that may be indirectly converted as a result of the levee setback cannot be quantified at this time, but it would likely be much less than the acreage of the levee setback area.

Because it is expected that implementation of Alternative 3 would both directly and indirectly convert Important Farmland in project Segment 2 to nonagricultural uses, this impact would be significant. It should be noted, however, that any lands that might be converted to habitat would not be lost in perpetuity from agricultural use, as occurs with urban development. While the conversion from agriculture to habitat would be long term, it would not necessarily be permanent. This would not be the case if the conversion to habitat were tied to a permitting or mitigation requirement, or if there were some other legal mechanism in effect calling for the habitat to be retained in perpetuity.

Impact IS-5.1-c

Displacement of Existing Housing in the Levee Setback Area. This impact would be the same as Impact ASB-5.1-c, described under Alternative 2 above. Both Alternative 2 and Alternative 3 would result in the removal of five to 10 residences in the levee setback area. For the same reasons as described above, this impact would be **less than significant**.

5.1.4 MITIGATION MEASURES

ALTERNATIVE 1 – THE LEVEE STRENGTHENING ALTERNATIVE

No mitigation is required for Impact LS-5.1-a (conflicts with land use planning and policies). Mitigation is provided below for Impact LS-5.1-b (conversion of Important Farmland to nonagricultural uses).

LS-5.1-b **Minimize Losses of Important Farmland to the Extent Feasible.** This mitigation would reduce the impact, but not to a less-than-significant level.

To minimize direct losses and indirect adverse effects on important farmland, TRLIA shall ensure that the following measures are implemented where feasible and practicable:

(a) Minimize the disturbance of Important Farmland and continuing agricultural operations during construction by locating construction laydown and staging areas on sites that are fallow, that are already developed or disturbed, or that are to be discontinued for use as agricultural land, and by using existing roads to access construction areas to the extent possible.

(b) When selecting the site and configuration of the detention basin, minimize the fragmentation of agricultural lands and retain contiguous parcels of agricultural land of sufficient size to support their efficient use for continued agricultural production.

Implementing this mitigation measure would reduce potential impacts of Alternative 1 on Important Farmland; however, it would not reduce the impact to a less-than-significant level because the conversion of Important Farmland would still occur.

ALTERNATIVE 2 – THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impact ASB-5.1-c (displacement of existing housing). Mitigation is provided below for Impact ASB-5.1-a (conflicts with land use planning and policies) and Impact ASB-5.1-b (conversion of Important Farmland to nonagricultural uses).

ASB-5.1-a **Resolve Inconsistencies between Proposed Uses of the Levee Setback Area and Yuba County Zoning.** This mitigation would reduce the impact, but not to a less-than-significant level.

TRLIA shall coordinate with the County Planning Department to appropriately address inconsistencies between proposed land uses and County-planned land uses and zoning designations. Before permanent changes in allowable land uses in the levee setback area need to be established (i.e., before degradation of the existing levee at the latest), TRLIA shall apply for a general plan amendment if necessary and for appropriate rezoning, a zoning amendment, or other measures determined by the Planning Department to be necessary to ensure the consistency of proposed land uses with zoning. Consistency is defined as land uses and activities permitted by the County in the levee setback area, as reflected by zoning and other land use guidelines, that do not conflict with the flood control function of the levee setback area. The approach to resolving any land use planning inconsistencies shall be determined by, and conducted in coordination with, the County Planning Department.

Any necessary modifications of general plan land use designations or of zoning, or placement of restrictions on existing zoning, will be determined by the Planning Department and approved by the County Planning Commission and Board of Supervisors as appropriate.

Implementing this mitigation measure could reduce the land use impact associated with conflicts with land use planning to a less-than-significant level. However, it is uncertain whether the County could complete the approval process for any necessary zoning or land use designation modifications before completion of the proposed project. Although not approving these modifications before completion of the project would not result in any physical effects on the environment, it would result in a period of time where identified land use conflicts would occur. In addition, even if the modification described above were approved, the project would still conflict with County policies for the preservation of agricultural land. Therefore, this impact would remain significant.

ASB-5.1-b **Preserve the Agricultural Productivity of Important Farmland to the Extent Feasible.** This mitigation would reduce the impact, but not to a less-than-significant level.

It is not known at this time whether lands in the levee setback area would be retained in agricultural production, converted to habitat, or a mixture of both land uses. If lands classified as Important Farmland in the levee setback area are to be retained in agricultural production, the following measures would apply to these lands.

To support the continued productive use of Important Farmland in the levee setback area in project Segment 2, TRLIA shall ensure that the following measures are implemented, to the extent feasible and practicable, in the design and implementation of the levee setback:

(a) When selecting sites for borrow excavation, minimize the fragmentation of lands that are to remain in agricultural use. Where practical, retain contiguous parcels of agricultural land of sufficient size to support their efficient use for continued agricultural production.

(b) Where the setback levee would transect agricultural properties and the continuation of agricultural use on the portions within the levee setback area would occur, ensure convenience of access to the levee setback properties sufficient to support ongoing agricultural operations.

(c) Make the most productive salvaged topsoil from the levee footprint available to landowners with less productive agricultural lands in the vicinity of, but outside the levee setback area that could benefit from the introduction of good-quality soil. By agreement between TRLIA or landowners of affected properties and the recipient(s) of the topsoil, the recipient(s) would be required to work the topsoil into the agricultural lands where it is delivered.

(d) Ensure that utilities currently in the levee setback area that are needed for ongoing agricultural uses, including wells, pipelines, and power lines, are appropriately relocated, replaced, or retrofitted to withstand flooding. Ensure that these systems and drainage systems are functioning as necessary after the project is in place so that agricultural uses are not unduly disrupted.

In addition, TRLIA shall ensure that the following measures are implemented, to the extent feasible and practicable, inside and/or outside the levee setback area:

(a) Minimize the disturbance of Important Farmland and continuing agricultural operations during construction by locating construction laydown and staging areas on sites that are fallow, that are already developed or disturbed, or that are to be discontinued for use as agricultural land, and by using existing roads to access construction areas to the extent possible.

(b) When selecting the site and configuration of the detention basin, minimize the fragmentation of agricultural lands and retain contiguous parcels of agricultural land of sufficient size to support their efficient use for continued agricultural production.

Implementing this mitigation measure would reduce potential impacts of the levee setback on Important Farmland, including indirect effects that may lead to the discontinuation of farming on some lands; however, it would not reduce the impact to a less-than-significant level because the conversion of a substantial amount of Important Farmland would still occur.

ALTERNATIVE 3 – THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impact IS-5.1-c (displacement of existing housing). Mitigation is provided below for Impact IS-5.1-a (conflicts with land use planning and policies) and Impact IS-5.1-b (conversion of Important Farmland to nonagricultural uses).

IS-5.1-a **Resolve Inconsistencies between Proposed Uses of the Levee Setback Area and Yuba County Zoning.** This measure is identical to Mitigation Measure ASB-5.1-a above. This mitigation would reduce the impact, but not to a less-than-significant level.

IS-5.1-b **Preserve the Agricultural Productivity of Important Farmland to the Extent Feasible.** This measure is identical to Mitigation Measure ASB-5.1-b above. This mitigation would reduce the impact of conversion of Important Farmland to nonagricultural uses, but not to a less-than-significant level.

5.1.5 IMPACTS REMAINING SIGNIFICANT AFTER MITIGATION

ALTERNATIVE 1 – THE LEVEE STRENGTHENING ALTERNATIVE

Impact LS-5.1-b (Conversion of Important Farmland to nonagricultural uses) would remain significant and unavoidable after mitigation. All impacts of Alternative 1 on land use would be less than significant.

ALTERNATIVE 2 – THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE

Impact ASB-5.1-a (conflicts with land use planning and policies) and Impact ASB-5.1-b (conversion of Important Farmland to nonagricultural uses) would remain significant and unavoidable after mitigation.

ALTERNATIVE 3 – THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE

Impact IS-5.1-a (conflicts with land use planning and policies) and Impact IS-5.1-b (conversion of Important Farmland to nonagricultural uses) would remain significant and unavoidable after mitigation.

SECTION 5.2 GEOLOGY, SOILS, AND MINERAL RESOURCES

This section addresses issues related to geologic hazards, including seismicity, soil erosion, and related levee safety issues, in addition to mineral resources. Flood hazards, geomorphology, and water quality effects of erosion are discussed in Section 5.3, "Water Resources and River Geomorphology."

5.2.1 REGULATORY SETTING

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

Levee Standards and Maintenance

The levees protecting the Reclamation District (RD) 784 area are part of the federal Sacramento River Flood Control Project (SRFCP), which was authorized by the Flood Control Act of 1917. The U.S. Army Corps of Engineers (Corps) began the SRFCP in 1918 and completed it in 1968. The SRFCP consists of a comprehensive system of levees, overflow weirs, outfall gates, pumping plants, levee bypass floodways, and overbank floodway areas. In the RD 784 area it includes levees along the left (east) bank of the Feather River, the right (north) bank of the Bear River, the left (south) bank of the Yuba River, and the right (west) bank of the Western Pacific Interceptor Canal, which collects water flowing toward RD 784 from the east and diverts the flows to the Bear River.

The Corps specifies in Engineering Manual 1110-2-1913 standards for the design and construction of federal "project" levees (U.S. Army Corps of Engineers 2000). "Project" levees in California are the levees, such as the SRFCP levees, that are built by the Corps and maintained by local agencies under the supervision of the State of California Reclamation Board (The Reclamation Board). The Reclamation Board is required to enforce appropriate standards for the construction, maintenance, and protection of adopted flood control plans. These regulations, set forth in Title 23 of the California Code of Regulations, are also intended to comply with The Reclamation Board's obligations to the Corps pursuant to numerous assurance agreements, Corps operation and maintenance manuals, and Title 33, Section 208.10 of the Code of Federal Regulations (33 CFR 208.10). RD 784 is the local entity that is responsible, under the supervision of The Reclamation Board, for maintaining the levees that protect the project area, including the left bank levee of the lower Feather River and the left bank levee of the lower Yuba River.

The Federal Emergency Management Agency (FEMA) also has oversight over flood control levees through the agency's levee certification program. For levees to be certified by FEMA as providing 100-year protection, evidence must be provided that adequate design and operation and maintenance systems are in place to provide reasonable assurance that protection exists from a base flood (1% or 100-year flood). Specific requirements pertaining to the amount of freeboard, closure devices, embankment protection from floods, embankment and foundation stability, settlement, interior drainage, operation plans, and maintenance plans are contained in 44 CFR 65.10.

Erosion Control

Erosion from construction activity under the Feather River Levee Repair Project (FRLRP) would be regulated under the federal Clean Water Act (CWA) and by FEMA. Erosion would also be regulated under the local grading ordinance (see "Local Plans, Policies, Regulations, and Laws" below).

The State Water Resources Control Board (SWRCB) and regional water quality control boards (RWQCBs) regulate discharges of waste to water through National Pollutant Discharge Elimination System (NPDES) permits, which are authorized under Section 402 of the CWA. The permits are issued for discharges to surface waters from such sources as stormwater runoff from general construction activities. The NPDES Construction Activities Storm Water General Permit applies to stormwater discharges associated with construction activity, including clearing, grading, excavation, and reconstruction of existing facilities, that could disturb at least 1 acre of land. The NPDES permitting process and other regulatory requirements for the protection of water quality are described in Section 5.3, "Water Resources and River Geomorphology."

For a levee to be recognized by FEMA as providing a "100-year" level of flood protection, the levee must be shown to satisfy several criteria, including embankment protection against erosion. Specific requirements are contained in 44 CFR 65.10. (Also see "Levee Standards and Maintenance" above.)

Federal Earthquake Hazards Reduction Act

In October 1997, the U.S. Congress passed the Earthquake Hazards Reduction Act to "reduce the risks to life and property from future earthquakes in the United States through the establishment and maintenance of an effective earthquake hazards and reduction program." To accomplish this, the act established the National Earthquake Hazards Reduction Program (NEHRP). This program was significantly amended in November 1990 by the National Earthquake Hazards Reduction Program Act (NEHRPA), by refining the description of agency responsibilities, program goals, and objectives.

The mission of the NEHRP includes:

- improved understanding, characterization, and prediction of hazards and vulnerabilities;
- improved building codes and land use practices;
- risk reduction through postearthquake investigations and education;
- development and improvement of design and construction techniques;
- improved mitigation capacity; and
- accelerated application of research results.

The NEHRPA designates FEMA as the lead agency of the program and assigns it several planning, coordinating, and reporting responsibilities. Other NEHRPA agencies include the National Institute of Standards and Technology, the National Science Foundation, and the U.S. Geological Survey (USGS).

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

California Seismic Hazards Mapping Act

The California Seismic Hazards Mapping Act of 1990 (Public Resources Code Sections 2690–2699.6) addresses seismic hazards other than surface rupture, such as liquefaction and induced landslides. The Seismic Hazards Mapping Act specifies that the lead agency for a project may withhold development permits until geologic or soils investigations are conducted for specific sites and mitigation measures are incorporated into plans to reduce hazards associated with seismicity and unstable soils.

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act (Public Resources Code Section 2621 et seq.) was passed by the California Legislature to mitigate the hazard of surface faulting to structures. The act's main purpose is to prevent the construction of buildings used for human occupancy on the surface trace of active faults. The act addresses only the hazard of surface fault rupture and is not directed toward other earthquake hazards. Local agencies must regulate most development in fault zones established by the State Geologist. Before a project can be permitted in a designated Alquist-Priolo Earthquake Fault Zone, cities and counties must require a geologic investigation to demonstrate that proposed buildings would not be constructed across active faults.

LOCAL PLANS, POLICIES, REGULATIONS, AND LAWS

Sections of the Yuba County Ordinance Code that regulate grading and borrow activities would apply to the FRLRP. Under Title XI (Planning), Chapter 11.25 of the ordinance code, a use permit from the Yuba County Planning Commission must be obtained before any grading, excavation, or fill activity commences. Conditions for issuance of a permit may be prescribed by the commission to avoid hazards of slides, caving, excessive settlement, erosion, or silting.

5.2.2 ENVIRONMENTAL SETTING

SOURCES OF INFORMATION

A stratigraphic inventory and literature review were completed to develop a baseline inventory of the geologic, soils, and seismic conditions of the project vicinity. Research methods included a review of published and unpublished literature and a cursory field survey.

Published geologic maps and reports covering the geology of the project vicinity were reviewed to determine the exposed rock units and to delineate their respective areal distributions. The *Problem Identification Report, TRLIA Phase 4 Feather River and Yuba River Left Bank Levees* (Kleinfelder 2006) was also reviewed. Analysis of geology and soils included in the environmental impact report (EIR) for the Yuba-Feather Supplemental Flood Control Project (Yuba County Water Agency 2003) and the EIR for the Feather-Bear Rivers Levee Setback Project (Three Rivers Levee Improvement Authority 2004) was also considered.

GEOLOGIC CONDITIONS

Regional Geology and Soils

The project area is located within the northern portion of the Sacramento Valley, which, together with the San Joaquin Valley, comprises the Great Valley geomorphic and geotectonic province. The Great Valley is a forearc basin composed of thousands of feet of sedimentary deposits that has undergone periods of subsidence and uplift over millions of years. The Great Valley basin began to form during the Jurassic period of the Mesozoic era as the Pacific oceanic plate was subducted underneath the adjacent North American continental plate. In the western portion of the Great Valley, Upper Jurassic to Upper Cretaceous rock sequences rest on Upper Jurassic oceanic crust sequences. In contrast, the eastern portion of the Great Valley is composed of shallow Pleistocene nonmarine deposits over a layer of Cretaceous marine/deltaic deposits only a few hundred feet thick, which rests on the metamorphic and igneous rocks of the Sierra Nevada—the western edge of the continental margin.

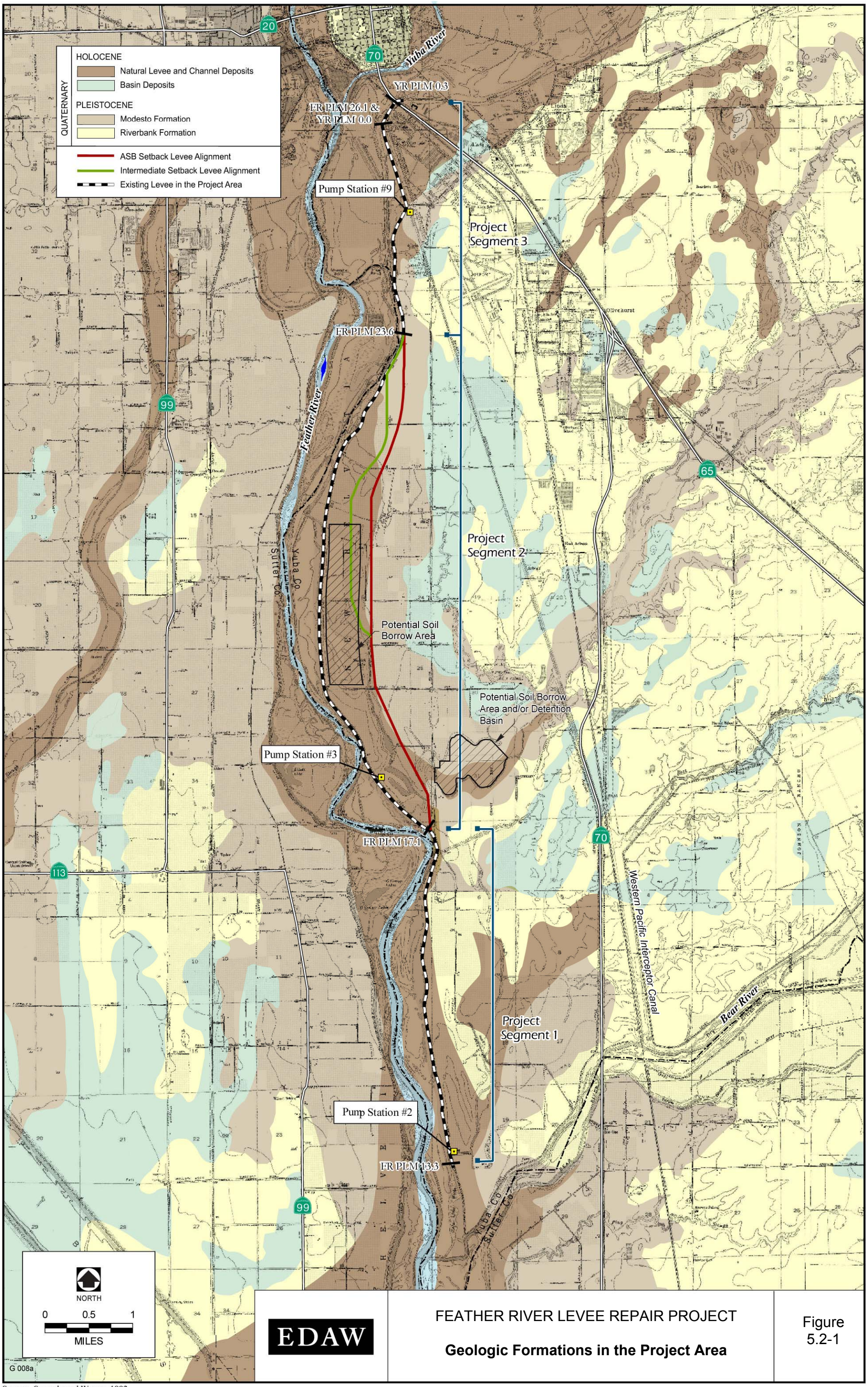
During the Jurassic and Cretaceous periods of the Mesozoic era, the Great Valley existed in the form of an ancient ocean. By the end of the Mesozoic, the northern portion of the Great Valley began to fill with sediment as tectonic forces caused uplift of the basin. Geologic evidence suggests that the Sacramento Valley and San Joaquin Valley gradually separated into two separate water bodies as uplift and sedimentation continued. By the time of the Miocene epoch (approximately 24 million years ago), sediments deposited in the Sacramento Valley were mostly of terrestrial origin. In contrast, the San Joaquin Valley continued to be inundated with water for another 20 million years, as indicated by marine sediments dated to the late Pliocene (approximately 5 million years ago).

Most of the surface of the Great Valley is covered with Recent (Holocene, i.e., 10,000 years Before Present [BP] to present day) and Pleistocene (i.e., 10,000–1,800,000 years BP) alluvium. This alluvium is composed of sediments from the Sierra Nevada to the east and the Coast Range to the west that were carried by water and deposited on the valley floor. Siltstone, claystone, and sandstone are the primary types of sedimentary deposits.

Most of the soils on the valley floor are shallow to moderately deep, sloping, well-drained soils with very slowly permeable subsoils underlain with hardpan. These soils have good natural drainage, slow subsoil permeability, and slow runoff (Natural Resources Conservation Service 1992). These soils are used primarily for pasture, range, and cultivation of grains and rice.

Project Area Geologic and Soil Conditions

Geologic formations within the FRLRP project segments and in the vicinity are depicted in Figure 5.2-1, “Geologic Formations in the Project Area.” The project area is in the eastern portion of the Sacramento Valley, and the project site lies within the floodplains of the Feather and Yuba Rivers. The natural floodplains of these rivers are wide in this area because the land is relatively flat. The floodplains are filled with Holocene-age alluvial deposits. These major drainage ways were originally confined within broad natural levees that sloped away from the rivers or streams. The natural levees formed through the deposition of alluvium during periods of flooding. As floodwaters lost energy, the coarser materials settled out nearest the rivers and



FEATHER RIVER LEVEE REPAIR PROJECT

Geologic Formations in the Project Area

Figure 5.2-1

Source: Saucedo and Wagner 1992

streams, forming the natural levees and sand bars in the vicinity of the river channel. The finer material was carried in suspension farther from the rivers or streams, and settled out in quiet water areas such as swales, abandoned meander channels, and lakes. However, because the streams have meandered and reworked the previously deposited sediments, extreme variations in material types may be found over a limited distance or depth. The most recent deposits in these floodplains are sediments generated by hydraulic mining operations in the Sierra Nevada during the mid-1800s. These sediments cover portions of the floodplain outside the existing levees, with thickness estimated to range from 10 to 15 feet.

Flanking the Recent alluvial deposits are late Pleistocene alluvial fan and terrace deposits of the Modesto and Riverbank Formations. Stream terrace deposits, mapped as the Modesto Formation, are higher in elevation and older than floodplain sediments. Before levees were built these stream terraces were flooded occasionally, but only small amounts of sediment were deposited during floods. The lower fan terraces of the Riverbank Formation are higher in elevation and older than stream terraces, and were flooded only rarely. (Additional information on these geologic formations is contained in Section 5.13, “Paleontological Resources.”)

Regional geologic mapping (Saucedo and Wagner 1992) shows that the existing Feather River levee within project Segment 1 overlies a mixture of the Pleistocene-age Riverbank and Modesto Formations. The levee in this project segment is also underlain in certain areas by younger Holocene channel deposits (Figure 5.2-1).

The existing Feather River levee and the proposed intermediate setback levee alignment in project Segment 2 overlie primarily Feather River channel deposits of Holocene age (Figure 5.2-1). River deposits crop out along the major rivers and streams of the Central Valley and include channel and floodplain deposits. River deposits are still accumulating, except where evidence of human activity (such as a levee) intervenes. Channel deposits, which consist chiefly of sand and gravel, range in width from a few feet to nearly 1,000 feet. Because soil development and topography are the criteria considered in mapping river deposits, subsurface contact with underlying deposits is poorly defined. River deposits in the Sacramento area have been described as predominantly coarse-grained at relatively shallow depths that appear to be hydraulically continuous with the present stream channels, floodplains, and natural levees. Within the northern portion of project Segment 2, the existing Feather River levee and the two proposed setback levee alignments overlie the older, Pleistocene-age Modesto Formation. Most of the proposed Above Star Bend (ASB) setback levee alignment overlies the contact border between the Modesto Formation and younger Holocene channel deposits (Figure 5.2-1).

The existing Feather River and Yuba River levees within project Segment 3 partially overlie the Modesto Formation (Feather River levee at the southern end of Segment 3) and partially overlie the Holocene channel deposits (Feather River and Yuba River levees at the northern end of the project segment) (Figure 5.2-1).

The Holocene channel deposits in the project area are anticipated to be poorly consolidated, well-sorted sands, silts, clays, and gravels. These deposits occur as gravelly sand, silt, and clay from flood events along the Feather River and its tributaries. This unit overlies the older Pleistocene alluvium and ranges in thickness from 5 to 15 feet. Soils within the Modesto and Riverbank Formations are expected to be composed of a similarly wide range of materials, but

slightly more consolidated, and these soils are expected to have higher shear strength and lower compressibility than the recent alluvial deposits (Yuba County Water Agency 2003).

Soils immediately adjacent to the Yuba and Feather Rivers are dominated by deep, nearly level, well-drained loamy and sandy soils. The natural drainage is good, and the soils have slow to moderate subsoil permeability. Runoff is slow, and inherent soil fertility is high. These soils are used for pasture, orchards, and row crops. The river terraces consist of very deep, well-drained alluvial soils (Natural Resources Conservation Service 1992) and are used for irrigated orchards and cultivated crops.

The *Yuba County Soil Survey* (Natural Resources Conservation Service 1992) identifies a variety of soil map units in the FRLRP project area. These units and their specific characteristics are described under "Soil Resources" below. The project area generally consists of deep soils derived from alluvial sources, which are classified by the Farmland Mapping and Monitoring Program as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. The soils have low to high permeability rates that, combined with the nearly level topography, result in low runoff rates and low risk of erosion.

SEISMICITY AND FAULT ZONES

The project area lies in east central California, an area that has experienced relatively low seismic activity in the past. The project area is not located in an Alquist-Priolo Earthquake Fault Zone (California Geological Survey 1999, Hart and Bryant 1999). The closest major faults in the vicinity are listed in Table 5.2-1.

Table 5.2-1
Faults in the Vicinity of the Project Area

Fault Name	Age of Fault Activity[1]	Distance from Project Area
Willows Fault Zone	Pre-Quaternary	5 miles
Dunnigan Hills	Holocene	20 miles
Prairie Creek	Historic	25 miles
Swain Ravine	Historic	30 miles
Cleveland Hills	Historic	40 miles
Melones	Pre-Quaternary	40 miles
Bear Mountain	Pre-Quaternary	40 miles
Coast Range Fault Zone	Historic	40 miles

[1] Historic = activity within the last 200 years; Holocene = activity within the last 10,000 years; Pre-Quaternary = no evidence of fault activity within the last 1,600,000 years.

Source: Jennings 1994

The nearest known active (Holocene or Historic) fault trace to the project area is the Dunnigan Hills fault, near the city of Woodland approximately 20 miles southwest of the project area (Jennings 1994). The Cleveland Hills fault, near Lake Oroville, is mapped approximately 40 miles north of the project area. The 1975 Oroville earthquake (5.7 Richter magnitude) caused surface rupture on portions of the Cleveland Hills fault.

Studies conducted after the Oroville earthquake concluded that the Swain Ravine fault was a continuation of the Cleveland Hills fault. The Prairie Creek fault joins with the Swain Ravine fault in southwestern Yuba County, and surface cracking was observed along this fault in Palermo following the 1975 Oroville earthquake. The Swain Ravine and Prairie Creek faults are considered capable of seismic activity, but the activity is estimated to have a long recurrence interval and a low slip rate (California Department of Water Resources 1979). Based on the California Seismic Hazard Map, a large-magnitude earthquake from either of these nearby seismic sources would produce an estimated maximum peak ground acceleration of 0.2 gravity (g) (equivalent to ±20% of the earth's normal gravitational strength) in the project area. Actual surface response may differ depending on local soil conditions.

A geotechnical field investigation was conducted in the local area for a setback of the lower Feather River levee that was proposed as part of the Yuba-Feather Supplemental Flood Control Project (Y-FSFCP). No evidence of faulting was interpreted from data recovered in this geotechnical field investigation (Yuba County Water Agency 2003).

Potential seismic hazards resulting from a nearby moderate to major earthquake can generally be classified as primary and secondary. The primary effect is fault ground rupture, also called surface faulting. Because there are no active faults mapped across the project site by the California Geological Survey or USGS and the project area is not located within an Alquist-Priolo Earthquake Fault Zone, fault ground rupture is unlikely. Common secondary seismic hazards include ground shaking, liquefaction, subsidence, and seiches. These hazards are discussed below.

Seismic Ground Shaking

Strong earthquakes generated along any fault in the region may affect the project area, depending on the characteristics of the earthquake and the location of the epicenter. Ground motions can be estimated by a probabilistic method at specified hazard levels. The intensity of ground shaking depends on the distance from the earthquake epicenter to the site, the magnitude of the earthquake, site soil conditions, and the characteristic of the source. *Probabilistic Seismic Hazard Assessment for the State of California* (Petersen et al. 1996), published by USGS and the California Division of Mines and Geology (CDMG), identifies the seismic hazard based on a review of these characteristics and historical seismicity throughout California. The results of these studies suggest that there is a 10% probability that the peak horizontal acceleration experienced at the site would exceed 0.2 g in 50 years. The California Building Standards Code sets 0.3 g as the threshold above which special structural design is necessary to accommodate potential ground movement.

Ground Failure/Liquefaction

Liquefaction is a process by which water-saturated materials (soil, sediment, and certain types of volcanic deposits) lose strength and may fail during strong ground shaking, when granular materials are transformed from a solid state into a liquefied state as a result of increased pore-water pressure. This behavior is most commonly induced by strong ground shaking associated with earthquakes. In some cases, a complete loss of strength occurs and catastrophic ground failure may result. However, liquefaction may happen where only limited strains develop, and ground surface deformations are much less serious.

Factors determining the liquefaction potential are soil type, the level and duration of seismic ground motions, the type and consistency of soils, and the depth to groundwater. Loose sands and peat deposits are susceptible to liquefaction, while clayey silts, silty clays, and clays deposited in freshwater environments are generally stable under the influence of seismic ground shaking.

The FRLRP project area has relatively shallow groundwater conditions. Unconsolidated sediments underlie the project area in layers of very loose or loose cohesionless soils (clean sand and silty sand). These materials, where saturated, may be susceptible to liquefaction immediately after strong earthquake shaking, which may induce damaging settlement and/or cracking of the levee. Such a situation is possible, but the probability that strong ground motion would coincide with or immediately precede high river levels is very low.

Three types of ground failure or collapse of soil structures commonly result from liquefaction: lateral spread, ground oscillation, and loss of bearing strength. Each type is briefly defined below.

Lateral Spread. This term defines the lateral displacement of surficial blocks of sediment as the result of liquefaction in a subsurface layer. Once liquefaction transforms the subsurface layer into a fluidized mass, gravity plus inertial forces that result from the earthquake may cause the mass to move downslope toward a cut slope or free face (such as a river channel or a canal). Lateral spreads most commonly occur on gentle slopes that range between 0.3° and 3°, and commonly displace the surface by several meters to tens of meters. Such movement typically damages pipelines, utilities, bridges, and other structures that have shallow foundations. Because topography in the project area is level and the potential for seismic activity is considered low, the potential for lateral spread is also considered low.

Ground Oscillation. When liquefaction occurs at depth and the slope is too gentle to permit lateral displacement, the soil blocks that are not liquefied may decouple from one another and oscillate on the liquefied zone. The resulting ground oscillation may be accompanied by opening and closing of fissures and sand boils, which may damage structures and underground utilities. Because of the low probability of strong seismic ground shaking in the project area, the probability of ground oscillation is also low.

Loss of Bearing Strength. When a soil loses strength and liquefies, loss of bearing strength may occur beneath a structure, possibly causing the structure to settle and tip. If the structure is buoyant, it may float upward. The only structure included in the FRLRP is the relocated Pump Station No. 3. The pump station would not be subject to human occupancy/habitation. Through proper site selection and implementation of various Uniform Building Code requirements, Pump Station No. 3 would not be subject to the effects of loss of bearing strength.

Subsidence and Settlement

Land surface subsidence can be induced by both natural phenomena and human activities. Natural phenomena include subsidence resulting from tectonic deformations and seismically induced settlements; soil subsidence caused by consolidation, hydrocompaction, or rapid sedimentation; subsidence resulting from oxidation or dewatering of organically rich soils; and

subsidence related to subsurface cavities. Human activities that can cause subsidence include withdrawal of subsurface fluids or sediments.

Pumping of water for residential, commercial, and agricultural uses from subsurface water tables can be a cause of subsidence in California. For example, subsidence has created serious problems for flood control in the Sacramento–San Joaquin River Delta (Delta). Estimates in 1993 indicated that the Delta was subsiding at a rate of more than 3 inches per year. However, according to the *Yuba County General Plan* (Yuba County 1994), excessive groundwater extraction occurred from 1950 through 1984 within the valley area of Yuba County, but no concomitant land subsidence was recorded. Thus, it appears that subsidence from groundwater extraction should not be an issue in the project area.

Soil settlement could occur at the proposed ASB and intermediate setback levee embankments in project Segment 2 because of an increase in overlying pressure from deposition and storage of a large volume of excavated soils. According to studies performed for the Y-FSFCP in support of preliminary design of a Feather River levee setback (Yuba County Water Agency 2003), levee foundations in loose sand will likely settle up to several inches; levee foundations in clayey soils would be expected to settle for several years after completion. Differential settlement could cause cracking in embankments. A similar potential exists at potential borrow sites in the levee setback area as a result of hydrocompaction (compaction of soil after an initial wetting event) when these sites are later flooded.

Seismic Seiches

Earthquakes may affect open bodies of water in two ways: by creating seismic sea waves and by creating seiches. Seismic sea waves (often called “tidal waves”) are caused by abrupt ground movements (usually vertical) on the ocean floor in connection with a major earthquake. Because of the distance of the project area from the ocean, seismic sea waves are not likely to be a factor.

A seiche is a sloshing of water in an enclosed or restricted water body such as a basin, river, or lake, caused by earthquake motion. The sloshing can occur for a few minutes or several hours. A seiche in the project vicinity could be damaging, but based on the anticipated short duration of seismic ground shaking in Yuba County, the risk from seiches can be considered low. In addition, under most circumstances, flows in the Yuba and Feather Rivers are in the normal drainage channel, fairly distant from the flood control levees. For a seiche to affect anything other than the normal river channel and associated floodplain, a large seismic event of relatively long duration would need to occur concurrently with high water levels in the Feather and/or Yuba Rivers.

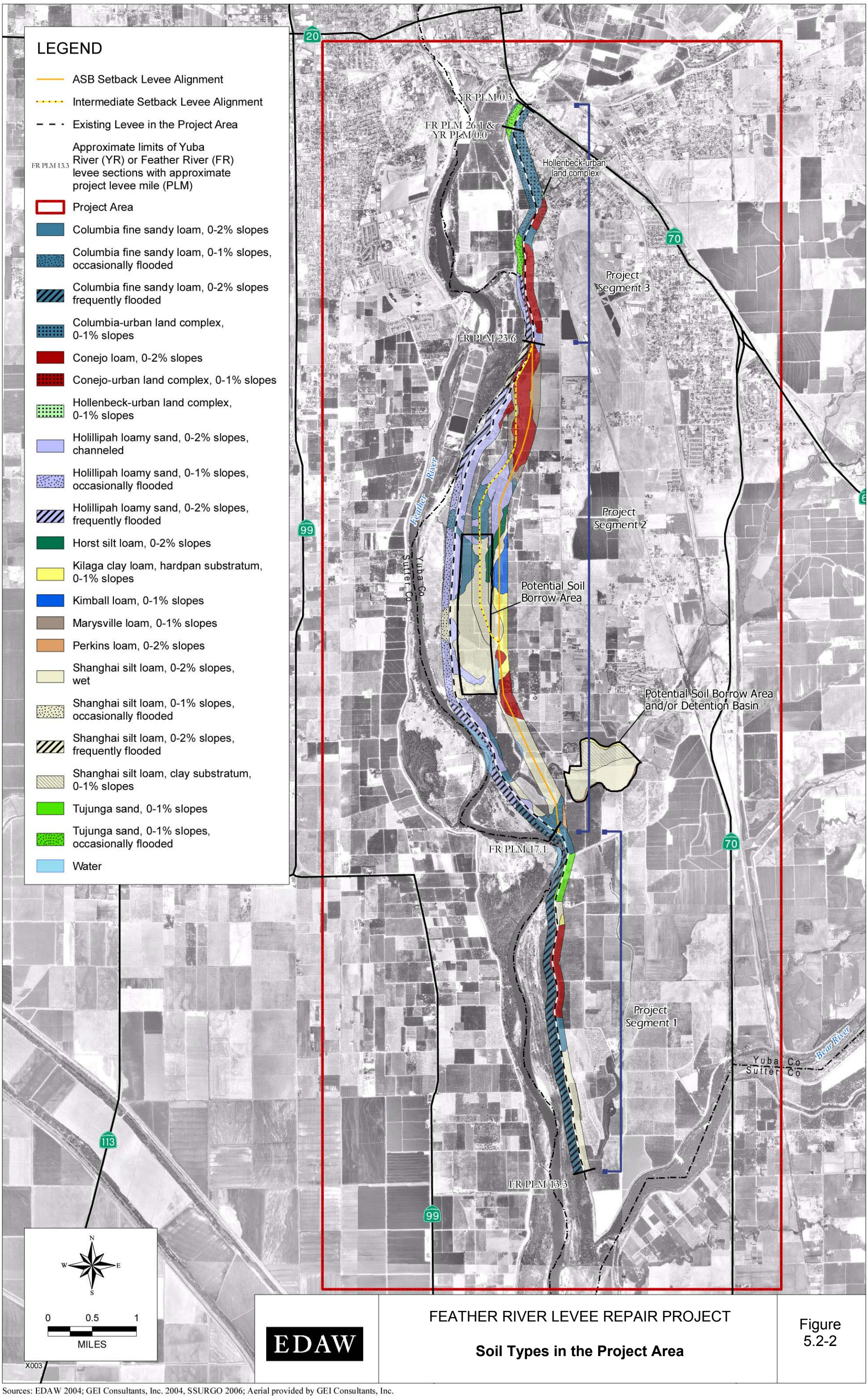
SOIL RESOURCES

Soil types and their distribution in the project area were identified through a review of maps provided by the U.S. Soil Conservation Service (now called the Natural Resources Conservation Service). The soil map units found within each project segment are listed below in Table 5.2-2. Figure 5.2-2, “Soil Types in the Project Area,” provides a detailed map of the surficial soils in the project area. Table 5.2-3 provides a detailed summary of the physical and chemical characteristics of each soil type identified from the project site.

Table 5.2-2
Soil Mapping Units Identified by Project Segment

Project Segment	Soil Mapping Unit
Segment 1	Columbia fine sandy loam, 0–2% slopes
	Columbia fine sandy loam, 0–2% slopes, frequently flooded
	Conejo loam, 0–2% slopes
	Horst silt loam, 0–2% slopes
	Kilaga clay loam, hardpan substratum, 0–1% slopes
	Shanghai silt loam, 0–2% slopes, wet
Segment 2 (Includes soils associated with the existing levee, ASB and intermediate levee setback alignments, the levee setback area, and potential soil borrow areas)	Columbia fine sandy loam, 0–2% slopes
	Columbia fine sandy loam, 0–1% slopes, occasionally flooded
	Columbia fine sandy loam, 0–2% slopes, frequently flooded
	Conejo loam, 0–2% slopes
	Holillipah loamy sand, 0–2% slopes, channeled
	Holillipah loamy sand, 0–1% slopes, occasionally flooded
	Holillipah loamy sand, 0–2% slopes, frequently flooded
	Horst silt loam, 0–2% slopes
	Kilaga clay loam, hardpan substratum, 0–1% slopes
	Kimball loam, 0–1% slopes
	Marysville loam, 0–1% slopes
	Perkins loam, 0–2% slopes
	Shanghai silt loam, 0–2% slopes, wet
	Shanghai silt loam, 0–1% slopes, occasionally flooded
	Shanghai silt loam, 0–2% slopes, frequently flooded
	Shanghai silt loam, clay substratum, 0–1% slopes
	Tujunga sand, 0–1% slopes
Segment 3	Columbia fine sandy loam, 0–1% slopes, occasionally flooded
	Columbia-urban land complex, 0–1% slopes
	Conejo loam, 0–2% slopes
	Conejo-urban land complex, 0–1% slopes
	Holillipah loamy sand, 0–2% slopes, channeled
	Holillipah loamy sand, 0–1% slopes, occasionally flooded
	Holillipah loamy sand, 0–2% slopes, frequently flooded
	Tujunga sand, 0–1% slopes, occasionally flooded

Source: Natural Resources Conservation Service 1992



EDAW

FEATHER RIVER LEVEE REPAIR PROJECT

Soil Types in the Project Area

Figure 5.2-2

Sources: EDAW 2004; GEI Consultants, Inc. 2004, SSURGO 2006; Aerial provided by GEI Consultants, Inc.

Table 5.2-3
Soil Mapping Unit Descriptions for Soil Types in the Project Area

Unit No.[1]	Soil Series Name	Depth (inches)	USDA texture	Shrink-Swell Potential	Permeability (in/hr)	Drainage	Water Erosion Hazard	Erosion Factors[2]		Land Capability[3]		pH
								K	T	N	I	
137 138 139 140	Columbia	0–9 9–18 18–68	Fine sandy loam Fine sandy loam, sandy loam Stratified sand to silt loam	Low	2.0–6.0	Poorly drained	Slight	0.32	5	IIIs IVw IIIs	IIs IVw IIs	6.1–7.8
141 143	Conejo	0–6 6–65	Loam Loam, clay loam	Low Moderate	0.6–2.0 0.2–0.6	Well drained	Slight	0.32	5	IIIc	I	6.1–7.8 6.1–8.4
161 162 163	Holillipah	0–6 6–66	Loamy sand Stratified silt loam to sand	Low Low	6.0–20 2.0–6.0	Excessively drained	Slight	0.17	5	IVs	IIIs	6.1–7.3
170	Horst	0–26 26–60 60–70	Silt loam Silt loam Loam	Low Moderate Low	0.6–2.0	Well drained	Slight	0.43 0.43 0.37	5	IIIc	Is	5.6–7.8 6.6–7.8 6.6–7.8
183	Kilaga	0–21 21–55 55–60 60–64	Clay loam Silty clay loam, silty clay, clay loam Indurated material Weathered bedrock	Moderate High — —	0.2–0.6 0.06–0.2 — —	Well drained	Slight	0.37 0.20 — —	3	IIIs	IIs	6.6–7.3 7.4–7.8 — —
185	Kimball	0–16 16–42 42–60	Loam Clay, clay loam, sandy clay loam, clay loam, loam Clay	Low High Moderate	0.6–2.0 0.01–0.06 0.06–0.2	Well drained	Slight	0.37 0.28 0.28	5	IIIs	IIIs	5.6–7.3 5.6–7.3 6.1–7.8

Table 5.2-3
Soil Mapping Unit Descriptions for Soil Types in the Project Area

Unit No.[1]	Soil Series Name	Depth (inches)	USDA texture	Shrink-Swell Potential	Permeability (in/hr)	Drainage	Water Erosion Hazard	Erosion Factors[2]		Land Capability[3]		pH
								K	T	N	I	
192	Marysville	0–6	Loam	Low	0.6–2.0	Well drainage	Slight	0.32	3	IIIs	IIIs	6.6–7.8
		6–36	Clay loam, siltyclay loam	Moderate	0.2–0.6			0.28				7.4–8.4
		36–40	Weathered bedrock	—	—			—				—
203	Perkins	0–5	Loam	Low	0.6–2.0	Well drained	Slight	0.32	5	IIIc	I	5.6–7.3
		5–58	Loam, clay loam	Moderate	0.2–0.6			0.32				5.6–7.3
		58–66	Stratified sandy loam to clay loam	Moderate	0.2–0.6			0.24				6.1–7.3
		66–72	Stratified very gravelly sandy loam to very cobbly clay loam	Low	0.6–2.0			0.15				6.1–7.3
218	Shanghai	0–20	Silt loam	Low	0.6–2.0	Poorly drained	Slight	0.43	5	IIIc	I	6.6–7.3
		20–69	Stratified silty clay loam to fine sandy loam	Moderate	0.6–2.0			0.43				6.6–7.8
219	Shanghai	0–20	Silt loam	Low	0.6–2.0	Poorly drained	Slight	0.49	5	IIIw	IIIw	6.6–8.4
		20–69	Stratified silty clay loam to fine sandy loam	Moderate	0.6–2.0			0.43				
220	Shanghai	0–8	Silt loam	Low	0.6–2.0	Poorly drained	Slight	0.49	5	IIIw	IIIw	6.6–8.4
		8–41	Stratified silty clay loam to fine sandy loam	Moderate	0.6–2.0			0.43				
		41–60	Clay	High	0.06–0.2			0.24				
249	Tujunga	0–6	Sand	Low	6.0–20	Excessively drained	Slight	0.17	5	VIe	IVs	6.1–7.3
		6–58	Loamy sand, fine sand, sand	Low	6.0–20			0.17				6.1–7.8

Table 5.2-3
Soil Mapping Unit Descriptions for Soil Types in the Project Area

Unit No.[1]	Soil Series Name	Depth (inches)	USDA texture	Shrink-Swell Potential	Permeability (in/hr)	Drainage	Water Erosion Hazard	Erosion Factors[2]		Land Capability[3]		pH
								K	T	N	I	
		58–62	Stratified gravelly sand to gravelly loamy sand	Low	6.0–20			0.15				6.1–7.8
251	Tujunga	0–6	Sand	Low	6.0–20	Excessively drained	Slight	0.17	5	VIw	IIIw	6.1–7.3
		6–58	Loamy sand, fine sand, sand	Low	6.0–20			0.17				6.1–7.8
		58–62	Stratified gravelly sand to gravelly loamy sand	Low	6.0–20			0.15				6.1–7.8

Notes: in/hr = inches per hour; USDA = U.S. Department of Agriculture

1 Soil unit number refer to numbers shown on soil maps in the *Yuba County Soil Survey* (National Resources Conservation Service 1992).

2 K is a measurement of relative susceptibility to sheet and rill erosion by water. It ranges from 0.10 to 0.64, with lower values representing a lower susceptibility to erosion. T represents soil loss tolerance, which is defined as the maximum rate of soil erosion (wind and water) without reducing crop production or environmental quality. Values ranges from 1 to 5 tons of soil loss per acre per year, with 5 representing soils less sensitive to erosion.

3 An indication of the suitability of soils for most kinds of field crops. Land capability classes are I through VIII, with VIII being unsuitable for most crop production. Subclasses denoting limiting factors are designated by letters e (erosion), w (water), s (shallow or stony), or c (climate). I=irrigated; N=nonirrigated.

— Either not measured or not applicable.

Source: Natural Resources Conservation Service 1992

LEVEE CONDITIONS

Historically, levees along both the Feather and Yuba Rivers have experienced recurring and serious seepage problems during high river stages. Boils have been reported in fields on the land side of the levees. The existing levees were constructed before 1940. Over the last 50 years, the Corps has implemented various modifications to improve levee protection, including installation of relief wells, berms, drains, and slurry walls.

Along the Feather River and Yuba River levee segments in the project area, levee heights range from 20 to 30 feet, and the levees are designed to pass the 1957 design profile with 3 feet of freeboard. Crown widths are approximately 20 feet or wider. Side slopes are generally 3:1 on the water side and 2:1 on the land side. Portions of the Feather River levee have berms of various heights and widths on the land side.

Existing drainage features on the land side of the Feather River levee include a number of irrigation ditches and wells throughout the proposed levee setback area in project Segment 2, and Clark Slough and Pump Stations No. 2, 3, and 9 along the Feather River. Clark Slough drains to the Feather River near the southern end of Segment 1. Flows from Clark Slough are pumped over the Feather River levee to the river via Pump Station No. 2.

The existing levees were constructed primarily of local soils, discussed previously. Foundation soils are similar. Groundwater levels have been measured at 6–16 feet below ground surface (Yuba County Water Agency 2003).

MINERAL RESOURCES

In compliance with the California Surface Mining and Reclamation Act (SMARA), CDMG has established the classification system shown in Table 5.2-4 to denote both the location and significance of key extractive resources.

Table 5.2-4
California Division of Mines and Geology Mineral Land Classification System

Classification	Description
MRZ-1	Areas where adequate information indicates that no significant mineral deposits are present or where it is judged that little likelihood exists for their presence
MRZ-2	Areas where adequate information indicates that significant mineral deposits are present or where it is judged that a high likelihood for their presence exists
MRZ-3	Areas containing mineral deposits, the significance of which cannot be evaluated from existing data
MRZ-4	Areas where available data are inadequate for placement in any other mineral resource zone

Note: MRZ = Mineral Resource Zone

Source: Habel and Campion 1988

Under SMARA, the State Mining and Geology Board may designate certain mineral deposits as being regionally significant to satisfy future needs. The board's decision to designate an area is

based on a classification report prepared by CDMG and on input from agencies and the public. The northern portion of the project area lies within the designated Yuba City–Marysville Production-Consumption Region for Portland cement and concrete-grade aggregate, which includes all designated lands within the marketing area of the active aggregate operations supplying the Yuba City–Marysville urban center.

The existing Feather River and Yuba River levees in project Segment 3, and the northern portion of the existing Feather River levee and the proposed setback levee alignments in Segment 2, are classified as MRZ-4, areas for which available information is lacking or where available data are inadequate for placement in any other mineral resource zone. According to Habel and Campion (1988), "Areas classified as MRZ-4 in the Yuba City–Marysville Production Consumption Region have thick overlying soil layers which offer few rock exposures or are inaccessible." Drill holes east of the northern portion of the existing Feather River levee within the area zoned MRZ-4, shown on Plate 7 of the Mineral Land Classification Map (Habel and Campion 1988), indicated that there is little likelihood of aggregate resources in this area.

The locations of the potential soil borrow area in the proposed levee setback area north of Country Club Avenue and the potential soil borrow area and/or detention basin east of Star Bend have not been zoned for mineral resources by CDMG. However, as with the northern portion of the proposed setback levee alignments, drill holes east of the project site, shown on Plate 7 of the Mineral Land Classification Map (Habel and Campion 1988), indicated that there is little likelihood of aggregate resources in this area. The project site does not contain any land zoned MRZ-2 within the Yuba City–Marysville Production-Consumption Region, and is not shown in the *Yuba County General Plan* as an area of mineral resources to be protected from further development.

5.2.3 ENVIRONMENTAL IMPACTS

Effects associated with geology and soils that could result from construction activities were evaluated qualitatively based on expected construction practices, materials, and locations, and the expected duration of project construction and related activities. Operations effects were also evaluated qualitatively based on anticipated flood operations as described in Chapter 4, "Description of the Proposed Project."

It was assumed that the design and construction of the proposed flood control facilities would meet or exceed applicable design standards for static and dynamic stability, secondary effects related to ground shaking, and seepage.

THRESHOLDS OF SIGNIFICANCE

Thresholds for determining the significance of impacts on geology, soils, and mineral resources were based on the environmental checklist form in Appendix G of the California Environmental Quality Act Guidelines (State CEQA Guidelines). A project alternative would have a significant impact on geology, soils, and mineral resources if it would:

- expose persons or property to geologic hazards, such as ground shaking, liquefaction, landslides, land subsidence, or erosion;

- be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project and potentially result in an on-site or off-site landslide, lateral spreading, subsidence, liquefaction, collapse, or other ground failure; or
- result in a loss of availability of a regionally or locally important mineral resource recovery site.

The existing Feather River and Yuba River levees in project Segment 3, and the northern portion of the existing Feather River levee and the proposed setback levee alignments in Segment 2, are classified as MRZ-4 (see discussion of "Mineral Resources" above); however, based on well log data east of the existing Feather River levee (Habel and Campion 1988, as well as data collected as part of planning for the Y-FSFCP and for the FRLRP), the project site does not contain a source of regionally or locally important mineral resources. Because the project would not result in a loss of mineral resources, no impact would occur, and this issue is not discussed further in this environmental impact report.

IMPACT ANALYSIS

Alternative 1 – The Levee Strengthening Alternative

Impact LS-5.2-a

Risk of Geologic Hazards to the Levees. Characteristics of the soils along the existing Feather River and Yuba River levees could lead to structural deficiencies or failure of the levees if not addressed in construction design. Although no active faults are in the immediate vicinity of the existing levee alignments, some ground shaking is possible from earthquakes at distant sites. The levees would be strengthened according to geotechnical engineering recommendations that incorporate seepage control features, making them more stable than the existing levee and less likely to fail. Therefore, this would be a **beneficial** effect.

The potential for water seepage problems to occur along the Feather River or Yuba River levees in the project area is created by discontinuous layers of clean sand found at varying depths. As discussed by Kleinfelder (2006), levee design would need to incorporate measures to alleviate potential seepage impacts. For example, slurry cutoff walls, relief wells, and/or seepage berms could be employed and are considered in the preliminary project design. Cutoff walls and relief wells intercept the shallow sand layers and form an underseepage barrier or relieve the internal seepage pressure. Seepage berms provide additional overburden at the landside levee toe while allowing the seepage pressures to dissipate at gradients below the project criteria.

In addition to seepage and settlement, the existing levees could be subject to ground shaking from earthquakes in the faults at Oroville and within the Coast Range. The unconsolidated sediments on which the levees are founded include layers of very loose or loose cohesionless soils (clean sand and silty sand). These materials, where saturated, may lose strength during and immediately after strong earthquake shaking (the phenomenon referred to as soil liquefaction). In the unlikely event of strong earthquake shaking, liquefaction of loose foundation soils may induce damaging settlement and/or cracking of the levees. Such a situation is possible, but the probability that strong ground motion would coincide with or immediately precede high river levels is very low.

However, the susceptibility of existing levees to seepage and seismic events is part of the existing condition. Levee repair and strengthening activities under Alternative 1 would not result in the construction of new levees or other structures potentially susceptible to seepage or seismic events, and would not alter the probability or potential intensity of seismic events in the project area.

Relative to existing conditions, implementation of levee repairs and strengthening under Alternative 1 would make the existing levees less susceptible to seepage, the levees would be more sound overall, and damage from a strong seismic event would be less likely. The use of up-to-date engineering methods during levee repair and strengthening activities would ensure that the stability of the Feather River and Yuba River levees would increase over existing conditions and that the risks of geology- and soils-related failure would be lower. This would be a beneficial effect.

Impact LS-5.2-b

Soil Erosion Hazards Associated with Levee Repair and Strengthening Activities. Although levee repair and strengthening activities would disturb earth, thereby potentially accelerating erosion, construction disturbance would be temporary, and soils in disturbed areas would be vegetated or otherwise stabilized after construction is complete. In addition, part of Alternative 1 includes correction of existing erosion problem areas on the water side of the Feather River left bank levee in project Segment 2. Levee repair and strengthening activities would not expose persons or property to erosion hazards. This impact would be **less than significant**.

Erosion impacts related to disturbed soil entering waterways and adversely affecting water quality are addressed in Section 5.3, "Water Resources and Geomorphology." The impact discussion below addresses the potential for the proposed project to expose persons or property to erosion hazards.

Construction activities associated with the proposed levee repair and strengthening would disturb earth, potentially resulting in accelerated erosion or an incidental release of sediment to adjacent lands or the Feather and Yuba Rivers. Ground-disturbing activities would include temporarily cutting down the top of the existing levee to provide a work platform, excavating for slurry cutoff walls, excavating for borrow material and constructing a detention basin, and removing soil during repairs to existing erosion problem areas. However, ground disturbance would be temporary. Soils in the proposed borrow material and detention basin sites are nearly level and are well drained, and the risk of erosion in these areas is slight. Consistent with standards of The Reclamation Board as stated in Title 23, Sections 111–157 of the California Code of Regulations, work on the levee and stabilization of exposed soils on the levee surface would need to be complete by November 1. In addition, temporary erosion/runoff control measures would be implemented during construction to minimize potential stormwater pollution from the construction areas (see the "Stormwater Pollution Prevention" discussion in Section 4.3.3, "Alternative 1 – Construction," in Chapter 4). Therefore, construction under Alternative 1 would not result in any erosion conditions that would be considered hazardous to persons or property. In addition, Alternative 1 includes measures to correct erosion problem areas identified on the Feather River left bank levee in project Segment 2, minimizing existing erosion hazards. This impact would be less than significant.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impact ASB-5.2-a

Risk of Geologic Hazards to the Levees. Characteristics of the soils along the proposed ASB setback levee alignment could lead to structural deficiencies or levee failure if not addressed in construction design. Although no active faults are in the vicinity of the existing levees or the setback levee alignment, some ground shaking is possible from distant sites. Effects on the stability of the proposed ASB setback levee would be no greater than effects on the existing levee. Construction according to design recommendations by the geotechnical engineers, independent reviews of the project design and construction by a Board of Senior Consultants (BOSC), and engineering review and approval by the Corps and The Reclamation Board would ensure the incorporation of appropriate features to address any potential structural instability of the levee. The setback levee would be engineered and constructed to modern standards with appropriate seepage control features and, therefore, would be more stable than the existing levee and unlikely to fail. This would be a **beneficial** effect.

The risk of geologic hazards to the existing Feather River and Yuba River levees in project Segments 1 and 3 under this alternative would be the same as those described above in Impact LS-5.2-a under Alternative 1.

The discussion below relies mainly on the preliminary geotechnical investigations performed for the preliminary setback-levee design prepared for the Y-FSFCP. However, the information is supplemented, where appropriate, with new geotechnical data collected in 2006 in support of the FRLRP. Reports discussing and analyzing the 2006 data are in preparation.

Past and current investigations include:

- a review of the available geological and geotechnical information,
- geological reconnaissance visits to the ASB setback levee alignment and the surrounding area,
- the drilling of exploratory test borings and cone penetration tests along the proposed levee alignment and in the vicinity,
- laboratory index testing of selected soil samples, and
- the presentation of the preliminary geotechnical data and evaluations in Volume 3, "Design Technical Memorandum on Geotechnical Conditions," of Appendix E of Yuba County Water Agency's (YCWA's) report on feasibility of the Y-FSFCP, for technical review by the California Department of Water Resources (DWR).

Based on the results of the preliminary geotechnical evaluations, the project design engineers have judged the proposed alignment of the ASB setback levee to be technically suitable, provided that appropriate measures are incorporated in the levee design to minimize the potential for static settlement and seepage-induced erosion problems, and to accommodate 200-year flood conditions.

Static settlement of the proposed levee embankments has been considered at a conceptual level in the preliminary design to address the presence of both unconsolidated recent sediments

(generally loose sands and fine-grained soils) and older, slightly more consolidated sediments (typically of medium density) in the foundation soils. Levee foundations in loose sand are likely to settle as much as several inches, but most of the settlement would occur as the levee is constructed (Yuba County Water Agency 2003). To address the likelihood that sand foundations would settle, the preliminary design anticipates that volumes of soil greater than the design estimates would be needed for the levee embankment. To address the potential for settlement of levee segments constructed on clayey foundation soils, overbuilding of the embankment (also called camber) is anticipated to be necessary to avoid loss of freeboard over the long term. The preliminary design also acknowledges that the potential for adjacent areas to settle at different rates or in different amounts under the embankment load needs to be addressed to prevent cracking and subsequent seepage or internal erosion during periods of high water levels.

The potential for water seepage problems to occur along the ASB setback levee alignment is created by discontinuous layers of clean sand found at varying depths. As discussed in Chapter 4, "Description of the Proposed Project," levee design would need to incorporate measures to alleviate potential seepage impacts. For example, seepage cutoff walls, closely spaced relief wells, and/or seepage berms could be employed and are considered in the preliminary project design. Cutoff walls and relief wells intercept the shallow sand layers and form an underseepage barrier or relieve the internal seepage pressure. Seepage berms provide additional overburden at the landside levee toe while allowing the seepage pressures to dissipate at gradients below the project criteria.

In addition to seepage and settlement, the ASB setback levee could be subject to ground shaking from earthquakes centered in the faults of both the Sierra Nevada and the Coast Range. The unconsolidated sediments on which the proposed setback levee would be founded include layers of very loose or loose cohesionless soils (clean sand and silty sand). These materials, where saturated, may lose strength during and immediately following strong earthquake shaking (the phenomenon referred to as soil liquefaction). In the unlikely event of strong earthquake shaking, liquefaction of loose foundation soils may induce damaging settlement and/or cracking of the levee. While this situation is possible, the combined probability of strong ground motion occurring during or just prior to high river levels is very low. Because of this low probability, the current standards of design do not specify that earthquake loadings must be included in stability analyses performed for levees that do not retain a permanent pool (Yuba County Water Agency 2003). The potential for earthquake damage of the setback levee would be no greater than the potential for such damage to the existing levee, and any associated hazards would be the same as or less than those associated with the existing levee because the setback levee would be more structurally sound overall. As under existing conditions, in the unlikely event that strong earthquake shaking were to result in liquefaction damage, such damage would need to be repaired as soon as practicable to restore the levee to an appropriate level of safety before the next flood event.

As of publication of this draft EIR (DEIR), no slope stability analyses associated with the preliminary project design have been completed and published. However, previous slope stability analyses of the existing levees have generally indicated that the levees are stable against shear strength failure under design flood conditions (Yuba County Water Agency 2003). It is anticipated that the same would be true for the proposed setback levee, which would be constructed using stricter construction quality control standards that require greater compaction

of embankment soils. Although reasonable levee side slopes have been adopted for the preliminary design of the cross sections, detailed confirmatory slope stability analyses would be performed during detailed design, using the selected cross section geometry and site-specific strength properties for foundation and embankment materials.

The preliminary design for the ASB setback levee is based on preliminary subsurface exploration and testing. If Alternative 2 was selected for implementation, further, more detailed investigations would be undertaken during final design to analyze the stability of the levee foundation and embankment, susceptibility to seepage and erosion damage, or other localized site-specific conditions of the proposed setback levee. Similarly, detailed investigations of potential borrow areas have not been possible and would be required as part of final design if this alternative were selected. As part of final design, additional field and laboratory investigations and detailed site-specific analyses and design studies would need to be undertaken to confirm the design levee cross section and finalize seepage control measures that are appropriate for the specific conditions encountered locally. Proposed additional field studies and analyses are described in Volume 3 of Appendix E, "Preliminary Design," of YCWA's feasibility report for the Y-FSFCP (Yuba County Water Agency 2003). The field explorations would be performed to:

- characterize soil profiles for the foundation of the setback levee,
- characterize permeable layers in the foundation,
- measure the undisturbed strength of foundation materials for slope stability analyses,
- assess the compressibility of foundation materials for settlement evaluations, and
- develop detailed information on borrow areas to establish the properties of borrow materials and define the limits of borrow excavations.

Final design would include:

- determining the density, strength, permeability, and consolidation properties of embankment and foundation soils as appropriate along the entire length of the proposed setback levee;
- finalizing levee sections and details required for special local conditions;
- analyzing levee sections for underseepage and through-seepage, and finalizing the design of seepage control measures;
- conducting slope stability analyses to confirm the stability of the setback levee embankment and foundation;
- performing settlement analysis and developing the design of camber, if required; and
- determining the final locations and depths of borrow areas.

Existing information indicates that all potential geological hazards that could be associated with the ASB setback levee (e.g., settlement, seepage, slope stability) can be successfully addressed

with appropriate design, engineering, and construction techniques. The final design of the ASB setback levee would incorporate the findings of the detailed geotechnical investigations and analyses as described above; the engineering design and construction progress would undergo independent reviews by a BOSC; the levee design and construction plans would meet Corps standards as specified in Engineering Manual 1110-2-1913 (U.S. Army Corps of Engineers 2000) and would require the approval of the Corps and The Reclamation Board; and project design would include interaction with other key reviewing agencies (DWR and RD 784). These detailed investigations, design and construction reviews, and approval processes would ensure the incorporation of appropriate features to address any potential structural instability of the proposed levee. In addition, the use of up-to-date engineering methods in the design and construction of the setback levee would ensure that its stability would exceed that of the existing levee, which has been subject to numerous seepage problems, and that the risks of geology- and soils-related failure would be lower. This would be a beneficial effect.

Impact ASB-5.2-b

Soil Erosion Hazards Associated with Construction of the ASB Setback Levee. Although construction activities associated with levee repair and strengthening and installation of the ASB setback levee would disturb earth, thereby potentially accelerating erosion, construction disturbance would be temporary and soils in disturbed areas would be vegetated or otherwise stabilized after construction is complete. In addition, the levee setback area is nearly level and is well drained, and the risk of erosion and associated hazards is slight. Levee repair and strengthening activities and construction of the ASB setback levee would not expose persons or property to erosion hazards. This impact would be **less than significant**.

Erosion impacts related to disturbed soil entering waterways and adversely affecting water quality are addressed in Section 5.3, “Water Resources and Geomorphology.” The potential for changes in river geomorphology resulting from hydraulic effects of the setback levee to contribute to erosion are also addressed in Section 5.3. The impact discussion below addresses the potential for construction of the proposed project to expose persons or property to erosion hazards.

Under Alternative 2, the risk of erosion hazards associated with levee repair and strengthening activities in project Segments 1 and 3 would be the same as those described above in Impact LS-5.2-a under Alternative 1.

Construction activities associated with the ASB levee setback would disturb earth and potentially result in accelerated erosion or an incidental release of sediment to adjacent lands, nearby drainages, or the Feather River. Ground-disturbing activities would include levee removal, site excavation for borrow materials, levee construction, removal of power poles and structures, and construction of a detention basin. However, soils within the levee setback area and proposed borrow material and detention basin sites are nearly level and are well drained, and the risk of erosion is slight. Temporary erosion/runoff control measures would be implemented during construction to minimize potential migration of sediments from the construction areas (see the “Stormwater Pollution Prevention” discussion in Section 4.4.3, “Alternative 2—Construction,” in Chapter 4). Therefore, construction under Alternative 2 would not result in any erosion conditions that would be considered hazardous to persons or property. This impact would be less than significant.

Impact ASB-5.2-c

Soil Erosion Hazards Associated with Flood Operations with the ASB Setback Levee. Floodwaters passing through the levee setback area could erode soil that is not currently subjected to flood flows on a frequent basis. However, levee construction would increase the width and decrease the depth and velocity of flood flows in the levee setback area, minimizing erosive forces. In addition, vegetative cover in the levee setback area (agriculture or habitat) would reduce the potential for erosion. This impact would be **less than significant.**

Lands within the ASB levee setback area are currently protected by the existing Feather River left bank levee and are only exposed to floodwaters if there is a catastrophic levee failure. After construction of the ASB setback levee and removal of portions of the existing levee in project Segment 2, floodwaters passing through the ASB levee setback area could erode soil that is not currently subjected to flood flows on a frequent basis. However, construction of the ASB setback levee would provide a broad floodplain area that would reduce the overall velocity of flood flows (Philip Williams & Associates 2006). This is expected to minimize erosive forces across the levee setback area. Furthermore, vegetative cover that would be present in the levee setback area (agriculture and/or habitat) would help stabilize the soil under flood conditions. The low velocity of flows within the levee setback area and the presence of vegetation would minimize the potential for soil erosion. Therefore, this impact would be less than significant.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impact IS-5.2-a

Risk of Geologic Hazards to the Levees. This impact would be the same as Impact ASB-5.2-a, described under Alternative 2 above. For the same reasons as described above, this impact would be **less than significant**.

Impact IS-5.2-b

Soil Erosion Hazards Associated with Construction of the Setback Levee. This impact would be the same as Impact ASB-5.2-b, described under Alternative 2 above. For the same reasons as described above, this impact would be **less than significant.**

Impact IS-5.2-c

Soil Erosion Hazards Associated with Flood Operations with the Intermediate Setback Levee. This impact would be the same as Impact ASB-5.2-c, described under Alternative 2 above. For the same reasons as described above, this impact would be **less than significant.**

5.2.4 MITIGATION MEASURES

ALTERNATIVE 1—THE LEVEE STRENGTHENING ALTERNATIVE

No mitigation is required for Impacts LS-5.2-a and LS-5.2-b.

ALTERNATIVE 2— THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impacts ASB-5.2-a, ASB-5.2-b, and ASB-5.2-c.

ALTERNATIVE 3—THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impacts IS-5.2-a, IS-5.2-b, and IS-5.2-c.

5.2.5 IMPACTS REMAINING SIGNIFICANT AFTER MITIGATION

All impacts of the three proposed project alternatives related to geology, soils, and mineral resources would be less than significant.

SECTION 5.3 WATER RESOURCES AND RIVER GEOMORPHOLOGY

This section addresses issues related to hydrology, water supply, water quality, and river geomorphology. Potential project effects on aquatic species are addressed in Section 5.4, "Fisheries."

5.3.1 REGULATORY SETTING

FLOOD SAFETY

Sacramento River Flood Control Project

The primary facilities for controlling flood damage in the Yuba-Feather River system are levees along the flood channels and reservoirs that provide flood storage. Also important in preventing flood damage are coordinated preparations for flood fighting and emergency planning, including evacuation. Several federal, state, and local agencies have responsibilities for different aspects of operations and maintenance of flood control facilities and for emergency response. These agencies include the U.S. Army Corps of Engineers (Corps); the National Weather Service; the California Department of Water Resources (DWR), including its Division of Safety of Dams; the State of California Reclamation Board (The Reclamation Board); the Governor's Office of Emergency Services (OES); Yuba County Water Agency (YCWA); Yuba County Office of Emergency Services; and local reclamation and levee districts. The roles of these entities are described in detail in Chapter 2 and Section 5.3 of the Yuba-Feather Supplemental Flood Control Project (Y-FSFCP) programmatic draft environmental impact report (DEIR) (Yuba County Water Agency 2003a), which is incorporated by reference into this DEIR.

The flood control facilities on the Feather and Yuba Rivers are part of the joint federal-state Sacramento River Flood Control Project (SRFCP). The Corps, in conjunction with the State of California, developed a flood control plan for the Feather and Yuba Rivers as part of the SRFCP. This plan included levee construction, channel improvements, and reservoir flood storage. The Corps developed specific design capacities for the river channels and flood control operation rules for Lake Oroville on the Feather River and New Bullards Bar Reservoir on the North Yuba River, both of which control flows in the Feather River below Marysville. These operating rules are in force for defined flood seasons. During flood operations, the Corps monitors the operation of the reservoirs to ensure compliance with the written regulations.

The levees on the left (east) bank of the Feather River and the left (south) bank of the Yuba River in the Feather River Levee Repair Project (FRLRP) project area were constructed by the Corps as part of the SRFCP. The Corps does not actively participate in the flood operation of the river and levee system, but has undertaken construction and repair of the existing levees along the Feather and Yuba Rivers over the years as part of its ongoing efforts to maintain the regional protections provided by the SRFCP. "Project" levees in California must meet the standards for design and construction specified by the Corps in Engineering Manual 1110-2-1913 (U.S. Army Corps of Engineers 2000).

The Reclamation Board enforces appropriate standards for the construction, maintenance, and protection of flood control facilities in the Central Valley. The Reclamation Board must approve any activity that may affect "project works," to ensure that the activity maintains the integrity and safety of flood control project levees and floodways and is consistent with the flood control plans adopted by the board and the California Legislature. "Project works" are the components of a flood control project within the jurisdiction of The Reclamation Board that the board or the legislature has approved or adopted. Project works include levees, bank protection projects, weirs, pumping plants, floodways, and any other related flood control works or rights-of-way that have been constructed using state or federal funds. Project works also include flood control plans. Rules in the California Code of Regulations (CCR) (23 CCR Sections 111–137]) regulate the modification and construction of levees to ensure public safety. The rules state that existing levees may not be excavated or left partially excavated during the flood season. The flood season for the Feather and Yuba Rivers is November 1 through April 15.

Levee operation and maintenance are overseen by DWR, which inspects the levees and issues a biannual report. The report covers the general condition of the levees, vegetation control, rodent control, and flood preparedness. The report contains maintenance recommendations that are subsequently implemented by the applicable levee district or reclamation district. Reclamation District (RD) 784 has jurisdiction over the levees in the FRLRP project area.

During floods, the levees must be continually patrolled so that the functioning of the levee system can be assessed and immediate emergency actions initiated if a defect is detected. Forecasts issued by the State-Federal Flood Operations Center, jointly operated by DWR and the National Weather Service, are the primary notification received by local levee districts and reclamation districts for the need to patrol the levees. If levee defects are found that are beyond the capability of the responsible levee or reclamation district to manage, the district will request assistance from the state and the Corps. Such requests are coordinated through the OES system.

See Section 5.3 of the Y-FSFCP DEIR (Yuba County Water Agency 2003a) for additional information on components of flood safety, including reservoir operations, flood forecasting, and emergency services.

Sacramento and San Joaquin River Basins California Comprehensive Study

The Sacramento and San Joaquin River Basins California Comprehensive Study (Comprehensive Study) is a joint effort by The Reclamation Board and the Corps, in coordination with federal, state, and local agencies, groups, and organizations in California's Central Valley. Responding to the flooding of 1997, the California Legislature and the U.S. Congress directed the Corps to develop a comprehensive plan for flood damage reduction and environmental restoration for the Sacramento and San Joaquin River basins. The Comprehensive Study is not a regulatory program per se, but consistency with its goals and objectives is important for any project that would affect flood control in the Sacramento and San Joaquin River basins.

In December 2002, an interim report was released by the Comprehensive Study team (U.S. Army Corps of Engineers and State of California Reclamation Board 2002). This is the most recent document released by the Comprehensive Study team. The report identified a comprehensive plan as an approach to developing future projects to reduce flood damage and restore the

ecosystem in the Sacramento and San Joaquin River basins. As described in the report, the comprehensive plan has three parts:

- a set of principles to guide future projects,
- an approach to develop projects with consideration for systemwide effects, and
- an organization to consistently apply the guiding principles in maintaining the flood management system and developing future projects.

The Comprehensive Study has proposed a set of guiding principles to govern implementation of projects that propose modifying the Sacramento or San Joaquin River flood control system. These principles have been developed to ensure that proposed projects are consistent with the objectives established by the Corps and The Reclamation Board. The Comprehensive Study's guiding principles are to:

- recognize that public safety is the primary purpose of the flood management system;
- promote effective floodplain management;
- promote agriculture and open-space protection;
- avoid hydraulic and hydrologic impacts;
- plan system conveyance capacity that is compatible with all intended uses;
- provide for sediment continuity;
- use an ecosystem approach to restore and sustain the health, productivity, and diversity of the floodplain corridors;
- optimize use of existing facilities;
- integrate with the CALFED Bay-Delta Program and other programs; and
- promote multipurpose projects to improve flood management and ecosystem restoration.

The FRLRP lies in the Feather River Region of the Comprehensive Study. The draft interim report notes in the discussion of this region that:

> [l]evees along the Feather, Yuba, and Bear Rivers that are already set back from the river offer greater flexibility in accommodating flood management and ecosystem restoration. There are opportunities to widen selected reaches of the floodways to reduce constrictions and increase flow capacity. Reducing floodway constrictions along the lower Feather River would improve levee reliability in the Marysville–Yuba City urban area by reducing flood stage.…There are opportunities to improve the effectiveness of existing reservoirs in managing floods on the Feather, Yuba, and Bear Rivers. The level of flood protection provided by Oroville and New Bullards Bar Reservoirs could be increased by reoperation or physical improvements to the dams. Operational criteria

> could be modified to coordinate releases from Oroville and New Bullards Bar or accommodate forecast-based operations…. Local stakeholder groups and ongoing studies have identified a number of measures that appear to have a high degree of local acceptability. These include a combination of measures such as reservoir reoperation, reservoir outlet modifications, other structural modifications to the dams or related facilities, localized levee setbacks, levee strengthening or rehabilitation, and riparian restoration within existing floodways.

WATER QUALITY

The quality of surface water and groundwater resources in California is protected under various federal and state laws, including the federal Clean Water Act (CWA) and the state Porter-Cologne Water Quality Control Act (Porter-Cologne Act). The U.S. Environmental Protection Agency (EPA) has generally authorized the State Water Resources Control Board (SWRCB) and the nine associated regional water quality control boards (RWQCBs) to administer all surface water and groundwater quality regulations in California. Both EPA and the SWRCB generally provide oversight, while the RWQCBs have primary responsibility for implementation and enforcement. The Central Valley RWQCB is responsible for enforcing these regulations in Yuba County.

Clean Water Act, Section 303(d)

The RWQCBs administer Section 303(d) of the CWA, which requires each state to maintain a list of water bodies in which physical and/or chemical aspects of water quality are limited or impaired by the presence of pollutants. Section 303(d) requires preparation of a total maximum daily load (TMDL) program for waters identified as impaired. The TMDL is a quantitative assessment of the pollutant sources, contaminant loads, assimilative capacity of the water body for the specific contaminants, and allocation of specific load reduction targets that are necessary to ensure compliance with the water quality standards.

Clean Water Act, Section 401

Section 401(a)(1) of the CWA requires applicants for a federal license or permit to conduct activities that may result in any discharge into navigable waters to provide the federal licensing or permitting agency a certification that any such discharge will not violate state water quality standards. The RWQCBs administer the Section 401 program with the intent of prescribing measures that are necessary to avoid, minimize, or mitigate adverse project impacts on water quality and ecosystems.

Water Quality Control Plan and Applicable Water Quality Criteria

Pursuant to the Porter-Cologne Act, each RWQCB prepares and updates a water quality control plan (Basin Plan) every 3 years that identifies water quality protection policies and procedures. The Basin Plan describes the officially designated beneficial uses for specific surface water and groundwater resources and the enforceable water quality objectives necessary to protect those beneficial uses.

The Basin Plan includes numerical and narrative water quality objectives for physical and chemical water quality constituents. Numerical objectives are set for temperature; dissolved oxygen (DO); turbidity; pH (i.e., acidity); total dissolved solids (TDS); electrical conductivity (EC); bacterial content; and various specific ions, trace metals, and synthetic organic compounds. Narrative objectives are set for parameters such as suspended solids, biostimulatory substances (e.g., nitrogen and phosphorus), oils and grease, color, taste, odor, and aquatic toxicity.

In addition, the California Toxics Rule (CTR) is a separate regulatory instrument that prescribes criteria for trace metals and organic compounds for the protection of aquatic life and human health. Federal and state drinking-water quality standards regulate the quality of treated municipal drinking-water supplies delivered to users.

National Pollutant Discharge Elimination System Permits and Waste Discharge Requirements

The SWRCB and RWQCBs regulate discharges of waste into waters of the state through National Pollutant Discharge Elimination System (NPDES) permits, authorized under Section 402 of the CWA for waste discharges to waters of the United States, and waste discharge requirements (WDRs), authorized under the Porter-Cologne Act. The RWQCBs issue NPDES permits and WDRs to ensure that projects that may discharge wastes to land or water conform with Basin Plan water quality objectives and policies and procedures (described above). The Porter-Cologne Act defines waters of the state as “any surface water or ground water, including saline waters, within the boundaries of the state.” Some waters that qualify as waters of the state, such as isolated wetlands, do not necessarily qualify as waters of the United States.

The RWQCBs issue NPDES permits for waste discharges to surface water from both point and nonpoint sources. The NPDES permit system includes an individual permit system for municipal wastewater treatment plants and several categories of stormwater discharges. General NPDES stormwater permits apply to industrial facilities and any general ground-disturbing construction activity greater than 1 acre.

Before construction of such projects, applicants must submit a Notice of Intent (NOI) to the RWQCB and prepare a Storm Water Pollution Prevention Plan (SWPPP). A SWPPP generally describes proposed construction activities, receiving waters, stormwater discharge locations, and best management practices (BMPs) that will be used to reduce project construction effects on receiving water quality. A number of “good housekeeping” BMPs are also generally included in a SWPPP to control waste discharges during the dry months. An appropriate selection of postconstruction permanent pollution control and treatment measures must also be considered for implementation where necessary to prevent long-term water quality impairment.

The NPDES permitting process for general construction activities requires the applicant to:

- file an NOI to discharge stormwater;
- prepare a SWPPP that identifies BMPs to prevent or minimize the discharge of sediments and other contaminants that have the potential to affect beneficial uses or to lead to violations of water quality objectives; and

- complete a self-implemented inspection, monitoring, and reporting program for BMP performance.

The RWQCBs issue WDRs to regulate activities of entities subject to the state's jurisdiction that would discharge waste that may affect groundwater quality or that may discharge waste in a diffused manner (e.g., through erosion from soil disturbance). WDRs specify terms and conditions that must be followed during the implementation and operation of a project.

The RWQCB administers a general WDR/NPDES permit process for low-threat discharges from construction dewatering activities that discharge to surface waters (i.e., removal of accumulated water during excavation). A NOI to discharge must be submitted to the RWQCB before commencement of the activity. The general order contains a set of standard terms and conditions for compliance with discharge prohibitions, specific effluent and receiving water limitations, required solids disposal activities, water quality monitoring protocols, and applicable water quality criteria. When numerous discharge locations are anticipated, the general order allows the applicant to submit a Pollution Prevention, Monitoring, and Reporting Plan that provides for consolidated identification of discharges, monitoring, and reporting procedures. The RWQCB can also issue a waiver to dewatering discharges if the discharge would not enter a water body.

Regulatory Guidance for Quality of Aquatic Sediment

There are no regulatory criteria pertaining to ambient concentrations of chemical constituents in aquatic sediments. However, if a project results in the removal of sediment, the material is subject to federal and state hazardous waste regulations, the RWQCB-designated waste classification program (Central Valley Regional Water Quality Control Board 1989), and applicable waste classification regulations described in CCR Title 22. The California Department of Health Services (DHS) administers the hazardous waste regulations pursuant to CCR Title 22. Title 22 (Division 4, Chapter 30) describes classification protocols, including lists of known compounds and waste testing requirements based on numerical concentration criteria.

For those sediments that are not classified as hazardous, the RWQCB method is used to classify material as "designated," "nonhazardous solid," or "inert." Designated allowable concentrations of total and soluble contaminants are established for the specific water bodies that may be affected through reuse of the material, beneficial uses of those water resources, potential of the waste to impair water quality, and environmental attenuation and leachability of the contaminants from the material. Wastes with contaminant concentrations exceeding the designated levels must be directed to waste management units (i.e., landfills) for disposal as "hazardous" wastes.

The RWQCB administers the reuse of contaminated "nonhazardous" sediment for creation, enhancement, and restoration of wetlands. The wetland reuse criteria were developed in part based on Effects Range–Low (ER-L) and Effects Range–Median (ER-M) criteria originally developed by the National Oceanic and Atmospheric Administration (California Department of Water Resources 1995). The ER-L and ER-M criteria reflect the concentrations below which adverse biological effects may be expected to occur less than 10% of the time and less than 50% of the time, respectively. The RWQCB also considers disposal options with respect to EPA's established preliminary remediation goals (PRGs). PRGs are concentration values that have been

established based on the risks to human health of wastes in soil material, using specific assumptions about receptor exposure. PRGs are guidance values only for acceptable constituent concentrations at industrial and residential sites; they are not legally binding enforcement criteria.

The RWQCB criteria specify allowable uses based on two categories:

- use for wetland noncover where exposure to the aquatic environment would be limited, and
- use for wetland cover or levee construction where sediments would be exposed to the water.

Over the last several years there has been a national effort to revise the criteria for freshwater aquatic sediment quality for general assessments of potential toxicity thresholds (MacDonald and Berger 2000).

Other Regulations for Water Quality Protection

The following other regulations related to water quality conditions are described in other sections of this EIR:

- Clean Water Act, Section 404. Under Section 404, the Corps regulates and issues permits for activities that involve the discharge of dredged or fill materials into "waters of the United States," including wetlands. See Section 5.5, "Terrestrial Biological Resources."
- SWRCB Water Right Decision 1644. Decision 1644 amends several water right permits and licenses and requires other actions to protect fish in the reach of the Yuba River downstream of Englebright Reservoir. See Section 5.4, "Fisheries."
- Section 1600 et seq. of the California Fish and Game Code. All diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake in California that supports wildlife resources is subject to regulation by the California Department of Fish and Game (DFG), pursuant to Sections 1600–1603 of the California Fish and Game Code. See Section 5.5, "Terrestrial Biological Resources."

These regulatory programs typically impose specific measures to reduce water quality impacts on wetlands and aquatic habitat. Local grading and erosion control ordinances may also apply to components of the FRLRP as they relate to soil disturbance in the area. Regulations associated with erosion control are described further in Section 5.2, "Geology and Soils."

HAZARDOUS MATERIALS AND WASTE MANAGEMENT

Inundation of lands in the FRLRP levee setback area under either Alternative 2 or Alternative 3 could result in the exposure of Feather River waters to preexisting hazardous materials or contaminated sites. While pollution or degradation of water quality is covered under the water quality laws and regulations described above, the handling and management of hazardous materials is governed under separate federal, state, and local plans, policies, regulations, and laws.

Federal Plans, Policies, Regulations, and Laws

At the federal level, the principal agency regulating the generation, transport, storage, and disposal of hazardous substances is EPA, under the authority of the Resource Conservation and Recovery Act (RCRA). EPA regulates hazardous substance sites under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA). Applicable federal regulations are outlined in Titles 29, 40, and 49 of the Code of Federal Regulations (CFR).

Hazardous materials and/or wastes potentially present at a site are identified in a Phase I Environmental Site Assessment. The designation of wastes is authorized under California statutes (see below). Phase I Environmental Site Assessments are typically performed before the beginning of any ground-disturbing construction activity to identify potential sources of surface and buried contaminants and provide a report of assessment findings. A variety of different protocols are offered by various technical and professional groups; in general, however, the method most commonly used is described in the American Society for Testing and Materials (ASTM) *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process* (ASTM E1527), last revised in 2005. This document provides clear guidance for use when undertaking a Phase I Environmental Site Assessment but also allows environmental professionals to exercise their judgment and discretion. ASTM has also developed standards to address the special considerations of large tracts (120 acres and greater) of undeveloped rural properties (including managed agriculture); these are described in ASTM *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process for Forestland or Rural Property* (ASTM E2247-02).

State Plans, Policies, Regulations, and Laws

Individual states may implement their own hazardous substance management programs as long as they are consistent with, and at least as strict as, RCRA (see above). EPA must approve state programs implementing the RCRA requirements. In California, the California Environmental Protection Agency (Cal/EPA) and OES establish rules governing the use of hazardous substances. Within Cal/EPA, the Department of Toxic Substances Control (DTSC) has primary responsibility for the generation, transport, and disposal of hazardous substances under the authority of the Hazardous Waste Control Law. DTSC delegates enforcement of this law to local jurisdictions. State regulations applicable to hazardous substances are outlined in CCR Title 26.

As described above, hazardous wastes are defined in California in policies and procedures outlined in CCR Title 22 (Division 4, Chapter 30). Criteria for classification of hazardous wastes include common names of known hazardous materials, and waste-testing protocols for identification for properties such as corrosivity, reactivity, ignitability, toxicity, and constituent concentration. Concentrations are identified through the testing of solid material and potential for leachate production with the Waste Extraction Test methodology (22 CCR Section 66700). Hazardous wastes must be managed appropriately and disposed of in Class 1 designated waste management units unless such containment is otherwise demonstrated to not be necessary.

Regulations implementing the Hazardous Waste Control Law list hazardous chemicals and common substances that may be hazardous; establish criteria for identifying, packaging, and labeling hazardous substances; prescribe management of hazardous substances; establish permit

requirements for treatment, storage, disposal, and transportation of hazardous substances; and identify hazardous substances that cannot be deposited in landfills.

Local Plans, Policies, Regulations, and Ordinances

The Yuba County Office of Emergency Services is the local agency responsible for enforcing a variety of requirements related to hazardous materials, waste, safety, noise, and other related concerns. It is the mission of the Office of Emergency Services to coordinate disaster activities before, during, and after catastrophic emergencies affecting the citizens of Yuba County. The Office of Emergency Services provides planning, training, and coordination to Yuba County departments and allied agencies throughout the county.

It is also the mission of the Office of Emergency Services to manage Yuba County's Hazardous Materials and Hazardous Waste programs. These state-mandated programs come under a single program identified by the State of California as the Certified Unified Program Agency. This program consists of six basic hazardous materials programs:

- Underground Storage Tanks,
- Hazardous Wastes,
- Hazardous Material Inventory and Reporting,
- Aboveground Storage Tanks,
- Risk Management Plans, and
- Article 80 of the Uniform Fire Code.

5.3.2 ENVIRONMENTAL SETTING

SOURCES OF INFORMATION

The following are the primary sources of information that were used to describe water resources and river geomorphology:

- *Draft Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project* (Yuba County Water Agency 2003a);
- *Land Acquisition and Management Plan for the Feather-Bear Rivers Levee Setback Project* (Yuba County Water Agency 2004);
- *Yuba County General Plan Background Report* (Yuba County 1994);
- Appendix I, "Hydraulic Analyses," of the *Report on Feasibility of RD 784 Supplemental Flood Control Improvements of the Yuba-Feather Supplemental Flood Control Project* (Yuba County Water Agency and Three Rivers Levee Improvement Authority 2004);
- Appendix A, "Hydrology," of YCWA's report on feasibility of the Y-FSFCP (Yuba County Water Agency 2002a);
- Appendix B, "Flood Operations," of YCWA's report on feasibility of the Y-FSFCP (Yuba County Water Agency 2002b);

- *Hydraulic and Hydrologic Analysis of the Three Rivers Levee Improvement Authority's Phase IV Project—Feather River Levee Repair Project* (MBK Engineers 2006) (Appendix B); and
- *Geomorphic Assessment of Project Alternatives for Feather River Levee Improvements Between the Bear and Yuba Rivers* (Philip Williams & Associates, Ltd. 2006) (Appendix C).

Water quality information was obtained primarily from available special study reports, including reports from the National Water Quality Assessment (NAWQA) program (U.S. Geological Survey 2000) and the Sacramento River Watershed Program (Larry Walker Associates 2001).

HYDROLOGY AND FLOOD CONTROL

Primary Drainages

The RD 784 area of Yuba County is bounded by the Yuba River on the north, the Feather River on the west, the Bear River on the south, and the Western Pacific Interceptor Canal (WPIC) on the east. The Yuba River is a tributary to the Feather River, and the WPIC connects with the Bear River upstream of the confluence with the Feather River. These drainages are briefly described below, followed by a summary of seasonal flows in the Yuba and Feather Rivers.

Yuba River

The Yuba River drains the western slope of the Sierra Nevada and flows generally southwesterly to its confluence with the Feather River at Marysville (see Figure 2-1, "Regional Setting," in Chapter 2, "Introduction"). The main stem of the Yuba River forms at the juncture of the Middle and North Yuba Rivers just south of New Bullards Bar Reservoir and is joined by the South Yuba River just a few miles downstream near Bridgeport in Nevada County, approximately 1 mile east of Yuba County. The North Yuba River above New Bullards Bar Dam drains approximately 489 square miles. Large portions of the Yuba River drainage (Middle and South Forks) are largely unregulated with respect to flood flows. The main stem of the Yuba River in the Marysville vicinity drains approximately 1,390 square miles.

Feather River

The Feather River and its main tributaries are shown in Figure 2-1 in Chapter 2. The Feather River drains an area of approximately 5,500 square miles at its confluence with the Bear River and 3,611 square miles above Oroville Dam in Butte and Plumas Counties. Between Oroville and Marysville, the Feather River drains an area of 369 square miles, flowing southerly through relatively flat or gently rolling terrain for 39 miles. North and South Honcut Creeks are principal tributaries to the Feather River between Marysville and Oroville and drain about 78 square miles of lower foothill and valley areas east of the Feather River. Jack and Simmerly Sloughs, also tributaries to the Feather River, are bordered by levees in places to confine them to their channels during flood events. The sloughs drain approximately 55 square miles north of Marysville between the left (east) bank levee of the Feather River and the right (north) bank levee of the Yuba River. Most of the area drained by the sloughs is rice-growing land that is seasonally flooded.

Bear River

The headwaters of the Bear River are in the vicinity of Emigrant Gap and Lake Spaulding. The Bear River flows generally southwesterly to a point approximately 8 miles north of Auburn, where it turns more westward to its confluence with the Feather River in the vicinity of Nicolaus. Elevations within the Bear River basin range from about 125 feet above mean sea level (msl) to more than 5,700 feet msl. Major tributaries to the Bear River are Greenhorn, Wolf, Rock, and Dry Creeks. The entire drainage of the Bear River is approximately 550 square miles (Yuba County Water Agency 2002a). Figure 2-1 in Chapter 2 shows the middle and lower reaches of the Bear River.

Major importation of water to the Bear River watershed occurs near its headwaters. Some irrigation spill and ditch seepage enters from the ridge between the South Yuba and Bear Rivers. Exports from the Bear River watershed are made through the conveyance facilities of Nevada Irrigation District and Pacific Gas and Electric Company. These diversions include nearly all the imported water and some of the natural flow. The diverted water is used for irrigation, power generation, and domestic supply in the Auburn area. The net effect of the upstream uses, exports, and imports in the Yuba and Bear River basins has been to deplete the streamflow at the base of the foothills. In recent years, the average amount diverted has been more than 44,000 acre-feet (af) seasonally. This amount primarily affects the Yuba River at Smartville; the average depletion of the Bear River above Wheatland is relatively minor because of the imports of water farther upstream from the Yuba River basin.

Western Pacific Interceptor Canal

The WPIC was constructed as part of the SRFCP. The WPIC runs north-south on the east side of State Route (SR) 70 from approximately 2 miles south of the SR 70/SR 65 interchange to the Bear River near Rio Oso. Flows in the WPIC are derived from Reeds and Hutchinson Creeks and Best Slough. Agricultural runoff presumably also contributes flows to the WPIC. The WPIC also receives backwater from the Bear River.

Feather and Yuba River Flows

The Feather and Yuba Rivers have similar seasonal distributions of flows. As shown in Table 5.3-1, “Average Mean, Maximum, and Minimum Monthly Flows (cfs) on the Feather and Yuba Rivers,” the mean monthly flows are greatest in winter and early spring (January through March) and are at a minimum in late summer and early fall (July through October). The effects of reservoir storage capacity on flows are noticeable in extreme water years. The Feather River has nearly uniform flows in different year types because of the very large storage capacity of Lake Oroville; however, Yuba River flows are greatly reduced in very dry years because of the more limited carryover storage capacity of Bullards Bar Reservoir. During wet periods, the maximum monthly flow in the Feather River is often less than the maximum flow on the Yuba River, even though the Feather River watershed is more than three times the size of the Yuba River watershed, because the large storage volume of Lake Oroville can more effectively attenuate high flows.

Table 5.3-1
Average Mean, Maximum, and Minimum Monthly Flows (cfs) on the Feather and Yuba Rivers

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Feather River at Oroville, USGS Gauge 11407000 (1969–2005)												
Mean	571	734	1,120	2,760	2,090	1,890	949	747	531	538	526	518
Maximum	1,580	3,310	7,730	26,750	25,180	18,870	7,060	7,920	1,000	770	800	660
Minimum	400	400	390	400	400	400	400	390	410	400	390	390
Yuba River near Marysville, USGS Gauge 11421000 (1970–2005)												
Mean	1,070	1,320	2,320	4,090	4,330	4,280	2,880	2,530	1,970	1,310	1,440	1,240
Maximum	2,370	4,480	11,430	26,180	20,970	15,100	14,280	9,720	8,630	3,740	2,830	2,900
Minimum	130	180	370	230	210	190	170	170	150	90	70	90

Notes: cfs = cubic feet per second; USGS = U.S. Geological Survey
Source: U.S. Geological Survey 2006

Major Reservoirs

The major reservoirs with a role in flood control operations for the project area are Lake Oroville on the Feather River and New Bullards Bar Reservoir on the North Yuba River (see Figure 2-1 in Chapter 2). Other reservoirs in the Yuba-Feather River watershed include Lake Almanor on the North Fork of the Feather River, Englebright Reservoir on the Yuba River, and Merle Collins and Slate Creek Reservoirs. Most of these reservoirs were created for the primary purpose of hydroelectric power generation, although they often fulfill several purposes, including flood control, water supply, and recreation.

Lake Oroville, owned and operated by the State Water Project, is the primary flood control feature on the Feather River. Lake Oroville captures runoff from a 3,611-square-mile watershed. At elevation 900 feet msl, the reservoir provides a full pool of 3,538,000 af of storage, up to 750,000 af of which is required for flood control. The reservoir inundates 15,800 acres at this elevation. Power is generated at the Hyatt Pumping-Generating Plant and Thermalito facilities downstream of Oroville Dam. Thermalito Afterbay has 45,000 af of storage space for water deliveries to local districts and for regulation of power releases from Oroville Dam and a maximum outflow of 17,000 cubic feet per second (cfs). Flood control operations for the reservoir are described in detail in the Y-FSFCP DEIR (Yuba County Water Agency 2003a).

New Bullards Bar Reservoir is owned and operated by YCWA and is the principal flood control reservoir on the Yuba River system. The reservoir is on the North Yuba River just above its confluence with the Middle Yuba River. New Bullards Bar Reservoir drains a watershed of 489 square miles, which is only 37% of the total Yuba River drainage area. At elevation 1,956 feet msl, the reservoir provides a full pool of 960,000 af of storage, up to 170,000 af of which is required for flood control. The reservoir inundates 4,790 acres at this elevation. Power is generated at the New Colgate Powerhouse, which has a maximum outflow of 3,500 cfs. Flood control operations for the reservoir are described in detail in the Y-FSFCP DEIR (Yuba County Water Agency 2003a).

Existing Flood Control Conditions for RD 784

Lake Oroville and New Bullards Bar Reservoir, as well as an extensive system of levees, provide flood control along the Feather and Yuba Rivers. Release volumes from Lake Oroville and New Bullards Bar Reservoir depend on the combined flows of the Feather and Yuba Rivers downstream of Marysville.

Design Flows

As described previously, the SRFCP includes Corps-specified design capacities for channels in the project area and flood control operation rules for Lake Oroville and New Bullards Bar Reservoir, including design target flows for the Feather and Yuba Rivers. The maximum design target flows for the levee system that protects RD 784 are shown in Table 5.3-2, along with the design-flow frequency, expressed in terms of the annual exceedance probability (AEP). The AEP is the probability that a given flow will be exceeded in any year; for example, an AEP of 1 in 125 has a 1-in-125, or 0.8%, probability of being exceeded in any year. Lake Oroville and New Bullards Bar Reservoir are operated to maintain flood flows at or below the flows shown in Table 5.3-2. The reservoirs fill and lose flood management capability at about the 1-in-150 AEP flood.

Table 5.3-2
Design Target Flows for Various Levees in the Project Vicinity

River	Design Flow	Design-Flow Frequency (AEP)
Yuba River	120,000–180,000 cfs depending on Feather River flow	Less frequent than 1 in 125
Feather River between Yuba River and Bear River	300,000 cfs	Less frequent than 1 in 125
Bear River at mouth	40,000 cfs	Less frequent than 1 in 50
WPIC	Backwater from Bear River	NA
Feather River below Bear River	320,000 cfs	Less frequent than 1 in 100

Notes: AEP = annual exceedance probability; cfs = cubic feet per second; NA = not applicable; WPIC = Western Pacific Interceptor Canal
Source: Trieu, pers. comm., 2006

Levee Conditions

Feather River Left (East) Bank Levee. The Feather River left bank levee from the confluence with the Yuba River to the confluence with the Bear River was initially constructed in the early 1900s. The levee failed frequently before the 1930s. To create a safer condition, the Corps set back a substantial portion of the levee and strengthened some reaches. This work was completed about 1940. Additional strengthening of the levee took place in the 1960s because significant seepage was evident during the 1955 flood. Additional weak areas in the levee were identified following the 1986 flood. In 1997, before these weak areas could be completely repaired, the levee failed across from Country Club Avenue to the north of Star Bend, in what is now FRLRP Segment 2.

The Corps has performed additional levee strengthening since the 1997 flood. The final contract for Corps levee strengthening along the Feather River levee at Site 7 just upstream of the Bear River (within what is now FRLRP Segment 1) was completed in 2004. Subsequent study has indicated underseepage, through-seepage, and erosion problems with this levee segment, resulting in the need for the FRLRP to achieve desired levels of flood protection (see Chapter 2, "Introduction," and Chapter 3, "Project Purpose, need, and Development," for more information). The levee downstream of Pump Station No. 2 (in and immediately south of project Segment 1) has also had underseepage problems that inhibit its flood protection capability. However, the setback levee at the confluence with the Bear River, being completed in 2006 under the Feather-Bear Rivers Levee Setback Project (F-BRLSP) (TRLIA's Phase 2 work), will improve hydrologic conditions in this reach such that desired flood protection levels are achieved.

Yuba River Left (South) Bank Levee. The left bank levee of the Yuba River was constructed and reconstructed from the early 1900s through 1964. The last levee segment strengthened by the Corps in 1964 was from Project Levee Mile (PLM) 1.0 to about PLM 3.0. In 1986, when the water surface was approximately 8 feet below the top of the levee, the Yuba River left bank levee failed in the reach between Simpson Lane Bridge and the SR 70 bridge approximately 1 mile upstream of the confluence with the Feather River. After the 1986 flood, the Corps strengthened the levee both in the vicinity of the levee break and upstream of the break area. A weak area in the levee was subsequently identified just upstream of the SR 70 bridge. A 2,200-foot-long, 50-foot-deep slurry wall was completed in this area in 2004, and a seepage berm was constructed in 2005 to address foundation and levee stability issues. Subsequent study has identified additional weak areas in the Yuba River left bank levee, precipitating the need for further levee strengthening projects that are currently under way, as well as for the levee strengthening element of the FRLRP from Yuba River PLM 0.0 to PLM 0.3.

Groundwater

General Conditions

The principal aquifers in the valley area of Yuba County are composed of continental sediments of Pleistocene and Recent age. These aquifers consist of as much as 100 feet of Pleistocene sands and gravels overlain by as much as 125 feet of Recent alluvial fan, floodplain, and stream channel deposits. The pre-Eocene formations in the valley area of Yuba County have relatively low permeability and are moderate water producers (Yuba County 1994). Natural groundwater levels can vary substantially from year to year and seasonally. Groundwater levels are generally higher in winter and spring.

A general assessment of the hydrogeology serves to characterize areas as either groundwater recharge or groundwater discharge areas. Groundwater discharge occurs in areas that are lower in elevation than the water surface in flowing streams. Groundwater recharge occurs as infiltration from precipitation and surface water in areas higher in elevation than streams. The valley areas along the Feather and Yuba Rivers generally serve as groundwater recharge areas.

Groundwater Conditions in the Project Area

The project area is in the southern portion of the Sacramento River hydrologic region and is located within the South Yuba subbasin (California Department of Water Resources 2003). In recent years, under relatively normal conditions, groundwater elevations in the South Yuba subbasin have ranged from about 150 feet in the northwest region of the basin to about 30 feet in the southwest corner near the confluence of the Feather and Bear Rivers (California Department of Water Resources 2003).

The proposed levee setback areas in project Segment 2, considered under Alternatives 2 and 3, are expected to have relatively shallow groundwater conditions (groundwater table generally less than 20 feet deep), as the nearby perennial flows of the Feather and Yuba Rivers provide ready recharge. Based on available topographic maps, the water surface elevation in the Feather River channel is estimated to range from approximately 34 feet at the north end of the project area to 20 feet at the south end (Yuba County Water Agency 2003b). However, flow levels in the channel can vary considerably depending on the volume of natural flow and releases from upstream dams.

Depending on local variations in the horizontal hydraulic continuity of the soil, groundwater levels near the river's edge and along the existing levees may be similar to river surface flow elevations, with a slight hydraulic gradient downward away from the rivers (and other sources of recharge, such as agricultural drainage). However, groundwater levels also vary seasonally with precipitation and runoff in this area and may rise closer to the ground surface during wet years. In addition, groundwater levels are influenced locally by pumping as the groundwater is withdrawn regularly during spring and summer for irrigation, and throughout the year for general use by most of the local growers. (Yuba County Water Agency 2003b.)

In a limited number of exploration borings performed in recent years in relation to the Feather River levee setback proposed under the Y-FSFCP, groundwater has been found to be 6–16 feet below the natural ground surface along the Feather River levee. Test borings along the proposed Above Star Bend (ASB) setback alignment in project Segment 2, performed previously as part of the effort evaluated in the Y-FSFCP DEIR, indicated that the elevation of the groundwater table varied from 19.9 feet to 30.8 feet along the length of the alignment. In general, groundwater elevations appeared to drop slightly from north to south (Yuba County Water Agency 2003b). Several agricultural irrigation wells were observed in the vicinity of the test borings; the use and influence of these wells on the local groundwater regime is unknown.

Local Drainage

Project Segment 1

Surface drainage in the vicinity of project Segment 1 is collected into ditches that ultimately drain into Clark Slough, an agricultural drainage canal maintained by RD 784 that meanders toward the south (Figure 5.3-1, "Drainage Features in the Vicinity of Project Segment 1)." Water in Clark Slough is directed toward a sump adjacent to the Feather River levee. Water collected in the sump can either flow by gravity into off-channel areas of the Feather River through two

culverts under the existing levee or be pumped over the levee through RD 784's Pump Station No. 2 (Yuba County Water Agency 2003a).

Water pumped from Pump Station No. 2 collects in Lake of the Woods, a topographic low on the river side of the existing levee, which empties into the channel of the Bear River (Yuba County Water Agency 2003a).

Project Segment 2

Drainage in the northern half of project Segment 2 is generally directed southwest, angling toward the existing Feather River levee. In much of the area west of the proposed setback levee alignments in Segment 2, drainage water is collected in Lateral 6 and conveyed to Messick Lake and several unnamed shallow water bodies, as shown in Figure 5.3-2, "Drainage Features in the Vicinity of Project Segment 2." Lateral 7/8 crosses the proposed setback levee alignment in a buried culvert at Anderson Avenue and empties from the east into Lateral 6 north of these water bodies. The Plumas Lake Canal, which collects drainage from several ditches east of the proposed setback levee alignments, crosses the alignments approximately 1,900 feet north of the southern end of the segment (in an area where the ASB and intermediate setback levee alignments coincide) and empties into a pond (Figure 5.3-2). Water from Messick Lake and the pond is pumped out over the existing levee into the Feather River floodway at RD 784's Pump Station No. 3.

Project Segment 3

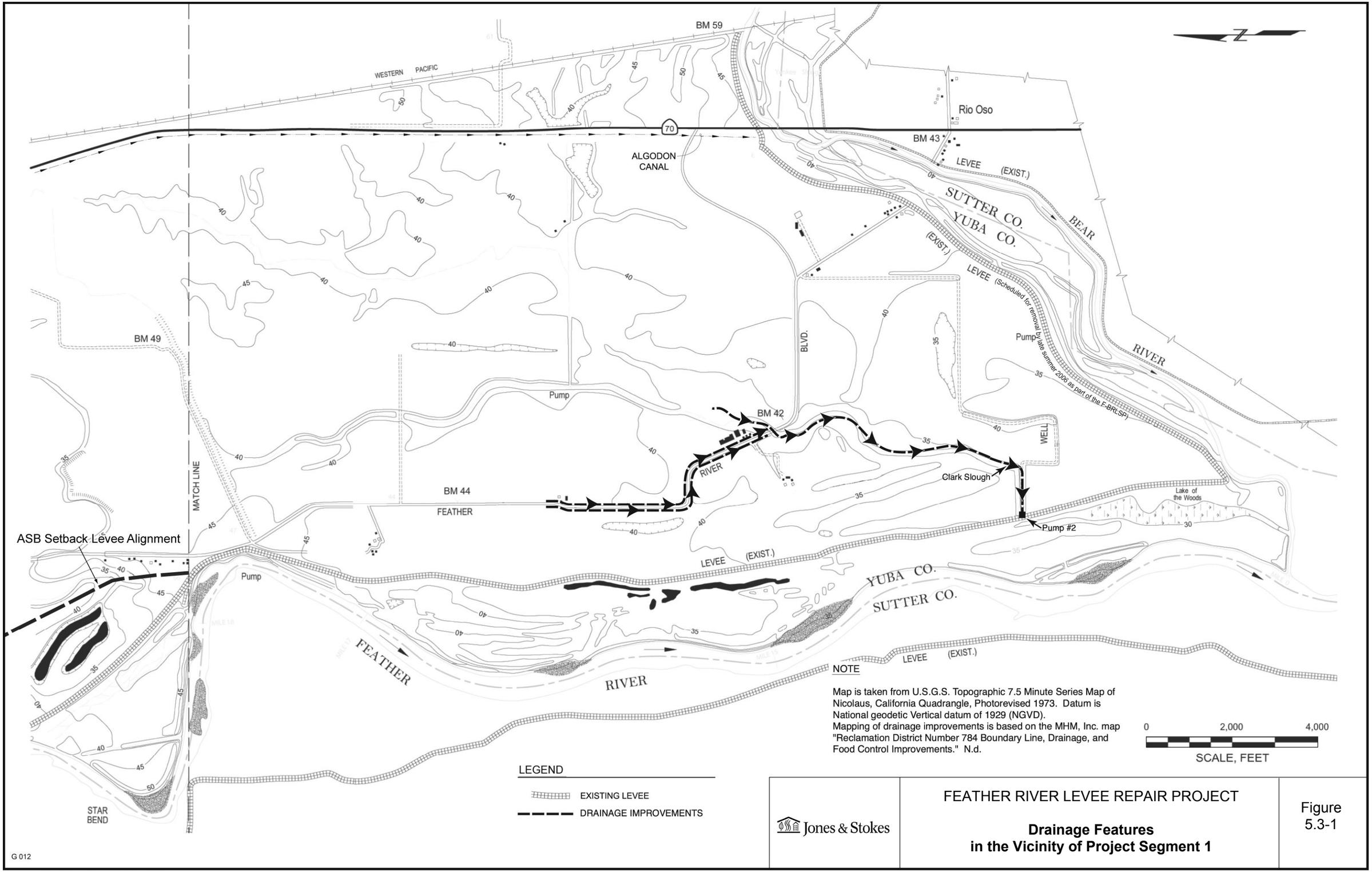
Surface runoff from the primarily urban northern reach of Segment 3 is conveyed by Lateral 15 to Pump Station No. 9, where it is pumped over the levee to the Feather River (Figure 5.3-3, "Drainage Features in the Vicinity of Project Segment 3"). Surface runoff from the primarily agricultural southern reach of Segment 3 is conveyed by the Algodon Canal to Pump Station No. 6 (in the southern portion of the RD 784 area), where it is discharged to the Bear River. RD 784 plans to construct a new pump station on Ella Road to divert the runoff from the area encompassing the southern portion of Segment 3, along with runoff from planned development to the east, directly to the Feather River. The schedule for construction of this pump station is not known at this time.

WATER QUALITY

Surface Water Quality

Designated beneficial uses of the Yuba River from Englebright Reservoir to the Feather River are:

- agricultural supply,
- contact and noncontact recreation,
- coldwater and warmwater fish habitat,
- fish migration and spawning,
- wildlife habitat, and
- power generation.

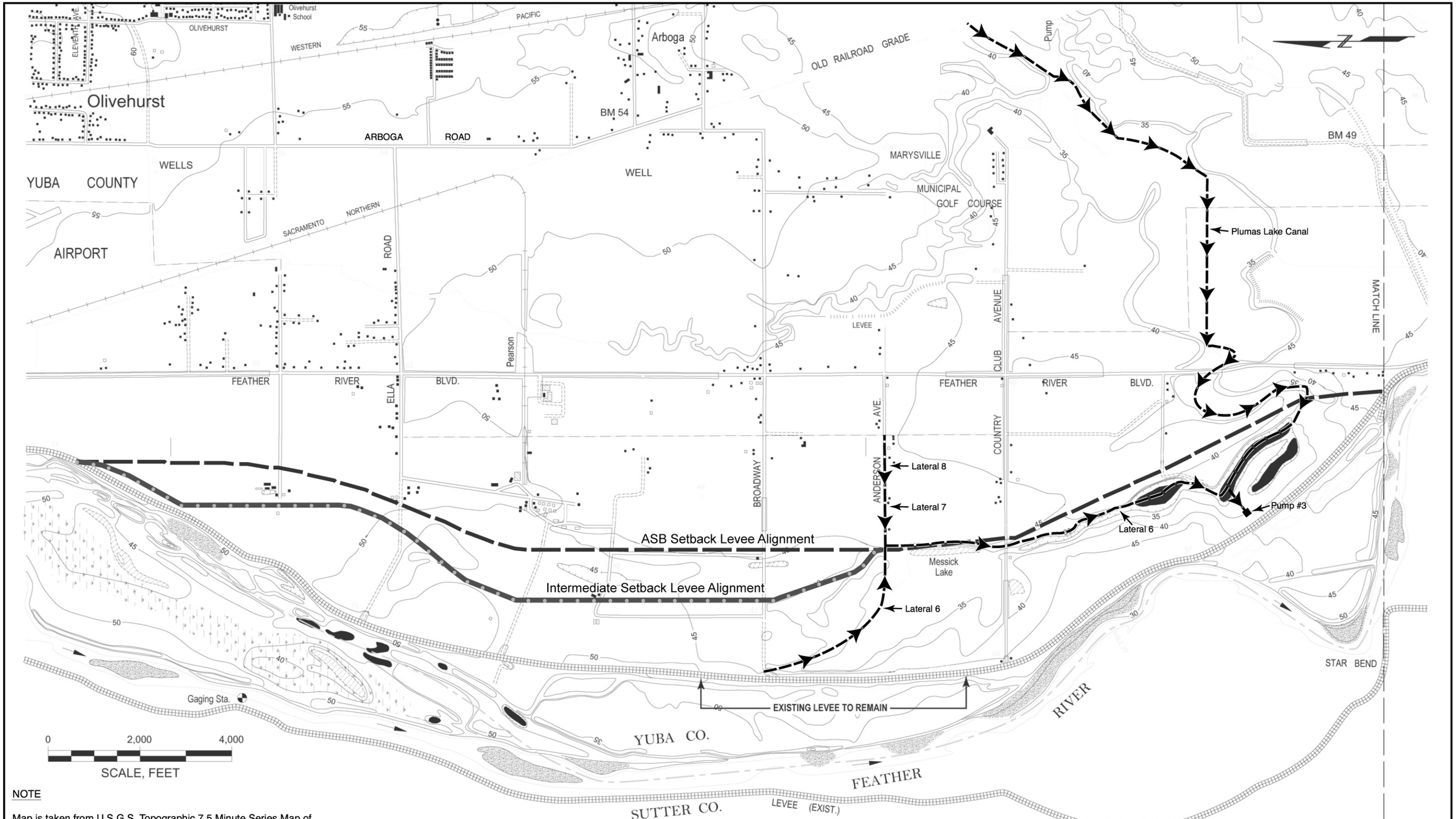


FEATHER RIVER LEVEE REPAIR PROJECT

Drainage Features in the Vicinity of Project Segment 1

Figure 5.3-1

Source: Adapted from Jones & Stokes 2002



NOTE

Map is taken from U.S.G.S. Topographic 7.5 Minute Series Map of Olivehurst, California Quadrangle, Photorevised 1973. Datum is National geodetic Vertical datum of 1929 (NGVD).
Mapping of drainage improvements is based on the MHM, Inc. map "Reclamation District Number 784 Boundary Line, Drainage, and Food Control Improvements." N.d.

LEGEND

EXISTING LEVEE
DRAINAGE IMPROVEMENTS

G 013

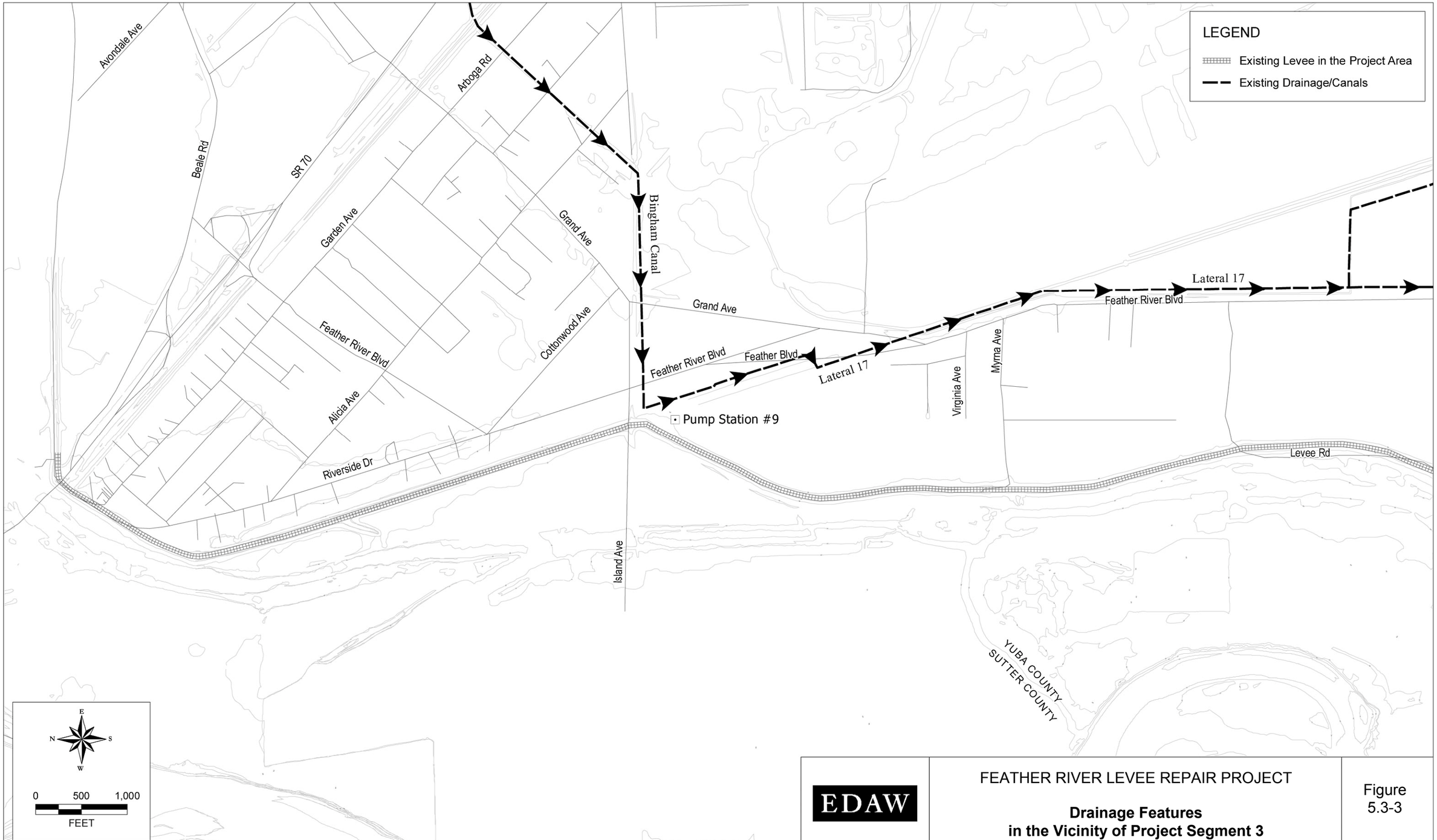
Jones & Stokes

FEATHER RIVER LEVEE REPAIR PROJECT

Drainage Features in the Vicinity of Project Segment 2

Figure 5.3-2

Source: Adapted from Jones & Stokes 2002



EDAW

FEATHER RIVER LEVEE REPAIR PROJECT

Drainage Features in the Vicinity of Project Segment 3

Figure 5.3-3

Sources: GEI Consultants, Inc. 2006; CaSIL 1998

Designated beneficial uses of the Feather River are:

- agricultural supply,
- municipal supply for Yuba City,
- contact and noncontact recreation,
- coldwater and warmwater fish habitat,
- fish migration and spawning, and
- wildlife habitat.

The Feather River is included on the 303(d) list of impaired waters for diazinon, Group A pesticides, mercury, and unknown toxicity. Agriculture and urban runoff are the main sources for diazinon and Group A pesticides, resource extraction is the main source for mercury, and the source is unknown for unknown toxicity. The Central Valley RWQCB has TMDL priorities of high, low, medium, and low for the respective stressors (State Water Resources Control Board 2002).

The U.S. Geological Survey (USGS) completed an evaluation of water quality conditions of the Feather and Yuba Rivers in the project area as a component of an overall analysis of conditions in the Sacramento River watershed (U.S. Geological Survey 2000). The evaluation indicated that the Yuba River generally has excellent water quality that is very low in contaminants. However, historical gold mining activities have left a legacy of mercury contamination (because mercury was used extensively for ore extraction), and the Yuba River is considered a major source of mercury loading in the Sacramento River watershed. Fish caught in Englebright Reservoir are known to have elevated tissue mercury levels (U.S. Geological Survey 2000).

Table 5.3-3, “Summary of Conventional Water Quality Constituents in the Feather and Yuba Rivers,” shows a summary of average concentrations from monthly water samples for conventional physical and inorganic chemical constituents measured in the Feather River at Nicolaus and the Yuba River at Marysville from February 1996 through April 1998 (U.S. Geological Survey 2000). In general, the data indicate that both rivers are low in TDS as indicated by measurements of EC, total hardness, and specific cations and anions. The water has neutral pH, moderate alkalinity, and adequate DO levels for aquatic organisms. The water from both rivers is also generally low in nutrients (nitrogen and phosphorus) that can cause growth of nuisance algae and aquatic vascular plants. Trace metal content is low in both rivers. Although mercury is routinely detected in both rivers, the concentrations have not exceeded ambient CTR criteria. Pesticides have been detected in the Feather River more frequently than in the Yuba River. With the exception of the drinking-water standard for carbofuran, there are no applicable regulatory criteria established for the pesticides that have been detected. DFG has established guidance values for aquatic-life chronic (i.e., 4-day-average) criteria applicable to the organophosphate pesticides diazinon and chlorpyrifos. The DFG guidance values and other reference dose values for aquatic life or human health hazards that have been established for many pesticides are generally indicative of the lowest concentrations at which toxic effects have been detected. The average concentration of diazinon in the Feather River exceeds the DFG guidance level of 50 nanograms per liter (ng/L) (California Department of Fish and Game 2000). Pesticide levels in the Feather River are presumably related to the influence of the extensive agricultural and urban activities (Oroville, Marysville, and Yuba City) occurring in the surrounding watershed.

Table 5.3-3
Summary of Conventional Water Quality Constituents in the Feather and Yuba Rivers

Constituent	Water Quality Objective	Feather River at Nicolaus	Yuba River at Marysville
Conventional Physical and Chemical Constituents			
Temperature	<2.5°F [a]	15.2°C	12.2°C
Flow (cfs)		359	125
EC (µS/cm)		84	72
DO (mg/L)	7.0 [b]	10.5	11.4
DO Saturation (%)	85 [b]	104	105
pH (standard units)	6.5 to 8.5 [c]	7.7	7.5
Alkalinity (mg/L $CaCO_3$)		34.2	28.4
Total Hardness (mg/L $CaCO_3$)		34.8	31.4
Suspended Sediment (mg/L)	narrative [d]	36.5	30.0
Calcium (mg/L)		8.2	7.9
Magnesium (mg/L)		3.5	2.8
Sodium (mg/L)		3.3	2.2
Potassium (mg/L)		0.9	0.5
Chloride (mg/L)	500 [e]	1.9	1.1
Sulfate (mg/L)	500 [e]	3.2	4.2
Silica (mg/L)		12.8	12.1
NO_2+NO_3 (mg/L N)	NO_3<10 [f]	0.17	0.08
Total Phosphorus (mg/L)		0.03	0.03
Trace Metals			
Arsenic (µg/L)	50 [g]	1.0	1.0
Chromium (µg/L)	180 [g]	<MRL	<MRL
Copper (µg/L)	5.1 [g]	1.3	1.5
Mercury (µg/L)	0.050 [h]	0.0085	0.0069
Nickel (µg/L)	52 [g]	1.0	1.2
Zinc (µg/L)	120 [g]	1.6	2.3
Organic Pesticides			
Molinate (ng/L)	13,000 [i]	373	<60
Simazine (ng/L)	3,400 [j]	88.9	<22
Carbofuran (ng/L)	40,000 [e], 500 [i]	38.5	<31
Diazinon (ng/L)	51 [k]	98	<28
Carbaryl (ng/L)	700 [j]	142	<41
Thiobencarb (ng/L)	1,000 [a]	167	<38
Chlorpyrifos (ng/L)	14 [k]	<25	<25
Methidathion (ng/L)		57	<38

Notes: $CaCo_3$ = calcium carbonate; µg/L = micrograms per liter; µS/cm = microsiemens per centimeter; mg/L = milligrams per liter; MRL = method reporting limit; ng/L = nanograms per liter; NO_2 = nitrogen dioxide; NO_3 = nitrogen trioxide

[a] RWQCB Basin Plan water quality objective for allowable change from controllable factors
[b] RWQCB Basin Plan water quality objective
[c] RWQCB Basin Plan water quality objective; <0.5 allowable change from controllable factors
[d] RWQCB Basin Plan narrative objective: water shall not contain constituent in concentrations that would cause nuisance or adversely affect beneficial uses
[e] Secondary drinking water maximum contaminant level (MCL)
[f] Primary drinking water maximum contaminant level (MCL)
[g] California Toxics Rule aquatic life criteria for 4-day average dissolved concentration
[h] California Toxics Rule human health maximum criteria total recoverable concentration
[i] California DFG hazard assessment value
[j] U.S. EPA Integrated Risk Information System reference dose for drinking water quality
[k] California DFG aquatic life guidance value for 4-day average concentration

Source: Constituent measurements from U.S. Geological Survey 2000

The Feather and Yuba Rivers have also been evaluated since 1998 as part of DWR's Sacramento River Watershed Program (Larry Walker Associates 2001). Water quality data have generally supported the earlier findings of the USGS NAWQA program data. In addition, toxicity data from the DWR program have indicated that Feather River water has occasionally been toxic to test organisms. Bulk sediment toxicity has been identified in one of four samples collected in the Feather River at Nicolaus since 1998. No toxicity has been detected from sediment toxicity tests conducted on Yuba River sediments.

Table 5.3-4, "Concentrations of Trace Metals Detected in Feather River and Yuba River Sediment," shows NAWQA sediment concentrations of trace metals from a single sample in 1997. The results indicate that concentrations of trace metals in both the Feather and Yuba Rivers are generally low relative to RWQCB criteria for reuse in wetlands. The concentrations of chromium and nickel in the Feather River were slightly higher than the RWQCB guidance values for wetland cover use; the Yuba River copper value was also higher than its respective wetland cover criterion. Concentrations of arsenic, chromium, copper, mercury, and zinc at both sites exceeded the most recent guidance criteria for general toxic effect thresholds (MacDonald and Berger 2000).

Table 5.3-4
Concentrations of Trace Metals Detected in Feather and Yuba River Sediment

Constituent	Feather River [a]	Yuba River [a]	Sediment Criteria for Wetlands Creation and Levee Restoration [b]	
			Wetlands Creation Noncover	Wetlands Creation Cover and Levee Restoration
Arsenic (mg/kg)	11	21	33–85	<33
Barium (mg/kg)	510	600		
Cadmium (mg/kg)	0.3	0.4	5–9	<5
Chromium (mg/kg)	280	210	220–300	<220
Copper (mg/kg)	70	95	90–390	<90
Lead (mg/kg)	19	16	50–110	<50
Mercury (mg/kg)	0.19	0.29	0.35–1.3	<0.35
Nickel (mg/kg)	160	98	140–200	<140
Selenium (mg/kg)	0.3	0.6	0.7–1.4	<0.7
Silver (mg/kg)	0.2	0.2	1.0–2.2	<1.0
Zinc (mg/kg)	110	98	160–270	<160

Note: mg/kg = milligrams per kilogram
[a] Source: U.S. Geological Survey 2000
[b] Source: San Francisco Bay RWQCB disposal option sediment screening criteria. Criteria specify the allowable use based on two categories: use for wetland noncover where exposure to the aquatic environment would be limited and wetland cover or levee construction where sediments would be exposed to the water.

Groundwater Quality

Groundwater resources in California are assumed to support drinking-water quality beneficial uses, unless proven otherwise. In general, the chemistry of groundwater in the Sacramento Valley is greatly influenced by the chemistry of recharge water. The volcanic and metamorphic

rock types are reflected in the magnesium bicarbonate and magnesium calcium-sodium bicarbonate water quality found in Yuba and Butte Counties (Boles, pers. comm., 2001). Concentrations show an increase in TDS resulting from dissolution of minerals that generally matches the predominant groundwater flow direction from northeast to southwest.

Groundwater provides most water supplies for the Marysville, Linda, and Olivehurst areas and for rural properties in the project vicinity. In general, the mineral content of the groundwater underlying south Yuba County is suitable for domestic and agricultural uses. The City of Olivehurst has 10 wells and Linda has five wells that draw water from 300–600 feet below ground surface (Foothill Associates 1999). Water quality samples routinely collected from these wells indicate that all regulated inorganic and organic pollutants are below the applicable drinking-water standards. However, groundwater in the area contains relatively high levels of iron, manganese, and gases (i.e., methane and hydrogen sulfide), which occasionally cause taste and odor problems but are not a threat to human health. The groundwater north of the Yuba River and in Butte County is generally of very good quality with a low TDS range of 250–300 milligrams per liter (Boles, pers. comm., 2001).

Hazardous Materials

No formal hazardous materials surveys have been conducted associated with the FRLRP. Phase I ESAs are currently in progress for Segments 1 and 3 and a screening-level assessment is being prepared for Segment 2. Preliminary surveys conducted in support of the Y-FSFCP EIR identified three small waste dump sites containing fruit waste and miscellaneous solid debris in the ASB levee setback area. Independent computer-generated database searches were conducted in support of the F-BRLSP EIR to identify any existing hazardous materials within the project area and immediate vicinity (Environmental Data Resources Inc. 2004a, 2004b). These searches encompassed a portion of the FRLRP Segment 1 area. The databases used are based on records kept by federal, state, and local agencies that are responsible for recording incidents of contamination and permitting transfer, storage, or disposal facilities that handle hazardous materials. The database searches revealed no hazardous materials within the sites considered in the F-BRLSP EIR. However, the searches did identify the presence of 24 hazardous materials sites that were located within a 1-mile radius from the boundaries of the project site. None of the sites identified during the database search are expected to require removal or cleanup.

Given historical and current land uses in the FRLRP project area, it would not be unusual for concentrated deposition of contaminants to be present in the form of organic litter (e.g., debris piles, orchard slash piles) or hazardous substances (e.g., abandoned vehicles and farm implements; aboveground and underground storage containers for, and residues of, fuel, oil, fertilizers, and pesticides; and material in illegal dumping areas).

GEOMORPHOLOGY

In its pristine condition, the Sacramento Valley was composed of perennial grasslands, riparian woodlands, and extensive marshes. The Sacramento River, Feather River, Bear River, and other primary waterways often would flood in winter and early spring, recharging wetlands and depositing fertile sediments on the floodplain that are now valued for agriculture. River channels

were somewhat migratory, shifting through time. In places along the rivers, natural levees would form to just above flood levels.

Hydraulic mining conducted during much of the latter half of the 19th century washed immense quantities of sediments into Sierra Nevada streams. The effects of hydraulic mining were, and remain, particularly significant for the valley portions of Yuba County, especially in the Marysville vicinity, where the Feather and Yuba Rivers converge. Both of these river basins received huge sediment loads from hydraulic mining at their upper reaches. At the mouth of the Yuba River at the south edge of Marysville (in what is now project Segment 3 of the FRLRP), 70 feet or more of sediment eventually filled the river channel. Upstream of Marysville, entire communities were buried under more than 40 feet of silt and gravel (Hoover et al. 1990).

Levees were constructed along the Feather and Yuba Rivers and their tributaries to prevent the flooding of Marysville and surrounding valley communities. The levees also prevented these communities from becoming buried under the sediments that were washed down from the mountains. To continue to protect Marysville and the surrounding communities, levees were built ever higher to confine the floodwaters to a relatively narrow channel that would promote sediment transport. The SRFCP levees on the Feather and Yuba Rivers were designed to confine flows to a relatively narrow channel that would efficiently convey sediment through the system, reducing the amount of dredging necessary to maintain navigation. As a result, Marysville, Olivehurst, and Linda are now many feet below the floodwater levels of the Feather and Yuba Rivers.

As part of the Corps' Yuba River Basin Investigation (U.S. Army Corps of Engineers and State of California Reclamation Board 1998), sediment transport was evaluated with a numerical model (HEC-6) for very large flood flows (the "400-year" flood). The following were the main conclusions of the study:

- The main phase of channel degradation (downcutting) on the Feather River through the hydraulic mining debris had occurred by the mid-1960s. Further large-scale degradation is unlikely within an engineering time frame (50 years) because the base elevation of the channel is controlled by sedimentation from the Yuba and Bear Rivers.

- The Feather River has cut through the mining debris, but there have not been mass bank failures that could lead to channel migration that could ultimately threaten the levee system.

- The channel is stable because of the sediment supply to the Feather River from the Yuba and Bear Rivers.

- Eventual reduction in sediment delivery from the Yuba and Bear Rivers is likely to promote lateral migration of the Feather River in the future.

In summary, while hydraulic mining debris stored in the Feather, Yuba, and Bear River channels continues to supply sediment to the river system, the channels are expected to remain relatively stable. As sediment supplies decline, the rivers again will adjust to a new equilibrium. Ultimately (hundreds to thousands of years in the future), it is likely that the river channels will cut down to their premining elevations and will begin migrating laterally.

5.3.3 ENVIRONMENTAL IMPACTS

THRESHOLDS OF SIGNIFICANCE

Thresholds for determining the significance of impacts on water resources and river geomorphology (including hazardous materials in relation to effects on water quality) were based on the environmental checklist form in Appendix G of the California Environmental Quality Act Guidelines (State CEQA Guidelines). A project alternative would have a significant impact on water resources and river geomorphology if its construction or operation would:

- violate any water quality standards or waste discharge requirements or otherwise substantially degrade water quality;
- substantially alter the existing drainage pattern of a site or area;
- substantially increase the rate or amount of surface runoff;
- result in increased exposure of persons or private property to flood hazards;
- substantially reduce water supply;
- alter regional or local hydrology, resulting in erosion of the levee system or substantial increases in the mobilization and/or deposition of sediments;
- create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment; or
- be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or environment.

IMPACT ANALYSIS

Modeling of Hydraulic Effects

Hydraulic effects of the ASB setback levee and intermediate setback levee alignments proposed for project Segment 2 (Alternative 2 and Alternative 3, respectively) were evaluated through modeling of a series of floods with different AEP levels in the project vicinity. The methods and results of the modeling are described in Appendix B**.**

For modeling purposes, the “Without Project” condition was the benchmark condition by which all hydraulic impacts were measured for the project alternatives. The “Without Project” condition was represented in the modeling by the existing condition (channel vegetation and geometry, top-of-levee elevations) of the flood control system, except in a few locations along the Bear River and Yankee Slough where data show that the levees are below the 1957 design criteria. At these locations, the “Without Project” condition was represented by the 1957 design profile levee elevation (1957 design water surface + 3 feet of freeboard). In other words, the top-

of-levee elevations that were found to be below design specifications were assumed to be restored to their original specified design elevations. The state and local districts have a requirement to maintain the project design levee grade, and once they become aware of a project deficiency, they must take action to correct that deficiency (see *Standard Operations and Maintenance Manual for the Sacramento River Flood Control Project*, dated May 1955, Section IV, paragraphs 4-02 and 4-04). The state and local districts are aware of these project deficiencies and are expected to restore levees to specified design elevations in the near future (Countryman, pers. comm., 2004).

FRLRP Alternatives 1, 2, and 3 and the "Without Project" condition were evaluated using state-of-the-art hydraulic models and hydrology data obtained from the Corps. The 1-in-100 and 1-in-200 AEP floods were routed through Lake Oroville and New Bullards Bar Reservoir for hypothetical storms centered over either the Feather River or Yuba River watershed. The resultant flows were routed through the flood system down to the location of Verona, on the Sacramento River immediately downstream of the confluence with the Feather River. Water surface profiles were calculated for each flood event and for each alternative. The Shanghai-Yuba centering (i.e., location in the hydrologic model where a storm is focused) provided the highest water surface elevations along the Feather and Yuba Rivers and also along the lower Bear River. The water surface profiles were calculated based on an assumption that levees would overtop but would not fail. This assumption ensures the worst-case (highest) water surface profile for any given flood. This is also the condition that the downstream levee system has a reasonable probability of experiencing during an extreme flood because levees are not designed to fail for a water surface elevation lower than the top of the levee.

Alternative 1 – The Levee Strengthening Alternative

Alternative 1 would not include a setback levee and associated floodway expansion, but rather results in a continuation of the existing levee configuration in the project area. As discussed below, this alternative could result in temporary effects on water quality associated with levee repair and strengthening activities, and installation of slurry cutoff walls could affect local groundwater conditions; however, this alternative would not result in any long-term changes to the existing drainage pattern of the project site, would not affect the rate or amount of surface runoff in the project area, would not increase exposure of persons or private property to flood hazards, and would not reduce water supply or alter regional or local hydrology. The project also would not affect the operation or risk of failure of upstream dams (i.e., Lake Oroville and New Bullards Bar Reservoir). Therefore, these impact mechanisms would not occur under Alternative 1 and are not discussed further.

Impact LS-5.3-a

Temporary Effects on Water Quality Associated with Levee Repair and Strengthening Activities. Ground-disturbing activities associated with repair and strengthening of the existing levees could cause soil erosion and sedimentation of local drainages and the Feather and Yuba River channels. Construction activities could also discharge waste petroleum products or other construction-related substances that could enter these waterways in runoff. Because the release of soil or other materials into these waterways could adversely affect river water quality, this impact would be **potentially significant**.

Among the construction activities associated with repairing and strengthening the existing Feather River left bank levee and the Yuba River left bank levee are the following:

- constructing slurry cutoff walls, stability/seepage berms, and relief wells;
- repairing levee segments susceptible to erosion.
- excavating borrow material from borrow sites and constructing a detention basin;
- relocating Pump Station No. 3; and
- relocating or modifying other existing facilities (e.g., wells, drainage channels, and irrigation systems).

These construction activities would disturb existing vegetation cover and soils on the existing levees and in nearby areas, would expose relatively large areas of disturbed ground that could be subject to rainfall and erosion, and could cause temporary discharges of sediment and other contaminants in stormwater runoff to drainage channels and the Feather and Yuba Rivers. Petroleum products or other construction-related substances (e.g., hydraulic fluids, concrete, solvents) also could be discharged inadvertently to waterways via stormwater runoff.

Although erosion and generation of contaminated runoff are possible during construction under Alternative 1, anything more than minor releases of sediment is unlikely because most land disturbance would occur during the dry months from late spring through fall. In addition, temporary erosion control measures would be implemented during construction to minimize stormwater pollution resulting from erosion and sediment migration from the construction areas, borrow areas, laydown/staging areas, and disposal areas. These temporary measures may include:

- the use of construction staging to minimize the amount of land disturbed at any one time;
- secondary containment for storage of fuel and oil; and
- the management of stockpiles and disturbed areas using earth berms, diversion ditches, straw wattles, straw bales, silt fences, gravel filters, mulching, revegetation, and temporary covers as appropriate.

Nevertheless, some soil erosion and sedimentation of waterways or discharge of contaminated runoff to waterways could occur. Because construction activities could affect water quality in nearby waterways by causing erosion and sedimentation or releasing construction materials into soil or water, this impact would be potentially significant.

Impact LS-5.3-b

Changes in Groundwater Levels Resulting from Seepage Control Measures. Slurry cutoff walls that would be installed in segments of the existing Feather River and Yuba River levees to control seepage could restrict groundwater flow and affect groundwater levels. Potential consequences are localized changes in well water levels and/or high groundwater levels east and south of the locations where slurry cutoff walls are installed. Such changes are not expected to substantially affect water supply or adversely affect land uses. This impact would be **less than significant**.

It is assumed that proposed repairs to the left bank levees of the Feather and Yuba Rivers would include installation of slurry cutoff walls in various portions of the levees to control seepage

during flood stages. The specific locations of slurry cutoff walls would be determined during detailed project design, scheduled to be conducted in late 2006 and through 2007. However, it is assumed that construction of slurry cutoff walls would focus on those portions of the levee alignments where widespread strata of permeable sands and gravels exist in the foundation.

The purpose of a slurry cutoff wall is to dissipate the hydraulic gradient in the levee foundation and reduce seepage quantities. This would reduce the hydraulic gradient and seepage flows through the foundation soils adjacent to the cutoff wall to safe levels. To achieve maximum effectiveness, the cutoff wall must extend completely through the permeable strata and terminate some distance into an underlying, reasonably continuous, less permeable layer. Under Alternative 1 slurry cutoff walls may extend to depths of 80 feet or more. The presence of slurry cutoff walls could restrict the movement of groundwater in either direction (away from the Feather River or Yuba River channel or toward the channel). Potential consequences are increases or decreases in the water levels in shallower wells and/or localized near-surface groundwater levels in areas immediately east and west of the slurry cutoff wall.

Groundwater levels in the area south of the Yuba River and east of the Feather River have generally risen since completion of the South Yuba Canal and delivery of irrigation water beginning in 1982. Water levels in the RD 784 area have been relatively stable since the mid-1990s on the order of 30 feet above sea level. (Bookman-Edmonston Engineering 2000.) This is above the elevation of water in the Feather River during nonflood periods. Water could move from the Feather and Yuba Rivers to nearby wells during periods of well pumping when the drawdown is below the level of water in the rivers. Although slurry cutoff walls could interfere with this movement, any effect on total water supply would not be substantial. RD 784 indicates that there have been no complaints to date about reductions in well yield in association with the Corps's 1997 installation of a 3-mile-long, 70-foot-deep slurry cutoff wall for seepage control along the Feather River levee from approximately Broadway to Star Bend, in what is now FRLRP Segment 2 (Goff, pers. comm., 2003).

The nearly uniform groundwater levels in RD 784 indicate that recharge from the east is nearly in balance with groundwater pumping and any losses to the Feather and Yuba Rivers. Water levels could rise on the east side (Feather River) or south side (Yuba River) of the existing levee where slurry cutoff walls are constructed if the pumping does not equal or exceed the recharge. Water could continue to move in either direction in the areas where slurry cutoff walls would not be constructed. Even with supplemental subsurface data to be obtained during design, it would be difficult to determine where, and to what extent, groundwater levels could change as a result of the presence of slurry cutoff walls. It can be expected, however, that any changes would be gradual. If local groundwater were to rise periodically to levels at which trees, crops, or structures could be damaged, excess groundwater could be pumped out using selected wells (as under current practices) or newly installed drains. TRLIA would coordinate with landowners as needed to resolve such circumstances. The excess groundwater could be delivered to irrigated lands or discharged to drains and then to the Feather River as part of RD 784's operations and maintenance.

Potential changes in groundwater levels associated with the installation of slurry cutoff walls are not expected to substantially affect water supply or local drainage. This impact would be less than significant.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impact ASB-5.3-a

Temporary Effects on Water Quality Associated with Levee Repair and Strengthening Activities and Setback Levee Construction. Ground-disturbing activities associated with repairs and strengthening of the existing levees and construction of the ASB setback levee could cause soil erosion and sedimentation of local drainages and the Feather and Yuba River channels. Construction activities could also discharge waste petroleum products or other construction-related substances that could enter these waterways in runoff. Because the release of soil or other materials into these waterways could adversely affect river water quality, this impact would be **potentially significant**.

Temporary water quality impacts associated with construction in project Segments 1 and 3 would be the same as in Impact LS-5.3-a, described under Alternative 1 above. However, because Alternative 2 includes the construction of the ASB setback levee in Segment 2, additional or more severe effects would result under this alternative, as described below.

Among the construction activities associated with the ASB levee setback are the following:

- removing portions of the existing levee in project Segment 2;
- excavating borrow material from proposed borrow sites;
- constructing the new setback levee and associated seepage control features (e.g., slurry cutoff walls, seepage berms, relief wells);
- constructing a detention basin;
- relocating Pump Station No. 3; and
- relocating or modifying other existing facilities (e.g., wells, drainage channels, and irrigation systems).

These construction activities would disturb existing vegetation cover and soils, would expose large areas of disturbed ground that could be subject to rainfall and erosion, and could cause temporary discharges of sediment and other contaminants in stormwater runoff to drainage channels and the Feather and Yuba Rivers. Petroleum products or other construction-related substances (e.g., concrete, hydraulic fluids, solvents) also could be discharged inadvertently to waterways via stormwater runoff.

There is the potential for the quantity and intensity of this impact to be large because of the areal extent of the construction activities. However, large-scale erosion and generation of contaminated runoff are unlikely because, although some slurry cutoff wall construction and other work would be conducted during the winter months (as weather, regulatory guidelines, and other factors allow), most land disturbance would occur during the dry months from late spring through fall. In addition, temporary erosion control measures would be implemented during construction to minimize stormwater pollution resulting from erosion and sediment migration from the construction areas, borrow areas, laydown/staging areas, and disposal areas. These temporary measures may include:

- the use of construction staging to minimize the amount of area disturbed at any one time;
- secondary containment for storage of fuel and oil; and
- the management of stockpiles and disturbed areas using earth berms, diversion ditches, straw wattles, straw bales, silt fences, gravel filters, mulching, revegetation, and temporary covers as appropriate.

Nevertheless, some soil erosion and sedimentation of waterways or discharge of contaminated runoff to waterways could occur. Because construction activities could affect water quality in nearby waterways by causing erosion and sedimentation or releasing construction materials into soil or water, this impact would be potentially significant.

Impact ASB-5.3-b

Disruption of Local Drainage Systems by the Levee Setback. The ASB setback levee would cross existing drainage infrastructure and sever parts of the drainage system for the local area. Drainage patterns within the levee setback area could be changed by project implementation as well. Because interruption of drainage patterns could cause or exacerbate local flooding, this impact would be **significant**.

On the lands outside the proposed ASB levee setback area, between the proposed levee setback alignment in project Segment 2 and the Western Pacific Interceptor Canal about 2 miles to the east, most of the surface runoff, including irrigation runoff, is collected in a series of RD 784 sloughs and canals that eventually drain to the Plumas Lake Canal (MHM n.d.). In addition, a small area east of the ASB levee setback area drains to Lateral 7/8. The proposed ASB setback levee alignment crosses Lateral 7/8 and the Plumas Lake Canal as they continue west into the levee setback area (Figure 5.3-2). As described under "Environmental Setting," the water conveyed into the levee setback area through Lateral 7/8 empties into Lateral 6, which drains a portion of the proposed ASB levee setback area. The water conveyed in Lateral 6 and the Plumas Lake Canal is pumped into the Feather River floodway at RD 784 Pump Station No. 3 (Figure 5.3-2). To ensure continued functioning of the drainage system east of the levee setback area, Pump Station 3 is proposed to be relocated to the land side of the ASB setback levee to drain the Plumas Lake Canal to the west of the levee.

The buried culvert from Lateral 7/8 that joins Lateral 6 above Star Bend would need to be removed where it crosses the setback levee alignment. The preliminary design for the levee setback suggests that Lateral 7/8 may be regraded to drain eastward along Anderson Avenue to Feather River Boulevard and that a new drainage ditch would need to be constructed to discharge the lateral to the most convenient point, which may be north along Feather River Boulevard to Lateral 10 or south along Feather River Boulevard to Lateral 9 (Yuba County Water Agency 2003a). Laterals 9 and 10 are part of the system that eventually discharges into the Plumas Lake Canal. The preliminary design also suggests that Lateral 6 may be abandoned and/or modified.

The proposed ASB levee setback would include the excavation of borrow sites that could also alter site drainage. The levee setback concept includes grading the borrow areas to slopes of 3:1 (horizontal:vertical) or flatter and regrading the bottom of the borrow areas to drain away from the setback levee and toward the river or toward existing drainage ways.

The modifications described above have been designed schematically. Although the preliminary levee setback design acknowledges the need to address local drainage, specific plans have not been developed to ensure that modified drainage features would adequately convey anticipated drainage volumes from the current and proposed land uses.

Because relocating drainage features and modifying the direction or volume of flows in parts of the drainage system could cause or exacerbate local flooding from normal surface runoff or stormwater runoff, this impact would be significant.

Inundation of the levee setback area during periods of high flow could cause some ponding of water that would remain in low spots, such as the footprint of the existing Feather River levee and possibly the borrow areas, when floodwaters recede. Until natural drainage or evaporation occurs, standing water could remain in these areas, which could provide breeding habitat for nuisance species such as mosquitoes and flies. However, irrigation practices that are a part of normal agricultural operations currently practiced in the ASB levee setback area sometimes lead to the formation of areas of standing shallow water that are favorable to the breeding of mosquitoes and other nuisance insects in drainage ponds, ditches, canals, and irrigated fields. It is unlikely that any additional areas of standing water that would result from occasional flooding of the levee setback area in winter months would appreciably increase the potential for breeding of these species compared with existing conditions. In addition, Mitigation Measure ASB-5.4-d, "Develop and Implement a Drainage and Grading Plan that Results in No Loss or Incidental Loss of Fish from Stranding," in Section 5.4, "Fisheries," calls for drainage improvements to the levee setback area and monitoring and necessary adjustments of these improvements. This measure is intended to prevent ponding of water after flood events to prevent/minimize the potential for stranding of special-status fish species in the setback area after floodwaters recede. Proper drainage would minimize any potential for increased mosquito production. Although detention basins constructed as part of the project would also generate areas of ponded water, the water would only be held for short periods until Pump Station No. 3 was able to discharge the accumulated stormwater flows. In addition, the detention basins would typically only fill during storm events in the winter and spring when mosquito activity is low. Detention basins included as part of this or any other project alternative are not expected to appreciably increase the potential for nuisance insect species to occur.

Impact ASB-5.3-c

Changes in Local Flood Hydrology Resulting from the Levee Setback. Setting back the left bank Feather River levee along the ASB setback levee alignment would decrease flood stages on the river. The levee setback would also provide a well-designed, well-constructed levee that would be more reliable and less subject to seepage than the existing levee. These changes would improve local flood protection. This effect would be **beneficial**.

The ASB levee setback proposed under Alternative 2 is designed to (1) decrease flood stages in the Feather River between Shanghai Bend and Star Bend (i.e., in project Segment 2) by increasing the channel width and, therefore, channel capacity; and (2) provide a well-designed, well-constructed levee using up-to-date technology. Lowering flood stages along this part of the Feather River channel would also reduce the backwater effects on flood stages upstream in both the Feather and Yuba Rivers.

Hydraulic simulations conducted for the FRLRP (MBK Engineers 2006**)** indicate that the ASB levee setback would lower water levels in the Feather River upstream of Star Bend (project Segments 2 and 3). For the 1-in-100 and 1-in-200 AEP events, it was determined that the ASB levee setback would lower the water level at the confluence of the Feather and Yuba Rivers by 1.3 feet and 1.6 feet, respectively. The presence of the ASB setback levee and related changes in upstream water levels would not affect the Lake Oroville or New Bullards Bar Reservoir dams.

Three Rivers Levee Improvement Authority (TRLIA) and DWR do not propose to increase the objective flow on the Feather River. Lowering flood stages and replacing the existing levee with a well-designed, well-constructed levee built using up-to-date construction standards would reduce the potential for levee failures in this channel segment that has historically been plagued by levee instability and failures. Effects of the levee setback on local flood protection would be beneficial.

Impact ASB-5.3-d

Changes in Flood Hydrology Downstream of the Setback Levee. The ASB levee setback would lower water levels upstream of the levee setback area, which could increase flows downstream of project Segment 2. This condition could lead to increased flooding downstream of Segment 2 if flood events should occur. However, the passage of floodwaters downstream to the Feather River would increase floodwater elevation within adequately sized levees, and the increased potential for levee failure and flooding downstream would be very slight. In addition, the implementation of Forecast-Coordinated Operations of Lake Oroville and New Bullards Bar Reservoir would reduce peak flows in the Feather-Yuba River system, and hence downstream of the levee setback area. Therefore, this impact would be **less than significant**.

As explained in Impact ASB-5.3-c above, the ASB levee setback proposed under Alternative 2 would increase flood storage capacity along the Feather River channel. Under most conditions, this would help attenuate downstream flows. However, because the levee setback would lower water levels upstream, flows in the Feather River just downstream of the ASB setback levee (project Segment 2) would increase slightly. The hydraulic simulations indicate that the Feather River peak flow just downstream of the setback levee under a 1-in-100 AEP event would increase from 271,938 cfs to 272,406 cfs, an increase of less than 1% (MBK Engineers 2006). The slight increase in flows would increase water surface elevation by 0.02 foot in the Feather River from the southern end of the setback levee alignment to the confluence with the Bear River. There would be no measurable increase in flood stage elevations downstream of the Bear River. For the 1-in-200 AEP event, the flows would increase from 347,031 cfs to 348,879 cfs, an increase of less than 1%. The water surface elevation in the Feather River from the southern end of the setback levee alignment to the confluence with the Bear River would increase by 0.08 foot as a result of the increased flow. Again, there would be no measurable increase in flood stage elevations downstream of the Bear River. The stage for the design flow remains below the project design stage (1957 profile) for the entire Feather River reach below the setback levee.

It should be noted that the hydraulic model used for this analysis does not take into account the planned Forecast-Coordinated Operations (F-CO) of Lake Oroville and New Bullards Bar Reservoir included as part of the Y-FSFCP. The F-CO element of the Y-FSFCP is a cooperative planning and model development process that is directed toward strengthening flood control operations for the Yuba and Feather Rivers by improving flood forecasts, closely coordinating the flood operations of Lake Oroville and New Bullards Bar Reservoir, improving operational procedures, and providing for improved communication and real-time forecast information to

reservoir operators and downstream emergency managers (Yuba County Water Agency 2003a). With implementation of the F-CO, any increases in downstream flood stage elevations associated with implementation of the ASB levee setback would be less than described above.

The simulated increases in downstream floodwater flows with the ASB levee setback are small (less than 1%), the increases in downstream flood stage elevation would be less than 1 inch for the 1-in-100 and 1-in-200 AEP events, and the stage for the design flow would remain below the project design stage even with these minor increases. Implementation of the F-CO would further reduce these minor increases. Therefore, this impact would be less than significant.

Impact ASB-5.3-e

Change in Water Demand and Available Water Supply Resulting from the ASB Levee Setback. Implementation of the ASB levee setback would remove approximately 240–1,300 acres of land from irrigated agricultural use along the proposed setback levee footprint and in the setback area. Alternative uses (e.g., levee, habitat restoration) are not expected to increase demand for water supply but, rather, are expected to decrease water use. This would be a **beneficial** effect.

The footprint of the ASB setback levee proposed under Alternative 2 would remove approximately 240–250 acres of land in project Segment 2 from agricultural use. It is unknown at this time how much, if any, of the levee setback area might be converted to riparian, wetland, or other habitat if the ASB setback levee is constructed. In the most extreme case, assuming that the entire levee setback area is converted to habitat, approximately 1,050 acres of land would be removed from agricultural use. Any irrigation associated with the establishment or maintenance of the setback levee or riparian, wetland, or other habitats would not surpass the current water use for agricultural crops and orchards. Any habitat restoration areas would be required to be self-sustaining, in that they would not need irrigation other than during the initial establishment of new vegetation.

It is expected that demand for water supply would not increase as a result of implementation of the ASB levee setback; in fact, demand is anticipated to decrease because 240–1,300 acres in the setback levee footprint and the levee setback area in project Segment 2 would be removed from irrigated agricultural use. Project effects on water demand and available water supply would be beneficial.

Impact ASB-5.3-f

Changes in Groundwater Levels Resulting from Installation of Slurry Cutoff Walls and the Levee Setback. Slurry cutoff walls that would be installed to control seepage in the existing Feather River and Yuba River levees in project Segments 1 and 3 and in the ASB setback levee in Segment 2 could restrict groundwater flow and affect groundwater levels. Potential consequences are localized changes in well water levels and/or high groundwater levels east of the setback levee and east and south of the locations where slurry cutoff walls are installed in Segments 1 and 3. Such changes are not expected to substantially affect water supply or adversely affect land uses. This impact would be **less than significant**.

This impact would be the similar to Impact LS-5.3-b, described above under Alternative 1. Installation of slurry cutoff walls in the existing levee in project Segments 1 and 3 would be the same under Alternative 2 as under Alternative 1, with the same less-than-significant effects on groundwater levels as described for Impact LS-5.3-b above. Installation of slurry cutoff walls in the ASB setback levee in project Segment 2 under Alternative 2 would alter the location of slurry cutoff walls in Segment 2 relative to Alternative 1; however, the mechanism by which

groundwater levels might be affected and the severity of the effect would be the same. Effects on groundwater levels would remain less than significant.

Impact ASB-5.3-g

Long-Term Effects on Water Quality Resulting from the Levee Setback. Potentially hazardous materials related to agricultural activities could be transported downstream when the levee setback area becomes inundated during flood events. These materials could contaminate floodwater and adversely affect river water quality. Because of the potential for adverse effects on water quality in the Feather River, this impact would be **potentially significant**.

The proposed ASB levee setback area has historically been used for intensive agriculture, primarily in the form of fruit and nut orchards. The inclusion of former agricultural lands in the Feather River floodway could result in the release of different types of contaminants into river water, such as pesticides and fertilizer, and organic litter and debris containing hazardous substances, during periodic flood events.

Pesticides, fertilizers, and other agricultural chemicals are applied on lands in the levee setback area, and pesticide residues in soil could be transported by periodic flood flows into the river. However, portions of the Feather River floodplain in the project area are currently used for agriculture. In addition, irrigation runoff from lands near the river but outside the floodplain area, including the ASB levee setback area, is currently conveyed to the Feather River via canals and ditches. The continued use of the ASB levee setback area for agricultural, whether the whole area or a portion, and occasional flooding of the area (i.e., approximately once in 3 years for a period of 3–5 days) is not expected to significantly increase the transport or concentrations of pesticides into the river in comparison with existing conditions.

Long-term uses in the proposed levee setback area may have resulted in the concentrated deposition of contaminants in the form of organic litter (e.g., debris piles, orchard slash piles) or hazardous substances (e.g., abandoned vehicles and farm implements; aboveground and underground storage containers for, and residues of, fuel, oil, fertilizers, or pesticides; and material in illegal dumping areas). Preliminary surveys of the levee setback area have identified three small waste dumps containing fruit waste and miscellaneous solid debris above Star Bend. Extensive surveys have not yet been completed, and additional dump or chemical spill sites may be present. Therefore, the full extent of potential problem areas is not known. If contaminants are present in soils in the levee setback area, they may become mobilized during flood conditions and be transported off-site by river flows, adversely affecting water quality.

In addition, portions of the Feather River levee, which may be used as borrow material for the ASB setback levee, were constructed before the existence of many of the regulations governing hazardous wastes and/or cleanup of contaminated soils and therefore may not have been tested for the presence of hazardous substances. Most likely, the fill material was uncontaminated because it probably would have originated in rural areas or riverine floodplain deposits and probably was not derived from sites containing hazardous wastes. However, some potential for contamination exists. There is also the potential that soils that would be exposed during excavation at borrow sites could be contaminated with elevated levels of pesticides and other hazardous substances or could be locations of abandoned dump sites. If contaminated soil exists in either of these sources and is used in construction of the setback levee, hazardous materials could be exposed to flood flows and subject to leaching and mobilization into river water.

Because periodic flooding of the ASB levee setback area could increase the release of hazardous materials into nearby water bodies and adversely affect water quality, this impact would be potentially significant.

Impact ASB-5.3-h

Changes in Floodplain Sediment Deposition Associated with the Levee Setback. Inundation of the ASB levee setback area would result in the transport and deposition of sediments in the setback area that may contain elevated concentrations of trace metals and/or organic constituents. Because it is unlikely that the sediment constituent concentrations resulting from inundation would be any higher than existing concentrations in the levee setback area, this impact would be **less than significant**.

As described in Impact 5.3-n of the Y-FSFCP programmatic EIR, sediments that may contain elevated concentrations of trace metals and/or organic constituents may be transported into the ASB levee setback area and deposited there during inundation with flood flows. It is unlikely that the concentrations of constituents deposited in the levee setback area in this way would be as high as those observed in the Feather River low-flow channel because the frequency of inundation would be less than that of the channel. It is also unlikely that sediment constituent concentrations resulting from inundation would be any higher than existing constituent concentrations in the levee setback area. The existing concentration patterns in river sediments are a result of continuous exposure to inputs of chemical contaminants. Conversely, the potential mass of contaminants transported into the proposed levee setback area would be less because of the relatively lower frequency of inundation.

Aquatic sediments in the Feather River currently exceed consensus-based guidelines for aquatic life concerns; however, concentrations are considerably less than EPA guidance PRGs for human health exposure in residential soils (PRGs are established only for industrial sites and residential sites). Consequently, the impact of potential changes in soil concentrations of trace metals and organic compounds would be less than significant.

Impact ASB-5.3-i

Changes in Geomorphic Processes Along the River Channels Resulting from the Levee Setback. Increasing the conveyance area of the Feather River floodway along the ASB setback levee alignment would alter water velocities and depths in the existing river channel and floodway in this area and upstream during flood events large enough to inundate the levee setback area (greater than an approximately a 3-year flow). These changes in velocities and depths could lead to decreased shear stresses from Star Bend to just below Shanghai Bend (project Segment 2) and slightly increased shear stresses at Shanghai Bend (Segment 3) and some distance upstream on both the Feather River and the Yuba River. Shear stresses would not change downstream of the levee setback area. Portions of the riverbanks and channel bed along the Feather and Yuba Rivers where shear stresses increase could experience minor increases in erosive forces. However, any increases would not be sufficient to result in a substantial increase in the mobilization and/or deposition of sediments. This impact would be **less than significant**.

The following discussion addresses the potential effects of increases in shear stresses along the Feather River and Yuba River channels, shorelines, and floodways. Potential effects of increased shear stresses on the levee system are addressed below in the discussion of Impact ASB-5.3-j, "Changes in Geomorphic Processes Along the Project Levees Resulting from the ASB Levee Setback."

The ASB levee setback would increase the capacity of the Feather River floodway to convey flood flows. Increasing the conveyance area by increasing the floodplain width would decrease the depth and velocity of flood flows in this portion of the Feather River floodway (along project Segment 2). This decrease in velocity would result in a decrease in shear stresses along this part of the Feather River (Philip Williams & Associates 2006). Shear stress is an expression of the lateral force of water against the adjacent shoreline. Higher shear stresses typically indicate greater erosion potential. Therefore, the presence of the setback levee would be expected to lessen the potential for channel bed and bank erosion on the Feather River along project Segment 2.

The presence of the setback levee would have little effect on flow velocities and no effect on shear stresses downstream of the levee setback area. However, the increase in flood flow conveyance capacity in the ASB levee setback area would increase flow velocities and erosion potential upstream of this area when flows are sufficient to inundate the levee setback area (greater than an approximately 3-year flow).

The degree of change in shear stress, and hence erosion potential, varies with the frequency and magnitude of flow events. To assess differences in shear stress between with- and without-project conditions, a shear-stress index was developed that reflects the change in boundary shear stress and the frequency with which different flow events are likely to occur over a 100-year period. For example, the change in shear stress for a 4-year event is multiplied by 25 (number of occurrences in a 100-year period) and the change in shear stress for a 100-year event is multiplied by 1. The sum of changes is divided by 100 (number of years in the evaluation period). The shear-stress index is a measure of the cumulative change in erosive energy at a location over a 100-year period. The analysis divided reaches into units based on geomorphic processes or sensitivity to increases in shear stress. The reaches are: Yuba River through Marysville (approximately PLM 0.0–1.5), Feather River through Yuba City (approximately PLM 26.5–34.0), Feather River right bank at Shanghai Bend (approximately PLM 22.25–23.75), Feather River left bank downstream of Shanghai Bend (approximately PLM 17.75–22.0), Feather River knickzone where incision on the river bottom has currently held up on a cohesive layer (approximately PLM 22.25–22.75), Feather River levee setback reach (approximately PLM 17.1–23.6), Feather River right bank at Star Bend (approximately PLM 15.5–19.0), and Feather River downstream of Star Bend (approximately PLM 12.0–15.25). Details of this analysis are provided in the draft report *Geomorphic Assessment of Project Alternatives for Feather River Levee Improvements Between the Bear and Yuba Rivers*, which is included in Appendix C of this EIR.

The analysis shows that along the levee setback area (including Star Bend), the ASB levee setback would reduce the shear-stress index by 3% relative to existing conditions (approximating a 3% reduction in erosive potential). In the reach around Shanghai Bend, the maximum shear-stress index is increased by 8% (west bank bend) and 5% (east bank downstream of Shanghai Bend). In the knickzone, the maximum increase in the shear-stress index is 7%. In the reaches through Yuba City and Marysville, the maximum increase in the shear-stress index is 3–8%.

Based on these results, portions of the riverbanks along the Feather and Yuba Rivers where the shear-stress index is predicted to increase could experience small amounts of new erosion or a slight acceleration of existing erosion. However, these increases in shear stresses could also

result in no effects in areas where shoreline sediments are sufficiently cohesive or if the banks are stabilized by vegetation, riprap, or other means and can resist the increase in erosive potential. Estimated increases in shear stresses would not be sufficient to result in substantial increases in the mobilization and/or deposition of sediment. Therefore, this impact would be less than significant.

Impact ASB-5.3-j

Changes in Geomorphic Processes Along the Project Levees Resulting from the ASB Levee Setback. Increasing the conveyance area of the Feather River floodway along the ASB setback levee alignment would alter water velocities and depths in the existing floodway in this area and upstream during flood events large enough to inundate the levee setback area (greater than an approximately a 3-year flow). These changes in velocities and depths would lead to decreased shear stresses along the right and left bank Feather River levees from Star Bend to just below Shanghai Bend (project Segment 2) and increased shear stresses along the levees at Shanghai Bend (Segment 3) and some distance upstream on both the Feather River and the Yuba River. Shear stresses along the levees would not change downstream of the levee setback area. Portions of the levee area along the Feather and Yuba Rivers where shear stresses increase could experience minor increases in erosive forces. Any increases in shear stresses would not be sufficient to result in a substantial increase in the mobilization and/or deposition of sediments or increase exposure of persons or private property to flood hazards (i.e., through damage to the levees). This impact would be **less than significant**.

The impact mechanism and analysis methodology for this impact is the same as described above for Impact ASB-5.3-i, "Geomorphic Processes Along the River Channels Resulting from the Levee Setback." However, the analysis below addresses the effects of changes in shear stresses and erosive potential on the levee system rather than the river channels, shorelines, and floodways.

The shear-stress index analysis for the levee system (see Appendix C) shows that in the levee setback area (including Star Bend), the ASB levee setback would reduce the shear-stress index along the levees by 14% (approximating to a 14% reduction in erosive potential). In the reach around Shanghai Bend, the maximum shear-stress index is increased by 8% along the levees (west bank bend), while on the east bank downstream of Shanghai Bend, there is a 1% increase in the shear-stress index along the levees. In the reaches through Yuba City and Marysville, the maximum increase in the shear-stress index along the levees is 3–6%.

Based on these results, various areas along the Feather River and Yuba River levees would experience small increases in shear stresses, and therefore erosive potential, resulting from the implementation of the ASB levee setback. However, even with these increases, the types of materials typically used to construct and protect levees (e.g., compacted soils, vegetative cover, riprap) would adequately resist the overall erosive potential. Estimated increases in shear stresses would not be sufficient to result in substantial increases in the mobilization and/or deposition of sediment or result in increased exposure of persons or private property to flood hazards (i.e., through damage to the levees). Therefore, this impact would be less than significant.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impact IS-5.3-a

Temporary Effects on Water Quality Associated with Levee Repair and Strengthening Activities and Setback Levee Construction. This impact would be the same as Impact ASB-5.3-a, described under Alternative 2 above. For the same reasons as described above, this impact would be **potentially significant**.

Impact IS-5.3-b

Disruption of Local Drainage Systems by the Levee Setback. The intermediate setback levee would cross existing drainage infrastructure and sever parts of the drainage system for the local area. Drainage patterns within the levee setback area could be changed by project implementation as well. Because interruption of drainage patterns could cause or exacerbate local flooding, this impact would be **significant**.

This impact would be similar to Impact ASB-5.3-b, described under Alternative 2 above. However, the severity of the impact would be somewhat less under Alternative 3 because the intermediate setback levee alignment is located farther to the west. Setting the Feather River levee back along this alignment would likely result in less disruption to drainage systems. However, the potential disruption of local drainage systems under Alternative 3 would remain a significant impact.

Impact IS-5.3-c

Changes in Local Flood Hydrology Resulting from the Levee Setback. Setting back the left bank Feather River levee along the intermediate setback levee alignment would decrease flood stages on the river. The levee setback would also provide a well-designed, well-constructed levee that would be more reliable and less subject to seepage than the existing levee. These changes would improve local flood protection. This effect would be **beneficial**.

This impact would be the same as Impact ASB-5.3-c, described under Alternative 2 above. Hydraulic simulations conducted for the FRLRP (MBK Engineers 2006) indicate that the intermediate levee setback would lower water levels in the Feather River upstream of Star Bend (project Segments 2 and 3) somewhat less than would the ASB levee setback levee—1.0 feet and 1.2 feet, respectively, for the 1-in-100 and 1-in-200 AEP events, rather than 1.3 feet and 1.6 feet with the ASB setback levee. The reductions in water levels would be less under this alternative because the intermediate setback levee would be located farther west than the ASB setback levee, creating a smaller setback area to hold floodwaters. However, the intermediate setback levee would decrease flood stage elevations and would provide a well-designed, well-constructed levee built using up-to-date construction standards, resulting in beneficial effects related to local flood protection.

Impact IS-5.3-d

Changes in Flood Hydrology Downstream of the Setback Levee. The intermediate levee setback would lower water levels upstream of the levee setback area, which could increase flows downstream of project Segment 2. This condition could lead to increased flooding downstream of Segment 2 if flood events should occur. However, the passage of floodwaters downstream to the Feather River would result in a increase in floodwater elevation within adequately sized levees, and the increased potential for levee failure and flooding downstream would be very slight. In addition, implementation of the F-CO for Lake Oroville and New Bullards Bar Reservoir would reduce peak flows in the Feather-Yuba River system, and hence downstream of the levee setback area. Therefore, this impact would be **less than significant**.

The effect of this impact would be the same as described above for Impact ASB-5.3-d under Alternative 2. However, the hydraulic simulations performed for Alternative 3 produce slightly different increases in flood stage elevations downstream of the setback levee. Hydraulic modeling indicates that the Feather River peak flow just downstream of the setback levee under a 1-in-100 AEP event would increase from 347,031 cfs to 348,624 cfs, an increase of less than 1% (MBK Engineers 2006). This slight increase in flow would result in a 0.02-foot increase in the water surface elevation in the Feather River from the southern end of the setback levee alignment to the confluence with the Bear River. There would be no measurable increase in flood stage elevations downstream of the Bear River. For the 1-in-200 AEP event, the flows would increase from 347,031 cfs to 348,624 cfs, an increase of less than 1%. The water surface elevation in the Feather River from the southern end of the setback levee alignment to the confluence with the Bear River would increase by 0.07 foot as a result of the increased flow. Again, there would be no measurable increase in flood stage elevations downstream of the Bear River. The stage for the design flow remains below the project design stage (1957 profile) for the Feather River reach below the setback levee.

As noted in the discussion of Impact ASB-5.3-d under Alternative 2, the hydraulic model used for this analysis does not take into account implementation of the F-CO for Lake Oroville and New Bullards Bar Reservoir. With implementation of the F-CO, any increases in downstream flood stage elevations associated with the intermediate levee setback would be less than described above.

The simulated increases in downstream floodwater flows with the intermediate levee setback are small (less than 1%), the increases in downstream flood stage elevation would be less than 1 inch for the 1-in-100 and 1-in-200 AEP events, and the stage for the design flow would remain below the project design stage even with these minor increases. Implementation of the F-CO would further reduce these minor increases. Therefore, this impact would be less than significant.

Impact IS-5.3-e

Change in Water Demand and Available Water Supply Resulting from the Intermediate Levee Setback. Implementation of the intermediate levee setback would remove approximately 220–950 acres of land from irrigated agricultural use along the proposed setback levee footprint and in the setback area. Alternative uses (e.g., levee, habitat restoration) are not expected to increase demand for water supply but, rather, are expected to decrease water use. This would be a **beneficial** effect.

The effect of this impact would be the same as described above for Impact ASB-5.3-e under Alternative 2. The footprint of the intermediate setback levee would remove approximately 220–230 acres of land from agricultural use. It is unknown at this time how much, if any, of the levee setback area might be converted to riparian, wetland, or other habitat if the intermediate setback levee is constructed. In the most extreme case, assuming the entire levee setback area is converted to habitat, approximately 720 acres of land would be removed from agricultural use. Any irrigation associated with the establishment or maintenance of the setback levee or riparian, wetland, or other habitats would not surpass the current water use for agricultural crops and orchards. Any habitat restoration areas would be required to be self-sustaining, in that they would not need irrigation other than during the initial establishment of new vegetation.

It is expected that demand for water supply would not increase as a result of implementation of the intermediate levee setback; in fact, demand is anticipated to decrease because approximately 220–950 acres in the setback levee footprint and the levee setback area in project Segment 2

would be removed from irrigated agricultural use. Project effects on water demand and available water supply would be beneficial.

Impact IS-5.3-f

Changes in Groundwater Levels Resulting from Installation of Slurry Cutoff Walls and the Levee Setback. This impact would be the same as Impact ASB-5.3-f, described under Alternative 2 above. For the same reasons as described above, this impact would be **less than significant**.

Impact IS-5.3-g

Long-Term Effects on Water Quality Resulting from the Levee Setback. Potentially hazardous materials related to agricultural activities could be transported downstream when the levee setback area becomes inundated during flood events. These materials could contaminate floodwater and adversely affect river water quality. Because of the potential for adverse effects on water quality in the Feather River, this impact would be **potentially significant**.

This impact would be similar to Impact ASB-5.3-g described above under Alternative 2. Although a smaller area of agricultural land would be placed in the Feather River floodway under Alternative 3 than under Alternative 2, the potential still exists for agricultural lands in the floodway to contain contaminants (e.g., pesticides and fertilizers) that could be released into the Feather River during periodic flood events. Long-term uses in the proposed levee setback area may also have resulted in the concentrated deposition of contaminants in the form of organic litter (e.g., debris piles, orchard slash piles) or hazardous substances (e.g., abandoned vehicles and farm implements; aboveground and underground storage containers for, and residues of, fuel, oil, fertilizers, or pesticides; and material in illegal dumping areas) that could be released into the Feather River during flood events.

In addition, portions of the Feather River levee, which may be used as borrow material for the intermediate setback levee, were constructed before the existence of many of the regulations governing hazardous wastes and/or cleanup of contaminated soils and therefore may not have been tested for the presence of hazardous substances. Soil taken from soil borrow areas may also contain contaminants. If contaminated soil exists in either of these sources and is used in construction of the setback levee, hazardous materials could be exposed to flood flows and subject to leaching and mobilization into river water.

Although there is not definitive evidence of soil contamination in any of these areas, further testing could indicate the presence of contaminants. Because periodic flooding of the intermediate levee setback area could increase the release of hazardous materials into nearby water bodies and adversely affect water quality, this impact would be potentially significant.

Impact IS-5.3-h

Changes in Floodplain Sediment Deposition Associated with the Levee Setback. Inundation of the levee setback area would result in the transport and deposition of sediments in the setback area that may contain elevated concentrations of trace metals and/or organic constituents. Because it is unlikely that the sediment constituent concentrations resulting from inundation would be any higher than existing concentrations in the levee setback area, this impact would be **less than significant**.

This impact would be the same as Impact ASB-5.3-h, described above under Alternative 2. Although the levee setback area would be smaller under Alternative 3 than under Alternative 2, the potential still exists for deposition of sediments in the intermediate levee setback area that

may contain elevated concentrations of trace metals and/or organic constituents. For the reasons described above, this impact would be less than significant.

Impact IS-5.3-i

Changes in Geomorphic Processes Along the River Channels Resulting from the Levee Setback. Increasing the conveyance area of the Feather River floodway along the intermediate setback levee alignment would alter water velocities and depths in the existing river channel and floodway in this area and upstream during flood events large enough to inundate the levee setback area (greater than an approximately 3-year flow). These changes in velocities and depths could lead to decreased shear stresses from Star Bend to just below Shanghai Bend (project Segment 2) and slightly increased shear stresses at Shanghai Bend (Segment 3) and some distance upstream on both the Feather River and the Yuba River. Shear stresses would not change downstream of the levee setback area. Portions of the riverbanks along the Feather and Yuba Rivers where shear stresses increase could experience minor increases in erosive forces. However, any increases would not be sufficient to result in a substantial increase in the mobilization and/or deposition of sediments. This impact would be **less than significant**.

This impact would be similar to Impact ASB-5.3-i, described above under Alternative 2. The impact mechanism and analysis methodology are the same under the two alternatives, although the effects on shear stresses are slightly different.

The geomorphic analysis (provided in Appendix C) shows that in the levee setback area (including Star Bend), the intermediate levee setback would reduce the shear-stress index by 3% relative to existing conditions (approximating a 3% reduction in erosive potential). In the reach around Shanghai Bend, the maximum shear-stress index is increased by 7% (west bank bend) and 5% (east bank downstream of Shanghai Bend). In the knickzone, the maximum increase in the shear-stress index is 7%. In the reaches through Yuba City and Marysville, the maximum increase in the shear-stress index is 3–4%.

Based on these results, portions of the riverbanks along the Feather and Yuba Rivers where the shear-stress index is predicted to increase could experience small amounts of new erosion or a slight acceleration of existing erosion. However, these increases in shear stresses could also result in no effects in areas where shoreline sediments are sufficiently cohesive or if the banks are stabilized by vegetation, riprap, or other means and can resist the increase in erosive potential. Estimated increases in shear stresses would not be sufficient to result in substantial increases in the mobilization and/or deposition of sediment. Therefore, this impact would be less than significant.

Impact IS-5.3-j

Changes in Geomorphic Processes Along the Project Levees Resulting from the Intermediate Levee Setback. Increasing the conveyance area of the Feather River floodway along the intermediate setback levee alignment would alter water velocities and depths in the existing floodway in this area and upstream during flood events large enough to inundate the levee setback area (greater than an approximately a 3-year flow). These changes in velocities and depths would lead to decreased shear stresses along the right and left bank Feather River levees from Star Bend to just below Shanghai Bend (project Segment 2) and increased shear stresses along the levees at Shanghai Bend (Segment 3) and some distance upstream on both the Feather River and the Yuba River. Shear stresses along the levees would not change downstream of the levee setback area. Any increases in shear stresses would not be sufficient to result in a substantial increase in the mobilization and/or deposition of sediments or increase exposure of persons or private property to flood hazards (i.e., through damage to the levees). This impact would be **less than significant**.

This impact would be similar to Impact ASB-5.3-j, described above under Alternative 2. The impact mechanism and analysis methodology are the same under the two alternatives, although the effects on shear stresses are slightly different.

The shear-stress index analysis for the levee system shows that in the levee setback area (including Star Bend), the intermediate levee setback would reduce the shear-stress index along the levees by 14% (approximating to a 14% reduction in erosive potential). In the reach around Shanghai Bend the maximum shear-stress index is increased by 7% along the levees (west bank bend), while on the east bank downstream of Shanghai Bend there is no increase in the shear-stress index along the levees. In the reaches through Yuba City and Marysville, the maximum increase in the shear-stress index along the levees is 2–3%.

Based on these results, various areas along the Feather River and Yuba River levees would experience small increases in shear stresses, and therefore erosive potential, resulting from the implementation of the intermediate levee setback. However, even with these increases, the types of materials typically used to construct and protect levees (e.g., compacted soils, vegetative cover, riprap) would adequately resist the overall erosive potential. Estimated increases in shear stresses would not be sufficient to result in substantial increases in the mobilization and/or deposition of sediment or result in increased exposure of persons or private property to flood hazards (i.e., through damage to the levees). Therefore, this impact would be less than significant.

5.3.4 MITIGATION MEASURES

ALTERNATIVE 1 – THE LEVEE STRENGTHENING ALTERNATIVE

No mitigation is required for Impact LS-5.3-b (effects on groundwater levels). Mitigation is provided below for Impact LS-5.3-a (temporary water quality effects).

LS-5.3-a(1) Prepare a SWPPP, File an NOI, and Comply with the NPDES Stormwater Permit for Project Construction Activities. This mitigation, together with Mitigation Measure LS-5.3-a(2), would reduce the potential impact to a less-than-significant level.

Before the start of any project construction work, site grading, or excavation, TRLIA or its primary construction contractor shall prepare a SWPPP detailing measures to control soil erosion and waste discharges from construction areas and shall submit an NOI to the Central Valley RWQCB for stormwater discharges associated with general construction activity. TRLIA shall require all contractors conducting construction-related work to implement the SWPPP to control soil erosion and waste discharges of other construction-related contaminants. The general contractor(s) and subcontractor(s) conducting the work shall be responsible for constructing or implementing, regularly inspecting, and maintaining the measures in good working order.

The SWPPP shall identify the grading and erosion control BMPs and specifications that are necessary to avoid and minimize water quality impacts to the extent practicable. Standard erosion control measures (e.g., management, structural, and vegetative controls) shall be implemented for all construction activities that expose soil. Grading operations shall be conducted to eliminate direct routes for conveying potentially contaminated runoff to drainage

channels. Erosion control barriers such as silt fences and mulching material shall be installed, and disturbed areas shall be reseeded with grass or other plants where necessary.

The SWPPP shall contain specific measures for stabilizing soils at construction-related sites before the onset of the winter rainfall season. These standard erosion control measures shall be designed to reduce the potential for soil erosion and sedimentation of drainage channels.

The following specific BMPs are recommended for implementation:

- Conduct all work according to site-specific construction plans that identify areas for clearing, grading, and revegetation so that ground disturbance is minimized.
- Avoid riparian and wetland vegetation wherever possible and identify vegetation to be retained for habitat maintenance (i.e., as identified through preconstruction biological surveys), cover cleared areas with mulches, install silt fences near riparian areas or streams to control erosion and trap sediment, and reseed cleared areas with native vegetation.
- Stabilize disturbed soils at all construction sites (e.g., levee repair areas, borrow areas) and staging areas before the onset of the winter rainfall season.
- Stabilize and protect stockpiles from exposure to erosion and flooding.

The SWPPP also shall specify appropriate hazardous materials handling, storage, and spill response practices to reduce the possibility of adverse impacts from use or accidental spills or releases of contaminants. Specific measures applicable to the project include, but are not limited to, the following:

- Develop and implement strict on-site handling rules to keep construction and maintenance materials out of drainages and waterways.
- Conduct all refueling and servicing of equipment with absorbent material or drip pans underneath to contain spilled fuel. Collect any fluid drained from machinery during servicing in leakproof containers and deliver to an appropriate disposal or recycling facility.
- Maintain controlled construction staging, site entrance, concrete washout, and fueling areas at least 100 feet away from stream channels or wetlands to minimize accidental spills and runoff of contaminants in stormwater.
- Prevent raw cement; concrete or concrete washings; asphalt, paint, or other coating material; oil or other petroleum products; or any other substances that could be hazardous to aquatic life from contaminating the soil or entering watercourses.
- Maintain spill cleanup equipment in proper working condition. Clean up all spills immediately according to the spill prevention and response plan, and immediately notify DFG and the RWQCB of any spills and cleanup procedures.

LS-5.3-a(2) Obtain a Use Permit from Yuba County and Comply with Permit Conditions for Erosion Control. This mitigation, together with Mitigation Measure LS-5.3-a(1), would reduce the potential impact to a less-than-significant level.

Before the start of any project-related grading, excavation, or fill activity, TRLIA or its primary construction contractor shall obtain a use permit from the Yuba County Planning Department in compliance with the Yuba County Ordinance Code. TRLIA shall require all contractors conducting construction-related work to implement the conditions of the permit. The general contractor(s) and subcontractor(s) conducting the work shall be responsible for constructing or implementing, regularly inspecting, and maintaining the required measures in good working order.

Implementing Mitigation Measures LS-5.3-a(1) and LS-5.3-a(2) together would reduce the potential temporary impact on water quality to a less-than-significant level.

ALTERNATIVE 2 – THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impact ASB-5.3-c (changes in local flood hydrology), Impact ASB-5.3-d (changes in downstream flood hydrology), Impact ASB-5.3-e (change in water demand and available water supply), Impact ASB-5.3-f (effects on groundwater levels), Impact ASB-5.3-h (changes in floodplain sediment deposition), Impact ASB-5.3-i (effects of increased shear stresses on river shorelines), or Impact ASB-5.3-j (effects of increase shear stresses on levees).

Mitigation is provided below for Impact ASB-5.3-a (temporary water quality effects), Impact ASB-5.3-b (disruption of local drainage systems by the levee setback), and Impact ASB-5.3-g (long-term water quality effects).

ASB-5.3-a(1) Prepare a SWPPP, File an NOI, and Comply with the NPDES Stormwater Permit for Project Construction Activities. This measure is identical to Mitigation Measure LS-5.3-a(1) above. Together with Mitigation Measure ASB-5.3-a(2), this mitigation would reduce the potential impact to a less-than-significant level.

ASB-5.3-a(2) Obtain a Use Permit from Yuba County and Comply with Permit Conditions for Erosion Control. This measure is identical to Mitigation Measure LS-5.3-a(2) above. Together with Mitigation Measure ASB-5.3-a(1), this mitigation would reduce the potential impact to a less-than-significant level.

ASB-5.3-b Coordinate with RD 784 to Modify Drainage Facilities that Would Be Affected by the Levee Setback and Ensure Appropriate Functioning of the Local Drainage System. This mitigation would reduce the impact to a less-than-significant level.

TRLIA or its primary construction contractor shall coordinate with RD 784 to evaluate local drainage needs before and after construction of the setback levee and shall prepare and implement a plan for modification of the portion of the drainage system that would be affected by the levee setback. A drainage study shall be prepared that evaluates the effects on local drainage that would result from the levee setback and any proposed changes in land uses in the

levee setback area. The study shall consider the design flows of the existing facilities that cross the proposed setback levee footprint (e.g., Lateral 7/8 and the Plumas Lake Canal). It shall develop appropriate plans for relocation or other modification of these facilities and construction of new facilities, as needed, to ensure equivalent functioning of the system during and after construction of the setback levee. Facility modification will include relocating Pump Station No. 3, and may include removing, filling, and/or rerouting drainage canals and culverts; regrading drainage alignments to redirect drainage; constructing new ditches and canals; and installing new culverts.

The plan shall also consider the continuing and proposed uses of the levee setback area and shall incorporate appropriate drainage requirements for those uses to prevent any unintended flooding from stormwater runoff. The plan shall integrate environmental mitigation requirements and drainage of restored borrow sites to the extent feasible and practical.

The final plan shall be approved by RD 784. TRLIA and its construction contractor(s) shall ensure that the necessary modifications are implemented without interruption of the adequate functioning of the drainage system. TRLIA shall also ensure that any necessary environmental review requirements have been met before the drainage modifications are implemented.

Implementing this mitigation measure would reduce the potential impact on existing drainage facilities to a less-than-significant level.

ASB-5.3-g(1) Conduct a Phase I Environmental Site Assessment for the Levee Setback Area and Implement Recommendations. This mitigation, together with Mitigation Measures ASB-5.3-g(2) and ASB-5.3-g(3), would reduce the potential impact to a less-than-significant level.

Before the start of any ground-disturbing construction activity, TRLIA or its primary construction contractor shall have a qualified hazardous waste specialist perform a Phase I Environmental Site Assessment of the levee setback area to identify potential sources of surface and buried contaminants, and provide a report of assessment findings.

The assessment shall include the following:

- review of available information on property history, including, as appropriate, historical and current topographic maps, aerial photographs, property title and permit information, interviews of environmental regulatory agency and Yuba County personnel, and interviews of current occupants and landowners regarding the current and past uses of the land;
- review of federal, state, and county governmental records and databases to determine whether any sites in the area are listed as hazardous waste sites; and
- reconnaissance-level surveys to observe visual evidence of hazardous materials use.

A written report on the findings of the assessment, including recommendations for the disposition of any identified hazardous waste sites or potential hazardous waste sites, shall be provided to TRLIA. TRLIA or its construction contractor(s) shall implement recommendations made in the Phase I report. If hazardous materials or wastes are identified, recommendations

could include, but would not be limited to, a Phase II assessment or cleanup of known identified hazardous waste sites. Presence of hazardous wastes would be determined using waste classification protocols described in CCR Title 22.

ASB-5.3-g(2) Evaluate Levee Borrow Material for Potential Contaminants in Coordination with the RWQCB. This mitigation, together with Mitigation Measures ASB-5.3-g(1) and ASB-5.3-g(3), would reduce the potential impact to a less-than-significant level.

Before the start of construction, TRLIA or its primary construction contractor shall have a qualified hazardous materials specialist collect and evaluate representative soil samples from the existing levee sections that would be used as sources of borrow, and from potential borrow sites. The soil samples shall be evaluated for contaminant residues (e.g., trace metals, organochlorine pesticides, polychlorinated biphenyls) that may be encountered in excavation and grading activities. This evaluation shall be conducted to address any requirements of the Central Valley RWQCB as part of the RWQCB's permitting and approval process for the project (e.g., Section 401 certification). Wastes that are encountered at hazardous levels shall be treated in accordance with CCR Title 22 procedures for hazardous materials reporting and disposal. Where the evaluation of soil samples detects the presence of wastes that are not present at hazardous levels, the results of the evaluation shall be reported to the RWQCB for classification in the RWQCB's designated waste classification program, and the RWQCB will determine the acceptability of the material for levee construction based on the potential of the waste to impair water quality and public health. Borrow material used for construction of the waterside levee face or other features with soil exposure to the aquatic environment (e.g., new drainage channels) that is deemed unacceptable by the RWQCB shall be properly disposed of in a landfill or made available for other approved uses.

ASB-5.3-g(3) Remove Nonhazardous Waste and Debris from the Levee Setback Area. This mitigation, together with Mitigation Measures ASB-5.3-g(1) and ASB-5.3-g(2), would reduce the potential impact to a less-than-significant level.

Before the beginning of the first season of potential flood operations with the setback levee in place, TRLIA or its primary construction contractor shall ensure the removal from the levee setback area of all large slash and wood piles, nonhazardous waste dumps, and other nonhazardous debris that could adversely affect water quality or create a hazard if carried downriver in flood flows. All removed materials shall be properly disposed of in approved off-site landfills.

Implementing Mitigation Measures ASB-5.3-g(1), ASB-5.3-g(2), and ASB-5.3-g(3) together would reduce potential impacts related to releases of hazardous materials from existing contaminated sites to a less-than-significant level.

ALTERNATIVE 3 – THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impact IS-5.3-c (changes in local flood hydrology), Impact IS-5.3-d (changes in downstream flood hydrology), Impact IS-5.3-e (change in water demand and

available water supply), Impact IS-5.3-f (effects on groundwater levels), Impact IS-5.3-h (changes in floodplain sediment deposition), Impact IS-5.3-i (effects of increased shear stresses on river shorelines), or Impact IS-5.3-j (effects of increased shear stresses on levees).

Mitigation is provided below for Impact IS-5.3-a (temporary water quality effects), Impact IS-5.3-b (disruption of local drainage systems by the levee setback), and Impact IS-5.3-g (long-term water quality effects).

IS-5.3-a(1) **Prepare a SWPPP, File an NOI, and Comply with the NPDES Stormwater Permit for Project Construction Activities.** This measure is identical to Mitigation Measure LS-5.3-a(1) above. Together with Mitigation Measure IS-5.3-a(2), this mitigation would reduce the potential impact to a less-than-significant level.

IS-5.3-a(2) **Obtain a Use Permit from Yuba County and Comply with Permit Conditions for Erosion Control.** This measure is identical to Mitigation Measure LS-5.3-a(2) above. Together with Mitigation Measure IS-5.3-a(1), this mitigation would reduce the potential impact to a less-than-significant level.

IS-5.3-b **Coordinate with RD 784 to Modify Drainage Facilities that Would Be Affected by the Levee Setback and Ensure Appropriate Functioning of the Local Drainage System.** This measure is identical to Mitigation Measure ASB-5.3-b above. This mitigation would reduce the potential impact to a less-than-significant level.

IS-5.3-g(1) **Conduct a Phase I Environmental Site Assessment for the Levee Setback Area and Implement Recommendations.** This measure is identical to Mitigation Measure ASB-5.3-g(1) above. Together with Mitigation Measures IS-5.3-g(2) and IS-5.3-g(3), this mitigation would reduce the potential impact to a less-than-significant level.

IS-5.3-g(2) **Evaluate Levee Borrow Material for Potential Contaminants in Coordination with the RWQCB.** This measure is identical to Mitigation Measure ASB-5.3-g(2) above. Together with Mitigation Measures IS-5.3-g(1) and IS-5.3-g(3), this mitigation would reduce the potential impact to a less-than-significant level.

IS-5.3-g(3) **Remove Nonhazardous Waste and Debris from the Levee Setback Area.** This measure is identical to Mitigation Measure ASB-5.3-g(3) above. Together with Mitigation Measures IS-5.3-g(1) and IS-5.3-g(2), this mitigation would reduce the potential impact to a less-than-significant level.

5.3.5 IMPACTS REMAINING SIGNIFICANT AFTER MITIGATION

With implementation of the mitigation described above, all impacts on water resources and river geomorphology would be reduced to a less-than-significant level.

SECTION 5.4 FISHERIES

This section addresses fish species found in the lower Feather River and lower Yuba River, including species that are listed or are candidates for listing under the federal Endangered Species Act (ESA) and the California Endangered Species Act (CESA). Water quality, hydrology, and geomorphology are discussed in Section 5.3, "Water Resources and River Geomorphology." Terrestrial biological resources (e.g., plants, wildlife) are discussed in Section 5.5, "Terrestrial Biological Resources."

5.4.1 REGULATORY SETTING

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

Federal Endangered Species Act

Pursuant to ESA, the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) have authority over projects that may result in take of a federally listed species. Under ESA, "take" means "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." USFWS has also interpreted the definition of "harm" to include significant habitat modification. If the project may affect a federally listed species, either an incidental take permit under ESA Section 10(a) or a federal interagency consultation under ESA Section 7 is required. USFWS has regulatory jurisdiction over freshwater and estuarine fishes (such as delta smelt), while NMFS has jurisdiction over anadromous and marine species (such as chinook salmon and steelhead).

Sustainable Fisheries Act

In response to growing concern about the status of U.S. fisheries, the Sustainable Fisheries Act of 1996 (Public Law [PL] 104-297) was passed by Congress to amend the Magnuson-Stevens Fishery Conservation and Management Act (PL 94-265), the primary law governing marine fisheries management in the federal waters of the United States. Under the Sustainable Fisheries Act, consultation is required by NMFS on any activity that might adversely affect essential fish habitat (EFH). EFH includes those habitats that fish rely on throughout their life cycles. It encompasses habitats necessary to allow sufficient production of commercially valuable aquatic species to support a long-term sustainable fishery and contribute to a healthy ecosystem.

Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (16 U.S. Code 661–666c), as amended, requires federal agencies to consult with USFWS, NMFS, and state fish and wildlife resource agencies before undertaking or approving projects that control or modify surface water. The recommendations made by these agencies must be fully considered in project plans by federal agencies.

Clean Water Act, Section 404

Section 404 of the Clean Water Act (CWA) establishes a requirement to obtain a permit from the U.S. Army Corps of Engineers (Corps) before undertaking any activity that involves any discharge of dredged or fill material into "waters of the United States," including wetlands. Waters of the United States include navigable waters of the United States, interstate waters, all other waters where the use or degradation or destruction of the waters could affect interstate or foreign commerce, tributaries to any of these waters, and wetlands that meet any of these criteria or that are adjacent to any of these waters or their tributaries. Many surface waters and wetlands in California, including the Feather and Yuba Rivers, meet the criteria for waters of the United States. Under Section 404, the Corps must consider impacts on listed species under ESA; it thereby incorporates USFWS and NMFS findings on impacts on federally listed fish species in its permit conditions.

Clean Water Act, Section 401

CWA Section 401(a)(1) specifies that any applicant for a federal license or permit to conduct any activity that may result in any discharge into navigable waters shall provide the federal licensing or permitting agency with a certification that any such discharge will not violate state water quality standards. In California, the nine regional water quality control boards (RWQCBs) administer the Section 401 program, prescribing measures for projects as necessary to avoid, minimize, and mitigate adverse impacts on water quality and ecosystems.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

California Endangered Species Act

Pursuant to CESA, a permit from the California Department of Fish and Game (DFG) is required for projects that could result in the take of a species that is state-listed as threatened or endangered. Under CESA, "take" is defined as an activity that would directly or indirectly kill an individual of a species; the CESA definition of take does not include "harming" or "harassing," as the ESA definition does. As a result, the threshold for take is higher under CESA than under ESA (i.e., habitat modification is not necessarily considered take under CESA).

Section 1600 et seq. of the California Fish and Game Code

All diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake in California that supports wildlife resources are subject to regulation by DFG, pursuant to Sections 1600–1603 of the California Fish and Game Code. Under Section 1603, it is unlawful for any person to substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake designated by DFG, or use any material from the streambeds, without first notifying DFG of such activity. A stream is defined as a body of water that flows at least periodically or intermittently through a bed or channel that has banks and supports fish or other aquatic life. This includes watercourses with a surface or subsurface flow that supports or has supported riparian vegetation. DFG's jurisdiction within altered or artificial waterways is based on the value of those waterways to fish and wildlife. A DFG streambed alteration agreement must be obtained for any project that would result in an impact on a river, stream, or lake.

Flow Requirements Affecting the Lower Feather River and Lower Yuba River

In addition to the regulations described above, two processes have resulted in the establishment of flow requirements upstream of the project area for the enhancement and protection of fish habitat. Both affect conditions for fish in the lower Feather River and lower Yuba River.

Revised Water Right Decision 1644

The State Water Resources Control Board (SWRCB) adopted Water Right Decision 1644 on March 1, 2001 (State Water Resources Control Board 2001). On July 16, 2003, the SWRCB adopted Revised Decision 1644 (State Water Resources Control Board 2003). Revised Decision 1644 amends several water rights permits and licenses and requires other actions to protect fish in the reach of the Yuba River downstream of Englebright Reservoir. Revised Decision 1644 established interim and long-term instream flow requirements for fall-run chinook salmon, spring-run chinook salmon, steelhead, and American shad. The interim instream flow requirements were developed for the Yuba River in part to protect fisheries resources as the full use of Yuba County Water Agency's (YCWA's) existing water rights and water supplies occurs over time. It also requires the preparation of plans to reduce fish losses at two diversion facilities and requires actions to promote release of water from Englebright Dam at temperatures that benefit anadromous fish. Finally, Revised Decision 1644 includes several requirements to ensure that water diversions from the lower Yuba River are made pursuant to valid water rights.

The long-term instream flow requirements included in Revised Decision 1644 are higher flows that were scheduled to take effect on April 21, 2006. On November 18, 2005, YCWA petitioned the SWRCB requesting an extension of instream flow requirements under Revised Decision 1644 from April 21, 2006 to March 1, 2007. On April 6, 2006, the SWRCB issued an order (WR 2006–0009) concluding that it was appropriate to change the effective date of the long-term requirements to March 1, 2007, subject to provisions of the order (State Water Resources Control Board 2006).

The interim instream flow requirements developed and adopted by the SWRCB in 2003 are the current minimum flow requirements for the lower Yuba River. These requirements are shown in Table 5.4-1, "Interim Instream Flow Requirements for the Lower Yuba River Included in Revised Decision 1644."

Agreement Concerning Operation of the Oroville Facilities

The August 1983 agreement between the California Department of Water Resources (DWR) and DFG titled *Concerning the Operation of the Oroville Division of the State Water Project for Management of Fish & Wildlife* sets criteria for flow and temperature for the low-flow section of the Feather River (between Thermalito Diversion Dam and the Thermalito Afterbay river outlet) and the reach of the Feather River below the river outlet to the confluence with the Sacramento River. The required minimum flows specified in the agreement for the Feather River between Thermalito Afterbay and Verona (i.e., the confluence) are listed in Table 5.4-2, "Minimum Flow Requirements for the Feather River."

Table 5.4-1
Interim Instream Flow Requirements for the Lower Yuba River Included in Revised Decision 1644

Period	Wet and Above-Normal Years (cfs)		Below-Normal Years (cfs)		Dry Years (cfs)		Critical Years (cfs)	
	Smartville Gauge	Marysville Gauge	Smartville Gauge	Marysville Gauge	Smartville Gauge	Marysville Gauge	Smartville Gauge	Marysville Gauge
September 15–October 1	700	250	550	250	500	250	400	150
October 1–14	700	250	550	250	500	250	400	250
October 15–April 20	700	500	700	500	600	400	600	400
April 21		1,000		900		400		280
April 22–April 30		1,000		900		400		270
May 1–31		1,500		1,500		500		270
June 1		1,050		1,050		400		245*
June 2–30		800		800		400		245*
July 1		560		560		280		245*
July 2		390		390		250		245*
July 3		280		280		250		100
July 4–September 14		250		250		250		100

Note: cfs = cubic feet per second
* The interim instream flow requirements for June 1–30 of critical years shall be 245 cfs, except if a lower flow is allowed pursuant to the provisions of the 1965 Yuba County Water Agency/California Department of Fish and Game agreement. The minimum flow on July 1 shall be 70% of the flow on June 30, and the minimum flow on July 2 shall be 70% of the flow on July 1.
Source: State Water Resources Control Board 2003

Table 5.4-2
Minimum Flow Requirements for the Feather River

Required Flow (cfs)	Months Affected	Criteria
1,700	October through March	Feather River unimpaired runoff for the preceding April through July >55% of normal (1,942,000 af)
1,000	April through September	
1,200	October through February	Runoff for the preceding April through July <55% of normal or Two or more consecutive years of April-through-July runoff <60% of normal
1,000	March through September	
900	October through February	Minimum allowable flows; additional deficiencies up to 25% can be imposed in the same proportion as those applied to agriculture if the Oroville storage would fall below 1.5 million af under projected operation
750	March through September	
2,500	October 15–November 30	Normal maximum flow for river channel spawning gravels; if this flow is exceeded except for flood control, failure, etc., the minimum flow through March 31 shall not be less than 500 cfs below the average maximum 1-hour flow
Variable	April through June	Release scheduled water in other than constant flows or release water in excess of minimum flows ahead of time

Notes: af = acre-feet; cfs = cubic feet per second
Source: California Department of Water Resources and California Department of Fish and Game 1983

Additional requirements that are specified in the agreement for the protection of fish govern flows at Thermalito Diversion Dam and the Feather River Fish Hatchery, water temperatures below the Thermalito Afterbay outlet and at the Feather River Fish Hatchery, and the rate of change in flows below Thermalito Afterbay.

CALFED Bay-Delta Program

The CALFED Bay-Delta Program (CALFED) is not a regulatory program but is arguably the largest water management and ecosystem restoration program in the nation. It is a comprehensive program established to solve the San Francisco Bay/Sacramento–San Joaquin Delta's (Bay-Delta's) water supply, water quality, ecosystem, and levee integrity problems. As such, CALFED deserves mention as part of the regulatory background for the Feather River Levee Repair Project (FRLRP) because implementation of CALFED projects is having a substantial effect on conditions and actions associated with the Bay-Delta system, including those affecting the Feather and Yuba Rivers.

CALFED was initiated in 1995 as a collaboration among state and federal agencies and the state's leading urban, agricultural, and environmental interests to address and resolve the environmental and water management problems associated with the Bay-Delta system. The mission of CALFED is to develop and implement a long-term comprehensive plan that would restore ecological health and improve water management for beneficial uses of the Bay-Delta.

CALFED addresses four interrelated, interdependent programs concurrently: water supply reliability, water quality, ecosystem restoration, and levee system integrity. These four major programs are implemented through 11 major program elements: Storage, Conveyance, Water Use Efficiency, Water Transfers, Ecosystem Restoration, Environmental Water Account, Water Management, Watersheds, Drinking Water Quality, Levee System Integrity, and the CALFED Science Program.

The Feather and Yuba Rivers are addressed in the CALFED Ecosystem Restoration Program (ERP). The ERP effort presents the visions for ecological management zones in the Bay-Delta system and their ecological management units. The Feather River/Sutter Basin Ecological Management Zone includes a Feather River Management Unit.

The visions for the unit include the following (CALFED Bay-Delta Program 2000):

- Improve natural spawning populations of spring- and fall-run chinook salmon and steelhead. This involves improving spring (March) flows below Oroville in dry and normal water years, improving spring-through-fall base flows, providing suitable water temperatures for summer rearing, and improving spawning and rearing habitat in the lower river below Oroville.

- Reactivate or maintain important ecological processes that create and sustain habitats for anadromous fish. The most important processes include floodplain and flood processes and a natural streamflow pattern in the river, to which most of the anadromous and resident native fishes are adapted.

LOCAL PLANS, POLICIES, REGULATIONS, AND LAWS

The *Yuba County General Plan* (Yuba County 1996) provides overall guidance for resource conservation in Yuba County and includes several resource conservation objectives that aim to protect significant biological resources. Specific habitats identified for special consideration for preservation and protection are the Yuba River and watershed within Yuba County. The general plan also states that the anadromous fishery occurring within the streams of Yuba County shall be afforded the same protection from the adverse effects of development as terrestrial species.

5.4.2 ENVIRONMENTAL SETTING

The FRLRP could potentially affect aquatic resources within the lower Feather and Yuba Rivers. The Feather and Yuba Rivers provide important habitat for native anadromous and resident Central Valley fishes, including species that are listed or species of concern for listing under ESA and CESA. Because the two rivers support many of the same fish species, the are discussed together in this section.

SOURCES OF INFORMATION

Information on existing conditions was derived from other environmental documents prepared for the project area and vicinity, including the following:

- previous environmental documents for the Yuba-Feather Supplemental Flood Control Project and the Feather-Bear Rivers Levee Setback Project;
- field data collected by DFG and DWR;
- status reviews of winter-run, spring-run, and fall-run chinook salmon, steelhead, green sturgeon, and Sacramento splittail; and
- reports describing historical conditions before construction of dams and other barriers.

Information was also derived from the California Natural Diversity Database (California Natural Diversity Database 2006) and a reconnaissance-level site visit conducted in July 2006.

FEATHER AND YUBA RIVER FISHERIES RESOURCES

The lower Feather and Yuba Rivers support a diverse assemblage of native and nonnative species (Table 5.4-3, “Fishes Present in the Lower Feather and Yuba Rivers”). Anadromous and other migratory species include Central Valley fall-run chinook salmon, Central Valley spring-run chinook salmon, Central Valley steelhead, white sturgeon, green sturgeon, Pacific lamprey, striped bass, and American shad. Juvenile winter-run chinook salmon may also periodically move into the lower Feather River during their downstream migrations in the Sacramento River.

Table 5.4-3
Fishes Present in the Lower Feather and Yuba Rivers

Common Name	Scientific Name	Native (N) or Introduced (I)
Green sturgeon	*Acipenser medirostris*	N
White sturgeon	*Acipenser transmontanus*	N
Sacramento sucker	*Catostomus occidentalis*	N
Riffle sculpin	*Cottus gulosus*	N
Tule perch	*Hysterocarpus traski*	N
Pacific lamprey	*Lampetra tridentata*	N
California roach	*Lavinia symmetricus*	N
Hardhead	*Mylopharodon conocephalus*	N
Central Valley steelhead	*Oncorhynchus mykiss*	N
Rainbow trout	*Oncorhynchus mykiss*	N
Sacramento River winter-run chinook salmon	*Oncorhynchus tshawytscha*	N
Central Valley spring-run chinook salmon	*Oncorhynchus tshawytscha*	N
Central Valley fall/late fall–run chinook salmon	*Oncorhynchus tshawytscha*	N
Sacramento splittail	*Pogonichthys macrolepidotus*	N
Sacramento pikeminnow	*Ptychocheilus grandis*	N
Speckled dace	*Rhinichthys osculus*	N
American shad	*Alosa sapidissima*	I
Mosquitofish	*Gambusia affinis*	I
Green sunfish	*Lepomis cyanellus*	I
Bluegill	*Lepomis macrochirus*	I
Redear sunfish	*Lepomis microlophus*	I
Smallmouth bass	*Micropterus dolomieui*	I
Striped bass	*Morone saxatilus*	I

Sources: California Department of Fish and Game 1991, Moyle 2002

Special-Status Species

Special-status fish species are legally protected or are otherwise considered sensitive by federal, state, or local resource conservation agencies and organizations. Special-status fish species addressed in this section include:

- species listed as threatened or endangered under ESA or CESA;
- species identified by USFWS, NMFS, or DFG as species of special concern; and
- species fully protected in California under the California Fish and Game Code.

A total of nine special-status fish species have the potential to occur in the lower Feather and Yuba Rivers, as described below. Of the nine species, green sturgeon, Central Valley steelhead

Evolutionarily Significant Unit (ESU), Sacramento River winter-run chinook salmon ESU, and Central Valley spring-run chinook salmon ESU are federally listed as endangered or threatened species. Sacramento River winter-run chinook salmon ESU and Central Valley spring-run chinook salmon ESU are also listed as endangered species under CESA. USFWS delisted Sacramento splittail from its threatened status on September 22, 2003. NMFS determined that listing is not warranted for Central Valley fall-/late fall–run chinook salmon. However, this species is still designated a species of concern by NMFS and species of special concern by DFG because of concerns about specific risk factors. The three remaining species (Pacific lamprey, California roach, and hardhead) are considered species of special concern by DFG and/or federal species of concern by NMFS or USFWS. Brief descriptions follow for the special-status species with potential to occur in the lower Feather and Yuba Rivers (Table 5.4-4).

Table 5.4-4
Special-Status Fish Species Potentially Occurring in the Lower Feather and Yuba Rivers

Species	Status [1]		Habitat	Potential to Occur in the Lower Feather River
	USFWS/ NMFS	DFG		
Green sturgeon *Acipenser medirostris*	T	--	Requires cold, freshwater streams with suitable gravel for spawning; rears seasonally inundated floodplains, rivers, tributaries, and Delta	Occurs in the lower Feather River; may occur in the lower Yuba River
Pacific lamprey *Lampetra tridentada*	SC	--	Requires cool, freshwater streams with suitable gravel for spawning	Occurs in the lower Feather and Yuba Rivers
California roach *Lavinia symmetricus* sp.	--	SSC	Spawning occurs in pools and side pools of rivers and creeks; juveniles rear in pools of rivers and creeks	Occurs in the lower Feather and Yuba Rivers
Hardhead *Mylopharodon conocephalus*	--	SSC	Spawning occurs in pools and side pools of rivers and creeks; juveniles rear in pools of rivers and creeks, and in shallow to deeper water of lakes and reservoirs	Occurs in the lower Feather and Yuba Rivers
Central Valley steelhead ESU *Oncorhynchus mykiss*	T	--	Requires cold, freshwater streams with suitable gravel for spawning; rears in seasonally inundated floodplains, rivers, and tributaries, and in the Delta	Occurs in the lower Feather and Yuba Rivers
Sacramento River winter-run chinook salmon ESU *Oncorhynchus tshawytscha*	E	E	Requires cold, freshwater streams with suitable gravel for spawning; rears in seasonally inundated floodplains, rivers, and tributaries, and in the Delta	Occurs in the Sacramento River and tributaries; adults and juveniles may stray into the Feather River; unlikely to occur adjacent to the project site

Table 5.4-4
Special-Status Fish Species Potentially Occurring in the Lower Feather and Yuba Rivers

Species	Status [1]		Habitat	Potential to Occur in the Lower Feather River
	USFWS/ NMFS	DFG		
Central Valley spring-run chinook salmon ESU *Oncorhynchus tshawytscha*	T	T	Requires cold, freshwater streams with suitable gravel for spawning; rears in seasonally inundated floodplains, rivers, and tributaries, and in the Delta	Occurs in the lower Feather and Yuba Rivers
Central Valley fall/late fall–run chinook salmon *Oncorhynchus tshawytscha*	--	SSC	Requires cold, freshwater streams with suitable gravel for spawning; rears in seasonally inundated floodplains, rivers, and tributaries, and in the Delta	Occurs in the lower Feather and Yuba Rivers
Sacramento splittail *Pogonichthys macrolepidotus*	DT	SSC	Spawning and juvenile rearing from winter to early summer in shallow weedy areas inundated during seasonal flooding in the lower reaches and flood bypasses of the Sacramento River, including the Yolo Bypass	Occurs in the lower Feather and Yuba Rivers

Notes: DFG = California Department of Fish and Game; ESU = Evolutionarily Significant Unit; NMFS = National Marine Fisheries Service; USFWS = U.S. Fish and Wildlife Service

[1] Legal Status Definitions

Federal Listing Categories (USFWS and NMFS)
- E Endangered (legally protected)
- T Threatened (legally protected)
- DT Recently delisted from threatened status
- SC Species of Concern

State Listing Categories (DFG)
- E Endangered (legally protected)
- T Threatened (legally protected)
- FP Fully Protected (legally protected, no take allowed)
- SSC Species of Special Concern (no formal protection)

Source: Data compiled by EDAW in 2006 from the California Natural Diversity Database (2006), past environmental impact reports addressing the project area, and sources cited in this section

Oroville Dam is the upstream limit of anadromous fish migration in the Feather River. Most of the water released from Oroville Reservoir is diverted at Thermalito Diversion Dam into the Thermalito Complex. During controlled releases, water is released at a constant rate of 600 cubic feet per second (cfs) through the Fish Barrier Dam to the Feather River Fish Hatchery and then into the low-flow section of the Feather River. This 8-mile reach, which extends downstream to the Thermalito Afterbay outlet, provides important spawning and rearing habitat for fall- and spring-run chinook salmon and steelhead. Fourteen miles of additional spawning and rearing habitat exists between the Thermalito Afterbay outlet and the mouth of Honcut Creek, which is located upstream of the FRLRP project area (see Figure 2-1, “Regional Setting,” in Chapter 2).

Englebright Dam is the upstream limit of anadromous fish migration in the Yuba River. The lower Yuba River supports natural production of fall-run chinook salmon, steelhead, Pacific lamprey, and American shad. Spring-run chinook salmon also occur in the lower Yuba River, but

the origin (natural versus hatchery) and population status of these fish are unclear. American shad and striped bass occur seasonally downstream of Daguerre Point Dam. Resident species include Sacramento sucker, Sacramento pikeminnow, hardhead, rainbow trout, and largemouth and smallmouth bass.

Descriptions of the special-status species and some of the other key species supported by the lower Feather and Yuba Rivers are provided below.

Special-Status Species

Green Sturgeon

Green sturgeon (*Acipenser medirostris*) has recently has been listed as threatened by NMFS (71 *Federal Register* [FR] 17757, April 7, 2006). Green sturgeon occur in the lower reaches of large rivers, including the Sacramento and San Joaquin River basins, and in the Eel, Mad, Klamath, and Smith Rivers. Green sturgeon is found primarily in the Sacramento River and occasionally in the lower Feather River. Green sturgeon adults and juveniles occur throughout the upper Sacramento River, based upon observations incidental to winter-run chinook monitoring at the Red Bluff Diversion Dam in Tehama County (National Marine Fisheries Service 2005). Green sturgeon spawn predominantly in the upper Sacramento River. They are thought to spawn every 3–5 years (Tracy 1990). Their spawning period is March to July, with a peak from mid-April to mid-June (Moyle et al. 1992). Juveniles inhabit the Bay-Delta estuary until they are approximately 4–6 years old, when they migrate to the ocean (Kohlhorst et al. 1991).

Pacific Lamprey

Similar to chinook salmon and steelhead (described below), Pacific lamprey (*Lampetra tridentata*) adults migrate upstream from the ocean during the winter and spring to spawn (Moyle 2002). Spawning occurs over gravel substrates. Larval lamprey rear in sand and mud substrates, gradually moving downstream over the rearing period. Little is known about their habitat needs or population trends. Pacific lamprey is a federal species of concern.

California Roach

California roach (*Lavinia symmetricus* sp.) are distributed throughout the state; however, there is a specific subspecies found in the Sacramento River drainage (excluding the Pit River). California roach occupy small, warm streams with intermittent flow in midelevation foothills. Dense populations often occur in isolated pools. They are tolerant of high temperatures (30 degrees Celsius [ºC] to 35ºC) and low oxygen levels, although they also can be found in cold, well-oxygenated systems; human-modified habitats; and the main channels of larger rivers (Moyle 2002). The subspecies found in the Sacramento River system, including the Feather and Yuba Rivers, is a California species of special concern.

Hardhead

Hardhead (*Mylopharodon conocephalus*) are widely distributed throughout the low- to mid-elevation streams in the main Sacramento–San Joaquin River drainage, including the Feather and Yuba Rivers. Undisturbed portions of larger streams at low to middle elevations are preferred by

hardhead. Hardhead are able to withstand summer water temperatures above 20ºC; however, they will select lower temperatures when they are available. Hardhead are fairly intolerant of low-oxygen waters, particularly at higher water temperatures. Pools with sand-gravel substrates and slow water velocity are the preferred habitat; adult fish inhabit the lower half of the water column, while the juvenile fish remain in the shallow water closer to the stream edges. Hardhead typically feed on small invertebrates and aquatic plants at the bottom of quiet water (Moyle 2002). Hardhead is a federal species of concern and a California species of special concern.

Central Valley Steelhead

Historically, Central Valley steelhead (*Oncorhynchus mykiss*) spawned and reared in most of the accessible upstream reaches of Central Valley rivers, including the Yuba, Feather, and Sacramento Rivers and their perennial tributaries. Steelhead generally migrated farther than chinook salmon (described below) into tributaries and headwater streams where cool, well-oxygenated water is available year round.

In the Central Valley, steelhead are now restricted to the upper Sacramento River downstream of Keswick Reservoir; the lower reaches of large tributaries downstream of impassable dams; small, perennial tributaries of the Sacramento River mainstem and large tributaries; and the Bay-Delta system.

Population estimates of steelhead on the Feather River have not been performed; however, since 1967 an average of approximately 900 steelhead have returned each year to the Feather River Fish Hatchery (California Department of Fish and Game 2006).

The upstream migration of adult steelhead in the mainstem Sacramento River historically started in July, peaked in September, and continued through February or March. Central Valley steelhead spawn mainly from January through March, but spawning has been reported from late December through April (McEwan and Jackson 1996). During spawning, the female digs a redd (gravel nest) in which she deposits her eggs, which are then fertilized by the male. Egg incubation time in the gravel is determined by water temperature, varying from approximately 19 days at an average water temperature of 15.5ºC to approximately 80 days at an average temperature of 14.5ºC (McEwan and Jackson 1996).

Steelhead fry usually emerge from the gravel 2–8 weeks after hatching (Barnhart 1986, Reynolds et al. 1993), between February and May, sometimes extending into June (California Department of Fish and Game 1991). Newly emerged steelhead fry move to shallow, protected areas along streambanks but move to faster, deeper areas of the river as they grow. Juvenile steelhead feed on a variety of aquatic and terrestrial insects and other small invertebrates.

Juvenile steelhead rear throughout the year and may spend 1–3 years in fresh water before emigrating to the ocean. Smoltification, the physiological adaptation that juvenile salmonids undergo to tolerate saline waters, occurs in juveniles as they begin their downstream migration. Smolting steelhead generally emigrate from March to June (California Department of Fish and Game 1991).

NMFS completed a status review of steelhead populations in Washington, Oregon, Idaho, and California, and identified 15 ESUs in this range. On August 9, 1996, NMFS issued a proposed

rule to list five of these ESUs (including the Central Valley steelhead) as endangered under ESA, and five as threatened (61 FR 155). The Central Valley steelhead ESU was later listed as threatened (downgraded from its proposed status of endangered) (63 FR 13347, March 19, 1998), and critical habitat (which included the lower Feather and Yuba Rivers) was designated for this ESU (65 FR 7764, February 16, 2000). However, following a lawsuit (*National Association of Home Builders et al. v. Donald L. Evans, Secretary of Commerce, et al.*) (see "Central Valley Spring-Run Chinook Salmon" below), NMFS rescinded the listing. After further review, critical habitat for the Central Valley steelhead ESU was designated on August 12, 2005. Critical habitat is designated to include select waters in the Sacramento and San Joaquin River basins, including the Feather and Yuba Rivers.

Sacramento River Winter-Run Chinook Salmon

Sacramento River winter-run chinook salmon (*Oncorhynchus tshawytscha*) do not spawn in the Feather or Yuba Rivers, but juveniles may periodically move into the lower portions of these systems during downstream migration.

Juvenile winter-run chinook salmon rear and emigrate in the Sacramento River from July through March (Hallock and Fisher 1985). Juveniles descending the Sacramento River above Red Bluff Diversion Dam (RBDD) from August through October, and possibly November, are mostly presmolts (smolts are juveniles that are physiologically ready to enter seawater) and probably rear in the Sacramento River below RBDD. Juveniles have been observed in the Delta from October through December, especially during high Sacramento River discharges caused by late fall and early winter storms.

Cover structures, space, and food are necessary components of rearing habitat for all races of chinook salmon. Suitable habitat includes areas with instream and overhead cover in the form of undercut banks; downed trees; and large, overhanging tree branches. The organic materials forming fish cover also help provide sources of food, in the form of both aquatic and terrestrial insects. Growth of juvenile chinook salmon in floodplain habitat is fast relative to growth in river habitat. Juvenile salmon have been found to have growth rates in excess of 1 millimeter (mm) per day when they rear in flooded habitat and as much as 20 mm in 2–3 weeks (Jones & Stokes 2001). The water temperature is typically higher in floodplain habitat than in main channel habitats. Although increased temperature increases metabolic requirements, the productivity in flooded habitat is also increased, resulting in higher growth rates (Sommer et al. 2001). The production of drift invertebrates in the Yolo Bypass has been found to be one to two times greater than in the river (Sommer et al. 2001). Also, grasses that are flooded support invertebrates that are also a substantial source of food for rearing juveniles. Increased areas resulting from flooded habitat can also reduce the competition for food and space and potentially decrease the possible encounters with predators (Sommer et al. 2001). Juvenile chinook salmon that grow faster are likely to migrate downstream sooner, which helps to reduce the risks of predation and competition in freshwater systems.

Juvenile chinook salmon in the Sacramento River move out of upstream spawning areas into downstream habitats in response to many factors, including inherited behavior, habitat availability, flow, competition for space and food, and water temperature. The number of juveniles that move and the timing of movement are highly variable. Storm events and the

resulting high flows appear to trigger movement of substantial numbers of juvenile chinook salmon to downstream habitats. In general, juvenile abundance in the Delta increases as flow increases (U.S. Fish and Wildlife Service 1993).

Winter-run salmon smolts may migrate through the Delta and bay to the ocean from December through as late as May (Stevens 1989). The Sacramento River channel is the main migration route through the Delta. Adult winter-run chinook salmon spend 1–3 years in the ocean. About 67% of the adult escapement that leaves the ocean to spawn in the Sacramento River consists of 3-year-olds, 25% consists of 2-year-olds, and 8% consists of 4-year-olds (Hallock and Fisher 1985).

Adult winter-run chinook salmon leave the ocean and migrate through the Delta into the Sacramento River from November through July. Salmon migrate upstream past RBDD from mid-December through July, and most of the spawning population has passed RBDD by late June.

Winter-run chinook salmon spawn from mid-April through August, and incubation continues through October. The primary spawning grounds in the Sacramento River are above RBDD. As mentioned above, adult winter-run chinook salmon do not enter the Feather or Yuba Rivers.

Central Valley Spring-Run Chinook Salmon

Central Valley spring-run chinook salmon (*Oncorhynchus tshawytscha*) historically were the second most abundant run of Central Valley chinook salmon (Fisher 1994). They occupied the headwaters of all major river systems in the Central Valley where there were no natural barriers. Adults returning to spawn ascended the tributaries to the upper Sacramento River, including the Pit, McCloud, and Little Sacramento Rivers. They also occupied Cottonwood, Battle, Antelope, Mill, Deer, Stony, Big Chico, and Butte Creeks, and the Feather, Yuba, American, Mokelumne, Stanislaus, Tuolumne, Merced, San Joaquin, and Kings Rivers. Spring-run chinook salmon migrated farther into headwater streams where cool, well-oxygenated water is available year round.

Current surveys indicate that remnant, nonsustaining spring-run chinook salmon populations may be found in Cottonwood, Battle, Antelope, and Big Chico Creeks (California Department of Water Resources 1997). More sizable, consistent runs of naturally produced fish are found only in Mill and Deer Creeks. The Feather River Fish Hatchery sustains the spring-run population on the Feather River, but the genetic integrity of that run is questionable (California Department of Water Resources 1997). Estimates since 1953 on the Feather River indicate that numbers of spring-run returning to the hatchery average around 2,115, although the estimates have increased dramatically since 1990 (California Department of Fish and Game 2006).

Juveniles display considerable variation in stream residence and migratory behavior. Juvenile spring-run chinook salmon may leave their natal streams as fry soon after emergence or rear for several months to a year before migrating as smolts or yearlings (Yoshiyama et al. 1998). Triggers for downstream movement are similar to those described above for winter-run chinook salmon.

Historical records indicate that adult spring-run chinook salmon enter the mainstem Sacramento River in February and March and continue to their spawning streams, where they then hold in deep, cold pools until they spawn. Spring-run are sexually immature during their spawning migration. Some adult spring-run chinook salmon start arriving in the Feather River below the Fish Barrier Dam in June. They remain there until the fish ladder is opened in early September. Spawning and rearing requirements for spring-run chinook salmon are similar to those identified above in the discussion for winter-run chinook salmon.

Spawning occurs in gravel beds in late August through October, and emergence takes place in March and April. Spring-run chinook salmon appear to emigrate at two different life stages: fry and yearlings. Fry move between February and June, while the yearling spring-run emigrate October to March, peaking in November (Cramer and Demko 1997).

On March 9, 1998 (63 FR 11481), NMFS issued a proposed rule to list spring-run chinook salmon as endangered. NMFS designated the Central Valley spring-run chinook as threatened on September 16, 1999 (64 FR 50393). On February 5, 1999, the California Fish and Game Commission listed spring-run chinook salmon as threatened under CESA. Critical habitat had originally been designated for Central Valley spring-run chinook salmon by NMFS (65 FR 7764, February 16, 2000). However, following a lawsuit (*National Association of Home Builders et al. v. Donald L. Evans, Secretary of Commerce, et al*.), NMFS rescinded the listing. After further review, critical habitat for the Central Valley spring-run chinook salmon ESU was designated on August 12, 2005. Critical habitat is designated to include select waters in the Sacramento and San Joaquin River basins, including the Feather and Yuba Rivers.

Central Valley Fall-/Late Fall–Run Chinook Salmon

Spawning escapement surveys on the Feather River are conducted between the Oroville Fish Barrier Dam and the Thermalito Afterbay outlet and between the afterbay outlet and the Gridley boat ramp above Honcut Creek. Annual estimates (since 1953) of the population of fall-/late fall–run chinook salmon (*Oncorhynchus tshawytscha*) based on spawning escapement survey counts and hatchery returns have averaged approximately 49,000 fish (California Department of Fish and Game 2006).

Spawning and rearing requirements for fall-/late fall–run chinook salmon are similar to those identified above in the discussion for winter-run chinook salmon. Juvenile fall-/late fall–run chinook salmon typically rear in fresh water (in their natal streams, the Sacramento River, and the Delta) for up to 5 months before entering the ocean. Juveniles migrate downstream during January through June. Juvenile chinook salmon prefer water depths of 0.5–3.3 feet and velocities of 0.26–1.64 feet per second (Raleigh et al. 1986). Important winter habitat for juvenile chinook salmon includes flooded bars, side channels, and overbank areas with relatively low water velocities. Juvenile chinook salmon have been found to successfully rear in floodplain habitat, which routinely floods but is dry at other times. Growth rates appear to be enhanced by the conditions found in floodplain habitat.

Fall-/late fall–run chinook salmon emigrate as fry and subyearlings and remain off the California coast during their ocean migration (63 FR 11481, March 9, 1998).

Adult fall-/late fall–run chinook salmon enter the Sacramento and San Joaquin River systems from July through April and spawn from October through February. During spawning, the female digs a redd (gravel nest) in which she deposits her eggs, which are then fertilized by the male. Optimal water temperatures for egg incubation are 6.7º–12.2ºC (Rich 1997). Newly emerged fry remain in shallow, lower-velocity edgewaters, particularly where debris congregates and makes the fish less visible to predators (California Department of Fish and Game 1998). The duration of egg incubation and time of fry emergence depends largely on water temperature. In general, eggs hatch after a 3- to 5-month incubation period, and alevins (yolk-sac fry) remain in the gravel until their yolk-sacs are absorbed (2–3 weeks).

Sacramento Splittail

Recent data indicate that Sacramento splittail (*Pogonichthys macrolepidotus*) occur in the Sacramento River as far upstream as RBDD (Sommer et al. 1997) and that some adults spend the summer in the mainstem Sacramento River rather than returning to the estuary (Baxter 1999). The distribution and extent of spawning and rearing along the mainstem Sacramento River is unknown.

Sacramento splittail spawn over flooded terrestrial or aquatic vegetation in lower reaches of the Sacramento River between early March and May (Wang 1986, Moyle et al. 1995, Moyle 2002). Spawning has been observed to occur as early as January and to continue through July (Wang 1986). Larval splittail are commonly found in the shallow, vegetated areas where spawning occurs. Larvae eventually move into deeper, open-water habitats as they grow and become juveniles. During late winter and spring, young-of-year juvenile splittail (i.e., those less than 1 year old) are found in floodplain habitat, sloughs, rivers, and Delta channels near spawning habitat. Juvenile splittail gradually move from shallow, nearshore habitats to the deeper, open-water habitats of Suisun and San Pablo Bays (Wang 1986). In areas upstream of the Delta, juvenile splittail can be expected to be present in the flood basins (i.e., Sutter and Yolo Bypasses and the Sacramento River) when these areas are flooded during the winter and spring.

In 1999, after 4 years of candidate status, the splittail was listed as threatened under ESA (64 FR 25, March 10, 1999). Fall midwater trawl surveys indicate that abundance of juvenile splittail has been highly variable from year to year, with peaks and declines coinciding with wet and dry periods, respectively, and correlated with the availability of flooded shallow-water habitat. After the listing, the State Water Contractors, the San Luis and Delta-Mendota Water Authority, and others challenged the listing, contending that it violated ESA and the Administrative Procedures Act. On June 23, 2000, the U.S. District Court in Fresno ruled in favor of the plaintiffs and found the listing unlawful. On September 22, 2003, USFWS delisted splittail as a threatened species, indicating that habitat restoration actions such as CALFED and the Central Valley Project Improvement Act are likely to keep the splittail from becoming endangered in the foreseeable future (68 FR 55139, September 22, 2003).

Other Key Species Supported by the Lower Feather and Yuba Rivers

American Shad

American shad (*Alosa sapidissima*) is an anadromous fish species that has been introduced into the Central Valley and has become established as a popular sport fish. American shad enter the Feather and Yuba Rivers to spawn during the spring (primarily May and June) and support a seasonal fishery downstream of the dams. Shad abundance increases at higher Yuba River flows relative to flows in the Feather and Sacramento Rivers (Painter et al. 1977).

Sacramento Sucker

Sacramento sucker (*Catostomus occidentalis*) is widely distributed throughout the Sacramento River system. Sacramento sucker occupy waters from cold, high-velocity streams to warm, nearly stagnant sloughs. They are common at moderate elevations (600–2,000 feet). Sacramento sucker feed on algae, detritus, and benthic invertebrates. They usually spawn for the first time in their fourth or fifth years. When they cannot move upstream and instead spawn in lake habitat, they typically orient themselves near areas where spring freshets flow into the lake. They typically spawn in stream habitat on gravel riffles from late February to early June. The eggs hatch in 3–4 weeks, and the young typically live in the natal stream for a couple of years before moving downstream to a reservoir or large river (Moyle 2002).

Striped Bass

Striped bass (*Morone saxatilus*) is an anadromous fish that has been an important part of the sport-fishing industry in the Delta. They were introduced into the Sacramento–San Joaquin estuary between 1879 and 1882 (Moyle 2002). Striped bass will not typically use fish ladders; therefore, their range in the lower Feather and Yuba Rivers is limited to the river reaches below dams. Striped bass may move into the lower reaches of the rivers year round but probably most often between April and June, when they spawn. The species tends to remain in deep, slow-moving water, where it has access to prey without having to expend a great deal of energy.

Sacramento Pikeminnow

Sacramento pikeminnow (*Ptychocheilus grandis*) occupy rivers and streams throughout the Sacramento–San Joaquin River system, mainly at elevations between 300 and 2,000 feet. The Yuba, Feather, and Sacramento Rivers support populations of Sacramento pikeminnow. Sacramento pikeminnow spawn in April and May, with eggs hatching in less than a week. Within a week of hatching, the fry are free-swimming and schooling.

Adult pikeminnow may feed on other fish, including juvenile pikeminnow, chinook salmon, and steelhead. According to Moyle (2002), they are overrated as predators on salmonid species in natural environments. They can, however, be major predators on juvenile salmon and steelhead in riverine environments modified by dams and fish ladders. Pikeminnow tend to remain in well-shaded, deep pools with sand or rock substrate and are less likely to be found in areas where there are higher numbers of introduced predator species, such as largemouth bass and other centrarchid species.

5.4.3 ENVIRONMENTAL IMPACTS

THRESHOLDS OF SIGNIFICANCE

Thresholds for determining the significance of impacts related to fisheries were based on the environmental checklist form in Appendix G of the California Environmental Quality Act Guidelines (State CEQA Guidelines). A project alternative would have a significant impact on aquatic resources if it would:

- substantially reduce or degrade the habitat of a state or federal special-status species, potentially resulting in a reduction in special-status species abundance;
- directly or indirectly reduce the growth, survival, or reproductive success of substantial numbers of federal candidate species; state-listed endangered, threatened, rare, or special-concern species; or regionally important commercial or game species;
- directly or indirectly reduce the growth, survival, or reproductive success of individuals of a species listed or proposed for listing as threatened or endangered under ESA;
- substantially interfere with, or prevent the movement or migration of, any fish species;
- substantially reduce any fish populations; or
- substantially reduce the quality and quantity of important habitat for any fish species or their prey species.

The term "substantial," in relation to a reduction in a fish population, its habitat, or its range, has not been quantitatively defined in CEQA. What is considered substantial varies with each species and with the circumstances pertinent to a particular geographic area. Impacts were considered less than significant if they did not meet at least one of the criteria listed above. The specific criteria regarding construction effects, water quality effects, habitat effects, and fish movement that were used to determine the significance of impacts on fish are described in the impact analysis. Effects on fish were considered for populations in the lower Feather and Yuba Rivers.

IMPACT ANALYSIS

Alternative 1 – The Levee Strengthening Alternative

Impact LS-5.4-a

Loss of Fish Habitat during Levee Repair and Strengthening Activities. Construction-related increases in sediments, turbidity, and contaminants could adversely affect fish habitats immediately adjacent to and downstream of project construction activities, possibly resulting in adverse effects on fish species listed or proposed for listing as threatened or endangered under ESA. This impact would be **potentially significant**.

Strengthening the existing left (east) bank Feather River levee and left (south) bank Yuba River levee would disturb soils along the top, and potentially the water side, of the existing levees. Any resulting erosion could temporarily increase turbidity and sedimentation downstream of the construction sites if soils are transported in river flows or stormwater runoff. (See Impact LS-5.3-

a in Section 5.3, "Water Resources and River Geomorphology," for additional discussion of this issue.)

Fish population levels and survival have been linked to levels of turbidity and siltation in a watershed. Prolonged exposure to high levels of suspended sediment could create a loss of visual capability in fish, leading to a reduction in feeding and growth rates; a thickening of the gill epithelia, potentially causing the loss of respiratory function; clogging and abrasion of gill filaments; and increases in stress levels, reducing the tolerance of fish to disease and toxicants (Waters 1995).

Also, high levels of suspended sediments would cause the movement and redistribution of fish populations, and could affect physical habitat. Once suspended sediment is deposited, it could reduce water depths in pools, decreasing the water's physical carrying capacity for juvenile and adult fish (Waters 1995). Increased sediment loading could degrade food-producing habitat downstream of the project area as well. Sediment loading could interfere with photosynthesis of aquatic flora and displace aquatic fauna. Many fish are sight feeders, and turbid waters reduce the ability of these fish to locate and feed on prey. Some fish, particularly juveniles, could become disoriented and leave areas where their main food sources are located, ultimately reducing their growth rates.

Avoidance is the most common result of increases in turbidity and sedimentation. Fish will not occupy areas unsuitable for survival unless they have no other option. Some fish, such as bluegill and bass species, will not spawn in excessively turbid water (Bell 1991). Therefore, FRLRP Alternative 1 could cause fish habitat to become limited if high turbidity resulting from construction-related erosion were to preclude a species from occupying habitat required for specific life stages.

In addition, the potential exists for contaminants such as fuels, oils, and other petroleum products used in construction activities to be introduced into the water system directly or through surface runoff. Contaminants may be toxic to fish or may alter oxygen diffusion rates and cause acute and chronic toxicity to aquatic organisms, thereby reducing growth and survival.

Any of the impact mechanisms listed above could directly or indirectly reduce the growth, survival, or reproduction success of individuals of a species listed or proposed for listing as threatened or endangered under ESA. Therefore, this impact would be potentially significant.

Impact LS-5.4-b

Loss of Overhead Cover and Instream Woody Material Associated with Levee Repair and Strengthening Activities. Small amounts of riparian vegetation (i.e., individual trees) may need to be removed or cleared at the waterside toe of the existing levee during repairs at erosion problem areas in project Segment 2. The loss of overhead cover for fish would be negligible and temporary, however, and revegetation would occur over time. Therefore, this impact would be **less than significant**.

No riparian habitat is located on the surface of the existing Feather and Yuba River levees in the project area and no losses of riparian habitat are anticipated during the repair and strengthening of these levees. However, small amounts of riparian vegetation (i.e., individual trees) that potentially provide overhead cover for fish or contribute instream woody material to the Feather River, may need to be removed or cleared from the waterside toe of the existing levee during the

correction of identified erosion problem areas in project Segment 2 (see Figure 4-1, "FRLRP Project Features," in Chapter 4). Removal of riparian vegetation adjacent to the existing levee or otherwise in the floodplain would be minor and temporary, and revegetation would occur over time. Effects on fish habitat would be negligible. Therefore, this impact would be less than significant.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impact ASB-5.4-a

Loss of Fish Habitat during Levee Repair and Strengthening Activities and Setback Levee Construction. Construction-related increases in sediments, turbidity, and contaminants could adversely affect fish habitats immediately adjacent to and downstream of project construction activities, possibly resulting in adverse effects on fish species listed or proposed for listing as threatened or endangered under ESA. This impact would be **potentially significant**.

This impact would be the same as Impact LS-5.4-a, described under Alternative 1 above, except that the areas of construction disturbance and potential contribution of sediments to fish habitat would be expanded with construction of the Above Star Bend (ASB) setback levee in project Segment 2. Under Alternative 2, removal of portions of the existing Feather River levee in Segment 2 and clearing and excavation at the potential borrow area would disturb soils in the floodplain or adjacent to drainage canals that discharge into the floodway. Any erosion resulting from project construction could temporarily increase turbidity and sedimentation downstream of the construction sites if soils are transported in high river flows or stormwater runoff. This impact would be potentially significant.

Impact ASB-5.4-b

Loss of Overhead Cover and Instream Woody Material Associated with Setback Levee Construction. In project Segment 2, vegetation may need to be removed to allow drainage from the levee setback area to the river channel, or it may be cleared at the waterside toe of the existing levee to accommodate levee removal. The loss in overhead cover for fish would be limited and temporary, however, and revegetation would occur over time. Therefore, this impact would be **less than significant**.

For project Segments 1 and 3 this impact would be the same as Impact LS-5.4-b, described under Alternative 1 above, with no effect on riparian vegetation associated with levee repairs. In Segment 2, small amounts of riparian vegetation that potentially provide overhead cover for fish or contribute instream woody material to the Feather River channel, could be cleared on the water side of the existing levee if drainage channels need to be constructed to allow drainage of the levee setback area to the Feather River channel. Removal of portions of the existing levee also could result in a minor loss of riparian vegetation along the waterside toe of the existing levee. Removal of any riparian vegetation or woody material in the floodplain would be minor and entirely offset by increased riparian habitat within the alignment of the existing levee over time. Effects on fish habitat would be negligible. Therefore, this impact would be less than significant.

Impact ASB-5.4-c

Effects on Habitat from Contaminants in Borrow Material. If contaminants are present in soil in the levee setback area or in borrow material used for the setback levee, they could be released when the area is inundated during flood events, resulting in harm to sensitive fish and habitat. This impact would be **potentially significant**.

Some of the borrow material for construction of the setback levee in project Segment 2 would be obtained from segments of the existing Feather River levee and some would be obtained from soil borrow area(s) between the setback levee alignment and the Feather River and/or east of Star Bend. Because of the age of the existing levee and the unknown condition of the proposed borrow areas, there is potential for soil material used in the setback levee to contain elevated levels of hazardous substances. Other disturbed soils in the proposed levee setback area could contain such substances as well. (See Impact ASB-5.3-g in Section 5.3, "Water Resources and River Geomorphology," for additional discussion of this issue.) If present, hazardous substances could be released into flowing water when it enters the levee setback area and could harm sensitive fish and habitat resources. This impact would be potentially significant.

Impact ASB-5.4-d

Fish Stranding Following Flooding of the Levee Setback Area. Following construction of the setback levee, the levee setback area may contain depressions where water could pond following inundation and fish could become trapped as floodwaters recede to the main river channel. Stranded fish, particularly juvenile chinook salmon and steelhead, would be exposed to predators and increasing water temperatures; with no means to return to the river, they would inevitably die. This impact would be **significant**.

Because it would increase the extent of floodplain habitat potentially available to native fishes for rearing, the proposed ASB levee setback would be expected to have long-term fisheries benefits. However, following periods when high flows pass through the levee setback area, receding floodwater could collect in existing ponds, channels and ditches, borrow areas, and other depressions there. Fish that enter the floodway during higher flows, particularly juvenile chinook salmon and steelhead, could become stranded in these areas. Fish that are trapped in such depressions for long periods of time would experience high mortality rates as a result of lethal water temperatures, poor water quality, predation, or desiccation of these areas. Because stranding could adversely affect populations of special-status fish species, this impact would be significant.

Impact ASB-5.4-e

Increased Aquatic and Riparian Habitat in the Levee Setback Area. Setting back the Feather River levee in project Segment 2 could allow the expansion of the available aquatic and riparian habitat corridor and could improve the success of fish species that use the area. This effect would be **potentially beneficial**.

The levee system along much of the lower Feather and Yuba Rivers limits aquatic and riparian habitats to relatively narrow corridors. Setting back the levee along the proposed ASB setback levee alignment would widen the lower Feather River floodway by as much as approximately 0.5 mile. This action would expand the available floodplain habitat for fish.

Floodplains provide important seasonal habitat for native fish species during the winter and spring flood periods. For this reason, a key restoration goal of CALFED is to improve the connectivity between rivers and floodplain habitat, as well as increase the amount of shallow-water habitat in the Central Valley (CALFED Bay-Delta Program 2001). Numerous studies have

shown that shallow water and dense vegetation in these areas provide highly productive rearing areas for numerous species, including chinook salmon and splittail. Seasonally flooded habitat provides rearing habitat for chinook salmon and spawning, rearing, and foraging habitat for splittail (Sommer et al. 1997, 2001, 2002; Baxter et al. 1996; Moyle et al. 2000; Jones & Stokes 1999). Floodplain habitat offers protection from large piscivorous fish such as striped bass. The temporary nature of the flooded habitat and the protection offered by relatively shallow water and dense vegetative cover serve to exclude predatory fish. The productivity of floodplains is generally related to the frequency, timing, water depths, velocities, vegetation, water quality, and duration of inundation relative to the life history and habitat requirements of fish species. Physical conditions (e.g., type and extent of vegetation, soil conditions, and drainage patterns) may also contribute to habitat quality.

Flooded vegetation provides an abundant source of food, including detrital material, insect larvae, crustaceans, and other invertebrates. Juvenile chinook salmon and splittail apparently forage among a variety of vegetation types, including trees, brush, and herbaceous vegetation, but their relative importance, alone or in combination, is unknown. As noted in Section 5.4.2, "Environmental Setting," juvenile chinook salmon that rear in seasonally flooded habitat have higher survival and growth rates than juveniles that remain in the main river channel to rear (Jones & Stokes 1999, Sommer et al. 2001). The increased rate of growth may be related to the higher temperatures in the shallow water in this habitat and the higher associated rate of production of invertebrates, which are a substantial source of food for rearing juveniles, and of the grasses that support the invertebrates. Increases in the area available to juveniles could also reduce the competition for food and space, and could reduce the likelihood of encounters with predators (Sommer et al. 2001). In addition, juvenile chinook salmon that grow faster are likely to migrate downstream sooner, which helps to reduce the risks of predation and competition in freshwater systems.

In summary, widening the floodway by setting back the levee would expand the available habitat for fish. The newly created floodplain could create refugia for fish during peak flows even if the habitat is only temporary. Many of these benefits would occur even if the levee setback area continued in agricultural operations. If habitat restoration were undertaken in all or part of the levee setback area, this could help reverse regional riparian habitat losses; increase the effective amount and quality of habitat available to fish; and improve the conveyance capacity of the floodplain to provide migration corridors for, and sustain, fish populations. Providing wider floodplains and larger habitat units is especially important for migratory fish species, such as salmon and steelhead. Because the proposed ASB levee setback could increase the extent of floodplain habitat potentially available to native fishes for rearing, this impact would be potentially beneficial.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impact IS-5.4-a

Loss of Fish Habitat during Levee Repair and Strengthening Activities and Setback Levee Construction. This impact would be the same as Impact ASB-5.4-a, described under Alternative 2 above. For the same reasons as described above, this impact would be **potentially significant**.

Impact IS-5.4-b

Loss of Overhead Cover and Instream Woody Material Associated with Setback Levee Construction. This impact would be the same as Impact ASB-5.4-b, described under Alternative 2 above. For the same reasons as described above, this impact would be **less than significant**.

Impact IS-5.4-c

Effects on Habitat from Contaminants in Borrow Material. If contaminants are present in soil in the levee setback area or in borrow material used for the setback levee, they could be released when the area is inundated during flood events, resulting in harm to sensitive fish and habitat. This impact would be **potentially significant**.

This impact would be the same as Impact ASB-5.4-c, described under Alternative 2 above, except that the areas of potential contamination (the levee setback area and the setback levee alignment) would be smaller under this alternative. This impact would be potentially significant.

Impact IS-5.4-d

Fish Stranding Following Flooding of the Levee Setback Area. Following construction of the setback levee, the levee setback area may contain depressions where water could pond following inundation and fish become trapped as floodwaters recede to the main river channel. Stranded fish, including chinook salmon and steelhead, would be exposed to predators and increasing water temperatures; with no means to return to the river, they would inevitably die. This impact would be **significant**.

This impact would be the same as Impact ASB-5.4-d, described under Alternative 2 above, except that there would be a smaller amount of land with potential stranding areas in the levee setback area with the intermediate setback levee alignment. This impact would be significant.

Impact IS-5.4-e

Increased Aquatic and Riparian Habitat in the Levee Setback Area. Setting back the Feather River levee in project Segment 2 could allow the expansion of the available aquatic and riparian habitat corridor and could improve the success of fish species that use the area. This effect would be **potentially beneficial**.

This impact would be the same as Impact ASB-5.4-e, described under Alternative 2 above, except that setting back the levee along the intermediate setback levee alignment would expand the Feather River floodway less than would a levee setback along the ASB setback levee alignment. Therefore, the potential for benefits to fish species would be reduced. However, this impact would remain potentially beneficial.

5.4.4 MITIGATION MEASURES

ALTERNATIVE 1 – THE LEVEE STRENGTHENING ALTERNATIVE

No mitigation is required for Impact LS-5.4-b (loss of overhead cover and instream woody material associated with construction). Mitigation is provided below for Impact LS-5.4-a (habitat loss during construction).

LS-5.4-a(1): Prepare a SWPPP, File an NOI, and Comply with the NPDES Stormwater Permit for Project Construction Activities. This measure is identical to Mitigation Measure LS-5.3-a(1) in Section 5.3, "Water Resources and River

Geomorphology." This mitigation, together with Mitigation Measure LS-5.4-a(2), would reduce the potential temporary impact to a less-than-significant level.

LS-5.4-a(2): Obtain a Use Permit from Yuba County and Comply with Permit Conditions for Erosion Control. This measure is identical to Mitigation Measure LS-5.3-a(2) in Section 5.3, "Water Resources and River Geomorphology." This mitigation, together with Mitigation Measure LS-5.4-a(1), would reduce the potential temporary impact to a less-than-significant level.

ALTERNATIVE 2 – THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impacts ASB-5.4-b (loss of overhead cover and instream woody material associated with construction) and ASB-5.4-e (changes in aquatic and riparian habitat in the levee setback area). Mitigation is provided below for Impacts ASB-5.4-a (habitat loss during construction), ASB-5.4-c (borrow material effects on habitat), and ASB-5.4-d (fish stranding).

ASB-5.4-a(1): Prepare a SWPPP, File an NOI, and Comply with the NPDES Stormwater Permit for Project Construction Activities. This measure is identical to Mitigation Measure LS-5.3-a(1) in Section 5.3, "Water Resources and River Geomorphology." This mitigation, together with Mitigation Measures ASB-5.4-a(2) and ASB-5.4-a(3), would reduce the potential temporary impact to a less-than-significant level.

ASB-5.4-a(2): Obtain a Use Permit from Yuba County and Comply with Permit Conditions for Erosion Control. This measure is identical to Mitigation Measure LS-5.3-a(2) in Section 5.3, "Water Resources and River Geomorphology." This mitigation, together with Mitigation Measures ASB-5.4-a(1) and ASB-5.4-a(3), would reduce the potential temporary impact to a less-than-significant level.

ASB-5.4-a(3): Obtain and Comply with Terms and Conditions of a Streambed Alteration Agreement for Construction Activities Associated with the Setback Levee. This mitigation, together with Mitigation Measures ASB-5.4-a(1) and ASB-5.4-a(2), would reduce the potential temporary impact to a less-than-significant level.

Three Rivers Levee Improvement Authority (TRLIA) or its representative shall consult with DFG regarding potential disturbance to fish habitat as part of the process for obtaining a streambed alteration agreement, pursuant to Section 1602 of the California Fish and Game Code, for construction work associated with the setback levee. TRLIA shall comply with conditions set forth in the streambed alteration agreement to protect fish habitat.

Implementing Mitigation Measures ASB-5.4-a(1), ASB-5.4-a(2), and ASB-5.4-a(3) together would reduce the potential temporary impact on fish habitat immediately adjacent to and downstream of project construction activities to a less-than-significant level.

ASB-5.4-c(1): Conduct a Phase I Environmental Site Assessment for the Levee Setback Area and Implement Recommendations. This measure is identical to Mitigation Measure ASB-5.3-g(1) in Section 5.3, "Water Resources and River Geomorphology." This mitigation, together with Mitigation Measures ASB-5.4-

c(2) and ASB-5.4-c(3), would reduce the potential impact to a less-than-significant level.

ASB-5.4-c(2): Evaluate Levee Borrow Material for Potential Contaminants in Coordination with the RWQCB. This measure is identical to Mitigation Measure ASB-5.3-g(2) in Section 5.3, "Water Resources and River Geomorphology." This mitigation, together with Mitigation Measures ASB-5.4-c(1) and ASB-5.4-c(3), would reduce the potential impact to a less-than-significant level.

ASB-5.4-c(3): Remove Nonhazardous Waste and Debris from the Levee Setback Area. This measure is identical to Mitigation Measure ASB-5.3-g(3) in Section 5.3, "Water Resources and River Geomorphology." This mitigation, together with Mitigation Measures ASB-5.4-c(1) and ASB-5.4-c(2), would reduce the potential impact to a less-than-significant level.

ASB-5.4-d: Develop and Implement a Drainage and Grading Plan that Minimizes Loss or Incidental Loss of Fish from Stranding. This mitigation would reduce the impact to a less-than-significant level.

TRLIA and its primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize the potential for fish stranding in the levee setback area:

(a) Plan and implement drainage improvements. TRLIA or its designated construction contractors, through a combination of grading and drainage improvements, shall minimize the potential for floodwater to pond in the levee setback area in such a way that substantial numbers of fish become stranded and consequently become exposed to hostile environments (warm water temperatures and increased predation).

As part of the development of the final design for the levee setback area, TRLIA or its representatives shall determine the specific topographic and hydrologic characteristics of the levee setback area and shall define the anticipated flooding regime (depth, duration, and extent of flooding), drainage patterns, and potential for fish stranding risks there. The final project design shall include recontouring as necessary to ensure complete drainage and provide fish passage back to the main river channel as floodflows recede from the levee setback area. Features with substantial stranding risk shall be identified for filling and/or grading.

Complete drainage is important to reduce the risk of stranding; however, maintaining some seasonal aquatic habitat in the levee setback area and/or hydrologic connectivity to the Feather River may also be important features if enhancement of fish habitat and production is selected as a management activity in the levee setback area.

Before the design of the setback levee and levee setback area is finalized, TRLIA or its representatives shall obtain the approval of DFG and NMFS indicating that the planned drainage and grading features are sufficient to address concerns about fish stranding potential, similar to the process used for the Feather-Bear Rivers Levee Setback Project

currently under construction downstream. The features of the setback levee and levee setback area shall be constructed in accordance with the approved final design.

(b) Monitor the success of the drainage features and adjust if necessary. A mitigation monitoring plan shall be developed by a qualified biologist on behalf of TRLIA and shall be approved by DFG and NMFS before implementation of the levee setback. This monitoring plan shall evaluate the effectiveness of the grading and drainage features in the levee setback area in reducing the risk of fish stranding and the stability of the drainage features and shall determine the need for maintenance or modification. The monitoring plan shall include provisions for remediation should the design of the levee setback area prove to be unsuccessful in preventing fish stranding. These measures shall include, as appropriate, such activities as regrading or filling depressions in the levee setback area.

The recommended monitoring scheme shall include annual monitoring for a period of 5 years following the removal of any part of the existing levee. Additional monitoring may be required for areas where remediation is necessary. Monitoring is recommended to include the following actions:

- Visual assessment of the levee setback area by a qualified biologist before the flood season (i.e., by October 31). This assessment should note any substantial changes in the overall structure since implementation of the final design for the area, including reestablishment of vegetation and the presence of “holes” or pits.

- A visual survey by a qualified biologist at the end of each event that floods the levee setback area (i.e., after the recession of waters that inundate the floodplain). This survey should identify whether there is any ponding that would result in fish stranding, or whether channels have formed that flow through completely to the low-flow channel of the Feather River.

Following each flood season (i.e., after April 16), a letter report shall be submitted to NMFS and DFG summarizing the overall condition of the floodplain area and any changes that have occurred from the previous year(s). If any remediation measures are required, they shall be outlined in the letter report, along with a schedule specifying when the remediation activities will occur. Appropriate remediation measures shall be implemented as soon as is practicable to minimize the potential for fish stranding while maintaining the desired habitat values (if habitat enhancement is included in the floodplain area) and hydraulic characteristics of the area.

The performance of the mitigation measure shall be considered successful if there is no isolated standing water and/or barriers to fish passage capable of resulting in substantial fish stranding following a flood event that inundates the levee setback area.

Implementing Mitigation Measure ASB-5.4-d would reduce the potential fish stranding impact to a less-than-significant level.

ALTERNATIVE 3 – THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impacts IS-5.4-b (loss of overhead cover and instream woody material associated with construction) and IS-5.4-e (increased aquatic and riparian habitat in the levee setback area). Mitigation is provided below for Impacts IS-5.4-b (habitat loss during construction), IS-5.4-c (borrow material effects on habitat), and IS-5.4-d (fish stranding).

IS-5.4-a(1): **Prepare a SWPPP, File an NOI, and Comply with the NPDES Stormwater Permit for Project Construction Activities.** This measure is identical to Mitigation Measure LS-5.3-a(1) in Section 5.3, "Water Resources and River Geomorphology." This mitigation, together with Mitigation Measures IS-5.4-a(2) and IS-5.4-a(3), would reduce the potential temporary impact to a less-than-significant level.

IS-5.4-a(2): **Obtain a Use Permit from Yuba County and Comply with Permit Conditions for Erosion Control.** This measure is identical to Mitigation Measure LS-5.3-a(2) in Section 5.3, "Water Resources and River Geomorphology." This mitigation, together with Mitigation Measures IS-5.4-a(1) and IS-5.4-a(3), would reduce the potential temporary impact to a less-than-significant level.

IS-5.4-a(3): **Obtain and Comply with Terms and Conditions of a Streambed Alteration Agreement for Construction Activities Associated with the Setback Levee.** This measure is identical to Mitigation Measure ASB-5.4-a(3) above. This mitigation, together with Mitigation Measures IS-5.4-a(1) and IS-5.4-a(2), would reduce the potential temporary impact to a less-than-significant level.

IS-5.4-c(1): **Conduct a Phase I Environmental Site Assessment for the Levee Setback Area and Implement Recommendations.** This measure is identical to Mitigation Measure ASB-5.3-g(1) in Section 5.3, "Water Resources and River Geomorphology." This mitigation, together with Mitigation Measures IS-5.4-c(2) and IS-5.4-c(3), would reduce the potential impact to a less-than-significant level.

IS-5.4-c(2): **Evaluate Levee Borrow Material for Potential Contaminants in Coordination with the RWQCB.** This measure is identical to Mitigation Measure ASB-5.3-g(2) in Section 5.3, "Water Resources and River Geomorphology." This mitigation, together with Mitigation Measures IS-5.4-c(1) and IS-5.4-c(3), would reduce the potential impact to a less-than-significant level.

IS-5.4-c(3): **Remove Nonhazardous Waste and Debris from the Levee Setback Area.** This measure is identical to Mitigation Measure ASB-5.3-g(3) in Section 5.3, "Water Resources and River Geomorphology." This mitigation, together with Mitigation Measures IS-5.4-c(1) and IS-5.4-c(2), would reduce the potential impact to a less-than-significant level.

IS-5.4-d: **Develop and Implement a Drainage and Grading Plan that Minimizes Loss or Incidental Loss of Fish from Stranding.** This measure is identical to

Mitigation Measure ASB-5.4-d above. This mitigation would reduce the impact to a less-than-significant level.

5.4.5 IMPACTS REMAINING SIGNIFICANT AFTER MITIGATION

With implementation of the mitigation described above, all impacts on fisheries would be reduced to a less-than-significant level.

SECTION 5.5 TERRESTRIAL BIOLOGICAL RESOURCES

Terrestrial wildlife, plants, and habitats are discussed in this section. Aquatic biological resources (e.g., fisheries) are addressed in Section 5.4, "Fisheries." The evaluation presented in this section is based on field survey results and a review of existing documentation. EDAW biologists conducted reconnaissance-level and focused biological field surveys of portions of the project area where access was permitted on March 22; May 8, 11, 18, 26, and 31; and July 27, 2006. The purpose of these surveys was to characterize general biological resources, evaluate the potential for sensitive biological resources to occur on the project site, and document locations of breeding raptors.

5.5.1 REGULATORY SETTING

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

Federal Endangered Species Act

The U.S. Fish and Wildlife Service (USFWS) has authority over projects that may affect the continued existence of a federally listed (threatened or endangered) terrestrial species. Section 9 of the federal Endangered Species Act (ESA) prohibits the take of federally listed species; take is defined under ESA, in part, as killing, harming, or harassment. Under federal regulations, take is further defined to include habitat modification or degradation where it actually results in death or injury to wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering.

Section 7 of ESA outlines procedures for federal interagency cooperation to conserve federally listed species and designated critical habitat. Section 7(a)(2) requires federal agencies to consult with USFWS to ensure that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species. The Feather River Levee Repair Project (FRLRP) is expected to require permitting and/or authorization by the U.S. Army Corps of Engineers (Corps); therefore, ESA compliance for the project is anticipated to be completed through Corps compliance with the procedures described in Section 7.

Section 404 of the Clean Water Act

In accordance with Section 404 of the Clean Water Act (CWA), the Corps regulates discharge of dredged or fill material into waters of the United States. Waters of the United States and their lateral limits are defined in Title 33, Part 328.3(a) of the Code of Federal Regulations to include:

- navigable waters of the United States,
- interstate waters,
- all other waters where the use or degradation or destruction of the waters could affect interstate or foreign commerce,
- tributaries to any of these waters, and

- wetlands that meet any of these criteria or that are adjacent to any of these waters or their tributaries.

Waters of the United States are often categorized as "jurisdictional wetlands" (i.e., wetlands over which the Corps exercises jurisdiction under Section 404) and "other waters of the United States" when habitat values and characteristics are being described. "Fill" is defined as any material that replaces any portion of a water of the United States with dry land or that changes the bottom elevation of any portion of a water of the United States. Any activity resulting in the placement of dredged or fill material within waters of the United States requires a permit from the Corps.

In accordance with Section 401 of the Clean Water Act, projects that apply for a Corps permit for discharge of dredged or fill material must obtain water quality certification from the appropriate regional water quality control board (RWQCB) indicating that the project will uphold state water quality standards.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA), first enacted in 1918, implements domestically a series of treaties between the United States and Great Britain (on behalf of Canada), Mexico, Japan, and the former Soviet Union that provide for international migratory bird protection. The MBTA authorizes the Secretary of the Interior to regulate the taking of migratory birds; the act provides that it shall be unlawful, except as permitted by regulations, "to pursue, take, or kill any migratory bird, or any part, nest or egg of any such bird…" (U.S. Code Title 16, Section 703). This prohibition includes both direct and indirect acts, although harassment and habitat modification are not included unless they result in direct loss of birds, nests, or eggs. The current list of species protected by the MBTA includes several hundred species and essentially includes all native birds. The act offers no statutory or regulatory mechanism for obtaining an incidental take permit for the loss of nongame migratory birds.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

California Endangered Species Act

Pursuant to the California Endangered Species Act (CESA), a permit from the California Department of Fish and Game (DFG) is required for projects that could result in the take of a plant or animal species that is state-listed as threatened or endangered. Under CESA, "take" is defined as an activity that would directly or indirectly kill an individual of a species, but the CESA definition of take does not include "harming" or "harassing," as the ESA definition does. As a result, the threshold for take is higher under CESA than under ESA (i.e., habitat modification is not necessarily considered take under CESA).

California Fish and Game Code Sections 3503 and 3503.5—Protection of Bird Nests and Raptors

Section 3503 of the California Fish and Game Code states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. Section 3503.5 specifically states that it is unlawful to take, possess, or destroy any raptors (i.e., species in the orders Falconiformes and Strigiformes), including their nests or eggs. Typical violations of these codes include destruction

of active nests resulting from removal of vegetation in which the nests are located. Violation of Section 3503.5 could also include failure of active raptor nests resulting from disturbance of nesting pairs by nearby project construction. This statute does not provide for the issuance of any type of incidental take permit.

California Fish and Game Code—Fully Protected Species

Protection of fully protected species is described in Sections 3511, 4700, 5050, and 5515 of the California Fish and Game Code. These statutes prohibit take or possession of fully protected species. DFG is unable to authorize incidental take of fully protected species when activities are proposed in areas inhabited by those species. DFG has informed nonfederal agencies and private parties that they must avoid take of any fully protected species in carrying out projects.

California Fish and Game Code Section 1602—Streambed Alteration

All diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake in California that supports wildlife resources are subject to regulation by DFG under Section 1602 of the California Fish and Game Code. Under Section 1602, it is unlawful for any person, governmental agency, or public utility to do the following without first notifying DFG:

> …substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of any river, stream, or lake, or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake.

A stream is defined as a body of water that flows at least periodically or intermittently through a bed or channel that has banks and supports fish or other aquatic life. This definition includes watercourses with a surface or subsurface flow that supports or has supported riparian vegetation. DFG's jurisdiction within altered or artificial waterways is based on the value of those waterways to fish and wildlife. A DFG streambed alteration agreement must be obtained for any project that would result in an impact on a river, stream, or lake.

Porter-Cologne Water Quality Control Act

Under the Porter-Cologne Water Quality Control Act, "waters of the state" fall under the jurisdiction of the appropriate RWQCB (which, for the FRLRP, would be the Central Valley RWQCB). Under the act, the RWQCB must prepare and periodically update water quality control basin plans. Each basin plan sets forth water quality standards for surface water and groundwater, as well as actions to control nonpoint and point sources of pollution to achieve and maintain these standards. Projects that affect wetlands or waters must meet waste discharge requirements of the RWQCB, which may be issued in addition to a water quality certification or waiver under Section 401 of the CWA.

California Native Plant Society Species Designations

The California Native Plant Society (CNPS) is a statewide nonprofit organization that seeks to increase understanding of California's native flora and to preserve this rich resource for future generations. CNPS has developed and maintains lists of vascular plants of special concern in

California as described below under "Special-Status Species." CNPS-listed species have no formal legal protection, but the values and importance of these lists are widely recognized. CNPS List 1 and 2 species are considered rare plants pursuant to Section 15380 of the California Environmental Quality Act (CEQA), and it is recommended that they be fully considered during preparation of environmental documents relating to CEQA.

LOCAL PLANS, POLICIES, REGULATIONS, AND LAWS

The *Yuba County General Plan* (Yuba County 1996) provides overall guidance for resource conservation in Yuba County and includes several resource conservation objectives that aim to protect significant biological resources. Specific habitats identified for special consideration for preservation and protection are the Yuba River, Yuba River watershed, wetlands, and valley oaks (*Quercus lobata*) and oak woodlands in foothill areas. Yuba County has also approved the *Yuba County Voluntary Individual Oak and Oak Woodland Management Plan*. The plan provides management techniques and guidelines for landowners who voluntarily choose to apply them in part or in full, to promote the general health of individual oaks and oak woodlands found upon their land. The plan encourages the retention of oaks of all sizes and species, including hollow or dead trees used for nesting, reforestation of oaks, planning for replacement of oaks, and the removal of trees which are fire or safety hazards.

5.5.2 ENVIRONMENTAL SETTING

SOURCES OF INFORMATION

Information provided in this section is based primarily on the results of field surveys conducted for the FRLRP, surveys conducted by EDAW in support of the Feather-Bear Rivers Levee Setback Project (F-BRLSP), and preparation of previous environmental documents for the Yuba-Feather Supplemental Flood Control Project (Y-FSFCP) and the F-BRLSP (Yuba County Water Agency 2003, 2004). Field surveys in the FRLRP project area could be conducted only in locations where access was permitted. Information on properties where access was not available was gathered by viewing the property from public areas and by analyzing aerial photographs. Additional information was compiled through review of databases of sensitive biological resources, including the California Natural Diversity Database (CNDDB) (California Natural Diversity Database 2006) and the online version of CNPS's *Inventory of Rare and Endangered Vascular Plants of California* (California Native Plant Society 2006).

HABITAT TYPES

Habitat types in the project area are characterized in this section. The descriptions of habitat types and species presence are based on observations made during the reconnaissance-level surveys and information previously presented in the Y-FSFCP programmatic environmental impact report (EIR) (Yuba County Water Agency 2003). Plant community classification is based primarily on *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986).

Six habitat types exist within the project area: riparian forest/scrub, elderberry savanna, wetlands, open-water drainages, ruderal areas, orchards/agricultural land, and development. Each of these habitat types is described briefly below. A Valley elderberry longhorn beetle mitigation area is also present within Segment 3. The location of these habitat types and the valley

elderberry longhorn beetle mitigation area are shown in Figures 5.5-1a, 5.5-1b, and 5.5-1c, "Habitat Types and Elderberry Shrub Locations within the Project Area."

Riparian Forest/Scrub

Riparian habitat in the project area includes Great Valley mixed riparian forest, Great Valley valley oak riparian forest, willow riparian scrub, and elderberry savanna (described separately below). Figures 5.5-1a through 5.5-1c show the extent of riparian habitat in and near the existing Feather River and lower Yuba River levees in all three FRLRP project segments and the proposed levee setback area in project Segment 2.

Riparian Forest

Riparian forest occurs as a broad to narrow band of vegetation within the floodplains of the Feather and Yuba Rivers. Relatively thin corridors of riparian habitat are present along Clark Slough, the Plumas Lake Canal, and irrigation/drainage ditches in the proposed levee setback area in Segment 2. Riparian habitat is characterized by a complex structure, and the dominance of its component species varies along the river.

Great Valley mixed riparian forest is found within the Feather River and Yuba River floodways and, to a lesser extent, along Clark Slough and the Plumas Lakes Canal. This is a deciduous broadleaved forest community with a moderately dense to dense tree canopy that typically includes several species as codominants.

Within the project area the upper canopy of Great Valley mixed riparian forest is typically dominated by valley oak, Fremont cottonwood (*Populus fremontii*), boxelder (*Acer negundo*), Goodding's willow (*Salix gooddingii*), shining willow (*S. lucida* spp. *lasiandra*), red willow (*S. laevigata*), and Oregon ash (*Fraxinus latifolia*). White alder *(Alnus rhombifolia*), northern California black walnut (*Juglans californica* var. *hindsii)*, and western sycamore (*Platanus racemosa*) may also exist in the upper canopy.

The lower shrub canopy is very dense and thicket-like. The dominant species are buttonbush (*Cephalanthus occidentalis*), California rose (*Rosa californica*), blue elderberry (*Sambucus mexicanus*), Himalayan blackberry (*Rubus discolor*), and shrub-like forms of the various willow species listed above. Lianas such as California grape (*Vitis californica*) and virgin's bower (*Clematis ligusticifolia)* are also found in the shrub layer. The herbaceous understory ranges from very developed to sparse depending on the amount of light filtering through the upper canopies, but typically includes various grasses, sedges, and rushes. The Great Valley mixed riparian forest along the existing Feather River levee is very dense and consists mostly of even-aged trees, with scattered, more established trees in some areas. A few mature valley oaks are apparent along the edge of the mixed riparian forest.

Great Valley valley oak riparian forest is generally found in the same areas as mixed riparian forest. Great Valley valley oak riparian forest is a deciduous broadleaved forest community with a closed to somewhat open canopy. This community type is similar to the Great Valley mixed riparian forest community described above but is clearly dominated by valley oak. The lower canopy includes scattered Oregon ash, Northern California black walnut, sycamore, and young valley oak. The sparse to dense shrub layer includes blue elderberry, California rose, coyote

brush (*Baccharis pilularis*), and Pacific blackberry (*Rubus ursinus*). Climbing vines are apparent in openings but may also be found scattered in the shady understory. Common vine species are California pipevine (*Aristolochia californica*), virgin's bower, and California grape. A variety of grasses, sedges, and forbs such as creeping wild-rye (*Leymus triticoides*), mugwort (*Artemesia douglasiana*), and barbara sedge (*Carex barbarae*) exist in the dense to sparse understory.

Riparian Scrub

Willow riparian scrub is a dense, shrub-dominated plant community that exists in patches along the Feather and Yuba Rivers and is also found along drainage/irrigation canals within the proposed levee setback area in project Segment 2. Characteristic willow species in the project area are Goodding's willow, Arroyo willow (*Salix lasiolepis*), and red willow. Blue elderberry shrubs can also be found frequently. This community typically creates dense, impenetrable thickets, but remains fairly short in stature.

Elderberry Savanna

Elderberry savanna is characterized by open stands of blue elderberry with an annual grassland understory. It occurs in project Segments 2 and 3, in areas along the Feather and Yuba River corridors where disturbances have created large gaps in the dense canopies of the mixed and valley oak riparian communities. Also found in this community are scattered coyote brush, rose, Himalayan blackberry, and willow shrubs.

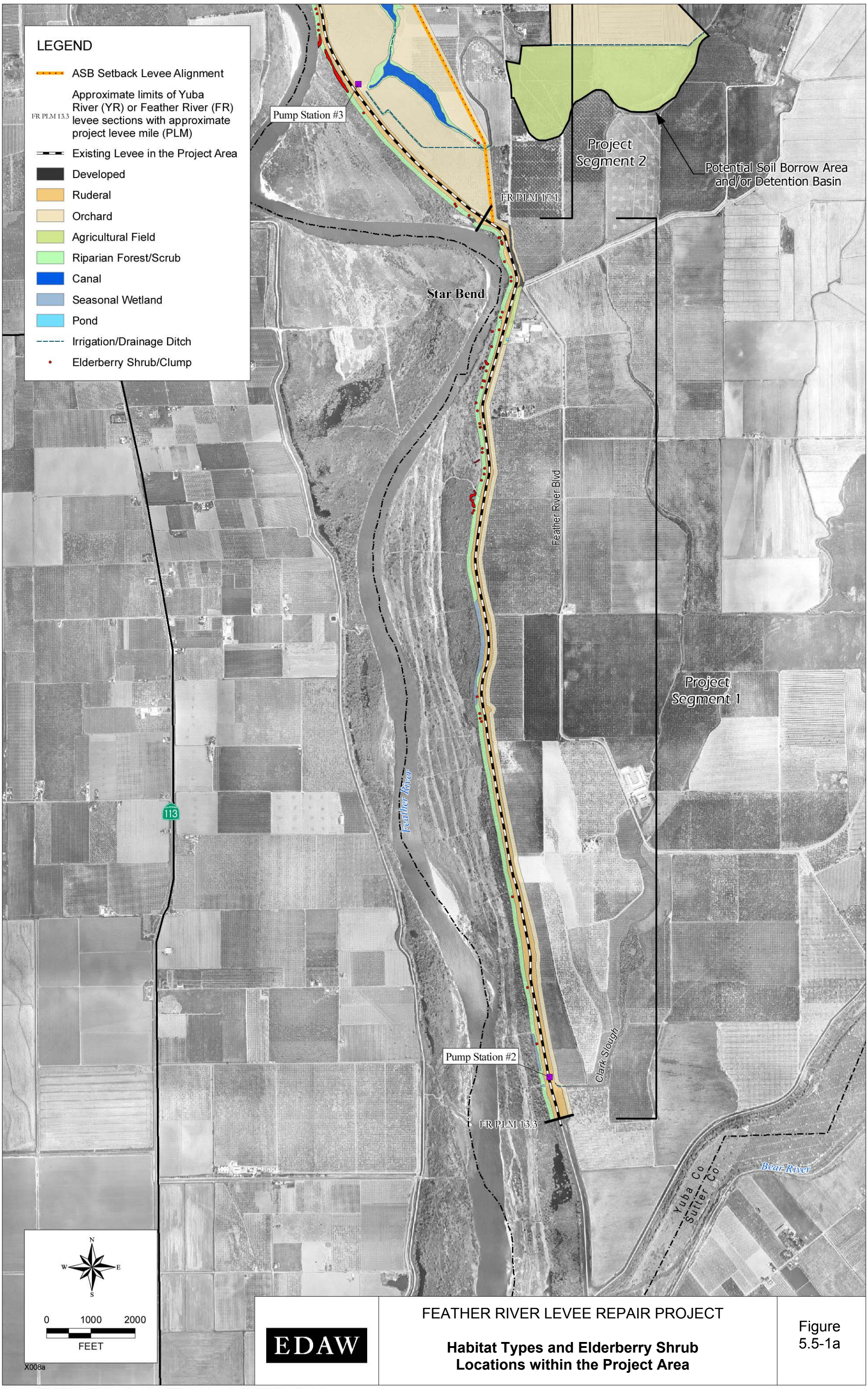
Wetlands

Freshwater marsh and seasonal wetland habitats can be found in project Segments 1 and 2. Wetland areas within the Feather River floodway, the Plumas Lake Canal, and additional drainage/irrigation ditches east of the existing Feather River levee support freshwater marsh vegetation (Figures 5.5-1a and 5.5-1b). Freshwater marshes are permanently flooded and are dominated by emergent perennial monocots, such as cattails (*Typha angustifolia*), sedges (*Carex* spp.), and tules (*Scirpus acutus*). Other characteristic herbaceous species are water primrose (*Ludwigia peploides*), smartweed (*Polygonum* sp.), South American vervain (*Verbena bonariensis*), and reed canarygrass (*Phalaris arundinacea*).

Potential seasonal wetlands exist within the riparian forest on the water side of the existing Feather River levee, primarily in project Segment 2. This area has many large linear depressions that may be a combination of remnant river channels and historical sources of borrow material. These low-lying areas temporarily pond water during the wet, winter season but become dry as the river levels and precipitation decrease in the spring and summer. Species observed in these seasonally wet areas included many of the species found in the riparian forest and willow scrub, but also include areas dominated by monocultures of herbaceous species.

Open-Water Drainages

The Feather and Yuba Rivers are large, perennially flowing drainages in the project area. They are generally open-water habitats lined with riparian forest and willow scrub. The Yuba River has a small side channel that carries high flows between the Feather River and the existing left bank



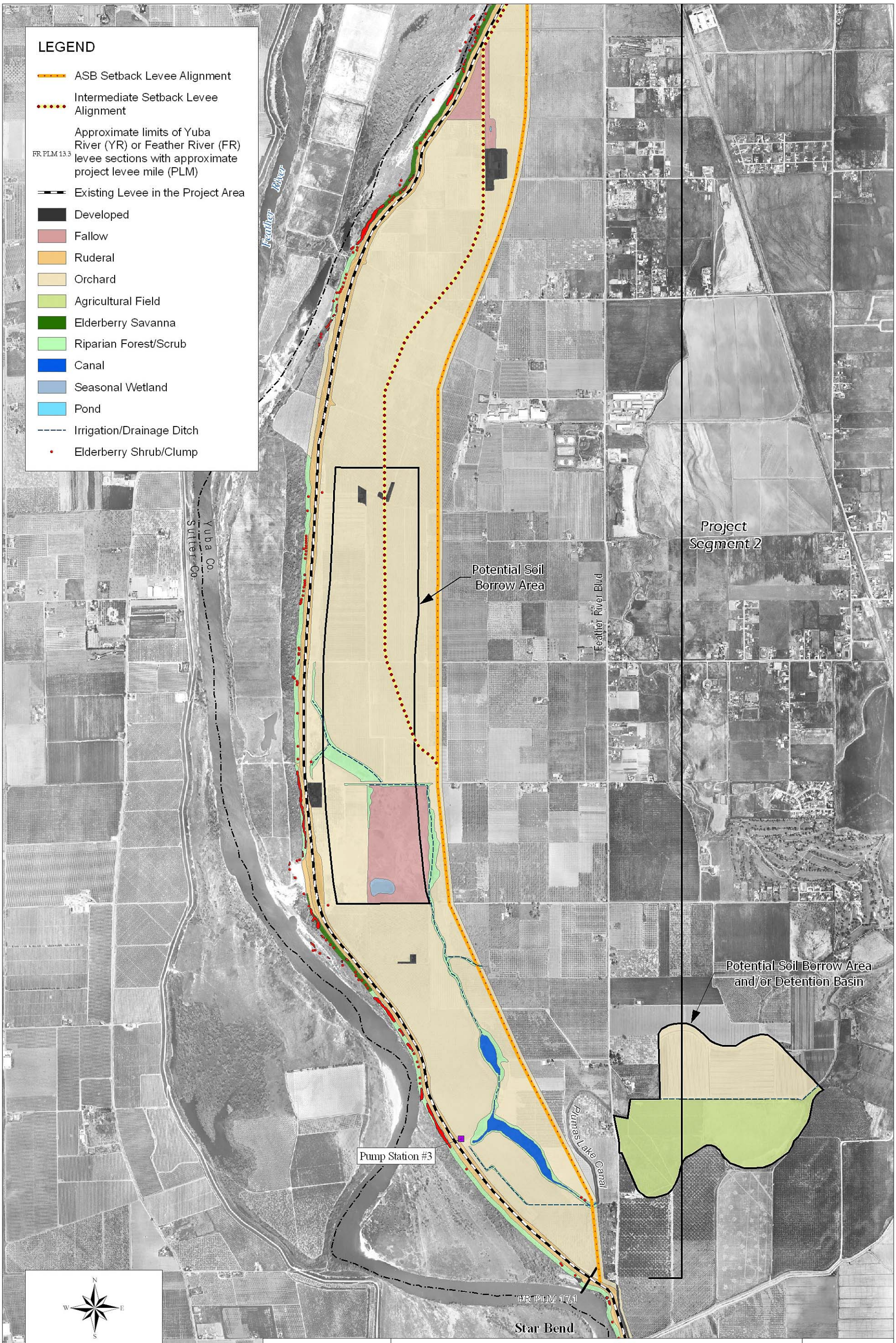
EDAW

FEATHER RIVER LEVEE REPAIR PROJECT

Habitat Types and Elderberry Shrub Locations within the Project Area

Figure 5.5-1a

Sources: EDAW 2006; GEI Consultants, Inc. 2004; Aerial provided by GEI Consultants, Inc.



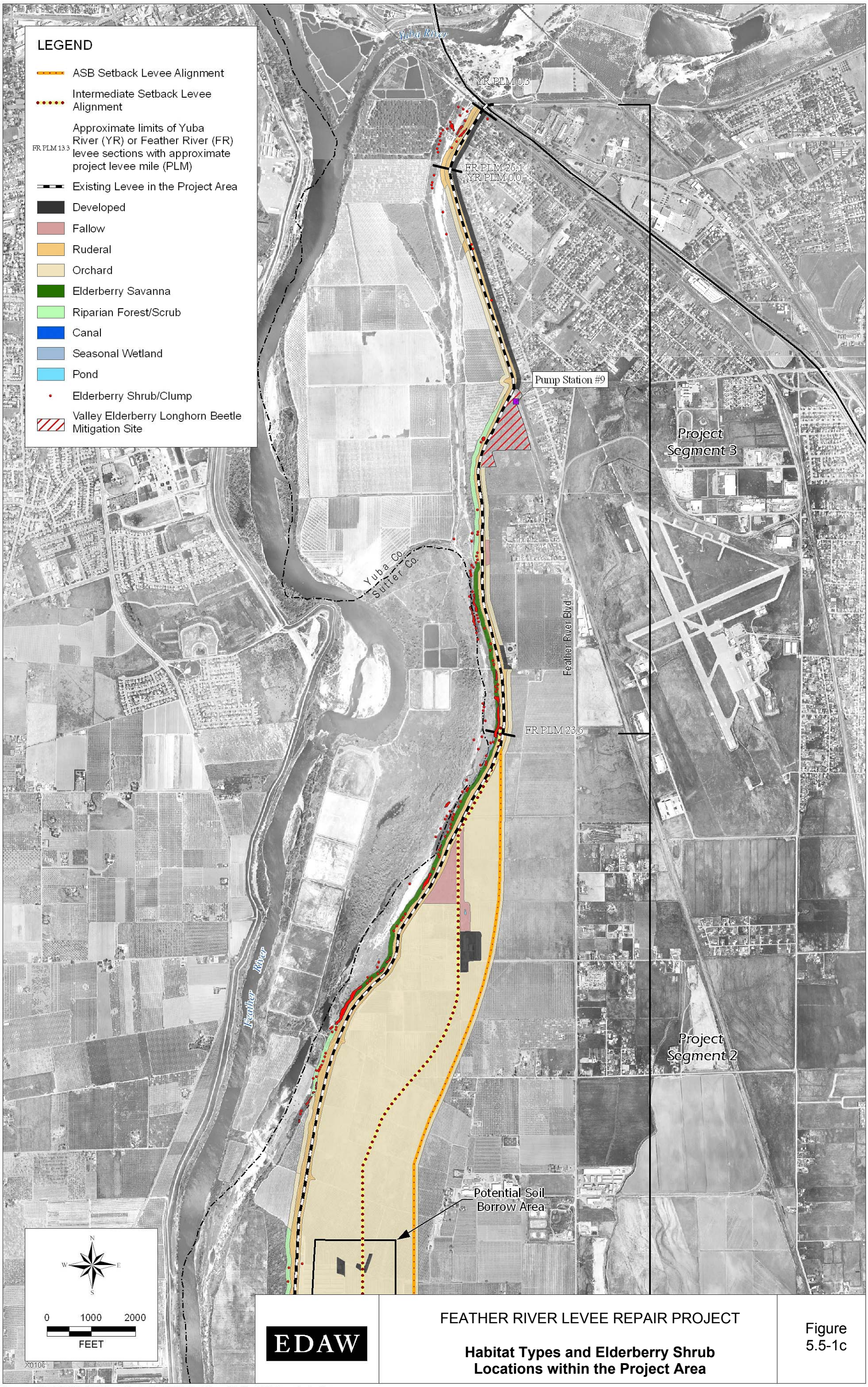
EDAW

FEATHER RIVER LEVEE REPAIR PROJECT

Habitat Types and Elderberry Shrub Locations within the Project Area

Figure 5.5-1b

Sources: EDAW 2006; GEI Consultants, Inc. 2004; Aerial provided by GEI Consultants, Inc.



EDAW

FEATHER RIVER LEVEE REPAIR PROJECT

Habitat Types and Elderberry Shrub Locations within the Project Area

Figure 5.5-1c

Sources: EDAW 2006; GEI Consultants, Inc. 2004; Aerial provided by GEI Consultants, Inc.

levee in project Segment 3. This side channel was not flowing at the time of the reconnaissance surveys, but some sections did contain standing water. Some portions of the channel bed were vegetated with riparian or wetland species and other areas were barren.

Many irrigation/drainage ditches serve to transport water to and from lands on both sides of the existing Feather River levee, including the proposed levee setback area in project Segment 2. Some of these irrigation ditches are maintained regularly and therefore lack vegetation; others are more established canals that are well vegetated. These ditches and canals convey water pumped from the river to orchards and fields of row crops on the land side of the Feather River levee and drain the area to three pump stations (Pump Stations No. 2, 3, and 9 in project Segments 1, 2, and 3, respectively) that lift stormwater and agricultural drainage water into the Feather River floodway.

Ruderal Areas

Ruderal areas are those that have been stripped of their native vegetative cover and that are either covered by gravel or dirt or dominated by weedy invasive species. Ruderal areas are common along the existing Feather River and Yuba River levees in all three project segments and in disturbed areas such as access roads. The levee slopes are generally dominated by nonnative grasses such as wild oats (*Avena fatua*); however, a few native species, including creeping wild rye (*Leymus triticoides*), blue elderberry, and valley oak saplings, have become established in isolated areas on the levee slopes and at the levee toe. The vegetation on the levee slopes is maintained periodically through prescribed fire and/or mowing. An approximately 35-foot-wide corridor along the water side of the existing levees is routinely mowed and/or disked to keep woody riparian vegetation from becoming established. Conspicuous weeds in these ruderal areas are medusahead (*Taeniatherum caput-medusae*), woolly mullein (*Verbascum thapsus*), Canada thistle (*Cirsium arvense*), and yellow star-thistle (*Centaurea solstitialis*).

Orchards/Agricultural Land

Many of the areas between the existing Feather River levee and Feather River Boulevard are dominated by agricultural land. These agricultural areas consist mostly of orchards where fruit and nut crops are grown, as well as some agricultural facilities. Orchards are also maintained in the Feather River floodway in project Segments 2 and 3, between the Feather River and the left (east) bank levee. A small percentage of the agricultural land in the proposed levee setback area in Segment 2 and Feather River floodway was fallow or planted with field crops at the time of the field surveys.

Fallow fields are areas that were previously cultivated, harvested, and plowed, but have not been in agricultural production recently. These lands are characterized primarily by annual grasses and weedy forbs, but they may also include seedlings of some native tree and shrub species, such as willows and cottonwoods. This community type differs from the ruderal classification in that it is not currently subject to ongoing disturbance and is used specifically to describe areas that were previously cultivated.

Developed Land

Developed areas in the project vicinity generally consist of residential structures and other buildings, yards, roads, and parking areas. Developed areas are scattered on the land side of the

existing Feather River and Yuba River levees. An area of relatively high-density commercial and residential development is located at the northern end of project Segment 3. There are several scattered residential properties and other structures within the proposed levee setback area in project Segment 2. Many of the developed areas are devoid of vegetation, but where vegetation exists, it ranges from sparse cover of weedy species to horticultural plantings.

WILDLIFE

The overall quality of wildlife habitat in the project vicinity is high, particularly in project Segment 1 and the southern portion of Segment 2. This is the case primarily because of the extensive corridor of riparian habitat within the existing Feather River floodway and riparian patches associated with the Plumas Lake Canal and other irrigation/drainage ditches within the potential levee setback area in Segment 2. Riparian habitat within the existing Feather River floodway supports a high diversity of terrestrial wildlife species, including a wide range of breeding, migrant, and wintering birds, common reptiles and amphibians, and a variety of mammals.

The large areas of agricultural lands east of the Feather River levee support a lower diversity of wildlife, but can provide valuable habitat for large numbers of common bird, reptile, and mammal species. Field crops, fallow fields, and ruderal areas provide important foraging and nesting habitat for a variety of species. Irrigation/drainage ditches and the aquatic habitats they support provide habitat for amphibians, reptiles, and birds that may not occur elsewhere in the project area.

EDAW surveys conducted in 2006 documented a wide diversity of breeding birds, including seven species of raptors within the project area: Swainson's hawk (*Buteo swainsoni*), northern harrier (*Circus cyaneus*), Cooper's hawk (*Accipiter cooperii*), white-tailed kite (*Elanus leucurus*), red-shouldered hawk (*Buteo lineatus*), red-tailed hawk (*Buteo jamaicensis*), and great horned owl (*Bubo virgineanus*). Mammals observed in the Feather River floodway and adjacent agricultural lands are mule deer (*Odocoileus hemionus*), bobcat (*Lynx rufus*), coyote (*Canis latrans*), black-tailed jackrabbit (*Lepus californicus*), and California ground squirrel (*Spermophilus beecheyii*). A variety of small mammals are also likely to occur and provide prey for the high numbers and diversity of breeding raptors.

SENSITIVE BIOLOGICAL RESOURCES

Sensitive biological resources addressed below are those that are afforded special protection through CEQA, the California Fish and Game Code (including but not limited to CESA), ESA, and the CWA.

Special-Status Species

Special-status species are plants and animals that are legally protected or that are otherwise considered sensitive by federal, state, or local resource conservation agencies and organizations, including:

- plant and wildlife species that are listed by ESA and/or CESA as rare, threatened, or endangered;
- plant and wildlife species considered candidates for listing or proposed for listing;

- wildlife species identified by DFG or USFWS as species of concern;
- wildlife species identified by DFG as fully protected; and
- taxa considered by CNPS to be "rare, threatened, or endangered in California." The CNPS Inventory of Rare and Endangered Vascular Plants of California (CNPS Inventory) (California Native Plant Society 2006) includes five lists for categorizing plant species of concern, which are summarized as follows:
    - List 1A—Plants presumed to be extinct in California
    - List 1B—Plants that are rare, threatened, or endangered in California and elsewhere
    - List 2—Plants that are rare, threatened, or endangered in California but more common elsewhere
    - List 3—Plants about which more information is needed (a review list)
    - List 4—Plants of limited distribution (a watch list)

The term "California Species of Special Concern" is applied by DFG to animals that are not listed under ESA or CESA but are nonetheless declining at a rate that could result in listing, or that historically occurred in low numbers and currently face known threats to their persistence. Plant inventories prepared by CNPS provide one source of substantial evidence that is used by lead agencies to determine what plants meet the definition of endangered, rare, or threatened species, as described in Section 15380 of the State CEQA Guidelines. For purposes of this document, the relevant inventories are List 1B (plants that are rare, threatened, or endangered in California and elsewhere) and List 2 (plants that are rare, threatened, or endangered in California but more common elsewhere). All plants listed in the CNPS Inventory (California Native Plant Society 2006) are considered "special plants" by DFG. The term "special plants" is a broad term used by DFG to refer to all of the plant taxa inventoried by the CNDDB, regardless of their legal or protection status. Notation as a List 1B or 2 plant species does not automatically qualify the species as endangered, rare, or threatened within the definition of State CEQA Guidelines Section 15380. Rather, CNPS designations are considered along with other available information about the status, threats, and population condition of plant species to determine whether a species warrants evaluation as an endangered, rare, or threatened species under CEQA. Other sources include consultation with biologists from federal, state responsible, and state trustee agencies with jurisdiction over natural resources of the project site and area; published and unpublished research; field survey records; local and regional plans adopted for the conservation of species (such as habitat conservation plans or natural community conservation plans), other CEQA or National Environmental Policy Act (NEPA) documents; or other relevant information. Plants on Lists 1A, 1B, and 2 of the CNPS Inventory may qualify for listing, and DFG recommends—and local governments may require—that these species be addressed in CEQA projects. However, a plant species need not be in the CNPS Inventory to be considered a rare, threatened, or endangered species under CEQA.

The CNDDB was used as the primary source to identify previously reported occurrences of special-status species in the project vicinity (California Natural Diversity Database 2006).

Although the CNDDB is the most current and reliable tool for tracking occurrences of special-status species, it contains only those records that have been reported to DFG. To identify additional special-status plant species with potential to occur in the project area, a search of the online edition of CNPS's *Inventory of Rare and Endangered Vascular Plants of California* (California Native Plant Society 2006) was also conducted. CNDDB and CNPS database searches were conducted for the Yuba City, Olivehurst, and Nicolaus U.S. Geological Survey (USGS) quadrangles, as well as the 12 immediately adjacent quadrangles. Other sources include both published and unpublished data and reports and observations made during reconnaissance surveys conducted for the FRLRP. The locations of the CNDDB-recorded occurrences of sensitive terrestrial biological resources in and near the project area are depicted in Figure 5.5-2, "CNDDB-Recorded Occurrences of Biological Resources in the Project Vicinity."

Special-Status Plant Species

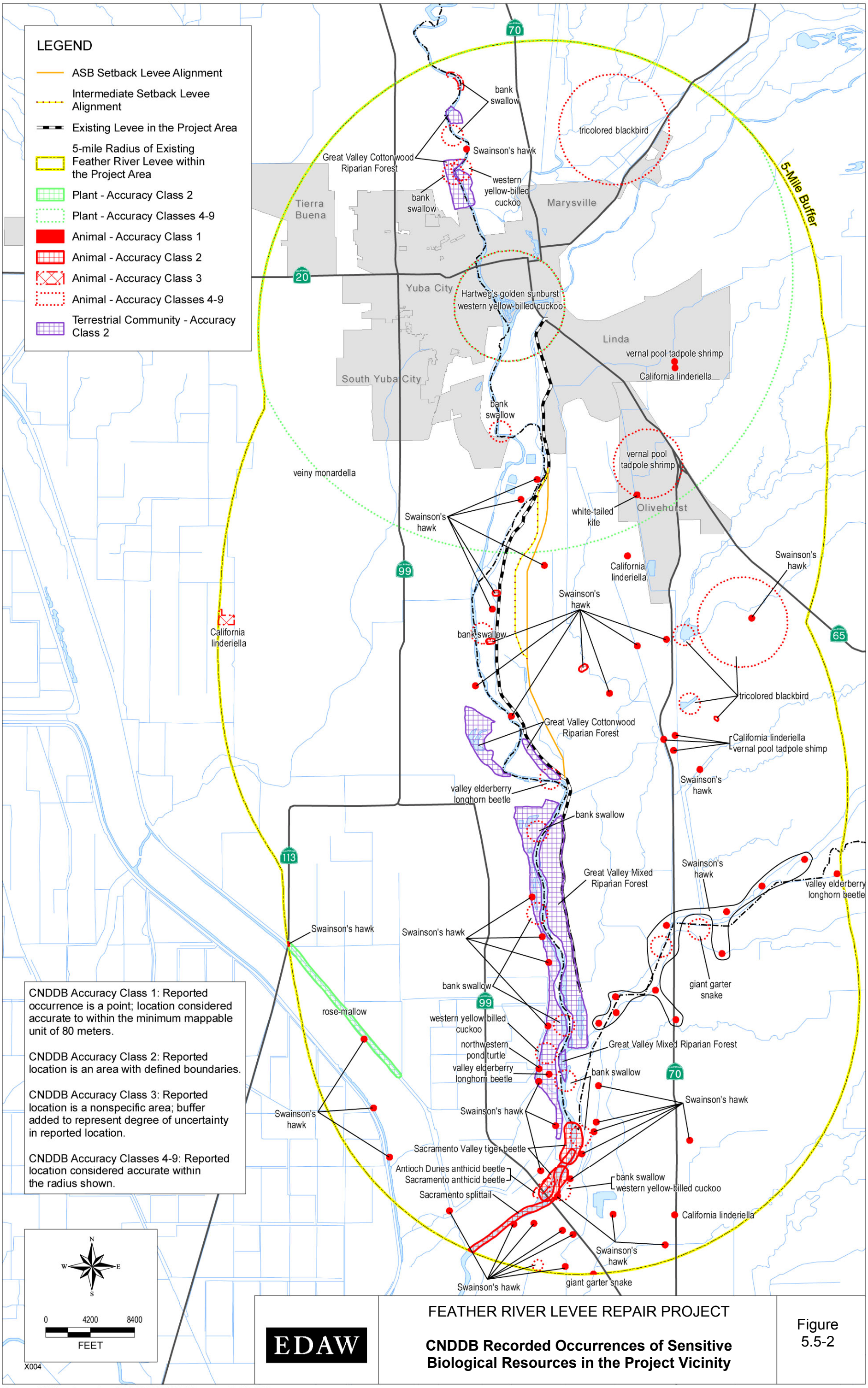
Seven special-status plant species are documented in the CNDDB and CNPS Inventory as occurring in the project vicinity. Each species is listed in Table 5.5-1, along with its status, habitat requirements, blooming periods, and potential for occurrence in the project area. Only two of these species, rose mallow and Wright's trichocoronis, have potential to occur in the project area and are discussed further below. The remaining species are not expected to occur because they are restricted to habitats that are not present in the project area, such as vernal pools, meadows, grasslands, and cismontane woodlands.

Rose mallow (*Hibiscus lasiocarpus*) is a CNPS List 2 plant (plants considered rare, threatened, or endangered in California but more common elsewhere). It is an emergent perennial herb in the mallow family that produces large pink flowers. It blooms from June to September and grows in freshwater marshes and swamps. Suitable habitat for rose mallow exists in the proposed levee setback area in project Segment 2 and includes areas of freshwater marsh within drainage/irrigation canals and ditches.

Wright's trichocoronis (*Trichocoronis wrightii* var. *wrightii*) is also a CNPS List 2 plant. It is an annual herb in the sunflower family. It produces small whitish flowers from May to September and grows in meadows, marshes and swamps, riparian forest, and vernal pools. Suitable habitat for Wright's trichocoronis is provided by freshwater marsh in the drainage/irrigation canals and ditches in the proposed levee setback area in Segment 2, in moist riparian habitats bordering drainage/irrigation canals and ditches, and within the Feather River floodway.

Special-Status Wildlife Species

Based on previously existing information and observations made during field surveys, a total of 15 special-status wildlife species have potential to occur in the project vicinity. The regulatory status, habitat associations, and potential for these species to occur in the project area are summarized in Table 5.5-2. Additional special-status animal species are known to occur in the region. However, based on the reconnaissance field survey and assessment of database records, these species are not expected to occur and were eliminated from further analysis because no suitable habitat occurs in the project area, the species have not been documented in the project vicinity despite numerous biological surveys, and/or the species have very restricted ranges that do not include the project area.



Sources: GEI Consultants, Inc. 2004, CNDDB 2006; Basemap: CaSIL 1998

Table 5.5-1
Special-Status Plant Species with Potential to Occur in the Project Vicinity

Species	Listing Status			Habitat	Distribution	Flowering Period	Potential for Occurrence in the Project Area
	Fed.	State	CNPS				
Ferris's milk-vetch *Astragalus tener* var. *ferrisiae*	—	—	1B	Meadows (vernally mesic), valley and foothill grassland (subalkaline flats); 5–75 meters elevation	Extant in Butte and Glenn counties; extirpated in Colusa, Solano, Sutter, and Yolo Counties	April–May	None; no suitable habitat
Dwarf downingia *Downingia pusilla*	—	—	2	Valley and foothill grassland (mesic), vernal pools; 1–445 meters elevation	Merced, Mariposa, Napa, Placer, Sacramento, Solano, Sonoma, Stanislaus, Tehama, and Yuba Counties; South America	March–May	None; no suitable habitat
Rose mallow *Hibiscus lasiocarpus*	—	—	2	Marshes and swamps (freshwater); 0–120 meters elevation	Butte, Contra Costa, Colusa, Glenn, Sacramento, San Joaquin, Solano, Sutter, and Yolo Counties; widespread outside of California	June–September	Moderate; suitable habitat present along rivers and ditches
Legenere *Legenere limosa*	—	—	1B	Vernal pools; 1–880 meters elevation	Extant in Lake, Napa, Placer, Sacramento, Shasta, San Mateo, Solano, Tehama, and Yuba Counties; extirpated in Sonoma and Stanislaus Counties	April–June	None; no suitable habitat
Veiny monardella *Monardella douglasii* ssp. *venosa*	—	—	1B	Cismontane woodland, valley and foothill grassland/heavy clay; 60–410 meters elevation	Extant in Butte and Tuolumne Counties; extirpated in Sutter County	May–July	None; no suitable habitat
Hartweg's golden sunburst *Pseudobahia bahiifolia*	E	E	1B	Cismontane woodland, valley and foothill grassland/clay; 15–150 meters elevation	Extant in Fresno, Madera, Merced, and Stanislaus Counties; extirpated in Sutter and Yuba Counties	March–April	None; no suitable habitat

Table 5.5-1
Special-Status Plant Species with Potential to Occur in the Project Vicinity

Species	Listing Status			Habitat	Distribution	Flowering Period	Potential for Occurrence in the Project Area
	Fed.	State	CNPS				
Wright's trichocoronis *Trichocoronis wrightii* var. *wrightii*	—	—	2	Meadows, marshes and swamps, riparian forest, vernal pools/alkaline; 5–435 meters elevation	Extant in Merced and Riverside Counties and in Texas, and widespread outside of California; extirpated in Colusa, San Joaquin, and Sutter Counties	May–September	Moderate; suitable habitat present along rivers and ditches

U.S. Fish and Wildlife Service (USFWS) Federal Listing Categories:
E Federally listed as endangered
California Department of Fish and Game (DFG) State Listing Categories:
E State listed as endangered
California Native Plant Society (CNPS) Listing Categories:
1B Plants considered rare, threatened, or endangered in California and elsewhere
2 Plants considered rare, threatened, or endangered in California but more common elsewhere
Sources: California Native Plant Society 2006, California Natural Diversity Database 2006

Table 5.5-2
Special-Status Wildlife Species with Potential to Occur in the Project Vicinity

Species	Listing Status		Habitat	Potential for Occurrence on the Project Site
	USFWS	DFG		
Invertebrates				
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	T	—	Elderberry shrubs, typically within riparian habitat.	May occur on-site. Valley elderberry longhorn beetles have been documented in the project vicinity (California Natural Diversity Database 2006). Elderberry shrubs grow in the Feather River and Yuba River floodways and in the proposed levee setback area in project Segment 2.
Reptiles				
Northwestern pond turtle *Emys marmorata marmorata*	FSC	CSC	Requires some slack- or slow-water aquatic habitat; prefers habitats with prevalence of basking sites.	Pond turtles are known to occur in the project vicinity (California Natural Diversity Database 2006). Suitable habitat is available in the Feather River floodway and in irrigation/drainage ditches and canals in the proposed levee setback area in project Segment 2.

Table 5.5-2
Special-Status Wildlife Species with Potential to Occur in the Project Vicinity

Species	Listing Status		Habitat	Potential for Occurrence on the Project Site
	USFWS	DFG		
Giant garter snake *Thamnophis gigas*	T	T	Open water associated with marshes, sloughs, and irrigation/drainage ditches within the Central Valley; requires developed wetland vegetation for cover.	Low potential but possible within the Plumas Lake Canal and other irrigation/drainage ditches in the proposed levee setback area in Segment 2.
Birds				
Swainson's hawk *Buteo swainsoni*	—	T	Forage in grasslands and agricultural fields; nest in open woodland or scattered trees.	Breeding pairs detected during 2002, 2005, and 2006 field surveys; known to nest in the Feather River floodway and could nest in woodland patches within the proposed levee setback area in project Segment 2.
Northern harrier *Circus cyaneus*	—	CSC	Nests and forages in open grassland, marsh, and agricultural fields.	May nest in ruderal areas and agricultural fields within the proposed levee setback area in Segment 2, and in the Feather River floodway.
Cooper's hawk *Accipiter cooperi*	—	CSC	Forages and breeds in oak woodland and deciduous riparian forest.	May nest in the riparian woodland within the Feather River floodway. Low potential to nest in woodland patches within the proposed levee setback area.
White-tailed kite *Elanus leucurus*	—	CSC FP	Prefers cultivated or marshy bottomlands with scattered tall trees, although will also use oak savannas. Occurs below 2,000 feet.	Known to nest in the Feather River floodway and could nest in woodland patches within the proposed levee setback area.
Western yellow-billed cuckoo *Coccyzus americanus occidentalis*	C	E	Generally occurs in dense riparian habitats.	May nest within the Feather River floodway.
Burrowing owl *Athene cunicularia*	—	CSC	Burrows in grasslands and agricultural areas, and along roads and canals; forages in areas of low-growth vegetation.	Limited potential to occur in the project area. No evidence of burrowing owls was detected during field surveys, and there are no CNDDB records in the vicinity of the project area.
Loggerhead shrike *Lanius ludovicianus*	FSC	CSC	Forages in grasslands and agricultural fields; nests in scattered shrubs and trees.	May nest in trees and shrubs in the proposed levee setback area, and in the Feather and Yuba River floodways. Suitable foraging habitat present throughout the project area.
Bank swallow *Riparia riparia*	—	T	Prefers open and partly open habitat, frequently near flowing water. Nests in steep sand, dirt, or gravel banks.	Documented locations within the Feather River floodway in all three project segments (California Natural Diversity Database 2006). May forage over the proposed levee setback area.

Table 5.5-2
Special-Status Wildlife Species with Potential to Occur in the Project Vicinity

Species	Listing Status		Habitat	Potential for Occurrence on the Project Site
	USFWS	DFG		
Yellow warbler *Dendroica petchia*	—	CSC	Generally occurs in riparian habitat characterized by small trees and shrubby understory.	May nest in the riparian woodland within the Feather River floodway. Low potential to nest in riparian areas within the proposed levee setback areas in project Segment 2.
Yellow-breasted chat *Icteria virens*	—	CSC	Generally occurs in willow riparian thickets and brushy tangles near watercourses.	May nest in the riparian woodland within the Feather River floodway. Low potential to nest in riparian areas within the proposed levee setback areas in project Segment 2.
Tricolored blackbird *Agelaius tricolor*	FSC	CSC	Forages in grasslands and agricultural fields; nests in freshwater marsh with dense cattails and tules, riparian scrub, and other dense shrubs and herbs.	Potential nesting habitat is of marginal quality; however, could nest in riparian scrub and freshwater marsh within the Feather River floodway and proposed levee setback areas in project Segment 2.
Mammals				
Pacific western big-eared bat *Corynorhinus townsendii townsendii*	FSC	CSC	Hibernates in caves, mines, and on old buildings. May roost at night in tree cavities. Forages in a variety of upland habitats.	May roost in snags in the riparian woodland within the Feather River floodway.

U.S. Fish and Wildlife Service (USFWS) Federal Listing Categories:
T Federally listed as threatened
C Candidate for listing
FSC Federal Species of Concern
California Department of Fish and Game (DFG) State Listing Categories:
T State listed as threatened
E State listed as endangered
FP Fully protected
CSC California Species of Special Concern
Source: California Natural Diversity Database 2006

Five of the special-status wildlife species with potential to occur in the project area are federally listed and/or state listed as endangered or threatened: valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), giant garter snake (*Thamnophis gigas*), Swainson's hawk, western yellow-billed cuckoo (*Coccyzus americanus occidentalis*), and bank swallow (*Riparia riparia*). These and other species listed in Table 5.5-2 are discussed further below.

The valley elderberry longhorn beetle is federally listed as threatened. This beetle is generally found in riparian habitats and requires blue elderberry shrubs for survival and reproduction. Valley elderberry longhorn beetle has been documented at the Bobelaine Audubon Sanctuary, located on the west (Sutter County) side of the Feather River, 12 miles south of Yuba City (California Natural Diversity Database 2006) (Figure 5.5-2). (The location of Bobelaine Audubon Sanctuary is shown in Figure 5.1-1, "Existing Conservation Areas in the Project Vicinity," in Section 5.1, "Land Use.")

Many elderberry shrubs occur throughout the Feather River and Yuba River floodways. Shrubs located near the existing Feather River and Yuba River levees are depicted in Figures 5.5-1a, 5.5-1b, and 5.5-1c. Shrubs are also likely to occur along canals and ditches in the proposed levee setback area in project Segment 2. All elderberry shrubs with stems 1 inch or greater in diameter within the range of the valley elderberry longhorn beetle are considered potential habitat for this threatened species.

The northwestern pond turtle is a federal Species of Concern and a California Species of Special Concern. The northwestern pond turtle has been documented along the Feather River in the Bobelaine Audubon Sanctuary (Figure 5.5-2). Suitable basking and nesting habitat for this species exists within portions of the Feather River floodway. Drainage and irrigation ditches and canals in the proposed levee setback area in project Segment 2 provide aquatic habitat suitable to support pond turtles.

Giant garter snake is federally and state listed as threatened. Giant garter snakes inhabit a variety of aquatic habitats, such as agricultural canals, marshes, sloughs, and ponds. Giant garter snakes also require adjacent upland habitat (for basking) and burrows (for overwintering) that provide sufficient cover and are at high enough elevations to function as refuges from floodwaters during the snakes' inactive season (early fall to early spring). A historical population was documented in the project region, east of State Route (SR) 70 near the Bear River approximately 3 miles upstream of the confluence with the Feather River (Figure 5.5-2). Despite the lack of recent records of giant garter snake in the project vicinity, aquatic habitats in the setback area could support giant garter snakes because they are hydrologically connected to areas capable of supporting the species. The rice fields and accompanying irrigation system that existed before extensive residential development west of SR 70 and north of Feather River Boulevard provided habitat and transit corridors for giant garter snakes that may have occupied the region historically. The Plumas Lake Canal is a historical feature capable of sustaining giant garter snakes, and it may support remnant populations of the species. Upland habitat in the proposed levee setback area in project Segment 2 is dominated by agricultural lands; these areas are incompatible with the biological needs of giant garter snake because routine maintenance eliminates belowground refuge. Therefore, undisturbed uplands and potential overwintering habitat is limited to bank margins of the aquatic habitat.

Swainson's hawk is state listed as threatened. This species prefers to nest in scattered riparian or woodland trees adjacent to grasslands and/or agricultural fields that provide suitable foraging habitat. Swainson's hawks are known to occur throughout the project area. At least two breeding pairs were documented in the project area during 2006 field surveys, including an active nest at the southern end of project Segment 1 and a pair just north of Star Bend at the southern end of Segment 2. Agricultural fields and ruderal vegetation in the project area provide suitable foraging habitat for this species.

Other special-status raptors known to occur in the project area are white-tailed kite, Cooper's hawk, and northern harrier. All of these raptors are California Species of Special Concern and protected under Section 3503.5 of the California Fish and Game Code. White-tailed kite is also fully protected under Section 3511 of the California Fish and Game Code. Suitable nesting habitat for white-tailed kite and Cooper's hawk is provided by riparian forest within the Feather River floodway and patches of large trees in the proposed levee setback area in project Segment

2. Cooper's hawks also forage in these forest and woodland habitats. Agricultural fields and ruderal vegetation in the project area provides suitable nesting and foraging habitat for northern harrier and foraging habitat for white-tailed kite. Breeding pairs of all three species were documented in project Segment 1 during 2006 field surveys.

Burrowing owl (*Athene cunicularia*) is a California Species of Special Concern and is protected under Section 3503.5 of the California Fish and Game Code. Burrowing owls prefer dry grasslands and other dry, open habitats. They typically nest and roost in burrow systems created by medium-sized mammals (e.g., ground squirrels), artificial sites (e.g., drain pipes and culverts), or self-excavated burrows, where soil conditions are appropriate. There are no documented records of burrowing owls in the project vicinity, and no individuals or evidence of their presence (e.g., burrows with pellets, whitewash) were observed during field surveys. However, the existing Feather River and Yuba River levees, agricultural field margins, and fallow fields could support burrowing owls if suitable burrows are present. These areas also provide suitable foraging habitat for burrowing owls.

Tricolored blackbird (*Agelaius tricolor*) is a federal Species of Concern and a California Species of Special Concern. Tricolored blackbirds nest colonially and prefer dense cattail patches, but they also utilize blackberry and other patches of dense vegetation. They forage in grasslands and agricultural fields. The nearest tricolored blackbird colonies documented during statewide surveys conducted in 2005 were at Beale Air Force Base, approximately 10 miles east of the project area (USFWS data). There are no records of historic colonies within approximately 2 miles of the project area (California Natural Diversity Database 2006). Despite the lack of known nearby colonies, freshwater marsh and riparian scrub habitats within the Feather River floodway and associated with irrigation/drainage ditches in the proposed levee setback area in project Segment 2 could support a nesting colony in the future. In addition, small flocks of tricolored blackbirds were observed flying over the project area during 2006 surveys and could forage in agricultural fields and other open habitats in the proposed levee setback area.

Western yellow-billed cuckoo is state listed as endangered and is a candidate for federal listing. This species requires relatively large wide patches of cottonwood-willow riparian forests. Potentially suitable habitat for yellow-billed cuckoo exists within the Feather River floodway, primarily in project Segment 1 and the southern portion of Segment 2. Western yellow-billed cuckoo has been documented at the Bobelaine Audubon Sanctuary and in project Segment 3 in the vicinity of the confluence of the Feather and Yuba Rivers (California Natural Diversity Database 2006) (Figure 5.5-2).

Bank swallow is state listed as threatened. This species prefers open and partly open habitat, frequently near flowing water. Individuals nest in steep sand, dirt, or gravel banks. Figure 5.5-2 depicts the locations of four historical colonies that have been documented along the banks of the Feather River in the project vicinity (California Natural Diversity Database 2006). Bank swallows could forage in the project area, but no suitable nesting habitat exists.

Loggerhead shrike (*Lanius ludovicianus*) is a federal Species of Concern and a California Species of Special Concern. Shrikes inhabit lowland and foothill areas with scattered shrubs and trees. Loggerhead shrikes nest in shrubs and small trees and typically forage in grasslands and agricultural fields. Suitable nesting and foraging habitat exists throughout the project area.

Yellow warbler (*Dendroica petechia*) and yellow-breasted chat (*Icteria virens*) are both California Species of Special Concern. Yellow warblers typically nest in riparian habitats with small trees and shrubs typical of low, open-canopy riparian woodland. Yellow-breasted chats typically nest in riparian habitats with a dense shrub layer. No evidence of either species nesting within the project area was documented during 2006 field surveys, although riparian habitats in the project area, primarily within the Feather River floodway, provide suitable foraging habitat and potential nesting habitat.

Pacific western big-eared bat (*Corynorhinus townsendii townsendii*) is a federal Species of Concern and a California Species of Special Concern. This species generally hibernates in caves, mines, or old buildings but may roost in tree cavities. There are no natural and very few potential artificial roosting locations in the project area on the land side of the existing levees. However, snags in the riparian woodland in the Feather River or Yuba River floodway could provide roosting habitat for small numbers of individuals. There are no CNDDB records of past colonies in or near the project area.

Sensitive Habitats

Sensitive habitats are those that are of special concern to resource agencies, or that are afforded specific consideration through CEQA, Section 1602 of the California Fish and Game Code, and/or Section 404 of the CWA, as discussed above in Section 5.5.1, "Regulatory Setting."

Irrigation/drainage canals and ditches with associated freshwater marsh vegetation, seasonal wetlands, and open-water channels would be considered waters of the United States, subject to regulation under CWA Section 404. All riparian habitats are subject to regulation under Section 1600 et seq. of the California Fish and Game Code. Other habitats considered sensitive by DFG are those identified as "rare and worthy of consideration" in natural communities recognized by the CNDDB. These sensitive communities provide essential habitat to special-status species that are often restricted in distribution or decreasing throughout their range. Natural communities within the project vicinity that qualify as sensitive include Great Valley mixed riparian forest, Great Valley valley oak riparian forest, and elderberry savanna.

5.5.3 ENVIRONMENTAL IMPACTS

THRESHOLDS OF SIGNIFICANCE

Thresholds for determining the significance of impacts on biological resources were based on the environmental checklist form in Appendix G of the State CEQA Guidelines. A project alternative would have a significant impact on biological resources if it would:

- have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by DFG or USFWS;
- have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in any local or regional plans, policies, or regulations, or by DFG or USFWS;

- have a substantial adverse effect on federally protected waters of the United States, including wetlands, as defined by Section 404 of the CWA (including but not limited to marshes, vernal pools, rivers, etc.) through direct removal, filling, hydrological interruption, or other means;
- interfere substantially with the movement of any native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;
- conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance;
- conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan; or
- substantially reduce the habitat of a fish and wildlife species, cause a fish or wildlife species to drop below self-sustaining levels, threaten to eliminate a plant or animal community, or reduce the number or restrict the range of an endangered, rare, or threatened species.

The term "substantial" in relation to adverse effects on plant and wildlife resources has not been quantitatively defined in CEQA. What is considered substantial can vary with each species or habitat and with the circumstances pertinent to a particular geographic area. Impacts were considered less than significant if they did not meet at least one of the criteria listed above.

IMPACT ANALYSIS

Alternative 1 – The Levee Strengthening Alternative

Impact LS-5.5-a

Effects on General Biological Resources. Levee repair and strengthening and related activities would result in disturbance and/or loss of vegetation along the Feather and Yuba River levees and at staging areas and detention basin and borrow sites. These areas provide habitat for many common plant and wildlife species. Although local populations of common species could be affected, these species are locally and regionally abundant. This impact would be **less than significant**.

Common plant and wildlife species found along and adjacent to the existing Feather and Yuba River levees and staging, borrow, and detention basin areas would be affected by activities associated with levee repair and strengthening. Such activities would affect primarily ruderal vegetation and agricultural crops. These habitats are locally and regionally abundant and are not considered sensitive natural plant communities. Common plant and wildlife species associated with these habitats are also locally and regionally abundant and would not be substantially affected by levee repair and strengthening activities under Alternative 1 (i.e., such activities would not substantially reduce the habitat for a wildlife species, cause a wildlife species to drop below self-sustaining levels, or threaten to eliminate a plant or animal community). Potential effects on sensitive habitats and species are addressed in separate discussions below. Because this alternative would not substantially adversely affect common plant and wildlife species, this impact would be less than significant.

Impact LS-5.5-b

Effects on Sensitive Habitats. Levee repair and strengthening and related activities could result in disturbance and/or loss of sensitive habitats, including jurisdictional wetlands, other waters of the United States, and riparian habitats. This impact would be **significant**.

Sensitive habitats within the project area include wetland, riparian, and open-water habitats that are likely under Corps jurisdiction and protected under Section 404 of the CWA. These areas are also subject to DFG jurisdiction under Section 1600 of the California Fish and Game Code, and Great Valley mixed riparian forest, Great Valley valley oak riparian forest, and elderberry savanna are considered sensitive natural communities by DFG. Much of the habitat on the water side of the existing Feather River and Yuba River levees is considered sensitive. Although levee strengthening and waterside erosion repair activities would primarily be restricted to the existing levees, there is potential for small amounts (i.e., from 5 acres to as little as a fraction of an acre) of sensitive habitats within the Feather River and Yuba River floodways to be affected.

Effects on sensitive habitats could also occur on the land side of the Feather River levee where the Plumas Lake Canal intersects the levee at Pump Station No. 3 and the detention basin site (project Segment 2) and at the potential borrow sites. Replacement of the pump station would result in disturbance of the canal and adjacent habitat and could result in the permanent loss of small amounts of habitat; detention basin construction and borrow excavation could also result in the permanent loss of small amounts of habitat.

Loss of sensitive habitat associated with levee strengthening and erosion repair and related activities would be a significant impact.

Impact LS-5.5-c

Loss of Special-Status Plants. Levee repair and strengthening and related activities could result in the loss of rose mallow and Wright's trichocoronis if they exist in areas that would be disturbed during these activities. This impact would be **potentially significant**.

Suitable habitat for two special-status plants, rose mallow and Wright's trichocoronis, exists in the irrigation/drainage canals and ditches on the land side of the Feather River levee, in moist riparian habitat adjacent to these ditches, and within the Feather River floodway in project Segment 2. Although levee strengthening and waterside erosion repair would primarily be restricted to the existing levee, there is potential for adjacent riparian habitat on the water side of the levee to be affected.

Effects on potential habitat could also occur on the land side of the Feather River levee where the Plumas Lake Canal intersects the Feather River levee at Pump Station No. 3 (project Segment 2 and the proposed detention basin site). Disturbance of the canal and adjacent habitat could result in permanent habitat loss.

Disturbance and/or loss of wetland and riparian habitat could result in loss of special-status plants, if present in the affected areas. No special-status plants have been observed in the project area, but focused botanical surveys have not been conducted. Because there is potential for these species to be present in the project area and suitable habitat for them could be disturbed or removed, this impact would be potentially significant.

Impact LS-5.5-d

Effects on Valley Elderberry Longhorn Beetle. Levee repair and strengthening and related activities could result in the loss of blue elderberry shrubs that are occupied by valley elderberry longhorn beetle. This impact would be **potentially significant**.

Valley elderberry longhorn beetles have been documented as recently as 2002 at the Bobelaine Audubon Sanctuary, on the west (Sutter County) side of the Feather River (California Natural Diversity Database 2006) (Figure 5.5-2). Blue elderberry shrubs, the host plant for valley elderberry longhorn beetle larvae, are found throughout riparian habitat along much of the Feather River and Yuba River floodways. Shrubs grow along the edge of the riparian corridor, immediately adjacent to the existing levees. Focused surveys for elderberry shrubs (i.e., counting individual shrubs and stems 1 inch or greater in diameter) have not been conducted, but shrubs have been observed in all three project segments (Figures 5.5-1a, 5.5-1b, and 5.5-1c). Although levee strengthening and waterside erosion repair activities would primarily be restricted to the existing levee, there is potential for elderberry shrubs in immediately adjacent riparian habitat on the water side of the levee to be affected. Shrubs could also be affected by replacement of Pump Station No. 3, construction of the detention basin, and use of potential borrow sites. Because project activities could result in the damage, death, or removal of elderberry shrubs, the impact on valley elderberry longhorn beetle would be potentially significant.

Impact LS-5.5-e

Effects on Northwestern Pond Turtle. Levee repair and strengthening and related activities could result in disturbance and/or loss of suitable aquatic habitat for northwestern pond turtle and could result in direct loss of individuals. This impact would be **potentially significant**.

The northwestern pond turtle has been documented along the Feather River in Bobelaine Audubon Sanctuary, and suitable aquatic habitat for the species is provided by irrigation/drainage canals with the project area, including the Plumas Lake Canal. Project activities at Pump Station No. 3 would result in disturbance of suitable aquatic habitat for northwestern pond turtle. Habitat could be permanently lost as a result of pump station replacement. Habitat in the Plumas Lake Canal could also be disturbed or lost as a result of activities associated with construction of the detention basin. Dewatering of and/or construction in areas of suitable aquatic habitat could result in stranding and direct mortality of turtles, if any are present in the affected areas. This impact would be potentially significant.

Impact LS-5.5-f

Effects on Giant Garter Snake. Levee repair and strengthening and related activities would result in disturbance and/or loss of suitable aquatic and upland habitat for giant garter snake. Construction activities also have the potential to result in direct take of individuals. This impact would be **significant**.

Giant garter snakes were documented in the project vicinity (south of the Bear River) before, but not during, surveys conducted in that area in 1987 (California Natural Diversity Database 2006). Irrigation/drainage canals and ditches east of the Feather River levee provide potentially suitable aquatic habitat for giant garter snake, although suitability may vary from time to time depending on maintenance regimes and current hydrologic characteristics. The banks of these canals and the adjacent upland areas may provide suitable habitat, depending on vegetation characteristics and

maintenance regimes. Project activities at Pump Station No. 3 would result in disturbance of a small amount of suitable aquatic habitat (less than an acre), and replacement of the pump station could result in the permanent loss of a similarly small amount of habitat. Uplands adjacent to this area would also be disturbed. Excavation of borrow areas or the proposed detention basin could result in disturbance or the permanent loss of upland habitat for giant garter snake if fallow or ruderal areas are affected. Construction activities could result in direct take of giant garter snake, particularly during the snake's inactive season (October through April). Because project construction activities under Alternative 1 could result in the loss of aquatic and/or upland habitat for giant garter snake and direct loss of individuals, this impact would be significant.

Impact LS-5.5-g

Effects on Swainson's Hawk and Other Nesting Raptors. Levee repair and strengthening and related activities would result in disturbance and/or loss of suitable nesting and/or foraging habitat for Swainson's hawk and other raptors and could result in loss of active nests. This impact would be **potentially significant**.

The project area provides suitable nesting and foraging habitat for Swainson's hawks and other special-status raptor species, including Cooper's hawk, northern harrier, white-tailed kite, and burrowing owl. Breeding pairs of all of these species except burrowing owl were observed in the project area during surveys conducted in 2006. Swainson's hawk and other tree-nesting species could nest in riparian habitat along the Feather River and in riparian and other nonorchard trees on the landside levee. Northern harriers could nest in agricultural fields and ruderal and fallow areas adjacent to the levee. Potential burrowing owl habitat is limited to the Feather River and Yuba River levees and nearby fallow and ruderal areas. Construction activities associated with Alternative 1 could result in disturbance of raptors nesting nearby, potentially resulting in nest abandonment and loss of active nests. There is also limited potential for borrow excavation, waterside erosion repair on the Feather River levee, and replacement of Pump Station No. 3 to require removal of suitable nesting habitat for tree-nesting species. If burrowing owls are present along the Feather River or Yuba River levees, occupied burrows could be directly destroyed by project construction.

Construction would result in disturbance and temporary loss of suitable raptor foraging habitat adjacent to the existing levee and in a small portion of the nearby potential soil borrow area, but such effects would be limited to a relatively small area. Temporary and permanent loss of low-quality foraging habitat could result from use of the potential detention basin/soil borrow site. The southern portion of this area currently supports a squash crop. Some row crops can provide suitable raptor foraging habitat, but those typically grown in the project vicinity (e.g., safflower, squash, melons) have limited suitability because they are too tall and dense to provide foraging access or too heavily maintained to support high prey densities. Therefore, disturbance or loss of raptor foraging habitat is not anticipated to have a substantial effect on special-status raptors.

Although they are not considered special-status species, common raptors such as red-shouldered hawk, red-tailed hawk, and great horned owl are protected under California Fish and Game Code Section 3503.5. Loss of an active raptor nest and/or occupied burrowing owl burrow would be a significant impact. Because project construction could potentially cause the loss of an active nest if nesting raptors are present, this impact would be potentially significant.

Impact LS-5.5-h

Effects on Other Special-Status Birds. Levee repair and strengthening and related activities would result in disturbance and/or loss of potential nesting and/or foraging habitat for several special-status bird species. Special-status species are unlikely to nest in areas that would be affected, and large areas of nesting and foraging habitat of equal or higher quality are available elsewhere in the project area. Therefore, this impact would be **less than significant**.

The Feather River and Yuba River floodways provide potential nesting habitat for western yellow-billed cuckoo, loggerhead shrike, bank swallow, yellow warbler, yellow-breasted chat, and tricolored blackbird. Wetland and riparian habitats on the land side of the existing levees may also be suitable for loggerhead shrike and tricolored blackbird. Habitat in the vicinity of areas that would be disturbed during project construction is of relatively low quality, in comparison to less disturbed and more contiguous habitat closer to the main channels of the Feather and Yuba Rivers. Loggerhead shrike has the greatest potential to nest in habitat nearby construction areas. However, few nesting individuals are anticipated. Because higher-quality habitat is available elsewhere, none of the special-status birds listed above would be substantially affected by implementation of Alternative 1. Therefore, this impact would be less than significant.

Impact LS-5.5-i

Effects on Pacific Western Big-Eared Bat. Levee repair and strengthening and related activities would not affect the suitability of foraging habitat or result in loss of important roost or maternity sites. This impact would be **less than significant**.

Pacific western big-eared bats could forage in the project area. Trees in and near the Alternative 1 project sites could provide roost sites for a small number of bats, but the project area does not provide roosting habitat capable of supporting large numbers of individuals. Implementation of Alternative 1 would not affect the suitability of foraging habitat in the project area. Because no important bat roost sites or maternity sites are anticipated to exist in the project area, none would be affected by implementation of Alternative 1. This impact would be less than significant.

Impact LS-5.5-j

Effects on Wildlife Corridors. Levee repair and strengthening and related activities would result in limited temporary disturbance of the Feather River and Yuba River habitat corridors but are not expected to affect overall use of these corridors by wildlife. This impact would be **less than significant**.

Riparian habitat along the Feather and Yuba Rivers supports valuable botanical and wildlife diversity and serves as a corridor for wildlife movement. The project area is within the Pacific Flyway and contains important habitat for birds, as well as reptiles and mammals. Construction activities associated with Alternative 1 would result in temporary disturbance of these wildlife corridors. However, disturbance would be limited to the edges of the corridors and is unlikely to disrupt migratory movements or use of nursery sites. This impact would be less than significant.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impact ASB-5.5-a

Effects on General Biological Resources. Levee repair and strengthening activities in project Segments 1 and 3 would temporarily disturb ruderal habitat on the levee slopes and adjacent riparian and agricultural land. Construction of the ASB setback levee in Segment 2 would result in loss of primarily agricultural land. Agricultural lands could also be lost at potential borrow and detention basin sites. These temporary impacts and potential permanent land use changes would affect habitat for many common plant and wildlife species. Although local populations would be reduced by these activities, these species are locally and regionally abundant. This impact would be **less than significant**.

Common plant and wildlife species found along and adjacent to the existing Feather River and Yuba River levees in project Segments 1 and 3 and within the potential levee setback and borrow areas in and near Segment 2 would be affected by activities associated with Alternative 2. Effects along portions of the existing levees to be repaired in Segments 1 and 3 would be temporary (see previous discussion of Impact LS-5.5-a); permanent habitat conversion would result from construction of the ASB setback levee and removal of portions of the existing levee in project Segment 2. In addition, use of the levee setback area to convey flood flows would result in occasional short-term inundation of habitat for some common species. Although habitat types within the levee setback area and at the areas considered for borrow sites and/or a detention basin could change, such changes are unlikely to result in any overall effects on common species, because these areas would continue to provide habitat values for such species. The primary areas that would be affected support ruderal vegetation and agricultural crops. These habitats are locally and regionally abundant and are not considered sensitive natural plant communities. Common plant and wildlife species associated with these habitats are also locally and regionally abundant and would not be substantially affected by the proposed project (i.e., the project would not substantially reduce the habitat for a wildlife species, cause a wildlife species to drop below self-sustaining levels, or threaten to eliminate a plant or animal community). Potential effects on sensitive habitats and species are addressed in separate discussions below. Because common plant and wildlife species would not be substantially adversely affected, this impact would be less than significant.

Impact ASB-5.5-b

Effects on Sensitive Habitats. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities would result in disturbance and/or loss of sensitive habitats, including jurisdictional wetlands, other waters of the United States, and riparian habitats. This impact would be **significant**.

Under Alternative 2, effects on sensitive habitats associated with levee repair and strengthening activities in project Segments 1 and 3 would be the same as those described above in Impact LS-5.5-b under Alternative 1.

Sensitive habitats within the project area include wetland, riparian, and open-water habitats that are likely under Corps jurisdiction and protected under Section 404 of the CWA, subject to DFG jurisdiction under Section 1600 of the California Fish and Game Code, and/or considered sensitive natural communities by DFG. Construction activities in areas considered for borrow sites and/or a detention basin could affect sensitive habitats. Construction of the ASB setback levee in Segment 2 would require fill of portions of the Plumas Lake Canal and other canals and ditches within the setback levee footprint. This would result in permanent fill of a relatively small amount of sensitive

habitat, but could result in additional permanent effects on the hydrology of the portions of the ditches within the levee setback area if they do not continue to serve irrigation and drainage purposes. Aquatic habitat within the levee setback area could be permanently affected if grading is required to allow floodwaters to drain to the Feather River and alleviate fish stranding. There are no specific plans for habitat restoration within the levee setback area at this time; however, if such restoration is compatible with flood control objectives, restoration of agricultural habitats to riparian and other sensitive habitats could occur in portions of the setback area, which could result in an overall increase in sensitive habitat within the project area. Because it is not known at this time whether such restoration would occur, this impact would be significant.

Impact ASB-5.5-c

Loss of Special-Status Plants. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities could result in the loss of rose mallow and Wright's trichocoronis if they are present in areas that would be disturbed during these activities. This impact would be **potentially significant**.

Under Alternative 2, potential effects on special-status plants associated with levee repair and strengthening activities in project Segments 1 and 3 would be the same as those described above in Impact LS-5.5-c under Alternative 1.

Suitable habitat for two special-status plants, rose mallow and Wright's trichocoronis, is present in the irrigation/drainage canals and ditches in the potential ASB levee setback area in project Segment 2 and in moist riparian habitat adjacent to these ditches and within the Feather River floodway. As discussed above under Impact ASB-5.5-b, construction of the ASB setback levee would require fill of small portions of canals and ditches within the setback levee footprint, and aquatic habitat within the levee setback area could be hydrologically altered by setback levee construction and/or graded to allow floodwaters to drain to the Feather River and alleviate fish stranding. Construction activities in areas considered for soil borrow sites and/or detention basins could also result in the loss of wetland habitats. Disturbance and/or loss of wetland and riparian habitats could result in loss of rose mallow and/or Wright's trichocoronis individuals or populations, if present in the affected areas. If restoration of wetlands and riparian habitat occurs in portions of the levee setback area, there could be an overall increase in available habitat for special-status plants within the project area. Because it is not known whether such restoration would occur and special-status plants could be lost as a result of levee repair and strengthening activities and/or construction of the ASB setback levee, this impact would be potentially significant.

Impact ASB-5.5-d

Effects on Valley Elderberry Longhorn Beetle. Levee repair and strengthening activities and construction of the ASB setback levee, and related activities could result in loss of blue elderberry shrubs that are occupied by valley elderberry longhorn beetles. This impact would be **potentially significant**.

Under Alternative 2, potential effects on valley elderberry longhorn beetle associated with levee repair and strengthening activities in project Segments 1 and 3 would be the same as those described above in Impact LS-5.5-d under Alternative 1.

Blue elderberry shrubs, the host plant for valley elderberry longhorn beetle larvae, are found throughout riparian habitat along much of the Feather River and Yuba River floodways and have

been observed near the levees in all three project segments (Figures 5.5-1a, 5.5-1b, and 5.5-1c). Shrubs are also anticipated to exist in riparian habitat within the potential ASB levee setback area. Unlike under Alternative 1, shrubs on the land side of the existing Feather River levee in Segment 2 could be affected by setback levee construction, greater use of potential borrow sites, and potential grading to allow floodwaters to drain to the Feather River and alleviate fish stranding. Shrubs could also potentially be affected by the area considered for a detention basin/borrow site.

Flooding of the ASB levee setback area in Segment 2 is not expected to adversely affect elderberry shrubs currently located in this area. The rate and duration of flooding of the levee setback area is expected to be similar to the rate and duration of flooding of most, if not all, of the existing Feather River floodway. Because elderberry shrubs within the floodway appear to thrive in spite of normal periodic flooding of the Feather River, the similar flooding regime within the proposed levee setback area is not expected to result in loss of elderberry shrubs or impacts on valley elderberry longhorn beetle. If restoration of wetlands and riparian areas occurs in portions of the setback area, there could be an overall increase in available habitat for the beetle.

It is not known whether restoration would occur, and levee repair and strengthening activities, construction of the ASB setback levee, and related activities could result in the damage, death, or removal of elderberry shrubs that could support valley elderberry longhorn beetle; therefore, this impact would be potentially significant.

Impact ASB-5.5-e

Effects on Northwestern Pond Turtle. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities would result in disturbance and/or loss of suitable aquatic habitat for northwestern pond turtle and could result in direct loss of individuals. This impact would be **potentially significant**.

Under Alternative 2, potential effects on northwestern pond turtle associated with levee repair and strengthening activities in project Segments 1 and 3 would be the same as those described above in Impact LS-5.5-e under Alternative 1.

Suitable habitat for northwestern pond turtle exists in the irrigation/drainage canals and ditches in the potential ASB levee setback area in project Segment 2 and the potential detention basin/soil borrow site. As discussed above, construction of the ASB setback levee would require fill of small portions of canals and ditches within the setback levee footprint, and aquatic habitat within the levee setback area could be hydrologically altered by setback levee construction and/or graded to allow floodwaters to drain to the Feather River and alleviate fish stranding. Construction of the detention basin could also result in the disturbance or removal of suitable habitat in the Plumas Lake Canal. Dewatering of and/or construction in areas of aquatic habitat could result in stranding and direct mortality of turtles, if any are present in the affected areas. If restoration of wetlands and riparian habitat occurs in portions of the levee setback area, there could be an overall increase in available habitat for pond turtles within the project area. Because it is not known whether such restoration would occur and there is potential for pond turtle mortality to result from setback levee construction, this impact would be potentially significant.

Impact ASB-5.5-f

Effects on Giant Garter Snake. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities would result in disturbance and/or loss of suitable aquatic and upland habitat for giant garter snake. Construction activities also have potential to result in direct take of individuals. This impact would be **significant**.

Under Alternative 2, effects on giant garter snake associated with levee repair and strengthening activities in project Segments 1 and 3 would be the same as those described above in Impact LS-5.5-f under Alternative 1.

Irrigation/drainage canals and ditches and adjacent uplands east of the Feather River levee provide potentially suitable habitat for giant garter snake. Borrow excavation and detention basin construction could result in impacts on upland habitat for giant garter snake in areas adjacent to suitable aquatic habitat. Construction of the ASB setback levee in project Segment 2 would result in fill of small portions of aquatic habitat within the setback levee footprint. The hydrology of the aquatic habitat within the levee setback area would be altered if it no longer serves irrigation and drainage purposes, and this habitat could require grading to allow floodwaters to drain to the Feather River and alleviate fish stranding. Perhaps most importantly, the levee setback area would become part of the Feather River floodway and could be inundated for multiple continuous days during each flood event. If giant garter snakes are present within the setback area, inundation would displace wintering individuals from their burrows and could result in mortality. Leaving remnants of the existing levee in place after the setback levee is constructed could preserve upland habitat for giant garter snake, but the suitability of habitat within the setback area would be uncertain. Construction activities could also result in direct take of giant garter snake, particularly during the snake's inactive season (October through April). Because construction activities under Alternative 2 and exposure to floodwaters could result in the loss of aquatic and/or upland habitat for giant garter snake and loss of individuals, this impact would be significant.

Impact ASB-5.5-g

Effects on Swainson's Hawk and Other Nesting Raptors. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities would result in disturbance and/or loss of suitable nesting and/or foraging habitat for Swainson's hawk and other raptors and could result in loss of active nests. This impact would be **potentially significant**.

Under Alternative 2, potential effects on Swainson's hawk and other nesting raptors associated with levee repair and strengthening activities in project Segments 1 and 3 would be the same as those described above in Impact LS-5.5-g under Alternative 1.

Swainson's hawk and other tree-nesting raptor species could nest in riparian habitat along the Feather River and in riparian and other patches of nonorchard trees on the landside levee. Northern harriers could nest in agricultural fields and ruderal and fallow areas adjacent to the levee and in the potential borrow site in the ASB levee setback area. Potential burrowing owl habitat exists along the Feather River and Yuba River levees and in other fallow and ruderal areas. Construction activities associated with Alternative 2 could result in disturbance of raptors nesting nearby, potentially resulting in nest abandonment and loss of active nests. There is also potential for setback levee construction and borrow excavation to require removal of suitable nesting habitat.

If burrowing owls are present along the Feather River or Yuba River levees or in suitable habitat within the ASB levee setback area, including the potential borrow site within the setback area or the potential detention basin/soil borrow site, occupied burrows could be directly destroyed by project construction. Construction would also result in disturbance and potential loss of suitable raptor foraging habitat, but such effects would be limited to relatively small areas of suitable habitat or to low-quality foraging habitat and are not anticipated to have a substantial effect on special-status raptors. Active nests of common raptors protected under California Fish and Game Code Section 3503.5 could also be affected. Loss of an active raptor nest and/or occupied burrowing owl burrow would be a significant impact. Conversion of orchards within the levee setback area could result in an overall increase in foraging habitat for special-status and common raptors. Because project construction could potentially cause the loss of an active nest if nesting raptors are present, this impact would be potentially significant.

Impact ASB-5.5-h

Effects on Other Special-Status Birds. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities would result in disturbance and/or loss of potential nesting and/or foraging habitat for several special-status bird species. Special-status species are unlikely to nest in areas that would be affected, and large areas of nesting and foraging habitat of equal or higher quality are available elsewhere in the project area. Therefore, this impact would be **less than significant**.

Under Alternative 2, potential effects on special-status birds other than raptors associated with levee repair and strengthening activities in project Segments 1 and 3 would be the same as those described above in Impact LS-5.5-h under Alternative 1.

The Feather River and Yuba River floodways provide potential nesting habitat for western yellow-billed cuckoo, loggerhead shrike, bank swallow, yellow warbler, yellow-breasted chat, and tricolored blackbird. Wetland and riparian habitats within the ASB levee setback area in project Segment 2 and the potential detention basin/soil borrow site would also be suitable for loggerhead shrike and tricolored blackbird. Habitat in the vicinity of areas that would be disturbed during project construction is of relatively low quality, in comparison to less disturbed and more contiguous habitat closer to the main channels of the Feather and Yuba Rivers. Although additional areas of potential nesting habitat would be affected by construction of the detention basin and the setback levee and potential grading of aquatic habitats to allow them to drain to the Feather River, the potential for special-status birds to nest in these areas is relatively low. Loggerhead shrike has the greatest potential to nest in habitat near construction areas. However, few nesting individuals are anticipated. Because habitat of higher quality is available elsewhere, none of the special-status birds listed above would be substantially affected by implementation of Alternative 2. This impact would be less than significant.

Impact ASB-5.5-i

Effects on Pacific Western Big-Eared Bat. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities would not affect suitability of foraging habitat or result in loss of important roost or maternity sites. This impact would be **less than significant**.

Under Alternative 2, potential effects on Pacific western big-eared bats associated with levee repair and strengthening activities in project Segments 1 and 3 would be the same as those described above in Impact LS-5.5-i under Alternative 1.

Pacific western big-eared bats could forage in the project area, including in the vicinity of the existing Feather River and Yuba River levees, the potential ASB setback levee in project Segment 2, potential borrow sites, and sites considered for a detention basin. Trees in and near these areas could provide roost sites for a small number of bats, but the project area does not provide roosting habitat capable of supporting large numbers of individuals. Implementation of this alternative would not affect the suitability of foraging habitat in the project area. Because no important bat roost sites or maternity sites are anticipated to exist in the project area, none would be affected by implementation of Alternative 2. This impact would be less than significant.

Impact ASB-5.5-j

Effects on Wildlife Corridors. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities would result in limited temporary disturbance of the Feather River and Yuba River habitat corridors and minor corridors associated with canals and ditches in the levee setback area. However, such disturbance is not expected to affect overall use of these corridors by wildlife. This impact would be **less than significant**.

Under Alternative 2, potential effects on wildlife corridors associated with levee repair and strengthening activities in project Segments 1 and 3 would be the same as those described above in Impact LS-5.5-j under Alternative 1.

Riparian habitat along the Feather and Yuba Rivers supports valuable botanical and wildlife diversity and serves as a corridor for wildlife movement. Irrigation/drainage canals and ditches within the ASB levee setback area (including the Plumas Lake Canal, which also passes through the proposed detention basin/soil borrow site) serve as wildlife corridors on a smaller scale. Construction activities associated with Alternative 2 would result primarily in temporary disturbance of these wildlife corridors. Disturbance of the Feather and Yuba River corridors would be limited to the edges of the corridors and is unlikely to disrupt migratory movements or use of nursery sites. Construction of the setback levee would create an obstacle along the Plumas Lake Canal but is not anticipated to serve as a barrier to wildlife movement. Similarly, the presence of detention basins along the canal would not serve as a barrier to wildlife movement. If portions of the levee setback area are ultimately restored to natural habitats, the Feather River riparian corridor would be expanded, ultimately resulting in a beneficial effect on its function as a corridor for movement of terrestrial wildlife. This impact would be less than significant.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impact IS-5.5-a

Effects on General Biological Resources. This impact would be the same as Impact ASB-5.5-a, described under Alternative 2 above, although the extent of the impact would be slightly less because of the reduced setback area associated with the intermediate setback levee alignment. For the same reasons as described above, this impact would be **less than significant**.

Impact IS-5.5-b

Effects on Sensitive Habitats. This impact would be the same as Impact ASB-5.5-b, described under Alternative 2 above, although the extent of the impact would be slightly less because of the reduced setback area associated with the intermediate setback levee alignment. For the same reasons as described above, this impact would be **significant**.

Impact IS-5.5-c

Loss of Special-Status Plants. This impact would be the same as Impact ASB-5.5-c, described under Alternative 2 above, although the extent of the impact would be slightly less because of the reduced setback area associated with the intermediate setback levee alignment. For the same reasons as described above, this impact would be **potentially significant**.

Impact IS-5.5-d

Effects on Valley Elderberry Longhorn Beetle. This impact would be the same as Impact ASB-5.5-d, described under Alternative 2 above, although the extent of the impact could be slightly less because of the reduced setback area associated with the intermediate setback levee alignment. For the same reasons as described above, this impact would be **potentially significant**.

Impact IS-5.5-e

Effects on Northwestern Pond Turtle. This impact would be the same as Impact ASB-5.5-e, described under Alternative 2 above, although the extent of the impact would be slightly less because of the reduced setback area associated with the intermediate setback levee alignment. For the same reasons as described above, this impact would be **potentially significant**.

Impact IS-5.5-f

Effects on Giant Garter Snake. This impact would be the same as Impact ASB-5.5-f, described under Alternative 2 above, although the extent of the impact would be slightly less because of the reduced setback area associated with the intermediate setback levee alignment. For the same reasons as described above, this impact would be **significant**.

Impact IS-5.5-g

Effects on Swainson's Hawk and Other Nesting Raptors. This impact would be the same as Impact ASB-5.5-g, described under Alternative 2 above, although the extent of the impact would be slightly less because of the reduced setback area associated with the intermediate setback levee alignment. For the same reasons as described above, this impact would be **potentially significant**.

Impact IS-5.5-h

Effects on Other Special-Status Birds. This impact would be the same as Impact ASB-5.5-h, described under Alternative 2 above, although the extent of the impact would be slightly less because of the reduced setback area associated with the intermediate setback levee alignment. For the same reasons as described above, this impact would be **less than significant**.

Impact IS-5.5-i

Effects on Pacific Western Big-Eared Bat. This impact would be the same as Impact ASB-5.5-i, described under Alternative 2 above, although the extent of the impact would be slightly less because of the reduced setback area associated with the intermediate setback levee alignment. For the same reasons as described above, this impact would be **less than significant**.

Impact IS-5.5-j

Effects on Wildlife Corridors. This impact would be the same as Impact ASB-5.5-j, described under Alternative 2 above. For the same reasons as described above, this impact would be **less than significant**.

5.5.4 MITIGATION MEASURES

ALTERNATIVE 1 – THE LEVEE STRENGTHENING ALTERNATIVE

No mitigation is required for Impact LS-5.5-a (general biological resources), Impact LS-5.5-h (other special-status birds), Impact LS-5.5-i (Pacific western big-eared bat), or Impact LS-5.5-j (wildlife corridors).

Mitigation is provided below for Impact LS-5.5-b (sensitive habitats), Impact LS-5.5-c (special-status plants), Impact LS-5.5-d (valley elderberry longhorn beetle), Impact LS-5.5-e (northwestern pond turtle), Impact LS-5.5-f (giant garter snake), and Impact LS-5.5-g (Swainson's hawk and other nesting raptors).

LS-5.5-b **Avoid Disturbance of Sensitive Habitats to the Extent Feasible and Comply with Corps and DFG Processes to Mitigate Unavoidable Effects.** This mitigation would reduce the impact to a less-than-significant level.

Three Rivers Levee Improvement Authority (TRLIA) and its primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize potential project effects on sensitive habitats. As noted in the setting and impact discussions above, for purposes of this EIR the potential presence of sensitive habitats was assessed through reconnaissance surveys (where access was allowed) and literature review. The mapping and surveys identified below are intended to supplement and clarify these initial surveys and reviews by providing timely, detailed, and finely tuned biological information within the specific geographical areas subject to impact under the alternative selected for implementation. Each measure is accompanied by one or more performance standards to control the ultimate level of impact:

(a) <u>Map potential waters of the United States and riparian habitat in the project area and, to the extent feasible and practicable, plan project features and construction activity to avoid direct effects on these areas.</u> Before the beginning of any ground-disturbing project activities, a qualified biologist shall delineate potential waters of the United States and shall formally map all riparian habitat that could be affected by the proposed project.

This activity will be performed following the requirements of a formal delineation of waters of the United States for CWA Section 404 permitting as described below. The primary engineering and construction contractors shall ensure, through coordination with the biologist, that the footprints of construction zones, borrow areas, staging areas, and access routes are designed to prevent any disturbance of waters of the United States and riparian habitat to the extent feasible and practicable.

All avoidable jurisdictional habitats that could potentially be affected by ground-disturbing project activity shall be protected during construction by temporary fencing and/or flagging, as appropriate. Qualified biological monitors shall be present during all construction activities that could potentially affect these protected habitats to ensure that project activity is excluded from these areas.

(b) Complete the Section 404 permitting process, and mitigate the acreage of affected jurisdictional wetland on a "no-net-loss" basis. Before the initiation of any ground-disturbing project activities in areas that contain potentially jurisdictional wetlands, qualified biologists shall complete a delineation of wetlands and other waters of the United States that would be affected by the proposed project. The findings shall be documented in a detailed report and submitted to the Corps for verification as part of the formal Section 404 wetland delineation process. For all jurisdictional areas that cannot be avoided as described above, TRLIA shall secure authorization for fill of wetlands and alteration of waters of the United States from the Corps through the Section 404 permitting process before project implementation. The acreage of jurisdictional wetland affected shall be mitigated (e.g., through restoration, rehabilitation, enhancement, and/or replacement) on a "no-net-loss" basis in accordance with Corps regulations. Habitat restoration, rehabilitation, and/or replacement shall be at a location and by feasible methods agreeable to the Corps. TRLIA shall implement the feasible mitigation measures adopted through the permitting process.

(c) Obtain a streambed alteration agreement from DFG and mitigate affected riparian habitat on a "no-net-loss" basis. Because project implementation would result in changes to the natural flow and bed and bank of a waterway (e.g., vegetated drainage canal, the Feather River), the project would likely require a Section 1602 streambed alteration agreement from DFG. If complete avoidance of identified riparian habitat is not feasible, the acreage of riparian habitat that would be removed shall be mitigated on a "no-net-loss" basis in accordance with DFG regulations and as specified in the streambed alteration agreement, if needed. Habitat mitigation (e.g., restoration, rehabilitation, and/or replacement) shall be at a location and by methods agreeable to DFG.

Implementing this mitigation measure would reduce the impact on sensitive habitats to a less-than-significant level.

LS-5.5-c **Conduct Detailed Special-Status Plant Surveys and Establish Construction Buffers as Necessary to Minimize Effects on Special-Status Plants.** This mitigation would reduce the potential impact to a less-than-significant level.

TRLIA and its primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize potential project effects on special-status plants:

(a) Conduct detailed special-status plant surveys and document the results. Before the initiation of any ground-disturbing project activities, a qualified botanist shall conduct detailed/focused surveys for rose mallow and Wright's trichocoronis in appropriate habitat within the project area, in accordance with USFWS and DFG guidelines and at the appropriate time of year when the target species would be in flower or otherwise clearly identifiable (June to September for rose mallow and May to September for Wright's trichocoronis). The findings shall be documented in a letter report that is retained by TRLIA. If rose mallow and Wright's trichocoronis are not found during focused surveys, no further action shall be required.

(b) Establish buffers wherever possible to protect identified special-status plants from construction activity. If special-status plants are found during focused surveys, the primary

engineering and construction contractors shall ensure, through coordination with a qualified biologist, that the footprint of project features and construction zones, staging areas, and access routes are designed such that any disturbance of the plants is prevented to the extent feasible and practicable. The botanist shall clearly identify the locations of special-status plant populations in the field by staking or flagging before construction. No project activities shall be allowed within the marked areas.

(c) Compensate for losses of special-status plants. If populations or individuals of rose mallow and Wright's trichocoronis are found during implementation of item (a) above, and the individuals or populations cannot be avoided during implementation of item (b), a mitigation and monitoring plan for the affected species shall be developed and implemented. The plan shall be prepared by a qualified biologist. Before disturbance of the individuals or populations of the effected species, the mitigation and monitoring plan shall be submitted to TRLIA for review and approval. The plan shall be submitted concurrently to DFG for review and comment, and TRLIA may consult with DFG before approval of the plan. Possible mitigation for individuals or populations removed during construction includes:

- removing and stockpiling topsoil with intact roots, rhizomes, and seed bank in the disturbance area, and either replacing the soil in the same location after construction is complete or placing it in a new area with suitable habitat; or
- collecting plants, seeds, or other propogules in the area to be disturbed, and placing propogules or cultivating nursery stock in the disturbed area after construction is complete or in a new area with suitable habitat.

Mitigation will be considered successful if populations of affected species in mitigation areas are sustained for a minimum of 3 years and are of similar size and quality as the affected populations.

Implementing this mitigation measure would reduce the potential impact on special-status plants to a less-than-significant level.

LS-5.5-d **Conduct Protocol-level Surveys, Establish Buffers, and Implement a Mitigation Plan as Necessary to Minimize Effects on Valley Elderberry Longhorn Beetle.** This mitigation would reduce the potential impact to a less-than-significant level.

TRLIA and its primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize potential project effects on valley elderberry longhorn beetles:

(a) Conduct protocol-level elderberry shrub surveys in the project area. Before the beginning of ground disturbance within 100 feet of any area that may support elderberry shrubs, a qualified biologist shall conduct an elderberry shrub survey consistent with USFWS protocols for conservation of valley elderberry longhorn beetle (U.S. Fish and Wildlife Service 1999). All elderberry shrubs with potential to be affected by project activities shall be mapped and the number of stems greater than 1 inch in diameter on each shrub that may require removal shall be counted. (Elderberry plants with no stems measuring 1 inch or

greater in diameter at ground level are considered unlikely to be habitat for the beetle because of their small size and/or immaturity [U.S. Fish and Wildlife Service 1999].)

(b) Protect elderberry shrubs from disturbance. The primary engineering and construction contractors, through coordination with the biologist, shall ensure to the extent feasible and practicable that the footprint of project features and construction zones, staging areas, and access routes are designed to ensure that no project activities would affect an elderberry shrub with stems measuring 1 inch in diameter at ground level. Buffers of at least 100 feet shall be established around all elderberry shrubs with stems greater than 1 inch in diameter at ground level that can be retained undisturbed on-site. The buffer shall be clearly identified in the field by staking or flagging. All project activity shall be prohibited within the buffer areas. If maintenance of these buffers is not feasible, consultation with USFWS shall be conducted as described below.

(c) If effects on shrubs cannot be avoided, develop and implement a mitigation plan approved by USFWS. If maintaining 100-foot protection buffers or otherwise avoiding construction-related effects on elderberry shrubs with a stem greater than 1 inch in diameter at ground level is not feasible, consultation with USFWS will be required, and an incidental take permit may be required. During this consultation, an appropriate and feasible mitigation plan shall be developed and provided to USFWS for approval. The plan may include, but would not necessarily be limited to, reducing buffers around shrubs that would not be removed; transplanting shrubs to a conservation area; and planting additional seedling or cuttings at a ratio ranging from 1:1 or 1:6, depending on the number of stems greater than or equal to 1 inch in diameter and whether beetle exit holes are found on the shrubs on-site (U.S. Fish and Wildlife Service 1999).

Implementing this mitigation measure would reduce the potential impact on valley elderberry longhorn beetle to a less-than-significant level.

LS-5.5-e **Conduct Surveys as Part of Dewatering Activities and Minimize Effects on Northwestern Pond Turtle.** This mitigation would reduce the potential impact to a less-than-significant level.

TRLIA and its primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize potential project effects on northwestern pond turtles:

(a) Conduct surveys after dewatering. A qualified biologist shall conduct surveys for northwestern pond turtles in aquatic habitats to be dewatered and/or filled during project construction and grading of aquatic habitat within the setback area. Surveys shall be conducted immediately after any dewatering and before any fill of aquatic habitat. If no pond turtles are found, no further mitigation will be required.

(b) Capture and move turtles. If any pond turtles are found, the biologist shall capture them and move them to suitable habitat in the vicinity of the project site.

Implementing this mitigation measure would reduce the potential impact on northwestern pond turtle to a less-than-significant level.

LS-5.5-f **Implement Applicable Take Minimization Measures and a Mitigation Plan as Necessary for Giant Garter Snake.** This mitigation would reduce the potential impact to a less-than-significant level.

TRLIA and its primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize potential project effects on giant garter snakes:

(a) Verify potential habitat in the project area and, to the extent feasible and practicable, plan project features and construction activity to avoid direct effects on these areas. Before the initiation of any ground-disturbing project activities, a qualified biologist approved by USFWS's Sacramento Fish and Wildlife Office shall verify where suitable habitat conditions for giant garter snake occur in areas that could be affected by the proposed project. The primary engineering and construction contractors shall ensure, through coordination with the biologist, that the footprint of project features and construction zones, staging areas, and access routes are designed to prevent any disturbance of potential giant garter snake habitat to the extent feasible and practicable.

(b) Designate areas to be avoided during construction. The primary engineering and construction contractors, through coordination with the biologist, shall designate giant garter snake habitat to be avoided during project construction as Environmentally Sensitive Areas. These areas shall be flagged by the biologist and avoided by all construction personnel.

(c) Limit the timing of construction activity within potential habitat. All construction activities that must take place within potential giant garter snake habitat (aquatic habitat and adjacent upland habitat within 200 feet) shall be limited to the period of May 1 to October 1 to the extent feasible.

(d) Follow guidelines for habitat dewatering. Dewatering of aquatic habitat shall not occur between October 1 and April 15. Any dewatered habitat must remain dry for at least 15 consecutive days after April 15 and before the excavation or filling of the dewatered habitat.

(e) Inspect suitable habitat within 24 hours of beginning construction. Within 24 hours before the initiation of construction activities within suitable habitat, a qualified biologist who is approved by USFWS's Sacramento Fish and Wildlife Office shall conduct preconstruction surveys for giant garter snakes. These areas shall be reinspected whenever a lapse of construction activity within suitable habitat occurs for a period greater than 2 weeks. If a giant garter snake is found, all activity that could result in death or injury of giant garter snake shall be delayed until consultation with USFWS and DFG has been completed and authorization to proceed has been received from those agencies.

(f) Minimize clearing of wetland vegetation. Clearing of wetland vegetation shall be confined to the minimum area necessary. Excavation of channel banks shall be accomplished by using equipment located on and operated from the top of the bank, with the least interference practical for emergent vegetation that would not be affected by the project.

(g) Restrict movement of equipment. Movement of heavy equipment to and from the project site shall be restricted to areas outside the identified suitable habitat, unless the equipment is

being moved on established roadways or in areas that have been inspected by a qualified biologist.

(h) Participate in environmental awareness program. Construction personnel shall participate in a USFWS-approved worker environmental awareness program. Under this program, workers shall be informed about the presence of giant garter snakes and habitat associated with the species and that unlawful take of the animal or destruction of its habitat is a violation of ESA.

(i) Restore disturbed areas. After completion of construction activities, any construction debris shall be removed and disturbed areas within potential giant garter snake habitat shall be restored to preproject conditions.

(j) If impacts cannot be avoided, develop and implement a feasible mitigation plan approved by USFWS. Consultation with USFWS and DFG shall be required for impacts that cannot be avoided, and an incidental take permit may be required. During this consultation, an appropriate and feasible mitigation plan shall be developed and provided to USFWS and DFG for approval. The mitigation plan may include, but would not necessarily be limited to, applicable take minimization measures outlined above, or modifications of those measures, and compensation for unavoidable impacts through replacement of habitat. Compensation ratios may range from 1:1 to 3:1 (replaced aquatic habitat to affected habitat), depending on the amount of habitat lost and the duration of the impact. Replacement habitat shall include both upland and aquatic habitat components at a ratio of 2:1 upland habitat to aquatic habitat.

Implementing this mitigation measure would reduce the potential impact on giant garter snake to a less-than-significant level.

LS-5.5-g(1) Conduct Preconstruction Surveys and Protect Active Nests to Minimize Effects on Swainson's Hawk. This mitigation, together with Mitigation Measures LS-5.5-g(2) and LS-5.5-g(3), would reduce the potential impact to a less-than-significant level.

TRLIA and its primary construction contractor shall ensure that the following measures are implemented to minimize potential project effects on Swainson's hawk:

(a) Conduct preconstruction surveys. Because project construction activity would occur during the Swainson's hawk breeding season (March 1 to September 15), a qualified biologist shall conduct preconstruction surveys to identify active nests in the nonorchard trees within 1/2 mile of construction areas (including staging and borrow areas). Because of the mostly linear nature of project construction, preconstruction surveys may be phased to accommodate construction activities; suitable nesting habitat shall be surveyed only when construction activities would encroach within 1/2 mile of unsurveyed areas. Surveys shall be conducted no less than 14 days and no more than 30 days before construction activities may encroach within 1/2 mile of unsurveyed areas. To the extent feasible, guidelines provided in *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (Swainson's Hawk Technical Advisory Committee 2000) shall be followed.

(b) Establish protective buffers around active nests. If an active nest is found, an appropriate buffer to avoid impacts shall be determined by a qualified biologist. No project activities shall commence within the buffer area until a qualified biologist confirms that the nest is no longer active. The size of the buffer may vary, depending on the nest location, nest stage, and construction activity. Monitoring of the nest by a qualified biologist may be required if the activity could adversely affect the nest.

LS-5.5-g(2) Conduct Preconstruction Surveys, Protect Occupied Burrows, and Relocate Individuals as Necessary to Minimize Effects on Burrowing Owl. This mitigation, together with Mitigation Measures LS-5.5-g(1) and LS-5.5-g(3), would reduce the potential impact to a less-than-significant level.

TRLIA and its primary construction contractor shall ensure that the following measures are implemented to minimize potential project effects on burrowing owl:

(a) Conduct preconstruction surveys. Before project-related activities in the project area, a qualified biologist shall conduct focused surveys for burrowing owls within 250 feet of construction areas (including staging and borrow areas). Surveys shall be conducted no less than 14 days and no more than 30 days prior to initiation of project activities, and surveys shall be conducted in accordance with DFG protocol (California Department of Fish and Game 1995).

(b) Establish protective buffers around occupied burrows. If occupied burrows are found, an appropriate buffer shall be established to avoid impacts on the burrows. A buffer of 165 feet would be required during the nonbreeding season (September 1 through January 31), and a buffer of 250 feet would be required during the breeding season (February 1 through August 31). To the extent feasible, project activity shall be excluded from within the buffer areas.

(c) Relocate owls if necessary. If impacts on occupied burrows are unavoidable, on-site passive relocation techniques approved by DFG shall be used to encourage owls to move to alternative burrows outside the impact area. However, no occupied burrows shall be disturbed during the nesting season unless a qualified biologist verifies through noninvasive methods that the burrow is no longer occupied.

LS-5.5-g(3) Conduct Preconstruction Surveys and Protect Active Nests to Minimize Effects on Other Nesting Raptors. This mitigation, together with Mitigation Measures LS-5.5-g(1) and LS-5.5-g(2), would reduce the potential impact to a less-than-significant level.

TRLIA and its primary construction contractor shall ensure that the following measures are implemented to minimize potential project effects on other nesting raptors:

(a) Conduct preconstruction surveys. Because project construction activity would occur during the raptor breeding season (February 15 to September 15), a qualified biologist shall conduct preconstruction surveys to identify active nests in the nonorchard trees within 500 feet of potential construction areas (including staging and borrow areas). Because of the linear nature of project construction, preconstruction surveys may be phased to accommodate construction activities; suitable nesting habitat shall be surveyed only when construction

activities would encroach within 500 feet of unsurveyed areas. Surveys shall be conducted no less than 14 days and no more than 30 days before construction encroaches within 500 feet of unsurveyed areas. If no active nests are found, no further mitigation shall be required.

(b) Establish protective buffers around active nests. If an active nest is found, an appropriate buffer to avoid impacts shall be determined by a qualified biologist. No project activities shall commence within the buffer area until a qualified biologist confirms that the nest is no longer active. The size of the buffer may vary, depending on the nest location, nest stage, and construction activity. Monitoring of the nest by a qualified biologist may be required if an activity could adversely affect the nest.

Implementing Mitigation Measures LS-5.5-g(1), LS-5.5-g(2), and LS-5.5-g(3) together would reduce the potential impact on Swainson's hawk and other nesting raptors to a less-than-significant level.

ALTERNATIVE 2 – THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impact ASB-5.5-a (general biological resources), Impact ASB-5.5-h (other special-status birds), Impact ASB-5.5-i (Pacific western big-eared bat), or Impact ASB-5.5-j (wildlife corridors).

Mitigation is provided below for Impact ASB-5.5-b (sensitive habitats), Impact ASB-5.5-c (special-status plants), Impact ASB-5.5-d (valley elderberry longhorn beetle), Impact ASB-5.5-e (northwestern pond turtle), Impact ASB-5.5-f (giant garter snake), and Impact ASB-5.5-g (Swainson's hawk and other nesting raptors).

ASB-5.5-b **Avoid Disturbance of Sensitive Habitat to the Extent Feasible and Comply with Corps and DFG Processes to Mitigate Unavoidable Effects.** This measure is identical to Mitigation Measure LS-5.5-b above. This mitigation would reduce the impact to a less-than-significant level.

ASB-5.5-c **Conduct Detailed Special-Status Plant Surveys and Establish Construction Buffers as Necessary to Minimize Effects on Special-Status Plants.** This measure is identical to Mitigation Measure LS-5.5-c above. This mitigation would reduce the potential impact to a less-than-significant level.

ASB-5.5-d **Conduct Protocol-level Surveys, Establish Buffers, and Implement a Mitigation Plan as Necessary to Minimize Effects on Valley Elderberry Longhorn Beetle.** This measure is identical to Mitigation Measure LS-5.5-d above. This mitigation would reduce the potential impact to a less-than-significant level.

ASB-5.5-e **Conduct Surveys as Part of Dewatering Activities and Minimize Effects on Northwestern Pond Turtle.** This measure is identical to Mitigation Measure LS-5.5-e above. This mitigation would reduce the potential impact to a less-than-significant level.

ASB-5.5-f **Implement Applicable Take Minimization Measures and a Mitigation Plan as Necessary for Giant Garter Snake.** This measure is identical to Mitigation Measure LS-5.5-f above. This mitigation would reduce the potential impact to a less-than-significant level.

ASB-5.5-g(1) **Conduct Preconstruction Surveys and Protect Active Nests to Minimize Effects on Swainson's Hawk.** This measure is identical to Mitigation Measure LS-5.5-g(1) above. Together with Mitigation Measures ASB-5.5-g(2) and ASB-5.5-g(3), this mitigation would reduce the potential impact to a less-than-significant level.

ASB-5.5-g(2) **Conduct Preconstruction Surveys, Protect Occupied Burrows, and Relocate Individuals as Necessary to Minimize Effects on Burrowing Owl.** This measure is identical to Mitigation Measure LS-5.5-g(2) above. Together with Mitigation Measures ASB-5.5-g(1) and ASB-5.5-g(3), this mitigation would reduce the potential impact to a less-than-significant level.

ASB-5.5-g(3) **Conduct Preconstruction Surveys and Protect Active Nests to Minimize Effects on Other Nesting Raptors.** This measure is identical to Mitigation Measure LS-5.5-g(3) above. Together with Mitigation Measures ASB-5.5-g(1) and ASB-5.5-g(2), this mitigation would reduce the potential impact to a less-than-significant level.

ALTERNATIVE 3 – THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impact IS-5.5-a (general biological resources), Impact IS-5.5-h (other special-status birds), Impact IS-5.5-i (Pacific western big-eared bat), or Impact IS-5.5-j (wildlife corridors).

Mitigation is provided below for Impact IS-5.5-b (sensitive habitats), Impact IS-5.5-c (special-status plants), Impact IS-5.5-d (valley elderberry longhorn beetle), Impact IS-5.5-e (northwestern pond turtle), Impact IS-5.5-f (giant garter snake), and Impact IS-5.5-g (Swainson's hawk and other nesting raptors).

IS-5.5-b **Avoid Disturbance of Sensitive Habitat to the Extent Feasible and Comply with Corps and DFG Processes to Mitigate Unavoidable Effects.** This measure is identical to Mitigation Measure LS-5.5-b above. This mitigation would reduce the impact to a less-than-significant level.

IS-5.5-c **Conduct Detailed Special-Status Plant Surveys and Establish Construction Buffers as Necessary to Minimize Effects on Special-Status Plants.** This measure is identical to Mitigation Measure LS-5.5-c above. This mitigation would reduce the potential impact to a less-than-significant level.

IS-5.5-d **Conduct Protocol-level Surveys, Establish Buffers, and Implement a Mitigation Plan as Necessary to Minimize Effects on Valley Elderberry Longhorn Beetle.** This measure is identical to Mitigation Measure LS-5.5-d

above. This mitigation would reduce the potential impact to a less-than-significant level.

IS-5.5-e **Conduct Surveys as Part of Dewatering Activities and Minimize Effects on Northwestern Pond Turtle.** This measure is identical to Mitigation Measure LS-5.5-e above. This mitigation would reduce the potential impact to a less-than-significant level.

IS-5.5-f **Implement Applicable Take Minimization Measures and a Mitigation Plan as Necessary for Giant Garter Snake.** This measure is identical to Mitigation Measure LS-5.5-f above. This mitigation would reduce the potential impact to a less-than-significant level.

IS-5.5-g(1) **Conduct Preconstruction Surveys and Protect Active Nests to Minimize Effects on Swainson's Hawk.** This measure is identical to Mitigation Measure LS-5.5-g(1) above. Together with Mitigation Measures IS-5.5-g(2) and IS-5.5-g(3), this mitigation would reduce the potential impact to a less-than-significant level.

IS-5.5-g(2) **Conduct Preconstruction Surveys, Protect Occupied Burrows, and Relocate Individuals as Necessary to Minimize Effects on Burrowing Owl.** This measure is identical to Mitigation Measure LS-5.5-g(2) above. Together with Mitigation Measures IS-5.5-g(1) and IS-5.5-g(3), this mitigation would reduce the potential impact to a less-than-significant level.

IS-5.5-g(3) **Conduct Preconstruction Surveys and Protect Active Nests to Minimize Effects on Other Nesting Raptors.** This measure is identical to Mitigation Measure LS-5.5-g(3) above. Together with Mitigation Measures LS-5.5-g(1) and IS-5.5-g(2), this mitigation would reduce the potential impact to a less-than-significant level.

5.5.5 IMPACTS REMAINING SIGNIFICANT AFTER MITIGATION

With implementation of the mitigation described above, all impacts on terrestrial biological resources would be reduced to a less-than-significant level.

SECTION 5.6 RECREATION

This section describes existing recreational facilities in the project vicinity and presents an analysis of recreation-related impacts that could result from implementation of any of the three proposed project alternatives.

5.6.1 REGULATORY SETTING

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

No federal plans, policies, regulations, or laws related to recreation resources are applicable to the proposed project.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

California Department of Fish and Game

The California Department of Fish and Game (DFG) manages the Feather River State Wildlife Area, which comprises several management "units" on both the left (east) and right (west) banks of the Feather River (see Figure 5.1-1, "Conservation Areas in the Project Vicinity"). As shown in Figure 5.1-1, the Lake of the Woods Unit (described below under "Recreational Opportunities along the Feather River") is located between the Feather River and the left bank levee, immediately adjacent to a portion of the Feather River Levee Repair Project (FRLRP) project area. DFG administers these units for multiple recreational uses, the most important of which are hunting and fishing. DFG regulates the types and levels of recreational use of these areas to ensure public safety and the protection of fish, wildlife, and plant resources. DFG may limit use within the units or portions of the units for safety reasons or to provide for the limited take of a species.

LOCAL PLANS, POLICIES, REGULATIONS, AND LAWS

Yuba County

The Yuba County (County) system of parks and recreational facilities is limited. The County does not have a parks and recreation department, nor does it have any regulations or general plan policies that would apply to the FRLRP.

City of Marysville

The City of Marysville maintains various recreation amenities in the floodplains of the Feather and Yuba Rivers. In particular, the City of Marysville's Riverfront Park consists of a large complex of facilities, many of which (e.g., an off-highway vehicle [OHV] motocross course, sports fields, a nature area, a BMX track) are located in the river floodplain. The northern edge of the FRLRP project area is in the vicinity of some of the motocross/BMX facilities. One of the policies of the Open Space, Conservation and Recreation Element of the *City of Marysville General Plan* (City of Marysville 1985) is "To encourage compatible recreational uses in floodplains of the Feather and Yuba rivers." This policy, among others, supports the broader goal

"To designate, protect, and conserve the natural resources, open space, and recreation lands in the city; and provide opportunities for recreation activities to meet citizens' needs."

5.6.2 ENVIRONMENTAL SETTING

SOURCES OF INFORMATION

Information for this section was obtained from individuals familiar with recreation resources in the project area and from various online and print documents, including Volumes I and II of the *Yuba County General Plan* (Yuba County 1994, 1996); the *City of Marysville General Plan* (City of Marysville 1985); the *Draft Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project* (Yuba County Water Agency 2003); the *Land Acquisition and Management Plan for the Feather-Bear Rivers Levee Setback Project* (Yuba County Water Agency 2004); the *Bear River and Western Pacific Interceptor Canal Levee Improvements Project Draft Environmental Impact Report* (Three Rivers Levee Improvement Authority 2004a); and the *Draft Environmental Impact Report for the Feather-Bear Rivers Levee Setback Project* (Three Rivers Levee Improvement Authority 2004b).

REGIONAL RECREATIONAL OPPORTUNITIES

Yuba County contains approximately 580 acres of neighborhood and community park and recreation facilities that are accessible to the public. Of these approximately 580 acres, roughly 270 acres are within the jurisdiction of the City of Marysville, including Riverfront Park, Ellis Lake, and scattered neighborhood parks. Olivehurst Public Utility District oversees approximately 13 acres of neighborhood parkland, the City of Wheatland maintains roughly 6 acres of parkland, and Brownsville has approximately 40 acres of parks. The remaining approximately 250 acres of park and recreation facilities are administered by the County Public Works Department (Yuba County 1994). Some of this acreage is located in the project vicinity and is discussed below under "Recreational Opportunities along the Feather River" and "Recreational Opportunities along the Yuba River."

In addition, numerous rivers, creeks, and reservoirs are used for recreation in Yuba County. Where access is available, fishing, hunting, picnicking, rafting, tubing, and swimming are the dominant recreational uses on the Feather, Yuba, and Bear Rivers. Developed day use and overnight facilities for camping, picnicking, and boating are available at upstream sites, including Camp Far West, Lake Mildred, Lake Francis, Merle Collins Reservoir, Englebright Reservoir, and New Bullards Bar Reservoir. Tahoe and Plumas National Forests occupy more than 56,000 acres of land in northeastern Yuba County and offer a wide variety of recreational opportunities (Yuba County 1994).

RECREATIONAL OPPORTUNITIES ALONG THE FEATHER RIVER

The lower Feather River flows from Oroville Dam to its confluence with the Sacramento River, largely past private land. Common activities along the Feather River include boat and shore fishing, pleasure boating, hunting, swimming, sightseeing, picnicking, and camping. Boat access between Oroville and Marysville is provided at Riverfront Park and near Live Oak, Gridley, and Biggs. Undeveloped access points downstream of Marysville are located along Garden Highway (State Water Resources Control Board 1997).

The primary recreation site in the FRLRP project vicinity is the Feather River State Wildlife Area, most of which is located south of Marysville and Yuba City near the confluence of the Feather and Bear Rivers in both Yuba and Sutter Counties. This wildlife area, which is managed by DFG, comprises several management units (California Department of Fish and Game 2006). The following management units are located along the Feather River and in the FRLRP project vicinity:

- The Abbott Lake Unit is a 439-acre site east of Garden Highway and north of Star Bend Road in Sutter County. This unit is adjacent to the right (west) bank levee of the Feather River and across the river from project Segment 2.
- The Star Bend Unit is a 50-acre site located along the left bank of the Feather River at Star Bend in Yuba County. This unit is near Segment 2.
- The O'Connor Lakes Unit is a 471-acre site east of Garden Highway and south of Star Bend Road in Sutter County. This unit is adjacent to the right bank levee of the Feather River and across the river from project Segment 1.
- The Lake of the Woods Unit is a 698-acre site along the left bank levee of the Feather River in Yuba County. It is immediately adjacent to Segment 1. The unit is accessible only by boat.

The four units in the project vicinity—Abbott Lake, Star Bend, O'Connor Lakes, and Lake of the Woods—are shown in Figure 5.1-1. This figure also shows the location of Bobelaine Audubon Sanctuary, which is discussed below and in Section 5.5, "Terrestrial Biological Resources," and the location of the Corps Marysville–Yuba City mitigation area.

Use of the public lands in the Feather River State Wildlife Area for all forms of recreation (e.g., hunting, fishing, hiking, motor biking) is currently estimated at about 5,000 user days annually. A user day is equivalent to a single person visiting a site for a day. One person may be responsible for multiple user days if he or she visits a site more than once during a year. Hunting (using shotguns only) is available within the management units from July through January, as well as during spring turkey season (late March through early May); usage of the area for this purpose is moderate. For example, estimated usage of the Lake of the Woods Unit by hunters and anglers from July through January is 1,500 user days; in the Star Bend Unit, this figure is about 500 user days, and the lands north of Star Bend, including the Abbott Lake Unit, are used at about the same rate (Three Rivers Levee Improvement Authority 2004b, Whitmore, pers. comm., 2006). Estimated annual usage of the O'Connor Lakes Unit by hunters and anglers is approximately 1,000 user days (Whitmore, pers. comm., 2006). Game animals in the wildlife area include quail, pheasant, rabbit, turkey, and deer.

Annual usage of the Lake of the Woods Unit by nonhunters (e.g., hikers, bird-watchers) outside the July-through-January hunting season is estimated at 500 user days; at Star Bend and points north, usage is estimated at 150 user days in each location. The level of annual recreation use at the O'Connor Lakes Unit by hikers and other nonhunters is estimated at 300 recreation user days (Whitmore, pers. comm., 2006). Access to the existing levees within these wildlife management units is currently very limited; vehicles are prohibited from driving on the levee except on ramps, and parking is limited to an area at the Star Bend Boat Ramp. The existing levee is used for

walk-in access only, and unauthorized vehicles can be cited (Three Rivers Levee Improvement Authority 2004b).

In addition to the lands managed by DFG as part of the Feather River State Wildlife Area, the Bobelaine Audubon Sanctuary, a registered state ecological reserve, is located on more than 430 acres on the west (Sutter County) side of the Feather River, 12 miles south of Yuba City (Figure 5.1-1). Managed by the Sacramento Audubon Society, the reserve is a remnant of the 2- to 5-mile-wide river forests that historically bordered the rivers in California's Central Valley. The Bobelaine reserve offers a variety of recreational activities, including picnicking, hiking along more than 5 miles of trails, and viewing numerous species of mammals and more than 190 species of birds, and it is a destination for field trips. Hunting and fishing are prohibited (Yuba Sutter Tourism Board 2004, Sacramento Audubon Society 2006).

Beyond the activities associated with the wildlife and habitat areas described above, recreationists currently use the Feather River channel and floodway adjacent to the project area for rafting, tubing, and swimming where access allows these uses. The tops of the levees are also used for bicycle riding, walking, and jogging. The City of Yuba City maintains the Feather River Levee Bike Trail along the right bank of the Feather River from Northgate Drive on the north to Shanghai Bend Road on the south. However, most levee areas in the project vicinity are not considered formal recreation facilities.

The Star Bend Boat Launch and Fishing Access, located 0.5 mile north of the Lake of the Woods Unit, is the only developed public recreation facility that intersects the project area. The 9-acre facility, owned by DFG and maintained by the County Public Works Department, provides a one-lane boat launch ramp, a picnic table, and parking for approximately 20 boat trailers; no camping or recreational vehicle access is provided (Whitmore, pers. comm., 2006).

Near the confluence of the Feather and Yuba Rivers, the City of Marysville maintains various recreation amenities in the floodplains of both rivers as part of its Riverfront Park. Riverfront Park consists of a large complex of facilities, several of which (e.g., an OHV motocross course, sports fields, a nature area, a BMX track, a boat ramp) are located in the river floodplain. The northern edge of the FRLRP project area is in the vicinity of some of the motocross/BMX facilities.

RECREATIONAL OPPORTUNITIES ALONG THE YUBA RIVER

Few public recreation facilities exist along the Yuba River below New Bullards Bar Dam (U.S. Bureau of Reclamation 1997). From Englebright Lake to the Feather River at Marysville, the river flows past mostly private lands, restricting public access; however, limited public access is available at the SR 20 crossing 5 miles downstream of Englebright Lake, at the end of Hallwood Boulevard and approximately 8 miles upstream of the confluence of the Yuba and Feather Rivers. Access is also provided through Riverfront Park in Marysville. Although powerboat access is available from launches on the Feather River near the confluence with the Yuba River, boats traveling up the river are constrained by flows and cannot pass Daguerre Point Dam approximately 12 miles upstream of the confluence. Despite the lack of public recreation facilities, fishing is common along the Yuba River. Anglers can fish from shore at access points available to the public, from boats that travel upstream of the Feather River, and from drift boats

launched near the SR 20 crossing (State Water Resources Control Board 1997). Prime fishing season is March through May and August through November, and winter fishing is popular in December through February.

A portion of the Marysville Unit of the Feather River State Wildlife Area is located along the Yuba River (Figure 5.1-1). The Marysville Unit totals approximately 85 acres and is located on separate sites adjacent to the city of Marysville. A 14.5-acre site associated with the Marysville Unit is located along the right (north) bank levee of the Yuba River in Marysville, several thousand feet upstream of the north end of the project area. Access is provided via Sampson Street or 14th Street.

5.6.3 ENVIRONMENTAL IMPACTS

THRESHOLDS OF SIGNIFICANCE

Thresholds for determining the significance of impacts related to recreation are based on the environmental checklist form in Appendix G of the California Environmental Quality Act Guidelines (State CEQA Guidelines) and professional standards and practices. A project alternative would have a significant impact on recreation if it would:

- increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated;
- include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment;
- substantially restrict or reduce the availability or quality of existing recreational opportunities in the project vicinity; or
- implement operational or construction-related activities related to the placement of project facilities that would cause a substantial long-term disruption of any institutionally recognized recreational activities. Institutionally recognized recreational activities are those associated with an established publicly or privately operated recreational facility, or those actively administered or promoted by a public or private entity.

None of the three project alternatives would involve the construction of additional recreational facilities or expansion of existing facilities. Therefore, the second significance threshold does not apply to the FRLRP.

IMPACT ANALYSIS

Alternative 1 – The Levee Strengthening Alternative

Impact LS-5.6-a

Temporary Changes in Recreational Opportunities during Levee Repairs. Construction noise could disrupt recreational uses in the project area, particularly in areas adjacent to the existing levee alignment. Some wildlife species present in or inhabiting natural areas are likely to be disturbed by noise and by the presence of project construction crews and equipment. Portions of the Feather River State Wildlife Area in project Segment 1 may need to be closed temporarily to hunting and other recreational activities for safety reasons

while adjacent sections of the existing Feather River levee are being repaired. There would be no public access to the Star Bend Boat Launch and Fishing Access for several days while levee repairs were conducted in this area. Although these temporary disturbances may affect the recreation experience for bird-watchers, hunters, boaters, and other recreational users, displaced recreational uses could be accommodated by other nearby facilities (Whitmore, pers. comm., 2006). For this reason, and because of the temporary nature of this effect, this impact would be **less than significant**.

Several recreation areas are in the project vicinity, and recreational uses in these areas and along the Feather River channel could be temporarily affected by noise and visual disturbance from construction activities associated with levee repairs. The recreation areas nearest to the project site are the Star Bend Boat Launch and Fishing Access; the Bobelaine Ecological Reserve; and four units of the DFG-managed Feather River State Wildlife Area—the Abbott Lake, Star Bend, O'Connor Lakes, and Lake of the Woods Management Units. Except for the Star Bend facilities and the Lake of the Woods Management Unit, these areas are on the west side of the Feather River and not on the project site (i.e., outside the levee repair and strengthening area) (Figure 5.1-1). The Lake of the Woods Unit stretches along the entire length of project Segment 1 below Star Bend, adjacent to the existing left bank levee of the Feather River. The Star Bend Unit lies between the river channel and the existing left bank levee, within Segment 2. The existing levee is approximately 1,000–3,000 feet east of the unit boundary (Figure 5.1-1). The Star Bend Boat Launch and Fishing Access is accessible from Feather River Boulevard near the Algodon Road intersection and is within project Segment 1.

In addition to the prescribed recreational activities in these designated areas, recreationists also use the Feather River channel in the project vicinity for rafting, tubing, and swimming where access allows these uses, and the top of the existing levee is used for bicycle riding, walking, and jogging. The northern edge of the FRLRP project area is in the vicinity of some Marysville Riverfront Park facilities (i.e., MotoCross/BMX facilities) and portions of project construction could be visible or audible from these locations.

Because the levee repair and strengthening activities do not involve breaching the existing levee, some limited work on or adjacent to the levee could commence before the end of the "flood season" (i.e., before April 15). The entire construction period is expected to occur over 2 years. Therefore, project construction could coincide with a portion of the spring turkey-hunting season in the Feather River State Wildlife Area, which begins in late March and continues until early May, and with a portion of the July-through-January hunting season for other game. The construction period would also coincide with the period of summer recreation along the channel and floodway. Therefore, it can be assumed that hunters, anglers, and other recreationists could be present during the construction period for each levee segment, and that recreational activities could be disturbed by construction activity.

Effects of construction activity on recreationists in areas along the right bank levee of the Feather River are expected to be minor because of the distance between these areas and construction sites across the river. Remnant riparian vegetation along the river would provide a partial buffer between public use areas along the right bank levee and construction sites on the east side of the river, providing some visual screening and noise attenuation. Construction activity is not expected to substantially disrupt recreational opportunities near the left bank levee (i.e., Lake of the Woods, Star Bend facilities, and recreation in unmanaged areas) because use of these areas is

only moderate, construction would proceed linearly, and disturbance would not affect individual sites for long periods. Furthermore, overall disturbance would be temporary, and recreationists could adapt to disturbance by using other nearby areas that provide similar recreational opportunities. Construction activity along the northern portion of Segment 3 is not expected to disrupt activities at Marysville Riverfront Park facilities for the same reasons described above (distance from construction activities, temporary nature of construction activities). In addition, park facilities nearest the project site consist of MotoCross/BMX tracks, which are uses that would not be adversely affected by construction noise.

Annual use of all the public lands in the Feather River State Wildlife Area is estimated at about 5,000 user days (Three Rivers Levee Improvement Authority 2004b). Hunter and angler use of the Lake of the Woods and Star Bend Management Units, the units closest to the proposed construction activity, is estimated at 1,500 and 350 user days, respectively, from July through January. Annual usage of these areas by nonhunters outside the July-through-January hunting season is estimated at 500 and 150 user days, respectively (Three Rivers Levee Improvement Authority 2004b). Because none of the wildlife management units experiences heavy use, each can be assumed to be able to accommodate additional visitors who may be temporarily displaced from a unit closer to the construction areas.

In the Lake of the Woods Management Unit (which is generally within project Segment 1), some wildlife is likely to be disturbed by nearby construction, but no boundaries or obstacles would prevent their movement to quieter areas nearby. Portions of the Feather River State Wildlife Area may need to be closed to hunting temporarily for safety reasons while sections of the existing levee are being repaired. However, hunters in this unit could move to other areas not subject to disturbance. Similarly, recreationists along the river channel or the levee top could move to other areas where there is less disturbance.

The Star Bend Boat Launch and Fishing Access in project Segment 1 is one of only a limited number of boat launch facilities in the project vicinity. The boat launch area is also used for parking by recreationists using the Feather River State Wildlife Area, as vehicle access to the levees is prohibited. Levee repairs in Segment 1 would cross the Star Bend Boat Launch and Fishing Access and would temporarily prevent access to the boat launch and associated parking area as the repairs intersect the existing access road over the top of the levee. However, construction efforts would proceed along each project segment in a linear fashion, only disturbing a particular area for a relatively short period. In addition, a temporary access road could be provided to the Star Bend Boat Launch and Fishing Access during a portion of the time that levee repairs intersect the existing access road. Overall, project construction is expected to prevent public access to the Star Bend Boat Launch and Fishing Access for no more than 2–3 days (Wanket, pers. comm., 2006). Loss of public access to the Star Bend Boat Launch and Fishing Access for 2–3 days would not substantially restrict or reduce the availability or quality of existing recreational opportunities in the project vicinity or cause a substantial long-term disruption of any institutionally recognized recreational activities.

Any temporary disruption of recreational opportunities near the project area resulting from construction disturbance is likely to be accommodated by other existing facilities in the area. Levee repairs are likely to result in a shift of recreational activity to different wildlife management units and other recreational facilities; however, numerous other recreational

opportunities are available in the project vicinity and the region, and a temporary shift in use of facilities affected by construction activities to other facilities would not be expected to accelerate the physical deterioration of any one facility. Disturbance of recreational opportunities near the project area would not substantially restrict or reduce the availability or quality of existing recreational opportunities in the project vicinity and would not cause a substantial long-term disruption of institutionally recognized recreational activities. Therefore, this impact would be less than significant.

Impact LS-5.6-b

Long-Term Changes in Recreational Opportunities Resulting from Levee Repairs. In the long term, recreational opportunities along the left bank levee of the Feather River would not be adversely affected by levee repairs. Levee repair and strengthening of the existing levee would not change Feather River flood stage elevations, and hence would not alter the duration or frequency of inundation of recreational facilities relative to existing conditions. After completion of construction activities, the project site would be restored and reclaimed as appropriate to preexisting conditions. Recreational opportunities after project construction are expected to be available to the extent that these opportunities are available under preproject conditions. No substantial changes in recreational opportunities would be associated with levee repair and strengthening of the existing levee. This impact would be **less than significant**.

Short-term effects of project construction on recreational opportunities are addressed above in the discussion of Impact LS-5.6-a. Long-term recreational opportunities along the left bank levee of the Feather River (i.e., Lake of the Woods, Star Bend facilities, and recreation in unmanaged areas) would not be adversely affected by levee repairs. Levee repair and strengthening of the existing levee would occur in place and would not involve levee setbacks; therefore, no changes in Feather River flood stage elevations would occur after completion of construction activities. Therefore, no existing recreational facilities would be inundated more frequently or for longer periods than under existing conditions. In addition, after project construction, the project site would be restored and reclaimed as appropriate to preexisting conditions.

Recreational opportunities in the Feather River State Wildlife Area, at the Star Bend Boat Launch, along the levee top, and in the Feather River channel are expected to be available after project construction to the extent that these opportunities are available under preproject conditions. No substantial changes in recreational opportunities would be associated with levee repair and strengthening of the existing levee. This impact would be less than significant.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impact ASB-5.6-a

Temporary Changes in Recreational Opportunities during Levee Repairs and Setback Levee Construction. Construction noise could disrupt recreational uses in the project area, particularly in areas adjacent to the existing levee. Some wildlife species present in or inhabiting natural areas are likely to be disturbed by noise and by the presence of project construction crews and equipment. Portions of the Feather River State Wildlife Area in project Segment 1 may need to be closed temporarily to hunting and other recreational activities for safety reasons while adjacent sections of the existing Feather River levee are being repaired. There would be no public access to the Star Bend Boat Launch and Fishing Access for several days while levee repairs were conducted in this area. Although these temporary disturbances may affect the recreation experience for bird-watchers, hunters, boaters, and other recreational users, displaced recreational uses could be accommodated by other nearby facilities (Whitmore, pers. comm., 2006). For this reason, and because of the temporary nature of this effect, this impact would be **less than significant**.

This impact would be the same as Impact LS-5.6-a, described under Alternative 1 above. The Lake of the Woods Unit stretches along the entire length of project Segment 1 below Star Bend, and the existing left bank levee is approximately 1,000–3,000 feet east of the Star Bend Unit, which is within Segment 2. Recreational uses in these areas and others along the Feather River channel could be temporarily affected by noise and visual disturbance from construction activities associated with levee repairs in Segments 1 and 3 and by the removal of the existing levee in Segment 2. However, effects of construction activity on recreationists in public use areas along the right bank levee of the Feather River channel are expected to be minor because of the distance between these areas and construction sites across the river. Riparian vegetation would partially buffer the noise and screen views of the project construction sites.

As described in Impact LS-5.6-a, any temporary disruption of recreational opportunities near the project area resulting from construction disturbance is likely to be accommodated by other existing facilities in the area. There would be no public access to the Star Bend Boat Launch and Fishing Access for a short period during completion of Segment 1 levee repairs in this area. However, access would be restricted for only 2–3 days. Disturbance of recreational opportunities near the project area would not substantially restrict or reduce the availability or quality of existing recreational opportunities in the project vicinity and would not cause a substantial long-term disruption of institutionally recognized recreational activities. Therefore, this impact would be less than significant.

Impact ASB-5.6-b

Long-Term Changes in Recreational Opportunities Resulting from Levee Repairs and Setback Levee Construction. Implementing levee repairs along project Segments 1 and 3 would have little or no effect on recreational uses in the Lake of the Woods Management Unit or along the Feather River channel in these project segments. Implementing the levee setback in Segment 2 would slightly modify Feather River flood stage elevations in the project vicinity during high flows, possibly affecting recreational uses, and could affect survival rates of wildlife following high-flow periods, which could temporarily affect associated wildlife-related recreation. The changes in Feather River flood stage elevations that would result from expansion of the Feather River floodway in Segment 2, however, would be infrequent, of short duration, and during periods when river stage is already high; therefore, no new effects on recreational uses are expected. Sections of the existing Feather River levee would be left in place as part of the proposed project, which would minimize losses of wildlife that could adversely affect long-term recreational activities. This impact would be **less than significant**.

Long-term changes in recreational opportunities in project Segments 1 and 3 would be exactly the same as described for Impact LS-5.6-b under Alternative 1 above. As described for Impact LS-5.6-b, implementing levee repairs along Segments 1 and 3 would not affect recreational uses in the Lake of the Woods Management Unit or along the Feather River channel in these project segments.

Some aspects of flood operations with implementation of the levee setback in Segment 2 have the potential to adversely affect recreational opportunities; these include changes in Feather River flood stage elevations and effects on the survival of wildlife that take refuge on the existing levee during high river flows.

Under Alternative 2, much of the existing Feather River levee along the setback levee alignment in project Segment 2 would be removed to allow water to flow into the setback area during high river stage. Setting back the levee in Segment 2 would widen the floodway and lower the flood

stage in this river reach (see Section 5.3, "Water Resources and River Geomorphology"). However, the change in the river's flood stage would not be substantial enough, frequent enough, or of long enough duration to have a noticeable effect on river-based recreational opportunities.

Removing the existing levee has the potential to lower the chance of survival of wildlife that take refuge on this high ground during inundation of the floodway, possibly resulting in reduced populations and slower repopulation of flooded areas after the water level declines, causing recreational opportunities to temporarily decrease. Recreational activities (e.g., walking, jogging, and cycling) that take place on the existing levee would be displaced by removal of the levee. However, portions of the existing levee would be retained in Segment 2 after the setback levee is complete. The levee sections that would remain in place are expected to provide sufficient high ground to prevent substantial losses of wildlife that could adversely affect recreational activities such as bird-watching. In addition, any habitat restoration or creation that may occur in the levee setback area would likely increase wildlife populations in the vicinity and improve wildlife-related recreational activities. Other recreational opportunities, such as hiking and jogging, are expected to be available on the new levee in project Segment 2 and on the current levee in Segments 1 and 3 to the extent that these opportunities are available on the existing levee. No substantial changes in recreational opportunities would be associated with removal of the existing levee in Segment 2. This impact would be less than significant.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impact IS-5.6-a

Temporary Changes in Recreational Opportunities during Levee Repairs and Setback Levee Construction. Construction noise could disrupt recreational uses in the project area, particularly in areas adjacent to the existing levee. Some wildlife species present in or inhabiting natural areas are likely to be disturbed by noise and by the presence of project construction crews and equipment. Portions of the Feather River State Wildlife Area in project Segment 1 may need to be closed temporarily to hunting and other recreational activities for safety reasons while adjacent sections of the existing Feather River levee are being repaired. There would be no public access to the Star Bend Boat Launch and Fishing Access for several days while levee repairs were conducted in this area. Although these temporary disturbances may affect the recreation experience for bird-watchers, hunters, boaters, and other recreational users, displaced recreational uses could be accommodated by other nearby facilities (Whitmore, pers. comm., 2006). For this reason, and because of the temporary nature of this effect, this impact would be **less than significant**.

This impact would be the same as Impact ASB-5.6-a, described under Alternative 2 above. Although portions of the intermediate setback levee alignment are located to the west of the ASB setback levee alignment, the potential short-term effects on recreational opportunities during construction would be the same for the two alternatives.

As described in Impact ASB-5.6-a under Alternative 2 above, any disruption of recreational opportunities resulting from construction disturbance near the project area would be short term and temporary. For most recreational activities, individuals diverted from using locations near the construction area could be accommodated by other existing facilities in the area. Disturbance of recreational opportunities near the project area would not substantially restrict or reduce the availability or quality of existing recreational opportunities in the project vicinity and would not cause a substantial long-term disruption of institutionally recognized recreational activities. Therefore, this impact would be less than significant.

Impact IS-5.6-b

Long-Term Changes in Recreational Opportunities Resulting from Levee Repairs and Setback Levee Construction. Implementing levee repairs along project Segments 1 and 3 would have little or no effect on recreational uses in the Lake of the Woods Management Unit or along the Feather River channel in these project segments. Implementing the levee setback in Segment 2 would slightly modify Feather River flood stage elevations in the project vicinity during high flows, possibly affecting recreational uses, and could affect survival rates of wildlife following high-flow periods, which could temporarily affect associated wildlife-related recreation. The changes in Feather River flood stage elevations that would result from expansion of the Feather River floodway in Segment 2, however, would be infrequent, of short duration, and during periods when river stage is already high; therefore, no new effects on recreational uses are expected. Sections of the existing Feather River levee would be left in place as part of the proposed project, which would minimize losses of wildlife that could adversely affect long-term recreational activities. This impact would be **less than significant**.

This impact would be the same as Impact ASB-5.6-b, described under Alternative 2 above. Long-term changes in recreational opportunities in project Segments 1 and 3 would be exactly the same as described previously, resulting in less-than-significant effects. Some aspects of flood operations with implementation of the levee setback in Segment 2 have the potential to adversely affect recreational opportunities; these include changes in Feather River flood stage elevations and effects on the survival of wildlife that take refuge on the existing Feather River levee during high river flows. The change in river stage that would result from expansion of the floodway, however, would be infrequent, of short duration, and during periods when river stage is already high, and no new effects on recreational uses are expected. Under Alternative 3, much of the existing Feather River levee along the setback levee alignment in Segment 2 would be removed to allow water to flow into the setback area during high river stage. However, portions of the existing levee would be retained in Segment 2 after the setback levee is complete. The levee sections that would remain in place are expected to provide sufficient high ground to prevent substantial losses of wildlife that could adversely affect long-term recreational activities. In addition, any habitat restoration or creation that may occur in the levee setback area would likely increase wildlife populations in the vicinity and improve wildlife-related recreational activities. Other recreational opportunities, such as hiking and jogging, are expected to be available on the new levee in project Segment 2 and on the current levee in Segments 1 and 3 to the extent that these opportunities are available on the existing levee. No substantial changes in recreational opportunities would be associated with removal of the existing levee in Segment 2. This impact would be less than significant.

5.6.4 MITIGATION MEASURES

ALTERNATIVE 1 – THE LEVEE STRENGTHENING ALTERNATIVE

No mitigation is required for Impact LS-5.6-a or Impact LS-5.6-b.

ALTERNATIVE 2 – THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impact ASB-5.6-a or Impact ASB-5.6-b.

ALTERNATIVE 3 – THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impact IS-5.6-a or Impact IS-5.6-b.

5.6.5 EFFECTS REMAINING SIGNIFICANT AFTER MITIGATION

All impacts of the three proposed project alternatives on recreation would be less than significant.

SECTION 5.7 AESTHETIC RESOURCES

This section focuses on visual components of aesthetic resources that may be affected by elements of the Feather River Levee Repair Project (FRLRP).

5.7.1 CRITERIA USED IN VISUAL ASSESSMENT

The aesthetic quality of an area is determined through the variety and contrasts of the area's visual features, the character of those features, and the scope and scale of the scene. The aesthetic quality of an area depends on the relationships between its features and their importance in the overall view. Visual images dominate observers' impressions of the aesthetic qualities of an area. Therefore, evaluating scenic resources requires a method that objectively characterizes visual features, assesses their quality in relation to the visual character of the surrounding area, and identifies their importance to the individuals viewing them. This process is derived from established federal procedures for visual assessment and is commonly used for a variety of project types.

Both natural and created features in a landscape contribute to its perceived visual quality. Landscape characteristics influencing visual quality include geologic, hydrologic, botanical, wildlife, recreation, and urban features. Several sets of criteria have been developed for defining and evaluating visual quality. A commonly used set of criteria includes the concepts of vividness, intactness, and unity. None of these is itself equivalent to visual quality; all three must be high to indicate high quality. These terms are defined as follows (Federal Highway Administration 1983):

- "Vividness" is the visual power or memorability of landscape components as they combine in striking and distinctive visual patterns.
- "Intactness" is the visual integrity of the natural and human-built landscape and its freedom from encroaching elements.
- "Unity" is the visual coherence and compositional harmony of the landscape considered as a whole.

This study uses a qualitative descriptive method for characterizing and evaluating the visual resources of the areas that could be affected by the project. The quality of views of areas that could be affected by the FRLRP is evaluated based on the relative degree of vividness, intactness, and unity apparent in views and also on viewer sensitivity. Viewer sensitivity is a function of several factors, including the following:

- visibility of the landscape,
- proximity of viewers to the visual resources,
- frequency and duration of views,
- number of viewers,
- types of individuals and groups of viewers, and
- viewers' expectations.

The sensitivity of a view of the landscape is also determined by the extent of the public's concern for a particular view. Areas of high visual sensitivity are typically highly visible to the general public. Scenic highways, tourist routes, and recreation areas are considered more visually sensitive than more urbanized locations. A determination finding that a potential visual impact has significance would be based on a change in visual character as determined by the obstruction of a public view, creation of an aesthetically offensive public view, or adverse changes to objects having aesthetic significance. A viewer's distance from landscape elements plays an important role in the determination of an area's visual quality. Landscape elements are considered higher or lower in visual importance based on their position relative to the viewer. Generally, the closer a resource is to the viewer, the more dominant, and therefore visually important, it is to the viewer.

5.7.2 REGULATORY SETTING

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

No federal plans, policies, regulations, or laws related to aesthetic resources are applicable to the proposed project.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

California's Scenic Highway Program was created by the California Legislature in 1963. Its purpose is to preserve and protect scenic highway corridors from change that would diminish the aesthetic value of lands adjacent to highways. A highway may be designated "scenic" depending on how much of the natural landscape travelers can see, the scenic quality of the landscape, and the extent to which development intrudes on travelers' enjoyment of the view. There are no designated state scenic highways in the project area (California Department of Transportation 2003).

LOCAL PLANS, POLICIES, REGULATIONS, AND LAWS

The project area is located in Yuba County. There are no regulations that pertain specifically to visual resources in the project area. The general goal of the Open Space and Conservation Element of the *Yuba County General Plan* (Yuba County 1994) is "To maintain and enhance the natural resources, open space land uses and scenic beauty of Yuba County in order to protect the quality of the environment, the County's economy, and the health and well-being of present and future residents." Supporting this goal is a policy to "encourage the preservation and enhancement of the natural features of the County, including rivers and streams and their banks, mountain peaks, bluffs, areas of scenic beauty, and native vegetation."

5.7.3 ENVIRONMENTAL SETTING

SOURCES OF INFORMATION

Information for this section was obtained from Volume I of the *Yuba County General Plan* (Yuba County 1994), the *Three Rivers Levee Improvement Authority Phase IV Erosion Investigation* (Three Rivers Levee Improvement Authority 2006), discussions with individuals with knowledge of the area, and field observations during site visits in June 2004 and May 2006.

PROJECT SEGMENT 1

As described in Section 4.1, "Introduction," in Chapter 4, "Description of the Proposed Project," the Feather River levee in the project area is divided into three segments. The southernmost segment, project Segment 1, extends from Project Levee Mile (PLM) 13.3 to PLM 17.1, between Reclamation District (RD) 784 Pump Station No. 2 and Star Bend. At its northern end, Segment 1 is adjacent to the west side of Feather River Boulevard for nearly a mile, until Feather River Boulevard turns east toward SR 70. SR 70 is about 2 miles east of the project area. Figure 5.11-1, "Roads in the Vicinity of the Proposed Feather River Levee Repair Project Area," shows local roads and highways in relation to the three project segments.

The area between Feather River Boulevard and the existing Feather River levee in project Segment 1 is rural, with few residences (Figure 5.7-1, "Views in and near Project Segment 1"). Views west toward the levee and east, from the levee, are typical of local rural areas, consisting mainly of orchards of various ages dominated by crops of walnuts, peaches, prunes, pears, and apples; scattered agricultural outbuildings and residences along Feather River Boulevard and connecting roads; disturbed areas of ruderal vegetation bordering roadways; utility poles and overhead utility lines; and the existing levee (Figure 5.7-1, Photo A). The area has little topographic variation. From Feather River Boulevard, the existing levee is visible in the middle distance where the road parallels the levee alignment and is a less evident feature of the viewshed farther south where the road runs east-west. SR 70 extends approximately parallel to the existing levee, which is located about 2 miles west of the roadway; where SR 70 approaches the Bear River, there are long-distance views across open agricultural land to the existing levee. A wide riparian corridor extends the length of project Segment 1 on the water side of the levee, and vegetation from this area is visible above the top of the levee to observers on the land side of the levee (Figure 5.7-1, Photo B). Because fewer nonagricultural elements, such as utility lines, encroach on the undeveloped rural character of views from the east below Star Bend than above Star Bend, views in Segment 1 have a higher degree of intactness and unity than those described for Segment 2 below. However, Segment 1 is visible to fewer individuals because of the sparse population within approximately 0.5 to 1 mile of this project segment and because of the orientation of Feather River Boulevard in relation to the existing levee. Therefore, these views are of low to moderate aesthetic value.

The right (west) bank Feather River levee obstructs most views of project Segment 1 from rural Sutter County to the west. Therefore, most individuals viewing Segment 1 from the west are boaters and other recreationists along the Feather River, including the Lake of the Woods unit of the Feather River State Wildlife Area (shown in Figure 5.1-1, "Conservation Areas in the Project Vicinity," in Section 5.1, "Land Use"). From the Feather River channel, views to the east are dominated by the river channel; the corridor of mixed riparian woodland and scrub of varying width that extends the length of the levee in the project area; and the existing left (east) bank Feather River levee, which blocks ground-level views of the agricultural land on the land side of the levee. The riparian corridor is dominated by Fremont cottonwood, valley oak, ash, box elder, and sycamore trees with a shrub layer dominated by willow, buttonbush, elderberry, and coyote bush. Many trees rise above the top of the levee, and views of the levee are screened by the natural vegetation in many locations.

A. Orchards adjacent to the Feather River levee with housing development visible on the horizon. View east from the existing levee.

B. Riparian vegetation along the Feather River levee in the project area. View northwest from the existing levee.

Views In and Near Project Segment 1 **Figure 5.7-1**

Views of the river corridor are distinctive and moderately vivid, with the meandering river channel and riparian areas forming striking and harmonious visual elements. The channel is free from urban encroachment in project Segment 1. However, the levees on both sides of the Feather River floodway, including areas of recent repairs, abruptly limit the lateral extent of the riparian growth and detract from the natural appearance of the corridor, reminding viewers of the presence of nearby urban and agricultural areas. The views have a moderate degree of both intactness and unity. Recreationists are generally considered a sensitive viewer group, but because the number of recreationists in this area is only moderate, the sensitivity of views is moderate. Overall, the views along the existing Feather River floodway in Segment 1 are of moderate aesthetic value.

PROJECT SEGMENT 2

Project Segment 2 extends approximately 6.2 miles from PLM 17.1 to PLM 23.6, from Star Bend to immediately south of Shanghai Bend (west of the Yuba County Airport). This project segment is about ⅔ mile west of Feather River Boulevard and 2.5 miles west of State Route (SR) 70 (Figure 5.11-1). Travelers on Feather River Boulevard and residents of the area between Feather River Boulevard and the existing levee would be the main viewers of the project area.

The aesthetic resources in this area are similar to those in Segment 1, except that several east-west lateral roadways connect to Feather River Boulevard in this project segment, there are more residences and other structures between Feather River Boulevard and the existing levee, and there are more utility lines. As in Segment 1, the landscape is dominated by orchards (Figure 5.7-2, "Views in and near Project Segment 2," Photo A). A few agricultural processing facilities are located in the area. Drainage canals and ponds can be found in the southern half of Segment 2. The existing levee, which is approximately 25 feet high on average, blocks views of the Feather River from the east. The tops of trees in the riparian area west of the levee are visible from some areas east of the levee (Figure 5.7-2, Photo B).

Views toward the levee from Feather River Boulevard and lands west of this roadway are neither striking nor distinctive. Because the elements of the landscape are a mixture of agricultural, agricultural industrial, residential, and utility features, the intactness and unity of the views are low to moderate. Views from the east, therefore, are generally of low to moderate aesthetic value. The existing levee is a familiar, integral part of the visual setting to the majority of regular viewers, consisting of occupants of residences in the area and commuters and other travelers on Feather River Boulevard. Views from some parts of Feather River Boulevard and the surrounding area include the levee as a background element, although in other areas, the dense growth of orchards obscures views toward the levee.

Parts of the existing levee are visible in long-distance views across open agricultural land from some areas east of Feather River Boulevard, including part of SR 70; the Yuba County Airport west of Olivehurst; rural roadways and scattered residences; and the Marysville Municipal Golf Course, approximately 1 mile east of the levee on Country Club Avenue. In many nonelevated locations east of Feather River Boulevard, long-distance views toward the levee are limited by earth berms where railroad tracks cross the area. A majority of the homes and businesses in the area are located east of the railroad tracks and have only partial views of the project area. Long-

A. Orchards and a view along Country Club Avenue near the project area. View to the east from the existing Feather River levee.

B. Riparian area and utility lines in the project area. View to the west, toward the Feather River, from the existing Feather River levee.

Views In and Near Project Segment 2 **Figure 5.7-2**

distance views from parts of SR 70 are also blocked by the Algodon Canal levee in addition to railroad berms.

As described for project Segment 1, the right bank Feather River levee obstructs most views of Segment 2 from rural Sutter County to the west. Most individuals viewing Segment 2 from the west would be boaters and other recreationists along the Feather River channel, including several units of the Feather River State Wildlife Area (see Figure 5.1-1). Views east from the river channel are as described above for Segment 1 and have moderate aesthetic value.

PROJECT SEGMENT 3

Project Segment 3 extends approximately 2.5 miles from Feather River PLM 23.6 to PLM 26.1, between Shanghai Bend and the confluence with the Yuba River, and also includes the Yuba River left (east) bank levee from PLM 0.0 to PLM 0.3 (west of the Yuba County Airport to the railroad crossing at the SR 70 bridge). This segment is about ⅓ mile west of Feather River Boulevard and is adjacent to a railroad bridge and SR 70 at its northern terminus (Figure 5.11-1).

Travelers on Feather River Boulevard and residents of the area between Feather River Boulevard and the existing Feather River levee would be the main viewers of Segment 3.

The aesthetic resources in this project segment are somewhat similar to those in Segments 1 and 2, although the area is generally more developed. There are substantially more residences in Segment 3 (Figure 5.7-3, "Views in and near Project Segment 3," Photo A) and other structures between Feather River Boulevard and the existing levee (mostly north of the Yuba County Airport). Many of the homes and structures are adjacent to the existing levee. In addition, SR 70 and the railroad tracks cross at the northern terminus of Segment 3. Additionally, roughly ½ mile of agricultural land lies to the west of the existing levee in the river floodway. The Yuba County Airport is east of Feather River Boulevard in the southern portion of Segment 3. As in Segment 1, undeveloped areas are dominated by orchards. RD 784 Pump Station No. 9 is located approximately in the middle of Segment 3. The existing Feather River levee, which is approximately 25 feet high on average, blocks views of the river from the east. The tops of trees in the riparian area west of the levee are visible from some areas east of the levee.

Views of project Segment 3 from Feather River Boulevard and residences east of the levee are neither vivid nor distinctive, especially at the northern end of the segment where SR 70 and the railroad tracks cross the area (Figure 5.7-3, Photo B). The elements of the landscape are a mixture of agricultural, agricultural industrial, residential, and utility features; therefore, the intactness and unity of the views and aesthetic value are low to moderate. The existing levee is a familiar, integral part of the visual setting to the majority of regular viewers, consisting of occupants of residences in the area and the commuters and other travelers on SR 70 and Feather River Boulevard. Views from some parts of Feather River Boulevard and the surrounding area include the levee as a background element, although in other areas, the dense growth of orchards obscures views of the levee and the surrounding area.

A. Residences north of the Yuba County Airport adjacent to the project area. View to the east from the existing Feather River levee.

B. SR 70 and railroad bridge adjacent to the project area. View to the north from the existing Feather River levee at the northern end of Segment 3.

Views in and Near Project Segment 3 **Figure 5.7-3**

Because of its proximity to south Yuba City, the section of Sutter County across the Feather River from project Segment 3 contains more residences than the sections of the county opposite Segments 1 and 2; however, as with the other segments, the right bank Feather River levee obstructs most views of Segment 3 from Sutter County. Most individuals viewing Segment 3 from the west are boaters and other recreationists along the Feather River, and from the Feather River channel, views toward this project segment to the east are dominated by the river channel and riparian woodland. Views of the river corridor are distinctive and moderately vivid, with the meandering river channel and riparian areas forming striking and harmonious visual elements. The channel is generally free from urban encroachment along Segment 3, except for the northern portion near SR 70 and the railroad tracks. The views have a moderate degree of both intactness and unity. Recreationists are generally considered a sensitive viewer group, but because the number of recreationists in this area is only moderate, the sensitivity of views is moderate. (Refer to Section 5.6, "Recreation," for a discussion of the level of recreational uses within the project area.) Overall, the views along the existing Feather River floodway are of moderate aesthetic value.

5.7.4 ENVIRONMENTAL IMPACTS

THRESHOLDS OF SIGNIFICANCE

Thresholds for determining the significance of impacts related to aesthetic resources were based on the environmental checklist form in Appendix G of the California Environmental Quality Act Guidelines (State CEQA Guidelines). A project alternative would have a significant impact on aesthetic resources if it would:

- have a substantial adverse effect on a scenic vista;
- substantially damage scenic resources, including but not limited to trees, rock outcrops, and historic buildings, within a state scenic highway;
- substantially degrade the existing visual character or quality of the site and its surroundings; or
- create a new source of substantial light or glare that would adversely affect day or nighttime views in the area.

There are no designated state scenic highways in the project area (California Department of Transportation 2003); therefore, the second significance threshold does not apply to the FRLRP.

IMPACT ANALYSIS

Alternative 1 – The Levee Strengthening Alternative

Impact LS-5.7-a

Temporary Changes in Visual Resources Associated with Levee Repairs. Levee repair and strengthening activities would temporarily reduce the aesthetic qualities of views by introducing earthmoving equipment and other construction equipment, materials, and work crews into the viewshed of recreationists, motorists on SR 70 and Feather River Boulevard, workers in nearby farming areas, and residents of the area. However, the construction areas would typically be distant from and/or screened from most viewers. Where

residents would be near the construction area (e.g., in project Segment 3), construction would pass by these areas relatively quickly and changes in aesthetic conditions would be short term and temporary. For these reasons, this impact would be **less than significant**.

Primary construction activities under FRLRP Alternative 1 would be repairing the existing levee in place to improve seepage and stability issues, constructing a detention basin in the detention basin/soil borrow area east of Star Bend, transporting borrow material from this area to the levee repair areas, and relocating Pump Station No. 3. These activities would require the use of various types of equipment and a crew generally of 50–60 persons, with as many as 100 at the peak of construction. A total volume of about 1.6 million cubic yards of borrow would be moved to the levee repair areas in about 80,000 haul unit trips (fewer if loads larger than about 20 cubic yards are possible). This transport of material would take place over two 6- to 9-month levee construction seasons (approximately April through November). The relocation of Pump Station No. 3 in project Segment 2 would entail the use of similar equipment over a relatively short period.

The presence and movement of heavy construction equipment and construction-related generation of dust would have the potential to temporarily degrade the existing visual character and/or quality of the area. Most viewers of the construction corridor, particularly in project Segments 1 and 2, would be recreationists on the west side of the existing Feather River levee, travelers along SR 70 and Feather River Boulevard, workers in nearby farming areas, and occupants of scattered residences between Feather River Boulevard and the existing levee. In Segment 3 many of those viewing the construction area would be residents in nearby homes. Of these groups, recreationists and residents are considered the most sensitive to aesthetic qualities. Recreationists' views of the construction corridor from the western end of the Feather River floodway would be screened or partially screened by the riparian corridor in all three project segments. Recreational use areas also extend along the Feather River to the north and south of this area, so recreationists could move away from areas close to visual disturbance to areas where construction activities would not encroach on the viewshed.

Many views from the land side of the construction corridor, including those from residences, would be largely screened by orchard trees, other vegetation, and structures. However, in project Segment 3 there are several locations where residences are adjacent to the eastern (landside) toe of the levee, and construction activities would be clearly visible from these vantage points. The total duration of construction activity in Segments 1 and 3 would be approximately 6–7 months. Construction activity in Segment 2 would also last approximately 8–9 months, but would take place in the year following the completion of activities in Segments 1 and 3. Levee repair work would typically move linearly down levee segments, with construction activities in any one location lasting from several days to no more than several weeks. Therefore, where construction activities would be clearly visible from nearby residences, the activity would be short term and temporary.

For the reasons listed above, project construction would not have a substantial adverse effect on a scenic vista or substantially degrade the existing visual character or quality of the site and its surroundings. This impact would be less than significant.

Impact LS-5.7-b

Changes in Light and Glare. There would be no substantial long-term sources of light or glare associated with levee repairs. However, equipment staging areas may be temporarily lit at night during construction, and portions of the construction areas may also need to be lit at night. Although such nighttime lighting may be visible from various residences, particularly in project Segment 3, in most locations views of the construction areas would be largely shielded by orchards, other vegetation, and structures. Where lit construction areas are visible, lighting would be short term and temporary. For these reasons, this impact would be **less than significant**.

There would be no substantial long-term sources of light or glare associated with levee repairs. However, equipment staging areas may be temporarily lit for security reasons during construction, and portions of the levee repair areas may need to be lit if levee construction needs to take place at night. In most of the project area, particularly in Segments 1 and 2, construction-related lighting would not be visible from any residences or other potentially sensitive vantage points. There are no residences in some parts of the project area, and where residences do exist, construction areas would be screened by orchards, other vegetation, or structures. However, in Segment 3 there are several locations where residences are adjacent to the eastern (landside) toe of the levee; if construction were to take place at night, construction lighting would be clearly visible from these vantage points. The total duration of construction activity in Segment 3 would be approximately 6–7 months. Levee repair work would typically move linearly down the levee segment, with construction activities in any one location lasting from several days to no more than several weeks. Therefore, where nighttime construction lighting (if needed) would be clearly visible from nearby residences, the activity would be short term and temporary.

For the reasons listed above, nighttime lighting related to project construction would not create a new source of substantial light or glare that would adversely affect day or nighttime views in the area. This impact would be less than significant.

Impact LS-5.7-c

Long-Term Modifications of Views from Levee Repairs. Levee repair and strengthening activities would not dramatically change the appearance of the project area, which is of low to moderate aesthetic value. There would be no substantial adverse effect on any scenic vista, and these repairs would not substantially alter the general character of views of the area. This impact would be **less than significant**.

Levee repair and strengthening activities would not substantially alter the visual character of the project area and its surroundings. The area would remain rural, and the project components—levees, wells, and drainage features—are common elements of views of the area. Existing views of the project area from the east (i.e., Feather River Boulevard and residences) generally lack vividness, given the flatness of the terrain and lack of distinctive features. Overall views have moderate unity and intactness, given their consistently rural agricultural character and the occasional presence of overhead utility lines and scattered industrial facilities mixed with crops and rural residences in the viewshed. The riparian growth along the floodway adds to the quality of these views. Repairing the levee would not alter the composition or character of elements in this viewshed, nor would it substantially alter the general landscape, which itself is not of high aesthetic value. Levee repairs could include use of stabilization elements such as soil cement, cobbles, and buried riprap and would include the construction of seepage/stability berms. These repairs would add new elements to the existing levee; however, the aesthetic impact of the repairs would be minimal because the construction specifications of the existing levee would remain similar and because the overall structure represents a homogenous visual landscape. The

levee would still be a background element in views from most vantage points and would still be screened from many views by orchard and riparian growth.

The soil borrow site/detention basin could occupy as much as approximately 150 acres of land east of Feather River Boulevard that is currently in agricultural use. The exact size and location would be determined in final design. Because of the flat terrain in the project area, the basin would not be highly visible from the roadway, although a long edge parallel to the roadway could present a noticeable discontinuity in the otherwise agricultural appearance of the area. The sides and bottom of the basin would be vegetated with grasses, lessening any adverse effect on the viewshed.

The proposed levee repair and strengthening and related activities associated with Alternative 1 would not adversely affect a scenic vista and would not have a substantial adverse effect on the character or quality of views of the area. This impact would be less than significant.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impact ASB-5.7-a

Temporary Changes in Visual Resources Associated with Levee Repairs and Setback Levee Construction. Levee repair and strengthening activities and construction of the ASB setback levee would temporarily reduce the aesthetic qualities of views by introducing earthmoving equipment and other construction equipment, materials, and work crews into the viewshed of recreationists, motorists on SR 70 and Feather River Boulevard, workers in nearby farming areas, and residents of the area. However, the construction areas would typically be distant from and/or screened from most viewers. Where residents would be near the construction area (e.g., in project Segment 3), construction would pass by these areas relatively quickly and changes in aesthetic conditions would be short term and temporary. For these reasons, this impact would be **less than significant**.

Temporary aesthetic impacts on project Segments 1 and 3 would be the same as in Impact LS-5.7-a, described under Alternative 1 above. However, because Segment 2 includes the construction of the ASB setback levee, additional aesthetic effects would result under Alternative 2, as described below.

The major components of ASB setback levee construction in project Segment 2 would be the removal of most of the existing levee, excavation of borrow areas between the setback levee alignment and the Feather River and/or east of Star Bend, transport of material from these sources to the setback levee alignment, construction of a detention basin in the area east of Star Bend, preparation of the setback levee foundation, and construction of the setback levee. New temporary-access haul roads would be needed to transport borrow across orchard land. The construction activities would require the use of various types of equipment such as scrapers, graders, and hydraulic excavators and a crew generally of 60–70 persons, with as many as 100 at the peak of construction. A total volume of about 3.1 million cubic yards of borrow would be moved across the levee setback area to the ASB setback levee alignment in about 155,000 haul unit trips (fewer if loads larger than about 20 cubic yards are possible). This transport of material would take place during an approximately 7- to 9-month (April through November) construction season for project Segment 2 (see Section 4.4.3, “Alternative 2—Construction,” and Section 4.6.1, “Implementation Schedule,” in Chapter 4, “Description of the Proposed Project,” regarding the construction schedule).

The presence and movement of heavy construction equipment and construction-related generation of dust could temporarily degrade the existing visual character and/or quality of the area. Most viewers of the construction area associated with project Segment 2 would be recreationists on the west side of the existing Feather River levee, travelers along SR 70 and Feather River Boulevard, workers in nearby farming areas, and occupants of scattered residences between Feather River Boulevard and the proposed ASB setback levee alignment. Of these groups, recreationists and residents are considered the most sensitive to aesthetic qualities. Recreationists' views of the construction activities would consist primarily of the removal of segments of the existing Feather River levee. Views from the western end of the Feather River floodway would be screened or partially screened by the riparian corridor there. Recreational use areas also extend along the Feather River to the north and south of this area, so recreationists could move away from areas close to visual disturbance to areas where construction activities would not encroach on the viewshed. Many views from the land side of the construction corridor would be largely screened by orchard trees.

The total duration of construction activity (construction of the levee foundation, the levee embankment, and the detention basin) in project Segment 2 would be about 17 months. Construction activity would be less during the winter months based on weather, regulatory guidelines, and other factors. Construction activity would not be continuous in any particular area during the 17-month construction period. The levee foundation may be constructed along a segment for several weeks, then construction could cease in that area for several months until the beginning of embankment construction or another activity. As the levee embankment is built, activity would occur at various times up and down the approximately 5.9-mile-long alignment. Therefore, close-up views of major construction activity in any given area along the ASB setback levee alignment in Segment 2 would be short term and temporary.

For the reasons listed above, project construction would not have a substantial adverse effect on a scenic vista or substantially degrade the existing visual character or quality of the site and its surroundings. This impact would be less than significant.

Impact ASB-5.7-b

Changes in Light and Glare. There would be no substantial sources of light or glare associated with levee repairs or with the long-term presence of the ASB setback levee and detention basin. However, equipment staging areas may be temporarily lit at night during construction, and portions of the construction areas may also need to be lit at night. Although such nighttime lighting may be visible from various residences, particularly in project Segment 3, in most locations views of the construction areas would be largely shielded by orchards, other vegetation, and structures. Where lit construction areas are visible, lighting would be short term and temporary. For these reasons, this impact would be **less than significant**.

Aesthetic effects on project Segments 1 and 3 associated with the temporary use of construction lighting would be the same as in Impact LS-5.7-b, described under Alternative 1 above. However, because Alternative 2 includes the construction of the ASB setback levee and a detention basin in project Segment 2, potential aesthetic impacts associated with light and glare in Segment 2 are described below.

There would be no substantial sources of light or glare associated with the long-term presence of the ASB setback levee and detention basin in project Segment 2. However, equipment staging areas may be temporarily lit for security reasons during construction, and portions of the

construction areas may need to be lit if activities need to take place at night. However, views of staging areas and the construction areas associated with Segment 2 would be largely shielded by orchards, other vegetation, and structures. Homes and other sensitive viewpoints are few and dispersed in the Segment 2 area; therefore, few individuals would be able to see nighttime construction lighting. If nighttime lighting were required, its use would be short term and temporary as construction proceeds along various portions of the construction area.

For the reasons listed above, nighttime lighting related to project construction would not create a new source of substantial light or glare that would adversely affect day or nighttime views in the area. This impact would be less than significant.

Impact ASB-5.7-c

Long-Term Modifications of Views from Levee Repairs and Installation of the Setback Levee. Levee repair and strengthening activities would not dramatically change the appearance of project Segments 1 and 3. Construction of the ASB setback levee would change the appearance of Segment 2. However, all three project segments are of low to moderate aesthetic value, there would be no substantial adverse effect on any scenic vista, and these changes would not substantially alter the general character of views of the area. This impact would be **less than significant**.

Long-term modifications of views of project Segments 1 and 3 resulting from levee repair and strengthening activities would be the same as in Impact LS-5.7-c, described under Alternative 1 above. However, because Alternative 2 includes the construction of the ASB setback levee and an associated detention basin in project Segment 2, additional effects on aesthetic resources would result under this alternative, as described below.

Construction of the ASB setback levee and the associated detention basin would change the long-term appearance of project Segment 2, which is rural/rural residential. As noted in Impact LS-5.7-c, the proposed detention basin would occupy land east of Feather River Boulevard and north of Algodon Road that is currently in agricultural use. Because of the flat terrain, the basin would not be highly visible from most vantage points. Its side and bottom surfaces would be vegetated with grasses, lessening any adverse effect on the viewshed.

The levee setback and the associated changes in land use would alter both the area's scenic vistas and its scenic resources; however, these effects would not be substantial. There are no historic buildings or state or local scenic highways located near the setback levee alignment. The largest viewing populations of the ASB setback levee would be travelers along SR 70 and Feather River Boulevard just west of SR 70. These viewers would have transitory and primarily obstructed views of the setback levee and levee setback area and are not considered a sensitive viewer group. Orchards obscure much of the view of the existing and proposed levee alignments; therefore, implementation of the levee setback would have only a minor effect on views.

In general, the proposed levee repair and strengthening activities, levee setback, and detention basin construction would not adversely affect a scenic vista and would not have a substantial adverse effect on the character or quality of views of the area. This impact would be less than significant.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impact IS-5.7-a

Temporary Changes in Visual Resources Associated with Levee Repairs and Setback Levee Construction. Levee repair and strengthening activities and construction of the intermediate setback levee would temporarily reduce the aesthetic qualities of views by introducing earthmoving equipment and other construction equipment, materials, and work crews into the viewshed of recreationists, motorists on SR 70 and Feather River Boulevard, workers in nearby farming areas, and residents of the area. However, the construction areas would typically be distant from and/or screened from most viewers. Where residents would be near the construction area (e.g., in project Segment 3), construction would pass by these areas relatively quickly and changes in aesthetic conditions would be short term and temporary. For these reasons, this impact would be **less than significant**.

The intermediate setback levee alignment under this alternative would be west of the ASB setback levee alignment under Alternative 2 (Figure 4-1, "Project Features," in Chapter 4, "Description of the Proposed Project"). Temporary changes to visual resources would be essentially the same for either setback levee alignment; therefore, this impact would be the same as Impact ASB-5.7-a, described under Alternative 2 above. For the same reasons as described above, this impact would be less than significant.

Impact IS-5.7-b

Changes in Light and Glare. There would be no substantial long-term sources of light or glare associated with levee repairs or with the long-term presence of the intermediate setback levee and detention basin. However, equipment staging areas may be temporarily lit at night during construction, and portions of the construction areas may also need to be lit at night. Although such nighttime lighting may be visible from various residences, particularly in project Segment 3, in most locations views of the construction areas would be largely shielded by orchards, other vegetation, and structures. Where lit construction areas are visible, lighting would be short-term and temporary. For these reasons, this impact would be **less than significant**.

The intermediate setback levee alignment under this alternative would be west of the ASB setback levee alignment under Alternative 2 (Figure 4-1). Temporary short-term increases in light and glare during project construction would be essentially the same for either setback levee alignment; therefore, this impact would be the same as Impact ASB-5.7-b, described under Alternative 2 above. For the same reasons as described above, this impact would be less than significant.

Impact IS-5.7-c

Long-Term Modifications of Views from Levee Repairs and Installation of the Setback Levee. Levee repair and strengthening activities would not dramatically change the appearance of project Segments 1 and 3. Construction of the intermediate setback levee would change the appearance of Segment 2. However, all three project segments are of low to moderate aesthetic value, there would be no substantial adverse effect on any scenic vista, and these changes would not substantially alter the general character of views of the area. This impact would be **less than significant**.

The intermediate setback levee alignment under this alternative would be west of the ASB setback levee alignment under Alternative 2 (Figure 4-1). Moderate changes to views within the project area where levees would be strengthened or set back would be essentially the same for either setback levee alignment; therefore, this impact would be the same as Impact ASB-5.7-c, described under Alternative 2 above. For the same reasons as described above, this impact would be less than significant.

5.7.5 MITIGATION MEASURES

ALTERNATIVE 1 – THE LEVEE STRENGTHENING ALTERNATIVE

No mitigation is required for Impacts LS-5.7-a, LS-5.7-b, and LS-5.7-c.

ALTERNATIVE 2 – THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impacts ASB-5.7-a, ASB-5.7-b, and ASB-5.7-c.

ALTERNATIVE 3 – THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impacts IS-5.7-a, IS-5.7-b, and IS-5.7-c.

5.7.6 IMPACTS REMAINING SIGNIFICANT AFTER MITIGATION

All impacts of the three proposed project alternatives on aesthetic resources would be less than significant.

SECTION 5.8 CULTURAL RESOURCES

This section includes an evaluation of the potential impacts on cultural resources that could result from implementation of the proposed levee improvements. Cultural resources include buildings, sites, structures, objects, or districts that may have historical, architectural, archaeological, cultural, or scientific significance. Cultural resources may include archaeological traces such as early Native American occupation sites and artifacts, or historic-era resources. These materials can be found at many locations on the landscape and, along with prehistoric and historic human remains and associated grave goods, are protected under various federal and state statutes. The most inclusive of these are Section 106 of the National Historic Preservation Act and the California Environmental Quality Act (CEQA), which are described below. Fossils (the remains of prehistoric animals and plants) are addressed in Section 5.13, "Paleontological Resources."

5.8.1 REGULATORY SETTING

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

Section 106 of the National Historic Preservation Act of 1966 and its implementing regulations (36 Code of Federal Regulations [CFR] Part 800, as amended in 1999) requires federal agencies to consider the effects of their actions, or those they fund or permit, on properties that may be eligible for listing or are listed in the National Register of Historic Places (NRHP).

The NRHP is a register of districts, sites, buildings, structures, and objects of significance in American history, architecture, archaeology, engineering, and culture. The regulations provided in 36 CFR Part 60.4 describe the criteria to evaluate cultural resources for inclusion in the NRHP. Cultural resources can be significant on the national, state, or local level. Properties may be listed in the NRHP if they possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

(A) are associated with events that have made a significant contribution to the broad patterns of our history;

(B) are associated with the lives of persons significant in our past;

(C) embody the distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction; or

(D) have yielded, or may be likely to yield, information important in prehistory or history.

To determine whether an undertaking could affect historic properties, cultural resources (including archaeological, historical, and architectural properties) must be identified, inventoried, and evaluated for listing in the NRHP. Although compliance with Section 106 is the responsibility of the lead federal agency, the work necessary to comply can be undertaken by others. The Section 106 process would need to be completed by any federal agency issuing a

permit for the Feather River Levee Repair Project (FRLRP), but it is not specifically required for CEQA compliance.

The Section 106 review process involves a four-step procedure:

- Initiate the Section 106 process by establishing the undertaking, developing a plan for public involvement, and identifying other consulting parties.
- Identify historic properties by determining the scope of efforts, identifying cultural resources, and evaluating their eligibility for inclusion in the NRHP.
- Assess adverse effects by applying the criteria of adverse effect on historic properties (resources that are eligible for inclusion in the NRHP).
- Resolve adverse effects by consulting with the State Historic Preservation Officer and other consulting agencies, including the Advisory Council on Historic Preservation if necessary, to develop an agreement that addresses the treatment of historic properties.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

CEQA includes cultural resources as an important component of its oversight and management policies. CEQA states that if a proposed project would result in an effect that may cause a substantial adverse change in the significance of a significant cultural resource (termed a "historical resource"), alternative plans or mitigation measures must be considered. Because only significant cultural resources need to be addressed, the significance of cultural resources must be determined before mitigation measures need to be developed.

CEQA Section 5024.1 (California Public Resources Code Section 5024.1) and Section 15064.5 of the State CEQA Guidelines (14 California Code of Regulations [CCR] Section 15064.5) define a historical resource as "a resource listed or eligible for listing on the California Register of Historical Resources." A historical resource may be eligible for inclusion in the California Register of Historical Resources (CRHR) if it:

(1) is associated with events that have made a significant contribution to the broad patterns of local or regional history or the cultural heritage of California or the United States;

(2) is associated with the lives of persons important to local, California, or national history;

(3) embodies the distinctive characteristics of a type, period, region, or method of construction, represents the work of a master, or possesses high artistic values; or

(4) has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California, or the nation.

CEQA also distinguishes between two classes of archaeological resources: archaeological sites that meet the definition of a historical resource as above, and "unique archaeological resources." An archaeological resource is considered "unique" if it:

- is associated with an event or person of recognized significance in California or American history or of recognized scientific importance in prehistory;
- can provide information that is of demonstrable public interest and is useful in addressing scientifically consequential and reasonable research questions;
- has a special or particular quality such as being the oldest, best example, largest, or last surviving example of its kind;
- is at least 100 years old and possesses substantial stratigraphic integrity; or
- involves important research questions that historical research has shown can be answered only with archaeological methods (Public Resources Code Section 21083.2).

The State CEQA Guidelines (14 CCR Section 15064.5[c]) also provide specific guidance on the treatment of archaeological resources, depending on whether they meet the definition of a historical resource or a unique resource.

The State CEQA Guidelines (14 CCR Section 15064.5[e]) also require that excavation be stopped whenever human remains are uncovered, and that the county coroner be called in to assess the remains. If the county coroner determines that the remains are those of a Native American, the Native American Heritage Commission (NAHC) must be contacted within 24 hours, and the provisions for treating or disposing of the remains and any associated grave goods as described in CCR Section 15064.5 must be followed.

The steps normally taken in a cultural resources investigation for CEQA compliance are as follows:

- Identify cultural resources.
- Evaluate the significance of the resources.
- Evaluate the effects of a project on all cultural resources.
- Develop and implement measures to mitigate the effects of the project on significant resources.

LOCAL PLANS, POLICIES, REGULATIONS, AND LAWS

No local plans, policies, regulations, or laws related to cultural resources are applicable to the proposed project.

5.8.2 ENVIRONMENTAL SETTING

SOURCES OF INFORMATION

To identify cultural resources that may be affected as a result of project implementation, EDAW cultural resource specialists reviewed pertinent information about previous surveys and known cultural resources in the project area, consulted with appropriate Native American

representatives, and conducted a pedestrian cultural resources inventory of portions of the project area. Relevant portions of the research and survey information prepared in 2003 for the Feather River Levee Setback element of the Yuba-Feather Supplemental Flood Control Project (Y-FSFCP) and reported in the Y-FSFCP programmatic environmental impact report (EIR) (Yuba County Water Agency 2003) and accompanying cultural resources survey report (Jones & Stokes 2003) were used as appropriate.

Records Search and Literature Review

Records searches were conducted at the North Central Information Center (NCIC) of the California Historical Resources Information System. The NCIC administers the cultural resources records for a six-county area, including Yuba County. The searches included reviewing the NCIC's database of previous surveys and known cultural resources in the areas of potential project disturbance in the project area. Sources consulted during the records searches include the NRHP, the CRHR, secondary historical sources, historical maps, and inventories of historic resources in Yuba County.

Native American Consultation

Before conducting fieldwork, EDAW consulted with the NAHC and local Maidu Native American groups, consisting of the Butte Tribal Council and Enterprise Rancheria of Maidu Indians of Oroville, Maidu Elders Organization of Dobbins, and Maidu Nation of Susanville. The NAHC responded that the Sacred Lands File does not have records of Native American cultural resources in the project area. No response has been received to date from the local Maidu groups. Correspondence with these groups is presented in Appendix D.

Field Inventory

Previous archaeological surveys covered most of the existing Feather River and Yuba River levees in the FRLRP project area—specifically, project Segments 1 and 2 and a portion of Segment 3. For the present study, an archaeological inventory was conducted along the proposed Above Star Bend (ASB) and intermediate setback levee alignments and the portion of the existing Feather River levee in Segment 3 that was not covered in the previous survey efforts. As described below in "Results of Current Investigations within the Project Area," portions of the setback levee alignments could not be surveyed because access to these areas was not available. Survey methods were consistent with the *Secretary of the Interior's Standards and Guidelines for Identification of Cultural Resources* (48 CFR 44720–44723). The presence of resources was recorded following the guidelines outlined in *Instructions for Recording Historical Resources* (California Office of Historic Preservation 1995).

The current inventory involved walking four parallel transects spaced at 25-meter (82-foot) intervals, resulting in the investigation of a 100-meter (328-foot)-wide footprint. A detailed sketch map was produced using a global positioning system (GPS) unit with accuracy to less than 3 meters (10 feet). Appropriate California Department of Parks and Recreation Series 523 forms were prepared as necessary. All sites and structures were photographed in their natural setting. Grass was removed periodically from areas with moderate cover to provide an adequate

sample of the ground surface. All areas of rodent disturbance, irrigation ditches, and other cut banks were inspected for the presence of subsurface cultural deposits.

Figures 5.8-1a and 5.8-1b, "Cultural Resources Surveys Conducted in the Project Area," show survey coverage in the project area.

REGIONAL SETTING

Prehistoric Context

Generally speaking, the archaeology of Yuba County is included within the broad framework established by archaeologists for the Sacramento Valley. Although human occupation of the northern Sacramento Valley may extend back 10,000 years or more, reliable evidence of the presence of such an early human presence is lacking. Early archaeological sites bearing evidence of these Paleo-Indian populations may be present in the valley but deeply buried under alluvium (Moratto 1984). The following summary of the prehistoric cultural sequence is drawn primarily from Moratto (1984).

Reliable evidence of early occupation in the northern Sacramento Valley dates after 8,000 years before present (B.P.) (Johnson et al. 1984). The Borax Lake Pattern of the Lower Archaic Period (8000–5000 B.P.) is defined by certain material items such as wide-stemmed projectile points, hand-stones, milling stones, and bowl mortars. The Late Borax Lake Pattern, which archaeologists date to the Middle Archaic Period (5000–2500 B.P.), represents a continuation of the earlier Borax Lake Pattern. Late Borax Lake is distinguished from the earlier manifestation by a greater diversity of projectile point types and use of the spear thrower (atl-atl).

During the Upper Archaic Period (2500–1500 B.P.), early cultures of the Sacramento Valley exhibited a shift to predominant use of mortars and pestles instead of hand-stones and milling stones. This change may reflect an increased reliance on acorns as a staple food by the valley's indigenous population.

The Emergent Period (1500–200 B.P.) in Sacramento Valley prehistory is represented by the Shasta Aspect of the Augustine Pattern. Shasta Aspect archaeological sites are typically located near watercourses, contain semi-subterranean dwellings and new artifact types, and reflect a hunting and gathering economy focused on acorn procurement. Moratto (1984) proposed that the Shasta Aspect represents the influence and intrusion of peoples from farther north in California. Toward the end of this period, extensive Euroamerican influences began to adversely affect native cultures throughout California.

Ethnographic Context

According to archaeological traces, documentary evidence, and oral history, the project area is located within the lands traditionally occupied by the Nisenan, or Southern Maidu. The language of the Nisenan, which includes several dialects, is classified within the Maiduan family of the Penutian linguistic stock (Kroeber 1925, Shipley 1978). The western boundary of Nisenan territory was the western bank of the Sacramento River. The eastern boundary was "the line in the Sierra Nevada mountains where the snow lay on the ground all winter" (Littlejohn 1928).

Nisenan settlement locations depended primarily on elevation, exposure, and proximity to water and other resources. Permanent villages were usually located on low rises along major watercourses. Village size ranged from three living structures to up to 40 or 50. Dwellings consisted of domed structures covered with earth and tule reeds or grass and usually measured 10–15 feet in diameter. Simple brush shelters were used in the summer and at temporary camps during food gathering rounds. Larger villages often had semi-subterranean dance houses that were covered in earth and tule reeds or brush and had a central smoke hole at the top and an east-facing entrance. Another common village structure was a granary, which was used for storing acorns (Wilson and Towne 1978). Two Nisenan villages were located at or near the southern end of what is now the FRLRP project area (project Segment 1) (Wilson and Towne 1978).

The Nisenan occupied permanent settlements from which specific task groups set out to harvest the seasonal bounty of flora and fauna that the rich valley environment provided. The Valley Nisenan economy was focused on riparian resources, in contrast to that of the Hill Nisenan, whose resource base consisted primarily of acorn and game procurement. The only domestic plant used by the Nisenan was native tobacco (*Nicotiana* sp.), but many wild species were closely husbanded. The acorn crop from the blue oak (*Quercus douglasii*) and black oak (*Q. kelloggii*) was managed so carefully that its management served as the equivalent of agriculture. Acorns could be stored in anticipation of winter shortfalls. Deer, rabbit, and salmon were the chief sources of animal protein in the Nisenan diet, but many other insect and animal species were taken when available. In large part, Nisenan lifeways remained unchanged for many generations before significant Euroamerican incursions starting in the early decades of the 19th century.

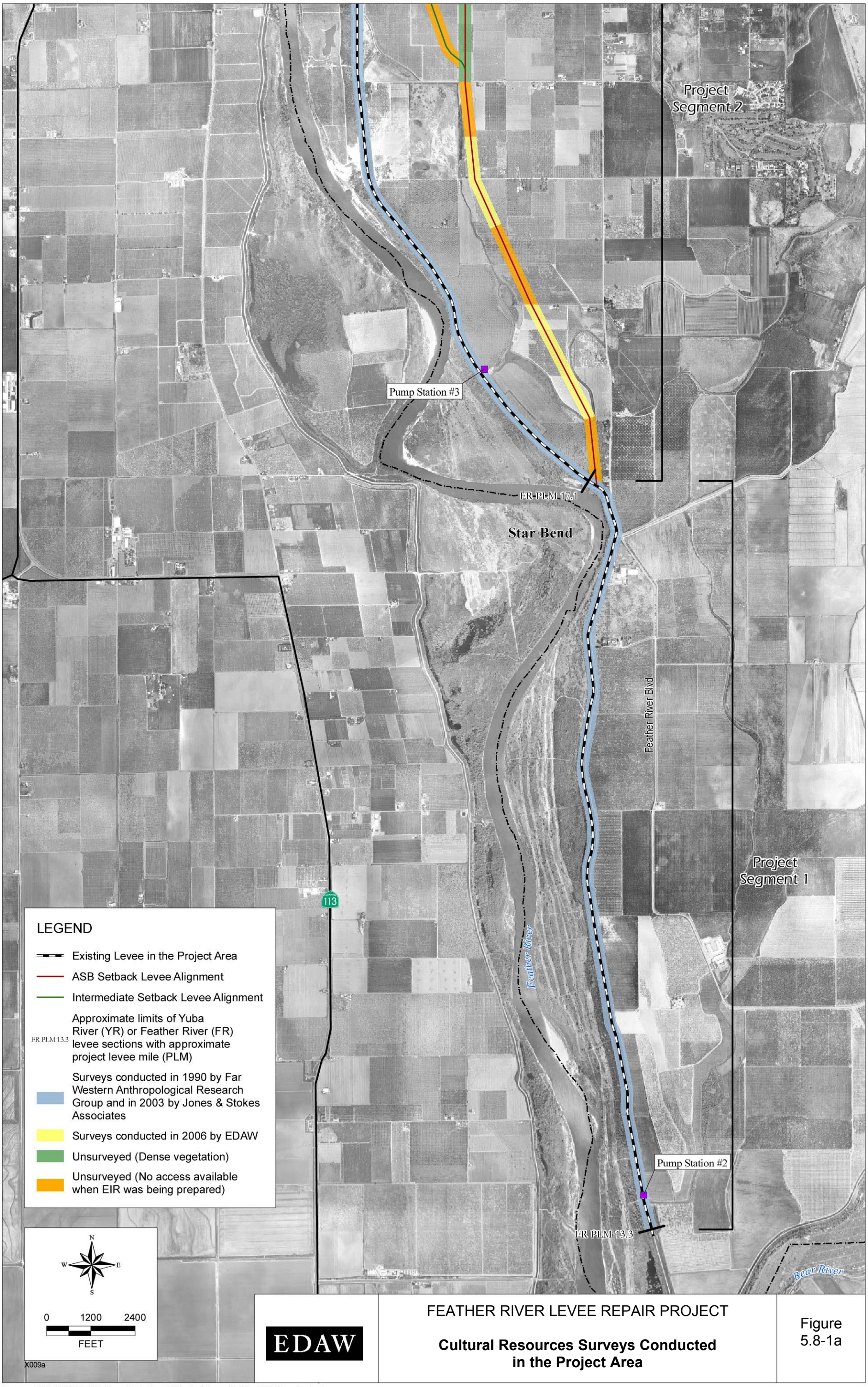
Historical Context

Exploration and Settlement

Europeans first explored the area that is now Yuba County in 1808, when Spanish explorer Gabriel Moraga led an expedition from Mission San Jose to the northern Sacramento Valley (Abeloe 1966, Gordon 1988). The earliest Euroamerican settlement in what is now Yuba County coincided with the establishment of land grants by the Mexican government. John A. Sutter obtained the first such grant in the region in 1841. Sutter's New Helvetia Rancho encompassed lands on the left (east) bank of the Feather River, including what is now the FRLRP project area (General Land Office 1859).

Mining

Beginning in 1849, prospectors and entrepreneurs overran the streams of the Sierra Nevada in search of riches. Miners initially established their claims and workings on watercourses and then gradually worked back from the flats adjacent to streams, ridges, and hillsides. By 1857, hydraulic mining began to replace the smaller-scale placer methods and extracting placer gold was no longer restricted to the immediate stream channel and bars. Debris from hydraulic operations destroyed or buried many of the older mining camps (Hoover et al. 1966).

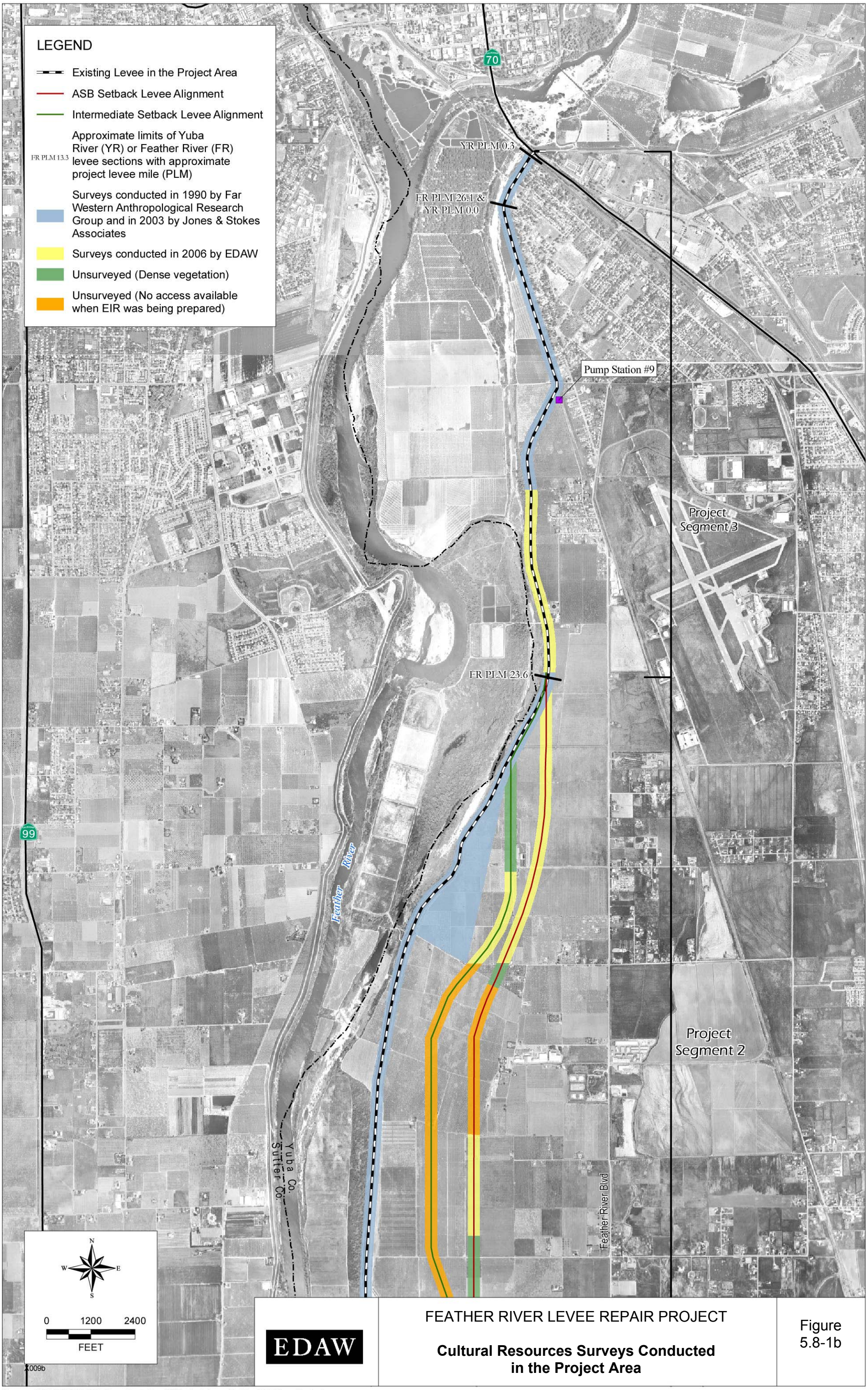


FEATHER RIVER LEVEE REPAIR PROJECT

Cultural Resources Surveys Conducted in the Project Area

Figure 5.8-1a

Sources: EDAW 2006; GEI Consultants, Inc. 2004; Aerial provided by GEI Consultants, Inc.



FEATHER RIVER LEVEE REPAIR PROJECT

Cultural Resources Surveys Conducted in the Project Area

Figure 5.8-1b

Sources: EDAW 2006; GEI Consultants, Inc. 2004; Aerial provided by GEI Consultants, Inc.

Although there are no records of large-scale mining in the project vicinity, the industry had considerable indirect effects on historical developments in the region. The diggings and mines in the nearby foothills dramatically increased economic activity in the region, leading to increased prosperity and the rise of larger and more numerous support industries such as cattle ranches and farms.

Meanwhile, the deposition of silt in Central Valley watercourses, including the Yuba and Feather Rivers, resulted in the raising of the riverbeds and increased flooding. Although the city of Marysville (immediately upstream of the FRLRP project area) experienced high waters every few years, there were no disastrous floods until December 1861 (Thompson & West 1879). As the waters receded, they left a deposit of 30–183 centimeters (11–72 inches) of sand on the bottomlands adjacent to the rivers. After 1861, catastrophic floods became more common, prompting the development of a levee system and beginning the process of land reclamation for agricultural purposes. In later years, other flood-control efforts were initiated as described below to further alleviate negative impacts on water quality and on the scale and frequency of seasonal flooding.

Agriculture and Flood Control

Initial efforts at flood control in the Central Valley were usually uncoordinated and consisted of small levees and drains constructed by individual landowners. These features proved insufficient to protect cultivated land, and much of the acreage east of the Feather River in the FRLRP project area remained marshland that was unsuited for agriculture (U.S. Geological Survey 1910, 1911). In 1861, the California Legislature created the State Board of Swampland Commissioners to effect reclamation of swamp and overflow lands. However, in 1866 the legislature terminated this board, and responsibility for swamp and overflow land fell to the individual counties. If a landowner could certify that he or she had spent at least $2 per acre in reclamation, the county would refund the purchase price of the property to the owner. Speculators took advantage of this program and a period of opportunistic and often-irrational levee building followed. (Thompson 1958, McGowan 1961.)

In response to the flood of 1907, citizens of Yuba County formed Reclamation District (RD) 784, which includes the land in the FRLRP project area. In 1908, at the time of its formation, RD 784 encompassed 22,762 acres of land, much of which was owned by the Farm Land Investment Company. RD 784 built substantial levee and drainage systems to restrain floodwaters from the Yuba, Feather, and Bear Rivers and the Western Pacific Interceptor Canal and incorporated levees built by the Farm Land Investment Company and other landowners.

In 1911, the California Legislature established the State of California Reclamation Board (The Reclamation Board) to exercise jurisdiction over reclamation districts and levee plans. That year, the state approved and began implementation of the Sacramento River Flood Control Project (SRFCP). The ambitious project included the construction of levees, weirs, and bypasses along the Sacramento River and its tributaries to channel floodwaters away from population centers. Under the SRFCP, new reclamation districts were created and existing districts, such as RD 784, were placed under the jurisdiction of The Reclamation Board (JRP Historical Consulting Services 1994).

LOCAL SETTING

A review of historic maps indicates the potential for the presence of archaeological deposits associated with several historic structures within the FRLRP project area. The 1859 General Land Office Plat Map for Township 15 North, Range 3 East, depicts a house in Elizatown just below Eliza Bend along the east side of the old Feather River channel in the vicinity of the current left (east) bank levee of the Feather River (project Segment 3) and another house just to the south in Township 14 North, Range 3 East. Farther south on the same map, fields and a fence are depicted along the east side of the Feather River in project Segment 2 in the vicinity of the northern end of the ASB and intermediate setback levees proposed under Alternatives 2 and 3, respectively. Three houses (designated as "Beach's," "Wessenharer's," and "Mesick's") appear to have been located in the vicinity of the intermediate setback levee alignment proposed under Alternative 3, and another house was located adjacent to the Feather River, near the west end of the contemporary Broadway. Directly across from this later structure, on the west side of the Feather River in Sutter County, are structures labeled "Indian Rancheria," "Hot House," "Iron House," and "Sutter's House." "Butterfield's House" is identified along the east side of the river oxbow in the vicinity of the pump where Feather River Boulevard is adjacent to the levee, west of Star Bend. A north-south road extending from the Feather River north toward Marysville appears to be at least partially located within the project area and is depicted on a 1849 map of the Sacramento Valley (Derby 1849), and the Indian rancheria mentioned above is labeled simply "Indians and Sutter's Hook Farm."

CULTURAL RESOURCES IN THE PROJECT AREA

Previous Archaeological Investigations

The files maintained at the NCIC contain information on previously conducted archaeological investigations that occurred within 1/4 mile of the project area. A summary of the records of past investigations directly related to the project area is presented in Table 5.8-1, "Summary of Previous Investigations within ¼ Mile of the Project Area." The findings of these past investigations are described briefly below.

Resources Previously Identified within the Project Area

Cultural resources previously identified within FRLRP project Segments 1 and 2 are described below. The records search did not reveal records of any cultural resources in Segment 3.

In 1953, archaeologists from the University of California, Berkeley (UC Berkeley) conducted salvage excavations at the request of a landowner who was proposing to build a dehydrator on a prehistoric village site identified as CA-Yub-5 (located in what is now project Segment 2), as documented by Elsasser and Baumhoff (1953). The UC Berkeley archaeologists removed the remains of several individuals and associated grave goods from the eastern portion of the site. The records of the burials themselves were minimal; however, grave goods included banjo ornaments, spire-lopped Olivella (olive snail) shell beads, square-cut Olivella shell beads, Haliotis (abalone) shell ornaments, obsidian projectile points, and bone awls. No data recovery excavations were completed. Based upon recovered shell beads, the investigators indicated that the site appears to date from the Middle Archaic to the Upper Archaic Period. While not

Table 5.8-1
Summary of Previous Investigations within 1/4 Mile of the Project Area

Report Title	NCIC File No.	Author and Date	Resources Identified
Studies Within the Project Area			
Archaeological Site Survey Record for CA-Yub-5	——	Elsasser and Baumhoff 1953	CA-Yub-5
Sacramento River Flood Control System Evaluation, Marysville–Yuba City Area Cultural Resources Survey	——	Bouey 1990	CA-Yub-13 within the project area and other sites outside the project area
Historic Resource Evaluation Report: Reclamation Facilities, RD 1001 and RD 784	——	JRP Historical Consulting Services 1994	Facilities associated with RD 784 and with RD 1001 to the south
Cultural Resources Survey for the Level (3) Communications Long Haul Fiber Optics Project—Segment WS04: Sacramento to Bakersfield	3853	Nelson et al. 2000	None in the project vicinity
Cultural Resources Inventory and Evaluation Report for the Yuba-Feather Supplemental Flood Control Project, Yuba County, California	——	Jones & Stokes 2003	Prehistoric site CA-Yub-5 and historic resources C-YCWA-1 and YCWA-3 through C-YCWA-8 in the project area
Class I Archaeological Survey, Reclamation District 784 Master Plan Update, Yuba County, California	6724	Jensen 2005	None
Studies Near the Project Area			
Archaeological Site Survey Record	——	Elsasser 1953, Riddell 1960	CA-Yub-6
Report on the Archeological Survey of the Bear River	——	Stoll and Thompson 1961	CA-Yub-1312 and CA-Yub-1313, both 1/4 mile to 2 miles east of the project area
Archaeological Site Survey Record	——	Olsen 1957	CA-Yub-14
Salvage of the Rio Oso Site, Yuba County, California	444	Olsen and Riddell 1962	CA-Yub-14
Cultural Resource Assessment of the Proposed Wastewater Treatment Plant Modification Along the Southern Bank of the Yuba River, Yuba County, California	——	Peak & Associates Inc. 1988	None
Negative Archaeological Survey Report, California Department of Transportation, Expenditure Authorization 297300	2755	Offerman 1992	None
Cultural Resources Survey and Investigation, Sacramento River Flood Control Project, Marysville–Yuba City Mitigation Area, Yuba County, California	939	U.S. Army Corps of Engineers 1993	Historic refuse west of the project area
Negative Archaeological Survey Report, California Department of Transportation, Expenditure Authorization OA2900 and 4A8900	2755	Offerman 2001	None
Cultural Resources Inventory and Evaluation Report for the Yuba-Feather Supplemental Flood Control Project, Yuba County, California	——	Jones & Stokes 2003	In addition to sites in the project area (see above), CA-Yub-1312
Archaeological Testing and Evaluation Report for the Feather-Bear River Setback Levee Project, Yuba County, California	——	Jones & Stokes 2005	CA-Yub-1312 and CA-Yub-1313
National Register of Historic Places Evaluation for CA-Yub-1312 and CA-Yub-1313, Feather-Bear Rivers Levee Setback Project, Yuba and Sutter Counties, California	——	EDAW 2006	CA-Yub-1312 and CA-Yub-1313
Cultural Resources Statement, West Linda Drainage Project	2497	Storm n.d.	CA-Yub-164 to the east of the project area

Notes: NCIC = North Central Information Center; RD = Reclamation District
Source: Data compiled by EDAW in 2006

providing evidence to substantiate their claim, the investigators remarked that more than half of the 6,000-square-foot site had been destroyed before the salvage excavation by pothunters, who reportedly had excavated some 30 burials before 1953. In 2002, Jones & Stokes archaeologists performing surveys in the area for the Y-FSFCP confirmed the recorded location of site CA-Yub-5 and made additional observations, as described below (Jones & Stokes 2003).

Far Western Anthropological Research Group (Far Western Anthropological) conducted surveys along several sections of levee in the Marysville–Yuba City area, including the major portion of the existing levee within the FRLRP project area, in 1990 (Bouey 1990). One site, CA-Yub-13, was suspected to be directly adjacent to (west of) the left (east) bank levee, just south of Star Bend in project Segment 1. According to Bouey (1990), CA-Yub-13 was initially documented by Olsen (1957) and Olsen and Riddell (1960). Initial observations had described a 50- by 100-foot area with dark compacted midden (habitation soil) containing a bone awl. A mano and stone bowl mortar fragment had been documented in 1960. Records indicate that the site was extensively vandalized and eroded by the Feather River. A lack of surface evidence and negative results of auger probes led the Far Western Anthropological investigators to conclude that the cultural material no longer exists. No new resources were observed (Bouey 1990).

Evaluation of RD 784 and neighboring RD 1001 was conducted by JRP Historical Consulting Services in 1994 (JRP Historical Consulting Services 1994). While RD 784 is historic, none of the reclamation-related features were recommended as eligible for listing in the NRHP, individually or as a system, because of a lack of integrity to the period of significance.

Nelson et al. (2000) surveyed a narrow utility corridor along the Western Pacific Railroad line that crosses project Segment 3 immediately south of Marysville. This linear survey did not identify any prehistoric or historic-era sites, features, or artifacts.

In 2002, archaeologists with Jones & Stokes inventoried a large portion of what is now the FRLRP project area at a reconnaissance level (50-meter [164-foot] parallel transects) as part of the Y-FSFCP effort. More intense (25-meter [82-foot]) parallel transects were used for a small portion of the project area consisting of approximately 1 mile of the Feather River levee north of Ella Road (project Segment 2) and adjacent orchards to the east. Site CA-Yub-5 was relocated. The archaeologists noted that a 4-foot-high mound is present on the site. No artifacts were observed on the surface, but a foot-thick midden layer and fire-cracked rock were observed in a cut bank on the western edge of the site, overlain by 1–3 feet of sand. Disturbances consisted of a dirt road along the western edge of the site, a barn, and a walnut orchard currently located on-site. An additional seven historic resources were identified within project Segments 1 and 2 during this investigation:

- RD 784 Pump Station No. 2 (C-YCWA-8) (Segment 1): A structure built as early as 1952 supporting a pumping facility that has been subsequently and recently modified.
- Clark Slough (C-YCWA-1) (Segment 1): An earthen ditch in the RD 784 irrigation and drainage system that extends approximately 2.5 miles between Pump Station No. 2 and Lateral 5.

- Feather River levee (C-YCWA-3) (Segments 1 and 2): A 25-foot-high earthen berm along the east side of the Feather River with a 14- to 16-foot-wide road along the 20-foot-wide crown.
- Barn (C-YCWA-4) (Segment 2): A wood frame structure built sometime in the early 1920s. In 1997, floodwaters lifted the barn off its foundation and twisted the structure into its current dilapidated condition.
- House and barn (C-YCWA-5) (Segment 2): A single-story house with a concrete slab foundation and concrete masonry unit walls and a carport at the south end of the building, and a two/three-story rectangular structure located north of the house.
- Migrant worker camp (C-YCWA-6) (Segment 2): The remains of a migrant worker camp that apparently consisted of two large bunkhouses, a bathhouse, and a fourth building that may have been a mess hall.
- Messick Lake Ditch/Lateral 6 (C-YCWA-7) (Segment 2): An earthen ditch that extends northwest and south from Messick Lake, crossing Anderson Avenue via corrugated steel pipe.

Jones & Stokes (2003) noted that the RD 784 irrigation features and the Feather River levee do not represent unique examples of reclamation technology and do not retain integrity to the period in which they achieved significance, having been modified over time. The other features were found to lack distinctive characteristics that would potentially qualify them for NRHP or CRHR listing. Therefore, these resources were considered not to be eligible for NRHP or CRHR listing.

Jensen (2005) surveyed an area immediately southwest of the southwest corner of the Yuba County Airport, bordered on the east by the abandoned Sacramento Northern Railroad line and on the west by the river side of the left (east) bank levee of the Feather River in project Segments 2 and 3. This survey encompassed the northernmost portion of project Segment 2. This survey did not identify any prehistoric or historic-era sites, features, or artifacts.

Resources Previously Identified at Sites Near the Project Area

First documented in 1953 (Elsasser 1953) and later updated in 1960 by Riddell, site CA-Yub-6 was recorded approximately 1/2 mile east of project Segment 2 near Feather River Boulevard. In 1953, the site was described as a low rise covered with darker soil than the surrounding area. Several burials were removed from this locale when they were exposed during excavations for a fuel storage tank. Riddell (1960) indicated that this is the location of a large village and cemetery measuring approximately 100 meters (328 feet) in diameter.

A study by Stoll and Thompson (1961) within the Bear River drainage identified two sites, CA-Yub-1312 and CA-Yub-1313, southeast of what is now the FRLRP project area:

- *Site CA-Yub-1312.* Located near the confluence of the Feather and Bear Rivers, this site was described as a leveled habitation site consisting of a midden covering an area of 200 meters by 125 meters (656 feet by 410 feet) within a sugar beet field. Associated constituents

included a pestle, a projectile point, a bone fragment, and a hammerstone. Fragments of human bone were also found at the site.

- *Site CA-Yub-1313.* Located just north of the Bear River near State Route 70 (approximately 2 miles east of the present project area), this site was described as consisting of scattered midden material, an obsidian projectile point, shell, bone, basalt and obsidian flakes, and what appeared to be a pestle fragment.

CA-Yub-14, also known as the Rio Oso Site, is situated west of the left bank Feather River levee near project Segment 1. It was first documented in 1957 when a subsurface archaeological deposit with human remains was discovered by construction workers during borrow excavations for construction along the levee. Olsen (1957) observed a 200-foot by 300-foot area with dark sandy midden, and reported the discovery of projectile points, shell ornaments, Olivella beads, a bone awl and a fish hook. “Many” burials were discovered, although no further details were offered. Vandals further damaged the site before salvage excavations could take place. Olsen and Riddell (1962) conducted salvage excavation at the site and identified a midden deposit approximately 14–16 inches below the surface and extending to a depth of 48–60 inches. A total of 42 burials were removed from this site. The investigators noted that the vast majority of the burials located at the site had been disturbed either by construction or by subsequent vandalism. Despite these site disturbances, burial positions and placement and the wealth of culturally and temporally diagnostic materials indicate that the site was heavily utilized during the Late Archaic Period.

Peak & Associates (1988) conducted an intensive survey for three effluent disposal ponds on a 30-acre parcel located approximately 100–200 feet south of the Yuba River and immediately adjacent to the Southern Pacific railroad line. No prehistoric or historic-era resources were documented within the project area, but an abandoned spur (NCIC site number PA-88-75) associated with the railroad was recorded in the immediate vicinity.

Offerman (1992) surveyed a 13.8-acre site at the location of the present-day Caltrans maintenance area located at 981 North Beale Road in Marysville, immediately east of SR 70. This site is approximately 0.25 mile south of the portion of the left (south) bank Yuba River levee that is located in project Segment 3. Another survey of this site was conducted by Offerman (2001). Neither of these intensive surveys identified any prehistoric or historic-era sites, features, or artifacts.

NCIC File No. 939 (U.S. Army Corps of Engineers 1993) is a record of a survey that was conducted for a levee project in the U.S. Army Corps of Engineers’ Marysville–Yuba City Mitigation Area, west of the left bank Feather River levee at Country Club Avenue, near project Segment 2. Historic glass and ceramics discovered adjacent to the levee near Segment 2 were determined to lack integrity and were therefore determined to be ineligible for listing in the NRHP or the CRHR.

As part of the archaeological inventory performed for the Y-FSFCP, Jones & Stokes (2003) surveyed the left (east) bank Feather River levee and adjacent land within approximately 2,000 feet to the east. The survey extended south of FRLRP Segment 1. Jones & Stokes archaeologists

confirmed the location of CA-Yub-1312 and noted the presence of an obsidian flake, a cobble tool, a faunal bone fragment, fire-affected rock, and freshwater mussel shell.

Subsurface testing was subsequently conducted by Jones & Stokes (2005) at this site and the suspected site of CA-Yub-1313 as part of the Feather-Bear Rivers Levee Setback Project (F-BRLSP). Archaeological deposits and human remains were found to be present at CA-Yub-1312; however, the deposits were highly disturbed, lacking both horizontal and vertical integrity, and the resources were determined to be not eligible for listing in the NRHP. Test excavations at CA-Yub-1313 concentrated on areas suspected to contain the remains of the site, based upon the site documents and information supplied by local residents. No evidence of the site was discovered during test excavations.

In 2005, during setback levee construction along the lower Bear River as part of the F-BRLSP, additional archaeological deposits were uncovered at site CA-Yub-1312, and previously undocumented human remains and archaeological materials were uncovered at the site of CA-Yub-1313. Subsequent investigations concluded that those related to CA-Yub-1312 represent redeposited midden soils graded by agricultural activities, probably in the mid to late 20th century. Test excavations at CA-Yub-1313 revealed the presence of a highly disturbed deposit. Because of the redeposited and highly disturbed nature of the archaeological deposits, neither site was recommended as eligible for inclusion in the NRHP (EDAW 2006).

Storm (n.d.) conducted an inventory for a drainage project in West Linda, directly east of the left bank Feather River levee near project Segment 3. While not noting any resources within the project area, Storm did note the presence of CA-Yub-164, a prehistoric occupation site, approximately 1 mile east of the project area.

Results of Current Investigations within the Project Area

On May 11, 15, 18, and 25, 2006, EDAW archaeologist Richard Deis conducted a pedestrian survey of corridors along the proposed ASB and intermediate setback levee alignments and the portion of the existing Feather River levee in project Segment 3 that was not covered in the previous survey efforts (EDAW 2006b). Approximately 2.0 miles of the proposed ASB setback levee alignment (Alternative 2) and 1.0 mile of the proposed intermediate setback levee alignment (Alternative 3) could not be inventoried because access to these areas was not available. In addition, approximately 1/2 mile of the ASB setback levee alignment and 3/4 mile of the intermediate setback levee alignment could not be inventoried because of dense grass that obscured 100% of the ground surface. For those areas that could be adequately inventoried, surface visibility averaged more than 30% and was limited by grasses. The 2006 survey did not include areas between the existing Feather River levee and the setback levees proposed under Alternatives 2 and 3 or areas that may be used for borrow materials and equipment staging. Figures 5.8-1a and 5.8-1b depict the areas surveyed. (Although the coverage area of the 2006 survey was limited, additional areas with the potential to be affected by project construction activities or flood control operations would be surveyed for cultural resources before initiation of project construction, as described in mitigation measures below.)

As described above, a total of nine previously identified resources have been identified within or directly adjacent to the project area (CA-Yub-13, C-YCWA-1, and C-YCWA-8 in or adjacent to

project Segment 1, and CA-Yub-5, C-YCWA-3, C-YCWA-4, C-YCWA-5, C-YCWA-6, and C-YCWA-7 in project Segment 2). In addition, CA-Yub-14 is near Segment 1 to the west. With the exception of CA-Yub-14, C-YCWA-5, and C-YCWA-6, to which access was not available, the EDAW archaeologist located all of the previously identified resources. Surface observations at the previously identified locale for CA-Yub-13, however, did not identify any cultural resource remains at this site. A detail map of CA-Yub-5 was completed; no further disturbances of this site, beyond those noted by Jones & Stokes (2003), were observed.

A single isolated find in Segment 2 and a new site, FR1 in Segment 3, were documented during this field investigation. The isolated find, consisting of a fragmented piece of sun-colored amethyst glass, was observed within the proposed intermediate setback levee alignment. This fragment is chipped along all of the margins and is eroded, indicating that it has been transported by fluvial processes, possibly during one or more of the historic flooding episodes. While this type of glass was in use from ca. 1880 to the late 1910s, it lacks association and further data potential.

Site FR1 consists of the remains of an irrigation/pump location situated along the west side of the left bank levee of the Feather River. Constituents consist of a head gate, concrete foundations/footings, an excavated pit, and a section of riveted steel pipe. Most likely these are the remains of a component of RD 784. The remains have been completely dismantled and scattered, which has compromised the integrity of the features.

A residential complex was also observed at 716 Murphy Road, southwest of the Yuba County Airport in the northern part of project Segment 2. This property contains various buildings and structures, none of which are more than 45 years of age.

Summary of Cultural Resources in the Project Area

Table 5.8-2, “Summary of Cultural Resources in the Project Area,” presents a list of previously identified and newly identified resources in and adjacent to the FRLRP project area, along with the NRHP and CRHR eligibility status of each resource.

5.8.3 ENVIRONMENTAL IMPACTS

THRESHOLDS OF SIGNIFICANCE

Thresholds for determining the significance of impacts on cultural resources were based on the environmental checklist form in Appendix G of the State CEQA Guidelines. A project alternative would have a significant impact on cultural resources if it would:

- cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5 of the State CEQA Guidelines;
- cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5 of the State CEQA Guidelines; or
- disturb any human remains, including those interred outside formal cemeteries.

Table 5.8-2
Summary of Cultural Resources in the Project Area

Project Segment	Site	Association	Description	Reference	Location – USGS Olivehurst Quad.			NRHP/CRHR Status
					T.	R.	Sec.	
Previously Identified Resources								
1	CA-Yub-13	Prehistoric	Village? (immediately west of Feather River levee)	Bouey 1990	13N	4E	6	Unevaluated
1	CA-Yub-14	Prehistoric	Village/burials outside (just west of) project area	Olsen 1957	13N	3E	6	Unevaluated
1	C-YCWA-1	Historic	Canal	Jones & Stokes 2003	13N	4E	13	Not eligible
1	C-YCWA-8	Historic	Pump station	Jones & Stokes 2003	13N	4E	25	Not eligible
2	CA-Yub-5	Prehistoric	Village/burials	Elsasser and Baumhoff 1953	13N	4E	25	Potentially eligible
1 and 2	C-YCWA-3	Historic	Levee	Jones & Stokes 2003	13N	4E	13	Not eligible
2	C-YCWA-4	Historic	Barn	Jones & Stokes 2003	13N	4E	25	Not eligible
2	C-YCWA-5	Historic	House and barn	Jones & Stokes 2003	13N	4E	24	Not eligible
2	C-YCWA-6	Historic	Work camp	Jones & Stokes 2003	13N	4E	24	Not eligible
2	C-YCWA-7	Historic	Canal	Jones & Stokes 2003	13N	4E	25	Not eligible
Newly Identified Resources								
2	Isolate 1	Historic	Glass fragment	EDAW 2006b	13N	4E	NA	Not eligible
3	FR1	Historic	Flood control features	EDAW 2006b	13N	4E	NA	Not eligible

Note: CRHR = California Register of Historical Resources; E = East; N = North; NA = Not available; NRHP = National Register of Historic Places; R = Range; Sec. = Section; T = Township; USGS = U.S. Geological Survey
Source: Data compiled by EDAW in 2006

A substantial adverse change in the significance of a resource means the physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of a historical resource would be materially impaired. Actions that would materially impair the significance of a historical resource are any actions that would demolish or adversely alter those physical characteristics of a historical resource that convey its significance and qualify it for inclusion in the CRHR or in a local register or survey that meets the requirements of Public Resources Code Sections 5020.1(k) and 5024.1(g).

IMPACT ANALYSIS

Analysis Method

The impacts of the project alternatives were considered with regard to the thresholds listed above. For each alternative, the analysis considered impacts on cultural resources that could result from ground-disturbing construction activities, such as the preparation and use of staging areas and access roads; excavation operations; and levee repairs and strengthening or setback levee construction. The analysis for Alternatives 2 and 3 also considered indirect impacts such as erosion or flood damage that could be caused by intermittent inundation associated with flood operations with the proposed setback levee.

Alternative 1 – The Levee Strengthening Alternative

Impact LS-5.8-a

Damage to or Destruction of Resources Associated with Prehistoric Archaeological Sites CA-Yub-13 and CA-Yub-14. Prehistoric site CA-Yub-13 was previously documented adjacent to the water side of the levee in project Segment 1, and prehistoric site CA-Yub-14 was documented just west of Segment 1. The eligibility of these resources for CRHR and NRHP listing has not been determined. Prehistoric remains that may be considered significant resources under CEQA may still be present near the documented locations of these sites and could be damaged or destroyed by proposed levee repair and strengthening activities. This impact would be **potentially significant.**

Prehistoric archaeological site CA-Yub-13 was previously documented at the northern end of project Segment 1, just south of Star Bend and adjacent to the water side of the levee. Compacted midden and artifact fragments were documented in 1957 and 1960 (Bouey 1990). Records indicate that the site was extensively vandalized, has been eroded by the Feather River, and had been affected by pump station construction. Bouey (1990) suggested that the site may no longer contain cultural resource materials. EDAW did not find any archaeological traces at the site during surveys conducted for the current effort. Nevertheless, it is possible that the project area may contain subsurface archaeological remains associated with CA-Yub-13 that could be considered significant resources under CEQA and that ground-disturbing project activities in the vicinity of the recorded location of CA-Yub-13 may damage or destroy such resources.

Site CA-Yub-14 was documented west of the left bank Feather River levee near project Segment 1 (in what is now the Lake of the Woods Unit of the Feather River State Wildlife Area). Numerous artifacts and “many” burials were reported by Olsen (1957). The site was subsequently vandalized. Salvage excavations (Olsen and Riddell 1962) recovered numerous burials and culturally and temporally diagnostic materials from this site, which provided evidence of prehistoric use. During the 2006 EDAW survey, the property where CA-Yub-14 was recorded could not be accessed. Consequently, the present-day condition and location of this site could not be assessed or confirmed. It is unknown whether any significant archaeological remains are still present at the site, and the recorded location of the site indicates that it may be sufficiently distant from the project area to preclude disturbance of any remaining cultural materials there by FRLRP activities. Nevertheless, it is possible that the project area may contain subsurface archaeological remains associated with CA-Yub-14 that could be considered significant resources and that ground-disturbing project activities in the vicinity of the recorded location of CA-Yub-14 may damage or destroy such resources.

Because it is possible that these sites, or elements of the sites, are eligible for NRHP or CRHR listing and may be considered significant resources under CEQA, any disturbance or destruction of resources associated with the sites may constitute a significant impact. Levee repair and strengthening activities could damage or destroy prehistoric remains that might be present at either of these locations. Therefore, this impact would be potentially significant.

Impact LS-5.8-b

Damage to or Destruction of Cultural Resources in Unsurveyed Areas. Potential borrow or staging areas have not been definitively identified and therefore have not been surveyed for cultural resources. Significant cultural resources could be present in these areas, and could be damaged by project-related ground-disturbing activities. This impact would be **potentially significant.**

The cultural resources survey did not include areas that may be used for borrow materials and equipment staging, which will be defined during area project design. Undocumented and potentially significant cultural resources may be present in these areas and could be damaged by project-related ground-disturbing activities. Therefore, this impact would be potentially significant.

Impact LS-5.8-c

Damage to or Destruction of Undocumented Buried Archaeological Resources during Construction. Project construction and related activities could damage or destroy previously unknown significant or potentially significant buried archaeological resources. This impact would be **potentially significant.**

Previously unidentified buried archaeological resources could be encountered during ground-disturbing activities, such as site preparation, grading, and excavation, in any of the project segments or at a soil borrow/detention basin site. Archaeological resources so encountered during construction could be damaged or destroyed. If any such resources are considered significant cultural resources, their damage or destruction would be considered significant. This impact would be potentially significant.

Impact LS-5.8-d

Damage to or Destruction of Undocumented Human Remains during Construction. It is possible that buried human remains could be unearthed during project-related ground-disturbing activities, causing damage to or destruction of such remains. This impact would be **potentially significant.**

It is possible that undiscovered buried human remains could be unearthed and damaged or destroyed during ground-disturbing activities, such as access road preparation, grading, excavation, and preparation and use of construction staging areas. Damage to or destruction of human remains during project construction or other project-related activities would be a significant impact. Because there is the potential for such damage to occur, this impact would be potentially significant.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impact ASB-5.8-a

Damage to or Destruction of Prehistoric Archaeological Site CA-Yub-5. Prehistoric archaeological site CA-Yub-5, which may be eligible for listing in the CRHR and NRHP, could be damaged or destroyed by construction activities or by inundation or scouring when flood flows pass through the levee setback area. Because this site may be a significant cultural resource, this impact would be **potentially significant.**

Archaeological site CA-Yub-5, a prehistoric village site, is located within the proposed setback levee alignment in project Segment 2, in an area where the alignments for the proposed ASB setback levee (Alternative 2) and the intermediate setback levee (Alternative 3) coincide. Native American burials and associated grave goods were removed from a portion of the site in the 1950s. A 4-foot-tall mound still exists at the site, and a thick midden layer is visible in a cut bank on one side of the site (Jones & Stokes 2003). Because little documentation of the previous excavations exists and the site retains the appearance of a prehistoric burial mound, it is considered possible that unrecovered prehistoric Native American burials or associated artifacts remain at the site. There is a lack of published information on the prehistory of Yuba County, particularly in the floodplain of the Feather River. CA-Yub-5 has previously yielded artifacts of importance to the understanding of regional prehistory, and has a high potential to yield more scientifically consequential information to supplement the little that is known. Therefore, it appears that CA-Yub-5 may be eligible for listing in the CRHR and the NRHP and therefore may be considered a historical resource (i.e., a significant cultural resource) for purposes of CEQA.

Because the site is within the proposed setback levee alignment, it could be damaged or destroyed by construction activities, such as grading, excavation, and transport of materials using heavy equipment. Flooding of the levee setback area by high Feather River flows following construction of the setback levee could also result in inundation or scouring that could damage or destroy site CA-Yub-5. Damage to or destruction of an archaeological site that is a historical resource would be a significant impact. Because the site represents a potentially significant resource that could be damaged by construction or operation of the project, this impact would be potentially significant.

Impact ASB-5.8-b

Damage to or Destruction of Resources Associated with Prehistoric Archaeological Sites CA-Yub-I3 and CA-Yub-I4. This impact would be the same as Impact LS-5.8-a, described under Alternative I above. For the same reasons as described above, this impact would be **potentially significant.**

Impact ASB-5.8-c

Damage to or Destruction of Cultural Resources in Unsurveyed Areas. Portions of the project area could not be surveyed for cultural resources because of ground conditions and lack of site access, and potential borrow or staging areas also have not been surveyed. Significant cultural resources could be present in these areas, and could be damaged by project-related ground-disturbing activities. This impact would be **potentially significant.**

Approximately 2.0 miles of the ASB setback levee alignment could not be inventoried because access to this area was not available. In addition, approximately 1/2 mile of the ASB setback levee alignment could not be inventoried because of dense grass that obscured 100% of the ground surface. For those areas that could be adequately inventoried, surface visibility averaged more than 30% and was limited by grasses. The survey also did not include areas between the

existing Feather River levee and the proposed ASB setback levee alignment or areas that may be used for borrow materials and equipment staging. Undocumented and potentially significant cultural resources may be present in these areas and could be damaged by project-related ground-disturbing activities. Therefore, this impact would be potentially significant.

Impact ASB-5.8-d

Damage to or Destruction of Undocumented Buried Archaeological Resources during Construction. This impact would be similar to Impact LS-5.8-c, described under Alternative 1 above. In addition, ground-disturbing activities associated with the proposed levee setback in project Segment 2, such as construction of the slurry cutoff wall and the setback levee foundation, have the potential to damage or destroy previously unidentified archaeological resources in the setback levee construction area. For the same reasons as described for Alternative 1, this impact would be **potentially significant.**

Impact ASB-5.8-e

Damage to or Destruction of Undocumented Human Remains during Construction. This impact would be similar to Impact LS-5.8-d, described under Alternative 1 above. In addition, ground-disturbing activities associated with the proposed levee setback in project Segment 2, such as construction of the slurry cutoff wall and the setback levee foundation, have the potential to damage or destroy undocumented human remains in the setback levee construction area. For the same reasons as described for Alternative 1, this impact would be **potentially significant.**

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impact IS-5.8-a

Damage to or Destruction of Prehistoric Archaeological Site CA-Yub-5. This impact would be the same as Impact ASB-5.8-a, described under Alternative 2 above. For the same reasons as described above, this impact would be **potentially significant.**

Impact IS-5.8-b

Damage to or Destruction of Resources Associated with Prehistoric Archaeological Sites CA-Yub-I3 and CA-Yub-I4. This impact would be the same as Impact LS-5.8-a, described under Alternative 1 above. For the same reasons as described above, this impact would be **potentially significant.**

Impact IS-5.8-c

Damage to or Destruction of Cultural Resources in Unsurveyed Areas. Portions of the project area could not be surveyed for cultural resources because of ground conditions and lack of access, and potential borrow or staging areas also have not been surveyed. Significant cultural resources could be present in these areas, and could be damaged by project-related ground-disturbing activities. This impact would be **potentially significant.**

Approximately 1.0 mile of the intermediate setback levee alignment could not be inventoried because access to this area was not available. In addition, approximately 3/4 mile of the intermediate setback levee alignment could not be inventoried because of dense grass that obscured 100% of the ground surface. For those areas that could be adequately inventoried, surface visibility averaged more than 30% and was limited by grasses. The survey also did not include areas between the existing levee and the proposed intermediate setback levee alignment or areas that may be used for borrow materials and equipment staging. Undocumented and potentially significant cultural resources may be present in these areas and could be damaged by project-related ground-disturbing activities. Therefore, this impact would be potentially significant.

Impact IS-5.8-d

Damage to or Destruction of Undocumented Buried Archaeological Resources during Construction. This impact would be the same as Impact ASB-5.8-d, described under Alternative 2 above. For the same reasons as described above, this impact would be **potentially significant.**

Impact IS-5.8-e

Damage to or Destruction of Undocumented Human Remains during Construction. This impact would be the same as Impact ASB-5.8-e, described under Alternative 2 above. For the same reasons as described above, this impact would be **potentially significant.**

5.8.4 MITIGATION MEASURES

Alternative 1 – The Levee Strengthening Alternative

Mitigation is provided below for Impact LS-5.8-a (damage to or destruction of resources associated with sites CA-Yub-13 and CA-Yub-14), Impact LS-5.8-b (damage to or destruction of cultural resources in unsurveyed areas), Impact LS-5.8-c (damage to or destruction of undocumented buried archaeological resources), and Impact LS-5.8-d (damage to or destruction of undocumented human remains).

LS-5.8-a(1) Conduct Further Evaluation and Subsurface Testing to Determine Whether Proposed Levee Improvements Could Damage Significant Resources Associated with Prehistoric Archaeological Sites CA-Yub-13 and CA-Yub-14. This mitigation, together with Mitigation Measure LS-5.8-a(2), would reduce the potential impact to a less-than-significant level.

If levee improvements would include activities that could disturb subsurface soils in the vicinity (within 1,000 feet) of the recorded location of either CA-Yub-13 or CA-Yub-14, TRLIA shall have a qualified archaeologist conduct an evaluation designed to assess the potential for damage to resources associated with the site(s) before initiation of project-related ground-disturbing activities in these areas. The evaluation may require assessment of the condition and data potential of specific areas of anticipated construction disturbance and/or determination of whether one or both of the sites are eligible for inclusion in the CRHR and/or NRHP. This evaluation shall include additional surveys, subsurface test excavations, analyses of any discovered archaeological materials, and (if necessary) data recovery.

If the testing indicates the presence of cultural resources, a qualified archaeologist shall evaluate the significance of the finds and shall recommend further mitigation measures. Because of the critical need to remedy weaknesses in the existing levee in Segment 1, it is unlikely that avoidance of any resources directly within the construction footprint would be possible, and data recovery would likely be required. Efforts involving testing, excavation, and monitoring shall be conducted in consultation with appropriate Native American representatives identified by the NAHC.

LS-5.8-a(2) Monitor Ground-Disturbing Activities in the Vicinity of Prehistoric Archaeological Sites CA-Yub-13 and CA-Yub-14. This mitigation, together

with Mitigation Measure LS-5.8-a(1), would reduce the potential impact to a less-than-significant level.

A qualified professional archaeologist and a Native American representative shall monitor all project-related ground-disturbing activities at and near the locations of prehistoric archaeological sites CA-Yub-13 and CA-Yub-14. If intact archaeological materials or human burials not recovered during the subsurface testing and excavation programs described in Mitigation Measure LS-5.8-a(1) are uncovered during project-related ground-disturbing activities, the archaeologist shall determine their possible significance and shall formulate appropriate mitigation measures. Appropriate mitigation may include no action, avoidance of the resource, and potential additional data and burial recovery.

Implementing Mitigation Measures LS-5.8-a(1) and LS-5.8-a(2) together would ensure that any significant cultural remains associated with sites CA-Yub-13 and CA-Yub-14 are appropriately addressed, and would reduce the potential impact to a less-than-significant level.

LS-5.8-b **Survey Unexamined Areas before Project Ground-Disturbing Activities and Implement Further Mitigation As Necessary.** This mitigation would reduce the potential impact to a less-than-significant level.

A qualified professional archaeologist shall conduct focused surveys of all portions of the project area that were not adequately surveyed during past efforts or during surveys for the current effort. The survey shall be conducted before activities associated with project preparation or construction are initiated, and during a fallow period, if possible, in the case of areas currently covered in agricultural crops or grasses. If cultural resources are identified as a result of the survey, the archaeologist shall evaluate the significance of the finds and recommend appropriate mitigation measures for significant resources. TRLIA and its construction contractors shall implement these mitigation measures.

Mitigation may include, but shall not necessarily be limited to, the avoidance of significant and potentially significant resources through changes in project design and/or subsurface testing and data recovery. Such efforts, particularly those involving testing and excavation, shall be conducted in consultation with appropriate Native American representatives identified by the NAHC.

Implementing this mitigation measure would ensure that impacts on unknown cultural resources in previously unsurveyed portions of the project area are prevented or mitigated, and would reduce the potential impact to a less-than-significant level.

LS-5.8-c **Stop Work and Implement Measures to Protect Archaeological Resources If Discovered during Ground-Disturbing Activities.** This mitigation would reduce the potential impact to a less-than-significant level.

If previously undocumented archaeological materials such as historic building or structure remains; historic artifact deposits or scatters; or prehistoric artifacts such as stone tool flaking debitage, mortars, pestles, shell, or bone are encountered during project construction, all ground-disturbing activity shall be suspended temporarily within a 100-foot radius of the find or a distance determined by a qualified professional archaeologist to be appropriate based on the

potential for disturbance of additional resource-bearing soils. A qualified professional archaeologist shall identify the materials, determine their possible significance, and formulate appropriate mitigation measures. Appropriate mitigation may include no action, avoidance of the resource, and potential data recovery. Ground disturbance in the zone of suspended activity shall not recommence without authorization from the archaeologist.

Implementing this mitigation measure would ensure proper identification and treatment of any significant cultural resources uncovered as a result of project-related ground disturbance and would reduce the potential impact on unknown buried archaeological resources to a less-than-significant level.

LS-5.8-d **If Human Remains Are Discovered during Ground-Disturbing Activities, Stop Work and Comply with State Laws Pertaining to the Discovery of Human Remains.** This mitigation would reduce the potential impact to a less-than-significant level.

If human remains are uncovered during project construction, all ground-disturbing activities shall immediately be suspended within a 100-foot radius of the find or a distance determined by a qualified professional archaeologist to be appropriate based on the potential for disturbance of additional remains, and TRLIA or its designated representative shall be notified. TRLIA shall immediately notify the Yuba County Coroner and a qualified professional archaeologist, if one is not already on-site. The coroner shall examine the discovery within 48 hours. If the coroner determines that the remains are those of a Native American, he or she shall contact the NAHC by phone within 24 hours. The NAHC shall contact the Most Likely Descendant (MLD) of the remains. TRLIA or its appointed representative and the archaeologist shall consult with the MLD regarding the removal or preservation and avoidance of the remains, and the parties shall rebury or preserve the remains as appropriate. Ground disturbance in the zone of suspended activity shall not recommence without authorization from the archaeologist.

Implementing this mitigation measure would reduce impacts on discovered human remains to a less-than-significant level.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Mitigation is provided below for Impact ASB-5.8-a (damage to or destruction of site CA-Yub-5), Impact ASB-5.8-b (damage to or destruction of resources associated with sites CA-Yub-13 and CA-Yub-14), Impact ASB-5.8-c (damage to or destruction of cultural resources in unsurveyed areas), Impact ASB-5.8-d (damage to or destruction of undocumented buried archaeological resources), and Impact ASB-5.8-e (damage to or destruction of undocumented human remains).

ASB-5.8-a **Evaluate the Significance of Archaeological Site CA-Yub-5 and, If Determined to Be Significant, Protect the Site from Damage and/or Conduct Data Recovery Excavation.** This mitigation would reduce the impact to a less-than-significant level.

TRLIA shall have a qualified archaeologist evaluate the extent and significance/eligibility for NRHP and CRHR listing of site CA-Yub-5 through test excavations and analysis of the site's stratigraphy and artifactual constituents. If the site is determined to lack eligibility for NRHP and

CRHR listing and is not found to be a significant cultural resource under CEQA, the archaeologist shall report these findings in a site investigation report and ensure that all remains discovered at the site are recorded and reported in accordance with professional practices, and no further protective measures will be necessary.

If intact stratigraphy, features, additional human remains, or artifacts indicate that the site may be eligible for NRHP or CRHR listing and therefore a significant historical resource according to CEQA criteria, TRLIA shall implement one or both of the measures described below in consultation with a professional archaeologist familiar with CA-Yub-5 to ensure that no significant cultural resources are damaged there. Two basic approaches are described: protecting the site from damage and conducting data recovery at the site. All site testing shall be conducted in consultation with appropriate Native American representatives designated by the NAHC, and a Native American monitor shall be present for monitoring during any excavation.

Option 1: Protect CA-Yub-5 from Damage

CA-Yub-5 can be protected from direct construction damage if the setback levee is realigned such that the site is beyond the footprint of ground-disturbing levee construction activity. This would require moving the levee alignment to the east of the site boundaries, thus placing the entire site within the levee setback area. It would be highly impractical to move the alignment to the west to place the site outside the project site and thereby avoid damaging it. Based on characteristics observed during archaeological field surveys, it is estimated that the setback levee would need to be constructed approximately 500 feet west of the proposed alignment in the area of CA-Yub-5 to ensure complete avoidance of the site. Geotechnical considerations render such a western shift of the alignment unrealistic because it would place this portion of the levee on a far less stable foundation (old riverbed) than under the proposed alignment.

Once situated within the levee setback area (i.e., the expanded floodway), the site should be protected from future erosion and scour from surface flows, as well as human disturbance, through the use of engineered features and/or strategic plantings. In addition, sufficient site data should be collected and analyzed to establish the important archaeological characteristics of the site. One of the most potentially significant characteristics of CA-Yub-5 is the presence of at least 12 inches of midden soil, which can be a source of information regarding the age of the site (through radiocarbon dating) and prehistoric diets and paleoenvironmental reconstruction (through microconstituent and chemical analyses). Because floodwaters passing through the levee setback area could alter the soil properties that permit accurate radiometric dating or hasten the degradation of macrobotanical and microbotanical remains, scientific data would need to be collected, recorded, and reported before the site is subjected to inundation.

It has been previously suggested that the site may be protected from future damage by use of a protective covering that is impermeable to water, which is also termed “capping.” However, “capping” CA-Yub-5 to protect it from water damage would be very impractical, if not impossible. It would be necessary to have a clear definition of the horizontal and vertical boundaries of CA-Yub-5, and the site would need to be completely encased in the covering so that it would be protected from saturation from all sides, including rising groundwater from below.

Option 2: Conduct Data Recovery at CA-Yub-5

Data recovery through destructive excavation is considered an acceptable mitigation measure for damage to archaeological sites if other mitigation measures are less feasible or wholly infeasible. The purpose of data recovery is to obtain scientifically consequential information from an archaeological site that would be partially or completely destroyed. Although much of the work required for data recovery is similar to that conducted during test excavations, the requirements for data recovery call for more extensive manual and perhaps mechanical excavation. Recovered materials shall be subjected to laboratory analysis (e.g., stone tool analysis, faunal analysis, radiocarbon assays, and obsidian hydration studies), and a report and interpretive material shall be prepared that documents the site investigation and findings.

Implementing one or both of the mitigation options described above would ensure that project effects on any significant cultural resources at CA-Yub-5 would be reduced to a less-than-significant level.

ASB-5.8-b(1) **Conduct Further Evaluation and Subsurface Testing to Determine Whether Proposed Levee Improvements Could Damage Significant Resources Associated with Prehistoric Archaeological Sites CA-Yub-13 and CA-Yub-14.** This measure is identical to Mitigation Measure LS-5.8-a(1) above. Together with Mitigation Measure ASB-5.8-b(2), this mitigation would reduce the potential impact to a less-than-significant level.

ASB-5.8-b(2) **Monitor Ground-Disturbing Activities in the Vicinity of Prehistoric Archaeological Sites CA-Yub-13 and CA-Yub-14.** This measure is identical to Mitigation Measure LS-5.8-a(2) above. Together with Mitigation Measure ASB-5.8-b(1), this mitigation would reduce the potential impact to a less-than-significant level.

ASB-5.8-c **Survey Unexamined Areas before Project Ground-Disturbing Activities and Implement Further Mitigation As Necessary.** This measure is identical to Mitigation Measure LS-5.8-b above. This mitigation would reduce the potential impact to a less-than-significant level.

ASB-5.8-d **Stop Work and Implement Measures to Protect Archaeological Resources If Discovered during Ground-Disturbing Activities.** This measure is identical to Mitigation Measure LS-5.8-c above. This mitigation would reduce the potential impact to a less-than-significant level.

ASB-5.8-e **If Human Remains are Discovered during Ground-Disturbing Activities, Stop Work and Comply with State Laws Pertaining to the Discovery of Human Remains.** This measure is identical to Mitigation Measure LS-5.8-d above. This mitigation would reduce the potential impact to a less-than-significant level.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Mitigation is provided below for Impact IS-5.8-a (damage to or destruction of site CA-Yub-5), Impact IS-5.8-b (damage to or destruction of resources associated with sites CA-Yub-13 and CA-Yub-14), Impact IS-5.8-c (damage to or destruction of cultural resources in unsurveyed areas), Impact IS-5.8-d (damage to or destruction of undocumented buried archaeological resources), and Impact IS-5.8-e (damage to or destruction of undocumented human remains).

IS-5.8-a **Evaluate the Significance of Archaeological Site CA-Yub-5 and, If Determined to Be Significant, Protect the Site from Damage and/or Conduct Data Recovery Excavation.** This measure is identical to Mitigation Measure ASB-5.8-a above. This mitigation would reduce the impact to a less-than-significant level.

IS-5.8-b(1) **Conduct Further Evaluation and Subsurface Testing to Determine Whether Proposed Levee Improvements Could Damage Significant Resources Associated with Prehistoric Archaeological Sites CA-Yub-13 and CA-Yub-14.** This measure is identical to Mitigation Measure LS-5.8-a(1) above. Together with Mitigation Measure IS-5.8-b(2), this mitigation would reduce the potential impact to a less-than-significant level.

IS-5.8-b(2) **Monitor Ground-Disturbing Activities in the Vicinity of Archaeological Sites CA-Yub-13 and CA-Yub-14.** This measure is identical to Mitigation Measure LS-5.8-a(2) above. Together with Mitigation Measure IS-5.8-b(1), this mitigation would reduce the potential impact to a less-than-significant level.

IS-5.8-c **Survey Unexamined Areas before Project Ground-Disturbing Activities and Implement Further Mitigation As Necessary.** This measure is identical to Mitigation Measure LS-5.8-b above. This mitigation would reduce the potential impact to a less-than-significant level.

IS-5.8-d **Stop Work and Implement Measures to Protect Archaeological Resources If Discovered during Ground-Disturbing Activities.** This measure is identical to Mitigation Measure LS-5.8-c above. This mitigation would reduce the potential impact to a less-than-significant level.

IS-5.8-e **If Human Remains Are Discovered during Ground-Disturbing Activities, Stop Work and Comply with State Laws Pertaining to the Discovery of Human Remains.** This measure is identical to Mitigation Measure LS-5.8-d above. This mitigation would reduce the potential impact to a less-than-significant level.

5.8.5 IMPACTS REMAINING SIGNIFICANT AFTER MITIGATION

With implementation of the mitigation described above, all impacts on cultural resources would be reduced to a less-than-significant level.

SECTION 5.9 AIR QUALITY

This section includes a summary of applicable regulations, existing air quality conditions, and an analysis of potential short-term and long-term air quality impacts of the Feather River Levee Repair Project (FRLRP). The method of analysis for short-term construction-related, long-term regional (operational), local mobile-source, odorous, and toxic air emissions is consistent with the recommendations of the Feather River Air Quality Management District (FRAQMD). In addition, mitigation measures are recommended as necessary to reduce significant air quality impacts.

5.9.1 REGULATORY SETTING

The project site is in Yuba County, which is in the Northern Sacramento Valley Air Basin (NSVAB). The NSVAB consists of Butte, Colusa, Glenn, Shasta, Sutter, Tehama, and Yuba Counties. Air quality in Yuba County is regulated by the U.S. Environmental Protection Agency (EPA), California Air Resources Board (ARB), and FRAQMD. Although EPA regulations may not be superseded, both state and local regulations may be more stringent. The following air quality regulations focus primarily on ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (PM), and lead. Because these are the most prevalent air pollutants known to be deleterious to human health and extensive health-effects criteria documents are available, these pollutants are commonly referred to as "criteria air pollutants."

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

At the federal level, EPA has been charged with implementing national air quality programs. EPA's air quality mandates are drawn primarily from the federal Clean Air Act (CAA), which was enacted in 1970. The most recent major amendments made by Congress were in 1990.

The CAA required EPA to establish national ambient air quality standards (NAAQS). As shown in Table 5.9-1, "Ambient Air Quality Standards and Attainment Designations," EPA has established primary and secondary NAAQS for the following criteria air pollutants: ozone, respirable particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), CO, NO_2, SO_2, and lead. The primary standards protect the public health and the secondary standards protect public welfare. The CAA also required each state to prepare an air quality control plan referred to as a State Implementation Plan (SIP). The federal Clean Air Act Amendments of 1990 (CAAA) added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is modified periodically to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies. EPA reviews all state SIPs to determine conformation to the mandates of the CAA and its amendments and to determine whether implementation will achieve air quality goals. If EPA determines that a SIP is inadequate, a Federal Implementation Plan (FIP) that imposes additional control measures may be prepared for the nonattainment area. Failure to submit an approvable SIP or to implement the plan within the mandated time frame may result in application of sanctions to transportation funding and stationary air pollution sources in the air basin.

Table 5.9-1
Ambient Air Quality Standards and Attainment Designations

Pollutant	Averaging Time	California Standards		National Standards [a]		
		Standards [b,c]	Attainment Status [d]	Primary [c,e]	Secondary [c,f]	Attainment Status [g]
Ozone	1-hour	0.09 ppm (180 μg/m^3)	N (Moderate)	– [h]	Same as Primary Standard	– [h]
	8-hour	0.07 ppm (137 μg/m^3)	U	0.08 ppm (157 μg/m^3)		U/A
Respirable Particulate Matter (PM_{10})	Annual Arithmetic Mean	20 μg/m^3	N	50 μg/m^3 [f]	Same as Primary Standard	U
	24-hour	50 μg/m^3		150 μg/m^3		
Fine Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean	12 μg/m^3	U	15 μg/m^3	Same as Primary Standard	–
	24-hour	–	–	65 μg/m^3		
Carbon Monoxide (CO)	1-hour	20 ppm (23 mg/m^3)	U	35 ppm (40 mg/m^3)	–	U
	8-hour	9 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)		
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	–	–	0.053 ppm (100 μg/m^3)	Same as Primary Standard	U/A
	1-hour	0.25 ppm (470 μg/m^3)	A	–		–
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	–	–	0.030 ppm (80 μg/m^3)	–	U
	24-hour	0.04 ppm (105 μg/m^3)	A	0.14 ppm (365 μg/m^3)	–	
	3-hour	–	–	–	0.5 ppm (1300 μg/m^3)	
	1-hour	0.25 ppm (655 μg/m^3)	A	–	–	–
Lead [i]	30-day Average	1.5 μg/m^3	A	–	–	–
	Calendar Quarter	–	–	1.5 μg/m^3	Same as Primary Standard	

Table 5.9-1
Ambient Air Quality Standards and Attainment Designations

Pollutant	Averaging Time	California Standards		National Standards [a]		
		Standards [b,c]	Attainment Status [d]	Primary [c,e]	Secondary [c,f]	Attainment Status [g]
Sulfates	24-hour	25 μg/m^3	A	No National Standards		
Hydrogen Sulfide	1-hour	0.03 ppm (42 μg/m^3)	U			
Vinyl Chloride [i]	24-hour	0.01 ppm (26 μg/m^3)	U/A			
Visibility-Reducing Particle Matter	8-hour	Extinction coefficient of 0.23 per kilometer —visibility of 10 miles or more (0.07—30 miles or more for Lake Tahoe) because of particles when the relative humidity is less than 70%.	U			

Notes: μg/m^3 = micrograms per cubic meter; mg/m^3 = milligrams per cubic meter; ppm = parts per million

[a] National standards (other than ozone, PM, and those based on annual averages or annual arithmetic means) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. The PM_{10} 24-hour standard is attained when 99% of the daily concentrations, averaged over 3 years, are equal to or less than the standard. The $PM_{2.5}$ 24-hour standard is attained when 98% of the daily concentrations, averaged over 3 years, are equal to or less than the standard.

[b] California standards for ozone, CO (except Lake Tahoe), SO_2(1- and 24-hour), NO_2, PM, and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[c] Concentration expressed first in units in which it was promulgated [i.e., parts per million (ppm) or micrograms per cubic meter (μg/m^3)]. Equivalent units given in parentheses are based upon a reference temperature of 25 degrees Celsius (°C) and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[d] Unclassified (U): A pollutant is designated unclassified if the data are incomplete and do not support a designation of attainment or nonattainment.

Attainment (A): A pollutant is designated attainment if the state standard for that pollutant was not violated at any site in the area during a 3-year period.

Nonattainment (N): A pollutant is designated nonattainment if there was at least one violation of a state standard for that pollutant in the area.

Nonattainment/Transitional (NT): A subcategory of the nonattainment designation. An area is designated nonattainment/transitional to signify that the area is close to attaining the standard for that pollutant.

[e] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.

[f] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[g] Nonattainment (N): Any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for the pollutant.

Attainment (A): Any area that meets the national primary or secondary ambient air quality standard for the pollutant.

Unclassifiable (U): Any area that cannot be classified on the basis of available information as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant.

[h] The national 1-hour ozone standard was revoked on June 15, 2005.

[i] ARB has identified lead and vinyl chloride as toxic air contaminants with no threshold of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

Sources: California Air Resources Board 2006a; U.S. Environmental Protection Agency 2006a, 2006b

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

ARB is the agency responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the California Clean Air Act (CCAA). The CCAA, which was adopted in 1988, required ARB to establish California ambient air quality standards (CAAQS) (Table 5.9-1). ARB has established CAAQS for sulfates, hydrogen sulfide, vinyl chloride, visibility-reducing particulate matter, and the above-mentioned criteria air pollutants. In most cases the CAAQS are more stringent than the NAAQS. Differences in the standards are generally explained by the health effects studies considered during the standard-setting process and the interpretation of the studies. In addition, the CAAQS incorporate a margin of safety to protect sensitive individuals.

The CCAA requires that all local air districts in the state endeavor to achieve and maintain the CAAQS by the earliest practical date. The act specifies that local air districts should focus particular attention on reducing the emissions from transportation and areawide emission sources, and provides districts with the authority to regulate indirect sources.

Other ARB responsibilities include overseeing local air district compliance with California and federal laws; approving local air quality attainment plans (AQAPs); submitting SIPs to EPA; monitoring air quality; determining and updating area designations and maps; and setting emissions standards for new mobile sources, consumer products, small utility engines, off-road vehicles, and fuels.

LOCAL PLANS, POLICIES, REGULATIONS, AND LAWS

FRAQMD attains and maintains air quality conditions in Yuba and Sutter Counties through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. The clean-air strategy of FRAQMD includes the preparation of plans and programs for the attainment of ambient-air-quality standards, adoption and enforcement of rules and regulations, and issuance of permits for stationary sources. FRAQMD also inspects stationary sources, responds to citizen complaints, monitors ambient air quality and meteorological conditions, and implements other programs and regulations required by the CAA, CAAA, and CCAA.

In an attempt to achieve the NAAQS and CAAQS and maintain healthful air quality throughout the NSVAB, FRAQMD and the other air districts in the NSVAB have jointly prepared and adopted AQAPs and reports. The most recent AQAP, completed in 2003, addresses all of the following:

- air quality modeling to identify the reductions needed and design effective emissions reduction strategies,
- comprehensive emission reduction programs that take advantage of zero- and near-zero-emission technologies, and
- the impacts of pollutant transport in the attainment demonstration.

In 1998 FRAQMD published the *Indirect Source Review Guidelines* (Feather River Air Quality Management District 1998). More recently FRAQMD has provided California Environmental Quality Act (CEQA) planning guidance online (Feather River Air Quality Management District 2006) to assist with identification of significant adverse air quality impacts and suggest amenities that will reduce potential project emissions early in the planning process. Because stationary sources such as industrial facilities are largely regulated, the guidelines focus on transportation and land-use control measures to reduce emissions to achieve and maintain federal and state health-based air quality standards.

All projects are subject to FRAQMD rules and regulations in effect at the time of construction. Specific rules applicable to the construction of the proposed project may include the following:

- Rule 3.0—Visible Emissions. A person shall not discharge into the atmosphere from any single source of emission whatsoever any air contaminant for a period or periods aggregating more than 3 minutes in any 1 hour which is as dark or darker in shade as that designated as No. 2 on the Ringelmann Chart, as published by the United States Bureau of Mines.

- Rule 3.2—Particulate Matter Concentration. A person shall not discharge into the atmosphere from any source particulate matter in excess of 0.3 grains per cubic foot of gas at standard conditions.

- Rule 3.15—Architectural Coatings. No person shall: (i) manufacture, blend, or repackage for sale within the District [FRAQMD]; (ii) supply, sell, or offer for sale within FRAQMD; or (iii) solicit for application or apply within FRAQMD, any architectural coating with VOC [volatile organic carbon] content in excess of the corresponding specified manufacturer's maximum recommendation.

- Rule 3.16—Fugitive Dust Emissions. A person shall take every reasonable precaution not to cause or allow the emissions of fugitive dust from being airborne beyond the property line, from which the emission originates, from any construction, handling or storage activity, or any wrecking, excavation, grading, clearing of land or solid waste disposal operation.

- Rule 4.1—Permit Requirements. Any person operating an article, machine, equipment, or other contrivance, the use of which may cause, eliminate, reduce, or control the issuance of air contaminants, shall first obtain a written permit from the Air Pollution Control Officer (APCO). Stationary sources subject to the requirements of Rule 10.3, Federal Operating Permit Program, must also obtain a Title V permit pursuant to the requirements and procedures of that rule.

TOXIC AIR CONTAMINANTS

Air quality regulations also focus on toxic air contaminants (TACs), or in federal parlance, hazardous air pollutants (HAPs). A TAC is defined as an air pollutant that may cause or contribute to an increase in levels of mortality or serious illness, or that may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air; however, their high toxicity or health risk may pose a threat to public health even at low concentrations. In general, for those TACs that may cause cancer, there is no concentration that does not present some risk. In other words, there is no threshold level below which adverse health impacts may

not be expected to occur. This contrasts with the criteria air pollutants, for which acceptable levels of exposure can be determined and for which the ambient standards have been established (Table 5.9-1). EPA and ARB regulate HAPs and TACs, respectively, through statutes and regulations that generally require the use of the maximum or best available control technology for toxics (MACT and BACT) to limit emissions. These statutes and regulations, in conjunction with additional rules set forth by FRAQMD, establish the regulatory framework for TACs.

Federal Hazardous Air Pollutant Programs

EPA has programs for identifying and regulating HAPs. Title III of the CAAA directed EPA to promulgate national emissions standards for HAPs (NESHAP). The NESHAP for major sources of HAPs may differ from the standards for area sources. Major sources are defined as stationary sources with potential to emit more than 10 tons per year (TPY) of any HAP or more than 25 TPY of any combination of HAPs; all other sources are considered area sources. The emissions standards are to be promulgated in two phases. In the first phase (1992–2000), EPA developed technology-based emission standards designed to produce the maximum emission reduction achievable. These standards are generally referred to as requiring MACT. For area sources, the standards may be different, based on generally available control technology. In the second phase (2001–2008), EPA is required to promulgate health risk–based emissions standards where deemed necessary to address risks remaining after implementation of the technology-based NESHAP standards.

The CAAA also required EPA to promulgate vehicle or fuel standards containing reasonable requirements that control toxic emissions, at a minimum emissions of benzene and formaldehyde. Performance criteria were established to limit mobile-source emissions of toxics, including benzene, formaldehyde, and 1,3-butadiene. In addition, Section 219 of the CAAA required the use of reformulated gasoline in selected areas with the most severe ozone nonattainment conditions to further reduce mobile-source emissions.

State and Local Toxic Air Contaminant Programs

The State of California regulates TACs primarily through the Tanner Air Toxics Act (Assembly Bill [AB] 1807 [1983]) and the Air Toxics Hot Spots Information and Assessment Act (AB 2588 [1987]). The Tanner Act sets forth a formal procedure for ARB to designate substances as TACs. Research, public participation, and scientific peer review must occur before ARB can designate a substance as a TAC. To date, ARB has identified more than 21 TACs and has adopted EPA's list of HAPs as TACs. Most recently, diesel PM was added to the ARB list of TACs.

Once a TAC is identified, ARB adopts an Airborne Toxics Control Measure (ATCM) for sources that emit that particular TAC. If there is a safe threshold for a substance at which there is no toxic effect, the control measure must reduce exposure below that threshold. If there is no safe threshold, the measure must incorporate BACT to minimize emissions.

The Hot Spots Act requires that existing facilities that emit toxic substances above a specified level prepare a toxic-emission inventory, prepare a risk assessment if emissions are significant, notify the public of significant risk levels, and prepare and implement risk reduction measures.

ARB has adopted diesel exhaust control measures and more stringent emission standards for various on-road mobile sources of emissions, including transit buses, and off-road diesel equipment (e.g., tractors, generators). In February 2000, ARB adopted a new public-transit bus fleet rule and emission standards for new urban buses. These new rules and standards provide for:

- more stringent emission standards for some new urban bus engines, beginning with 2002 model year engines;
- zero-emission bus demonstration and purchase requirements applicable to transit agencies; and
- reporting requirements with which transit agencies must demonstrate compliance with the urban-transit bus-fleet rule.

Upcoming milestones include the low-sulfur diesel-fuel requirement, and tighter emission standards for heavy-duty diesel trucks (2007) and off-road diesel equipment (2011) nationwide.

Over time, the replacement of older vehicles will result in a vehicle fleet that produces substantially fewer TACs than under current conditions. Mobile-source emissions of TACs (e.g., benzene, 1-3-butadiene, diesel PM) have been reduced significantly over the last decade, and will be reduced further in California through a progression of regulatory measures (e.g., Low-Emission Vehicle [LEV]/Clean Fuels and Phase II reformulated gasoline regulations) and control technologies. With implementation of ARB's Risk Reduction Plan, it is expected that diesel PM concentrations will be reduced by 75% in 2010 and 85% in 2020 from the estimated year 2000 level. Adopted regulations are also expected to continue to reduce emissions of formaldehyde from cars and light-duty trucks. As emissions are reduced, it is expected that risks associated with exposure to the emissions will also be reduced.

ARB recently published *Air Quality and Land Use Handbook: A Community Health Perspective* (California Air Resources Board 2005), which provides guidance concerning land use compatibility with sources of TAC emissions. While not a law or adopted policy, the handbook offers recommendations for the siting of sensitive receptors near uses associated with TACs, such as freeways and high-traffic roads, commercial distribution centers, rail yards, ports, refineries, dry cleaners, gasoline stations, and industrial facilities to help keep children and other sensitive populations out of harm's way.

At the local level, air pollution control or management districts may adopt and enforce ARB control measures. Under FRAQMD Regulation 4.0 ("General Requirements"), Regulation 4.1 ("Permits Required"), Regulation 10.1 ("New Source Review"), and Regulation 10.3 ("Federal Operating Permits"), all sources that possess the potential to emit TACs are required to obtain permits from FRAQMD. Permits may be granted to these operations if they are constructed and operated in accordance with applicable regulations, including new-source review standards and air-toxics control measures. FRAQMD limits emissions and public exposure to TACs through a number of programs. FRAQMD prioritizes TAC-emitting stationary sources based on the quantity and toxicity of the TAC emissions and the proximity of the facilities to sensitive receptors.

Sources that require a permit are analyzed by FRAQMD (e.g., in a health risk assessment) based on their potential to emit toxics. If it is determined that the project would emit toxics in excess of FRAQMD's threshold of significance for TACs, as identified below, sources must implement the best available control technology for TACs (T-BACT) to reduce emissions. If a source cannot reduce the risk below the threshold of significance even after T-BACT has been implemented, FRAQMD will deny the permit required by the source. This helps to prevent new problems and reduces emissions from existing older sources by requiring them to apply new technology when retrofitting with respect to TACs.

5.9.2 ENVIRONMENTAL SETTING

SOURCES OF INFORMATION

The information in this section is based primarily on review of the following documents:

- FRAQMD's *Indirect Source Review Guidelines* (Feather River Air Quality Management District 1998),
- FRAQMD CEQA planning information (Feather River Air Quality Management District 2006),
- *Draft Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project* (Yuba County Water Agency 2003), and
- *Draft Environmental Impact Report for the Feather-Bear Rivers Levee Setback Project* (Three Rivers Levee Improvement Authority 2004).

FACTORS AFFECTING POLLUTANT CONCENTRATIONS

The ambient concentrations of air pollutant emissions are determined by the amount of emissions released by pollutant sources and the ability of the atmosphere to transport and dilute such emissions. Natural factors that affect transport and dilution include terrain, wind, atmospheric stability, and the presence of sunlight. Therefore, existing air quality conditions in the project area are determined by such natural factors as topography, meteorology, and climate, in addition to the amount of emissions released by existing air pollutant sources, as discussed separately below.

Topography

The dimensions of the NSVAB are approximately 216 miles north to south and 95 miles east to west at the widest part. The NSVAB is bounded on the west and north by the Coast Range and on the east by the southern portion of the Cascade Range and the northern portion of the Sierra Nevada. The surrounding mountain ranges reach heights of 3,500 feet in the southwest, 8,500 feet in the northwest, 1,700 feet in the southeast, and 10,500 feet in the northeast. These mountain ranges provide a substantial physical barrier to locally created pollution as well as that transported northward on prevailing winds from the Sacramento metropolitan area.

Meteorology and Climate

The annual temperature, humidity, precipitation, and wind patterns of the NSVAB reflect the regional topography and the strength and location of a semipermanent, subtropical high-pressure cell. Summer temperatures that often exceed 100 degrees Fahrenheit (°F) coupled with clear sky conditions are favorable for ozone formation. Most precipitation in the valley occurs during winter storms. The coastal mountain ranges induce winter storms from the Pacific Ocean to release precipitation on the western slopes, producing a partial rain shadow over the valley. The winds and unstable atmospheric conditions associated with the passage of winter storms result in periods of low air pollution and excellent visibility. However, between winter storms, high pressure and light winds lead to the creation of low-level temperature inversions and stable atmospheric conditions that can result in high concentrations of CO and particulate matter (PM).

Summer conditions in the NSVAB are typically characterized by high temperatures and low humidity, with prevailing winds from the south. Summer temperatures average approximately 90°F during the day and 50°F at night (Feather River Air Quality Management District 1998).

Winter conditions in the NSVAB are characterized by occasional rainstorms interspersed with stagnant and foggy weather. Winter temperatures average in the low 50s (°F), and nighttime temperatures average in the upper 30s. Rainfall occurs mainly from late October to early May, averaging 17.2 inches per year, but varies significantly from year to year. During winter, north winds are frequent, but winds from the south predominate (Feather River Air Quality Management District 1998). The predominant wind direction and speed is from the south at 8.0 miles per hour (mph) (California Air Resources Board 1994).

Atmospheric Stability and Inversions

Stability describes the resistance of the atmosphere to vertical motion. The stability of the atmosphere depends on the vertical distribution of temperature. When the temperature decreases vertically at 10 degrees Celsius (°C) per 1,000 meters, the atmosphere is considered “neutral.” When the change in temperature is greater than 10°C per 1,000 meters, the atmosphere is considered “unstable.” When the change is less than 10°C per 1,000 meters, the atmosphere is termed “stable.” In the NSVAB, categories range from extremely unstable conditions, which are present in spring and summer, through neutral to stable conditions, which are both present in fall and winter. Unstable conditions occur primarily during the daytime, when solar heating warms the lower atmospheric layers sufficiently. Under extremely unstable conditions, large fluctuations in horizontal wind direction are coupled with large mixing depths, which are the vertical depths available for diluting air pollution near the ground. As solar heating decreases, fluctuations in wind direction and the vertical mixing depth become less pronounced, resulting in neutral to stable conditions. Under the most stable conditions, which are present in the NSVAB in fall and winter, air pollution emitted into the atmosphere will travel downwind with poor dispersion. The dispersive power of the atmosphere decreases with progression through the categories from extremely unstable to stable.

An inversion is a layer of warmer air over a layer of cooler air. Inversions influence the mixing depth of the atmosphere, thus significantly affecting air quality conditions. The NSVAB experiences two types of inversions that affect air quality. The first type of inversion layer contributes to photochemical smog problems by confining pollution to a shallow layer near the

ground. This type occurs in summer, when sinking air near the ground forms a "lid" over the region. The second type of inversion occurs when the air near the ground cools while the air aloft remains warm. This type of inversion occurs during winter nights and can cause localized air pollution "hot spots" near emission sources because of poor dispersion. The shallow surface-based inversions are present in the morning, but are often broken by daytime heating of the air layers near the ground.

AMBIENT AIR QUALITY IN THE PROJECT AREA

Concentrations of criteria air pollutants (ozone, PM_{10}, $PM_{2.5}$, CO, NO_2, SO_2, and lead) are used as indicators of ambient air quality conditions. A brief description of each criteria air pollutant, including source types, health effects, and future trends, is provided below along with the most current attainment area designations and monitoring data for the project area.

Ozone

Ozone is a photochemical oxidant and the primary component of smog. Ozone, typically associated with poor air quality, is not emitted directly into the air, but is formed through a series of chemical reactions between reactive organic gases (ROG) and oxides of nitrogen (NO_X) in the presence of sunlight. Motor vehicles and stationary (industrial) sources are major sources of emission of both ROG and NO_X, which are also referred to as ozone precursors.

Ozone located in the upper atmosphere (stratosphere) acts in a beneficial manner by shielding the earth from harmful ultraviolet radiation that is emitted by the sun. However, ozone in the lower atmosphere (troposphere) is a major health and environmental concern. Because sunlight and heat serve as catalysts for the reactions between ozone precursors, peak ozone concentrations typically occur during summer in the Northern Hemisphere (U.S. Environmental Protection Agency 2006a). In general, ozone concentrations over or near urban and rural areas reflect an interplay of emissions of ozone precursors, transport meteorology, and atmospheric chemistry (Godish 1991).

The adverse health effects associated with exposure to ozone pertain primarily to the respiratory system. Scientific evidence indicates that ambient levels of ozone can affect not only sensitive receptors, such as asthmatics and children, but healthy adults as well. Exposure to ambient levels of ozone ranging from 0.10 to 0.40 part per million (ppm) for 1–2 hours has been found to significantly alter lung functions by increasing respiratory rates and pulmonary resistance, decreasing tidal volumes, and impairing respiratory mechanics. Ambient levels of ozone above 0.12 ppm are linked to such symptoms as throat dryness, chest tightness, shortness of breath, headache, and nausea. In addition to these adverse health effects, some evidence also relates ozone exposure to an increase in susceptibility to respiratory infections (Godish 1991). Ozone causes substantial damage to leaf tissues of crops and natural vegetation and damages many materials by acting as a chemical oxidizing agent (Feather River Air Quality Management District 1998).

Emissions of ozone precursors in the project area have decreased in recent years and are projected to continue to decline in the future. On-road motor vehicles and other mobile sources are by far the largest contributors. More stringent mobile-source emission standards, cleaner burning fuels, and new rules for industrial operations have largely contributed to the decline in

emissions trends. However, peak ozone values have not declined as quickly over the last several years as they have in other urban areas. This is because the urbanized areas of the Central Valley are identified as both transport contributors and receptors for these pollutants. Regardless, ozone concentrations have been declining in the project area because of the decrease in precursor emissions.

Particulate Matter

Health concerns associated with suspended particles focus on those particles small enough to reach the lungs when inhaled. Few particles larger than 10 micrometers in diameter reach the lungs. Therefore, respirable particulate matter is considered to consist of particles with an aerodynamic diameter of 10 micrometers or less, referred to as PM_{10}. PM_{10} consists of particulates directly emitted into the air, such as fugitive dust, soot, and smoke from mobile and stationary sources, construction operations, fires, and natural windblown dust, and particulates formed in the atmosphere by condensation and/or transformation of SO_2 and ROG (U.S. Environmental Protection Agency 2006a). Major sources of PM_{10} are the combustion of wood, diesel, and other fuels; industrial processes; and ground-disturbing activities such as construction and agricultural operations. In Yuba and Sutter Counties, the primary sources of PM_{10} are entrained road dust, farming operations, and agricultural burning (Feather River Air Quality Management District 1998).

Ambient PM_{10} standards are designed to prevent respiratory disease and protect visibility. The adverse health effects associated with PM_{10} depend on the specific composition of the particulate matter. For example, health effects may be associated with metals, polycyclic aromatic hydrocarbons, and other toxic substances adsorbed onto fine particulates (the piggybacking effect), or with fine dust particles of silica or asbestos. Generally, adverse health effects associated with PM_{10} may result from both short-term and long-term exposure to elevated PM_{10} concentrations and may include breathing and respiratory symptoms, aggravation of existing respiratory and cardiovascular diseases, alterations in the body's immune system, carcinogenesis, and premature death (U.S. Environmental Protection Agency 2006a).

Finer particles having an aerodynamic diameter of 2.5 micrometers or less are referred to as $PM_{2.5}$. $PM_{2.5}$ poses an increased health risk because these particles can deposit deep in the lungs and contain substances that are particularly harmful to human health.

Direct emissions of PM_{10} and $PM_{2.5}$ have increased in recent years and are projected to continue increasing in the near future. Emissions are dominated by contributions from areawide sources, primarily fugitive dust from paved and unpaved roads, fugitive dust from construction and demolition, and particulates from residential fuel combustion. Emissions of PM_{10} and $PM_{2.5}$ from mobile sources in the project area have remained relatively steady.

Carbon Monoxide

Carbon monoxide is a colorless, odorless, and poisonous gas produced by incomplete burning of carbon in fuels, primarily from mobile (transportation) sources of pollution. Approximately three-fourths of the nationwide CO emissions are estimated to be from mobile (transportation) sources; the remaining CO emissions are associated with wood-burning stoves, incinerators, and

industrial sources. Peak CO levels are generally found near areas with high concentrations of mobile (transportation) sources and occur typically during calm conditions in the winter months.

CO enters the bloodstream through the lungs by combining with hemoglobin, which normally supplies oxygen to the cells. However, CO combines with hemoglobin much more readily than oxygen does, resulting in a drastic reduction in the amount of oxygen available to the cells. Adverse health effects associated with exposure to CO concentrations include such symptoms as dizziness, headaches, slow reflexes, and fatigue. CO exposure is especially harmful to individuals who suffer from cardiovascular and respiratory diseases (U.S. Environmental Protection Agency 2006a).

Nitrogen Dioxide

Nitrogen dioxide is a brownish, highly reactive gas that is present in all urban environments. The major human-made sources of NO_2 are combustion devices, such as boilers, gas turbines, and mobile and stationary reciprocating internal-combustion engines. Combustion devices emit primarily nitric oxide (NO), which reacts through oxidation in the atmosphere to form NO_2 (U.S. Environmental Protection Agency 2006a). The combined emissions of NO and NO_2 are referred to as NO_X, which are reported as equivalent NO_2. Because NO_2 is formed and depleted by reactions associated with photochemical smog (ozone), the NO_2 concentration in a particular geographical area may not be representative of the local NO_X emission sources.

Inhalation is the most common route of exposure to NO_2. Because NO_2 has relatively low solubility in water, the principal site of toxicity is in the lower respiratory tract. The severity of the adverse health effects depends primarily on the concentration inhaled rather than the duration of exposure. An individual may experience a variety of acute symptoms, including coughing, difficulty with breathing, vomiting, headache, and eye irritation, during or shortly after exposure. After approximately 4–12 hours an exposed individual may experience chemical pneumonitis or pulmonary edema with breathing abnormalities, cough, cyanosis, chest pain, and rapid heartbeat. Severe, symptomatic NO_2 intoxication after acute exposure has been linked on occasion with prolonged respiratory impairment with such symptoms as chronic bronchitis and decreased lung functions.

Sulfur Dioxide

Sulfur dioxide is produced by such stationary sources as coal and oil combustion, steel mills, refineries, and pulp and paper mills. The major adverse health effects associated with SO_2 exposure pertain to the upper respiratory tract. SO_2 is a respiratory irritant with constriction of the bronchioles occurring with inhalation of SO_2 at 5 ppm or more. On contact with the moist mucous membranes, SO_2 produces sulfurous acid, which is a direct irritant. Concentration rather than duration of the exposure is an important determinant of respiratory effects. Exposure to high SO_2 concentrations may result in edema of the lungs or glottis and respiratory paralysis.

Lead

Lead is a metal found naturally in the environment as well as in manufactured products. The major sources of lead emissions have historically been mobile and industrial sources. As a result of the phase-out of leaded gasoline (discussed in detail below), metal processing is currently the

primary source of lead emissions. The highest levels of lead in air are generally found near lead smelters. Other stationary sources are waste incinerators, utilities, and lead-acid battery manufacturers.

Twenty years ago, mobile sources were the main contributor to ambient lead concentrations in the air. In the early 1970s, EPA set national regulations to gradually reduce the lead content in gasoline. In 1975, unleaded gasoline was introduced for motor vehicles equipped with catalytic converters. EPA banned the use of leaded gasoline in highway vehicles in December 1995 (U.S. Environmental Protection Agency 2006a).

As a result of EPA's regulatory efforts to remove lead from gasoline, emissions of lead from the transportation sector have declined dramatically (by 95% between 1980 and 1999), and levels of lead in the air decreased by 94% between 1980 and 1999. Transportation sources, primarily airplanes, now contribute only 13% of lead emissions. A recent National Health and Nutrition Examination Survey reported a 78% decrease in the levels of lead in people's blood between 1976 and 1991. This dramatic decline can be attributed to the move from leaded to unleaded gasoline (U.S. Environmental Protection Agency 2006a).

The decrease in lead emissions and ambient lead concentrations over the past 25 years is California's most dramatic success story with regard to air quality management. The rapid decrease in lead concentrations can be attributed primarily to phasing out the lead in gasoline. This phase-out began during the 1970s, and subsequent ARB regulations have virtually eliminated all lead from gasoline now sold in California. All areas of the state are currently designated as attainment for the state lead standard (EPA does not designate areas for the national lead standard). Although the ambient lead standards are no longer violated, lead emissions from stationary sources still pose "hot spot" problems in some areas. As a result, ARB identified lead as a TAC.

Air Pollutant Sources and Concentrations

Approximately 60–70% of the air pollution in the FRAQMD area comes from mobile sources, which includes on-road and off-road motor vehicles (including cars, trucks, planes, trains, tractors, combines, buses, motorcycles, and boats). The remaining 30–40% of the air pollution in the FRAQMD area is a result of stationary sources that include agricultural operations, open burning of vegetative wastes, wood burning for residential heating, manufacturing industries, electric generation industries, diesel backup generators, retail gasoline and local bulk distribution facilities, auto body shops, dry cleaners, landfills, other human-made sources that emit air contaminants, and naturally occurring sources (including biological and geological sources, wildfires, and windblown dust) (Feather River Air Quality Management District 2006).

Air pollutant concentrations are measured at several monitoring stations in the NSVAB. The Yuba City air quality monitoring station on Almond Street is the closest monitoring station to the FRLRP project area with sufficient data to meet EPA and ARB criteria for quality assurance. In general, the ambient air quality measurements from this monitoring station are representative of the air quality in the project area.

Table 5.9-2, "Summary of Annual Air Quality Data from the Yuba City–Almond Street Air Quality Monitoring Station," summarizes the air quality data from this monitoring station for the years 2003–2005.

Table 5.9-2
Summary of Annual Air Quality Data from the Yuba City–Almond Street Monitoring Station

	2003	2004	2005
Ozone			
State standard (1-hour/8-hour avg., 0.09/0.07 ppm)			
National standard (8-hour avg., 0.08 ppm)			
Maximum concentration (1-hour/8-hour avg., ppm)	0.090/0.079	0.098/0.081	0.092/0.073
Number of days state standard exceeded	0	2	0
Number of days national 8-hour standard exceeded	0	0	0
Respirable particulate matter (PM_{10})			
State standard (24-hour avg., 50 $\mu g/m^3$)			
National standard (24-hour avg., 150 $\mu g/m^3$)			
Maximum concentration ($\mu g/m^3$)	83.0	53.0	60.0
Number of days state standard exceeded (measured/calculated [a])	5/30.7	1/NA	5/31.1
Number of days national standard exceeded (measured/calculated [a])	0/0	0/0	0/0
Fine particulate matter ($PM_{2.5}$)			
No separate state standard			
National standard (24-hour avg., 65 $\mu g/m^3$)			
Maximum concentration ($\mu g/m^3$)	32.0	39.0	45.0
Number of days national standard exceeded (measured [b])	0	0	0
Carbon monoxide (CO)			
State standard (1-hour/8-hour avg., 20/9.1 ppm)			
National standard (1-hour/8-hour avg., 35/9.5 ppm)			
Maximum concentration (1-hour/8-hour avg., ppm)	4.30/2.36	5.80/2.54	4.40/3.39
Number of days state standard exceeded	0	0	0
Number of days national 1-hour/8-hour standard exceeded	0/0	0/0	0/0
Nitrogen dioxide (NO_2)			
State standard (1-hour avg., 0.25 ppm)			
National standard (annual, 0.053 ppm)			
Maximum concentration (1-hour avg., ppm)	0.080	0.066	0.062
Annual average (ppm)	0.014	0.012	0.012
Number of days state standard exceeded	0	0	0

Notes: $\mu g/m^3$ = micrograms per cubic meter; NA = not available; ppm = parts per million by volume

[a] Measured days are those days when an actual measurement was greater than the level of the state daily standard or the national daily standard. Measurements are typically collected every 6 days. Calculated days are the estimated number of days that a measurement would have been greater than the level of the standard had measurements been collected every day. The number of days above the standard is not necessarily the number of violations of the standard for the year.

[b] The number of days a measurement was greater than the level of the national daily standard. Measurements are collected every day, every 3 days, or every 6 days, depending on the time of year and the site's monitoring schedule. The number of days above the standards is not directly related to the number of violations of the standard for the year.

Sources: California Air Resources Board 2006b, U.S. Environmental Protection Agency 2006c

Attainment Status

Both ARB and EPA use the type of monitoring data provided in Table 5.9-2 to designate areas according to attainment status for criteria air pollutants established by the agencies. The purpose of these designations is to identify those areas with air quality problems and thereby initiate planning efforts for improvement. The three basic designation categories are "nonattainment," "attainment," and "unclassified." The "unclassified" designation is used in an area that cannot be classified on the basis of available information as meeting or not meeting the standards. In addition, the California designations include a subcategory of the nonattainment designation, called "nonattainment-transitional." The nonattainment-transitional designation is given to nonattainment areas that are progressing and nearing attainment.

The state and national attainment status designations for Yuba County are presented in Table 5.9-1. Yuba County is designated as a nonattainment area with respect to the state standards for ozone (1-hour) and PM_{10}, and is either in attainment or unclassified for the remaining state standards. Yuba County is either in attainment or unclassified for federal standards (Feather River Air Quality Management District 2006).

ARB does not establish attainment status designations for vinyl chloride because ARB has classified it as a TAC for which ARB has established an ACTM that reduces exposure below the safe threshold.

5.9.3 ENVIRONMENTAL IMPACTS

THRESHOLDS OF SIGNIFICANCE

Significance thresholds for total maximum daily emissions are used by air quality management districts as a guide to identify the level of significance that a project may have on the formation of ozone and a project's contribution to the district's overall PM_{10} load. The FRAQMD *Indirect Source Review Guidelines* and CEQA planning guidance (Feather River Air Quality Management District 1998, 2006) provide recommended thresholds of significance for project-generated emissions of ozone precursors and PM_{10}.

In accordance with these recommended thresholds, a project alternative would have a significant impact on air quality if any of the following would occur:

- project implementation would substantially conflict with or substantially obstruct implementation of the applicable air quality plan;
- project construction would result in emissions that exceed:
  - 25 pounds per day (lb/day) of ROG,
  - 25 lb/day of NO_X, or
  - 80 lb/day of PM_{10};
- operation of the project would result in regional emissions that exceed:
  - 25 lb/day of ROG,
  - 25 lb/day of NO_X, or
  - 80 lb/day of PM_{10};

- operation of the project would result in or contribute to local CO concentrations that exceed the California 1-hour or 8-hour CO ambient air quality standards of 20 ppm or 9 ppm, respectively; or
- project implementation would result in exposure of sensitive receptors to excessive concentrations of toxic air emissions, criteria air pollutants, or odorous emissions.

Implementation of any of the project alternatives considered would not result in any major sources of odor, and the project does not involve operation of any of the common types of facilities that are known to produce odors (e.g., landfill, coffee roaster, wastewater treatment facility). In addition, the diesel exhaust from the use of on-site construction equipment would be intermittent and temporary, and it would dissipate rapidly from the source with an increase in distance. Thus, implementation of the proposed project would not expose sensitive receptors to odorous emissions, and this issue is not discussed further in this environmental impact report (EIR).

IMPACT ANALYSIS

Analysis Method

Almost all increased pollutant emissions that would be associated with the proposed project would be generated by construction activities. Construction emissions are described as short term or temporary in duration. These short-term emissions, especially PM_{10}, have the potential to represent a significant air quality impact.

Fugitive dust emissions are associated primarily with site preparation and excavation and vary as a function of such parameters as soil silt content, soil moisture, wind speed, acreage of disturbance area, and vehicle miles traveled on-site and off-site. ROG and NO_X emissions are associated primarily with gas and diesel equipment exhaust and the application of architectural coatings. CO emissions are a direct function of vehicle idling time and, thus, traffic flow conditions.

The methodology used for estimating construction emissions associated with the levee repairs and potential levee setback was based on emission factors and assumptions obtained from the following sources:

- FRAQMD's *Indirect Source Review Guidelines* (Feather River Air Quality Management District 1998),
- FRAQMD CEQA planning guidance (Feather River Air Quality Management District 2006),
- the Sacramento Metropolitan Air Quality Management District's air quality thresholds of significance (Sacramento Metropolitan Air Quality Management District 2004),
- EPA's *Compilation of Air Pollutant Emission Factors* (U.S. Environmental Protection Agency 1985),

- the South Coast Air Quality Management District's *CEQA Air Quality Handbook* (South Coast Air Quality Management District 1993), and
- EMFAC 2002 (California Air Resources Board 2003).

Assumptions regarding construction equipment and personnel, haul distances, areas of disturbance, and durations and timing of different construction activities were developed based on the information provided in Chapter 4, "Description of the Proposed Project," and coordination with project engineers.

The conclusions regarding construction emissions are based on the maximum daily emissions calculated for the entire 20-month construction period (scheduled to start in 2007 and last through 2008). The potential overlap of activities (e.g., construction of the slurry cutoff wall, setback levee, and detention basin) was considered.

For purposes of the calculations of maximum potential daily emissions, unmitigated conditions were assumed for fugitive dust emissions (i.e., no dust-control measures were assumed to be applied). This standard method of calculating potential emissions is very conservative, given that modern construction practices include very active dust-control measures, such as watering of roadways and wetting of excavation areas and stockpiles.

Alternative 1 – The Levee Strengthening Alternative

Impact LS-5.9-a

Temporary Emissions of ROG, NO_X, and PM_{10} during Construction. Maximum daily emissions of ROG, NO_X, and PM_{10} associated with levee repair and strengthening activities would exceed FRAQMD's recommended significance thresholds and contribute to existing nonattainment conditions for ozone and PM_{10} in the NSVAB. This impact would be **significant.**

The total length of the existing Feather River and Yuba River levees in project Segments 1, 2, and 3 is approximately 13.1 miles, or roughly 69,000 feet. Repair and strengthening activities along 13.1 miles of levee would result in the temporary generation of construction-related emissions for approximately 2 years. In each year of the project most emissions would be generated between April 15 and November 1, which is considered outside of the "flood season." Fugitive dust and mobile-source emissions (such as motor vehicle exhaust) would be generated by various construction activities, including:

- the operation of equipment at the construction sites, employee commute trips, and the delivery of equipment and materials to the construction areas;
- ground disturbance associated with preparing work surfaces on and near the existing levee; installing seepage control measures such as slurry cutoff walls, relief wells, and seepage/stability berms; and excavation of material from borrow areas and the proposed detention basin site;
- construction of the replacement for Pump Station No. 3 and demolition of the existing pump station.

The anticipated equipment types, borrow quantities and sources, and truck trips required for construction of the setback levee are described under Section 4.3.3, "Alternative 1—Construction," in Chapter 4, "Description of the Proposed Project." Detailed calculations are shown in Appendix E of this EIR, "Calculations of Construction-Related Emissions." The following discussions describe the main assumptions used in the calculations and summarize the results.

Assumptions

It was assumed for purposes of emissions calculations that the following mobile heavy-construction equipment could be used for general levee repair, construction of slurry cutoff walls, berm construction, borrow/detention basin excavation, and construction of Pump Station No. 3:

- eight excavators,
- six scrapers,
- six bulldozers,
- three graders,
- three rollers,
- two water trucks,
- 20 highway dump trucks,
- one crane,
- one loader, and
- four additional pieces of mobile equipment (e.g., tool carrier trucks, lubricating trucks).

Please note that the air quality model used for this analysis requires entries for specific types of construction equipment included in the model. The model does not provide entries for all types of construction equipment listed in Section 4.3.3, "Alternative 1—Construction." Therefore, the equipment listed above is intended to represent an approximation of the equipment described in Section 4.3.3.

The amount and types of equipment used during construction activities would vary from day to day depending on the specific activities being conducted. The number of off-site vehicle trips is also anticipated to vary from day to day. For purposes of calculating the maximum potential daily emissions, it was assumed that the equipment listed above would operate simultaneously for 16 hours on a day of maximum construction activity. This is a very conservative assumption used to calculate potential maximum daily emissions.

A peak construction labor force of 100 employees and an average travel distance of 10 miles to the construction site were assumed.

The daily average area of ground disturbance was estimated by calculating an estimated footprint for the levee repair work area, including additional acreage to account for staging areas, detention basin construction, potential soil borrow sites, and other activities, and dividing the total by the expected number of work days. As mentioned above, the total length of the existing Feather River and Yuba River levees in the three project segments is about 13.1 miles, or 69,000 feet. For purposes of this analysis, the average width of the levee repair work area was assumed

to be 100 feet (the actual average width is likely to be less). The area of land disturbance would therefore be approximately 6.9 million square feet, or 158 acres. The detention basin/borrow area is expected to cover approximately 150 acres, and seepage/stability berms are expected to cover approximately 30 acres. To account for ground disturbance associated with staging areas and other activities, an additional 50 acres was added to the disturbance area, although the actual acreage of additional disturbance is expected to be less. The total estimated acreage of ground disturbance was therefore assumed to be approximately 388 acres. Based on the assumption that the period of active ground disturbance would total 440 days (22 active construction days per month over 20 months), the average daily disturbance area was calculated to be approximately 0.88 acre.

The emissions calculations also included 4,910 truck trips to haul aggregate base, concrete, demolition debris, bentonite, and other materials to and within the site. These materials were assumed to be transported an average of 5.5 miles on paved roads. This estimate of haul trips exceeds estimates elsewhere in this DEIR (e.g., Section 4.3.3, "Alternative 1—Construction"; and Section 5.11, "Transportation and Circulation") to provide a margin of error and to ensure that emissions are not underrepresented. In addition, the emission calculations include sufficient haul trips to move 1.6 million cy of borrow material.

Results

Average daily construction emissions were calculated for completion of Alternative 1. It was assumed that there would be 440 active construction work days during the 2-year construction period. Detailed calculations of the maximum daily temporary emissions are shown in Appendix E. Table 5.9-3, "Summary of Maximum Daily Average Construction Emissions for Alternative 1," summarizes the results for this alternative. As indicated in the table, the maximum unmitigated daily emissions associated with Alternative 1 were estimated at 166 lb/day of ROG, 816 lb/day of NO_X, and 692 lb/day of PM_{10}.

Table 5.9-3
Summary of Maximum Daily Average Construction Emissions for Alternative 1

Emission Source	Pollutant (lb/day)		
	ROG	**NO_X**	**PM_{10}**
Mobile-Source Equipment	165	814	43
Employee Trips	1	2	0
Fugitive Dust			649
Total Unmitigated	**166**	**816**	**692**
FRAQMD Threshold	**25**	**25**	**80**

Notes: FRAQMD = Feather River Air Quality Management District; lb/day = pounds per day; NO_X = oxides of nitrogen; PM_{10} = particles with an aerodynamic diameter of 10 micrometers or less; ROG = reactive organic gases
See Appendix E for assumptions and modeling results.
Source: Data compiled by EDAW in 2006

Based on the conservative assumptions described above, the maximum daily emissions under Alternative 1 would exceed FRAQMD's recommended significance thresholds of 25 lb/day for

ROG, 25 lb/day for NO_X, and 80 lb/day for PM_{10}. In addition, Yuba County is designated as a nonattainment area for the national and state ozone (1-hour) standards and as a nonattainment area for the state PM_{10} standard. Because maximum construction emissions of ROG, NO_X, and PM_{10} would exceed FRAQMD thresholds and would contribute to existing nonattainment conditions in the NSVAB, this impact would be significant.

Impact LS-5.9-b

Long-Term Changes in Emissions of ROG, NO_X, and PM_{10} Associated with Levee Repairs and Strengthening. The proposed levee repairs and strengthening are expected to contribute only minimally, if at all, to long-term emissions of pollutants through potential vehicle trips related to occasional maintenance activities. The resulting increase in long-term emissions would be small; therefore, this impact would be **less than significant.**

The only operational activities associated with Alternative 1 would be the continuation of maintenance activities that are currently performed along the existing Feather River and Yuba River levees. The only potential mechanism for changes in operation or maintenance activities under Alternative 1 are the possible installation of relief wells and the relocation and possible increase in capacity at Pump Station No. 3. Relief wells are being considered in the preliminary project design as a method to address levee underseepage. However, a final determination as to the usage, number, and location of relief wells would be made as part of the detailed design process. Relief wells can be prone to plugging and damage from vandalism, and require operation (water removal) and periodic maintenance (flushing, cleaning, and replacement) to remain effective over the long term. If relief wells are installed, these maintenance activities could generate vehicle trips to the levees; however, such trips would be infrequent, and they are not expected to contribute measurably to long-term regional or local vehicle emissions.

If relief wells are included in Alternative 1, the capacity at the new/relocated Pump Station No. 3 would need to be greater than the capacity at the existing pump station to accommodate water generated by the relief wells. However, such an increase in capacity would not result in a significant increase in maintenance requirements. Replacement of Pump Station No. 3 could potentially reduce the need for maintenance activities because the existing exposed pump facility would be replaced by new pump equipment enclosed in a structure. Under any scenario associated with the relocation of Pump Station No. 3, if additional vehicle trips for maintenance are necessary, such additional trips would be infrequent and are not expected to contribute measurably to long-term regional or local vehicle emissions.

Replacement of Pump Station No. 3 could result in the use of an emergency backup generator at the new facility. If installed, such a backup generator would be subject to FRAQMD permitting and BACT requirements and thus would not be considered to have significant air-quality impacts. In fact, air districts typically do not even require the inclusion of such emissions in CEQA analyses unless the operation of a stationary source would result in surplus emissions in excess of BACT and offsets.

Therefore, the overall long-term effect of Alternative 1 on local and regional pollutant emissions is expected to be a negligible increase, if any, in emissions of ROG, NO_X, and PM_{10}. In addition, because Alternative 1 would not generate substantial vehicle trips and associated vehicle miles traveled, the project would be in compliance with the NSVAB AQAP. Thus, implementation of

Alternative 1 would not conflict with or obstruct implementation of the applicable air quality plan. This impact would be less than significant.

Impact LS-5.9-c

Exposure of Sensitive Receptors to Toxic Air Emissions. Emissions of TACs associated with construction or operations under Alternative 1 would not result in exposure of receptors to concentrations of TACs in excess of applicable thresholds. This impact would be **less than significant**.

Short-Term Construction Sources

Levee repair and strengthening activities would result in short-term emissions of diesel exhaust from on-site heavy-duty equipment. ARB identified particulate exhaust emissions from diesel-fueled engines (diesel PM) as a TAC in 1998. Construction under Alternative 1 would result in the generation of diesel PM emissions from the use of off-road diesel equipment required for site grading and excavation, and other construction activities. According to ARB, the potential cancer risk from the inhalation of diesel PM, as discussed below, outweighs the potential noncancer health impacts.

The dose to which receptors are exposed (a function of concentration and duration of exposure) is the primary factor used to determine the health risk (i.e., potential exposure to TAC emission levels that exceed applicable standards). Dose is positively correlated with time, meaning that a longer exposure period would result in a higher exposure level for the maximally exposed individual. Thus, the risks estimated for a maximally exposed individual are higher if a fixed exposure occurs over a longer period of time. According to the California Environmental Protection Agency's Office of Environmental Health Hazard Assessment (OEHHA), health risk assessments, which determine the exposure of sensitive receptors to TAC emissions, should be based on a 70-year exposure period; however, such assessments should be limited to the period/duration of activities associated with the project (Salinas, pers. comm., 2004).

Thus, short-term construction activities would not expose sensitive receptors to substantial pollutant concentrations for the following reasons:

- the overall use of mobilized equipment would be temporary (approximately 1% of the 70-year exposure period);
- equipment would move regularly down the linear construction corridor, further limiting the exposure period at any one location because diesel PM dissipates rapidly with an increase in distance from the source (Zhu et al. 2002);
- there are no sensitive receptors located in the immediate vicinity of a majority of the project site; and
- where there are sensitive receptors nearby (only in project Segment 3), they would be located at least 75 feet from the construction area.

As a result, this impact would be less than significant.

Long-term Operational Sources

Alternative 1 would not result in a net increase of long-term emissions of TACs from mobile sources. Long-term operations under this alternative would not require any additional employees and thus would not result in any emissions of TACs associated with employee commute trips. Also with respect to mobile-source emissions, as stated previously under Impact LS-5.9-b, maintenance-related trips would be negligible.

Furthermore, implementation of Alternative 1 would not result in the operation of any new major stationary emission sources of TACs. Specifically, long-term operations would include the use of an emergency backup generator at the new Pump Station No. 3, which would serve as a replacement for the existing Pump Station No. 3; however, such a stationary source would be subject to FRAQMD permitting and toxic (T)-BACT requirements. Before granting a permit for sources, FRAQMD would perform or refer to a formal health-risk assessment to ensure that operations would not result in the exposure of sensitive receptors to levels of TAC emissions that exceed the recommended threshold. Thus, long-term operational sources would not expose sensitive receptors to substantial pollutant concentrations. As a result, this impact would be less than significant.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impact ASB-5.9-a

Temporary Emissions of ROG, NO_X, and PM_{10} during Construction. Maximum daily emissions of ROG, NO_X, and PM_{10} associated with levee repair and strengthening activities in project Segments 1 and 3 and construction of the Above Star Bend (ASB) setback levee in Segment 2 would exceed FRAQMD's recommended significance thresholds and contribute to existing nonattainment conditions for ozone and PM10 in the NSVAB. This impact would be **significant.**

See the discussion of Impact LS-5.9-a for Alternative 1 above. Levee repair and strengthening activities and construction of the ASB setback levee would result in the temporary generation of construction-related emissions for approximately the same length of time and during the same periods as construction activities assumed under Alternative 1. Construction activities in project Segments 1 and 3 would be the same as under Alternative 1, but fugitive dust and mobile-source emissions would be expected to be greater under Alternative 2 because a new setback levee would be constructed in Segment 2 and the existing Feather River levee removed in this project segment, resulting in a larger construction area and disturbed surface and hauling of greater volumes of soil.

The anticipated equipment types, borrow quantities and sources, and truck trips required for construction of the ASB setback levee are described under Section 4.4.3, "Alternative 2—Construction," in Chapter 4. Detailed calculations are shown in Appendix E of this EIR. The following discussions describe the main assumptions used in the calculations and summarize the results.

Assumptions

It was assumed for purposes of emissions calculations that the following mobile heavy-construction equipment could be used for general levee repair, construction of slurry cutoff

walls, berm construction (if needed), construction of Pump Station No. 3, and construction of the ASB setback levee foundation and embankment:

- six excavators,
- 10 scrapers,
- six bulldozers,
- four graders,
- four rollers,
- two water trucks,
- 20 highway dump trucks,
- one crane,
- one loader, and
- three additional pieces of mobile equipment (e.g., tool carrier trucks, lubricating trucks).

Please note that the air quality model used for this analysis requires entries for specific types of construction equipment included in the model. The model does not provide entries for all types of construction equipment listed in Section 4.4.3, "Alternative 2—Construction." Therefore, the equipment listed above is intended to represent an approximation of the equipment described in Section 4.4.3.

The amount and types of equipment used during construction activities would vary from day to day depending on the specific activities being conducted. The number of off-site vehicle trips is also anticipated to vary from day to day. For purposes of calculating the maximum potential daily emissions, it was assumed that the equipment listed above would operate simultaneously for 16 hours on a day of maximum construction activity. This is a very conservative assumption used to calculate potential maximum daily emissions.

A peak construction labor force of 100 employees and an average travel distance of 10 miles to the construction site were assumed.

The daily average area of ground disturbance was estimated by adding the approximate areas of the existing levee segments to be repaired and strengthened (project Segments 1 and 3) or removed (Segment 2), the footprint of the ASB setback levee, and the proposed borrow sites, then dividing the total by the expected number of work days. The existing Feather River levee segment along Segment 2 that would be removed is a total of approximately 6.5 miles long. The area cleared would be approximately 6.86 million square feet (34,320 feet long x 200 feet wide), or 158 acres. The new setback levee would be approximately 5.9 miles long. The maximum area of ground disturbance would be approximately 10.9 million square feet (31,152 feet long x 350 feet wide), or 250 acres. The total length of the existing Feather River and Yuba River levees in project Segments 1 and 3 is about 6.6 miles, or 34,850 feet. For purposes of this analysis, the average width of the levee repair work area was assumed to be 100 feet (the actual average width is likely to be less). The area of land disturbance would therefore be approximately 3.5 million square feet, or 80 acres. The soil borrow area and detention basin/borrow area currently being considered covers approximately 689 acres. Although it is unlikely that this entire area would be disturbed, it is assumed for the emission calculations that construction would affect the entire 689 acres. To account for ground disturbance associated with staging areas and other activities, an additional 50 acres was added to the disturbance area, although the actual acreage of

additional disturbance is expected to be less. The total estimated acreage of ground disturbance was therefore assumed to be approximately 1,230 acres. Based on the assumption that the period of active ground disturbance would total 440 days (22 active construction days per month over 20 months), the average daily disturbance area under Alternative 2 was calculated to be about 2.8 acres.

The emissions calculations also included 2,700 truck trips to haul aggregate base and drain rock, concrete, demolition debris, bentonite, and other materials to and within the site. These materials were assumed to be transported an average of 5.5 miles on paved roads. This estimate of haul trips exceeds estimates elsewhere in this DEIR (e.g., Section 4.4.3, "Alternative 2—Construction"; and Section 5.11, "Transportation and Circulation") to provide a margin of error and to ensure that emissions are not underrepresented. In addition, the emissions calculations include sufficient haul trips to move 3.3 million cy of borrow material for construction of the ASB setback levee.

Results

Average daily construction emissions were calculated for completion of Alternative 2. It was assumed that there would be 440 active construction work days during the 2-year construction period. Detailed calculations of the maximum daily temporary emissions are shown in Appendix E. Table 5.9-4, "Summary of Maximum Daily Average Construction Emissions for Alternative 2," summarizes the results for this alternative. As indicated in the table, the maximum unmitigated daily emissions associated with Alternative 2 were estimated at 188 lb/day of ROG, 938 lb/day of NO_X, and 1,447 lb/day of PM_{10}.

Table 5.9-4
Summary of Maximum Daily Average Construction Emissions for Alternative 2

Emission Source	Pollutant (lb/day)		
	ROG	**NO_X**	**PM_{10}**
Mobile-Source Equipment	187	936	49
Employee Trips	1	2	0
Fugitive Dust			1,398
Total Unmitigated (Levee)	**188**	**938**	**1,447**
FRAQMD Threshold	**25**	**25**	**80**

Notes: FRAQMD = Feather River Air Quality Management District; lb/day = pounds per day; NO_X = oxides of nitrogen; PM_{10} = particles with an aerodynamic diameter of 10 micrometers or less; ROG = reactive organic gases. Results are rounded to the nearest whole number.
See Appendix E for assumptions and modeling results.
Source: Data compiled by EDAW in 2006

Based on the conservative assumptions described above, maximum emissions under Alternative 2 would exceed FRAQMD's recommended significance thresholds of 25 lb/day for ROG, 25 lb/day for NO_X, and 80 lb/day for PM_{10}. In addition, Yuba County is designated as a nonattainment area for the national and state ozone (1-hour) standards and as a nonattainment area for the state PM_{10} standard. Because construction emissions of ROG, NO_X, and PM_{10} would

exceed the FRAQMD thresholds and would contribute to existing nonattainment conditions in the NSVAB, this impact would be significant.

Impact ASB-5.9-b

Long-Term Changes in Emissions of ROG, NO_X, and PM_{10} Associated with Levee Repairs and Strengthening and the Levee Setback. The proposed levee repairs and strengthening in project Segments 1 and 3 and the ASB levee setback in Segment 2 would be expected to contribute only minimally, if at all, to long-term emissions of pollutants through vehicle trips related to occasional maintenance activities. The potential cessation of agricultural uses on some lands in the levee setback area could result in a decrease in long-term pollutant emissions in this area, particularly PM_{10} emissions associated with agricultural land disturbance and burning operations. Such a reduction would be a small **potentially beneficial** effect on air quality.

For project Segments 1 and 3 and for the relocation of Pump Station No. 3, this impact would be the same as described above for Impact LS-5.9-b under Alternative 1. Changes to operations and maintenance activities in these areas, if any, would not result in significant increases in emissions.

Along the ASB setback levee in project Segment 2, levee maintenance activities would be the same as for the existing levee in almost all respects. The only potential difference between the operation and maintenance of the new setback levee and current practice would be the possible use of relief wells along the setback levee. Relief wells are being considered in the preliminary project design as a method to address levee underseepage. However, a final determination as to the usage, number, and location of relief wells would be made as part of the detailed design process. Relief wells can be prone to plugging and damage from vandalism, and require operation (water removal) and periodic maintenance (flushing, cleaning, and replacement) to remain effective over the long term. If relief wells are installed, these maintenance activities could generate vehicle trips to the levees; however, such trips would be infrequent, and they are not expected to contribute measurably to long-term regional or local vehicle emissions.

Land use changes that are possible as part of implementation of the levee setback could have small but measurable beneficial effects on long-term pollutant emissions affecting regional and local air quality. Setting back the levee could allow for the conversion of some land from agricultural uses to riparian and wetland areas. If habitat restoration is implemented in any locations in the setback area, the restored areas would be removed from agricultural production. As noted previously, the primary sources of PM_{10} in Yuba and Sutter Counties are entrained road dust, farming operations, and agricultural burning (Feather River Air Quality Management District 1998). Agricultural emissions are typically unmitigated, although burning is regulated by FRAQMD such that it is prohibited on days of decreased air quality.

The cessation of agricultural uses on some of the lands in the ASB levee setback area would result in reductions in land disturbance such as plowing and disking; the use of tractors, bulldozers, and other heavy mobile farm equipment on unpaved ground; and agricultural burning. There is not sufficient information to quantify the amount of the potential decrease in pollutants associated with any long-term land use changes. However, examination of some of the standard emission factors used in calculating fugitive dust emissions provides some indication of the potential size of PM_{10} emissions that may be associated with typical farming activities. As indicated in Table 5.9-5, "Standard Factors Used in Evaluating Fugitive Dust Emissions,"

plowing 20 acres in a day could release more than 1,700 lb/day (20 x 85.6) of fugitive dust, and the equivalent of one truck (or other heavy equipment, such as a harvester) traveling 10 miles on an unpaved road could cause the emission of 230 lb/day (1 x 10 x 23).

In addition to decreases in fugitive dust emissions, any reduced agricultural use of lands in the levee setback area would also likely result in a decrease in the emission of ozone (ROG and NO_X) because of the reduction in the regular, long-term use of heavy mobile farm equipment.

Table 5.9-5
Standard Factors Used in Evaluating Fugitive Dust Emissions

Activity	Unit of Measure	Emission Factor (lb/day)
Dirt/debris/grading	Number of pieces of equipment operating during 1 hour	21.8
Exposed graded surfaces	Acres per day	85.6
Truck travel on unpaved roads	Miles traveled per day	23

Note: lb/day = pounds per day
Source: South Coast Air Quality Management District 1993

In contrast, the long-term use of lands as riparian/wetland habitat would not be expected to generate pollutant emissions, except for possible increases in emissions from vehicle trips to the levee setback area associated with recreational uses. If substantially increased recreational uses are envisioned as a result of subsequent design of land uses in the levee setback area, long-term air quality effects may need to be considered in more detail in additional environmental review. However, substantial increases in vehicle trips associated with recreational use of the levee setback area are not anticipated, and any increases in emissions associated with recreational uses are not currently expected to offset the decrease in emissions that would be associated with decreased agricultural uses. Therefore, the overall long-term effect of the levee setback on local and regional pollutant emissions could potentially be a reduction in emissions of ROG, NO_X, and PM_{10}. A decrease in operational emissions would be a beneficial effect on long-term air quality conditions.

Impact ASB-5.9-c

Exposure of Sensitive Receptors to Toxic Air Emissions. Emissions of TACs associated with construction or operations under Alternative 2 would not result in exposure of receptors to concentrations of TACs in excess of applicable thresholds. This impact would be **less than significant**.

This impact would be similar to Impact LS-5.9-c, described under Alternative 1 above. Although construction equipment would operate in different locations with construction of the ASB setback levee than under Alternative 1 (e.g., along the ASB setback alignment, in soil borrow areas, in the levee setback area), the same mechanisms and potential for exposure to TACs would occur. Because construction would occur in different locations, there is the potential for different or additional sensitive receptors to be nearby. However, no sensitive receptors would be closer than the distance identified for Alternative 1 (no closer than 75 feet). For the same reasons as described above, this impact would be less than significant.

Alternative 3 – The Levee Strengthening and Intermediate Setback Alternative

Impact IS-5.9-a

Temporary Emissions of ROG, NO_X, and PM_{10} during Construction. This impact would be the same as Impact ASB-5.9-a, described under Alternative 2 above. For the same reasons as described above, this impact would be **significant**.

Impact IS-5.9-b

Long-Term Changes in Emissions of ROG, NO_X, and PM_{10} Associated with Levee Repairs and Strengthening and the Levee Setback. This impact would be the same as Impact ASB-5.9-b, described under Alternative 2 above. Potential beneficial effects on air quality could be slightly less because the levee setback area would be smaller, and, thus, slightly less agricultural land has the potential to be converted to nonagricultural use. However, operational emissions would still be negligible under Alternative 3. As a result, for the same reasons as described above, this impact would be **potentially beneficial**.

Impact IS-5.9-c

Exposure of Sensitive Receptors to Toxic Air Emissions. This impact would be the same as Impact ASB-5.9-c, described under Alternative 2 above. For the same reasons as described above, this impact would be **less than significant**.

5.9.4 MITIGATION MEASURES

ALTERNATIVE 1—THE LEVEE STRENGTHENING ALTERNATIVE

No mitigation is required for Impact LS-5.9-b (long-term changes in ROG, NO_X, and PM_{10} emissions) or Impact LS-5.9-c (exposure to toxic air emissions).

Mitigation is provided below for Impact LS-5.9-a (construction-related emissions of ROG, NO_X, and PM_{10}).

LS-5.9-a **Implement FRAQMD Pollution-Control Measures to Minimize Temporary Emissions of ROG, NO_X, and PM_{10} during Construction.** This mitigation would reduce the impact, but not to a less-than-significant level.

FRAQMD's *Indirect Source Review Guidelines* and online CEQA guidance provide mitigation measures for reducing short-term air quality impacts. As recommended by FRAQMD, Three Rivers Levee Improvement Authority shall ensure that the following mitigation measures (summarized from FRAQMD guidance) are implemented during all project construction activities to the extent practicable. In addition, construction of the proposed project is required to comply with all applicable FRAQMD rules and regulations, in particular Rule 3.0 (Visible Emissions), Rule 3.16 (Fugitive Dust Emissions), and Rule 3.15 (Architectural Coatings).

1. Implement a Fugitive Dust Control Plan that includes the following measures (see Appendix E):

- All grading operations on a project should be suspended when winds carry dust beyond the property line despite implementation of all feasible dust control measures. Consideration should be given to suspending all project grading when winds exceed 20 mph to minimize the risk of dust being carried beyond the property line.

- Construction sites shall be watered as directed by the [Yuba County] Department of Public Works or FRAQMD and as necessary to prevent fugitive dust violations.

- An operational water truck should be on-site at all times. Apply water to control dust as needed to prevent visible emissions violations and offsite dust impacts.

- On-site dirt piles or other stockpiled particulate matter should be covered, wind breaks installed, and water and/or soil stabilizers employed to reduce windblown dust emissions. Incorporate the use of approved nontoxic soil stabilizers according to manufacturer's specifications to all inactive construction areas.

- All transfer processes involving a free fall of soil or other particulate matter shall be operated in such a manner as to minimize the free fall distance and fugitive dust emissions.

- Apply approved chemical soil stabilizers according to the manufacturers' specifications, to all inactive construction areas (previously graded areas that remain inactive for 96 hours) including unpaved roads and employee/equipment parking areas.

- To prevent track-out, wheel washers should be installed where project vehicles and/or equipment exit onto paved streets from unpaved roads. Vehicles and/or equipment shall be washed prior to each trip. Alternatively, a gravel bed may be installed as appropriate at vehicle/equipment site exit points to effectively remove soil buildup on tires and tracks to prevent/diminish track-out.

- Paved streets shall be swept frequently (water sweeper with reclaimed water recommended; wet broom) if soil material has been carried onto adjacent paved, public thoroughfares from the project site.

- Provide temporary traffic control as needed during all phases of construction to improve traffic flow, as deemed appropriate by the Department of Public Works and/or Caltrans [California Department of Transportation] and to reduce vehicle dust emissions.

- Reduce traffic speeds on all unpaved surfaces to 15 mph or less and reduce unnecessary vehicle traffic by restricting access. Provide appropriate training, on-site enforcement, and signage.

- Reestablish ground cover on the construction site as soon as possible and prior to final occupancy, through seeding and watering.

- No open burning of vegetative waste (natural plant growth wastes) or other materials (trash, demolition debris et al.) may be conducted at the project site. Materials also may not be hauled off-site for disposal by open burning Vegetative wastes should be chipped or delivered to waste to energy facilities (permitted biomass facilities), mulched, composted, or used for firewood.

2. Construction equipment exhaust emissions shall not exceed FRAQMD Regulation III, Rule 3.0 ("Visible Emissions") limitations (40% opacity or Ringelmann 2.0). Operators of vehicles and equipment found to exceed opacity limits shall take action to repair the equipment within 72 hours or remove the equipment from service. Failure to comply may result in a Notice of Violation.

3. The primary contractor shall be responsible to ensure that all construction equipment is properly tuned and maintained prior to and for the duration of onsite operation.

4. Limit vehicle and equipment idling times to 10 minutes—saves fuel and reduces emissions.

5. Use existing power sources (e.g., power poles) or clean fuel generators rather than temporary power generators.

6. Develop and implement a traffic plan to minimize traffic flow interference from construction activities. The plan may include advance public notice of routing, use of public transportation, and satellite parking areas with a shuttle service. Schedule operations affecting traffic for off-peak hours. Minimize obstruction of through-traffic lanes. Provide a flag person to guide traffic properly and ensure safety at construction sites.

7. Portable engines and portable engine-driven equipment units used at the project work site, with the exception of on-road and off-road motor vehicles, may require ARB Portable Equipment Registration with the state or a local district permit. The owner/operator shall be responsible for arranging appropriate consultations with ARB or the District [FRAQMD] to determine registration and permitting requirements prior to equipment operation at the site.

8. The proponent shall assemble a comprehensive inventory list (i.e. make, model, engine year, horsepower, and emission rates) of all heavy-duty off-road (portable and mobile) equipment (50 horsepower and greater) that will be used an aggregate of 40 or more hours for the construction project and apply the following mitigation measure:

Reducing NO_X emissions from off-road diesel powered equipment

The project shall provide a plan for approval by FRAQMD demonstrating that the heavy-duty (equal to or greater than 50 horsepower) off-road equipment to be used in the construction project, including owned, leased and subcontractor vehicles, will achieve a projectwide fleet-average 20% NO_X reduction and 45% particulate reduction[1] compared to the most recent ARB fleet average at time of construction.

The FRAQMD Fugitive Dust Control Plan is included in Appendix E.

Implementing the FRAQMD measures is expected to achieve a 5% reduction in ROG emissions from construction equipment, 20% reduction in NO_X emissions from construction equipment, 45% reduction in PM_{10} emissions from construction equipment, and 75% reduction in fugitive dust emissions (Sacramento Metropolitan Air Quality Management District 2004). The resulting maximum average daily emissions with implementation of Alternative 1, as shown in Table 5.9-6, "Summary of Maximum Daily Average Construction Emissions with Mitigation Incorporated," are calculated to be 158 lb/day of ROG, 653 lb/day of NO_X, and 186 lb/day of PM_{10}.

Table 5.9-6
Summary of Maximum Daily Average Construction Emissions with Mitigation Incorporated

Total Emissions	Pollutant (lb/day)		
	ROG	NO_X	PM_{10}
Alternative 1			
Total Unmitigated	166	816	692
Total Mitigated [1]	158	653	186
FRAQMD Threshold	25	25	80
Alternatives 2 and 3			
Total Unmitigated	188	938	1,447
Total Mitigated [1]	179	751	377
FRAQMD Threshold	25	25	80

Notes: FRAQMD = Feather River Air Quality Management District; lb/day = pounds per day; NO_X = oxides of nitrogen; PM_{10} = particles with an aerodynamic diameter of 10 micrometers or less; ROG = reactive organic gases

[1] Based on a 5% reduction in ROG emissions from construction equipment, 20% reduction in NO_X emissions from construction equipment, 45% reduction in PM_{10} emissions from construction equipment, and 75% reduction in fugitive dust emissions (Sacramento Metropolitan Air Quality Management District 2004).

See Appendix E for assumptions and modeling results.

Source: Data compiled by EDAW in 2006

These mitigated emissions would exceed the FRAQMD thresholds of 25 lb/day for ROG, 25 lb/day for NO_X, and 80 lb/day for PM_{10}. Therefore, although the impact would be reduced, implementing Mitigation Measure LS-5.9-a would not reduce the impact related to construction-related emissions to a less-than-significant level.

[1] Acceptable options for reducing emissions may include use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology (Carl Moyer Guidelines), after-treatment products, voluntary offsite mitigation projects, provide funds for air district off-site mitigation projects, and/or other options as they become available. The District should be contacted to discuss alternative measures.

ALTERNATIVE 2—THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impact ASB-5.9-b (long-term changes in ROG, NO_X, and PM_{10} emissions) or Impact ASB-5.9-c (exposure to toxic air emissions).

Mitigation is provided below for Impact ASB-5.9-a (construction-related emissions of ROG, NO_X, and PM_{10}).

ASB-5.9-a **Implement FRAQMD Pollution-Control Measures to Minimize Temporary Emissions of ROG, NO_X, and PM_{10} during Construction.** This measure is identical to Mitigation Measure LS-5.9-a above. This mitigation would reduce the impact (see Table 5.9-6), but not to a less-than-significant level.

ALTERNATIVE 3—THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impact IS-5.9-b (long-term changes in ROG, NO_X, and PM_{10} emissions) or Impact IS-5.9-c (exposure to toxic air emissions).

Mitigation is provided below for Impact IS-5.9-a (construction-related emissions of ROG, NO_X, and PM_{10}).

IS-5.9-a **Implement FRAQMD Pollution-Control Measures to Minimize Temporary Emissions of ROG, NO_X, and PM_{10} during Construction.** This measure is identical to Mitigation Measure LS-5.9-a above. This mitigation would reduce the impact (see Table 5.9-6), but not to a less-than-significant level.

5.9.5 IMPACTS REMAINING SIGNIFICANT AFTER MITIGATION

ALTERNATIVE 1—THE LEVEE STRENGTHENING ALTERNATIVE

Impact LS-5.9-a (Temporary emissions of ROG, NO_X, and PM_{10} during construction) would remain significant and unavoidable after mitigation.

ALTERNATIVE 2—THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE

Impact ASB-5.9-a (Temporary emissions of ROG, NO_X, and PM_{10} during construction) would remain significant and unavoidable after mitigation.

ALTERNATIVE 3—THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE

Impact IS-5.9-a (Temporary emissions of ROG, NO_X, and PM_{10} during construction) would remain significant and unavoidable after mitigation.

SECTION 5.10 NOISE

This section includes background information concerning noise fundamentals, a summary of applicable regulations, a description of existing noise conditions, and an analysis of potential short-term and long-term noise impacts of the Feather River Levee Repair Project (FRLRP). In addition, mitigation measures are recommended, as necessary, to reduce significant noise impacts.

5.10.1 NOISE FUNDAMENTALS

SOUND AND THE HUMAN EAR

Sound is energy that is transmitted through the air as the result of a disturbance or vibration, and that may evoke an auditory sensation. Noise is generally defined as sound that is loud, unpleasant, unexpected, or disagreeable.

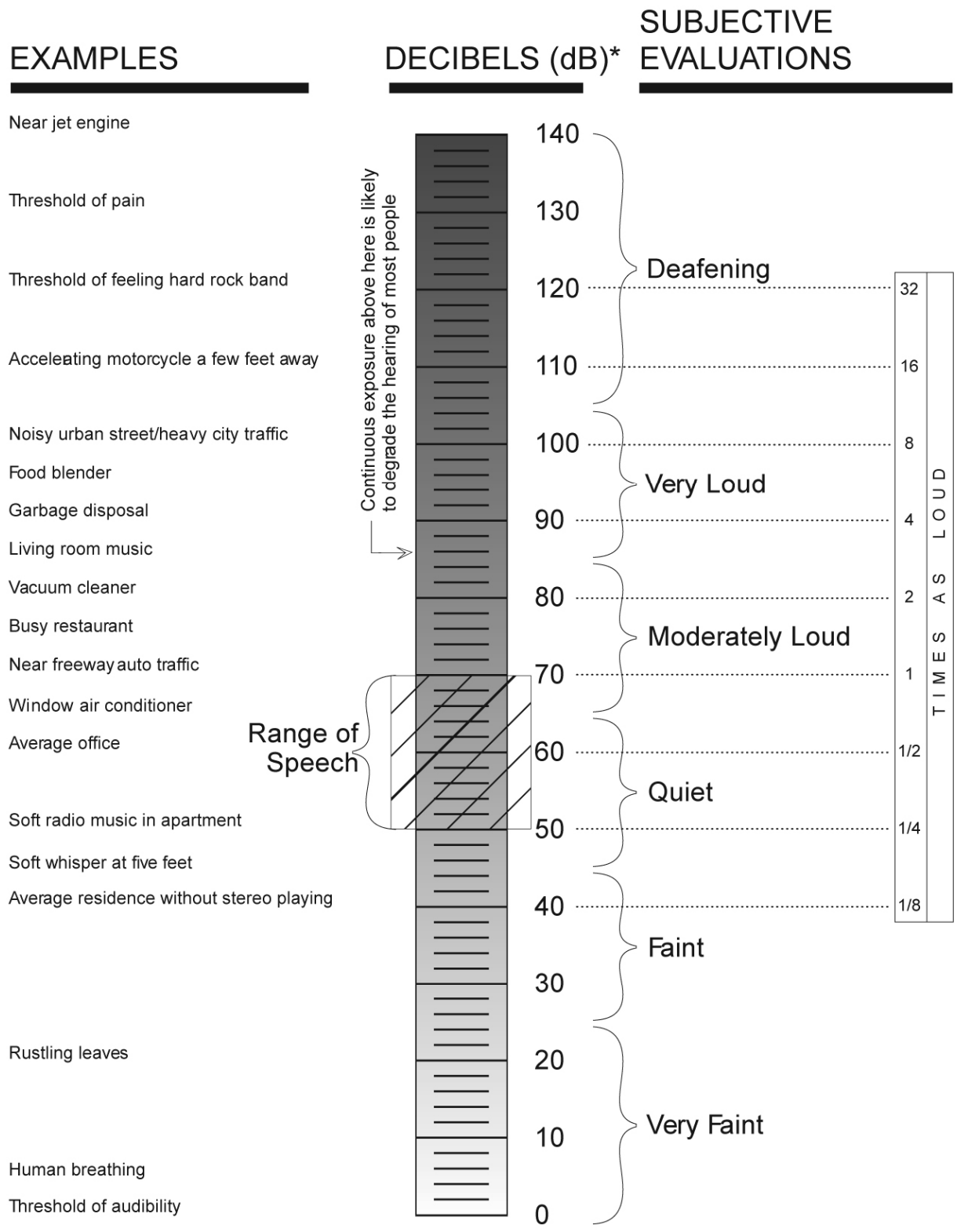
Because of the ability of the human ear to detect a wide range of sound-pressure fluctuations, sound-pressure levels are expressed in logarithmic units called decibels (dB). In addition, because the human ear is not equally sensitive to sound at all frequencies, a specific frequency-dependent rating scale was devised to relate noise to human sensitivity. An A-weighted dB (dBA) scale performs this compensation by discriminating against frequencies in a manner approximating the sensitivity of the human ear. The basis for compensation is the faintest sound audible to the average ear at the frequency of maximum sensitivity. This A-weighted dB scale has been chosen by most authorities for purposes of environmental noise regulation.

Typical indoor and outdoor noise levels are presented in Figure 5.10-1, "Typical Indoor and Outdoor Noise Levels." As indicated, typical sounds range from 10 dBA (very quiet) to 100 dBA (very loud). Conversation is roughly 60 dBA at 3–5 feet. As background noise levels exceed 60 dBA, speech intelligibility becomes increasingly difficult. Noise becomes physically discomforting at 110 dBA.

SOUND PROPAGATION

As sound (noise) propagates from the source to the receptor, the attenuation, or manner of noise reduction in relation to distance, depends on such factors as the inverse square law, surface characteristics, atmospheric conditions, and presence of physical barriers. The inverse square law describes the attenuation resulting from the pattern in which sound travels from the source to the receptor. Sound travels uniformly outward from a point source in a spherical pattern with an attenuation rate of 6 dBA per doubling of distance (dBA/DD). However, from a line source, sound travels uniformly outward in a cylindrical pattern with an attenuation rate of 3 dBA/DD.

The surface characteristics between the source and receptor may result in additional sound absorption and/or reflection. In addition, atmospheric conditions such as wind speed, temperature, and humidity may affect noise levels. Furthermore, the presence of a barrier between the source and receptor may also attenuate noise levels. The actual amount of attenuation depends on the barrier size and noise frequency. A noise barrier may be any natural



*dB are "average" values as measured on the A-scale of a sound-level meter
(From Concepts in Architectural Acoustics: M. David Egan, McGrawHill, 1972 and U.S. Department of Housing and Urban Development, Office of Community Planning and Development "The Noise Guidebook").

EDAW

FEATHER RIVER LEVEE REPAIR PROJECT

Typical Indoor and Outdoor Noise Levels

Figure 5.10-1

G 015

or human-made feature, such as a hill, tree, building, wall, or berm (California Department of Transportation 1998).

NEGATIVE EFFECTS OF NOISE ON HUMANS

Negative effects of noise exposure include physical damage to the human auditory system, interference, and disease. Exposure to noise may result in physical damage to the auditory system, which may lead to gradual or traumatic hearing loss. Gradual hearing loss is caused by sustained exposure to moderately high noise levels over a period of time. By contrast, traumatic hearing loss is caused by sudden exposure to extremely high noise levels over a short period of time. However, gradual and traumatic hearing loss both may result in permanent hearing damage. In addition, noise may interfere with or interrupt sleep, relaxation, recreation, and communication. Although most interference may be classified as annoying, the inability to hear a warning signal may be considered dangerous. Noise may also be a contributor to diseases associated with stress, such as hypertension, anxiety, and heart disease. The degree to which noise contributes to such diseases is dependent upon the noise frequency, bandwidth, level, and exposure time (California Department of Transportation 1998).

NOISE DESCRIPTORS

The selection of a proper noise descriptor for a specific source depends on the spatial and temporal distribution, duration, and fluctuation of the noise. The noise descriptors most often used to describe traffic, community, and environmental noise are defined below (California Department of Transportation 1998):

- L_{max} (maximum noise level): The maximum instantaneous noise level during a specific period of time. The L_{max} may also be referred to as the "peak (noise) level."
- L_X (statistical descriptor): The noise level exceeded X% of a specific period of time.
- L_{eq} (equivalent noise level): The energy mean noise level. The instantaneous noise levels during a specific period of time in dBA are converted to relative energy values. From the sum of the relative energy values, an average energy value is calculated; this is then converted back to dBA to determine the L_{eq}.
- L_{dn} (day-night noise level): The 24-hour L_{eq} with a 10-dBA "penalty" for the noise-sensitive hours between 10 p.m. and 7 a.m. The L_{dn} is used to account for the fact that noise during this specific period of time, considered normal sleeping hours, is a potential source of disturbance to sleepers.
- CNEL (community noise equivalent level): A noise level similar to the L_{dn} described above, but with an additional 5-dBA "penalty" for the noise-sensitive hours between 7 p.m. and 10 p.m., which are typically reserved for relaxation, conversation, reading, and television. When the same 24-hour noise data are used, the CNEL value is typically about 0.5 dBA higher than the L_{dn} value.

5.10.2 REGULATORY SETTING

FEDERAL PLANS, POLICIES, REGULATIONS AND LAWS

No federal plans, policies, regulations, or ordinances related to noise are applicable to the proposed project. However, to address the human response to groundborne vibration, the Federal Transit Administration (FTA) has set forth the following maximum acceptable vibration criteria for different types of land uses (Federal Transit Administration 1995):

- 65 vibration decibels (VdB) for land uses where low ambient vibration is essential for interior operations (such as hospitals and high-tech manufacturing or laboratory facilities),
- 80 VdB for residential uses and buildings where people normally sleep, and
- 83 VdB for institutional land uses with primarily daytime operations (such as schools, churches, clinics, and offices).

Standards have also been established to address the potential for groundborne vibration to cause structural damage to buildings. These standards were developed by the Committee of Hearing, Bio Acoustics, and Bio Mechanics (CHABA) at the request of the U.S. Environmental Protection Agency (Federal Transit Administration 1995). For fragile structures, CHABA recommends a maximum of 0.25 inch per second (in/sec) peak particle velocity (PPV) (Federal Transit Administration 1995).

STATE PLANS, POLICIES, REGULATIONS AND LAWS

The *State of California General Plan Guidelines*, published by the Governor's Office of Planning and Research (2003), provide guidance for the acceptability of different land uses within specific L_{dn}/CNEL contours to assist local agencies in their preparation of general plan noise elements. It would be the responsibility of Yuba County to incorporate these standards as appropriate into the *Yuba County General Plan* (see below). These state standards are not directly relevant to the evaluation of the FRLRP.

With respect to groundborne vibration, for the protection of fragile, historic, and residential structures, the California Department of Transportation (Caltrans) recommends a threshold of 0.2 in/sec PPV for normal residential buildings and 0.08 in/sec PPV for old or historically significant structures (California Department of Transportation 2002). These standards are more stringent than the federal standard established by CHABA, presented above.

LOCAL PLANS, POLICIES, REGULATIONS AND LAWS

Yuba County General Plan Noise Element

The *Yuba County General Plan* Noise Element, adopted in August 1980 (Yuba County 1980), contains objectives for acceptable noise exposure with respect to land use designations. The recommended noise-level criteria in the general plan are summarized in Table 5.10-1, "Recommended Objectives for Ambient Allowable Noise Levels in Yuba County." These designations are established for land use planning purposes and are intended to apply to long-term exposure to noise, as opposed to temporary noise sources, such as from construction.

Table 5.10-1
Recommended Objectives for Ambient Allowable Noise Levels in Yuba County

Land Use Category	7 a.m.–10 p.m.	10 p.m.–7 a.m.
Low-density residential	50 dBA	50 dBA
Multifamily residential	55 dBA	50 dBA
Schools	45 dBA	45 dBA
Retail/commercial	60 dBA	55 dBA
Passive recreation	45 dBA	45 dBA
Active recreation	70 dBA	70 dBA
Hospitals/mental health facilities	45 dBA	40 dBA
Agriculture	50 dBA	50 dBA
Neighborhood commercial	55 dBA	55 dBA
Professional office	55 dBA	55 dBA
Light manufacturing	70 dBA	65 dBA
Heavy manufacturing	75 dBA	70 dBA

Note: dBA = A-weighted decibels
Source: Yuba County 1994

Yuba County Noise Ordinance

Yuba County has adopted a noise ordinance, codified as Chapter 8.20 of the Yuba County Ordinance Code, to protect the citizens of Yuba County from unnecessary, excessive, and annoying noise and vibration and maintain quiet in areas that exhibit low noise levels. The maximum permissible noise levels for different land uses, as specified in Section 8.20.140 of the Yuba County Ordinance Code, are shown in Table 5.10-2, "Yuba County Noise Regulations." As specified in Section 8.20.140, where the ambient noise level is less than designated in this listing, the governing permissible noise level is the respective maximum noise level shown.

Table 5.10-2
Yuba County Noise Regulations

Zone	Time Period	Ambient Level	Maximum Permissible Noise Levels (dBA)
Single-family residential	10 p.m.–7 a.m. 7–10 p.m. 7 a.m.–7 p.m.	45 50 55	55 60 65
Multifamily residential	10 p.m.–7 a.m. 7 a.m.–10 p.m.	50 55	60 65
Commercial—Business and Professional (BP) subzone	10 p.m.–7 a.m.	55	65
Commercial	7 a.m.–10 p.m.	60	70
M-1 (General Industrial)	Any time	65	75
M-2 (Extractive Industrial)	Any time	70	80

Note: dBA = A-weighted decibels
Source: Yuba County Noise Regulations, Chapter 8.20 of the Yuba County Ordinance Code

The Yuba County noise ordinance also contains the following regulation that is applicable to the FRLRP:

> 8.20.310. Construction of Buildings and Projects. It shall be unlawful for any person within a residential zone, or within a radius of 500 feet therefrom, to operate equipment or perform any outside construction or repair work on buildings, structures, or projects or to operate any pile driver, power shovel, pneumatic hammer, derrick, power hoist, or any other construction type device between the hours of 10:00 p.m. of one day and 7:00 a.m. of the following day in such a manner that a reasonable person of normal sensitiveness residing in the area is caused discomfort or annoyance unless a permit has been duly obtained beforehand from the Director of the Planning and Building Services Department as set forth in Section 8.20.710 of the Noise Ordinance.

COMMUNITY AMBIENT NOISE DEGRADATION

In addition to the criteria discussed above, another consideration in defining impact criteria is based on the degradation of the existing noise environment. A variety of reactions result from the exposure to noise, ranging from serious annoyance to no awareness. About 10% of the population is so sensitive to noise that they object to any noise not of their own making. Thus, some complaints occur in even the quietest environments. Another sizable portion of the population (about 25%) does not react or complain even in very severe noise exposure. People can be expected to respond to changes in sound level as follows:

- Except in carefully controlled laboratory experiments, an increase or decrease of only 1 dBA is difficult to perceive.
- Outside of the laboratory, a 3-dBA increase or decrease is considered a noticeable difference.
- A 10-dBA increase is generally perceived as a doubling of loudness and would likely cause an adverse community reaction.

A noise impact is considered “generally not significant” if no noise-sensitive sites are located in the project area, or if increases in community noise level with implementation of the project are expected to be 3 dBA or less at noise-sensitive locations, and the project would not result in violations of local ordinances or standards. Noise-sensitive sites include residences, motels, hotels, public meeting rooms, auditoriums, schools, churches, libraries, hospitals, amphitheaters, parks, and other areas where low noise levels are essential.

The “significance” of a change in noise levels is somewhat subjective. However, both the Federal Highway Administration (FHWA) and Caltrans have published general criteria, applicable to roadway noise, that can also be used to define noise impacts associated with other community noise increases. In general, if the increase in noise exposure level would be greater than 3 dBA, the significance of the impact will depend on the ambient noise level and the presence of noise-sensitive uses. Noise impacts can be considered “possibly significant” if increases in noise exposure levels are expected to be no greater than 5 dBA with implementation of the project. Noise impacts can be considered “generally significant” if a project would cause noise standards or ordinances to be exceeded, would increase community noise levels by 6–10 dBA in urban areas, or would increase noise levels by 10 dBA in more rural areas.

5.10.3 ENVIRONMENTAL SETTING

SOURCES OF INFORMATION

Information for this section was obtained primarily from the following sources:

- Volume I, "Environmental Setting and Background," of the *Yuba County General Plan* (Yuba County 1994);
- *Draft Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project* (Yuba County Water Agency 2003);
- *Draft Environmental Impact Report for the Feather-Bear Rivers Levee Setback Project* (Three Rivers Levee Improvement Authority 2004b); and
- observations of noise-sensitive receptors during various field visits by project team members.

EXISTING NOISE-SENSITIVE RECEPTORS

Noise-sensitive land uses generally include those uses where exposure would result in adverse effects (e.g., sleep disturbance, annoyance), as well as uses where quiet is an essential element of their intended purpose. Residences are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. Other sensitive land uses include hospitals, convalescent facilities, parks, auditoriums, amphitheaters, public meeting rooms, motels, hotels, churches, schools, libraries, and other uses where low interior noise levels are essential.

The noise-sensitive receptors in the FRLRP project vicinity are single-family residences, a school (Cedar Lane Elementary School, located several hundred feet east of the existing Feather River levee in project Segment 3), and a nursing home located just east of the Above Star Bend (ASB) setback levee alignment on Ella Avenue. There are few residences in project Segment 1 (see Section 5.7, "Aesthetic Resources"). In Segment 2, as described in Chapter 4, "Description of the Proposed Project," preliminary surveys of existing facilities identified approximately five to 10 residences in the ASB levee setback area (Alternative 2). In addition, as stated above, a small nursing home is located just to the east (land side) of the ASB setback levee alignment. In the intermediate levee setback area (Alternative 3) there are also five to 10 residences, although this alignment is several hundred feet west of the nursing home. Project Segment 3 is generally more developed than the other two project segments, with substantially more residences, and many of the homes in this segment are adjacent to the existing Feather River levee (see Section 5.7). Multiple residences in the project area (primarily in Segment 3) are located within 500 feet of the existing levee or one of the proposed setback levee alignments. At least one residence in Segment 1 and several residences in Segment 3 are located within 150 feet of the existing levee or one of the proposed setback levee alignments. The evaluation of effects of construction noise on sensitive uses focuses on these residences.

EXISTING NOISE ENVIRONMENT

Vehicle traffic is the primary noise source in the project vicinity. The major roadways in the area are State Route (SR) 70 and Feather River Boulevard (see Figure 5.11-1, "Roads in the Vicinity

of the FRLRP," in Section 5.11, "Transportation and Circulation"). Traffic on these roadways includes agricultural equipment; truck traffic from food processing plants, industrial sites, and logging; recreational vehicles; and vehicle traffic associated with the Plumas Lake area, Olivehurst, Linda, Marysville, and Yuba City, including commuters traveling to places of employment in the Sacramento region. Additional sources of noise in this area include agricultural operations, boats, pets, and occasional train pass-bys and/or aircraft flights overhead.

Existing roadway traffic noise levels were calculated for SR 70 and Feather River Boulevard using the FHWA Traffic Noise Prediction Model (Federal Highway Administration 1988) with traffic data for segments of SR 70 and Feather River Boulevard in the project area (California Department of Transportation 2006, Yuba County 1994). Assumptions regarding the distribution of vehicle types (i.e., percentage of automobiles, light trucks, heavy trucks, and other vehicles) were based on default model settings for the project area as contained in URBEMIS 2002 (California Air Resources Board 2002), which are interpolated from California Department of Motor Vehicles data. Additional input assumptions included day/night percentages of autos and medium and heavy trucks, vehicle speeds, ground attenuation factors, and roadway widths. The inputs and calculations are shown in Table 5.10-3, "Modeled Existing Vehicular Traffic-Noise Levels on State Route 70 and Feather River Boulevard," and in Appendix F.

Table 5.10-3
Modeled Existing Vehicular Traffic-Noise Levels on State Route 70 and Feather River Boulevard [1]

Roadway Segment	Distance (ft) from Roadway Centerline to CNEL/L_{dn} (dBA)				CNEL/L_{dn} (dBA) 50 Feet from Centerline of Near Travel Lane
	70 CNEL	65 CNEL	60 CNEL	55 CNEL	
State Route 70					
Between Yuba County line and Feather River Boulevard	104.8	221.1	473.9	1019.9	72.46
Between Feather River Boulevard and McGowan Road	92.3	193.4	414.0	890.6	71.57
Between McGowan Road and SR 65	133.5	283.8	609.7	1312.4	741.0
Between SR 65 and Olivehurst Avenue	185.6	397.2	854.3	1839.6	76.30
Between Olivehurst Avenue and Erle Road	202.2	433.1	931.8	2006.6	76.87
Between Erle Road and Feather River Boulevard	203.7	436.3	938.7	2021.4	76.91
Between Feather River Boulevard and North Beale Road	244.4	524.4	1128.7	2430.7	78.11
Feather River Boulevard					
North of Broadway	NA	NA	105	225	64
South of Grand Avenue	NA	101	217	468	69

Notes CNEL = community noise equivalent level; dBA = A-weighted decibels; ft = feet; Ldn = day-night noise level; NA = not available; SR = State Route

[1] Modeled noise levels do not consider any shielding or reflection of noise by existing structures or terrain features or noise contribution from other sources and where:

- dBA is a measure on a logarithmic scale that indicates the squared ratio of sound pressure to a reference sound pressure. A-weighted (A) refers to the specific frequency-dependent rating scale that is used to approximate human response.
- CNEL is the energy average of the A-weighted noise levels during a 24-hour period with 5 dBA added to the evening (7–10 p.m.) hours and 10 dBA to the night (10 p.m.–7 a.m.) hours.
- Ldn is the energy average of the A-weighted noise levels during a 24-hour period with 10 dBA added to the night (10 p.m.–7 a.m.) hours.

Sources: Yuba County 1994, Yuba County Water Agency 2003, California Department of Transportation 2006, data provided by EDAW in 2006

5.10.4 ENVIRONMENTAL IMPACTS

This impact analysis addresses impacts of project-related noise on humans. Potential noise effects on wildlife are discussed in Section 5.5, "Terrestrial Biological Resources."

THRESHOLDS OF SIGNIFICANCE

Thresholds for determining the significance of noise impacts were based on general standards for community ambient noise degradation and the Yuba County standards identified above. A project alternative would have a significant noise impact if:

- construction equipment would be operated or construction work would be performed within 500 feet of a residential zone during the noise-sensitive hours between 10 p.m. and 7 a.m. (Yuba County Ordinance Code Section 8.20.310),
- construction operations would result in a noticeable increase (3 dBA) in ambient noise levels at the closest occupied (interior) or regularly used (exterior) portion of a noise-sensitive receptor,
- operation of the project would result in long-term noise levels that exceed Yuba County's applicable exterior noise standards, or
- operation of the project would result in an increase of 3 dBA in the ambient noise level at the property line of a noise-sensitive receptor.

A project alternative would have a significant impact related to vibration if:

- construction-generated vibration levels would exceed 80 VdB (FTA's maximum acceptable vibration standard with respect to human response at residential uses) (Federal Transit Administration 1995) or 0.2 in/sec PPV (Caltrans's recommended standard with respect to the prevention of structural building damage for normal residential buildings [California Department of Transportation 2002]) at nearby existing noise-sensitive land uses.

IMPACT ANALYSIS

Analysis Method

Almost all noise that would be associated with the FRLRP would be generated by construction activities and, therefore, would be short term. The estimates of construction-related noise levels are based on anticipated equipment use and noise-generation factors developed by the U.S. Environmental Protection Agency (1971) and the Federal Transit Administration (1995). Construction-generated groundborne vibration impacts were assessed based on existing documentation (e.g., vibration levels produced by specific construction equipment) and the distance of structures and sensitive receptors from the given source.

No long-term sources of noise would be associated with levee repairs and strengthening or with setting back the Feather River levee. The only operational activities that would be associated with the ASB setback levee (proposed under Alternative 2) or the intermediate setback levee

(proposed under Alternative 3) would be the continuation at the setback levee of maintenance activities currently performed at the existing Feather River levee. These activities would be performed only periodically and would not increase ambient noise levels noticeably. Further, no new stationary sources of noise would be introduced to the project area. Although an existing source of operational noise would be relocated, that is, Pump Station No. 3, it would not be moved near any sensitive receptors. In addition, the current pump equipment at Pump Station No. 3 is exposed. The replacement pump station would enclose the pump equipment in a structure, likely resulting in decreased noise generation during pump operation. For these reasons, only construction-generated noise is addressed in this section.

Alternative 1 – The Levee Strengthening Alternative

Impact LS-5.10-a

Temporary Increase in Noise Levels during Construction. Noise levels associated with construction activities could exceed the maximum permissible noise limits at residences. Construction equipment may operate between the hours of 10 p.m. and 7 a.m., and could operate within 500 feet of a residential zone during these hours. Therefore, construction activities occurring between 10 p.m. and 7 a.m. could result in annoyance and/or sleep disruption of certain receptors within the project area. In addition, construction operations may result in a noticeable temporary increase (3 dBA or more) in ambient noise levels at these residences. Therefore, this impact would be **significant.**

Construction activities under Alternative 1 would include grading, clearing, and excavation associated with site preparation; borrow excavation and detention basin construction; transport of materials; and other activities. The on-site equipment required for levee repairs and strengthening is anticipated to include two hydraulic excavators, six scrapers, three bulldozers, three graders, three rollers, two water wagons, 20 highway dump trucks, one lubricating truck, one loader, a truck-mounted crane, and numerous pickup trucks. Mobile equipment for construction of the slurry cutoff wall may include three hydraulic excavators, three bulldozers, three utility excavators, and three integrated tool carriers. Depending on the operations conducted, individual equipment noise levels can range from 77 to 98 dBA at 50 feet, as indicated in Table 5.10-4, "Typical Equipment Noise Levels."

The simultaneous operation of the on-site construction equipment associated with levee repair and strengthening activities, as identified above (including construction of the slurry cutoff wall), could result in combined intermittent noise levels of approximately 102 dBA 50 feet from the alignment of the existing levee (Appendix F). This estimate is calculated based on the very conservative assumption that multiple pieces of equipment that generate the highest noise levels would be operating at the same site along the levee alignment at the same time. However, this scenario would be very unlikely to occur, particularly with the narrow linear nature of the construction area. Also, the construction effort would consist of three main activities: construction of a slurry cutoff wall, other levee repair and strengthening activities, and excavation and transport of borrow materials. The three main activities would take place at different locations. Nevertheless, it is assumed for this analysis that noise from these sources may have cumulative effects on nearby sensitive receptors, and that noise levels 50 feet from any part of the construction area where heavy equipment is operating could be in the range of 74–102 dBA.

Table 5.10-4
Typical Equipment Noise Levels

Type of Equipment	Noise Level in dBA at 50 Feet	
	Without Feasible Noise Control	With Feasible Noise Control *
Dozer or tractor	80	75
Scraper	88	80
Excavator	88	80
Compactor	82	75
Roller	74	–
Backhoe or loader	85	75
Grader	85	75
Crane	83	75
Generator	78	75
Drill	98	80
Compressor	81	75
Pump	76	75
Truck	91	75
Chain saw	77	77

Note: dBA = A-weighted decibels

* Feasible noise control includes the use of intake mufflers, exhaust mufflers, and engine shrouds in accordance with manufacturers' specifications.

Sources: U.S. Environmental Protection Agency 1971, Federal Transit Administration 1995

At least one residence is within about 150 feet of the existing levee along project Segment 1 and multiple residences are within 150 feet of the existing levee in Segment 3. Based on the equipment noise levels described above and assuming a noise attenuation rate of 6 dBA/DD, exterior noise levels approximately 100 feet from the part of the levee alignment where repairs are occurring could be as high as 96 dBA without the use of feasible noise control, and noise levels 200 feet from the construction area could be as high as 90 dBA. Noise levels in areas within about 6,500 feet of the levee alignment could exceed 60 dBA, without feasible noise control, as a result of construction activity. Some noise-sensitive receptors in these areas are already within areas of higher noise contours associated with SR 70 and Feather River Boulevard, and the Yuba County Airport, but would likely experience more elevated noise levels during levee construction for up to several weeks.

In addition to equipment operation, additional noise would also be generated by off-site construction-related traffic. As described in Section 5.11, "Transportation and Circulation," there would be approximately 84,910 construction-related truck trips over two construction seasons, averaging approximately 4,250 truck round trips per month or about 190–200 per work day. These trips would occur throughout the work day and would be spread geographically, as work would occur simultaneously in several locations along the levee alignment. Employee travel to and from the work sites could increase traffic on local roadways during peak morning and evening periods. For Alternative 1 the maximum workforce during peak construction periods is

estimated to be 100 employees, resulting in up to 100 employee-generated commute trips in the mornings and evenings, assuming that no ridesharing occurs. Typically, a doubling of traffic volumes is required before a noticeable increase (3 dBA) in traffic noise levels occurs. The annual average daily traffic (AADT) volume on SR 70 has been estimated to range from 13,300 to 60,000 trips between the Yuba-Sutter County line and the Yuba River. The increase in vehicle traffic associated with project construction would not substantially increase traffic volume during peak hours on SR 70, but it could substantially increase traffic on local roadways between SR 70 and the construction area, causing a temporary noticeable increase (3 dBA) in off-site ambient noise levels.

The exact hours of equipment operation at the construction sites are not known and have not been specifically limited to the hours between 7 a.m. and 10 p.m. According to the Yuba County Ordinance Code, construction operations may occur during the noise-sensitive hours between 10 p.m. and 7 a.m., but not within 500 feet of residences. Because residences are located closer than 500 feet to the construction area in several locations (particularly in Segment 3), if the proposed construction activities were to take place during the more noise-sensitive evening and nighttime hours, this could violate Section 8.20.310 of the Yuba County Ordinance Code and/or may result in a noticeable temporary increase (3 dBA or more) in ambient noise levels and cause annoyance or sleep disruption to occupants of these residences closest to construction areas. For the reasons discussed above, this impact would be significant.

Impact LS-5.10-b

Exposure of Sensitive Receptors to Excessive Groundborne Vibration During Construction. Construction-generated vibration levels would not result in levels above 0.2 in/sec PPV (Caltrans's recommended standard with respect to the prevention of structural building damage) or 80 VdB (FTA's maximum acceptable vibration standard with respect to human response at residential uses) at the nearest land uses. Thus, this impact would be **less than significant.**

Construction activities have the potential to result in varying degrees of temporary ground vibration, depending on the specific construction equipment used and operations involved. Ground-vibration levels associated with various types of construction equipment are summarized in Table 5.10-5, "Typical Construction Equipment Vibration Levels." Vibration generated by construction equipment typically spreads through the ground and diminishes in magnitude with increases in distance. While effects of ground vibration may be imperceptible at low levels, they may result in detectable vibrations and slight damage to nearby structures at moderate and high levels, respectively. At the highest levels of vibration, damage to structures is primarily architectural (e.g., loosening and cracking of plaster or stucco coatings) and rarely results in structural damage.

Construction operations associated with Alternative 1 would be anticipated to include excavators, bulldozers, graders, and trucks, among other miscellaneous pieces of equipment. Groundborne noise and vibration resulting from levee repair and strengthening activities would be associated primarily with the use of bulldozers and movement of other tracked vehicles (i.e., excavators), which typically result in levels of groundborne vibration at 25 feet from the process that can exceed the applicable threshold of annoyance (80 VdB), as shown in Table 5.10-5. However, because the nearest residential structures would be located approximately 100–150 feet from the construction site at the nearest point, and groundborne vibration dissipates rapidly with distance, vibration levels would not surpass the 80-VdB threshold at these nearby

residential structures. Note that none of the pieces of construction equipment shown in Table 5.10-5 exceed the vibration threshold of 0.2 in/sec for structural damage. Pile drivers are the primary piece of construction equipment capable of exceeding this threshold, and there are no proposals to use impact pile drivers as part of FRLRP construction. Thus, the temporary construction vibration associated with on-site equipment would not be anticipated to expose sensitive receptors to or generate excessive groundborne vibration or groundborne noise levels. Therefore, this impact would be less than significant.

Table 5.10-5
Typical Construction Equipment Vibration Levels

Equipment	PPV at 25 feet (in/sec)	Approximate L_v at 25 feet
Large bulldozer	0.089	87
Caisson drilling	0.089	87
Trucks	0.076	86
Jackhammer	0.035	79
Small bulldozer	0.003	58

Notes: in/sec = inches per second; L_v = velocity level in decibels (VdB) and based on the root mean square (RMS) velocity amplitude; PPV = peak particle velocity

Source: Federal Transit Administration 1995

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impact ASB-5.10-a

Temporary Increase in Noise Levels during Construction. Noise levels associated with construction activities could exceed the maximum permissible noise limits at residences. Construction equipment may operate between the hours of 10 p.m. and 7 a.m. and could operate within 500 feet of a residential zone during these hours. Therefore, construction activities occurring between 10 p.m. and 7 a.m. could result in annoyance and/or sleep disruption of certain receptors within the project area. In addition, construction operations may result in a noticeable temporary increase (3 dBA or more) in ambient noise levels at these residences. This impact would be **significant.**

This impact is similar to Impact LS-5.10-a, described under Alternative 1 above. The on-site equipment required for levee repairs and strengthening and construction of the ASB setback levee is anticipated to include two hydraulic excavators, eight to 10 scrapers, four bulldozers, three to four graders, four rollers, two water wagons, 20 highway dump trucks, one lubricating truck, one loader, a truck-mounted crane, and numerous pickup trucks. Mobile equipment for construction of the slurry cutoff wall may include two hydraulic excavators, two bulldozers, two utility excavators, and two integrated tool carriers. Depending on the operations conducted, individual equipment noise levels can range from 77 to 98 dBA at 50 feet, as indicated in Table 5.10-4.

The simultaneous operation of the on-site construction equipment associated with levee repair and strengthening activities and the ASB levee setback, as identified above (including construction of the slurry cutoff wall), could result in combined intermittent noise levels of

approximately 104 dBA 50 feet from the alignment of the existing levee (Appendix F). This estimate is calculated based on the very conservative assumption that multiple pieces of equipment that generate the highest noise levels would be operating at the same site along the project alignment at the same time. However, this scenario is very unlikely to occur, particularly with the linear nature of the construction area. Also, the construction effort would consist of several activities: construction of a slurry cutoff wall, other levee repair and strengthening activities, construction of the ASB setback levee, and excavation and transport of borrow material from borrow sites. These activities would take place at different locations, and in some cases, during different construction seasons. Nevertheless, it is assumed for this analysis that noise from these sources may have cumulative effects on nearby sensitive receptors, and that noise levels 50 feet from any part of the construction area where heavy equipment is operating could be in the range of 74–104 dBA.

At least one residence is within approximately 150 feet of the existing levee along project Segment 1. The ASB setback levee alignment is within several hundred feet of some residences and a nursing home along Segment 2. Multiple residences are within 150 feet of the existing levee in Segment 3. Therefore, based on the equipment noise levels described above and assuming a noise attenuation rate of 6 dBA/DD, exterior noise levels approximately 100 feet from the part of the existing or setback levee alignment where construction is occurring could be as high as 98 dBA without the use of feasible noise control, and noise levels 200 feet from the construction area could be as high as 92 dBA. Noise levels in areas within about 6,500 feet of the existing or setback levee alignment could exceed 60 dBA, without feasible noise control, as a result of construction activity.

Construction-generated traffic under Alternative 2 would be greater than under Alternative 1, primarily because of the need to transport a greater volume of material from borrow sites to the setback levee alignment. During the second construction season, when the setback levee is being constructed, truck round trips are estimated to average approximately 8,400 trips per month or roughly 380–390 trips per work day. During peak construction periods up to approximately 100 employee commute trips would occur in the mornings and evenings, assuming that no ridesharing occurs. Construction-related traffic would be much less during the first construction season when repairs of the existing levee in Segments 1 and 3 would take place. Typically, a doubling of traffic volumes is required before a noticeable increase (3 dBA) in traffic noise levels occurs. The AADT volume on SR 70 has been estimated at greater than 16,000 trips. The increase in vehicle traffic associated with project construction would not substantially increase traffic volume during peak hours on SR 70, but it could substantially increase traffic on local roadways between SR 70 and the construction area, causing a temporary noticeable increase (3 dBA) in off-site ambient noise levels.

As described under Impact LS-5.10-a, the exact hours of equipment operation at the construction sites are not known and have not been specifically limited to the hours between 7 a.m. and 10 p.m. Because construction operations may occur during the noise-sensitive hours between 10 p.m. and 7 a.m. within 500 feet of residences, the proposed activities could violate Section 8.20.310 of the Yuba County Ordinance Code. For this reason, construction activities could result in a potentially significant noise impact. In addition, the occurrence of construction operations, particularly during the noise-sensitive hours, may result in a noticeable temporary increase (3 dBA or more) in ambient noise levels and cause annoyance or sleep disruption to

occupants of residences closest to construction areas. For the reasons discussed above, this impact would be significant.

Impact ASB-5.10-b

Exposure of Sensitive Receptors to Excessive Groundborne Vibration during Construction. This impact would be the same as Impact LS-5.10-b, described under Alternative 1 above. Construction processes under Alternative 2 would not occur any closer to sensitive land uses than discussed under Alternative 1, and no new construction equipment or processes that would generate additional groundborne vibration would be used. For the same reasons as described above, this impact would be **less than significant.**

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impact IS-5.10-a

Temporary Increase in Noise Levels during Construction. This impact would be similar to Impact ASB-5.10-a, described under Alternative 2 above. Although the intermediate setback levee alignment is in a different location than the ASB alignment relative to some sensitive receptors, and traffic generation may be somewhat different based on needs for borrow material, the extent and nature of the impact would not be appreciably different. For the same reasons as described above, this impact would be **significant.**

Impact IS-5.10-b

Exposure of Sensitive Receptors to Excessive Groundborne Vibration During Construction. This impact would be the same as Impact LS-5.10-b, described under Alternative 1 above. Construction processes under Alternative 2 would not occur any closer to sensitive land uses than those discussed under Alternative 1, and no new construction equipment or processes that would generate additional groundborne vibration would be used. For the same reasons as described above, this impact would be **less than significant.**

5.10.4 MITIGATION MEASURES

ALTERNATIVE 1 – THE LEVEE STRENGTHENING ALTERNATIVE

No mitigation is required for Impact LS-5.10-b (exposure to excessive groundborne vibration during construction). Mitigation is provided below for Impact LS-5.10-a (temporary increase in noise levels during construction).

LS-5.10-a **Limit Generation of Noise by Equipment during Project Construction.** This mitigation would reduce the potential impact, but not to a less-than-significant level.

Three Rivers Levee Improvement Authority (TRLIA) shall ensure that the primary construction contractor implements the following mitigation measures during construction activities:

(a) To the extent practicable, construction activities shall be limited to the hours of 7 a.m. to 10 p.m. when operations occur within 500 feet of a residential or other noise-sensitive land use. Decisions as to whether nighttime construction is needed within 500 feet of residential or other noise-sensitive land uses shall only consider the need to complete project activities before the beginning of

the flood season and the associated need to maintain human safety and the integrity of the flood control system.

(b) All construction equipment shall be properly maintained and equipped with noise control, such as mufflers, in accordance with manufacturers' specifications.

(c) To the extent feasible, the simultaneous operation of construction equipment within 50 feet of the project boundary shall be limited.

In addition, TRLIA shall implement the following measure:

(d) Before construction at each site near noise-sensitive receptors, TRLIA shall provide written notification to potentially affected receptors, identifying the type, duration, and frequency of construction operations. Notification materials will also identify a mechanism for residents to register complaints with TRLIA and Yuba County (the agency responsible for enforcement of the Yuba County noise ordinance) if construction noise levels are overly intrusive or construction occurs outside the permitted hours. TRLIA and/or Yuba County would then take corrective action.

Implementation of measure (a) would encourage compliance with Section 8.20.310 of the Yuba County Ordinance Code, but it would not ensure compliance, as schedule constraints and the need to maintain the integrity of the flood control system may require nighttime construction. Implementation of measures (b) and (c) would reduce construction-generated noise levels at the nearest noise-sensitive receptors by approximately 10 dBA. In addition, measure (d) would be consistent with International Standards Organization recommendation R-1996 by providing a mechanism for affected individuals to provide input or to seek corrective action if construction levels are overly intrusive. However, even with implementation of the proposed measures, noticeable increases (3 dBA) in the ambient noise environment would be anticipated to occur temporarily at some nearby residences. Therefore, implementing this mitigation would reduce the potential temporary noise impact, but not to a less-than-significant level.

ALTERNATIVE 2 – THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impact ASB-5.10-b (exposure to excessive groundborne vibration during construction). Mitigation is provided below for Impact ASB-5.10-a (temporary increase in noise levels during construction).

ASB-5.10-a **Limit Generation of Noise by Equipment during Project Construction.** This measure is identical to Mitigation Measure LS-5.10-a above. This mitigation would reduce the impact, but not to a less-than-significant level.

ALTERNATIVE 3 – THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impact IS-5.10-b (exposure to excessive groundborne vibration during construction). Mitigation is provided below for Impact IS-5.10-a (temporary increase in noise levels during construction).

IS-5.10-a **Limit Generation of Noise by Equipment during Project Construction.** This measure is identical to Mitigation Measure LS-5.10-a above. This mitigation would reduce the impact, but not to a less-than-significant level.

5.10.5 IMPACTS REMAINING SIGNIFICANT AFTER MITIGATION

ALTERNATIVE 1 – THE LEVEE STRENGTHENING ALTERNATIVE

Impact LS-5.10-a (temporary noise increase during construction of the setback levee) would remain significant and unavoidable after mitigation.

ALTERNATIVE 2 – THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE

Impact ASB-5.10-a (temporary noise increase during construction of the setback levee) would remain significant and unavoidable after mitigation.

ALTERNATIVE 3 – THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE

Impact IS-5.10-a (temporary noise increase during construction of the setback levee) would remain significant and unavoidable after mitigation.

SECTION 5.11 TRANSPORTATION AND CIRCULATION

This section describes the traffic and circulation characteristics of the existing roadways in the project vicinity and analyzes the potential impacts of the project alternatives on normal traffic circulation and transportation systems. Potential project effects on emergency vehicle access and response are discussed in Section 5.12, "Public Services, Utilities, and Service Systems."

5.11.1 REGULATORY SETTING

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

No federal plans, policies, regulations, or laws related to transportation and circulation are applicable to the proposed project.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

The California Department of Transportation (Caltrans) is responsible for planning, designing, constructing, operating, and maintaining all state-owned roadways in Yuba County. Caltrans enforces various policies and regulations related to the modification of, or encroachment on state-owned roadways.

LOCAL PLANS, POLICIES, REGULATIONS, AND LAWS

The Yuba County (County) Department of Public Works is responsible for planning, designing, constructing, operating, and maintaining all County-owned roadways. The *Yuba County General Plan* classifies County-maintained roads according to their function and linkage to land use. Among these classifications are major roads and collector roads. Major roads are defined as the primary carriers of intercity and intracounty travel in Yuba County, linking primary employment and population centers. Collector roads are defined as roadways intended to provide subregional access and circulation by linking major roads with residential streets.

The general plan assesses level of service (LOS) for County-maintained major roads and collector roads. LOS is a qualitative measure of traffic operating conditions whereby letter grades of A through F are assigned to roadway segments, with the letter grade A denoting best conditions and letter grade F the worst. LOS rankings are additionally categorized by physical characteristics of the surrounding area, either urban (U) or rural (R), with rural roadways further classified as rolling (RR), or mountainous (RM).

The *Yuba County General Plan* establishes goals that pertain to transportation on County-maintained roads. The general plan contains a circulation goal of maintaining roadway LOS that recognizes differences between urban and rural environments and minimizes congestion. This goal is intended for long-term planning. The general plan does not address temporary changes in LOS related to construction activities.

5.11.2 ENVIRONMENTAL SETTING

SOURCES OF INFORMATION

Information used to prepare this section was obtained from the *Yuba County General Plan*, Volumes I and II (Yuba County 1994, 1996); Caltrans traffic volume data (California Department of Transportation 2006); conversations with County staff members; and observations during site visits in 2006.

PROJECT AREA

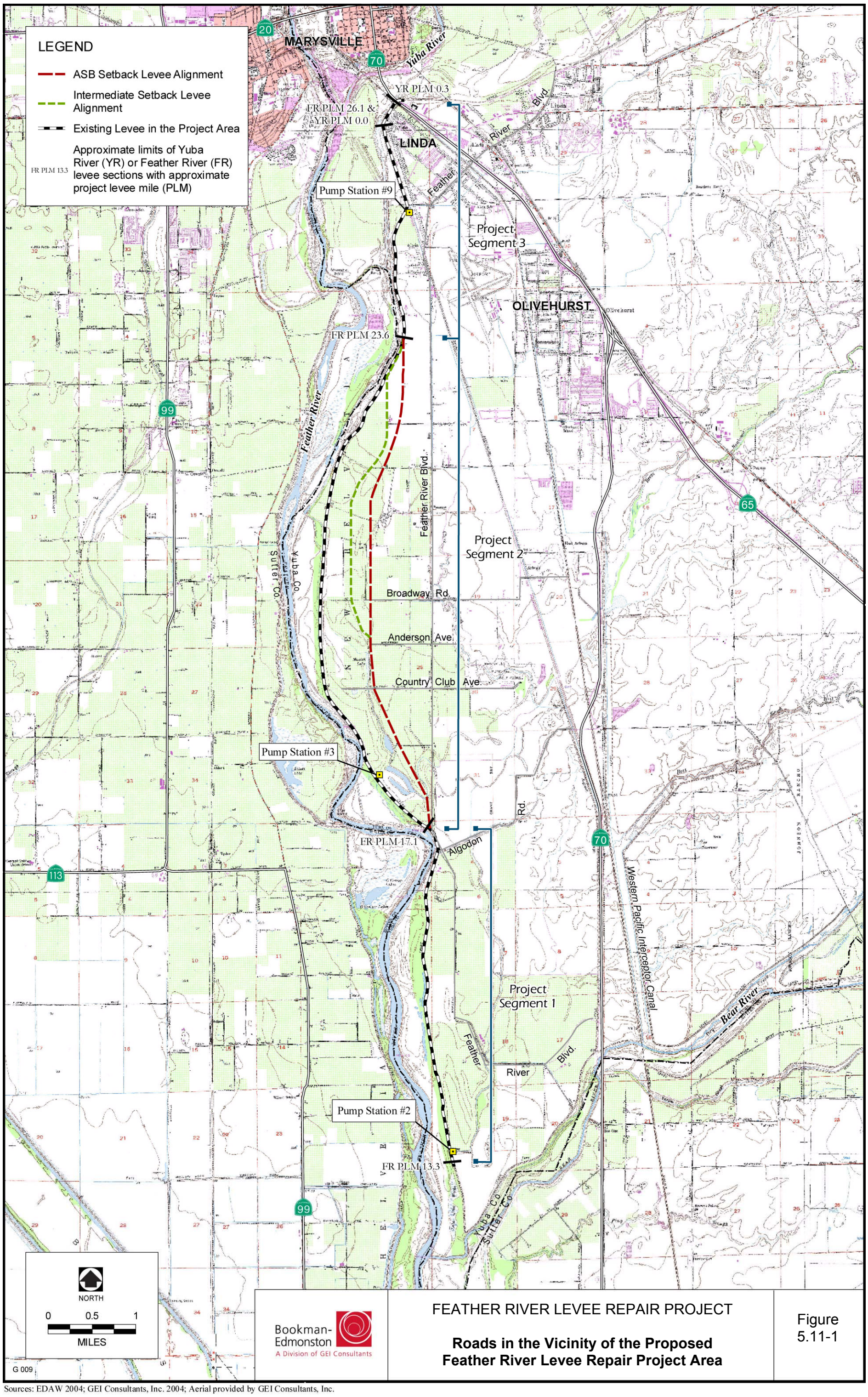
The primary roadways that would be used to access project construction areas are State Route (SR) 70, Feather River Boulevard, and local east-west roadways that connect SR 70 and Feather River Boulevard to the existing levee alignment and potential setback levee alignments. Under Alternatives 2 and 3, construction personnel would also likely use newly constructed temporary-access haul roads that would cross the levee setback alignments in what is currently orchard and other agricultural land. The major roadways that would be used by construction-related traffic are shown in Figure 5.11-1, "Roads in the Vicinity of the Proposed Feather River Levee Repair Project Area."

State Route 70

SR 70 provides north-south circulation between Marysville and the Sacramento metropolitan area. SR 70 is a two- and four-lane highway that extends north-south east of the project area. The *Yuba County General Plan* characterizes the topography traversed by SR 70 in Yuba County as "flat," and classifies different parts of the roadway as conventional highway, expressway, and freeway (Yuba County 1996). Annual average daily traffic (AADT) volumes for SR 70 include approximately 16,300 trips at the Yuba-Sutter County line east of project Segment 1 and 45,000 trips at the Feather River Boulevard interchange east of project Segment 3 (California Department of Transportation 2006). The general plan circulation element includes a forecast for AADT of 34,100 in year 2015 on SR 70 at the county line (Yuba County 1996).

Feather River Boulevard

Feather River Boulevard extends mostly north and south from Marysville to near the Sutter County line, passing just to the east of all three project segments. The road serves the community of West Linda and the industrial and agricultural areas of southwest Yuba County. Feather River Boulevard is 22 feet wide and terminates in the south at an at-grade intersection with SR 70, just north of the SR 70 overcrossing of the Bear River east of project Segment 1. Traffic that typically uses Feather River Boulevard includes agricultural equipment, truck traffic from food processing plants and industrial sites located on Feather River Boulevard, and traffic from residents of the Plumas Lake Specific Plan area. With the addition of traffic from development in the Plumas Lake Specific Plan area, the AADT varies along the various segments of Feather River Boulevard, with a majority of traffic in the Plumas Lake area. The 1994 general plan reports an AADT of 1,600 on Feather River Boulevard north of Broadway (in project Segment 2) (Yuba County 1994). The general plan circulation element includes a forecast for AADT of 8,100 in the project vicinity in year 2015.



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FEATHER RIVER LEVEE REPAIR PROJECT

Roads in the Vicinity of the Proposed Feather River Levee Repair Project Area

Figure 5.11-1

Sources: EDAW 2004; GEI Consultants, Inc. 2004; Aerial provided by GEI Consultants, Inc.

Feather River Boulevard is an emergency access route, especially important for emergency response to southwest Yuba County and to the Feather River via the Star Bend Boat Launch and Fishing Access in project Segment 1 (Cucci, pers. comm., 2006).

Associated Roads

County roads extending west from Feather River Boulevard that may be used by construction personnel and for hauling of construction materials to the project area include Broadway Road, Anderson Avenue, Country Club Avenue, and Algodon Road (Figure 5.11-1). In general, these roads are paved, narrow, nonstriped, two-lane roads that become unpaved roads as they near the Feather River levee access gates within the project area. Near the northern terminus of the project area, some roads that serve residential development in the community of Linda may also be used during project construction, including Riverside Drive, Garden Avenue, and Alicia Avenue.

5.11.3 ENVIRONMENTAL IMPACTS

THRESHOLDS OF SIGNIFICANCE

Thresholds for determining the significance of impacts on transportation and circulation were based on the environmental checklist form in Appendix G of the California Environmental Quality Act Guidelines (State CEQA Guidelines) and guidance developed by the Institute of Transportation Engineers (ITE). For the initial screening of temporary project effects on traffic, ITE recommends that an impact be examined further when it involves an increase of 50 or more trucks, 100 passenger vehicles, or an equivalent combination of vehicles per hour in the peak direction during the peak hour at any roadway intersection (Institute of Transportation Engineers 1989).

A project alternative would have a significant impact on transportation and circulation if it would:

- cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system;
- cause an increase of 50 or more trucks, 100 passenger vehicles, or an equivalent combination of vehicles per hour in the peak direction during the peak hour at any roadway intersection (ITE recommended threshold);
- exceed, either individually or cumulatively, an LOS standard established by the county congestion management agency for designated roads or highways;
- result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks;
- substantially increase hazards due to a design feature or incompatible uses;

- result in inadequate parking capacity; or
- conflict with adopted policies, plans, or programs supporting alternative transportation.

None of the project alternatives would entail the construction of towers or other impediments to air traffic. Therefore, the project alternatives would have no effect on air traffic, and these issues are not discussed further below.

All construction-related vehicles (i.e., equipment and worker vehicles) would be parked away from any public roadways at construction staging areas. No public parking facilities would be affected by the parking of construction-related equipment and worker vehicles.

None of the project alternatives would affect alternative transportation methods or routes, nor would they conflict with any local plans or policies regarding alternative transportation.

In addition, as noted above, effects of the project alternatives on emergency access are addressed in Section 5.12, "Public Services, Utilities, and Service Systems," and are not evaluated in this section.

IMPACT ANALYSIS

The project alternatives have the potential to affect transportation and circulation during construction. However, any effect of operation of the project alternatives on transportation and circulation issues would be negligible. Few, if any, additional vehicle trips would be associated with long-term maintenance under any of the project alternatives. Construction under Alternative 1 would not affect roadway or transportation system features in the long term. Construction under Alternatives 2 and 3 would cut off the western ends of some roads where they cross the proposed setback levee alignments along project Segment 2, but these roads are used for access to residences and agricultural operations in the proposed levee setback area that would be removed with implementation of the levee setback, and routine access to these areas would no longer be needed. The project alternatives do not include any permanent design features that would present hazards to transportation systems. Therefore, the impact discussions in this section are limited to construction-related effects.

Alternative 1 – The Levee Strengthening Alternative

Impact LS-5.11-a

Increase in Traffic on Local Roadways near the Project Site during Construction. During the anticipated 20-month construction period, commute trips and haul truck trips associated with levee repair and strengthening activities would increase traffic on Feather River Boulevard, SR 70, and local roadways that provide access to the project alignment (e.g., Anderson Avenue, Country Club Avenue, Riverside Drive). However, construction-related trips would not exceed the thresholds established by ITE for temporary traffic increases and would not represent a substantial increase in traffic levels on these roadways or other local roads. This impact would be **less than significant**.

The proposed levee repair and strengthening activities would have only a temporary effect on traffic. LOS standards established for roads by county congestion management agencies are intended to regulate long-term traffic increases or changes in traffic patterns that result from the development of facilities such as businesses and residences. Because the levee repair and

strengthening activities would not generate traffic or change traffic patterns over the long term, LOS standards are not considered in this evaluation of traffic effects. For the initial screening of temporary project effects on traffic, ITE recommends that an impact be examined further when it involves an increase of 50 or more trucks, 100 passenger vehicles, or an equivalent combination of vehicles per hour in the peak direction during the peak hour at any roadway intersection (Institute of Transportation Engineers 1989). For purposes of this analysis, impacts of project-generated traffic may be considered substantial if the amount of project-generated vehicle trips would exceed any of these thresholds.

Construction-related traffic would consist of daily commute trips of construction workers and truck trips to haul materials and supplies, such as drain rock, borrow materials, cement, and aggregate surfacing within and from outside the project vicinity. Construction personnel, equipment, and imported materials would reach the project area via SR 70 and Feather River Boulevard, which are currently used by trucks and other heavy agricultural equipment. Between Feather River Boulevard and the existing levee, local roads would be used to provide access to specific levee segments. Roads likely to be used include Broadway Road, Anderson Avenue, Country Club Avenue, Algodon Road, Riverside Drive, Garden Avenue, and Alicia Avenue. These roads are used primarily by nearby residents and agricultural operations and receive little traffic. Short temporary-access haul roads would likely be constructed between these existing local roadways, which typically end before reaching the existing levee, and the levee work area.

The construction labor force is estimated to average about 50–60 persons over the 2-year construction period (i.e., roughly 20 months of active work from approximately May 2007 into December 2008). Peak staffing could be close to 100 depending on the contractor's schedule. Construction staff traffic, therefore, could reach a total of 100 trips during the peak morning and evening commute hours at times of peak construction activity. This is a conservative assumption that does not consider the likelihood that some of the construction crew would rideshare. However, members of the construction crew are expected to travel to the project area from different directions, with overall traffic spread among various roadways and intersections, and it is also likely that some ridesharing would take place. Therefore, commute traffic is not expected to exceed the ITE threshold of an increase in traffic volume of 100 vehicles in the peak direction during the peak hour at any intersection.

About 40 trailer ("low-boy") truck round trips would be required to transport the contractor's plant and equipment to the site over a period of approximately 1 month. A similar number of round trips would occur as the work is completed to remove the equipment from the site. The number of truck trips and employee trips associated with mobilization is expected to fall well below the ITE thresholds of 50 trucks, 100 passenger vehicles, or an equivalent combination of vehicles per peak hour in the peak direction at an intersection.

About 4,000 highway truck trips would be needed to bring the drain rock, aggregate surfacing, and rock facing material to the site from the quarry of origin. About 300 truckloads would be needed to bring dry bentonite to the site. About 300 truckloads would also be needed to bring cement to the site. Another 25–30 trailer truckloads would be required to bring other permanent materials to the site, such as geotextile fabric, erosion control materials, structural steel, piping, utility poles, well casings, and ancillary equipment. About 100 concrete loads, transported by transit mixer truck, are also likely. In addition, about 100 highway truckloads may be needed to

carry construction debris and waste dump materials to a suitable landfill. Transport of an estimated 1.6 million cubic yards (cy) of borrow material between borrow sites and the levee alignment would also be required. This would result in approximately 80,000 haul trips if a load of 20 cy per trip is assumed. Larger haul unit sizes would reduce the number of trips and impacts on air quality.

The total of approximately 84,910 truck trips would take place over roughly 20 months encompassing two construction seasons, resulting in an average of approximately 4,250 truck round trips per month or about 190–200 per work day (assuming 22 work days per month). These trips would be spread out over the work day and would also be spread geographically, as work would occur simultaneously in several locations along the levee alignment. Also, truck trips would seldom occur at the same time as employee commute trips, as employees must be at the project site to operate haul trucks and receive deliveries of materials. It is unlikely that truck traffic would exceed the ITE threshold of 50 trucks per hour in the peak direction during the peak hour at any individual roadway intersection, or that commute traffic and truck haul traffic combined would exceed the equivalent threshold for a mix of passenger vehicles and trucks during a peak hour in a peak direction at a single intersection.

During the 20-month construction period under Alternative 1, commute trips and truck haul trips would increase traffic on SR 70, Feather River Boulevard, and local roadways. However, the construction-related trips would not exceed the thresholds established by ITE at any time or substantially increase overall traffic levels on the local road system. Therefore, this impact would be less than significant.

Impact LS-5.11-b

Increase in Traffic Hazards on Local Roadways near the Project Site during Construction. Construction-related traffic could track mud and gravel onto local roadways, and haul truck traffic could interfere with the flow of traffic on these roads. These conditions could pose hazards for travelers on local roadways. This impact would be **potentially significant.**

During the anticipated 20-month construction period under Alternative 1, trucks delivering materials and removing debris, as well as commute traffic, would be entering and exiting unpaved construction areas periodically and using local roadways. As described in Impact LS-5.11-a, truck traffic associated with levee repair and strengthening activities is expected to average 190–200 round trips per work day. Because similar activities would be performed during much of the construction period (with some limitations acknowledged during the winter months because of weather, soil conditions, agency guidelines, and other factors), the amount of daily truck traffic associated with delivery of materials or hauling of debris is not expected to vary widely, and the addition of construction-related truck traffic to traffic volumes on local roadways is not expected to noticeably alter traffic flow in most circumstances. However, trucks and workers exiting the construction area at the end of the work day are likely to move directly between Feather River Boulevard and entrances to the construction area or the existing levee road. Many of these vehicles would also enter SR 70. At times, the presence of slow-moving trucks entering or exiting construction areas could pose hazards to other vehicles on Feather River Boulevard and SR 70. In addition, trucks and other vehicles could track mud and gravel onto the local roadways, potentially posing a driving hazard. This impact would be potentially significant.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impact ASB-5.11-a

Increase in Traffic on Local Roadways near the Existing Levee and Setback Levee Alignment during Construction. During the anticipated 20-month construction period, commute trips and haul truck trips associated with levee repair and strengthening activities and setback levee construction would increase traffic on Feather River Boulevard, SR 70, and local roadways that provide access to the project alignment (e.g., Anderson Avenue, Country Club Avenue, Riverside Drive). However, construction-related trips would not exceed the thresholds established by ITE for temporary traffic increases and would not represent a substantial increase in traffic levels on these roadways or other local roads. This impact would be **less than significant.**

See Impact LS-5.11-a, described under Alternative 1 above. As under Alternative 1, project construction under Alternative 2 would have only a temporary effect on traffic. Construction-related traffic would consist of daily commute trips of construction workers and truck trips to haul materials and supplies, such as drain rock, cement, and aggregate surfacing from outside the project vicinity via SR 70 and Feather River Boulevard, and truck trips to haul soil between borrow sites and the ASB setback levee alignment.

The construction labor force is estimated to average about 60–70 persons over the 2-year construction period. Peak staffing could be close to 100 depending on the contractor's schedule. Construction staff traffic, therefore, could reach a total of 100 trips during the peak morning and evening commute hours at times of peak construction activity. This is a conservative assumption that does not consider the likelihood that some of the construction crew would rideshare. Members of the construction crew are expected to travel to the project area from different directions, with overall traffic spread among various roadways and intersections, and it is also likely that some ridesharing would take place. Therefore, although construction staff traffic could potentially generate 100 commute trips during peak construction periods, commute traffic is not expected to exceed the ITE threshold of an increase in traffic volume of 100 vehicles in the peak direction during the peak hour at any individual intersection.

It is expected that about 60–70 trailer ("low-boy") truck round trips would be required to transport the contractor's plant and equipment listed above to the site. A similar number of round trips would be needed to remove the equipment from the site as the work is completed.

Approximately 1,500 highway truck trips would be needed to bring the aggregate surfacing and similar aggregate and quarry materials to the site from the quarry of origin. About 150 truckloads would be needed to bring dry bentonite to the site. Another 40–50 trailer truckloads would be required to bring other permanent materials to the site, mainly including geotextile fabric, erosion control materials, structural steel, piping, utility poles, well casings, and ancillary equipment. About 30–40 concrete loads, transported by transit mixer truck, are also likely. In addition, about 750 highway truckloads may be needed to carry demolition debris, construction debris, and waste dump materials to a suitable landfill.

The activities listed above would generate up to approximately 2,560 truck trips. However, the main source of construction traffic would be the required transport of borrow material from the points of excavation at the existing Feather River levee or borrow areas to the placement areas at the ASB setback levee alignment in project Segment 2 and levee repair areas in Segments 1 and 3. A total volume of approximately 3.3 million cubic yards (cy) would require about 165,000

haul unit trips if a load of 20 cy per trip is assumed. For the purposes of this analysis, it is assumed that no material would be removed from the existing levee, thereby maximizing the number of haul trips. It is also assumed that borrow would be extracted in approximately equal proportions from the potential borrow areas east and west of the ASB setback levee alignment (although the site west of the alignment is closer to the work area and would be the preferred borrow source). Using these assumptions, approximately 82,500 haul trips would originate from the potential borrow area west of the ASB setback levee alignment and approximately 82,500 trips would originate from the potential detention basin/borrow area site east of the alignment. Only trips associated with the potential detention basin/borrow area or other sources east of the setback levee alignment would interact with traffic on local roadways, as local traffic would be excluded from sites west of the ASB setback levee alignment during construction.

Using the above assumptions, implementation of Alternative 2 would generate up to approximately 85,060 vehicle trips on local roadways. These 85,060 trips would take place over two construction seasons, although a vast majority of trips would take place during the second construction season, when the embankment for the ASB setback levee would be built. Assuming that all trips associated with the hauling of borrow material and half of the remaining trips would occur during the last 10 months of project construction, approximately 83,780 trips would take place during this period. This would result in an average of approximately 8,400 truck round trips per month or about 380–390 round trips per work day (assuming 22 work days per month).

These trips would be spread out over the work day and would also be spread geographically, as work would occur simultaneously in several locations along the project alignment. For example, the construction area for the ASB setback levee is linear and extends over 5.9 miles. Therefore, construction trips would be spread geographically over different roadways and intersections. Also, truck trips would seldom occur at the same time as employee commute trips, as employees must be at the project site to operate haul trucks and receive deliveries of materials.

It is unlikely that truck traffic would exceed the ITE threshold of 50 trucks per hour in a peak hour in a peak direction at a single intersection, or that commute traffic and truck haul traffic combined would exceed the equivalent threshold for a mix of passenger vehicles and trucks during a peak hour in a peak direction at a single intersection. Construction trips would be far fewer during the first construction season, and the same conclusions would apply.

During the approximately 20-month construction period under Alternative 2, commute trips and truck haul trips would increase traffic on Feather River Boulevard, SR 70, and local roadways. However, the construction-related trips would not exceed the thresholds established by ITE at any time or substantially increase overall traffic levels on the local road system. Therefore, this impact would be less than significant.

Impact ASB-5.11-b

Increase in Traffic Hazards on Local Roadways near the Existing Levee and Setback Levee Alignment during Construction. Construction-related traffic could track mud and gravel onto local roadways, and haul truck traffic could interfere with the flow of traffic on these roads. These conditions could pose hazards for travelers on local roadways. This impact would be **potentially significant.**

During the anticipated 20-month construction period, trucks delivering materials and equipment, hauling borrow material, removing debris, as well as commute traffic, would be entering and

exiting unpaved construction areas periodically and using local roadways. As described in Impact ASB-5.11-a, truck traffic associated with Alternative 2 is expected to average approximately 380–390 round trips per work day during the 2008 construction season, with far fewer trips during the 2007 construction season. Although the amount of vehicle traffic associated with project construction would vary considerably between the two construction seasons, similar activities would typically be performed from month to month within each construction season (with some limitations acknowledged during the winter months because of weather, soil conditions, agency guidelines, and other factors). Therefore, within each construction season the amount of daily truck traffic associated with delivery of materials or hauling of debris or borrow is not expected to vary widely, and the addition of construction-related truck traffic to traffic volumes on local roadways is not expected to noticeably alter traffic flow in most circumstances. However, trucks and workers exiting the construction area at the end of the work day are likely to move directly between Feather River Boulevard and entrances to the construction area or the existing levee road. Many of these vehicles would also enter SR 70. At times, the presence of slow-moving trucks entering or exiting construction areas could pose hazards to other vehicles on Feather River Boulevard and SR 70. In addition, trucks and other vehicles could track mud and gravel onto the local roadways, potentially posing a driving hazard. This impact would be potentially significant.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impact IS-5.11-a

Increase in Traffic on Local Roadways near the Existing Levee and Setback Levee Alignment during Construction. During the anticipated 20-month construction period, commute trips and truck haul trips associated with levee repair and strengthening activities and setback levee construction would increase traffic on Feather River Boulevard, SR 70, and local roadways that provide access to the project alignment (e.g., Anderson Avenue, Country Club Avenue, Riverside Drive). However, construction-related trips would not exceed the thresholds established by ITE for temporary traffic increases and would not represent a substantial increase in traffic levels on these roadways or other local roads. This impact would be **less than significant.**

See Impact ASB-5.11-a, described under Alternative 2 above. As under Alternatives 1 and 2, project construction under Alternative 3 would have only a temporary effect on traffic. Construction-related traffic would consist of daily commute trips of construction workers and truck trips to haul materials and supplies, such as aggregate surfacing and cement from outside the project vicinity via SR 70 and Feather River Boulevard and haul trips to move borrow material between soil borrow areas and the Intermediate setback alignment.

Trip generation from all sources under Alternative 3 is expected to be approximately the same as described above for Alternative 2. Therefore, this impact would be the same as Impact ASB-5.11-a, described under Alternative 2. For the same reasons as described above, this impact would be less than significant.

Impact IS-5.11-b

Increase in Traffic Hazards on Local Roadways near the Existing Levee and Setback Levee Alignment during Construction. Construction-related traffic could track mud and gravel onto local roadways, and haul truck traffic could interfere with the flow of traffic on these roads. These conditions could pose hazards for travelers on local roadways. This impact would be **potentially significant.**

Construction-related traffic under Alternative 3 would not be substantially different than described previously for Alternative 2. Therefore, this impact would the same as Impact ASB-5.11-b, described under Alternative 2 above. For the same reasons as described above, this impact would be potentially significant.

5.12.4 MITIGATION MEASURES

ALTERNATIVE 1 – THE LEVEE STRENGTHENING ALTERNATIVE

No mitigation is required for Impact LS-5.11-a (increase in traffic on local roadways during construction). Mitigation is provided below for Impact LS-5.11-b (increase in traffic hazards during construction).

LS-5.11-b **Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways.** This mitigation measure would reduce the potential impact to a less-than-significant level.

To reduce hazards to vehicles on local roadways, Three Rivers Levee Improvement Authority (TRLIA) shall ensure that its primary construction contractor implements the following measures:

(a) Develop and implement a traffic safety plan in coordination with the County and Caltrans. The construction contractor shall develop a plan for traffic safety assurance for the county roadways in the project vicinity. The contractor shall submit the plan to the County Public Works Department for approval before the initiation of construction-related activity that could adversely affect traffic on county roadways. A similar plan shall be prepared for SR 70 and submitted to Caltrans for review before initiation of construction-related activity that could adversely affect traffic on the highway. If both the County and Caltrans will accept the same traffic safety plan, then only one plan need be prepared. The plan(s) may call for the following elements, based on the requirements of each agency:

- posting warnings about the potential presence of slow-moving vehicles;
- using traffic control personnel when appropriate;
- scheduling truck trips outside of peak morning and evening traffic periods to the extent feasible;
- placing and maintaining barriers and installing traffic control devices necessary for safety, as specified in Caltrans's *Manual of Traffic Controls for Construction and Maintenance Works Zones* and in accordance with County requirements; and
- maintaining routes for passage of emergency response vehicles through roadways affected by construction activities.

The contractor shall train construction personnel in appropriate safety measures as described in the plan(s), and shall implement the adopted plan(s).

(b) Minimize the accumulation of mud and dirt on local roadways. All operations shall limit or expeditiously remove the accumulation of project-generated mud or dirt from adjacent public streets at least once every 24 hours when operations are occurring. The construction contractor shall sweep the paved roadways (water sweeper with reclaimed water recommended) at the end of each day if substantial volumes of soil material have been carried onto adjacent paved, public roads from the project sites. Also see a similar requirement under Mitigation Measure LS-5.9-a, "Implement FRAQMD Pollution-Control Measures to Minimize Temporary Emissions of ROG, NO_X, and PM_{10} during Construction."

Implementing Mitigation Measure LS-5.11-b would reduce the potential impact related to traffic hazards to a less-than-significant level.

ALTERNATIVE 2 – THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impact ASB-5.11-a (increase in traffic on local roadways during construction). Mitigation is provided below for Impact ASB-5.11-b (increase in traffic hazards during construction).

ASB-5.11-b **Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways.** This measure is identical to Mitigation Measure LS-5.11-b above. This mitigation would reduce the potential impact to a less-than-significant level.

ALTERNATIVE 3 – THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impact IS-5.11-a (increase in traffic on local roadways during construction). Mitigation is provided below for Impact IS-5.11-b (increase in traffic hazards during construction).

IS-5.11-b **Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways.** This measure is identical to Mitigation Measure LS-5.11-b above. This mitigation would reduce the potential impact to a less-than-significant level.

5.11.5 IMPACTS REMAINING SIGNIFICANT AFTER MITIGATION

With implementation of the mitigation described above, all impacts on transportation and circulation would be reduced to a less-than-significant level.

SECTION 5.12 PUBLIC SERVICES, UTILITIES, AND SERVICE SYSTEMS

Public services addressed in this section are limited to emergency services (fire, police, and emergency medical services). Schools, parks, and other public facilities are not discussed because the project alternatives would neither affect these facilities nor result in a need for new or physically altered schools, parks, or other public facilities. This section also addresses several public utilities and service systems: gas, electrical, water, sewer, cable, telephone, and drainage systems. Wastewater and solid-waste systems are not discussed because none of the project alternatives would result in the production of wastewater or the long-term production of solid waste.

5.12.1 REGULATORY SETTING

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

No federal plans, policies, regulations, or laws related to public services, utilities, and service systems are applicable to the proposed project.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

No state plans, policies, regulations, or laws related to public services, utilities, and service systems are applicable to the proposed project.

LOCAL PLANS, POLICIES, REGULATIONS, AND LAWS

Approval of an encroachment permit by the County Public Works Department may be required for placement of utilities in easements and rights-of-way in Yuba County when related earthmoving operations exceed 50 cubic yards. The *Yuba County General Plan* also contains policies related to the aesthetic character of new utilities and public service infrastructure (Cucci, pers. comm., 2006).

The County Public Works Department is responsible for operating and maintaining County roads, and it has jurisdiction over the removal of utilities from within County road rights-of-way. However, the County does not have jurisdiction over the simple removal of utilities from areas not located within such rights-of-way. County roads are used as emergency-vehicle routes, and Feather River Boulevard is an emergency-vehicle route in southwestern Yuba County (Lee, pers. comm., 2006). Feather River Boulevard provides emergency vehicles with access to areas of southwestern Yuba County and to the Feather River (via the Star Bend Boat Launch and Fishing Access) (Cucci, pers. comm., 2006).

5.12.2 ENVIRONMENTAL SETTING

SOURCES OF INFORMATION

Some information concerning public services, utilities, and service systems in the project area was obtained previously during preparation of the Feather-Bear Rivers Levee Setback Project (F-BRLSP) draft environmental impact report (DEIR) (September 2004) and the Yuba-Feather Supplemental Flood Control Program (Y-FSFCP) programmatic DEIR (October 2003). For these DEIRs, information was collected during a site visit; in conversations with project engineers; from Appendix E, "Preliminary Design," of the report on feasibility of the Y-FSFCP (Yuba County Water Agency 2003); in interviews with County Planning Department staff members; correspondence and conversations with various service providers; and maps showing the locations of existing utilities. That information has been supplemented for the Feather River Levee Repair Project (FRLRP) by information from the County Community Development Department, County Public Works Department, Olivehurst Public Utility District (OPUD), the Linda County Water District, and project engineers. Detailed utility information has not yet been collected for the area northeast of Star Bend being considered for a detention basin and soil borrow site (see Figure 4-1, "FRLRP Project Features," in Chapter 4). If this site is ultimately selected for a detention basin/soil borrow area, further utility information will be collected during the detailed design phase.

SERVICE PROVIDERS

Most of the project area is in the OPUD water and sewer sphere of influence. For a majority of this area, particularly in project Segments 1 and 2, there are no OPUD water or sewer lines, and local residents and businesses rely on wells and septic systems. OPUD does provide water and sewer service in the vicinity of Segment 3 east of Feather River Boulevard near Olivehurst (Tillotson, pers. comm., 2006). In the northern portion of Segment 3, Linda County Water District provides water and sewer service to areas north and west of the Yuba County Airport between the levee and State Route (SR) 70, near Linda.

Reclamation District (RD) 784 manages a majority of the storm drainage systems in the project area. (Shaw, pers. comm., 2006.) However, Yuba County (County) manages some of the storm drainage facilities in the more heavily developed areas near Segment 3.

Pacific Gas and Electric Company (PG&E) maintains the electrical and gas lines in the project area, and AT&T (formerly SBC Communications) maintains the telephone infrastructure. Comcast is the local cable television provider.

The Linda Fire Protection District provides fire protection for all of project Segments 1 and 3 and the majority of Segment 2. OPUD provides fire protection for a small portion of Segments 2 and 3 from Ella Avenue north to the Yuba County Airport (Shaw, pers. comm., 2006). The nearest staffed Linda Fire Protection District station is on Scales Road in Linda; there is also an unstaffed volunteer station at the intersection of Broadway and Arboga Road, east of project Segment 2 approximately 2 miles south of Olivehurst (Cucci, pers. comm., 2006). The County Sheriff's Department provides police protection for the project area.

EXISTING PUBLIC SERVICES, UTILITIES, AND SERVICE SYSTEMS

Project Segment 1

Public utilities and associated structures in project Segment 1 consist primarily of infrastructure related to agricultural operations (electrical lines and drainage improvements). Figure 5.12-1, "Public Utilities, Service Systems, and Structures in the Vicinity of Project Segment 1," shows the approximate locations of existing public utilities and service systems near the left (east) bank levee of the Feather River in Segment 1.

Aboveground PG&E 12-kilovolt (kV) electrical transmission lines on wooden poles parallel County Road 512 and an unnamed road that zigzags to the southwest from its intersection with Feather River Boulevard and County Road 512. A segment of electrical transmission line connects to RD 784 Pump Station No. 2, which consists of two large pumps, a 7-foot-wide by 5-foot-high concrete box culvert through the levee to allow gravity flow of drainage water to the Feather River, and two 36-inch diameter discharge pipes connected to the pumps to discharge water to the river when the river level is too high for gravity flow (MHM Inc. n.d., GEI 2006). Segments of the transmission lines connect to two privately owned irrigation wells near the project area (Pacific Gas and Electric Company 2001; Chambers, pers. comm., 2004). Other segments of the electrical transmission lines connect with privately owned irrigation wells that serve land and facilities near the levee, as well as with several privately owned irrigation lines (Yuba County Water Agency 2003).

An underground electrical cable also crosses the Feather River left bank levee near Algodon Road to feed the Plumas Mutual pump station. The Plumas Mutual pump station is an irrigation pump station located on the water side of the Feather River left levee near PLM 16.9. The pump station consists of two pumps that supply irrigation water from the Feather River to an irrigation canal that runs parallel to Algodon Road. Two 36-inch diameter pipes cross under the levee to connect the pump station to the canal.

Aboveground telephone poles and lines and some buried lines extend east from the telephone lines that run along Feather River Boulevard east of project Segment 1 (Klein, pers. comm., 2002; Freeman, pers. comm., 2002). Many of the aboveground telephone lines are attached to electrical power poles. In addition, an underground phone line runs along the west side of Feather River Boulevard south of Algodon Road.

Clark Slough is an agricultural drainage canal maintained by RD 784 that is located east of project Segment 1. The canal runs south, then west for approximately 3,500 feet before ending at Pump Station No. 2 (described above). No modifications to Pump Station No. 2 are proposed as part of the FRLRP (Wanket, pers. comm., 2006). Buried irrigation pipelines adjacent to the left bank levee of the Feather River connect with several irrigation risers and standpipes (Figure 5.12-1).

Project Segment 2

Public utilities and associated structures in project Segment 2 (including the existing levee, the levee footprint, and the proposed levee setback area) consist primarily of infrastructure related to agricultural operations (electrical lines and drainage improvements), telephone lines, and a

PG&E high-voltage electrical transmission line. Figure 5.12-2, "Public Utilities, Service Systems, and Structures in the vicinity of Project Segment 2," shows the approximate locations of existing public utilities and service systems near the left bank levee of the Feather River in Segment 2.

The PG&E 115-kV high-voltage transmission line referred to as the Bogue Loop line crosses the northern end of project Segment 2 between Ella Road and Murphy Road and is supported by steel transmission towers. Several PG&E overhead electrical lines on wooden poles also extend into the area. Lines and tributaries run from the east into the project area at Ella Road, West Ella Avenue, Broadway, and Country Club Avenue on approximately 120 poles. These lines provide electricity to residences and agricultural operations. The two lines that are parallel to Ella Avenue and Country Club Avenue pass through the proposed levee setback area and continue west of the existing levee (Pacific Gas and Electric Company 2001). These distribution lines service existing river diversion pumps across the Feather River. An overhead line on wooden poles also passes across the northern edge of the area being considered for a detention basin/soil borrow site.

Aboveground telephone poles and lines, as well as some buried lines, lead from the telephone lines that run along Feather River Boulevard into the proposed levee setback area to serve individual homes (Klein, pers. comm., 2002; Freeman, pers. comm., 2002). Aboveground telephone lines are typically attached to the wooden poles supporting electrical lines described above. A PG&E natural gas pipeline runs along the east side of Feather River Boulevard in the Star Bend area.

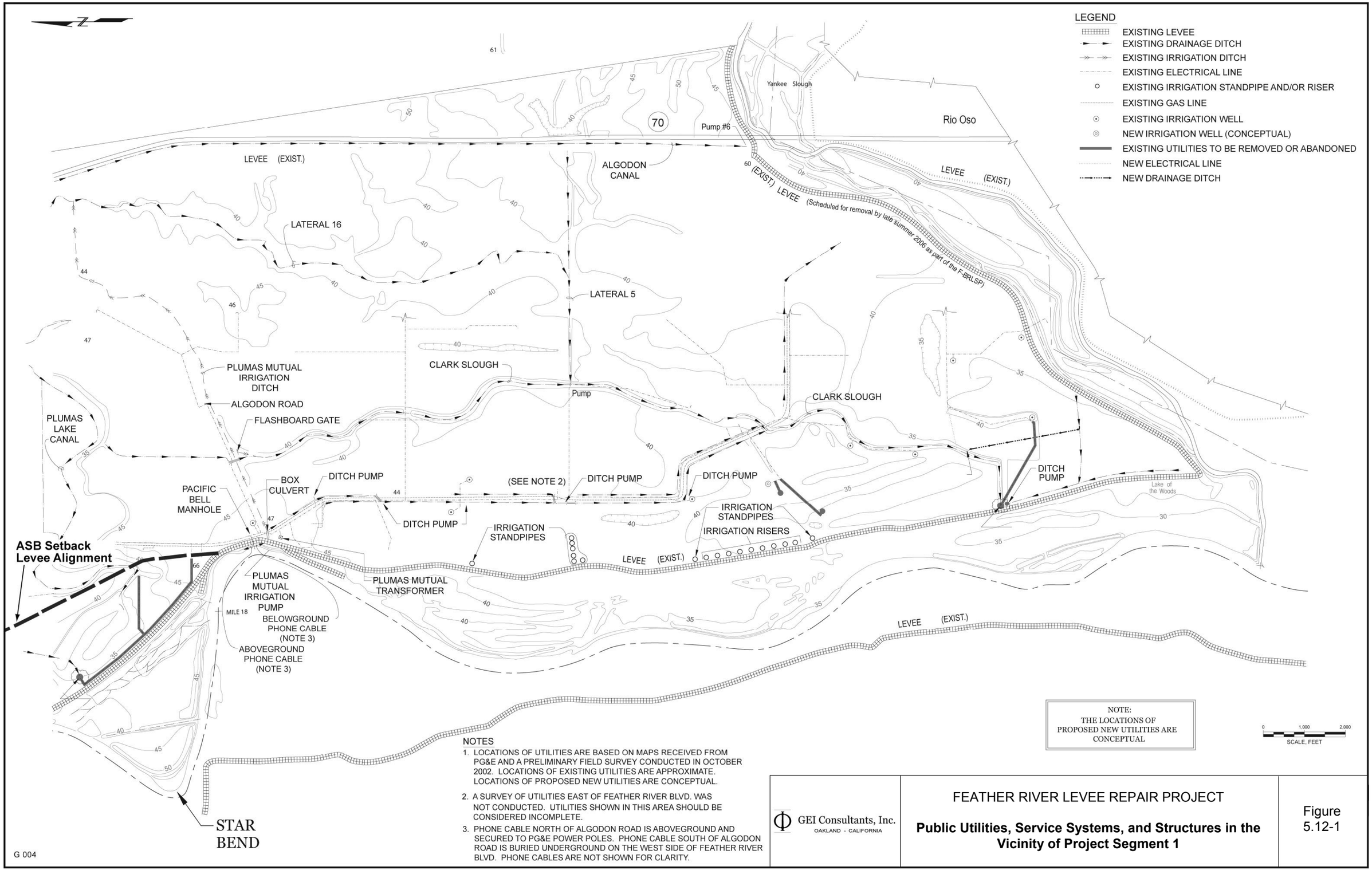
RD 784 maintains the Lateral 6 Canal, which lies entirely within and drains portions of the proposed levee setback area; the Lateral 7/8 Canal, which crosses the proposed Above Star Bend (ASB) setback levee alignment in a buried culvert and empties from the east into Lateral 6; and the Plumas Lake Canal, which drains out of Algodon Canal and crosses the proposed detention basin/soil borrow area site and the proposed setback levee alignment near its south end, running west approximately 1,500 feet into the proposed ASB levee setback area. Both the Lateral 6 Canal and the Plumas Lake Canal drain into a pond. The water in this pond is pumped over the levee into the Feather River floodway by RD 784 Pump Station No. 3 (MHM Inc. n.d.).

In addition to these public utilities and service systems, approximately 20 privately owned wells and several private irrigation lines serve land and facilities along project Segment 2 and possibly some land uses east of the proposed levee setback area (Yuba County Water Agency 2003).

Project Segment 3

Public utilities and associated structures in project Segment 3 consist of both infrastructure related to agricultural operations and infrastructure supporting residential and other urban uses in the area. Figure 5.12-3, "Public Utilities, Service Systems, and Structures in the Vicinity of Project Segment 3," shows the approximate locations of existing public utilities and service systems near the left bank levee of the Feather River in Segment 3.

Several 12-kV overhead power distribution lines cross the Feather and Yuba River left bank levees in project Segment 3. Starting in the southern portion of Segment 3, a line crosses the



NOTES

1. LOCATIONS OF UTILITIES ARE BASED ON MAPS RECEIVED FROM PG&E AND A PRELIMINARY FIELD SURVEY CONDUCTED IN OCTOBER 2002. LOCATIONS OF EXISTING UTILITIES ARE APPROXIMATE. LOCATIONS OF PROPOSED NEW UTILITIES ARE CONCEPTUAL.
2. A SURVEY OF UTILITIES EAST OF FEATHER RIVER BLVD. WAS NOT CONDUCTED. UTILITIES SHOWN IN THIS AREA SHOULD BE CONSIDERED INCOMPLETE.
3. PHONE CABLE NORTH OF ALGODON ROAD IS ABOVEGROUND AND SECURED TO PG&E POWER POLES. PHONE CABLE SOUTH OF ALGODON ROAD IS BURIED UNDERGROUND ON THE WEST SIDE OF FEATHER RIVER BLVD. PHONE CABLES ARE NOT SHOWN FOR CLARITY.

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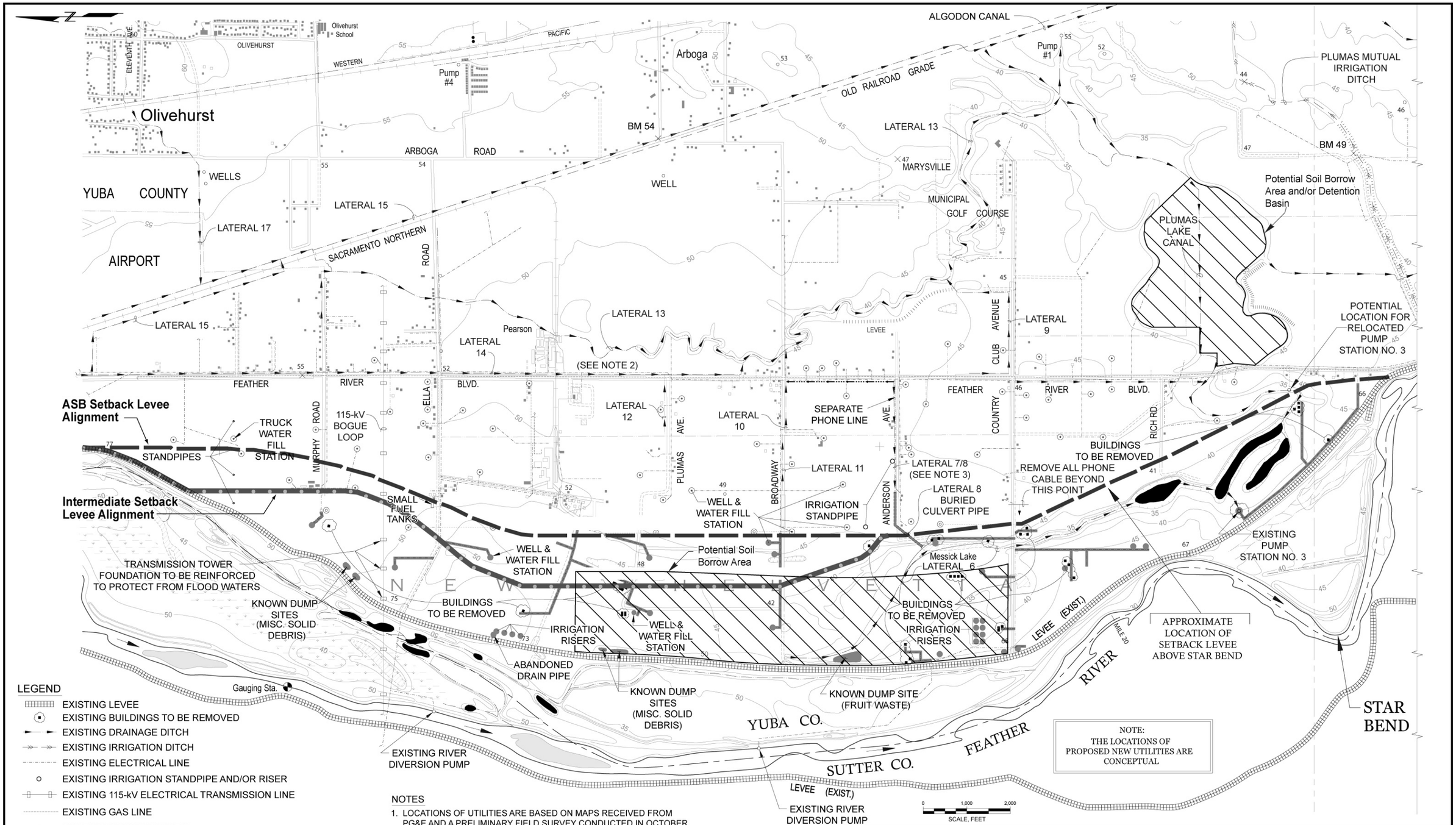
FEATHER RIVER LEVEE REPAIR PROJECT

Public Utilities, Service Systems, and Structures in the Vicinity of Project Segment 1

Figure 5.12-1

Source: Yuba County Water Agency 2003



NOTES

1. LOCATIONS OF UTILITIES ARE BASED ON MAPS RECEIVED FROM PG&E AND A PRELIMINARY FIELD SURVEY CONDUCTED IN OCTOBER 2002. LOCATIONS OF EXISTING UTILITIES ARE APPROXIMATE. LOCATIONS OF PROPOSED NEW UTILITIES ARE CONCEPTUAL.
2. A SURVEY OF UTILITIES EAST OF FEATHER RIVER BLVD. WAS NOT CONDUCTED. UTILITIES SHOWN IN THIS AREA SHOULD BE CONSIDERED INCOMPLETE.
3. LATERAL 7/8 WILL BE REGRADED TO DRAIN EAST TOWARD FEATHER RIVER BOULEVARD.

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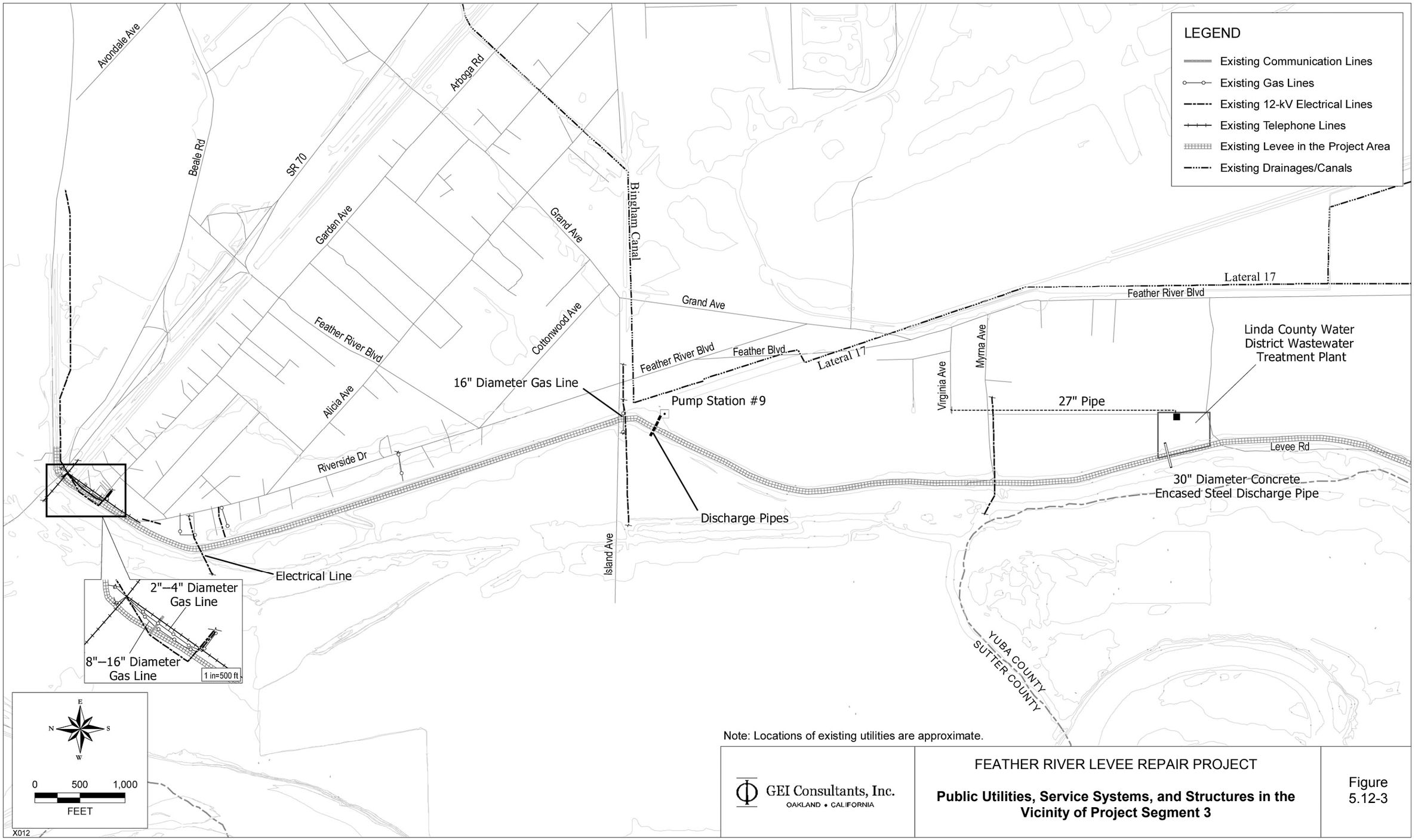
FEATHER RIVER LEVEE REPAIR PROJECT

Public Utilities, Service Systems, and Structures in the Vicinity of Project Segment 2

Figure 5.12-2

Source: Yuba County Water Agency 2003



Note: Locations of existing utilities are approximate.

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FEATHER RIVER LEVEE REPAIR PROJECT

Public Utilities, Service Systems, and Structures in the Vicinity of Project Segment 3

Figure 5.12-3

Sources: GEI Consultants, Inc. 2006; U.S. Army Corps of Engineers As-Built Plans for Sacramento River Flood Control System Phase II, revised April 1999, CaSIL 1998

levee at Myrna Avenue. A second line crosses the levee along the south side of Island Road and a spur line splits from this line at the levee crest to feed Pump Station No. 9. Pump Station No. 9 consists of two pumps that discharge drainage water into the Feather River via pipes installed in the levee. A third 12-kV overhead electrical line crosses the levee approximately 250 feet south of the confluence of the Yuba and Feather Rivers. Another line runs along the crown of the Yuba River levee from the end of Garden Avenue eastward across the Western Pacific Railroad crossing.

Overhead telephone lines are attached to power poles along several of the alignments described above. A buried cable television line runs along the landside toe of the Yuba River left bank levee for approximately 900 feet just west of the Western Pacific Railroad crossing.

Based on drawings provided by PG&E, a 16-inch diameter gas line crosses the Feather River left bank levee in project Segment 3 along the south side of Island Road (GEI 2006). In addition, a gas line that varies from 8 to 16 inches in diameter follows the crest of the levee embankment from the end of Garden Avenue to the Western Pacific Railroad and SR 70. A smaller gas line that varies from 2 to 4 inches in diameter parallels this 10-inch line, but is installed within the levee closer to the landside toe.

On the land side of the levee at approximately PLM 23.9 is the Linda County Water District Wastewater Treatment Plant. Based on available drawings, a 30-inch-diameter concrete encased steel discharge pipe extends beneath the levee from the treatment plant to a junction box at the waterside toe of the levee.

Surface runoff from the primarily urban northern reach of Segment 3 is conveyed by Lateral 15 to Pump Station No. 9, where it is pumped over the levee to the Feather River (Figure 5.12-3). Surface runoff from the primarily agricultural southern reach of Segment 3 is conveyed by the Algodon Canal to Pump Station No. 6 (in the southern portion of the RD 784 area), where it is discharged to the Bear River. RD 784 plans to construct a new pump station on Ella Road to divert the runoff from the area encompassing the southern portion of Segment 3, along with runoff from planned development to the east, directly to the Feather River. The schedule for construction of this pump station is not known at this time.

5.12.3 ENVIRONMENTAL IMPACTS

THRESHOLDS OF SIGNIFICANCE

Thresholds for determining the significance of impacts related to public services, utilities, and service systems are based on the environmental checklist form in Appendix G of the California Environmental Quality Act Guidelines (State CEQA Guidelines). A project alternative would have a significant impact on public services, utilities, and service systems if it would:

- increase risk of structural failure of, or substantially interfere with service from, existing gas facilities and pipelines, electrical transmission or distribution lines, telephone lines, drainage improvements, or water distribution facilities;
- increase demand for emergency services, power or natural gas facilities, communications systems, water infrastructure, sewer lines, or solid-waste services beyond their current

capacity, resulting in substantial adverse physical changes associated with meeting the increased demand; or

- increase response times for emergency service providers.

Because the FRLRP does not include new development, it would not result in demand for increased natural gas facilities, communication systems, water infrastructure, sewer lines, or solid-waste services beyond their current capacity. Therefore, increased demand for these services is not evaluated. Effects of project alternatives on local drainage systems are addressed in Section 5.3, "Water Resources and River Geomorphology."

IMPACT ANALYSIS

Alternative 1 – The Levee Strengthening Alternative

Impact LS-5.12-a

Damage of Public Utility Infrastructure and Disruption of Service in the Project Area. Various aboveground and buried utility lines identified in the project area either are near or cross the Feather River and Yuba River levee segments planned for repair and strengthening and the area considered for a detention basin/soil borrow site. The potential exists for additional buried gas, electrical, cable television, or telephone lines that have not already been identified to be located near or to cross these areas. Construction activities associated with project implementation could cause minor damage to public utility infrastructure or temporarily disrupt utility service. However, detailed project design would include consultation with all potential service providers to identify utility line locations and appropriate protection measures, and consultation would continue during construction to ensure avoidance/protection of these utilities as construction proceeds. Implementation of Alternative 1 would not result in substantial interference with gas, electrical, cable television, or telephone service. This impact would be **less than significant.**

Existing utilities in each project segment are described in detail above in Section 5.12.2, "Environmental Setting." Overhead and buried phone lines are located in the vicinity of the levee repair areas in each of the three project segments. Overhead electrical power lines are also located near the Feather and Yuba River levees in all three project segments, and two or more overhead power lines cross over the levees in both Segment 2 and Segment 3. An overhead power line also crosses the northern edge of the area considered as a site for a detention basin/soil borrow area. In Segment 1 a buried power line crosses under the Feather River levee. In Segment 3 one natural-gas pipeline crosses through the Feather River levee, and segments of two additional pipelines parallel a portion of the Yuba River levee buried in the embankment. A buried cable television line is located in the vicinity of the levee in Segment 3. Please note that utility lines related to water/irrigation and drainage are discussed below in Impact LS-5.12-b.

Although service providers have been contacted for information on the locations of utility infrastructure in the project vicinity, and preliminary surveys have been conducted, the potential exists for additional buried utility lines (e.g., gas, electrical, cable television, telephone) that have not been identified to be located near or crossing the project area.

Project activities under Alternative 1 are not anticipated to require existing utilities to be temporarily taken off-line during construction. However, should utility shutdowns be required, they would be temporary and brief (minutes to hours), and they would not substantially interfere with service. Construction activities could cause minor accidental damage to both identified and

unidentified public utility infrastructure, resulting in temporary disruptions to service. However, detailed design would include consultation with all potential service providers to identify utility line locations and appropriate protection measures, and consultation would continue during construction to ensure avoidance/protection of these utilities as construction proceeds. Therefore, the potential for damage to utility infrastructure during construction is remote, and if damage were to occur, disruptions to service would be short term and temporary until repairs were completed.

Implementation of Alternative 1 would not result in substantial interference with gas, electrical, cable television, or telephone service. This impact would be less than significant.

Impact LS-5.12-b

Damage of Water Supply and Drainage Facilities and Interference with Service in the Project Area. Various aboveground and buried water supply and drainage lines identified in the project area either are near or cross the Feather River and Yuba River levee segments planned for repair and strengthening and the area considered for a detention basin/soil borrow site. The potential exists for additional buried water supply and drainage facilities that have not already been identified to be located near or to cross these areas. Construction activities associated with project implementation could damage water supply and drainage infrastructure or temporarily disrupt service. However, detailed project design would include consultation with appropriate agencies and individuals responsible for water delivery and drainage facilities in the area to identify facility locations and appropriate protection measures, and consultation would continue during construction to ensure avoidance/protection of these utilities as construction proceeds. In addition, the project would be designed to maintain water supply and drainage service equivalent to existing conditions. Implementation of Alternative 1 would not result in substantial interference with water supply or drainage service. This impact would be **less than significant.**

Existing utilities in each project segment are described in detail above in Section 5.12.2, “Environmental Setting.” In both Segments 1 and 2 buried irrigation pipes and irrigation risers are located adjacent to the levee repair areas and nearby wells and drainage canals (e.g., Clark Slough, Lateral 6 canal, Lateral 7/8 canal, Plumas Lake Canal). Clark Slough terminates at Pump Station No. 2 in Segment 1. Pump Station No. 2 includes a 7-foot by 5-foot box culvert through the Feather River levee to allow gravity flow of drainage water into the river, as well as two 36-inch diameter pipelines through the levee for use when gravity flow is not possible and drainage water must be actively pumped into the river. Canals in Segment 2 drain to Pump Station No. 3, which also includes pipelines that pass through the Feather River levee. The Plumas Lake Canal Cross the area being considered for a detention basin/soil borrow site. In Segment 3, Pump Station No. 9 discharges drainage water into the Feather River via pipes installed in the levee.

On the river side of the Feather River levee in Segment 1 is the Plumas Mutual pump station. This station pumps irrigation water from the river to the land side of the levee via two 36-inch pipelines that cross under the levee. The Linda Water District Wastewater Treatment Plant in Segment 3 includes a 30-inch diameter discharge pipeline that passes beneath the Feather River levee.

These water supply and drainage facilities consist of substantial infrastructure elements, and significant effort could be required to repair, relocate, or replace these elements depending on the levee repair and construction methods implemented at each location. For example, trenching for slurry cutoff walls would likely pass through pipelines and culverts buried in the levee

embankment; repair, replacement, or relocation of the pipelines would be required for service to continue. If stability berms were installed over existing irrigation pipelines or standpipes, these facilities would have to be relocated for service to continue.

During detailed project design the presence of existing water supply and drainage infrastructure would be considered in selecting appropriate levee repair methods and construction practices. Where possible, repair methods and construction practices would be selected that would not affect existing infrastructure. If effects could not be avoided, appropriate infrastructure repair, replacement, or relocation activities would be included in the project design and implemented during construction. Repair, replacement, or relocation of infrastructure elements would provide water supply and drainage service equivalent to existing conditions. The detailed project design would include consultation with appropriate agencies and individuals responsible for water delivery and drainage facilities in the area to identify facility locations and appropriate protection or corrective measures. Consultation would continue during construction to ensure appropriate implementation of avoidance/protection or corrective measures as construction proceeds.

Although reasonable attempts have been made to determine the locations of water supply and drainage infrastructure in the project area, and preliminary surveys have been conducted, the potential exists for additional buried infrastructure elements that have not already been identified to be located near or cross the project area. Construction activities could cause minor accidental damage to both identified and unidentified utility infrastructure, resulting in temporary disruptions to service. However, as stated above, detailed project design would include consultation with all potential service providers to identify infrastructure locations and appropriate protection measures, and consultation would continue during construction to ensure avoidance/protection of facilities as construction proceeds. Therefore, the potential for accidental damage to utility infrastructure during construction is remote, and if damage were to occur, disruptions to service would be short term and temporary until repairs were completed.

Construction of Alternative 1 could result in the need to temporarily take individual water supply and drainage infrastructure elements out of service for short periods. However, various methods are available to prevent or minimize service interruptions: service interruptions could be staged (i.e., one pipeline taken off-line while another pipeline remains available) or timed when service is not needed (i.e., irrigation pipelines shut down during periods of low irrigation demand), or temporary replacement pipelines or other infrastructure could be installed during construction. If utility shutdowns are required, they would be temporary and implemented in a manner designed to avoid adversely affecting service.

Based on the information provided above, implementation of Alternative 1 would not result in substantial interference with water supply or drainage services. This impact would be less than significant.

Impact LS-5.12-c

Potential for Conflicts with Emergency Response Vehicles during Construction. Feather River Boulevard is an emergency-vehicle route. The increased traffic on Feather River Boulevard associated with levee repair and strengthening activities could increase emergency response times and otherwise make access to the area more difficult for emergency service providers. This impact would be **potentially significant.**

Feather River Boulevard provides access for emergency vehicles to areas of southwestern Yuba County and to the Feather River (via the Star Bend Boat Launch and Fishing Access). No accidents related to river recreation that required emergency response have occurred in several years. Development in this part of the county is relatively sparse, including scattered rural residences and two fruit packing warehouses along Feather River Boulevard. However, areas of higher density development occur near the northern end of Feather River Boulevard in project Segment 3, and at the southern end in the Plumas Lake area in Segment 1. Emergency access from SR 70 to areas near this roadway is generally expected to be related to fire control during dry months and flood control during wet months (Boeck, pers. comms., 2002 and 2004).

Project construction would occur over a period of approximately 2 years. It is important that access to areas along Feather River Boulevard remains open for emergencies related to late-season flood events, and particularly for potential fire-control events during the dry season. The increased traffic on Feather River Boulevard from trucks and other vehicles associated with levee repair and strengthening activities could increase emergency response times and otherwise make access to the area more difficult for emergency service providers. This impact would be potentially significant.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impact ASB-5.12-a

Damage of Public Utility Infrastructure and Disruption of Service in the Levee Repair and ASB Levee Setback Areas. Impacts related to utilities in project Segments 1 and 3 and the area considered for a detention basin/soil borrow site would be the same as those described above in Impact LS-5.12-a under Alternative 1. Most of the public utilities in the proposed ASB levee setback area in Segment 2 would no longer be needed and would be removed. However, a PG&E transmission line and two PG&E distribution lines cross this area and would remain in place under project implementation, and floodwaters could threaten the stability of the steel towers and wooden poles that support these lines. In addition, buried utilities could be present in locations that have not been identified in preliminary surveys and contact with service providers. Utilities infrastructure remaining in the levee setback area could be damaged by levee construction, by a proposed soil borrow area, or by floodwaters passing through the setback area, possibly resulting in interruption of service. This impact would be **potentially significant.**

Impacts related to utilities resulting from levee repairs and strengthening in project Segments 1 and 3 and use of the area considered for a detention basin/soil borrow site would be the same as those described above in Impact LS-5.12-a under Alternative 1.

Several electrical transmission and distribution lines are located within the proposed ASB levee setback area in Segment 2, and some above- and belowground telephone lines extend into the area. A buried PG&E natural-gas pipeline also runs along the east side of Feather River Boulevard in the Star Bend area. Buried lines in the levee setback area and the transmission towers and wooden power poles that support the aboveground lines are currently protected from regular flooding by the existing levee. With implementation of the levee setback, flood waters would occasionally flow through the setback area. This flooding could have a detrimental effect on these utilities, as flood waters are likely to inundate any underground utility lines in the levee setback area and could threaten the stability of power poles and transmission towers and the lines they support. In addition, a proposed soil borrow site in the levee setback area could adversely affect aboveground and buried utilities.

All of the telephone lines and most of the electrical lines in the proposed levee setback area serve the existing residences and agricultural wells, buildings, and pump station in the levee setback area and terminate there. These structures and facilities would need to be removed before the setback levee is completed and the floodway is expanded, halting the need for continued service in the levee setback area itself. Those electrical and telephone lines that currently serve these existing uses would be removed as well, and no service disruption would be associated with their removal. It is unclear at this time whether the natural-gas pipeline in Feather River Boulevard near Star Bend only serves facilities in the levee setback area, or whether it is a segment of a longer pipeline that delivers natural gas to other areas. For the purposes of this analysis, a conservative approach is taken and it is assumed that the pipeline serves other areas.

In addition to the electrical lines that terminate in the proposed levee setback area, the PG&E Bogue Loop 115-kV high-power transmission line and two PG&E distribution lines cross the ASB levee setback area. The Bogue Loop line crosses the northern end of the proposed levee setback area in an east-west direction and continues into Sutter County west of the project area. The other lines parallel Ella Avenue and Country Club Avenue and terminate west of the existing levee (Figure 5.12-2). It is assumed that all of these lines would need to be maintained to continue to serve existing uses. However, with implementation of the levee setback, the lower parts of the transmission towers and poles supporting these lines within the levee setback area would be subject to periodic flooding and could be damaged by the force of flood waters in the expanded floodway. The preliminary design of the setback levee suggests that reinforcement of these structures would be necessary, and that the distribution lines may need to be raised at the setback levee crossing. The PG&E natural-gas pipeline in Feather River Boulevard (if it were to be retained) would be subject to the same periodic flooding and could possibly require additional reinforcement or protection, such as being reburied at a greater depth.

Design engineers conducted a preliminary survey in October 2002 of the existing facilities and utilities that would be affected by the levee setback. The following is a summary of the assessment of the identified utilities and conceptual plans for their removal, relocation, or reinforcement, as described in Appendix E, “Preliminary Design,” of Yuba County Water Agency’s (YCWA’s) report on feasibility of the Y-FSFCP (Yuba County Water Agency 2003). Additional or updated information collected in 2006 as part of preliminary design investigations and during additional field reviews has been added where appropriate.

Electrical Transmission Lines. It is expected that the steel towers supporting the Bogue Loop in the levee setback area would remain in their current locations, but that their foundations and the lower part of the towers would need to be reinforced to resist water forces and scour during flood inundation.

Electrical Power Distribution Lines. The 12-kV power distribution lines that currently supply residences, wells, buildings, and pump stations in the levee setback area would be removed from this area once the facilities that are serviced by the lines are removed, or in the case of Pump Station No. 3, relocated to the land side of the levee. In addition, two power distribution lines that service existing river diversion pumps—one line just south of the 115-kV transmission line paralleling Ella Avenue, and the other paralleling Country Club Avenue—cross the Feather River. These two lines would remain in place, but the poles in the levee setback area may need reinforcement. The lines may need to be upgraded where they cross the setback levee to provide

the appropriate clearance in accordance with California Code of Regulations (CCR) Section 123. New distribution lines would be installed to service replacement wells and relocated pump stations.

Natural-Gas Lines. A buried PG&E natural-gas pipeline runs along the east side of Feather River Boulevard in the Star Bend area. It is unclear at this time whether this pipeline only serves facilities in the setback area, or whether it is a segment of a longer pipeline that delivers natural gas to other areas. For the purposes of this analysis, a conservative approach is taken and it is assumed that the pipeline serves other areas and would be retained. Further study would be required to determine whether additional reinforcement or protection would be required (such as being reburied at a greater depth) for the pipeline to withstand periodic flooding in the levee setback area.

Overhead Telephone Lines. In general, telephone lines in the project area are aboveground and secured to power poles. One dedicated overhead phone line was observed along Anderson Avenue, but this line would not be affected by the levee setback. All telephone lines in the levee setback area would be removed when the power distribution lines are removed.

Other. No buried communications lines were identified in the levee setback area. However, more detailed surveys will be conducted during detailed design once access to all of the levee setback area becomes available.

It can be assumed that the levee setback would have no effect on electrical and telephone services that currently terminate in the levee setback area because, as described above, these facilities would be removed along with the residences and any other structures they serve. However, the steel towers supporting PG&E's Bogue Loop, the wooden poles supporting the PG&E electrical distribution lines that cross the levee setback area, and the buried PG&E natural-gas pipeline in Feather River Boulevard near Star Bend could be damaged by flood waters and/or soil borrow activities if these structures are not reinforced adequately before construction of the setback levee. Electrical and/or natural-gas service outside the levee setback area could be disrupted if these facilities are damaged.

In addition, although service providers have been contacted for information on the locations of utility infrastructure and preliminary surveys of the facilities have been conducted, it is possible that some utilities that could be affected by project implementation may not have been identified.

Construction activity has the potential to affect both identified and unidentified electrical, natural-gas, and telephone infrastructure remaining in the levee setback area, and flood water passing through the levee setback area could damage any infrastructure that remains there, possibly resulting in interruption of service. Therefore, this impact would be potentially significant.

Impact ASB-5.12-b

Damage of Water Supply and Drainage Facilities and Interference with Service in the Levee Repair and ASB Levee Setback Areas. Impacts on water supply and drainage facilities in project Segments 1 and 3 and the area considered for a detention basin/soil borrow site would be the same as those described above in Impact LS-5.12-b under Alternative 1. Implementation of the levee setback would cut off local drainage systems and could damage privately owned water supply systems that serve agricultural uses. The

preliminary design for the setback levee includes conceptual plans for abandoning, relocating, and modifying these systems. Three Rivers Levee Improvement Authority (TRLIA) and its design engineers would coordinate with RD 784 and local landowners to relocate pumps and replace wells and irrigation systems as necessary, as determined in final design. Effects of the levee setback on the drainage system are addressed in Section 5.3, "Water Resources and River Geomorphology." The impact on water supply and drainage facilities would be **less than significant.**

Impacts on water supply and drainage facilities resulting from levee repairs and strengthening in project Segments 1 and 3 and the area considered for a detention basin/soil borrow site would be the same as those described above in Impact LS-5.12-b under Alternative 1.

If RD 784 Pump Station No. 3 in project Segment 2 were left in its current location (which is not proposed under any of the three FRLRP project alternatives), it would be inundated by flood waters with implementation of the levee setback and resulting expansion of the floodway. However, Alternative 2 includes relocation of Pump Station No. 3 to the land side of the ASB setback levee. Therefore, there would be no adverse effects on this facility.

Privately owned wells, water fill stations, and irrigation systems in the levee setback area could be inundated by flood waters, and irrigation systems would also be cut off at the setback levee alignment. In addition, water supply and drainage facilities could be damaged by soil borrow activities. Residences and agricultural uses that rely on some of the wells and the water fill stations would be removed from the levee setback area with project implementation, and the facilities that service them would no longer be needed. However, wells and irrigation systems would be needed for agricultural operations that could continue in the levee setback area.

Design engineers conducted a preliminary survey in October 2002 of the existing water delivery and drainage systems as well as public utilities that would be affected by the levee setback. The locations of facilities that were identified during the survey, and conceptual plans for their disposition, are shown in Figure 5.12-2. The following is a summary of the assessment of the identified water service and drainage components and conceptual plans for their removal, relocation, or reinforcement, as described in Appendix E, "Preliminary Design," of YCWA's report on feasibility of the Y-FSFCP (Yuba County Water Agency 2003), supplemented by information on water well requirements. Additional or updated information collected in 2006 as part of preliminary design investigations and during additional field reviews has been added where appropriate.

Drainage Laterals and Ditches. Lateral 6 lies entirely within the levee setback area. The lateral may be abandoned and/or could be integrated with habitat enhancement/restoration measures if these are implemented in the levee setback area.

Lateral 7/8 currently drains westward and discharges into Lateral 6 through a buried culvert. The buried culvert crosses the setback levee footprint and would be removed. Lateral 7/8 would be regraded to drain eastward along Anderson Avenue to Feather River Boulevard. A new drainage ditch would need to be constructed to discharge the lateral to the most convenient point, which could be either north along Feather River Boulevard to Lateral 10, or south along Feather River Boulevard to Lateral 9. The most appropriate route would be selected during detailed design based on topography, access, capacity of existing drainage facilities, and other considerations.

Wells. Approximately 20 wells were identified within the ASB levee setback area. Standards and requirements for wells are described in DWR Bulletins 74-81 and 74-91 (California Department of Water Resources 1981, 1991). In general, one of the objectives of the standards is to prevent surface waters from entering wells that draw usable groundwater supplies of superior quality. Wells are required to be located and constructed so that the top of the well casing terminates above known levels of flooding by drainage or runoff from the surrounding land, unless this is impracticable and the enforcing agency specifies an alternative means of protection. It is assumed that this requirement would apply to existing wells in the levee setback area. Destruction of the wells within the levee setback area and replacement with wells outside the area is presumed to be more feasible than protecting the existing wells, which might require raising and reinforcing power lines and transformers, modifying casings or installing special valves, changing out pumps, and relocating electrical controls; however, modification of existing wells is not precluded as an option for continuing water supply in the levee setback area (Pujol, pers. comm., 2006). Wells within the levee setback area would be destroyed (or modified) in accordance with the applicable water well regulations. Although most of these wells service land and facilities entirely within the levee setback area, some may also supply water to the land east of this area. Therefore, if wells are destroyed, some replacement wells may have to be installed on the land side of the setback levee. Figure 5.12-2 shows conceptual locations for an estimated five replacement wells. In addition, other wells may have to be installed on the land side of the setback levee to irrigate land within the levee setback area that would continue in agricultural production.

Irrigation Lines. Irrigation pipelines are buried beneath the surface of the levee setback area. Surface manifestations include irrigation risers and standpipes. All irrigation lines would be removed from within the footprint of the setback levee and associated toe easements. Within the levee setback area, lines that are to be abandoned would be plugged and abandoned in place. Risers, standpipes, and other aboveground portions of irrigation lines would be removed. However, irrigation lines would be required to remain within the levee setback area to irrigate the land that would continue in agricultural production. It has been assumed that such existing lines would be connected to modified existing wells, or replacement irrigation wells by means of new lines that would cross the setback levee. Pipeline crossings of the setback levee would be designed in accordance with CCR Section 123.

Final design of the levee setback would include coordination with RD 784 and local landowners to relocate pumps and replace wells and irrigation systems as needed. Replacement of privately owned water supply and delivery facilities (wells and irrigation systems) would depend on the extent of the need for continued irrigation of crops throughout the levee setback area. Such replacement would be considered as part of the land management planning for the levee setback area that TRLIA would conduct with landowners, resource agencies, and other stakeholder groups in final design for the setback levee. Impacts of the levee setback on drainage in the levee setback area are addressed in Section 5.3, “Water Resources and River Geomorphology.” The public-service impact of the levee setback on water supply and drainage facilities that could be damaged by construction activity (i.e., excavation) or through inundation would be less than significant.

Impact ASB-5.12-c

Potential for Conflicts with Emergency Response Vehicles during Construction. This impact would be similar to Impact LS-5.12-a described under Alternative 1 above. However, construction traffic on Feather River Boulevard would potentially be greater under Alternative 2 because of the greater number of truck haul trips associated with construction of the setback levee. For the same reasons as described above, this impact would be **potentially significant.**

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impact IS-5.12-a

Damage of Public Utility Infrastructure and Disruption of Service in the Levee Repair and Intermediate Levee Setback Areas. This impact would be similar to Impact ASB-5.12-a, described under Alternative 2 above. However, the extent of affected utilities would be somewhat less under Alternative 3 because the intermediate setback levee alignment is located farther to the west, resulting in a smaller setback area and effects on fewer facilities. For the same reasons as described above, this impact would be **potentially significant.**

Impact IS-5.12-b

Damage of Water Supply and Drainage Facilities and Interference with Service in the Levee Repair and Intermediate Levee Setback Areas. This impact would be similar to Impact ASB-5.12-b, described under Alternative 2 above. However, the extent of affected water supply and drainage facilities would be somewhat less under Alternative 3 because the intermediate setback levee alignment is located farther to the west, resulting in a smaller setback area and effects on fewer facilities. For the same reasons as described above, this impact would be **less than significant.**

Impact IS-5.12-c

Potential for Conflicts with Emergency Response Vehicles during Construction. This impact would be the same as Impact ASB-5.12-c, described under Alternative 2 above. For the same reasons as described above, this impact would be **potentially significant.**

5.12.4 MITIGATION MEASURES

ALTERNATIVE 1 – THE LEVEE STRENGTHENING ALTERNATIVE

No mitigation is required for Impact LS-5.12-a (damage of public utility infrastructure and service disruption in the project area) and Impact LS-5.12-b (damage of water supply/drainage facilities and service interference in the project area). Mitigation is provided below for Impact LS-5.12-c (potential for conflicts with emergency response vehicles).

LS-5.12-c **Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways.** This measure is identical to Mitigation Measure LS-5.11-b, "Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways," in Section 5.11, "Transportation and Circulation." This mitigation would reduce the potential impact to a less-than-significant level.

ALTERNATIVE 2 – THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impact ASB 5.12-b (damage of water supply/drainage facilities and service interference in the levee repair and setback areas).

Mitigation is provided below for Impact ASB-5.12-a (damage of public utility infrastructure and service disruption in the levee repair and setback areas) and Impact ASB-5.12-c (potential for conflicts with emergency response vehicles).

ASB-5.12-a Coordinate with Utility Providers to Remove, Reinforce, and Modify Public Utility Infrastructure in the ASB Levee Setback Area and Prevent Damage of Facilities. This mitigation would reduce the impact to a less-than-significant level.

TRLIA, the design engineers, or the primary construction contractor for the levee setback, as appropriate, shall implement the following measures before the beginning of construction to ensure that the levee setback does not adversely affect public utility infrastructure or result in interruption of utility service:

(a) Coordinate with PG&E to protect electrical lines that cross the levee setback area. To maintain PG&E electrical service through the Bogue Loop 115-kV high-power transmission line and the two standard electrical lines that run along Ella Avenue and Country Club Avenue, TRLIA or its representative shall coordinate with PG&E to raise, relocate, or reinforce the steel towers and wood poles that stand in the proposed bypass area.

(b) Ensure that all utility lines in the setback area have been identified and removed or reinforced as necessary. TRLIA or its representative shall ensure that any electrical, telephone, gas, and cable television lines within the levee setback area have been identified before the initiation of any ground-disturbing construction activity. Before the beginning of any construction-related ground disturbance, TRLIA or its representative shall coordinate with all potential service providers known to have, or potentially having, utility infrastructure in the levee setback area, including but not limited to PG&E, AT&T, Comcast, OPUD, and RD 784, to ensure that the utility lines are removed or reinforced as appropriate.

Ensuring that flooding of the levee setback area would not affect PG&E overhead lines that would remain in the levee setback area, and ensuring removal or protection of all other public utility infrastructure, would reduce this impact to a less-than-significant level.

ASB-5.12-c Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways. This measure is identical to Mitigation Measure LS-5.11-b, "Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways," in Section 5.11, "Transportation and Circulation." This mitigation would reduce the potential impact to a less-than-significant level.

ALTERNATIVE 3 – THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impact IS-5.12-b (damage of water supply/drainage facilities and service interference in the levee repair and setback areas).

Mitigation is provided below for Impact IS-5.12-a (damage of public utility infrastructure and service disruption in the levee repair and intermediate levee setback areas) and Impact IS-5.12-c (potential for conflicts with emergency response vehicles).

IS-5.12-a **Coordinate with Utility Providers to Remove, Reinforce, and Modify Public Utility Infrastructure in the Intermediate Levee Setback Area and Prevent Damage of Facilities.** This measure is identical to Mitigation Measure ASB-5.12-a above. This mitigation would reduce the impact to a less-than-significant level.

IS-5.12-c **Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways.** This measure is identical to Mitigation Measure LS-5.11-b, "Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways," in Section 5.11, "Transportation and Circulation." This mitigation would reduce the potential impact to a less-than-significant level.

5.12.5 IMPACTS REMAINING SIGNIFICANT AFTER MITIGATION

With implementation of the mitigation listed above, all impacts on public services, utilities, and service systems would be reduced to a less-than-significant level.

SECTION 5.13 PALEONTOLOGICAL RESOURCES

Paleontological resources (fossils) are the remains or traces of prehistoric animals and plants. This section assesses the potential for earthmoving activities associated with the proposed levee repairs to affect scientifically important fossil remains, as recommended under the California Environmental Quality Act Guidelines (State CEQA Guidelines). The analysis presented in this section conforms to Society of Vertebrate Paleontology (SVP) criteria.

5.13.1 REGULATORY SETTING

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

No federal plans, policies, or laws related to paleontological resources are applicable to the proposed project.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

No state or local agencies have specific jurisdiction over paleontological resources on private lands. No state or local agency requires a paleontological collecting permit to allow for the recovery of fossil remains discovered as a result of construction-related earthmoving on state or private land in a project site. However, if a state agency were to acquire ownership of project lands, California Public Resources Code Chapter 1.7 ("Archaeological, Paleontological, and Historical Sites"), Section 5097.5, could apply. This section of the Public Resources Code specifies that state agencies may undertake surveys, excavations, or other operations as necessary on state lands to preserve or record paleontological resources.

LOCAL PLANS, POLICIES, REGULATIONS, AND LAWS

No local plans, policies, or ordinances related to paleontological resources are applicable to the proposed project. Yuba County has not adopted goals for protection of paleontological resources.

PROFESSIONAL STANDARDS

The SVP (1995, 1996), a national scientific organization of professional vertebrate paleontologists, has established standard guidelines that outline acceptable professional practices in the conduct of paleontological resource assessments and surveys, monitoring and mitigation, data and fossil recovery, sampling procedures, specimen preparation, analysis, and curation. Most practicing professional paleontologists in the nation adhere to the SVP assessment, mitigation, and monitoring requirements, as specifically spelled out in the organization's standard guidelines. The criteria for determining sensitivity of paleontological resources are described below under "Paleontological Resource Assessment Criteria" and "Thresholds of Significance."

5.13.2 ENVIRONMENTAL SETTING

GEOGRAPHIC LOCATION AND PHYSIOGRAPHIC ENVIRONMENT

As discussed in Section 5.2, "Geology, Soils, and Mineral Resources," the area considered for the Feather River Levee Repair Project (FRLRP) is located in the Sacramento Valley. The Sacramento Valley and the San Joaquin Valley comprise the Great Valley of California, which is located between the Sierra Nevada on the east and the Coast Range mountains on the west.

The Great Valley is composed of thousands of feet of sedimentary deposits that have undergone periods of subsidence and uplift over millions of years. During the Jurassic and Cretaceous periods of the Mesozoic era, the Great Valley existed in the form of an ancient ocean. By the end of the Mesozoic, the northern portion of the Great Valley began to fill with sediment as tectonic forces caused uplift of the basin. By the time of the Miocene epoch, approximately 24 million years ago, sediments deposited in the Sacramento Valley were mostly of terrestrial origin.

Most of the surface of the Great Valley is covered with Recent (Holocene, i.e., 10,000 years Before Present [BP] to present day) and Pleistocene (i.e., 10,000–1,800,000 years BP) alluvium. This alluvium is composed of sediments from the Sierra Nevada to the east and the Coast Range to the west that were carried by water and deposited on the valley floor. Siltstone, claystone, and sandstone are the primary types of sedimentary deposits.

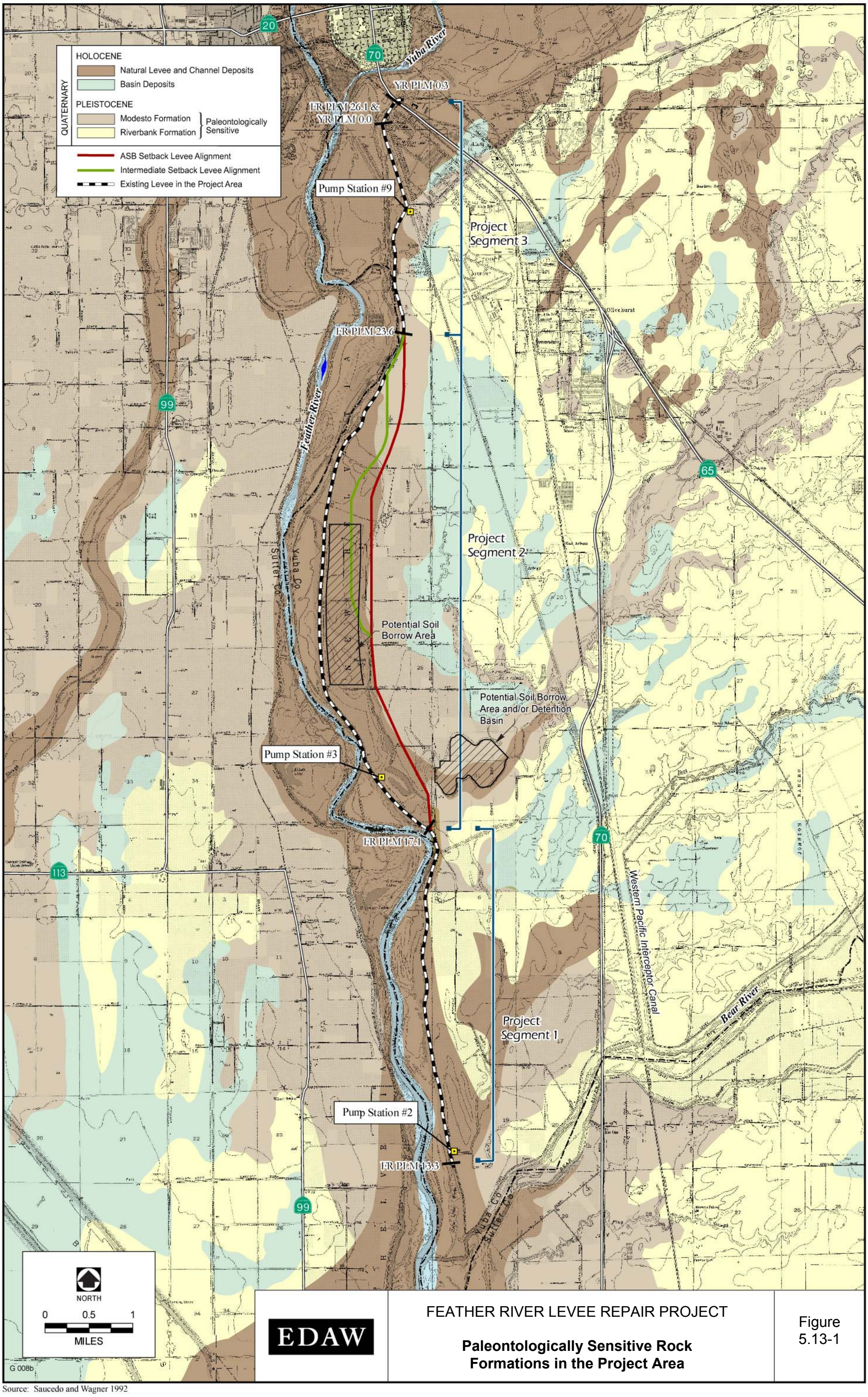
The proposed levee repair area is located entirely within Yuba County and within the U.S. Geological Survey (USGS) Nicolaus, Olivehurst, and Yuba City Quadrangles (1:24,000).

REGIONAL GEOLOGIC SETTING

Geology of the Sacramento Valley has been described in some detail by various authors such as Hackel (1966), Page (1986), Graham and Olson (1988), and Bartow (1991). Geologic history and conditions are relevant to the evaluation of paleontological resources because they influence the type of fossils that may be found (i.e., aquatic vs. terrestrial organisms) and the probability that any prehistoric remains would be subject to fossilization rather than normal decay. As discussed in Section 5.2, "Geology, Soils, and Mineral Resources," the depositional history of the Sacramento Valley during the late Quaternary period included several cycles related to fluctuations in regional and global climate that caused alternating periods of deposition followed by periods of subsidence and erosion. Thus, during the Pleistocene epoch the Sacramento Valley consisted of stages of wetlands and floodplain creation as tidewaters rose in the valley from the west, areas of erosion when tidewaters receded, and alluvial fan deposition from streams emanating from the adjacent mountain ranges (Atwater 1982, Bartow 1991).

Holocene Alluvium

Sediments adjacent to the Feather and Yuba Rivers are composed of Recent (Holocene) alluvial floodplain deposits (Figure 5.13-1, "Paleontologically Sensitive Rock Formations in the Project Area"). In general, these deposits consist primarily of unconsolidated sand and silt. Holocene alluvial deposits overlie an older alluvial fan system composed of Pleistocene-age sediments.



EDAW

FEATHER RIVER LEVEE REPAIR PROJECT

Paleontologically Sensitive Rock Formations in the Project Area

Figure 5.13-1

Source: Saucedo and Wagner 1992

Modesto Formation

Gale et al. (1938) and Piper et al. (1939) were the first to publish detailed geologic maps in the southern Sacramento/northern San Joaquin Valley areas, and designated the older alluvial Pleistocene deposits as the Victor Formation. However, in 1959, Davis and Hall proposed a subdivision of the Victor Formation into the Turlock Lake (oldest), Riverbank (middle), and Modesto (youngest) Formations. The type section (i.e., initial documented discovery) of the Modesto Formation was designated along the south bluff of the Tuolumne River south of the city of Modesto. In 1981, Marchand and Allwardt proposed that the name "Victor Formation" be abandoned and that the Turlock Lake, Riverbank, and Modesto Formations be adopted as formal nomenclature for Quaternary deposits in the Sacramento and San Joaquin Valleys. Researchers since have followed this recommendation.

In the FRLRP project vicinity, the Modesto Formation forms alluvial fans along the Feather River (Figure 5.13-1). Researchers differ as to the age of this formation: Marchand and Allwardt (1981) place the age between approximately 12,000 and 42,000 years BP; Atwater (1982) places the age from 9,000 to 73,000 years BP; and Helley and Harwood (1985) follow Marchand and Allwardt's dating scheme. The Modesto Formation can be divided into an upper and lower member (i.e., distinct upper and lower levels), both of which occur in the project area. The lower member of the Modesto is composed of consolidated, slightly weathered, well-sorted silt and fine sand, locally containing gravels. Age estimates for the lower member range from 42,000 to 73,000 years BP. The upper member of the Modesto is composed of unconsolidated, unweathered gravel, sand, silt, and clay. These deposits form alluvial terraces that are topographically higher than those of the lower member. Age estimates for the upper member range from 12,000 to 26,000 years BP.

Riverbank Formation

Davis and Hall (1959) were the first to name the Riverbank Formation. They designated the type section in the city of Riverbank in an area along the south bank of the Stanislaus River. Sediments in the Riverbank Formation consist of weathered reddish gravel, sand, and silt that form alluvial terraces and fans. In the Sacramento Valley, this formation contains more maficigneous rock fragments than the San Joaquin Valley, and thus tends toward stronger soil-profile developments that are more easily distinguishable from the Modesto Formation.

The Riverbank Formation is Pleistocene in age, but is considerably older than the Modesto Formation; estimates place it between 130,000 and 450,000 years BP. Similar to the Modesto Formation, the Riverbank Formation forms alluvial fans and terraces of the Feather and Bear Rivers; however, Riverbank fans and terraces are higher in elevation and generally have a more striking topography than those formed by the Modesto. In the project area, the Riverbank Formation is found in a mixture with the Modesto Formation, containing more arkosic rocks, along the existing Feather River levee in project Segment 1.

PALEONTOLOGICAL RESOURCE INVENTORY METHODS

A stratigraphic inventory and paleontological resource inventory were completed to develop a baseline paleontological resource inventory of the project area and the vicinity by rock unit, and

to assess the potential paleontological productivity of each rock unit. Research methods included a review of published and unpublished literature and a cursory field survey. These tasks complied with SVP (1995) guidelines.

Stratigraphic Inventory

Geologic maps and reports covering the geology of the project area were reviewed to determine the exposed rock units and to delineate their respective areal distributions in the project area.

Paleontological Resource Inventory

Published and unpublished geological and paleontological literature was reviewed to document the number and locations of previously recorded fossil sites from rock units exposed in and near the project area, as well as the types of fossil remains each rock unit has produced. The literature review was supplemented by an archival search conducted at the University of California Museum of Paleontology (UCMP) in Berkeley, California, on May 30, 2006.

Field Survey

A field reconnaissance was conducted in May 2006 to document the presence of any previously unrecorded fossil sites and of strata that might contain fossil remains. Reconnaissance was limited to inspection of the visible ground surface in the project area. Only those parcels where access was available and that appeared to be underlain by or adjacent to the Modesto Formation were surveyed. The ground surface was clearly visible in all areas surveyed, and the site was completely flat. No exposures of potentially fossiliferous strata were observed in the areas surveyed.

PALEONTOLOGICAL RESOURCE ASSESSMENT CRITERIA

The potential paleontological importance of the project area can be assessed by identifying the paleontological importance of exposed rock units within the area. Because the areal distribution of a rock unit can be easily delineated on a topographic map, this method is conducive to delineating parts of the site that are of higher and lower sensitivity for paleontological resources and to delineating parts of the project area that may therefore require monitoring during construction.

A paleontologically important rock unit is one that (1) has a high potential paleontological productivity rating and (2) is known to have produced unique, scientifically important fossils. The potential paleontological productivity rating of a rock unit exposed at a project site refers to the abundance/densities of fossil specimens and/or previously recorded fossil sites in exposures of the unit in and near the site. Exposures of a specific rock unit at a project site are most likely to yield fossil remains representing particular species in quantities or densities similar to those previously recorded from the unit in and near the site.

A variety of factors are considered in determining whether an individual vertebrate fossil specimen may be considered unique or significant, including whether the fossil is:

- identifiable;
- complete;
- well preserved;
- age diagnostic;
- useful in paleoenvironmental reconstruction;
- a type specimen;
- a member of a rare species;
- a species that is part of a diverse assemblage; or
- a skeletal element different from, or a specimen more complete than, those now available for its species.

For example, identifiable vertebrate marine and terrestrial fossils are generally considered scientifically important because they are relatively rare. The value or importance of different fossil groups varies, depending on the age and depositional environment of the rock unit that contains the fossils, their rarity, the extent to which they have already been identified and documented, and the ability to recover similar materials under more controlled conditions such as part of a research project. Marine invertebrates are generally common, well developed, and well documented. They generally would not be considered a unique paleontological resource.

The following tasks were completed to establish the paleontological importance of each rock unit exposed at the project site:

- The potential paleontological productivity of each rock unit was assessed, based on the number of fossil remains previously documented within the rock unit.
- The potential for rock units exposed within the project site to contain unique paleontological resources was considered.

RESOURCE INVENTORY RESULTS

Stratigraphic Inventory

Regional and local surficial geologic mapping and correlation of the various geologic units in the project vicinity has been provided at a scale of 1:250,000 by Saucedo and Wagner (1992) and 1:62,500 by Helley and Harwood (1985).

Paleontological Resource Inventory and Assessment by Rock Unit

Vertebrate mammalian fossils have proven helpful in determining the relative age of alluvial fan sedimentary deposits (Louderback 1951, Savage 1951, Albright 2000). Mammalian inhabitants

of the Pleistocene alluvial fan and floodplain included mammoths, horses, mastodons, camels, ground sloths, and pronghorns.

The Pleistocene epoch, known as the "great ice age," began approximately 1,800,000 years ago. Surveys of Late Cenozoic land mammal fossils in northern California have been provided by Hay (1927), Stirton (1939), Savage (1951), Lundelius et al. (1983), and Jefferson (1991a, 1991b). On the basis of his survey of vertebrate fauna from the nonmarine Late Cenozoic deposits of the San Francisco Bay region, Savage (1951) concluded that two major divisions of Pleistocene-age fossils could be recognized: the Irvingtonian (older Pleistocene fauna) and the Rancholabrean (younger Pleistocene and Holocene fauna). These two divisions of Quaternary Cenozoic vertebrate fossils are widely recognized today in the field of paleontology. The age of the more Recent Pleistocene, Rancholabrean fauna was based on the presence of bison and on the presence of many mammalian species that are inhabitants of the same area today. In addition to bison, large land mammals identified as part of the Rancholabrean fauna include mammoths, mastodons, camels, horses, and ground sloths.

Holocene Alluvium

Project-related activities that would occur within alluvial floodplain or basin deposits identified in Figure 5.13-1 would be located within Holocene (10,000 years BP and younger) sediments. Because, by definition, an object must be more than 10,000 years old to be considered a fossil, activities in these deposits would not have an impact on paleontological resources.

Modesto and Riverbank Formations

Remains of land mammals have been found at a number of localities in alluvial deposits referable to the Modesto Formation or the Riverbank Formation. Jefferson (1991a, 1991b) compiled a database of California Late Pleistocene vertebrate fossils from published records, technical reports, unpublished manuscripts, information from colleagues, and inspection of museum paleontological collections at more than 40 public and private institutions. Although Jefferson did not list any fossil sites in Yuba County, three nearby sites in Sutter County have yielded Rancholabrean vertebrate fossils recovered from Pleistocene-age sediments. The closest vertebrate fossil to the project site was recovered from an area across the Feather River approximately 3.5 miles west of the levee, near Yuba City (UCMP V-6426), in sediments referable to the Modesto Formation. This site yielded a vertebra from a Pleistocene (Irvingtonian) age Proboscidea, an order that includes mammoths, mastodons, and elephants. UCMP locality V-3915 on Oswald Road, approximately 8 miles northwest of the project area, yielded remains from a Pleistocene-age bison in sediments referable to the Modesto Formation. UCMP locality V-4043 in the Sutter Buttes, approximately 12 miles northwest of the northern end of the project area, yielded remains from a Pleistocene-age horse in sediments referable to the Riverbank Formation.

Fossil specimens from the Modesto Formation have been reported by Marchand and Allwardt (1981) near the type locality in the city of Modesto. These authors also reported fossil specimens from the Riverbank Formation near its type locality in the city of Riverbank. Other locations are also known throughout the northern and Central Valley (University of California Museum of Paleontology 2006). For example, there are several sites approximately 20–30 miles away in

Yolo County, near the cities of Davis and Woodland, that have yielded Rancholabrean-age rodents, snakes, horses, antelope, Harlan's ground sloth, mammoth, and saber-toothed tiger from sediments referable to both the Modesto and Riverbank Formations (Hay 1927, University of California Museum of Paleontology 2004). There are at least eight recorded Rancholabrean-age vertebrate fossil sites from the Riverbank Formation in the city of Sacramento, approximately 20 miles south of the project area (Hilton et al. 2000, Kolber 2004, University of California Museum of Paleontology 2006). These sites have yielded remains of mammoth, bison, coyote, horse, camel, antelope, several types of reptiles, and Harlan's ground sloth.

Results of a paleontological records search at the UCMP indicated no fossil remains within the project area, and no fossils were observed during a cursory field visit. However, the occurrence of Pleistocene vertebrate fossil remains in sediments referable to the Modesto and Riverbank Formations from near Yuba City, other locations in Sutter County, as well as in Davis, Woodland, and numerous other areas throughout the northern and Central Valleys, suggests there is a potential for uncovering additional similar fossil remains in appropriate rock/soil types during construction-related earthmoving activities within the project area.

5.13.3 ENVIRONMENTAL IMPACTS

THRESHOLDS OF SIGNIFICANCE

Thresholds for determining the significance of impacts related to paleontological resources are based on the environmental checklist form in Appendix G of the State CEQA Guidelines, and on the SVP criteria discussed below. Based on the State CEQA Guidelines, a project alternative would have a significant impact on paleontological resources if it would directly or indirectly destroy a unique paleontological resource or site.

In its standard guidelines for assessment and mitigation of adverse impacts on paleontological resources, the SVP (1995) established three categories of sensitivity for paleontological resources—high, low, and undetermined:

- **High sensitivity.** Areas where fossils have been previously found are considered to have a high sensitivity and a high potential to produce fossils. In areas of high sensitivity that are likely to yield unique paleontological resources, full-time monitoring is typically recommended during any project ground disturbance.

- **Low sensitivity.** Areas that are not sedimentary in origin and that have not been known to produce fossils in the past typically are considered to have low sensitivity and monitoring is usually not needed during project construction.

- **Undetermined sensitivity.** Areas or rock formations that have not had any previous paleontological resource surveys or fossil finds are considered undetermined until surveys and mapping are performed to determine their sensitivity. After reconnaissance surveys, observation of exposed cuts, and possibly subsurface testing, a qualified paleontologist can determine whether the area should be categorized as having a high or low sensitivity.

In keeping with the significance criteria of the SVP (1995), all vertebrate fossils are generally categorized as having potential significance based on their scientific value.

IMPACT ANALYSIS

Alternative 1 – The Levee Strengthening Alternative

Impact LS-5.13-a

Disturbance of Unknown Paleontological Resources during Earthmoving Activities. Portions of the project area and immediate vicinity are underlain by the Modesto and Riverbank Formations, which are paleontologically sensitive rock formations. Construction activities in the Modesto and Riverbank Formations associated with proposed levee strengthening (e.g., slurry cutoff walls, relief wells), use of the soil borrow area/detention basin location, and related activities (e.g., relocation of Pump Station No. 3) could adversely affect unknown subsurface paleontological resources. This impact would be **potentially significant**.

Based on the records search conducted at the UCMP, there are no previously recorded fossil sites within the project area. The nearest recorded fossil site, UCMP V-6426, is located approximately 3.5 miles west of the project area. By definition, sediments associated with Holocene-age alluvium do not contain paleontologically sensitive resources; therefore, earthmoving activities in most of the sediments contained within and adjacent to the existing levee would result in no impacts on paleontological resources.

However, segments of the northern portion of the existing levee are located in Pleistocene-age sediments of the Modesto Formation and a portion of the existing levee in the northern portion of project Segment 1 is located in the Riverbank Formation (Figure 5.13-1). In addition, most of the area east of Star Bend that has been identified as a potential detention basin and/or soil borrow site is underlain by Modesto Formation sediments. The Modesto and Riverbank Formations are paleontologically sensitive rock formations under SVP criteria. In these areas, construction activities on and slightly below the existing ground surface would not adversely affect resources because Pleistocene-age fossils would not be encountered until approximately 10 feet below ground surface. However, excavations deeper than 10 feet, such as for the installation of slurry cutoff walls in the levee alignment or installation of relief wells, have the potential to encounter and possibly damage paleontologically sensitive resources. A new location for Pump Station No. 3 has not been identified at this time. If the relocated Pump Station No. 3 were placed in an area underlain by the Modesto Formation rock unit, excavations associated with this facility could also have the potential to encounter and possibly damage paleontologically sensitive resources. This impact would be potentially significant.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impact ASB-5.13-a

Disturbance of Unknown Paleontological Resources during Earthmoving Activities. Portions of the project area and immediate vicinity are underlain by the Modesto and Riverbank Formations, which are paleontologically sensitive rock formations. Construction activities in the Modesto and Riverbank Formations associated with proposed levee strengthening (e.g., slurry cutoff walls, relief wells), construction of the ASB setback levee, use of the soil borrow area/detention basin location, and related activities (e.g., relocation of Pump Station No. 3) could adversely affect unknown subsurface paleontological resources. This impact would be **potentially significant**.

Construction activities to strengthen existing levees in project Segments 1 and 3 and to relocate Pump Station No. 3 could have an adverse impact on paleontological resources, for the reasons described above (for all project segments) in Impact LS-5.13-a. Under Alternative 2, potential

impacts on paleontological resources for project Segments 1 and 3 would be the same as described in Impact LS-5.13-a for Alternative 1.

The northern portion of the proposed ASB levee setback area in project Segment 2 is located entirely within sediments of the Modesto Formation, which is a paleontologically sensitive rock formation under SVP guidelines (Figure 5.13-1) (Society of Vertebrate Paleontology 1995, 1996). The remainder of the ASB levee setback alignment is located on the border between the Modesto Formation and adjacent natural levee and channel deposits, but the final design would favor placing as much of the levee as possible on Modesto Formation sediments because they have better engineering characteristics for levee foundation construction. Piling of soil to form levees or berms on top of the existing ground surface would not adversely affect resources because Pleistocene-age fossils would not be encountered until approximately 10 feet below ground surface. However, excavations deeper than 10 feet (e.g., for the installation of slurry cutoff walls in the setback levee) have the potential to encounter and possibly damage paleontologically sensitive resources. In addition, most of the area east of Star Bend that has been identified as a potential detention basin and/or soil borrow site is underlain by Modesto Formation sediments. This impact would be potentially significant.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impact IS-5.13-a

Disturbance of Unknown Paleontological Resources during Earthmoving Activities. Portions of the project area and immediate vicinity are underlain by the Modesto and Riverbank Formations, which are paleontologically sensitive rock formations. Construction activities in the Modesto and Riverbank Formations associated with proposed levee strengthening (e.g., slurry cutoff walls, relief wells), construction of the intermediate setback levee, use of the soil borrow area/detention basin location, and related activities (e.g., relocation of Pump Station No. 3) could adversely affect unknown subsurface paleontological resources. This impact would be **potentially significant**.

Construction activities to strengthen the existing levee in project Segments 1 and 3 and to relocate Pump Station No. 3 could have an adverse impact on paleontological resources, for the reasons described previously (for all project segments) in Impact LS-5.13-a. Under Alternative 3, potential impacts on paleontological resources for project Segments 1 and 3 would be the same as described in Impact LS-5.13-a for Alternative 1.

Within project Segment 2, most of the proposed intermediate setback levee alignment would occur in Holocene-age sediments (Figure 5.13-1). By definition, sediments associated with Holocene-age alluvium do not contain paleontologically sensitive resources; therefore, earthmoving activities in these areas would result in no impacts on paleontological resources. However, where the alignment occurs at the interface of Holocene-age sediments and sediments associated with the Modesto Formation, the final design would favor placing as much of the levee as possible on Modesto Formation sediments because they have better engineering characteristics for levee foundation construction.

The northern portion of the proposed intermediate setback levee, also within project Segment 2, would be placed in sediments of the Modesto Formation, which is a paleontologically sensitive rock formation under SVP guidelines (Society of Vertebrate Paleontology 1995, 1996). As described above under Impact ASB-5.13-b, piling of soil to form levees or berms on top of the

existing ground surface would not adversely affect resources because Pleistocene-age fossils would not be encountered until approximately 10 feet below ground surface. Excavations deeper than 10 feet (e.g., for the installation of slurry cutoff walls in the setback levee) have the potential to encounter and possibly damage paleontologically sensitive resources. In addition, most of the area east of Star Bend that has been identified as a potential detention basin and/or soil borrow site is underlain by Modesto Formation sediments. Therefore, excavation and grading activities at this location also have the potential to encounter and possibly damage paleontologically sensitive resources. This impact would be potentially significant.

5.13.4 MITIGATION MEASURES

ALTERNATIVE 1 – THE LEVEE STRENGTHENING ALTERNATIVE

Mitigation is provided below for Impact LS-5.13-a (disturbance of unknown paleontological resources).

LS-5.13-a **Conduct Training for Construction Personnel, Cease Work if Paleontological Resources are Encountered, and Implement an Appropriate Mitigation Strategy.** This mitigation measure would reduce the potential impact to a less-than-significant level.

Three Rivers Levee Improvement Authority (TRLIA) or its primary construction contractor shall implement the following measures:

(a) Before the start of construction activities, construction personnel involved with earthmoving activities shall be informed of the possibility of encountering fossils, the appearance and types of fossils likely to be seen during construction activities, and proper notification procedures should fossils be encountered. This worker training may either be prepared and presented by an experienced field archaeologist at the same time as construction worker education on cultural resources, or be prepared and presented separately by a qualified paleontologist.

(b) If paleontological resources are discovered during earthmoving activities, the construction crew shall immediately cease work within at least 25 feet of the find. TRLIA shall retain a qualified paleontologist to evaluate the resource and prepare a proposed mitigation plan in accordance with SVP guidelines (1995). The proposed mitigation plan may include a field survey, construction monitoring, sampling and data recovery procedures, museum storage coordination for any specimen recovered, and a report of findings. Recommendations determined by TRLIA to be necessary and feasible shall be implemented before construction activities can resume at the site where the paleontological resources were discovered.

Implementing this mitigation measure would reduce the potential impact on paleontological resources to a less-than-significant level.

ALTERNATIVE 2 – THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE

Mitigation is provided below for Impact ASB-5.13-a (disturbance of unknown paleontological resources).

ASB-5.13-a **Conduct Training for Construction Personnel, Cease Work if Paleontological Resources are Encountered, and Implement an Appropriate Mitigation Strategy.** This measure is identical to Mitigation Measure LS-5.13-a. Implementing this mitigation measure would reduce the potential impact on paleontological resources to a less-than-significant level.

ALTERNATIVE 3 – THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE

Mitigation is provided below for Impact IS-5.13-a (disturbance of unknown paleontological resources).

IS-5.13-a **Conduct Training for Construction Personnel, Cease Work if Paleontological Resources are Encountered, and Implement an Appropriate Mitigation Strategy.** This measure is identical to Mitigation Measure LS-5.13-a. Implementing this mitigation measure would reduce the potential impact on paleontological resources to a less-than-significant level.

5.13.5 IMPACTS REMAINING SIGNIFICANT AFTER MITIGATION

With implementation of the mitigation described above, all impacts on paleontological resources would be reduced to a less-than-significant level.

CHAPTER 6 CUMULATIVE IMPACTS

6.1 CEQA REQUIREMENTS

Section 15130 of the California Environmental Quality Act Guidelines (State CEQA Guidelines) requires that an environmental impact report (EIR) discuss cumulative impacts of a project when the project's incremental effect is "cumulatively considerable." According to Section 15065, "Cumulatively considerable means that the incremental effects of an individual project are considerable when viewed in the connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects as defined in Section 15130." Sections 15130 and 15355 both stress cumulative impacts in the context of "closely related" projects and from projects "causing related impacts."

Pursuant to Section 15130(b) of the State CEQA Guidelines,

> [t]he discussion of cumulative impacts shall reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great detail as is provided for the effects attributable to the project alone. The discussion should be guided by standards of practicality and reasonableness, and should focus on the cumulative impact to which the identified other projects contribute rather than the attributes of other projects which do not contribute to the cumulative impact.

A project alternative is considered to have a significant cumulative effect if:

- the cumulative effects of related projects (past, current, and reasonably foreseeable future projects) without the proposed project are not significant and the proposed project's additional impact is substantial enough (i.e., is considerable), when added to the cumulative effects, to result in a significant impact; or

- the cumulative effects of related projects (past, current, and reasonably foreseeable future projects) without the proposed project are already significant and the proposed project's incremental effect is cumulatively considerable.

The term "considerable" is subject to interpretation. The standards used herein to determine whether an effect is considerable are that either the impact of the proposed project would contribute in any manner to the existing significant cumulative impact, or the cumulative impact would exceed an established threshold of significance when the proposed project's incremental effects are combined with similar effects from other projects.

When feasible, mitigation measures are to be developed that reduce the project's contribution to cumulative effects.

6.2 PROJECTS WITH EFFECTS SIMILAR TO THOSE OF THE PROPOSED PROJECT

The analysis of cumulative environmental impacts associated with the Feather River Levee Repair Project (FRLRP) addresses the potential incremental impacts of the three proposed project alternatives and associated project components in combination with similar effects of other past, present, and probable future projects. The geographic area considered in the analysis varies depending on the particular resource under consideration and the extent to which it could be influenced by the project. The rationale for the selection of each geographic area under consideration in the cumulative impact analysis is described first in this section. This discussion is followed by information on general development trends in the project area. The final subsection describes relevant individual past, present, and future projects and related studies.

6.2.1 GEOGRAPHIC SCOPE

The geographic area that could be affected by a project alternative varies depending on the type of environmental resource being considered. When the effects of a project alternative are considered in combination with those of other past, present, and future projects to identify cumulative impacts, the other projects that are considered may also vary depending on the type of environmental effects being assessed. The following are the general geographic areas associated with the different resources addressed in the analysis:

- Land use—mostly regional (Yuba County), also some local (project site)
- Geology, soils, and mineral resources—local (project site)
- Water resources and river geomorphology—mostly local (project site; Feather, Yuba, and Bear Rivers), some regional (Sacramento River system)
- Fisheries—mostly local (project site; Feather, Yuba, and Bear Rivers), some regional (Sacramento River system)
- Terrestrial biological resources—mostly local (project site and surrounding areas), some regional
- Recreation—local (project site and adjacent lands)
- Aesthetic resources—immediate vicinity of project site
- Cultural resources—local area
- Air quality—regional (area under the jurisdiction of the Feather River Air Quality Management District [FRAQMD], consisting of Yuba and Sutter Counties)
- Noise—immediate project vicinity where project effects are noticeable
- Transportation and circulation—roadways in the project area

- Public services, utilities, and service systems—local facilities
- Paleontological resources—local area

The geographic context relevant to the consideration of most environmental effects of the three proposed project alternatives is as follows:

- Alternative 1, The Levee Strengthening Alternative—The existing Feather River left (east) bank levee from Project Levee Mile (PLM) 13.3 to PLM 26.1 (from approximately Pump Station No. 2 to the mouth of the Yuba River), and the Yuba River left (south) bank levee from PLM 0.0 to PLM 0.3 (from the confluence with the Feather River to the Union Pacific Railroad crossing at the State Route [SR] 70 bridge). The potential borrow site/detention basin area shown in Figure 4-1, "FRLRP Project Features." Also, lands adjacent to each of these locations.
- Alternative 2, The Levee Strengthening and ASB Setback Levee Alternative—The existing Feather River left bank levee from PLM 13.3 to PLM 26.1 and the Yuba River left bank levee from PLM 0.0 to PLM 0.3. The Above Star Bend (ASB) setback levee alignment shown in Figure 4-1 between approximately Feather River PLM 17.1 and PLM 23.6. Lands between the setback levee alignment and the existing levee. The potential detention basin/soil borrow area site shown in Figure 4-1. Lands adjacent to each of these locations.
- Alternative 3, The Levee Strengthening and Intermediate Setback Levee Alternative—The existing Feather River left bank levee from PLM 13.3 to PLM 26.1 and the Yuba River left bank levee from PLM 0.0 to PLM 0.3. The intermediate setback levee alignment shown in Figure 4-1 between approximately Feather River PLM 17.1 and PLM 23.6. Lands between the setback levee alignment and the existing levee. The potential detention basin/soil borrow area site shown in Figure 4-1. Lands adjacent to each of these locations.

Alternatives 2 and 3 would affect high-flow conditions in the Feather River. Therefore, the listing of individual projects provided later in this section is focused on projects that could directly affect Feather River and Yuba River flood flows and flood protection, in addition to projects that could affect the areas in the vicinity of the project site.

As shown in the listing above, some types of project effects (e.g., land use, flood control, and air quality) are considered on a regional scale. The regional context for the cumulative impact analysis addressing these effects is described more generally rather than in relation to individual development projects, for the reasons discussed below.

Listing individual projects on the broader regional scale for the purposes of cumulative impact assessment would be impractical to attempt and is unnecessary given the nature of the regional impacts under consideration (e.g., agricultural land conversion, short-term air quality effects). Information on these resources is generally collected based on regional resource studies and plans; using these studies and plans, rather than developing lists of projects on a regional basis, ensures that all resource studies and development are considered.

Information on agricultural land conversion in Yuba County was obtained from the Farmland Mapping and Monitoring Program (FMMP) of the California Department of Conservation. These

data are the most complete available on this topic and encompass the land use conversions attributable to all development projects.

The regional context for air quality emissions is the portion of the Northern Sacramento Valley Air Basin (NSVAB) under the jurisdiction of FRAQMD (i.e., Yuba and Sutter Counties), which administers federal, state, and local air quality management programs for Yuba County. The FRAQMD *Indirect Source Review Guidelines* and online CEQA guidance (Feather River Air Quality Management District 1998, 2006) provide recommended thresholds of significance for project-generated emissions. In accordance with these recommended thresholds, a project may be considered to pose a significant air quality impact if project-generated emissions are near or exceed the thresholds. Although cumulative impacts are not discussed in the guidelines, limits are provided that apply to individual projects regardless of pollutant emissions expected from other projects. Therefore, the air quality emissions of individual projects throughout FRAQMD are not discussed, but regional air pollution is considered.

6.2.2 DEVELOPMENT TRENDS IN THE YUBA COUNTY AREA

Because historical land use patterns underlie general present-day trends in regional and local flood protection efforts and environmental changes, information on historical development is summarized here to provide context for the discussion of cumulative impacts. This description is followed by a description of current trends in population and agricultural land conversion.

Historical Flood Control Efforts

Early levee construction was conducted primarily by landowners to address local flooding issues and did not consider the hydraulic impacts on other areas or the natural processes of the rivers. The early levees cut off areas of the floodplain and its water storage capacity, causing flood flows to greatly exceed the capacity of channels in many areas. The impacts of upstream hydraulic gold mining exacerbated the flooding problems. In the early 1900s, the federal and state governments began constructing systemwide flood management facilities that included levees, weirs, and bypass channels designed to protect lives and property, aid navigation, and flush sediment remaining from hydraulic mining. These conveyance facilities improved flood protection and navigation and allowed continued agricultural and urban development but constrained the rivers to specific alignments, significantly reducing channel meandering, and further isolated rivers from their historical floodplains. (U.S. Army Corps of Engineers and State of California Reclamation Board 2002.) As agricultural and urban development increased within the floodplain, more communities and properties were at risk of flooding, and improvements to the system were made periodically to meet local needs. Major modifications, reconstructions, and upgrades have been implemented by the U.S. Army Corps of Engineers (Corps) over the years in response to deficiencies identified during flood events.

Large-scale dam construction began in the 1930s and continued into the 1970s. Major dams include Oroville Dam on the Feather River and New Bullards Bar Dam and Englebright Dam on the Yuba River. These and other dams and reservoirs provide flood control benefits by reducing seasonal high flows so that downstream flood conveyance systems can operate more safely and effectively. They also provide numerous other benefits, such as recreational opportunities and water supply for municipal uses, crop irrigation, and energy generation.

Current Trends in Population Growth and Conversion of Agricultural Land

The population of Yuba County grew moderately in recent decades, increasing by 3.4% between 1990 and 2000. The Sacramento Area Council of Governments (SACOG) projects a more rapid population increase for the county in the coming years as approved master planned developments begin construction and transportation improvements stimulate further development in Yuba County. (Yuba County Community Development Department 2004.) This is evident from population growth since 2000 compared to population growth in the 1990s. According to U.S. Census records, the population in Yuba County grew from 58,228 in 1990 to 60,219 in 2000, an increase of 3.4% (California Department of Finance 2000). The current population as of January 1, 2006, is estimated to be 69,827 (California Department of Finance 2006), an increase of 16% since 2000.

The county's population is projected to reach approximately 97,561 by 2020 and 109,875 by 2025 (Sacramento Area Council of Governments 2004). The gain in new residents would be approximately 40,048 by 2025, or a little more than 35%. Yuba County and the cities within the county are facing numerous regional growth issues pertaining to air quality degradation, traffic generation, biological habitat loss, loss of farmland, and other environmental changes related to urban development.

Table 6-1, "Land Use Conversions Involving Important Farmland," shows the recent data compiled by the FMMP on land use conversions involving Important Farmland (Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance) in Yuba County. Although the FMMP data also include statistics on grazing land, these are not included in Table 6-1 because conversion of grazing land to nonagricultural uses is not used as a threshold of significance in CEQA and in the analysis of project effects.

As indicated by a comparison between the net totals for acreage changes and the total changes in acreage attributable to conversion to urban and built-up land, most of the reported conversions of Important Farmland are to FMMP land use categories other than "urban and built-up land." These other areas include "grazing land" and "other land." The majority of the acreage converted to "grazing land" was agricultural land being fallowed. "Other land" may include land uses such as feedlots and other rural uses, low-density rural residential, government lands, and road systems.

6.2.3 PAST, PRESENT, AND FUTURE PROJECTS

This section describes implemented, developed, or planned projects that may result in environmental effects similar to those of the FRLRP, such that these effects, when combined, constitute cumulative impacts. It also describes some important studies that are expected to provide the basis for development of future projects. The projects and studies are grouped into three general categories: flood control efforts, development projects, and ecosystem and habitat restoration efforts. These categories provide a basis for discussing general types of environmental effects, but components of these studies and projects could potentially belong in more than one category.

Table 6-1
Land Use Conversions Involving Important Farmland

Changes in Important Farmland	Yuba County (Acres)
Total Acreage of Important Farmland Inventoried	
1992	93,662
1994	94,307–94,419*
1996	95,336–95,347*
1998	93,745–93,756*
2000	90,176
2002	89,217
2004	86,880
Total Losses and Gains of Important Farmland	
1992–1994	-69 + 714 = 645 net gain
1994–1996	-889 + 1,806 = 917 net gain
1996–1998	-2,428 + 837 = 1,591 net loss
1998–2000	-4,596 + 1,027 = 3,569 net loss
2000–2002	-2,530 + 1,574 = 956 net loss
2002–2004	-3,003 + 705 = 2,298 net loss
Amount of Important Farmland Converted to Urban and Built-Up Land	
1992–1994	15
1994–1996	55
1996–1998	0
1998–2000	86
2000–2002	14
2002–2004	4

* Total number of acres inventoried for these years differs between Farmland Mapping and Monitoring Program reports because of changes in mapping methods.

Sources: California Department of Conservation 1996, 1998, 2000a, 2002a, 2004a, 2006

Flood Control Efforts

This section describes past, present, and future studies and projects that are related to flood control in the project vicinity. The section focuses on levee improvement projects in the project area and additional nonlevee flood control projects that are planned or under study. Many of the nonlevee flood control projects that are planned or under study were described in the Yuba-Feather Supplemental Flood Control Project (Y-FSFCP) programmatic EIR. Information from the Y-FSFCP programmatic EIR is summarized below; however, see the programmatic EIR for complete descriptions of these potential future flood control elements.

Some of the efforts discussed below are ongoing and provide recommendations and guidance for developing future flood control projects. In these instances, there is no specific, reasonably foreseeable project to include in the evaluation of cumulative impacts provided in Section 6.3, but these efforts are described here to provide a more complete context for understanding the relationship of the FRLRP to regional flood control efforts.

Emergency Levee Repairs

In February 2006, the Governor declared a state of emergency for California's levee system and signed Executive Order S-01-06 to allow the California Department of Water Resources (DWR) to repair critical levee erosion sites. Since that time, DWR has identified 29 critical erosion sites within the Sacramento River flood control system, in Colusa, Sacramento, Solano, Sutter, Yolo, and Yuba Counties.

Under a Memorandum of Understanding signed by the key federal permitting agencies (the National Marine Fisheries Service [NMFS], the U.S. Fish and Wildlife Service [USFWS], the Corps, and DWR, the federal agencies agreed to expedite federal permitting to ensure that critical repairs are completed. As part of the agreement, the State of California would be required to ensure that levee repair projects are planned to avoid jeopardizing threatened or endangered species and to maintain water quality, and that they consider other relevant environmental effects.

As of June 27, 2006, DWR had obtained all necessary environmental permits and regulatory approvals to repair the 29 critical levee erosion sites. Construction on most of the sites is planned to begin in July 2006 and be completed by November 2006. DWR will be responsible for repairing erosion at 19 levee sites, and the Corps will repair erosion on 10 levee sites. Most of the erosion repairs are expected to consist of placing rock on the water side of the levee. The repairs would reestablish the levee slope and the supporting toe structure, bringing the levee up to its original level of flood protection. At least four of the 29 sites will require a setback levee design. (DWR 2006a.)

In the FRLRP project vicinity, DWR plans to repair two erosion sites on the left (south) bank Bear River levee in Sutter County: one at River Mile (RM) 2.4 near Rio Oso, and one at RM 10.1 near Wheatland. Of the remaining sites, 21 are on the Sacramento River in Colusa, Sacramento, Sutter, and Yolo Counties; five are on Cache Creek in Solano and Yolo Counties; and one is on Steamboat Slough in Solano County. (DWR 2006b.)

Locally Planned Projects to Improve and Reconstruct Local Levees

Feather River Setback Levee at Star Bend Project

The proposed Feather River Setback Levee at Star Bend Project would be implemented by Sutter County. The project is located in Sutter County on the right (west) bank of the Feather River, less than 1 mile northeast of the intersection of SR 99 and Garden Highway. The project would construct a setback levee that would begin near Feather River RM 18.0 and extend in a southeasterly direction from the intersection of Star Bend Boulevard and the existing right bank Feather River levee at Levee District (LD) No. 1 Levee Mile 4.5 to the approximate intersection of Tudor Road with the right bank Feather River levee at LD 1 Levee Mile 3.75. The total

approximate length of the setback levee would be approximately 3,330 feet. The setback levee alignment is currently planted in orchards. Agricultural land in the setback levee alignment is designated by the FMMP as Prime Farmland and Farmland of Local Importance. This project is anticipated to begin construction in spring 2007. (EIP Associates 2006.)

Three Rivers Levee Improvement Authority Flood Control Improvements

The FRLRP is part of Phase 4 of Three Rivers Levee Improvement Authority's (TRLIA's) four-phase program of flood control improvements for southwestern Yuba County. Phase 1 was completed in 2004, construction of Phases 2 and 3 began in September 2005 and is expected to be completed in 2006, and the Yuba River (non-FRLRP) portion of Phase 4 is expected to be constructed in 2006. The improvements are intended to address factors that may compromise the integrity of the existing levees, including:

- deficiencies in levee height relative to the 100-year and 200-year storm events,
- levee through-seepage and underseepage, and
- wind and wave erosion on levee slopes.

The elements of the four work phases that are expected to contribute, along with the FRLRP, to cumulative flood control benefits and other cumulative environmental effects are listed below.

Phase 1 Improvements (2004)

- **Yuba River Levee:** Construction of a 50-foot-deep slurry cutoff wall through the top of the levee from SR 70 to a site that breached in 1986, a length of 2,200 feet.

Phase 2 Improvements (2005)

- **Yuba River Levee:** Construction of 90- and 300-foot-wide landside seepage berms to protect against underseepage.

- **Olivehurst Detention Basin:** Improvements to major drain channels in the Olivehurst basin, including widening and deepening of these channels, Clark Lateral and Clark Slough, to accommodate 100-year flows; construction of a detention basin to store floodwaters; modifications to the culvert under SR 70 to prevent backflow from the Bear River; and connection of a forcemain to a new stormwater pumping facility, which would be designed to pump the 100-year storm event out of the pond over a 3-day period.

- **Upper Western Pacific Interceptor Canal (WPIC) Levee:** Construction of a 500-foot-long, 38-foot-deep slurry cutoff wall and an 1,100-foot, 44-foot-deep slurry cutoff wall to minimize underseepage at Plumas Lake.

- **Lower WPlC Levee:** Construction of a landside toe ditch filled to provide protection against underseepage.

- **Upper Bear River Levee:** Reconstruction of 300 feet of levee and construction of rock slope protection at the confluence with the WPIC to provide erosion protection.

Phase 2 Improvements (2006)

- **Olivehurst Detention Basin:** Construction of a ring levee between SR 70 and the Clark Lateral levee.
- **WPIC Levee:** Construction of a levee crown raise to provide adequate freeboard.
- **Upper Bear River Levee:** Construction of a levee crown raise to provide adequate freeboard and a waterside impervious zone to prevent through-seepage. Removal of Pump Station No. 6 and installation of a new setback pump station to protect against underseepage at the Algodon Canal. Tie-in for the Bear River setback levee.

Phase 3 Improvements (2005)

- **Lower River Bear Levee:** The following activities were completed in 2005 as part of the Feather-Bear Rivers Levee Setback Project (F-BRLSP):
  - clearing, grubbing, and stripping of the setback levee foundation;
  - excavation and backfilling of approximately 9,500 feet of inspection trench;
  - construction of approximately 9,500 feet (430,000 square feet) of soil-bentonite slurry cutoff wall;
  - construction of a setback levee tie-in embankment with the existing Feather River levee; and
  - initial construction of detention basins.

Phase 3 Improvements (2006–2007)

- **Lower River Bear Levee:** The following activities are being completed in 2006 as part of the F-BRLSP:
  - demolition of existing structures within the levee setback area,
  - completion of planned tree removal in the setback area,
  - construction of the setback levee embankment,
  - installation of approximately 18 relief wells,
  - completion of construction of two detention basins with total capacity of 300 acre-feet,
  - removal of portions of the existing Bear and Feather River levees, and
  - construction of a floodplain swale to mitigate potential fish stranding.
- **Environmental Restoration:** Planting of more than 600 acres of native habitat types in the levee setback area and the existing Bear River floodway.

Phase 4 Improvements (2006–2007)

- **Upper Yuba Levee:** Construction of a cutoff wall between the Union Pacific Railroad track and Simpson Lane to protect against underseepage. Filling of a ditch along the water side of the Yuba River levee east of Simpson Lane near the Goldfields.

Recent and Planned U.S. Army Corps of Engineers Projects to Improve and Reconstruct Local Levees

Sacramento River Flood Control System Evaluation Phase II Project

In the 1990s, the Corps performed an extensive levee evaluation and reconstruction effort of the Feather and Yuba River levees as part of the Sacramento River Flood Control System Evaluation Phase II Project (System Evaluation). The purpose of the project was to restore the design level of flood protection provided by the levees. The Feather River levee crest was reestablished to its original grades, and a landside stability berm and drain were installed between PLM 20.1 and PLM 23.0 (north of Broadway). Remedial modifications for the 3-mile-long reach of the Feather River levee from Broadway to Star Bend (between PLM 17.1 and PLM 20.1) were also completed; this work consisted mainly of the installation of a 70-foot-deep slurry cutoff wall along the waterside toe of the levee. A shallower slurry cutoff wall was installed through the crest of the levee between PLM 16.6 and PLM 17.1 along Feather River Boulevard just downstream of Star Bend. A landside stability berm and drain were installed between PLM 15.9 and PLM 16.6 south of Star Bend. (Yuba County Water Agency 2003b.)

Marysville–Yuba City Mitigation Area: Adjacent to the Above Star Bend project area is the Marysville–Yuba City Mitigation Area, a site established and maintained by the Corps to mitigate the loss of habitat associated with the System Evaluation levee work in the Marysville and Yuba City areas. This project consolidates mitigation requirements resulting from work on levees into one large area for a better functioning system. The project site is 75.8 acres, which includes 2.2 acres of seasonal wetland and 73.6 acres of riparian forest and uplands. The project is near the southern portion of FRLRP project Segment 2 on a high terrace, above the average summer flows of the Feather River. The land had been under crop production for many years, but site conditions were favorable for riparian forest restoration as well as seasonal wetland creation. The seasonal wetland was incorporated to provide sufficient groundwater levels for the riparian forest. Additionally, a small bioengineered drainage was excavated between the river and wetland area to limit damage to the wetland from flood waters.

Yuba River Basin Investigation

In 1998, the Corps conducted a feasibility study to increase the level of flood protection for Yuba County. This project is referred to as the Yuba River Basin Investigation or the Yuba River Basin Project. The purpose of the levee improvements included in the project is to raise the probable nonfailure point of the existing levee system (defined as the highest water level at which it is highly likely that the levee would not fail) by strengthening the levees, and thus to increase the level of flood protection. The work consists of extensions and/or additions to the System Evaluation reconstruction work. Some of the Yuba River Basin Project work has already been completed in conjunction with the System Evaluation work, including work between Feather River PLM 20.1 and PLM 23.0, between PLM 16.6 and PLM 17.1, and between PLM 15.9 and PLM 16.6; additional improvements are planned, consisting of extensions and/or

additions to the System Evaluation reconstruction work. In 2003, new Corps underseepage guidelines led to reevaluation of the project, which substantially increased the estimated cost. Because of this cost increase, the project must be reauthorized by Congress. Congressional reauthorization is currently being sought. Project components would include deepening slurry cutoff walls, removing some berms, installing some new slurry cutoff walls, increasing the widths of some berms, adding impervious fill and drain blankets to the levees, relocating slurry cutoff walls from the levee toe to crown, and reshaping some levees (U.S. Environmental Protection Agency 2004).

Nonlevee Flood Control Projects

Oroville Facilities Relicensing Process

DWR constructed and operates the Oroville Facilities (dam, reservoir, powerhouse, afterbay, etc.). The facilities store and deliver water to municipal, industrial, and agricultural users and local senior water rights holders. In addition, the facilities are operated to provide power generation, improve water quality in the Sacramento–San Joaquin Delta, manage the Feather River floodwaters, provide recreation, and enhance fish and wildlife. The Oroville Facilities are operated under a license issued by the Federal Energy Regulatory Commission (FERC) on February 11, 1957, for a term of 50 years. The license for the facilities will expire on January 31, 2007. As required by the Federal Power Act and the FERC regulations, DWR (the licensee) filed an application for a new license on January 31, 2005, although studies, analysis, public outreach, and other activities related to relicensing were initiated well before the application was filed.

DWR, federal and state agencies, Native American tribes, local government officials, and interested members of the public have actively participated in the relicensing process as a collaborative team to identify issues; plan studies; and consider potential protection, mitigation, and enhancement measure (PM&E) measures. DWR issued a National Environmental Policy Act (NEPA) Scoping Document 2 and Amended CEQA Notice of Preparation on February 25, 2003, to further the public's understanding of the Oroville Facilities and solicit comments on the scope of the environmental assessment of the project (California Department of Water Resources 2003). FERC is expected to issue a draft environmental impact statement under NEPA for the Oroville Facilities Relicensing in September 2006, with a final environmental impact statement to follow in March 2007. DWR anticipates releasing a draft EIR under CEQA in November 2006, with a final EIR to follow in March 2007. The proposed action/proposed project is the implementation of the new terms and conditions contained in the new FERC license and settlement agreement. Terms and conditions will include PM&E measures that could have direct or indirect effects on the environment. Some of these measures remain programmatic in nature, while others have been sufficiently developed for reasonably foreseeable environmental effects of the proposal to be identified. It is likely that any modified operations resulting from the FERC relicensing process would have less environmental impact than operations under the current 50-year license granted in 1957.

New Colgate Powerhouse Tailwater Depression Project

Implementation of the New Colgate Powerhouse tailwater depression project would overcome a physical limitation of the powerhouse that requires the curtailment of releases from New Bullards Bar Reservoir through the powerhouse during periods of higher flows.

Currently, when flow in the Yuba River exceeds about 10,000 cubic feet per second (cfs) (including spillway discharges from New Bullards Bar Dam), the river stage begins to submerge the turbines at New Colgate Powerhouse and affect turbine operation, resulting in the need to reduce the releases from the powerhouse. The powerhouse must be totally shut down when river flows exceed 25,000 cfs. Curtailing flows through the powerhouse during periods of high river flows reduces the allowable rate of release from New Bullards Bar Reservoir. As a consequence, the amount of reservoir flood storage that can be kept empty ahead of the flood peak is reduced. A tailwater depression system would overcome this limitation, thereby allowing releases to continue through the powerhouse during high flows and increasing the amount of reservoir flood storage space available to incoming floodwaters. This project was approved in 2002 and detailed design was completed in 2004, but has since been put on hold. Yuba County Water Agency (YCWA) intends to implement this project in the future when funding becomes available, but no defined schedule for project initiation has been identified.

Lake Oroville Surcharge Operations and Thermalito Afterbay Emergency Reoperation

The Lake Oroville surcharge operations (also called Oroville Dam modification) and Thermalito Afterbay emergency reoperation would involve improved flood storage capabilities at State Water Project (SWP) facilities on the Feather River. Surcharge of Lake Oroville was initially envisioned as using inflatable crest gates on the Oroville Dam emergency spillway to create additional temporary flood storage capability. It was subsequently determined that surcharging could be done by managing releases through the spillway gates, although spills over the emergency spillway would cause erosion. The proposed emergency reoperation of Thermalito Afterbay would use the operating pool at Thermalito Afterbay for flood control.

Both of these measures would need to be implemented by DWR, which operates the Oroville-Thermalito Complex. YCWA prepared technical memoranda on these proposals for DWR consideration (Yuba County Water Agency 2002a, 2002b) and recommends their implementation by DWR to improve flood control operations in the Yuba-Feather River Basin; however, DWR has no specific plans for their implementation.

Yuba-Feather River Forecast-Coordinated Operations Program

The Yuba-Feather River Forecast-Coordinated Operations (F-CO) Program is a cooperative planning and model development process directed toward strengthening flood control operations for the Yuba and Feather Rivers. This program is in the first stages of implementation. The program objective is to maintain flow targets at key downstream points on the Feather River during high-water events. This objective will be achieved through the following program components:

- integrating flood control operations of Lake Oroville, operated by DWR, with New Bullards Bar Reservoir, operated by YCWA;
- improving flood forecasting by installing new gauging stations and refining forecasting methods;

- developing a Decision Support System with enhanced communication protocols that will improve coordinated operations during major floods; and
- updating emergency management protocols for both YCWA and the SWP.

Conceived and approved by the YCWA flood control study team as an element of the Y-FSFCP, the program is being implemented cooperatively by YCWA, the National Weather Service, the Corps, and DWR. As of November 2005, nine of 12 planned new precipitation gauges had been installed throughout the watershed, two snow pillows were planned for installation by summer 2006, a new stream gauge had been installed on the North Fork Yuba River, and planning was under way for the installation of six additional stream gauges in the watershed (California Department of Water Resources 2005). Improved flood forecasting and coordination of the flood control operations of the Oroville and New Bullards Bar facilities are expected to provide significant regional flood control benefits downstream, particularly along the Yuba and Feather Rivers. One reasonably foreseeable application of F-CO is the use of improved inflow forecasts to initiate flood releases in advance of those required by Corps reservoir operating rules (i.e., before the encroachment of reservoir inflows into the flood reserve space), which will help reduce potential downstream flood flow peaks and make additional reservoir storage space available to incoming flows (Yuba County Water Agency 2003b).

New Bullards Bar Reservoir Outlet/Spillway Capacity Increase

The New Bullards Bar Outlet Capacity Increase was proposed and approved by YCWA as an element of the Y-FSFCP. As conceived, the project would entail doubling release capability at the bottom of the reservoir flood pool of New Bullards Bar Reservoir through the addition of a new upper-level outlet works to augment the existing dam outlets. The new outlet system would provide the physical means to release water in early stages of, or in advance of, a storm. Although YCWA completed a feasibility study for this element that included a project-level environmental review (Yuba County Water Agency 2003c), this flood control element was not carried forward into detailed design because of funding limitations. When implementation funding becomes available, YCWA intends to pursue a modified version of this element, the New Bullards Bar Spillway Capacity Increase.

Development Projects

This section provides a general description of major current and planned development projects in Yuba County. See “Current Trends in Population Growth and Conversion of Agricultural Land” above for information on total conversion of Important Farmland attributable to all projects since 1992. These projects are considered for purposes of this analysis to be “current” or “reasonably foreseeable.” Environmental clearances and permitting for some developments in the Plumas Lake Specific Plan and East Linda Specific Plan areas have been obtained and development in these areas has already begun. Development in the River Highlands Community Plan area is undergoing review by Yuba County (County).

Plumas Lake Specific Plan

The Plumas Lake Specific Plan would develop or redevelop approximately 5,300 acres in the vicinity of historic Plumas Lake. The specific plan area is located west of SR 70 between

Olivehurst and the Bear River, just east of the proposed FRLRP levee setback areas. The plan includes low-, medium-, and high-density residential development; shopping centers; business parks; and medical centers. Development began in 2002 and is expected to remain roughly constant (assuming that adequate flood protection can be provided), with construction occurring at a uniform pace, until full buildout in approximately 20 years. As of June 2005, 17 subdivision tract maps, representing 14,767 residential lots, had been approved or were being considered for County approval (Yuba County Community Development and Public Works 2005). The most recent available FMMP mapping shows approximately 2,700 acres in this development area classified as Important Farmland (California Department of Conservation 2002b).

East Linda Specific Plan

The East Linda Specific Plan would develop 1,760 acres, of which 1,330 acres would be residential development and 430 acres would be commercial development. The southwestern boundary of the plan area is about 3 miles northeast of the proposed FRLRP levee setback areas. The specific plan area is bounded by the Linda levee on the north, Erle Road on the south, Yuba College and urban areas of Linda on the west, and Griffith Avenue on the east. Planned land uses include schools, parks, and recreation/floodway easements. Development began in 2002 and is expected to remain roughly constant, with construction occurring at a uniform pace, until full buildout in approximately 20 years (Yuba County Water Agency 2003c). As of July 2005, eight subdivision tract maps, representing 2,482 residential lots, had been approved or were being considered for County approval (Yuba County Community Development and Public Works 2005). The most recent available FMMP mapping shows approximately 200 acres of Important Farmland in this area (California Department of Conservation 2002b).

River Highlands Community Plan

The River Highlands Community Plan, which was approved in December 1993, would develop approximately 22,600 acres, of which 14,115 acres would be residential development, 42 acres commercial development, 540 acres industrial development, 1,218 acres public land, 108 acres for schools, and 6,600 acres open space. The area is bordered by the Yuba River on the north, Nevada County on the east, and Beale Air Force Base on the south and west (Cotter, pers. comm., 2003). None of the River Highlands Community Plan area is designated as Important Farmland (California Department of Conservation 2002b). A draft specific plan for a portion of the community plan area, called Yuba Highlands, was submitted to the County in September 2002. The Yuba Highlands development would encompass approximately 3,000 acres and would be the first major development in the River Highlands Community Plan area. Development in the Yuba Highlands area would include a mix of land uses, including residential development at various densities, commercial development, industrial development, and open space. (Yuba Foothills Associates 2002.) The specific plan is being evaluated in an EIR, and the project is undergoing County review (Yuba County Community Development and Public Works 2005).

Other Recent Development Projects

Other development projects that were recently approved or are currently under consideration by the County include several small subdivisions in the Loma Rica/Browns Valley and Linda communities (e.g., East Linda Estates, Oak Grove Estates, Rothwell Estates), as well as eight

subdivisions, totaling approximately 2,200 residential units, in the North Arboga Study Area (e.g., Pheasant Point, Hawes Ranch Estates, Feather Glen, Thoroughbred Acres, Draper Ranch South, Village Greens) (Yuba County Community Development and Public Works 2005). In addition, EIRs are currently being prepared for an approximately 2,100-housing-unit mixed-use development that would be annexed into the Plumas Lake Specific Plan Area, and the Woodbury project near Olivehurst, a proposed 6,500-housing-unit mixed-use development.

The following are other development projects in Yuba County identified by the California Department of Conservation as having converted land classified by the FMMP as Important Farmland, grazing land, or other land to urban and built-up uses between 1998 and 2004 (California Department of Conservation 2000, 2002a, 2002b, 2004b):

- **Sacramento Valley Amphitheater**—converted approximately 25 acres of Important Farmland to public use near Olivehurst;
- **Pacific Millwork Processing Plant**—converted approximately 10 acres of Important Farmland to industrial use near Olivehurst;
- **three Mariani Fruit Packing Plants**—converted approximately 45 acres of Important Farmland to industrial uses north of Marysville;
- **expansion of the Yuba-Sutter Recovery Facility**—converted approximately 10 acres of grazing and other land to industrial use near Marysville;
- **Gold Village Housing Community**—converted approximately 30 acres of grazing and other land to residential use near Smartville;
- **American Wood Fibers Processing Plant**—converted approximately 15 acres of grazing and other land to industrial use near Olivehurst;
- **Norcal Moulding Processing Plant**—converted approximately 5 acres of grazing and other land to industrial use near Olivehurst;
- **expansion of Ostrom Road Landfill**—converted approximately 35 acres of grazing and other land to landfill near Beale Air Force Base;
- **expansion of the Sleep Train Amphitheatre parking lot**—converted irrigated farmland to urban land;
- **Wheatland Ranch Homes**—converted approximately 50 acres of grazing and other land to residential use in Wheatland;
- **development of new homes (no project name)**—converted approximately 20 acres of grazing and other land to residential use near Wheatland and west of SR 65;
- **Wal-Mart**—converted approximately 10 acres of grazing and other land to commercial use near Linda; and

- **Beale Heights**—converted approximately 15 acres of grazing and other land to residential use near Beale Air Force Base.

Additional development since 2004 has also resulted in the conversion of farmland. However, this information is not yet available from the California Department of Conservation.

Ecosystem and Habitat Restoration Efforts

Under the FRLRP, land uses in the proposed levee setback area in project Segment 2 could consist of agricultural operations and/or habitat restoration activities that are compatible with flood control objectives. No specific plans for habitat restoration in the levee setback area are proposed at this time, although this is considered a potential future use. It is possible that several hundred to more than 1,000 acres of habitat in the levee setback area could be restored at some time in the future. Therefore, this section describes major studies and projects related to habitat and floodplain management and restoration along the Sacramento, Feather, and Yuba Rivers and tributaries, the effects of which could combine with possible FRLRP restoration activities to result in cumulative effects.

CALFED Bay-Delta Program

Initiated in 1995, the CALFED Bay-Delta Program (CALFED) is a collaboration among state and federal agencies and the state's leading urban, agricultural, and environmental interests to address and resolve environmental and water management problems associated with the San Francisco Bay/Sacramento–San Joaquin Delta (Bay-Delta) system. The mission of CALFED is to develop and implement a long-term comprehensive plan that would restore ecological health and improve water management for beneficial uses. CALFED addresses four interrelated, interdependent programs concurrently: water supply reliability, water quality, ecosystem restoration, and levee system integrity.

The Feather and Yuba Rivers are addressed in the Ecosystem Restoration Program (ERP). The ERP effort presents the visions for ecological management zones in the Bay-Delta system and their ecological management units. The Feather River/Sutter Basin Ecological Management Zone includes Feather River and Yuba River Ecological Management Units.

The visions for the Feather River Ecological Management Unit include the following (CALFED Bay-Delta Program 2000):

- Improve natural spawning populations of spring- and fall-run chinook salmon and steelhead. This involves improving spring (March) flows below Oroville in dry and normal water years, improving spring-through-fall base flows, providing suitable water temperatures for summer rearing, and improving spawning and rearing habitat in the lower river below Oroville.

- Reactivate or maintain important ecological processes that create and sustain habitats for anadromous fish. The most important processes include floodplain and flood processes and a natural streamflow pattern in the river, to which most of the anadromous and resident native fishes are adapted.

The visions for the Yuba River Ecological Management Unit include the following (CALFED Bay-Delta Program 2000):

- Improve spring streamflows for spawning runs of spring-run chinook salmon (potentially), steelhead, sturgeon, and American shad.
- Evaluate gravel recruitment and sediment transport processes, stream-channel configuration, and riparian habitats in the lower Yuba River floodplain to improve anadromous and resident fish production and survival.

The CALFED ERP also includes an Upper Yuba River Studies Program, the purpose of which is to determine whether the introduction of wild chinook salmon and steelhead to the upper Yuba River watershed is biologically, environmentally, and socioeconomically feasible over the long term. The studies program is ongoing, with regular work group meetings. Removal of Englebright Dam is a key alternative that will be evaluated. Although major funding has been provided for this program, baseline study results are not available and the feasibility study of alternatives has not yet begun (Upper Yuba River Studies Program 2005). This project is not considered reasonably foreseeable because it is not sufficiently developed.

There are several specific CALFED projects that have been completed or are ongoing that would have effects that may combine with those of the three FRLRP alternatives. The following past, current, and reasonably foreseeable CALFED projects would have effects closely related to those of the three project alternatives:

- South Yuba River Coordinated Watershed Management Plan;
- Development of Implementation Plan for Lower Yuba River Anadromous Fish Habitat Restoration;
- Sacramento River Conservation Area Program;
- Sacramento River Floodplain Acquisition and Riparian Restoration (three projects);
- Sacramento River Meander Restoration;
- Floodplain Acquisition, Management, and Monitoring on the Sacramento River;
- Floodplain Acquisition and Subreach/Site-Specific Management Planning on the Sacramento River (Red Bluff to Colusa);
- Riparian Habitat Restoration on the Sacramento River—Verona to Collinsville;
- Sacramento River Gravel Restoration Project;
- Watershed Management Planning for Sacramento River Riparian Program;
- Yolo Bypass Habitat Restoration Study;
- Cosumnes Floodplain Acquisition and Restoration;

- Inundation of a Section of the Yolo Bypass to Restore Sacramento Splittail and other Native Species; and
- Cosumnes/Mokelumne Corridor Floodplain Acquisitions, Management, and Restoration Planning.

Fundamental goals of these projects are to improve fisheries, riparian habitat, stream channel and floodplain functions, and/or watershed environments. Although some adverse environmental impacts may result from these projects in total, especially with respect to agricultural production, these projects would improve the function and integrity of the riverine and riparian ecosystem. Several projects would also improve flood conveyance capacity.

Lower Yuba River Fisheries Technical Working Group

The Lower Yuba River Fisheries Technical Working Group is a stakeholder group that concentrates on efforts to improve the fishery and environment in the lower Yuba River below Englebright Dam. Members include YCWA, Pacific Gas and Electric Company (PG&E), USFWS, NMFS, the California Department of Fish and Game (DFG), DWR, CALFED, the South Yuba River Citizens League, Friends of the River, the California Sportfishing Protection Alliance, Cordua Irrigation District, Reclamation District (RD) 784, and other stakeholders. The goal of the group is to improve lower Yuba River fish resources by restoring ecosystem processes and minimizing stressors to fish populations. Emphasis is on anadromous fish populations. The working group is examining options for improving salmon and steelhead passage around Daguerre Point Dam and is developing an Implementation Plan for Lower Yuba River Anadromous Fish Habitat Restoration (South Yuba River Citizens League 2006, Yuba County Water Agency 2002c).

Yuba County Water Agency Fisheries-Related Projects and Investigations

YCWA has implemented several fisheries studies and enhancement projects on its own, as well as through the Lower Yuba River Fisheries Technical Work Group. The past, current, and reasonably foreseeable projects are as follows (Yuba County Water Agency et al. 2004):

- Browns Valley Irrigation District and Cordua-Hallwood Irrigation District fish screen installation;
- Narrows 2 Powerplant Intake Extension Project to conserve cold water for salmon and steelhead;
- Narrows 2 Powerplant Flow Bypass System Project to reduce flow fluctuations and reductions;
- Narrows 2 Powerplant flow ramping modifications to minimize ramping;
- incorporation of fishery enhancement flows in regular operations and water transfers;
- use of New Bullards Bar Reservoir’s lower outlet on a year-round basis to provide coldwater flows for salmon and steelhead;

- off-stream channel investigation in the Yuba Goldfields for salmon rearing;
- funding of Yuba County Fish and Game Commission projects;
- funding of arctic coolers for County school program to rear fish;
- installation, operation, and maintenance of Yuba River and Feather River temperature monitoring equipment;
- reconstruction of a DFG fence on the Yuba River;
- annual chinook salmon spawning escapement surveys (1991–present);
- annual monitoring and evaluation of the effects of water transfers on juvenile and adult salmon and steelhead (2001–present);
- a comprehensive program to evaluate the effectiveness of flow fluctuation criteria from the State Water Resources Control Board's Water Right Decision 1644 and Revised Decision 1644 in protecting redds and fry from dewatering and stranding;
- funding for research by a graduate student from the University of California, Davis, on juvenile steelhead distribution and abundance in the lower Yuba River (2001–2002);
- ongoing field monitoring to assist YCWA with flow scheduling to protect salmon and steelhead redds and juveniles from dewatering and stranding;
- research on the life history and run composition of steelhead in the lower Yuba River, funded jointly by CALFED, USFWS, and YCWA (2001–present);
- an implementation plan for the Lower Yuba River Anadromous Fish Habitat Restoration Program;
- participation in the Lower Yuba River Temperature Coordinating Committee, Lower Yuba River Fisheries Technical Working Group, Yuba-Feather Work Group, and CALFED Upper Yuba River Studies Program; and
- Olivehurst Floodplain Federal Emergency Management Agency (FEMA) certification.

River Partners

River Partners, formerly the Sacramento River Partners, works in conjunction with numerous federal, state, and local entities: DFG; the California Department of Parks and Recreation; California State University, Chico; Glenn-Colusa Irrigation District; the Corps; USFWS; the State Wildlife Conservation Board; the Great Valley Center L.E.G.A.C.I. Program; the California Waterfowl Association; Sacramento River National Wildlife Refuge; and San Joaquin River National Wildlife Refuge. The goal of River Partners is to create "high-quality wildlife habitat for the benefit of the environment and local communities" by using a variety of techniques to restore riparian areas along the Sacramento and San Joaquin Rivers and their tributaries while protecting agricultural investments. Projects focus on:

- restoring riparian habitat;
- reconnecting and linking fragmented habitats;
- providing erosion control for the riverbanks;
- building and strengthening relationships between partner entities, local and county governments, and local farmers;
- providing recreational opportunities, such as hunting, hiking, and bird watching, at some project areas;
- educating the public on the benefits of habitat restoration;
- providing research opportunities; and
- enhancing scenic views with mature riparian habitat.

Approximately 19 projects in the Sacramento River system are complete or in progress; project areas range in size from approximately 2.5 acres to 1,361 acres. Project sites in the Sacramento River system are generally between the Hamilton City Pumping Plant in Glenn County and 10 miles north of Colusa in Colusa County. The O'Connor Lake Project with DFG entails the restoration of riparian habitat on 228 acres dominated by invasive nonnative species at the O'Connor Lake Ecological Preserve on the Feather River. Project funding is from various sources, including CALFED, the Wildlife Conservation Board, USFWS, DFG, Glenn-Colusa Irrigation District, and the U.S. Bureau of Reclamation. (Sacramento River Partners 2002, 2005.) It is reasonably foreseeable that River Partners will continue these efforts and restore additional habitats, although specific additional projects are unknown.

Sacramento River Conservation Area

The Nature Conservancy and its partners USFWS, the California Wildlife Commission, and DFG, along with stakeholders, have undertaken riparian restoration of a continuous 100-mile-long stretch of the Sacramento River between Red Bluff and Colusa. Aspects of the project include implementing large-scale riparian habitat restoration, creating a sustainable farming program, and restoring the river's hydrology and bank condition (including possibly setting back levees) to improve the ability of the river to move freely within its meander belt. The goal of the project is to improve the Sacramento River's ecological health, protect the area's plant and wildlife species, and demonstrate examples of successful integrated land use (Sacramento River Conservation Area Forum 2002).

The Nature Conservancy is purchasing floodprone riverside farmland from willing sellers where agricultural production is declining. It restores land within these areas while developing site-specific plans, including conservation easements, set-aside agreements, bank protection, landowner protections, and floodplain management strategies; developing a program to improve permit and regulatory coordination and consistency; developing educational and outreach programs; and supporting monitoring and research programs. (The Nature Conservancy 2002.) It

is reasonably foreseeable that The Nature Conservancy will continue these efforts and make additional purchases of land for conservation; however, specific details are unknown.

Feather River Coordinated Resource Management Group

The Feather River Coordinated Resource Management (FRCRM) group is a partnership of 22 public and private groups that formed in 1985 to collectively improve watershed health in the upper Feather River watershed above Lake Oroville. The FRCRM has focused on cumulative watershed effects on water quality, desertification, and reductions in biodiversity on public and private lands. It has used education, restoration technology, and demonstration projects to encourage cooperation and participation in its efforts (Feather River Coordinated Resource Management 2006).

More than 50 watershed projects have been completed since 1989 in the upper Feather River watershed, including Wolf Creek, Red Clover Creek, Black Rock Creek, Boulder Creek, Greenhorn Creek, Clarks Creek, Carmen Creek, Hosselkus Creek, Elizabethtown Creek, North Canyon Creek, and Last Chance Creek. Projects have included urban stream restoration, meadow rewatering, construction of check dams, and bank stabilization. Projects planned for 2006 include ongoing monitoring of upper Last Chance Creek, reevaluation of the Spanish Creek gravel sampling project, and continued channel restoration on Red Clover Creek. The FRCRM group will continue these efforts in accordance with concepts outlined in the Feather River Watershed Management Strategy. (Feather River Coordinated Resource Management 2006.)

6.3 CUMULATIVE IMPACT ANALYSIS

Chapter 5, “Environmental Analysis,” identifies potential direct and indirect environmental effects of the three FRLRP project alternatives. These effects are assessed in this section in terms of their potential to combine with similar environmental effects of the other projects (past, current, and reasonably foreseeable) listed above, resulting in cumulative impacts. The analysis is focused on considering the potential for those impacts identified in Chapter 5 to contribute considerably to cumulative impacts after mitigation.

As explained earlier in this chapter in the section “Geographic Scope,” the extent of the geographic area that may be affected with implementation of the FRLRP varies depending on the resource under consideration. Not all projects discussed above would contribute, along with the FRLRP, to cumulative environmental effects. Also, Section 15130(a)(1) of the State CEQA Guidelines states that an EIR “should not discuss impacts which do not result in part from the project evaluated in the EIR.” Therefore, for each discussion below, the past, present, and reasonably foreseeable future projects that are considered are limited to those having potential effects similar to those of the proposed project that would affect the same geographic area as the FRLRP.

6.3.1 LAND USE

Alternative 1 – The Levee Strengthening Alternative

Under Alternative 1 placement of seepage/stability berms (primarily in project Segment 2), relocation of Pump Station No. 3, and construction of a detention basin could result in the conversion of up to approximately 180 acres of Prime Farmland to nonagricultural uses.

As shown in Table 6-1 in "Current Trends in Population Growth and Conversion of Agricultural Land," in Section 6.2 above, the latest FMMP data indicate that from 1992 through 2004, Yuba County experienced a net loss of Important Farmland (consisting of land classified as Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance) totaling approximately 2,300 acres out of approximately 87,000 acres inventoried. Gains in Important Farmland were recorded for the county for the 1992–1994 and 1994–1996 periods; these were slightly more than offset by losses in the 1996–1998 period. Both losses and gains were recorded for the 1998–2000 and 2000–2002 periods, resulting in a total net loss for both of these periods. Both losses and gains were recorded for the most recent reported period, 2002–2004, with a total net loss of 2,298 acres for this period.

Comparison of these statistics with those in the lower part of Table 6-1 shows that most of the acreage lost was not converted to urban and built-up uses. Other possible mechanisms for the loss of Important Farmland as recorded by the FMMP are conversions to grazing land or the fallowing of farmland. Although land may be converted from grazing or fallow lands back to Important Farmland in future reporting periods, the trends in development and population growth in the region, described in Section 6.2.2, "Development Trends in the Yuba County Area," indicate that net increases in Important Farmland, like those recorded in the 1992–1994 and 1994–1996 periods, are unlikely. Some future farmland conversion would take place in the Plumas Lake Specific Plan and East Linda Specific Plan areas, which are planned for gradual buildout over approximately the next 20 years. Additional development proposals in the project region currently being evaluated could also result in further farmland conversions. Locally, the F-BRLSP downstream on the Feather River and lower Bear River is converting approximately 300 acres of agricultural land in the levee setback area to habitat. On a regional scale, the Sacramento Valley has lost Important Farmland to environmental restoration (along river corridors) and urban development (areas surrounding existing cities). Additionally, it is reasonably foreseeable that there will be future environmental restoration and urban development projects in the Sacramento Valley, given the restoration programs and urban development currently under way.

Installation of seepage/stability berms under Alternative 1 and construction of the proposed detention basin would contribute to the cumulative conversion of Important Farmland to nonagricultural uses locally and regionally. Although mitigation is included in Section 5.1, "Land Use," that would help to reduce the potential impact on Important Farmland, the direct impact would not be reduced to a less-than-significant level, and this alternative would make a considerable contribution to this existing cumulative impact that would be significant and unavoidable.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 and the relocation of Pump Station No. 3 would be the same as the effects described previously (for all project segments) for Alternative 1.

Implementation of the ASB levee setback in Segment 2 would conflict with specific County policies for the preservation of agricultural land where the setback levee would result in the removal of agricultural land from production. Uses of the levee setback area may be inconsistent with current zoning. Inconsistencies with County land use policies and zoning are considered significant direct impacts on land use. However, these effects are project specific and limited to a local site; therefore, they are not considered to contribute to a cumulative impact.

The ASB levee footprint and levee easements in project Segment 2 would permanently convert a total of approximately 210 acres of Prime Farmland, 35 acres of Farmland of Statewide Importance, and 2 acres of Unique Farmland to nonagricultural uses. Construction of a detention basin would likely occur on up to several hundred acres of land that is currently in agricultural use.

Land uses in the levee setback area could consist of agricultural operations and/or habitat restoration activities that are compatible with flood control objectives. No specific plans for habitat restoration in the setback area are proposed at this time, although this is considered a potential future use. For purposes of the analysis in this EIR, and to assess the highest level of impacts, it is conservatively assumed that the entire levee setback area would be used for habitat restoration, and would therefore include the conversion of up to approximately 1,025 acres of Prime Farmland, 10 acres of Farmland of Statewide Importance, and 10 acres of Unique Farmland to nonagricultural uses.

The cumulative conversion of agricultural land in the project region to nonagricultural uses is characterized above in the discussion of Alternative 1. The levee setback and detention basin construction would contribute to the cumulative conversion of Important Farmland to nonagricultural uses locally and regionally. Although mitigation is included in Section 5.1, “Land Use,” that would help to reduce the potential impact on Important Farmland, the direct impact would not be reduced to a less-than-significant level, and this alternative would make a considerable contribution to this existing cumulative impact that would be significant and unavoidable. It should be noted, however, that any lands that might be converted to habitat may not necessarily be lost in perpetuity from agricultural use, as occurs with urban development. While the conversion from agriculture to habitat would be long term, it would not necessarily be permanent. This would not be the case if the conversion to habitat were tied to a permitting or mitigation requirement, or if there were some other legal mechanism in effect calling for the habitat to be retained in perpetuity.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1, and the impacts associated with construction of the setback levee in Segment 2 would be the same as the effects described previously for Alternative 2.

However, the levee setback area would be somewhat smaller under Alternative 3 than under Alternative 2 because the intermediate setback levee alignment is located farther to the west than the ASB setback levee alignment.

The intermediate levee setback footprint and levee easements in Segment 2 would permanently convert approximately 210 acres of Prime Farmland, 10 acres of Farmland of Statewide Importance, and 5 acres of Unique Farmland to nonagricultural uses, and would potentially convert up to several hundred additional acres of Important Farmland for the proposed detention basin. As discussed for the ASB levee setback above, it is conservatively assumed for the analysis in this EIR that the entire levee setback area would be used for habitat restoration, and would therefore include the conversion of up to approximately 700 acres of Prime Farmland, 10 acres of Farmland of Statewide Importance, and 10 acres of Unique Farmland to nonagricultural uses.

For the reasons described above, the intermediate levee setback and detention basin construction would contribute to the cumulative conversion of Important Farmland to nonagricultural uses locally and regionally. Although mitigation is included in Section 5.1 that would help to reduce the potential impact on Important Farmland, the direct impact would not be reduced to a less-than-significant level, and this alternative would make a considerable contribution to this existing cumulative impact that would be significant and unavoidable. As noted above, however, any lands that might be converted to habitat would not necessarily be lost in perpetuity from agricultural use, as occurs with urban development, unless a mitigation or regulatory requirement were to call for permanent preservation of the habitat.

6.3.2 GEOLOGY, SOILS, AND MINERAL RESOURCES

Alternative 1 – The Levee Strengthening Alternative

Although levee repair and strengthening activities would disturb earth, thereby potentially accelerating erosion, construction disturbance would be temporary, and soils in disturbed areas would be vegetated or otherwise stabilized after construction is complete. In addition, part of Alternative 1 includes correction of existing erosion problem areas on the water side of the Feather River left bank levee in project Segment 2. Based on these conditions, there is only a minimal risk of soil erosion hazard, if any, associated with levee repair and strengthening activities. In addition, there are no other planned projects in the local area that would result individually or cumulatively in significant erosion hazards. Therefore, Alternative 1 would not make a cumulatively considerable contribution to any significant impacts related to soil erosion hazards.

Up-to-date engineering methods would be used during levee repair and strengthening activities, ensuring that the stability of the existing Feather and Yuba River levees would increase over existing conditions and that the risks of geologic/soils/seismic related failure would be lower. This is a beneficial effect. With the F-BRLSP, other TRLIA flood control projects, the Corps levee improvements conducted as part of the System Evaluation Project and as a result of the Yuba River Basin Investigation, and the other levee improvements planned for the area by YCWA, a similar beneficial effect would occur on a cumulative level. The FRLRP would contribute to this cumulative beneficial effect.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1.

Although construction activities associated with construction of the ASB setback levee would disturb earth, thereby potentially accelerating erosion, construction disturbance would be temporary and soils in disturbed areas would be vegetated or otherwise stabilized after construction is complete. In addition, the levee setback area is nearly level and is well drained, and the risk of erosion and associated hazards is slight. Some soil erosion could also occur during flood operations when flows pass through the levee setback area, but because velocities would be low, erosion potential is not considered high. In addition, vegetative cover in the levee setback area (agriculture or habitat) would reduce the potential for erosion. Consequently, there is only a minimal risk of soil erosion hazard, if any, associated with the proposed levee setback. In addition, there are no other planned projects in the local area that would result individually or cumulatively in significant erosion hazards. Therefore, the ASB levee setback would not make a cumulatively considerable contribution to any significant soil erosion impact.

The setback levee would be engineered and constructed to modern standards with appropriate seepage control features, making it more stable than the existing levee and decreasing the risk of levee failure associated with geologic/soils/seismic hazards. This is a beneficial effect. With the F-BRLSP, other TRLIA flood control projects, the Corps levee improvements conducted as part of the System Evaluation Project and as a result of the Yuba River Basin Investigation, and the other levee improvements planned for the area by YCWA, a similar beneficial effect would occur on a cumulative level. The FRLRP would contribute to this cumulative beneficial effect.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1. The impacts associated with construction of the setback levee in Segment 2 would be the same as the effects described previously for Alternative 2. For the reasons described above, the intermediate levee setback would not result in a considerable contribution to any significant adverse cumulative soil erosion hazard impacts, and would contribute to a beneficial cumulative impact related to reduced geologic/soils/seismic hazards in combination with other flood control projects.

6.3.3 WATER RESOURCES AND RIVER GEOMORPHOLOGY

Alternative 1 – The Levee Strengthening Alternative

Levee repair and strengthening activities could allow soil and sediment to enter local waterways via erosion, resulting in adverse effects on water quality and contamination of waterways by toxic substances. Mitigation described in Section 5.3, “Water Resources and River Geomorphology,” however, would ensure that appropriate erosion control and spill containment measures would be implemented to minimize any potential for water quality effects. Because these measures would be incorporated into construction practices, this potential temporary effect

would be less than significant both as a direct impact and as a potential contribution to any cumulative impact. In addition, other levee reconstruction and repair efforts conducted by the Corps along the left bank Feather and Yuba River levees in recent years and planned for future implementation have been and will be required to incorporate similar measures to ensure the protection of water quality from potential sedimentation and effects of toxic spills. All projects in the area that would result in the disturbance of more than 1 acre of land are also required to implement a Stormwater Pollution Prevention Plan (SWPPP) through the National Pollutant Discharge Elimination System (NPDES) permit process. The SWPPP must include measures to control erosion and protect water quality. For these reasons, levee repair and strengthening activities would not make a cumulatively considerable contribution to any significant cumulative impact on water quality.

Levee repair and strengthening would also provide a levee that would be more reliable and less subject to seepage than the existing levee. These changes would improve local flood protection providing a beneficial effect. Levee repair and strengthening would combine with the effects of other recent and planned flood control projects to result in a cumulatively beneficial effect on flood protection in the Feather-Yuba River Basin above the confluence of the Feather and Bear Rivers.

Levee repairs and strengthening of the existing levee would not change Feather River flood stage elevations; therefore, these activities would not result in any long-term changes to the existing drainage pattern of the project site, would not affect the rate or amount of surface runoff in the project area, and would not reduce water supply or alter regional or local hydrology. Therefore, the FRLRP would not make a considerable contribution to any potential cumulative effects on sediment deposition, water supply, or geomorphic processes.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1. Impact conclusions related to soil, sediment, and contaminants entering local waterways would also apply to the setback levee in Segment 2.

Potential changes in land use associated with the ASB levee setback would not adversely affect local water demand and supply and may, in fact, cause demand to decrease. Effects of the levee setback related to sediment deposition in the ASB levee setback area are not expected to be measurable. No other known projects would contribute to similar potential effects in a manner that would result in a significant cumulative impact. Therefore, there would be no cumulative effect on water supply or sediment deposition to which the levee setback would make a considerable contribution.

The ASB setback levee would cross existing drainage infrastructure and sever parts of the drainage system for the local area. Drainage patterns within the levee setback area could be changed by project implementation as well. Measures included in Section 5.3 would preclude any adverse effects of a levee setback on local drainage. These effects are project specific and limited to a local site; therefore, they are not considered to contribute to a cumulative impact.

Implementation of the ASB levee setback could result in changes in geomorphic processes by altering velocities in the existing floodway in this area and upstream, leading to decreased shear stresses from Star Bend to just below Shanghai Bend (project Segment 2) and increased shear stresses at Shanghai Bend (Segment 3) and some distance upstream on both the Feather River and the Yuba River. However, increases in shear stresses would be minor and would not result in erosion of the levee system or substantial increases in the mobilization and/or deposition of sediments. None of the other projects included in this cumulative analysis, when considered together with the FRLRP, would contribute substantially to potential effects associated with increased shear stresses. Therefore, no significant cumulative impact would occur.

With a reduction in water surface elevations at and above the ASB levee setback area, peak flows in the Feather River downstream of the setback levee would increase slightly, from 271,938 cfs to 272,406 cfs during the 1-in-100 AEP event, an increase of less than 1%. Modeling results indicate that the slight increase in flows would result in an increased water surface elevation of 0.02 foot in the Feather River from the southern end of the setback levee alignment to the confluence with the Bear River. For the 1-in-200 AEP event, the flows would increase from 347,031 cfs to 348,879 cfs, an increase of less than 1%. The water surface elevation in the Feather River from the southern end of the setback levee alignment to the confluence with the Bear River is expected to increase by 0.08 foot as a result of the increased flow. These increases in downstream floodwater flows with the ASB levee setback are small (less than 1%), and the increases in downstream flood stage elevation would be less than 1 inch for the 1-in-100 and 1-in-200 AEP events. In addition, with implementation of the F-CO (see description of the F-CO in Section 6.2.3, “Past, Present, and Future Projects”), any increases in downstream flood stage elevations associated with the ASB levee setback would be less than described above. The impact of this very slight increase in risk would be less than significant.

The recent and proposed development projects listed in Section 6.2.3, including development of the Plumas Lake Specific Plan, East Linda Specific Plan, and River Highlands Community Plan areas, have the potential to incrementally increase runoff associated with storm events by increasing impervious surfaces within the Feather-Yuba River watershed. However, these developments are required to mitigate these increases in runoff through the construction and operation of detention basins. Any increase in runoff volumes from these developments that reaches the surrounding rivers during storm events would be a minor incremental contribution to river flows and would not result in a significant cumulative impact. Because the increased risk of downstream flooding associated with the ASB levee setback would also be minor, this effect is considered to be inconsequential in a cumulative context as well as in a direct sense. Therefore, the ASB levee setback would not be considered to contribute to a significant cumulative impact on potential downstream flooding associated with changes in downstream hydrology.

Setting back the left bank Feather River levee along the ASB setback levee alignment would decrease flood stages on the river. The levee setback would also provide a well-designed, well-constructed levee that would be more reliable and less subject to seepage than the existing levee. These changes would improve local flood protection, providing a beneficial effect. The ASB levee setback would combine with the effects of other recent and planned flood control projects to result in a cumulatively beneficial effect on flood protection in the Feather-Yuba River Basin above the confluence of the Feather and Bear Rivers.

Potentially hazardous materials related to agricultural activities could be transported downstream when the ASB levee setback area becomes inundated during flood events. These materials could contaminate floodwater and adversely affect river water quality. However, measures described in Section 5.3 would reduce the potential for the release of hazardous materials. For this reason, the levee setback is not expected to result in a considerable contribution to a cumulative water quality impact.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1. The impacts associated with the construction of the setback levee in project Segment 2 would be the same as or very similar to the effects described previously for Alternative 2. However, the levee setback area would be somewhat smaller under Alternative 3 than under Alternative 2 because the intermediate setback levee alignment is located farther to the west than the ASB setback levee alignment.

Modeling results indicate that with a reduction in water levels at and above the intermediate levee setback area, peak flows in the Feather River downstream of the setback levee would increase slightly, from 271,938 cfs to 272,262 cfs during the 1-in-100 AEP event, an increase of less than 1%. This slight increase in flow is expected to result in a 0.02-foot increase in the water surface elevation in the Feather River from the southern end of the setback levee alignment to the confluence with the Bear River. For the 1-in-200 AEP event, modeling results show that the flows would increase from 347,031 cfs to 348,624 cfs, an increase of less than 1%. The water surface elevation in the Feather River from the southern end of the setback levee alignment to the confluence with the Bear River is expected to increase by 0.07 foot as a result of the increased flow. These increases in downstream floodwater flows with the intermediate levee setback are small (less than 1%), and the increases in downstream flood stage elevation would be less than 1 inch for the 1-in-100 and 1-in-200 AEP events. In addition, with implementation of the F-CO, any increases in downstream flood stage elevations associated with the intermediate levee setback would be less than described above. The impact of this very slight increase in risk would be less than significant.

For the reasons described above, the intermediate levee setback is not expected to result in a considerable contribution to any significant cumulative impacts related to water resources and river geomorphology.

6.3.4 FISHERIES

Alternative 1 – The Levee Strengthening Alternative

Levee repair and strengthening activities could cause sedimentation and contamination of waterways by toxic substances and adversely affect fish in the Feather and Yuba River channels and downstream. Mitigation described in Section 5.3, “Water Resources and River Geomorphology,” and repeated in Section 5.4, “Fisheries,” would ensure that appropriate erosion control and spill containment measures would be implemented to minimize any effects on fish habitat and fish populations associated with sedimentation or contamination. Because these measures would be incorporated into construction practices, this potential temporary effect

would be less than significant both as a direct impact and as a potential contribution to any cumulative impact. In addition, other levee reconstruction and repair efforts conducted and planned for the Feather, Yuba, and Bear River levees by the Corps, TRLIA, and/or other agencies have been and will be required to incorporate similar measures to ensure the protection of water quality and fish habitat from potential sedimentation and effects of toxic spills, in accordance with existing regulations. Also, all projects in the area that would result in the disturbance of more than 1 acre of land are required to implement a SWPPP through the NPDES permit process. The SWPPP must include measures to control erosion, prevent releases of contaminants, and protect water quality.

For these reasons, levee repair and strengthening activities would not make a cumulatively considerable contribution to any significant impact associated with sedimentation and introduction of toxic materials into fish habitat.

Any direct effects of construction activities on overhead cover or woody material that could degrade fish habitat would be negligible, and any potential contribution to a cumulative effect on these habitat features would also be negligible.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1. Impact conclusions related to sedimentation and introduction of toxic materials into fish habitat would also apply to the setback levee in Segment 2.

Flood operations with implementation of the ASB levee setback have the potential to result in the stranding and mortality of fish, including protected species, in areas within the expanded floodway (i.e., levee setback area) where water collects and fish become trapped as floodwaters recede. This effect, if not mitigated, could combine with the deleterious effects of more than 150 years of past actions in the Sacramento River Basin that have reduced populations of chinook salmon and steelhead in the region enough that these are now designated special-status species. Levee projects in general have had a significant cumulative effect on these species. However, to reduce the potential for fish to become stranded in the levee setback area, a drainage and grading plan for the area would be developed and implemented in consultation with DFG, NMFS, and USFWS as described in Section 5.4 of this EIR. The plan would ensure that the project design incorporates appropriate features to minimize the potential for stranding and ensure that only a minor incidental loss of fish would result from the levee setback (a loss expected to be offset by increases in growth and survival of juvenile fish that would use new habitat created in the levee setback area). For these reasons, the ASB levee setback would not contribute considerably to any significant cumulative adverse effect on fish populations.

It is unknown at this time how much, if any, of the levee setback area might be converted to riparian, wetland, or other habitat if the ASB setback levee is constructed. If this potential land use is implemented in the future, the levee setback area would provide a riparian and aquatic habitat corridor, providing additional floodplain habitat for fish along the Feather and Yuba Rivers and potentially improving the success of fish species that use the area. This potential benefit could make a considerable contribution to cumulative benefits to fish that may be derived

from projects that expand the floodplain corridor that are being implemented in the Sacramento River system, including the F-BRLSP (currently under construction), River Partners, and Sacramento River Conservation Area efforts described above, as well as potential future projects that may be developed through the CALFED Upper Yuba River Studies Program and the Lower Yuba River Fisheries Technical Working Group. Overall, downward trends in fish populations are reversing, largely because of the substantial efforts being made for salmon and steelhead recovery. The ASB levee setback could contribute to this trend and, given the mitigation described in Section 5.4, could contribute to species recovery. Consequently, the ASB levee setback would not contribute to a significant adverse cumulative impact on fisheries.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1, and the impacts associated with construction of the setback levee in Segment 2 would be the same as the effects described previously for Alternative 2.

However, the intermediate levee setback would affect a smaller land area than would be affected by the ASB setback levee. Like the ASB levee setback, the intermediate levee setback would not result in a considerable contribution to any significant adverse cumulative impact with the implementation of mitigation measures. The intermediate levee setback would result in a smaller setback area with less potentially available floodplain habitat than the ASB levee setback, resulting in a slightly reduced potential beneficial impact on fisheries.

6.3.5 TERRESTRIAL BIOLOGICAL RESOURCES

Alternative 1 – The Levee Strengthening Alternative

Levee repair and strengthening activities would have less-than-significant project-specific impacts, without the need for mitigation, on the following resources: general biological resources, special-status bird species other than raptors, Pacific western big-eared bat, and wildlife corridors. The project would not provide a substantial contribution to any potential significant cumulative impacts related to these resources.

As stated in Section 5.5, “Terrestrial Biological Resources,” construction activities associated with Alternative 1 could have potential adverse effects on the following resources: jurisdictional waters of the United States and riparian habitat, special-status plants, valley elderberry longhorn beetle, northwestern pond turtle, giant garter snake, and Swainson’s hawk and other nesting raptors. Mitigation included in Section 5.5 would be implemented to address potential direct effects on these resources. Any unavoidable effects on waters of the United States and riparian habitat would be addressed through restoration or replacement according to methods and terms agreed upon through consultation with the Corps and/or DFG, ensuring no net loss of the affected resources. Surveys, maintenance of buffer areas where practicable, and other avoidance measures described in the mitigation presented in Section 5.5 would ensure minimization of any potential temporary effects of construction on valley elderberry longhorn beetles, northwestern pond turtles, giant garter snakes, and nesting Swainson’s hawks and other raptors and their habitats.

Any other projects would be required to implement measures similar to those that would be undertaken for Alternative 1 to ensure minimization of impacts on these potentially affected species, most of which are protected by the federal Endangered Species Act (ESA) and/or sections of the California Fish and Game Code, including the California Endangered Species Act (CESA). Past and ongoing levee repair efforts being conducted by the Corps, TRLIA, and others have provided relatively large habitat restoration areas such as the Corps Marysville–Yuba City Mitigation Area and habitat restoration associated with the F-BRLSP. These restoration areas provide a cumulative benefit to terrestrial biological resources that assists in compensating for any adverse cumulative impacts.

Based on the foregoing, Alternative 1 would not be considered to make a considerable contribution to any significant adverse cumulative effects on terrestrial biological resources.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1. Impact conclusions related to all terrestrial biological resources addressed in Section 5.5 would also apply to the setback levee in Segment 2. For the reasons discussed above for various biological resources where significant impacts are mitigated to less-than-significant levels, the impacts under Alternative 2 would not make a considerable contribution to any significant cumulative effects on terrestrial biological resources.

Implementation of the ASB levee setback has the potential to contribute considerably to a cumulative benefit to terrestrial biological resources through restoration actions that would enhance the riverine ecosystem along the Feather River. If the restoration of wetlands, enhancement of floodway riparian communities, or restoration of open grassland, for example, is included in future land management of the levee setback area, regional benefits could result, including increasing the effective amount of habitat available to species and helping to reverse habitat fragmentation. These efforts, in combination with other restoration projects described in Section 6.2.3, would combine to enhance regional migratory corridors; provide larger habitat units for wildlife and species that require large home ranges; and provide greater opportunities for separate populations to interbreed, potentially increasing species' genetic diversity.

Based on the foregoing, Alternative 2 would not be considered to make a considerable contribution to any significant adverse cumulative effects on terrestrial biological resources.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1, and the impacts associated with construction of the setback levee in project Segment 2 would be the same as the effects described previously for Alternative 2. The levee setback area would be somewhat smaller under Alternative 3 than under Alternative 2 because the intermediate setback levee alignment is located farther to the west than the ASB setback levee alignment. Like the ASB levee setback, the intermediate levee setback would not result in a considerable contribution to any significant adverse cumulative impact on terrestrial biological resources.

6.3.6 RECREATION

Alternative 1 – The Levee Strengthening Alternative

Levee repair and strengthening activities may have minor and temporary (less-than-significant) direct effects on recreational resources, such as hunting, boating, and nature viewing, in areas adjacent to or near the existing Feather River levee alignment in the existing river channel. No substantial long-term changes in recreational opportunities would be associated with repair and strengthening of the existing Feather and Yuba River levees. Feather River flood stage elevations would not change, the project site would be restored and reclaimed as appropriate to preexisting conditions after completion of construction activities, and recreational opportunities are expected to be available to the extent that these opportunities are available under preproject conditions. Levee repair and strengthening activities would not contribute to any potential significant cumulative impacts on recreation.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impacts associated with repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1.

Construction of the ASB setback levee may have minor and temporary (less-than-significant) direct effects on recreational resources, such as hunting, boating, and nature viewing, in areas adjacent to or near the levee setback area in the existing Feather River channel. Implementation of the ASB levee setback in Segment 2 would also contribute to a less-than-significant impact associated with potential losses of wildlife from flooding in the setback area that could adversely affect long-term hunting opportunities or other recreational activities. The ASB setback levee would not contribute to any potential significant cumulative impacts on recreation.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1, and the impacts associated with construction of the setback levee in Segment 2 would be the same as the effects described previously for Alternative 2. For the reasons described above, the intermediate setback levee would not contribute to any potential significant cumulative impacts on recreation.

6.3.7 AESTHETIC RESOURCES

Alternative 1 – The Levee Strengthening Alternative

Levee repair and strengthening activities would temporarily reduce the aesthetic qualities of views by introducing earthmoving equipment and other construction equipment, materials, and work crews into the viewshed of recreationists, motorists on SR 70 and Feather River Boulevard, workers in nearby farming areas, and residents of the area. However, aesthetic conditions would be the same after construction as before the levee repairs. Construction of a detention basin east of Feather River Boulevard would permanently alter views, especially where orchards may be removed.

However, this change would not substantially affect the quality of views. No scenic vistas would be affected. Because construction activities would be temporary and would affect few viewers, and the essential character of views of the area would not change, repair and strengthening of the Feather and Yuba River levees would not contribute to any potential significant cumulative aesthetic impacts.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impacts associated with repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1. Effects of detention basin construction east of Feather River Boulevard would be the same as described for Alternative 1.

Construction of the proposed ASB setback levee would temporarily reduce the aesthetic qualities of views by introducing earthmoving equipment and other construction equipment, materials, and work crews into the viewshed of recreationists, motorists on SR 70 and Feather River Boulevard, workers in nearby farming areas, and residents of the area. However, because construction activities would be temporary and would affect few viewers, this impact would be less than significant.

Long-term changes in aesthetic conditions associated with the presence of the setback levee would not change the essential character of views of the area in Segment 2 (rural, bordering a floodway with riparian components) or the quality of those views (moderate aesthetic value) and would not substantially affect a scenic vista. Because construction activities would be temporary and would affect few viewers, and the essential character of views of the area would not change with the presence of the setback levee, the ASB levee setback would not contribute to any potential significant cumulative aesthetic impacts.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1. The setback levee area would be somewhat smaller under Alternative 3 than under Alternative 2 because the intermediate setback levee alignment is located farther to the west than the ASB setback levee alignment. The intermediate setback levee would not make a considerable contribution to any potential significant cumulative impacts on aesthetic resources for the same reasons as stated above.

6.3.8 CULTURAL RESOURCES

Alternative 1 – The Levee Strengthening Alternative

Table 5.8-2, “Summary of Cultural Resources in the Project Area,” in Section 5.8, “Cultural Resources,” presents a list of previously identified and newly identified resources in and directly adjacent to the FRLRP project area, along with the National Register of Historic Places and California Register of Historical Resources eligibility status of each resource. Mitigation described in Section 5.8 would ensure the protection in place, or the recovery and subsequent protection, of any significant cultural resources determined to be present in the existing Feather or Yuba River levee alignment or elsewhere in the project area that could be damaged by project-

related activities. These management actions would ensure that the value of any significant cultural resource would be preserved. They also would ensure that project activities would not contribute to any significant impact on cultural resources that may have occurred as a result of disturbance or destruction of prehistoric sites likely to have taken place before the enforcement of protections afforded by current laws such as CEQA.

In addition, activities associated with the proposed levee strengthening (e.g., construction of slurry cutoff walls) and related activities (e.g., relocation of Pump Station No. 3, construction of the detention basin) have the potential to encounter and possibly damage unknown as-yet-undiscovered subsurface cultural resources. Mitigation described in Section 5.8 would be initiated to prevent any significant impacts on cultural resources from occurring.

Implementing mitigation measures provided in Section 5.8 would ensure that construction under Alternative 1 would not incrementally contribute to any significant cumulative impacts on important cultural resources in the project region. These measures are fairly standard to ensure compliance with Section 15064.5 of the State CEQA Guidelines and related provisions of the Public Resources Code, and it is assumed that similar measures would be applied to related projects, and other projects in the region, as appropriate. Where federal agency approvals are required to implement projects, moreover, additional protection would also be anticipated under the National Historic Preservation Act, which is commonly implemented by federal agencies, making measures such as those described herein fairly standard as well.

For these reasons, repair and strengthening of the Feather and Yuba River levees would not incrementally contribute to a significant cumulative effect on cultural resources.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1.

Mitigation described in Section 5.8 would ensure the protection in place, or recovery and subsequent protection, of any significant cultural resources determined to be present in the ASB levee setback area or elsewhere in the project area that could be damaged by project-related activities. In addition, construction of the ASB setback levee in Segment 2 and related activities (e.g., use of the soil borrow area/detention basin location) have the potential to encounter and possibly damage unknown as-yet-undiscovered subsurface cultural resources. Mitigation described in Section 5.8 would be initiated to prevent any significant cumulative impacts on cultural resources from occurring.

For the reasons discussed above, the ASB setback levee would not incrementally contribute to a significant cumulative effect on cultural resources.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1, and the impacts associated with construction of the setback

levee in project Segment 2 would be the same as the effects described previously for Alternative 2. However, the levee setback area would be somewhat smaller under Alternative 3 than under Alternative 2 because the intermediate setback levee alignment is located farther to the west than the ASB setback levee alignment, resulting in less ground disturbance, and therefore less potential for disturbing unknown cultural resources. For the reasons described above, the intermediate levee setback would not incrementally contribute to a significant cumulative effect on cultural resources.

6.3.9 AIR QUALITY

Virtually all pollutant emissions associated with the three proposed project alternatives would be the result of construction-related activity; any operational emissions would be extremely minor and would not contribute measurably to cumulative air quality emissions. Therefore, this evaluation focuses only on the pollutants of concern that would be associated with construction-related emissions: reactive organic gases (ROG), oxides of nitrogen (NO_X), and particulate matter greater than 10 microns in diameter (PM_{10}).

The FRAQMD portion of the NSVAB is designated as a nonattainment area with respect to the state standards for ozone (1-hour) and PM_{10}. Yuba and Sutter Counties are designated as a nonattainment area with respect to the state standards for ozone (1-hour) and PM_{10}, and are either in attainment or unclassified for the remaining state standards. Yuba and Sutter Counties are either in attainment or unclassified for federal standards (Feather River Air Quality Management District 2006).

Any project that is constructed in the FRAQMD has the potential to add traffic and other pollution-emitting sources that would contribute to the cumulative degradation of air quality in the region. This is particularly true of large-scale housing and commercial developments, such as development of the Plumas Lake Specific Plan, East Linda Specific Plan, and River Highlands Community Plan areas. At the same time, vehicles throughout the region are continuously being modernized as consumers replace older vehicles, and the newer vehicles have improved air emission levels. Furthermore, FRAQMD is required to make progress toward compliance with federal clean air standards. It can be assumed that policies and regulatory programs (requirements for best available control technology) will minimize air quality impacts over time; however, it cannot be stated with certainty that future air quality, with growth projected to occur throughout the region (see “Current Trends in Population Growth and Conversion of Agricultural Land” above), will be better in the future than it is today.

Because of the nature of conditions that affect air quality, impacts on air quality are considered on a regional basis; in the case of the project area, this region covers at least Yuba County and Sutter County, which is under FRAQMD jurisdiction. It is neither practical nor reasonable to consider a complete list of all projects that would affect this large region. Rather, attainment plans form the basis of projecting and resolving adverse air quality conditions throughout the region.

Alternative 1 – The Levee Strengthening Alternative

Construction-related emissions associated with levee repair and strengthening activities would result in emissions of toxic air contaminants (TACs) associated with the operation of diesel-

powered construction equipment. This impact would be less than significant because several factors would limit the exposure of sensitive receptors to TACs: the distance of receptors from the project site, the limited amount of emissions, the temporary nature of exposure, or a combination of these factors. Therefore, implementation of Alternative 1 would not incrementally contribute to any potential cumulative impacts related to TAC exposure.

Construction-related emissions associated with Alternative 1 are expected to temporarily and periodically exceed one or more of the FRAQMD thresholds for ROG, NO_X, and PM_{10}. FRAQMD's *Indirect Source Review Guidelines* and CEQA guidance (Feather River Air Quality Management District 2006) provide mitigation measures for reducing these short-term air quality impacts, as described in Section 5.9, "Air Quality." The direct impact would be temporary and intermittent and would be reduced by implementation of these measures; however, because of the potential magnitude of pollutant emissions and the amount by which they may exceed FRAQMD's recommended daily thresholds, implementing this mitigation would not reduce the impact to a less-than-significant level. In addition, it can be assumed that the construction period for Alternative 1 would overlap with construction periods or implementation phases of other projects in the Yuba County and Sutter County areas and throughout the basin, such as construction or occupation of the major development areas and other levee repair projects noted above. Each individual project would contribute measurably to adverse air quality conditions, therefore also contributing to nonattainment of FRAQMD air quality standards and resulting in a significant cumulative air quality impact. There is no feasible mitigation available that would cause all FRAQMD air quality standards to be met by the time construction of the FRLRP takes place.

Despite the implementation of the required mitigation, construction-related emissions under Alternative 1 would contribute substantially to nonattainment of FRAQMD air quality standards, resulting in a significant contribution to a significant and unavoidable cumulative impact.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1. Impacts related to TACs under Alternative 1 would apply to all three project segments under Alternative 2.

Construction-related emissions associated with construction of the ASB setback levee in Segment 2 are expected to temporarily and periodically exceed one or more of the FRAQMD thresholds for ROG, NO_X, and PM_{10}. However, these emissions would be expected to be greater than under Alternative 1 because construction of the setback levee, removal of the existing levee, and the need to develop additional soil borrow areas would result in a larger construction area and disturbed surface and hauling of greater volumes of soil. As described above, implementation of mitigation measures would not reduce the impact to a less-than-significant level.

In addition, it can be assumed that the construction period for the ASB levee setback would overlap with construction periods or implementation phases of other projects in the Yuba County and Sutter County areas and throughout the basin, such as construction or occupation of the

major development areas and other levee projects noted above. Each individual project would contribute measurably to adverse air quality conditions, therefore also contributing to nonattainment of FRAQMD air quality standards and resulting in a significant cumulative air quality impact. There is no feasible mitigation available that would cause all FRAQMD air quality standards to be met by the time construction of the FRLRP takes place.

Despite the implementation of the required mitigation, construction-related emissions under Alternative 2 would contribute substantially to nonattainment of FRAQMD air quality standards, resulting in a significant contribution to a significant and unavoidable cumulative impact.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1, and the impacts associated with construction of the setback levee in project Segment 2 would be the same as the effects described previously for Alternative 2. However, the levee setback area would be somewhat smaller under Alternative 3 than under Alternative 2 because the intermediate setback levee alignment is located farther to the west than the ASB setback levee alignment, resulting in slightly less construction-related emissions. For the reasons described above, the effects of the intermediate setback levee on air quality, despite the implementation of the required mitigation, would contribute to nonattainment of FRAQMD air quality standards, resulting in a significant contribution to a significant and unavoidable cumulative impact.

6.3.10 NOISE

The discussion of cumulative noise effects is focused on the areas near the existing and proposed setback levee alignments where noise from construction activities would combine with noise from other projects and exceed established thresholds for sensitive receptors.

Alternative 1 – The Levee Strengthening Alternative

Construction work for Alternative 1 is expected to generate noise levels that, even with mitigation, would exceed the thresholds for sensitive receptors. At least one residence is within about 150 feet of the existing Feather River levee along project Segment 1 and multiple residences are within 150 feet of the existing levee in Segment 3. These significant noise increases would be short term and intermittent, corresponding to periods when numerous pieces of construction equipment are operating simultaneously at locations close enough to the residence to produce noise at nuisance levels. Implementation of mitigation described in Section 5.10, “Noise,” would reduce the potential temporary noise impact, but not to a less-than-significant level.

Noise is a localized occurrence and attenuates with distance. Therefore, only future cumulative development projects in the direct vicinity of the FRLRP project site would have the potential to add to anticipated project-generated noise, thus resulting in cumulative noise impacts. However, projects considered in this cumulative analysis that have the potential to be under construction concurrently with the FRLRP are located more than 2,000 feet from the FRLRP project site at a minimum, and some are located miles from the site. The closest “cumulative project” is the

Plumas Lake Specific Plan area, which, at its nearest points, is located between 2,000 and 3,000 feet east of project Segments 1 and 2. However, if construction activities associated with Alternative 1 and the Plumas Lake Specific Plan were to occur concurrently, it is possible that construction noise associated with these projects together could combine to result in greater noise levels at some of the dispersed rural residences in the area than noise levels from each project alone. Therefore, a significant cumulative noise impact could occur and the FRLRP would make a substantial contribution to this impact.

Mitigation to reduce construction noise generation is included in the FRLRP. It is assumed that similar mitigation is included for the Plumas Lake Specific Plan. No further feasible mitigation measures are available to reduce cumulative construction noise at sensitive receptors to less-than-significant levels.

Alternative 1 would result in a less-than-significant impact related to generation of groundborne vibration during construction. Groundborne vibration attenuates rapidly with distance and projects must be in close proximity to each other (within the range of approximately 100 feet, depending on the type of equipment generating the vibration) to simultaneously contribute to vibration levels at the same location. There are no opportunities for projects addressed in this cumulative analysis to interact with the FRLRP in regard to groundborne vibration, and no cumulative impact would occur.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1. Impacts associated with groundborne vibration described for Alternative 1 would also apply to all project segments under Alternative 2.

The ASB setback levee alignment in Segment 2 is located closer to the Plumas Lake Specific Plan area than the existing levee alignment. Therefore, there is greater potential for a cumulative impact related to construction noise to occur. As discussed above for Alternative 1, under Alternative 2 construction of the FRLRP could provide a substantial contribution to a significant and unavoidable cumulative impact related to construction noise.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be similar to the effects described previously (for all project segments) for Alternative 1, and the impacts associated with construction of the setback levee in Segment 2 would be similar to the effects described previously for Alternative 2. For the reasons described above, construction of the FRLRP under Alternative 3 could provide a substantial contribution to a significant and unavoidable cumulative impact related to construction noise.

6.3.11 TRANSPORTATION AND CIRCULATION

Alternative 1 – The Levee Strengthening Alternative

Construction-related traffic, commute trips, and haul truck trips associated with levee repair and strengthening activities would cause a moderate (less-than-significant) temporary increase in traffic on Feather River Boulevard, SR 70, and local roadways that provide access to the project alignment (e.g., Anderson Avenue, Country Club Avenue, Riverside Drive).

Alternative 1 could also temporarily increase traffic hazards on Feather River Boulevard near the existing Feather River levee alignment; however, mitigation measures described in Section 5.11, "Transportation and Circulation," would be implemented to ensure that any potential hazards are minimized. There are no known projects that would contribute substantially to increased traffic on these roadways or that would contribute substantially to a localized potential increase in traffic hazards on Feather River Boulevard during the anticipated FRLRP construction period. The East Linda Specific Plan and River Highlands Community Plan areas are sufficiently distant from the project area that construction and added population in these areas is not expected to contribute traffic on local roadways that would be affected by project construction. Traffic associated with construction work and new residential and commercial development in the Plumas Lake Specific Plan area would likely result in a moderate increase in short-term and long-term traffic on Feather River Boulevard and an increase in traffic on SR 70. During the construction period for Alternative 1, some of the traffic increases associated with construction in the Plumas Lake Specific Plan area and with other construction projects for levee improvements in the area may coincide with the construction traffic that would be generated by the proposed project. As described in Section 5.11, construction-related trips would not exceed the thresholds established by the Institute of Traffic Engineers (ITE) for temporary traffic increases and would not represent a substantial increase in traffic levels on these roadways or other local roads. Therefore, this traffic would not be considered to contribute substantially to traffic volumes, either directly or when considered in combination with other projects. Levee repair and strengthening and relocation of Pump Station No. 3 would not make a cumulatively considerable contribution to any significant cumulative impact associated with transportation and circulation.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1.

Because of the construction of the ASB setback levee, Alternative 2 would generate a greater number of construction-related trips than Alternative 1. Such trips would be associated with the transport of larger quantities of borrow material. However, the trip generation from all sources would not exceed the thresholds established by ITE for temporary traffic increases and would not represent a substantial increase in traffic levels on these roadways or other local roads. Construction of the ASB setback levee could also temporarily increase traffic hazards on Feather River Boulevard near the levee alignment. Implementation of mitigation measures described in Section 5.11 would ensure that any potential hazards are minimized. For the reasons described

above, and in the discussion of Alternative 1, construction of the ASB setback levee would not make a cumulatively considerable contribution to any significant cumulative impact associated with transportation and circulation.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1, and the impacts associated with construction of the setback levee in project Segment 2 would be the same as the effects described previously for Alternative 2. Trip generation from all sources is expected to be approximately the same under Alternative 3 as under Alternative 2. For the reasons described above, construction of the intermediate setback levee would not make a cumulatively considerable contribution to any significant cumulative impact associated with transportation and circulation.

6.3.12 PUBLIC SERVICES, UTILITIES, AND SERVICE SYSTEMS

Alternative 1 – The Levee Strengthening Alternative

Although reasonable attempts have been made to determine the locations of public utility infrastructure in the project area, and preliminary surveys have been conducted, the potential exists for additional buried infrastructure elements that have not already been identified to be located near or crossing the levee. Construction activities could cause minor accidental damage to both identified and unidentified utility infrastructure, resulting in temporary disruptions to service. However, detailed design of the levee repairs would include consultation with all potential service providers to identify infrastructure locations and appropriate protection measures, and consultation would continue during construction to ensure avoidance/protection of facilities as construction proceeds. Therefore, the potential for accidental damage to utility infrastructure during construction is remote, and if damage were to occur, disruptions to service would be short term and temporary until repairs were completed. Implementation of Alternative 1 would not result in substantial interference with utility infrastructure and services. Similar precautions would be expected to be taken during construction of other projects considered in this cumulative analysis, with a similar low likelihood of disruptions to service, and any disruptions, if they were to occur, would be short term and temporary. Therefore, no significant cumulative impact related to disruptions of utility service during construction is expected to occur. If such a cumulative impact were significant, the FRLRP would not contribute substantially to the impact.

The increased traffic on Feather River Boulevard associated with levee repair and strengthening activities could increase emergency response times and otherwise make access to the area more difficult for emergency service providers. Areas of higher density development occur near the northern end of Feather River Boulevard in project Segment 3, and at the southern end in the Plumas Lake area in Segment 1. It is important that access to areas along Feather River Boulevard remains open for emergencies related to late-season flood events, and particularly for potential fire-control events during the dry season. Mitigation described in Section 5.12, “Public Services, Utilities, and Service Systems,” would ensure avoidance of this potential impact, and

levee repairs and strengthening would not make a considerable contribution to any potential cumulative impacts related to emergency access.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1.

Implementation of the ASB levee setback could result in damage to public utility infrastructure and service disruption in the levee setback area. Although service providers have been contacted for information on the locations of utility infrastructure and preliminary surveys of the facilities have been conducted, it is possible that some utilities that could be affected by project implementation may not have been identified. Infrastructure remaining in the levee setback area could be damaged by construction of the setback levee, by use of a proposed soil borrow area, or by the passage of floodwaters through the setback area, possibly resulting in interruption of service.

As discussed above, the increased traffic on Feather River Boulevard associated with levee repair and strengthening activities could increase emergency response times and otherwise make access to the area more difficult for emergency service providers. Construction traffic on Feather River Boulevard would potentially be greater under Alternative 2 than under Alternative 1 because a larger number of haul truck trips would be associated with construction of the setback levee.

Mitigation described in Section 5.12, however, would ensure avoidance of potential impacts on public utility infrastructure, utility service disruptions, and interference with emergency response. The ASB setback levee would not make a considerable contribution to any potential cumulative impacts on public services, utilities, and service systems.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1, and the impacts associated with construction of the setback levee in project Segment 2 would be the same as the effects described previously for Alternative 2. However, the extent of affected utilities would be somewhat less under Alternative 3 than under Alternative 2 because the intermediate setback levee alignment is located farther to the west than the ASB setback levee alignment, resulting in a smaller setback area. For the reasons described above, the intermediate setback levee would not contribute to any potential significant cumulative impacts on public services, utilities, and service systems.

6.3.13 PALEONTOLOGICAL RESOURCES

Alternative 1 – The Levee Strengthening Alternative

Activities associated with the proposed levee strengthening (e.g., construction of slurry cutoff walls) and related activities (e.g., relocation of Pump Station No. 3, construction of a detention basin) have the potential to encounter and possibly damage unknown paleontological resources.

If any previously undiscovered paleontological resources are found in the levee alignment, at the pump station, or at the soil borrow/detention basin sites as a result of construction activity, mitigation described in Section 5.13, "Paleontological Resources," would be initiated that would prevent any significant impacts on paleontological resources from occurring. Therefore, implementation of Alternative 1 would not make a considerable contribution to any potential cumulative impacts on paleontological resources.

In addition, a potential cumulative net benefit on paleontological resources in the region could occur because construction activity may encounter resources that would otherwise go undiscovered. The protection of those resources would allow future study that would contribute to the body of scientific knowledge.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1.

Construction of the ASB setback levee in Segment 2 and related activities (e.g., use of the soil borrow area/detention basin) have the potential to encounter and possibly damage unknown paleontological resources. If any previously undiscovered paleontological resources are found in the ASB levee setback area or in the soil borrow area/detention basin as a result of construction activities, mitigation described in Section 5.13 would be initiated to prevent any significant impacts on paleontological resources from occurring. Therefore, implementation of Alternative 2 would not make a considerable contribution to any potential cumulative impacts on paleontological resources.

As described above, a potential cumulative net benefit to paleontological resources in the region could occur because construction activity may encounter resources that would otherwise go undiscovered. The protection of those resources would allow future study that would contribute to the body of scientific knowledge.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1, and the impacts associated with construction of the setback levee in project Segment 2 would be the same as the effects described previously for Alternative 2. However, the levee setback area would be somewhat smaller under Alternative 3 than under Alternative 2 because the intermediate setback levee alignment is located farther to the west than the ASB setback levee alignment, resulting in less potential for disturbance of unknown paleontological resources. For the reasons described above, the intermediate levee setback would not contribute to any potential significant cumulative impacts on paleontological resources.

CHAPTER 7 OTHER CEQA-REQUIRED SECTIONS

7.1 GROWTH-INDUCING EFFECTS

7.1.1 CEQA REQUIREMENTS

The California Environmental Quality Act Guidelines (State CEQA Guidelines) require that an environmental impact report (EIR) evaluate the growth-inducing impacts of a proposed project (Section 21100[b][5]). Growth-inducing impacts are described in Section 15126.2(d) of the State CEQA Guidelines as follows:

> [T]he ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth (a major expansion of a wastewater treatment plant might, for example, allow for more construction in service areas). Increases in the population may tax existing community service facilities, requiring construction of new facilities that could cause significant environmental effects…. [In addition,] the characteristics of some projects…may encourage and facilitate other activities that could significantly affect the environment, either individually or cumulatively. It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.

Included in this definition are public works projects that would remove obstacles to population growth. Direct growth inducement would result if a project, for example, involved the construction of new housing. Indirect growth inducement would result if a project established substantial new permanent employment opportunities (e.g., new commercial, industrial, or governmental enterprises), involved a construction effort with substantial short-term employment opportunities that would indirectly stimulate the need for additional housing and services, or removed an obstacle to housing development.

Growth inducement itself is not an environmental effect, but it may foreseeably lead to environmental effects. If substantial growth inducement occurs, it can result in secondary environmental effects, such as increased demand on community and public services and infrastructure, increased traffic and noise, degradation of air or water quality, degradation or loss of plant or animal habitats, or conversion of agricultural and open-space land to urban uses. However, these adverse effects are less likely to occur, and where they do occur they are more likely to be adequately mitigated, if the induced growth is consistent with or accommodated by the land use plans and growth management plans and policies for the area affected (e.g., city and county general plans, specific plans, transportation management plans). Local land use plans provide for land use development patterns and growth policies that encourage orderly urban development supported by adequate urban public services such as water supply, roadway infrastructure, sewer services, and solid waste services. A project that would induce “disorderly” growth (i.e., growth that would conflict with the local land use plans) could indirectly cause additional adverse environmental impacts and other public services impacts.

If significant indirect environmental effects of growth may occur, the question must be answered whether those effects have already been considered and mitigated, or overridden if unavoidable, in a completed CEQA process, or whether they instead need to be disclosed and analyzed in the proposed project's EIR. If the induced growth is consistent with an approved general plan, specific plan, or similar planning document, and a CEQA document on that plan adequately addresses the effects of growth in the plan, the environmental effects of growth induced by the proposed project have already been evaluated. In this case, the EIR for the proposed project can refer to the completed CEQA document for the impact analysis and need not evaluate it in detail again. A project that would induce growth that is not consistent with a general plan, specific plan, or similar planning document could indirectly cause additional significant environmental impacts beyond those evaluated in the earlier CEQA documents on the plan. In this case, the EIR for the proposed project would need to disclose and evaluate potential additional significant effects and proposed mitigation for those effects, if feasible.

7.1.2 GROWTH-INDUCEMENT POTENTIAL OF THE PROPOSED PROJECT

Fostering Growth—Housing and Employment

Because the Feather River Levee Repair Project (FRLRP) would not involve the construction of housing, it would not be directly growth inducing. Construction activities associated with the FRLRP would generate short-term employment opportunities that would have the potential to indirectly stimulate the need for additional housing and services during the construction periods, which would occur over 2 years in 2007–2008. Active construction would occur primarily from spring through late fall during these 2 years, and depending on the alternative selected by Three Rivers Levee Improvement Authority (TRLIA), the construction effort would require a typical labor force of approximately 50–70 people. Intensive construction periods could require an increase in construction staff to a total of as many as 100 people at any one time. However, because of the limited number and type of new jobs that would be generated and the temporary nature of those jobs, it is anticipated that the new jobs would be filled using the existing local employment pool. Existing available housing in the Marysville–Yuba City area would easily accommodate any workers who relocate from outside the area, if needed. Moreover, project operations and maintenance necessary for the FRLRP would not require new workers. Therefore, indirect growth-inducing impacts resulting from implementation of the FRLRP would be less than significant.

Removing Obstacles to Growth—Flood Protection

Overview of Flood Protection Efforts and Planned Development in the RD 784 Area

As described in detail in Chapter 3, "Project Purpose, Need, and Development," flooding that occurred in the Central Valley in 1986 resulted in initiation of various flood control studies and projects in the Yuba River basin and in the Reclamation District (RD) 784 area of Yuba County. The System Evaluation Project prepared by the U.S. Army Corps of Engineers (Corps) and the California Department of Water Resources was the first of these flood control projects. This project was followed in 1988 by Yuba County Water Agency's (YCWA's) initiation of the Yuba Basin Project.

In 1993, following the initiation of the System Evaluation Project and the Yuba River Basin Project, and before the floods of 1997, Yuba County (County) had approved the Plumas Lake Specific Plan, which provides for a 12,000-home development on 5,200 acres in the southern portion of the RD 784 area. A few years before, the County had also approved the smaller East Linda Specific Plan adjacent to Yuba Community College, north of Olivehurst. Construction of the Plumas Lake and East Linda developments began in 2002. However, the results of a Corps floodplain mapping study completed in 2003 indicates that the people and property in the RD 784 area, including homes that had already been built in the Plumas Lake Specific Plan area before the release of the Corps study, are subject to a much higher flood risk than previously believed. Without levee improvements that meet Federal Emergency Management Agency (FEMA) criteria, FEMA could issue new Flood Insurance Rate Maps for the RD 784 area.

To avoid having RD 784 mapped into the FEMA 100-year floodplain, YCWA, RD 784, and the County, in consultation with many landowners and developers in the south county, elected to move aggressively on a program for achieving FEMA certification of the RD 784 levees. As a result of this program, various levee repair/improvement projects and other flood protection projects have been completed, are under way, or are being studied in the RD 784 area, including the FRLRP.

In 2005, the State of California Reclamation Board (The Reclamation Board) issued an encroachment permit for work on Phase 3 of the program of elements under the Y-FSFCP, which included Bear River and WPIC levee improvements and construction of the Olivehurst detention basin. Notably, the encroachment permit contained a special condition that limited the issuance of building permits in the RD 784 area to 800 in 2005 and 700 in 2006. Limitations on building permits would be removed after planned flood protection projects were completed. This condition in The Reclamation Board's encroachment permit, which was agreed to by the County, provided a nexus between completion of flood protection efforts and future growth/development in the RD 784 area.

Since 2005, remaining state bond funding for TRLIA's levee improvements under the Costa-Machado Water Act of 2000 has been expended. The lack of available funding has constrained TRLIA's ability to continue planned flood protection improvements, including implementation of the FRLRP (the subject of this EIR) as well as additional levee repair work on the Yuba River left (south) bank levee. These circumstances contributed to the April 21 and May 19, 2006, decisions by The Reclamation Board to approve a resolution allowing TRLIA to accelerate its levee improvement program using developer-generated funding (The Reclamation Board's meeting transcripts are available online at http://recbd.ca.gov/meeting_transcripts/2006/). The resolution allows developers to generate these funds by removing the previous Reclamation Board limitation on building permits (800 in 2005 and 700 in 2006). The Reclamation Board found that the building permit limitation in the Plumas Lake Specific Plan area was, indeed, limiting TRLIA's ability to continue necessary levee improvement and construction projects. Therefore, development could proceed in the specific plan area without the previous constraints.

However, The Reclamation Board's April 2006 resolution includes various conditions that must be met to allow continued development, to which all parties agreed. TRLIA made a commitment to use its best efforts to complete all elements of the flood control program by 2008. The developers must purchase flood insurance for homeowners in the Plumas Lake Specific Plan

developments until 2008, or until completion of necessary flood protection efforts. Furthermore, the County agreed to satisfy concerns expressed by The Reclamation Board regarding the status of its Flood Safety Information and Emergency Evacuation Plan. The decision by The Reclamation Board to lift the previous building restrictions allows TRLIA, in partnership with the County and the local landowners, to finalize and implement its finance program to raise the $135 million necessary to complete the levee improvement program.

Growth-Inducing Effects of the FRLRP

As described above, the Plumas Lake Specific Plan was approved in 1993. Construction of the first homes in the developments began in spring 2003. Based on the circumstances described above, continuing buildout of the Plumas Lake Specific Plan area is directly linked to continuing levee improvements that are proposed under the FRLRP. Based on the conditions of The Reclamation Board's April 2006 resolution, to which the involved parties agreed, without implementation of the FRLRP and other flood protection projects, development in the Plumas Lake Specific Plan area could not proceed beyond 2008. Therefore, implementation of the FRLRP is growth inducing in the sense that it removes an obstacle to future development.

However, development supported by completion of the FRLRP is consistent with existing land use and project plans in the RD 784 area that had been approved long before the need for the proposed levee improvements had become apparent. Development in these areas is proceeding in accordance with the applicable plans, which include the *Plumas Lake Specific Plan* (Yuba County 1992a), *East Linda Specific Plan* (Yuba County 1990a), and *Yuba County General Plan* (Yuba County 1994a, 1996a).

CEQA analyses have been completed for these plans and associated projects that disclose the environmental effects associated with their implementation. Applicable CEQA analyses include the draft and final EIRs for the *Plumas Lake Specific Plan* (Yuba County 1992b, 1993); for the *East Linda Specific Plan* (Yuba County 1990b, 1990c); and for the *Yuba County General Plan* (Yuba County 1994b, 1996b).

CEQA analyses are under way for two additional large-scale mixed-use projects consisting of up to approximately 6,500 and 2,100 housing units, respectively. However, EIRs for these projects are not yet available.

Implementation of the FRLRP would not alter the location or amount of growth and development envisioned in the available EIRs prepared for local planning documents. Any effects on the environment resulting from the FRLRP removing an obstacle to existing planned growth in the RD 784 area are identified in these available documents. Significant impacts identified in these documents are summarized below.

Some people may argue that implementation of the FRLRP could induce additional new development in the RD 784 area that is currently unplanned and unknown. The degree to which the additional flood protection provided by the FRLRP would alter future development patterns or increase the potential for growth in areas afforded greater flood protection is speculative; therefore, no further discussion is required (State CEQA Guidelines Section 15145).

Land Use

The EIRs for the *Yuba County General Plan* and *East Linda Specific Plan* found no significant impacts related to land use as a result of project implementation.

The *Plumas Lake Specific Plan* EIR found that the specific plan would endanger agricultural lands adjacent to the plan area boundaries because of land use conflicts between urban and agricultural uses. Mitigation measures are provided, but the impact is still identified as significant and unavoidable. The EIR also found that public health impacts could potentially arise from agricultural aerial spraying in lands adjacent to the plan area. A mitigation measure was provided, but the impact is still considered potentially significant. Inconsistency of the specific plan with the goal and with Policy 1a of the Agricultural Lands section of the Land Use Element of the *Yuba County General Plan* was found to be a significant and unavoidable impact in the EIR. The EIR also concludes that the conversion of 5,000 acres of agricultural land to nonagricultural uses is a significant and unavoidable impact, as is the permanent change in character and use of a large amount of land. The *Plumas Lake Specific Plan* EIR recognizes potential impacts from residential land uses abutting commercial, industrial, and infrastructure land uses. This impact is reduced to a less-than-significant level by a mitigation measure. However, potential impacts on public health and safety where residential areas are adjacent to the All Pure Chemical plant are considered significant and unavoidable, although mitigation is provided.

Population and Housing

The EIRs for the *Yuba County General Plan* and *Plumas Lake Specific Plan* found no significant impacts related to housing and population that would arise from project implementation. The *East Linda Specific Plan* EIR states in the section related to population and housing that there are no significant impacts resulting from project implementation related to these topic areas. However, elsewhere in the EIR it identifies population growth as a significant and unavoidable impact.

Geology, Soils, and Mineral Resources

The EIRs for the *Yuba County General Plan* and *Plumas Lake Specific Plan* do not identify any significant impacts related to geology, soils, and mineral resources. The *East Linda Specific Plan* EIR concludes that construction of new roads, underground utilities, drainage retention areas, dwelling units, commercial developments, and school facilities will cause the displacement, disruption, compaction, and covering over of plan area soils. Mitigation measures reduce these impacts to less-than-significant levels.

Hydrologic Conditions, Water Supply and Quality, and Drainage

The *Yuba County General Plan* EIR identifies flooding impacts in the Wheatland/Bear River area as significant. The EIR provides a mitigation measure that reduces these impacts to a less-than-significant level. The *Plumas Lake Specific Plan* EIR identifies no significant impacts related to hydrologic conditions, water supply and quality, or drainage as a result of project implementation.

The *East Linda Specific Plan* EIR concludes that development of the specific plan area would have the following impacts: increase in the rate and amount of surface-water runoff; increase in

the amount of unnatural objects carried from place to place by runoff; increase in the amount of harmful chemicals from human activities and machinery released into runoff water; erosion during construction activity; alteration of the course of floodwaters; and change in the quantity of groundwater. Mitigation measures reduce these impacts to less-than-significant levels.

Biological Resources

The *Plumas Lake Specific Plan* EIR discusses the development of the plan area and its impact on loss of habitat area. The EIR also discusses potential project impacts related to removal of the riparian forest and scrub areas within the plan area boundaries, as well as potential indirect impacts on and direct removal of permanent water and seasonally ponded wetlands, including U.S. Army Corps of Engineers jurisdictional wetlands. All of these impacts are reduced to less-than-significant levels with mitigation measures.

The *Yuba County General Plan* EIR addresses indirect and secondary effects on biological resources. These impacts can occur via illegal hunting, domestic dog activity, off-road vehicle use, the use of pesticides and other harmful chemicals, and other factors related to more intense human presence and activity. A mitigation measure is provided to mitigate this impact, but it remains potentially significant.

The *East Linda Specific Plan* EIR discusses the potential for project impacts on vernal pools and vernal pool habitat. Mitigation measures reduce these impacts to less-than-significant levels.

Aesthetic Resources

The EIRs for the *Yuba County General Plan* and *Plumas Lake Specific Plan* found no significant impacts related to aesthetics or scenic resources that would arise from project implementation. The *East Linda Specific Plan* EIR considers the change in the visual character of the site from rural to urban to be a significant and unavoidable impact.

The EIRs for the *Yuba County General Plan* and *Plumas Lake Specific Plan* found no significant impacts related to light and glare that would arise as a result of project implementation. The *East Linda Specific Plan* EIR found that light spillage from parking lots or sign lighting onto adjacent residential properties could result in significant glare impacts. Mitigation measures reduce these impacts to less-than-significant levels.

Cultural Resources

The *Yuba County General Plan* EIR concluded that as a result of new development allowed by the general plan, existing cultural resources would be significantly more susceptible to vandalism, impacts from off-road vehicles, and other secondary or indirect effects. This increase in susceptibility would occur because of the greater numbers of people in the county and because of new developments located relatively close to certain cultural resources. The EIR provides a mitigation measure that reduces this impact to a less-than-significant level.

The *Plumas Lake Specific Plan* EIR concluded that development of the specific plan area could disrupt or destroy significant historical sites. Mitigation measures reduce this impact to a less-than-significant level. The *East Linda Specific Plan* EIR found no significant impacts related to cultural resources that would arise from project implementation.

Air Quality

The *Yuba County General Plan* EIR identifies significant air quality impacts related to new development, primarily because the air basin is already in nonattainment for some constituents. No mitigation measures were identified that would guarantee that this impact could be reduced to a less-than-significant level, so it remains potentially significant.

The *Plumas Lake Specific Plan* EIR discusses air quality impacts related to construction dust emissions and hazardous emissions from construction equipment. These impacts are reduced to less-than-significant levels by mitigation measures. The EIR concludes that development in the plan area could add to a significant cumulative decline in air quality in the region. Mitigation measures are provided, but the impact remains significant and unavoidable.

The *East Linda Specific Plan* EIR identifies construction dust and increased motor vehicle emissions as impacts anticipated as part of development of the plan area. Mitigation measures reduce these impacts to less-than-significant levels.

Noise

The *Yuba County General Plan* EIR recognizes significant direct and cumulative noise impacts from the development of noise-sensitive land uses closer to existing railroads and commercial, industrial, and recreational noise sources, and from the development of new commercial, industrial, and recreational noise sources closer to existing noise-sensitive land uses. The EIR also discusses the potential impact of the development of noise-sensitive uses close to Beale Air Force Base, the Brownsville Aero Pines Airport, and the Yuba County Airport, exposing these uses to aircraft noise. Mitigation measures reduce all of these impacts to less-than-significant levels. The General Plan EIR also anticipates traffic noise impacts at new noise-sensitive land uses from new and existing roadways, and at existing land uses from new roadways. These impacts are reduced by mitigation measures to less-than-significant levels. The exposure of existing noise-sensitive land uses to increased traffic noise from existing roadways is also identified as a significant impact. A mitigation measure is provided for this impact, but this mitigation may not be possible in some instances, leaving the impact as potentially significant.

The *Plumas Lake Specific Plan* EIR found two significant noise impacts: railroad, future traffic, and existing industrial noise impacts on noise-sensitive land uses, and construction activity noise impacts on surrounding uses. Both impacts are mitigated to less-than-significant levels.

The *East Linda Specific Plan* EIR concludes that sensitive uses within the 65–75 decibel (dB) community noise equivalent level (CNEL) noise contour for State Route (SR) 70 and people living near the SR 70 bypass, the railroad, and other major arterials may be subject to unacceptably high noise levels. These impacts are reduced by mitigation measures to less-than-significant levels.

Transportation and Circulation

One transportation-related impact identified in the *Yuba County General Plan* EIR is that growth and development under the general plan could affect the development and maintenance of an efficient and effective roadway system with acceptable levels of service (LOS). Some roads that would need to be widened to ensure acceptable LOS, because of the level of growth allowed by the general plan, might not be widened. A mitigation measure in the EIR proposes (a) the

widening of each such road for which widening is possible and (b) alternative measures to mitigate the decreased LOS for roads that cannot be widened because of physical constraints. If these measures are effective, the impact is reduced to a less-than-significant level, but the impact remains potentially significant pending the effectiveness of the measures.

The *Plumas Lake Specific Plan* EIR discusses LOS impacts on multiple intersections under the "Existing Plus Project Scenario," all of which are mitigated to less-than-significant levels. These intersections include the following: Arboga Road/Erie Road; SR 70 southbound ramps/Erie Road; Arboga Road/McGowan Parkway; SR 70 southbound ramps/McGowan Parkway; SR 70 northbound ramps/McGowan Parkway; SR 70 southbound ramps/Feather River Boulevard; SR 70 northbound ramps/Feather River Boulevard; SR 70 southbound ramps/Plumas-Arboga Road; and SR 70 northbound ramps/Plumas-Arboga Road. Also under the "Existing Plus Project Scenario," the *Plumas Lake Specific Plan* EIR discusses additional impacts on SR 70 and SR 65 mainlines and interchanges. One impact is that projected travel demand at the Algodon Road/Plumas-Arboga Road and Feather River Boulevard interchanges with SR 70 will create the need for major interchange modifications. A mitigation measure is provided for this impact, but it remains potentially significant. Another impact is that traffic generated by development of the plan area will create the need for greater capacity on SR 70; this impact is reduced to a less-than-significant level with mitigation.

Under the "Cumulative Plus Project Scenario," the *Plumas Lake Specific Plan* EIR discusses LOS impacts on multiple intersections, all of which are mitigated to less-than-significant levels. These intersections include the following: Arboga Road/Erie Road; SR 70 southbound ramps/Erie Road; SR 70 northbound ramps/Lindhurst Road; Arboga Road/McGowan Parkway; SR 70 southbound ramps/McGowan Parkway; SR 70 northbound ramps/McGowan Parkway; SR 65 northbound/McGowan Parkway; Feather River Boulevard/Ella Avenue; Plumas-Arboga Road/Algodon Road; SR 70 southbound ramps/Feather River Boulevard; SR 70 northbound ramps/Feather River Boulevard, and; SR 70 southbound ramps/Plumas-Arboga Road. Also under the "Cumulative Plus Project Scenario," the Plumas Lake Specific Plan EIR discusses the impact of future cumulative traffic growth resulting from project implementation on LOS on several roadway segments. This impact is reduced to a less-than-significant level with mitigation.

As under the "Existing Plus Project Scenario," the *Plumas Lake Specific Plan* EIR discusses additional impacts on SR 70 and SR 65 mainlines and interchanges under the "Cumulative Plus Project Scenario." These impacts include the following: increased traffic creating a need for major intersection modification to the Algodon Road/Plumas-Arboga Road and Feather River Boulevard interchanges with SR 70; increased traffic resulting in the need for greater capacity on SR 70; increased public transit demand as a result of increased population; and insufficient funding for improvements because of the lack of an impact fee structure. All of these impacts are mitigated to less-than-significant levels.

The *East Linda Specific Plan* EIR states that if full buildout were to occur before the completion of the SR 70 bypass, unacceptable LOS would occur on SR 70 from the E Street Bridge to the SR 70/SR 65 intersection. This impact remains potentially significant even after mitigation measures are applied.

Public Services, Utilities, and Parks and Recreation

The *Yuba County General Plan* EIR found no significant impacts related to public services and utilities or parks and recreation resulting from project implementation.

The *Plumas Lake Specific Plan* EIR discusses impacts of development of the plan area on increased water and wastewater facility and service demands and increased stormwater facility demands. Other impacts include public safety hazards potentially created by floodplain development and declining water quality potentially caused by development of the plan area. All of these impacts are mitigated to less-than-significant levels. The EIR also identifies the impact of additional fire service demands resulting from development of the specific plan area and the potential impact of structural and suburban land use–related fires resulting from this development. These impacts are reduced to less-than-significant levels via mitigation.

Significant impacts in the *Plumas Lake Specific Plan* EIR related to additional demands for law enforcement services and the anticipated increase in suburban-type crimes are both mitigated to less-than-significant levels. Significant impacts related to increased demand for solid waste collection and disposal are also reduced to less-than-significant levels with mitigation.

The *Plumas Lake Specific Plan* EIR discusses how development of the plan area would remove current recreation opportunities and create demand for additional ones. Mitigation measures reduce this impact to a less-than-significant level. The EIR also states that development of the specific plan area would create significant demands for educational facilities and services. Mitigation measures reduce this impact to a less-than-significant level.

The *East Linda Specific Plan* EIR identifies water and wastewater impacts related to portions of the plan area not being included in the Linda County Water District. It also discusses impacts related to a new water main and distribution lines not yet being in place and additional standby power needed to meet system demands and design criteria. Other impacts in the EIR relate to insufficient capacity of sewer trunk lines, wastewater treatment facilities, and stormwater drainage facilities to serve the plan area at buildout. The EIR also identifies impacts related to the need for new firefighting equipment and increased demands for service from the Yuba County Sheriff's Department. School impacts include the need for new school facilities to serve the plan area and the cost of land acquisition, site improvement, and building construction, which would exceed available revenue. The need for new parks is also identified as an impact. Mitigation measures are listed in the *East Linda Specific Plan* EIR for each of the public services and facilities impacts discussed above, but increased demand for public services is also listed as a significant and unavoidable impact. Sewage treatment and water supply are specifically listed in the section discussing significant and unavoidable impacts.

Risk of Upset/Public Health and Safety

The EIRs for the *Yuba County General Plan* and *East Linda Specific Plan* found no significant impacts related to risk of upset or public health and safety. The *Plumas Lake Specific Plan* EIR discusses how development could be hindered or slowed by the discovery of and investigation of hazardous materials on-site. This impact is mitigated to a less-than-significant level.

Paleontological Resources

The EIRs for the *Yuba County General Plan*, *East Linda Specific Plan*, and *Plumas Lake Specific Plan* do not address paleontological resources.

7.2 AREAS OF KNOWN CONTROVERSY

The primary area of potential controversy associated with the FRLRP is the change in land uses that would occur as a result of setting back the left bank Feather River levee between Star Bend and Shanghai Bend under either Alternative 2 or Alternative 3. Under Alternative 2, a total of approximately 1,600 acres would be included in the setback levee footprint and easements and the setback area (new floodway). Of that total acreage, approximately 250 acres would be required for the setback levee footprint and easements, and the remaining approximately 1,350 acres would be subject to periodic inundation during high river flows. Under Alternative 3, approximately 230–240 acres would be required for the setback levee footprint and easements, and approximately 1,600–1,700 acres would be included in the new floodway. The majority of the land within the levee setback area is currently used for agriculture. Continued farming operations may be feasible in many parts of the setback area but could be impractical in other areas as a result of project implementation. Under Alternatives 2 and 3, up to several hundred acres of agricultural land could also be converted to a detention basin. It should be noted that under Alternative 1 up to approximately 180 acres of agricultural land would be removed from production to accommodate a detention basin and seepage/stability berms.

With implementation of the FRLRP, periodic episodes of inundation in the levee setback area are expected to be infrequent enough and of short enough duration to allow farming to continue on some portion of the land in the setback area. TRLIA may acquire flood easements from landowners who want to continue to farm or use their land in ways that are compatible with flowage easements. Some portion of the land in the levee setback area may be permanently removed from agricultural production and would be acquired through fee-title. Future management plans for these acquired properties could include restoration of habitat and wetland areas as a substitute for agricultural uses where opportunities are present.

Setting back the Feather River levee may be controversial because private property would be transected by a new levee, some property owners would be displaced, homes and other structures in the setback area would be removed, farmable land would be subject to flooding, and prime agricultural land would be removed from agricultural use. Furthermore, if habitat restoration is included in the FRLRP, converting agricultural land to riparian and wildlife habitat is controversial in some agricultural communities, especially in the Sacramento Valley, where extensive areas are being converted or are proposed for conversion from agricultural use to riparian habitat. County tax revenues also may change as a result of potential land use changes.

An additional area of potential controversy is project construction. Levee strengthening and/or construction of a setback levee would likely pose a temporary nuisance to nearby residents. All construction-related impacts identified in this EIR (see Chapter 5) have appropriate mitigation measures that would be implemented as part of the project; however, short-term impacts associated with construction, such as those associated with noise, dust, and traffic, could exacerbate any public controversy regarding the FRLRP.

This project would help resolve a current area of known and long-standing controversy, namely, the existing risk of flooding impacts in the Yuba-Feather River watershed, as demonstrated by recent catastrophic flooding events. Implementation of any of the three FRLRP alternatives examined in this EIR would result in the levees in the project area providing flood protection for the 1-in-200 annual exceedance probability flood and increasing the overall level of flood protection in the RD 784 area.

Overall, the FRLRP would reduce the ongoing concern and controversy over flood protection in the nearby communities. Any continuing controversy surrounding the project would be related primarily to the direct effects of the proposed levee setback under Alternatives 2 and 3 on affected landowners as well as the effects on agricultural production associated with lands in the levee setback area.

7.3 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS OF RESOURCES

The FRLRP would result in the irretrievable commitment of:

- fossil fuels during construction of the project;
- energy resources needed to repair the existing levees, and under Alternatives 2 and 3, to construct the setback levee and associated features and to relocate utilities; and
- construction materials.

If FRLRP Alternative 2 or Alternative 3 were selected, a newly constructed setback levee would become a permanent landscape feature along the Feather River and an irreversible change in land use would result.

7.4 UNRESOLVED ISSUES

TRLIA would need to select which alternative to approve among the three alternatives evaluated at an equal level of detail in this EIR. The decision would be based on numerous factors besides environmental impacts, including cost, availability of financing, effects on landowners, the potential for regional flood control benefits, future permitting requirements, and implementation schedule.

Regardless of which alternative is selected for implementation, detailed design of project features and planning of construction would need to be coordinated with mitigation requirements in this EIR so that sensitive resources, utilities, and disturbance to adjacent landowners are avoided where practicable. Detailed plans for mitigation of effects on biological resources that cannot be physically avoided during construction would need to be developed in compliance with applicable federal and state laws (e.g., the federal and California Endangered Species Acts) and in coordination with the regulatory agencies.

Land uses in the levee setback area under Alternatives 2 and 3 could consist of agricultural operations and/or habitat restoration activities. Special operations and maintenance plans would need to be prepared and implemented to ensure the long-term maintenance of any agricultural and/or habitat areas, and to ensure that such areas would not conflict with the flood control

function of the levee setback area. Any future management plans would require consultation with affected landowners, resource agencies, and other stakeholders.

CHAPTER 8 ALTERNATIVES

8.1 CEQA REQUIREMENTS

The guiding principles for the selection of alternatives for analysis in an environmental impact report (EIR) are provided by the California Environmental Quality Act Guidelines (State CEQA Guidelines). Section 15126.6 of the State CEQA Guidelines indicates that the alternatives analysis must:

- describe a range of reasonable alternatives to the project that could feasibly attain the basic objectives of the project;
- consider alternatives that could reduce or eliminate any significant environmental impacts of the proposed project, including alternatives that may be more costly or could otherwise impede the project's objectives; and
- evaluate the comparative merits of the alternatives.

The range of reasonable alternatives must be selected and discussed in a manner that fosters meaningful public participation and informed decision making (State CEQA Guidelines Section 15126.6[f]).

The alternatives analysis in this EIR is governed by the "rule of reason" in accordance with Section 15126.6(f) of the State CEQA Guidelines. That is, the range of alternatives presented in this EIR is limited to ones that will inform a reasoned choice by Three Rivers Levee Improvement Authority's (TRLIA's) decision makers. In addition to the guiding principles for the selection of alternatives as set forth above, Section 15126.6 of the State CEQA Guidelines requires that an EIR (1) evaluate a "No Project Alternative," (2) identify alternatives that were initially considered but then rejected from further evaluation, and (3) identify the "environmentally superior alternative."

Alternatives may be eliminated from detailed consideration in the EIR if they fail to meet most of the basic project objectives, are infeasible, or could not avoid any significant environmental effects (State CEQA Guidelines Section 15126.6[c]). Lead agencies are guided by the general definition of feasibility found in CEQA: "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors" (State CEQA Guidelines Section 15364).

In addition to CEQA, the National Environmental Policy Act and Section 404 of the Clean Water Act provide guidance on alternatives. These guidelines, as well as those of CEQA, have been considered in the identification, evaluation, screening, and finalizing of alternatives for the Feather River Levee Repair Project (FRLRP) to support future decision making in compliance with these acts.

Section 8.2 provides an overview of the alternatives selection process for the FRLRP. Section 8.3 describes the alternatives evaluated in this EIR. Section 8.4 compares the environmental effects of the alternatives, and Section 8.5 discusses the environmentally superior alternative.

8.2 ALTERNATIVES SCREENING PROCESS

As described in Chapter 3, "Project Purpose, Need, and Development," the proposed FRLRP is an expansion and modification of the Above Star Bend (ASB) levee setback previously evaluated in the programmatic EIR for the Yuba-Feather Supplemental Flood Control Project (Y-FSFCP) (Yuba County Water Agency 2003). The following discussion briefly summarizes the development of the FRLRP. See Section 3.3, "Development of the Feather River Levee Repair Project," for additional information.

8.2.1 YUBA-FEATHER SUPPLEMENTAL FLOOD CONTROL PROJECT—FEATHER RIVER LEVEE SETBACK

The Y-FSFCP programmatic EIR contains a substantial amount of background information provided to assist reviewers in understanding both the alternatives development process and the rational basis for the selection of three elements, including a Feather River levee setback, for detailed feasibility analysis. Section 3.2, "Need for Supplemental Flood Control," of the Y-FSFCP programmatic EIR describes the combination of environmental conditions, institutional factors, and physical and operational characteristics of the flood control system that were factored into the selection of alternative flood control elements for detailed evaluation by Yuba County Water Agency (YCWA) and its flood control study team. Section 3.3, "Formulation of the Proposed Project," of the Y-FSFCP programmatic EIR summarizes the lengthy screening process that led to the selection of the alternatives evaluated in the EIR.

The selection of the alternatives evaluated previously in the Y-FSFCP programmatic EIR was based largely on findings of previous studies by the flood control study team. In these studies, more than 30 potential elements of a flood control program were identified and screened separately and in combination. The basic project purpose of the Y-FSFCP was to define and implement cost-effective and practicable measures as soon as possible within the budget provisions of the Costa-Machado Water Act of 2000 (Water Act of 2000) to provide the greatest possible increment of flood protection from the Yuba and Feather Rivers. The focus of the study, like the focus of the FRLRP, was primarily on providing benefits for Yuba County and secondarily on providing benefits for other areas that might also contribute to project implementation.

The Feather River levee setback element was developed to provide flood protection by lowering channel water levels. The other flood control elements that would also have the potential to lower Feather River water levels are new storage in existing, upstream flood control reservoirs; more efficient operation of these reservoirs; and dredging of the Feather River channel. The studies determined that new reservoir storage would be effective in increasing flood protection; however, the construction of new dams is not authorized as part of the Water Act of 2000. The Y-FSFCP efforts completed to date have been funded in large part through this act; therefore, new reservoir storage was eliminated from further consideration as a viable project alternative because it would entail the construction of new dams.

More efficient operation of existing flood control reservoirs was investigated and recommended as a project feature in the form of two elements: Forecast-Coordinated Operations of Lake Oroville and New Bullards Bar Reservoir for Major Storms (F-CO), which is being implemented, as described in Chapter 6, "Cumulative Impacts," and New Bullards Bar Outlet Capacity Increase.

Dredging of the Feather River channel was screened as a potential flood control improvement measure. This option was rejected because it was concluded that dredging would not be effective in reducing flood stages. The channel area that could be dredged represents a small portion of the entire floodway (levee to levee); as a result, it was determined that lowering the main channel would not provide significant reductions in flood levels. Dredging would also have the potential to break through geologic controls (hard points) in the channel and create a dangerous condition of channel movement.

Selection of specific levee setback options was based on several considerations: improvement to the hydraulic characteristics of the Feather River, levee stability and performance, costs, and impacts on land users. Hydraulic evaluations focused on increasing the width of constricted river reaches. It was determined that the two previously considered setback options, Above Star Bend and Below Star Bend, would provide both significant hydraulic benefits for Yuba and Sutter Counties and important levee stability/performance benefits for Yuba County. (As described below, the Below Star Bend levee setback has been eliminated from consideration because of improvements that have subsequently been made to the southernmost portion of the Feather River levee between Star Bend and the Bear River.) Comparable channel widening on the Sutter County side of the Feather River would be as long, or longer, depending on the selected alignment and would not provide stability/performance benefits for Yuba County. It was found that the possible levee setback in Sutter County near the airport at Yuba City would not provide any significant flood reduction benefit. The possible setback on the wide bend where State Route (SR) 99 crosses the Feather River was determined to be cost-prohibitive and to entail substantial implementation complications because of the need to modify the SR 99 crossing itself.

In summary, the previous flood control studies and alternatives screening entailed careful consideration of a wide range of potential flood control elements in the context of a complex set of factors affecting performance of the existing flood protection system. See *Alternatives Analysis Report for the Yuba-Feather Supplemental Flood Control Project* (Yuba County Water Agency 2002) and Chapter 8 of the Y-FSFCP draft environmental impact report (DEIR) (Yuba County Water Agency 2003) for complete descriptions of the previous alternatives selection process.

8.2.2 FEATHER RIVER LEVEE REPAIR PROJECT

Recent studies by the U.S. Army Corps of Engineers (Corps) and TRLIA indicate that several reaches of the Feather River left (east) bank levee between the mouth of the Yuba River and the mouth of the Bear River, as well as reaches of the lower Yuba River left (south) bank levee, do not satisfy geotechnical criteria for seepage for the 1-in-100 annual exceedance probability (AEP) flood (i.e., the "100-year flood"). For example, the Corps prepared the Lower Feather River Floodplain Mapping Study, dated Feb. 17, 2005. The report identified various deficiencies

with the Feather River, Yuba River, Bear River, and Western Pacific Interceptor Canal levees in the Reclamation District (RD) 784 area.

More recently, a Problem Identification Report (PIR) prepared for TRLIA (Kleinfelder 2006) addressed the condition of the Feather River left bank levee from Project Levee Mile (PLM) 13.3 (just south of Pump Station No. 2) to the beginning of the Yuba River left bank levee at PLM 26.1, and the Yuba River left bank levee from PLM 0.0 (beginning of the levee) to PLM 0.3, and from PLM 2.2 to PLM 6.1. The purpose of the PIR was to perform a feasibility-level evaluation of subsurface geotechnical conditions and levee conditions in accordance with the requirements of the Federal Emergency Management Agency (FEMA). The PIR concluded that portions of the subject levees do not currently meet FEMA's geotechnical certification requirements for through-seepage (water seeping through levee soils) and underseepage (water seeping under levee soils) during flood events.

In addition, the *Phase 4 Erosion Investigation Report* prepared for TRLIA (MBK Engineers 2006) assessed existing levee erosion issues on the left bank levees of the Feather River and lower Yuba River. The investigation report identified several areas of concern regarding erosion along the levee embankment slope in the area identified in this DEIR as project Segment 2 (see Figure 4-1, "FRLRP Project Features," in Chapter 4 of this DEIR). The report identified the need for ongoing assessment, monitoring, and corrective action at these locations.

Development of the FRLRP was initiated in response to levee deficiencies identified in the various available studies. The primary purpose of the FRLRP is to correct identified deficiencies in the left bank levees of the Feather and Yuba Rivers, and consequently to improve flood protection for the RD 784 area of Yuba County. The project design objectives focus on measures to bring the levees into compliance with FEMA's geotechnical certification requirements for underseepage and through-seepage, as well as engineering standards for the State of California Reclamation Board (The Reclamation Board) and the Corps.

The objectives of the FRLRP, as identified previously in Section 3.1, "Project Purpose and Objectives," are:

- to secure flood protection for at least a flood event with a 0.5% (or 1-in-200) annual chance of exceedance,
- to help secure FEMA certification of the subject reaches of levee,
- to avoid increasing downstream flow and stage during peak-flow conditions,
- to achieve these objectives as soon as possible, and
- to incorporate environmental mitigation as appropriate.

Various approaches to achieve these objectives were considered for each of the three project segments identified in this DEIR (see Figure 4-1). The alternatives screening process for each segment is described below.

Segment 1

Project Segment 1 extends from Feather River PLM 13.3 (approximately 0.5 mile north of the confluence with the Bear River) to PLM 17.1 at Star Bend. This area was considered for the Below Star Bend levee setback in the Y-FSFCP programmatic EIR. However, the October 2004 feasibility study for the Bear River setback levee found that a setback levee at the confluence of the Feather and Bear Rivers would provide some of the hydraulic and flood control benefits that would be provided by setting back the existing Feather River left bank levee below Star Bend. Further study conducted in support of the EIR prepared for the Feather-Bear Rivers Levee Setback Project (F-BRLSP) found that the hydraulic and flood control benefits resulting from this project preclude the need to improve the Feather River left bank levee below Pump Station No. 2 (approximately PLM 13.4). The EIR for the F-BRLSP was certified in November 2004 and project construction began in 2005.

Because of the presence of the F-BRLSP setback levee, a setback levee in FRLRP Segment 1 would provide few flood control benefits, yet it would result in impacts on property, facilities, and landowners associated with placing new lands in the floodplain. Therefore, a setback levee in Segment 1 was not considered further and levee strengthening was adopted as the preferred approach to addressing levee deficiencies in this area. As described in Chapter 4, "Description of the Proposed Project," all three project alternatives include the same levee strengthening approach in Segment 1.

Segment 2

Project Segment 2 extends from Feather River PLM 17.1 to PLM 23.6. This area includes the ASB levee setback described in the Y-FSFCP programmatic EIR. A levee setback was considered in this area for several reasons:

- a setback levee would replace the existing levee, thereby "correcting" any deficiencies in the existing levee;
- hydraulic and flood control benefits would be achieved by widening an existing narrow point in the river;
- a new setback levee would be constructed using materials and methods consistent with modern standards; and
- a setback levee placed sufficiently eastward of the existing levee could be placed on soils more suitable for supporting a levee foundation.

The ASB setback levee alignment included in the Y-FSFCP programmatic EIR provided a starting point for identifying alternatives for Segment 2 in the FRLRP. TRLIA staff members, project engineers, hydrologists, and others conducted various studies, meetings, and workshops to further develop and refine project alternatives.

Abandoning the setback levee concept and strengthening the existing levee in place was considered as an alternative approach for Segment 2. This approach was considered to allow evaluation of the effects of correcting the levee deficiencies without obtaining the hydraulic and

flood control benefits of a setback levee. As in Segment 1, strengthening the existing levee in Segment 2 would avoid any impacts on property, facilities, and landowners associated with placing new lands in the floodplain. This approach is reflected in this EIR in Alternative 1, The Levee Strengthening Alternative.

Alternative 2 in this EIR, The Levee Strengthening and ASB Setback Levee Alternative, includes a setback levee in Segment 2 that generally follows the alignment of the ASB setback levee included in the Y-FSFCP programmatic EIR. However, as part of the alternatives development process, the northern portion of the setback levee alignment was extended to encompass an area of seepage concerns identified in the PIR. The Levee Strengthening and ASB Setback Levee Alternative was selected for analysis in this EIR because it allows decision makers to evaluate an alternative that provides the benefits of the ASB setback levee listed above, while weighing these benefits against impacts on property, facilities, and landowners associated with placing new lands in the floodplain.

Several other potential setback levee alignments were considered during the alternatives development process. Almost all of these alignments were located to the west of the ASB setback levee alignment. Evaluation of a setback levee alignment between the ASB levee alignment and the existing Feather River levee was considered desirable because it would allow consideration of an intermediate condition, or a balance of benefits and impacts: because of the smaller setback area, hydraulic and flood control benefits could be reduced, but impacts on property, facilities, and landowners associated with placing new lands in the floodplain would also be reduced. Factors considered when potential intermediate setback alignments were developed and evaluated included the suitability of underlying soil conditions to support a levee foundation, the goal of minimizing the splitting of landowner parcels, and effects on potential upstream hydraulic benefits.

The setback levee alignment reflected in this EIR in Alternative 3, The Levee Strengthening and Intermediate Setback Levee Alternative, was considered an appropriate representation of the intermediate setback levee scenario to allow decision makers to evaluate the competing interests of increasing flood control benefits through construction of a setback levee while reducing the placement of property and facilities in the floodplain. The intermediate setback levee alignment shown in Alternative 3 (see Figure 4-1 in Chapter 4) is considered a general representation of the various intermediate setback alignments considered in the alternatives development process. If Alternative 3 is selected for implementation, the ultimate alignment of an intermediate setback levee may be shifted east or west during the final design process based on soil conditions, to avoid structures or utilities, and based on other factors. The analysis of Alternative 3 in this EIR could be used to support a range of intermediate setback levee alignments between the existing levee and the ASB setback levee alignment.

Segment 3

Project Segment 3 includes the Feather River left bank levee from PLM 23.6 to PLM 26.1 (the confluence with the Yuba River) and the Yuba River left bank levee from PLM 0.0 to PLM 0.3. Unlike Segments 1 and 2, in Segment 3 substantial development is located adjacent to the existing Feather River levee, including the Linda County Water District Wastewater Treatment Plant and multiple homes and other structures in the community of Linda. It would not be

feasible to relocate such a large number of residences, structures, and facilities to allow creation of a setback levee in this area. Therefore, a setback levee in Segment 3 was not considered further and levee strengthening was adopted as the preferred approach to addressing levee deficiencies in this area. As described in Chapter 4, "Description of the Proposed Project," all three project alternatives include the same levee strengthening approach in Segment 3.

8.2.3 ALTERNATIVES CONSIDERED AND REJECTED

As discussed previously, a setback levee in project Segment 1 was considered in the Y-FSFCP programmatic EIR (i.e., the Below Star Bend setback levee), but was rejected for further analysis because development of the F-BRLSP precludes the need for a setback levee in Segment 1. Also as discussed above, a setback levee in Segment 3 was excluded from further consideration because of the infeasibility of relocating the large numbers of residences, structures, and facilities in this area.

The concept of placing a setback levee east of the ASB setback levee alignment was considered. However, a preliminary hydraulic evaluation found that flood control benefits relative to the ASB setback levee alignment would not be significant. It was determined that any minor flood control benefits would be outweighed by impacts on property, facilities, and landowners by placing additional land in the floodplain. Therefore, alternatives related to placing setback levees east of the ASB levee setback alignment were not evaluated further.

8.3 PROJECT ALTERNATIVES EVALUATED IN THIS EIR

The following alternatives are considered in this EIR:

- Alternative 1 – The Levee Strengthening Alternative,
- Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative,
- Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative, and
- the No-Project Alternative.

Descriptions of the alternatives are provided below.

8.3.1 PROJECT ALTERNATIVES

The FRLRP consists of implementation of one of three potential alternatives. Each alternative includes actions in the three project segments that are used to define the project area (see Figure 4-1):

- Project Segment 1 consists of the existing Feather River left bank levee from PLM 13.3 to PLM 17.1 (from approximately RD 784 Pump Station No. 2 upstream to Star Bend).

- Project Segment 2 consists of the existing Feather River left bank levee from PLM 17.1 to PLM 23.6 (from approximately Star Bend upstream to west of the Yuba County Airport).

- Project Segment 3 consists of the existing Feather River left bank levee from PLM 23.6 to PLM 26.1, and the Yuba River left bank levee from PLM 0.0 to PLM 0.3 (west of the Yuba County Airport to the railroad crossing adjacent to the SR 70 bridge).

Alternative 1 – The Levee Strengthening Alternative

Under this alternative, levee repair and strengthening activities would be completed along the entire length of project Segments 1, 2, and 3. Levee repairs and strengthening would consist of various activities, including installation of slurry cutoff walls, relief wells, and seepage/stability berms, and placement of buried cobble in areas where erosion of the levee embankment has been identified as a problem. RD 784 Pump Station No. 3 is located next to the existing Feather River levee. Implementation of Alternative 1 would involve removing Pump Station No. 3 and installing a new pump station farther east of the levee, which would correct seepage deficiencies related to the existing pump station. Because discharges from new relief wells could exceed the capacity of the new Pump Station No. 3 during peak-flow periods, implementation of this project alternative would require construction of a detention basin to temporarily hold these peak flows. Soil taken from the detention basin could be used as borrow material for levee repair and strengthening activities. Additional borrow material could also be used from other sources.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Under this alternative, levee repair and strengthening activities would be completed along project Segments 1 and 3. Repair and strengthening activities in these segments would be the same as under Alternative 1. In project Segment 2, a setback levee would be constructed roughly following the ASB setback levee alignment identified in the Y-FSFCP EIR. Because of unfavorable soil conditions, implementation of various seepage control measures would be required along the setback levee. These measures could include zoned embankments, slurry cutoff walls, seepage berms, and relief wells. Portions of the existing Feather River levee along the setback levee alignment would be removed to allow water to flow into and out of the new floodway/setback area (i.e., the area between the existing levee and the setback levee) during high river stages. The setback levee footprint and associated floodway/setback area would occupy approximately 1,600 acres. This acreage includes residences and other structures; appropriate compensation would be negotiated with affected landowners and relocation assistance would be provided consistent with applicable federal and state statutes. With removal of portions of the existing levee, removal or protection of utilities and wells in the setback area would also be required, and lands in the floodway would be contoured and managed to prevent fish stranding as high flows recede.

Because local drainage patterns would be changed by the setback levee, implementation of this project alternative would require construction of a detention basin to prevent adverse flooding effects on nearby properties. Soil taken from the detention basin site could be used to construct the setback levee embankment. Additional soil borrow areas would be established to provide sufficient material to construct the setback levee embankment. As under Alternative 1, a pump station to replace Pump Station No. 3 would be installed. The new pump station would be located immediately east of the new setback levee. Land uses in the levee setback area (i.e., the area between the existing levee and the new setback levee) could consist of agricultural operations and/or habitat restoration activities that do not impede the flood flow function of the setback area. No specific plans for habitat restoration in the levee setback area are proposed at this time, although this is considered a potential future use.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

FRLRP Alternative 3 is very similar to Alternative 2. The same levee repair and strengthening activities described for Alternatives 1 and 2 would be conducted in project Segments 1 and 3. In Segment 2 a setback levee would be constructed. Approximately the southern one-third of this setback levee alignment would follow the ASB setback levee alignment identified in Alternative 2. However, in the vicinity of Anderson Avenue the setback levee would shift to the west of the alignment proposed under Alternative 2 (see Figure 4-1 as well as Figure 2-3, "FRLRP Project Area," in Chapter 2). This westward shift would allow less land to be placed in the new floodway under Alternative 3 than under Alternative 2. Fewer houses, structures, and other facilities would be affected by levee construction or would need to be removed from the floodway/levee setback area. The setback levee footprint and associated floodway/setback area would occupy approximately 1,300 acres under Alternative 3 if the alignment shown in Figure 4-1 is used. However, the intermediate setback levee alignment is representative of a range of potential setback levee locations between the existing levee and the ASB setback levee alignment. It is acknowledged that during detailed project design, various factors may influence the specific location of the intermediate setback levee if this alternative is adopted.

The general design, construction, and operational characteristics of an intermediate setback levee under Alternative 3 (land uses in the levee setback area, the relocation/replacement of Pump Station No. 3, and creation of detention basins and soil borrow areas) would be the same as those for the ASB setback levee under Alternative 2.

8.3.2 NO-PROJECT ALTERNATIVE

The No-Project Alternative represents conditions that "would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services" (State CEQA Guidelines Section 15126.6[e][2]). As required by CEQA, a No-Project Alternative has been included to allow TRLIA to compare the impacts of approving the proposed project (either Alternative 1, Alternative 2, or Alternative 3) with the impacts of not approving the proposed project.

The No-Project Alternative would consist of retaining the Feather River and lower Yuba River left bank levees in the project area in their current condition. No action would be taken. No levee repairs or strengthening would be implemented. Erosion problem areas identified in project Segment 2 would not be addressed. Pump Station No. 3 would be retained in its current condition at its current location.

If the FRLRP were not implemented, it is reasonable to expect that the deficiencies in the subject levees would ultimately be addressed some time in the future because of the need to increase flood protection in the RD 784 area. However, other than the FRLRP, there are no other near-term plans to comprehensively repair or improve the subject levees. If TRLIA were not to implement the FRLRP, there are no other current plans available for TRLIA, the Corps, the California Department of Water Resources, or other agencies with jurisdiction over the levees to implement.

8.4 COMPARISON OF THE ENVIRONMENTAL EFFECTS OF THE ALTERNATIVES

8.4.1 ENVIRONMENTAL EFFECTS OF THE PROJECT ALTERNATIVES

The environmental effects of Alternatives 1, 2, and 3 are described in Chapter 5, "Environmental Analysis." See Sections 5.1 through 5.13 for detailed descriptions of potential effects of these individual project alternatives.

8.4.2 ENVIRONMENTAL EFFECTS OF THE NO-PROJECT ALTERNATIVE

Consistent with Section 15126.6(d) of the State CEQA Guidelines, the No-Project Alternative is evaluated in less detail in this EIR than the FRLRP alternatives. Sufficient information is provided about the No-Project Alternative to allow for a meaningful evaluation, analysis, and comparison of this alternative with the other alternatives evaluated previously in this EIR.

Land Use: There would be no direct changes in land use or conversion of farmland to other uses under the No-Project Alternative. No existing structures or residences would need to be removed or relocated. Therefore, there would be no direct land use impacts. However, indefinite postponement of levee strengthening actions needed to remedy identified underseepage and through-seepage conditions could result in levee failures during future high-flow conditions, with corresponding flooding and associated damage to farmland, agriculture-related structures, and residences and potential for injury and loss of life.

Geology, Soils, and Mineral Resources: There would be no ground-disturbing activities under the No-Project Alternative, nor would any new areas be exposed to erosive forces (i.e., exposure of the new levee setback area to floodwaters). Therefore, there would be no impacts on geology, soils, and mineral resources. The beneficial effect of reduced risks from geological hazards associated with strengthening the levees under the three project alternatives would not occur under the No-Project Alternative.

Water Resources and River Geomorphology: Under the No-Project Alternative surface water or groundwater conditions, hydrology, geomorphology, or water quality would not change relative to existing conditions. Therefore, there would be no impacts related to water resources and geomorphology. Beneficial effects related to improved flood hydrology under Alternatives 2 and 3 would not occur under the No-Project Alternative, and the lack of a comprehensive program of levee strengthening in the short term would perpetuate the risk to lives and property in the RD 784 area that is associated with potential levee failure. In addition, potential benefits associated with decreases in water demand under Alternatives 2 and 3 resulting from possible conversion of agricultural land to habitat would not occur under the No-Project Alternative.

Fisheries: There would be no ground-disturbing activities or vegetation removal that might affect fish habitat under the No Project Alternative, and this alternative does not have the potential to create areas where fish might be stranded. Therefore, there would be no impacts related to fisheries. Beneficial effects related to increased fish habitat in the levee setback area under Alternatives 2 and 3 would not occur under the No-Project Alternative.

Terrestrial Biological Resources: Existing habitat conditions would not be modified under the No-Project Alternative, and no construction activities that could directly or indirectly affect vegetation or wildlife would occur. Therefore, there would be no impacts related to terrestrial biological resources. Potential benefits to biological resources under Alternatives 2 and 3 associated with possible conversions of agricultural land to habitat would not occur under the No-Project Alternative.

Recreation: No construction activities that could temporarily affect recreational opportunities would occur under the No-Project Alternative, nor would any changes be made to facilities or land use conditions that could affect recreational facilities. Therefore, there would be no impacts related to recreational resources.

Aesthetic Resources: Existing views would not change under the No-Project Alternative and there would be no potential for new sources of light and glare. Therefore, there would be no impacts related to aesthetic resources.

Cultural Resources: Under the No-Project Alternative there would be no ground-disturbing activities that might adversely affect known or currently undiscovered cultural resources. There would be no impacts on cultural resources.

Air Quality: Under the No-Project Alternative there would be no use of construction equipment, no ground-disturbing activities, or modifications in current maintenance and operations activities that could result in increased emissions of pollutants or toxic air contaminants (TACs). Therefore, there would be no impacts related to air quality. Potential beneficial effects related to decreased agricultural emissions if agricultural lands are converted to habitat in the levee setback area under Alternatives 2 and 3 would not occur under the No-Project Alternative.

Noise: No activities that would increase noise or groundborne vibration levels above existing conditions would occur under the No-Project Alternative. Therefore, there would be no impacts related to noise and vibration.

Transportation and Circulation: No new vehicle trips would be generated under the No-Project Alternative and there would be no new traffic hazards. Therefore, there would be no impacts related to traffic and circulation.

Public Services, Utilities, and Service Systems: There would be no ground-disturbing activities under the No-Project Alternative that could damage existing utilities or would require their removal or relocation. There would also be no changes to transportation systems or increases in traffic that could affect the ability of emergency responders to move through the project area. Therefore, there would be no direct impacts related to public services, utilities, or service systems. However, the lack of increased flood protection associated with the No-Project Alternative would continue to limit the construction of schools and other public services facilities needed to serve existing development in the RD 784 area. Therefore, the No-Project Alternative would contribute to a situation in which portions of the RD 784 area could continue to be underserved.

Paleontological Resources: There would be no ground-disturbing activities under the No-Project Alternative that might adversely affect paleontological resources. Therefore, there would be no impacts on paleontological resources.

8.4.3 COMPARISON OF THE ALTERNATIVES

Table 8-1, "Summary of the Environmental Effects of the Alternatives," summarizes the potential environmental effects of the project alternatives and the No-Project Alternative.

Table 8-1
Summary of the Environmental Effects of the Alternatives

Environmental Effect	No-Project Alternative	The Levee Strengthening Alternative (Alternative 1)	The Levee Strengthening and ASB Setback Levee Alternative (Alternative 2)	The Levee Strengthening and Intermediate Setback Levee Alternative (Alternative 3)
Land Use				
Conflicts with land use planning	–	LTS	SU	SU
Prime Farmland conversion	–	SU	SU	SU
Displacement of housing	–	–	LTS	LTS
Geology, Soils, and Mineral Resources				
Risk of geologic hazards	–	B	B	B
Construction-related erosion hazards	–	LTS	LTS	LTS
Setback area erosion	–	–	LTS	LTS
Water Resources and River Geomorphology				
Construction effects on water quality	–	LTS (m)	LTS (m)	LTS (m)
Local drainage changes	–	–	LTS (m)	LTS (m)
Changes in local flood hydrology	–	–	B	B
Changes in downstream flood hydrology	–	–	LTS	LTS
Changes in water demand and supply	–	–	B	B
Effects on groundwater levels	–	LTS	LTS	LTS
Effects of flood operations on water quality	–	–	LTS (m)	LTS (m)
Sediment deposition in setback area	–	–	LTS	LTS
Geomorphic processes/erosion	–	–	LTS	LTS
Fisheries				
Loss of fish habitat during construction	–	LTS (m)	LTS (m)	LTS (m)
Loss of overhead cover/instream woody material	–	LTS	LTS	LTS
Habitat effects from borrow material contaminants	–	–	LTS (m)	LTS (m)
Stranding	–	–	LTS (m)	LTS (m)

Table 8-1
Summary of the Environmental Effects of the Alternatives

Environmental Effect	No-Project Alternative	The Levee Strengthening Alternative (Alternative 1)	The Levee Strengthening and ASB Setback Levee Alternative (Alternative 2)	The Levee Strengthening and Intermediate Setback Levee Alternative (Alternative 3)
Increased habitat in floodplain area	–	–	B	B
Terrestrial Biological Resources				
Effects on general biological resources	–	LTS	LTS	LTS
Effects on sensitive habitats (e.g., jurisdictional waters, riparian habitat)	–	LTS (m)	LTS (m)	LTS (m)
Effects on special-status plants	–	LTS (m)	LTS (m)	LTS (m)
Effects on valley elderberry longhorn beetle	–	LTS (m)	LTS (m)	LTS (m)
Effects on northwestern pond turtle	–	LTS (m)	LTS (m)	LTS (m)
Effects on giant garter snake	–	LTS (m)	LTS (m)	LTS (m)
Effects on Swainson's hawk and other nesting raptors	–	LTS (m)	LTS (m)	LTS (m)
Effects on other special-status birds	–	LTS	LTS	LTS
Effects on Pacific western big-eared bat	–	LTS	LTS	LTS
Effects on wildlife corridors	–	LTS	LTS	LTS
Recreation				
Short- or long-term recreation effects	–	LTS	LTS	LTS
Aesthetic Resources				
Short- or long-term effects on views	–	LTS	LTS	LTS
Light and glare	–	LTS	LTS	LTS
Cultural Resources				
Disturbance of unknown resources or human remains	–	LTS (m)	LTS (m)	LTS (m)
Disturbance of known resources	–	LTS (m)	LTS (m)	LTS (m)
Air Quality				
Temporary effects on air quality	–	SU	SU	SU
Long-term effects on air quality	–	LTS	B	B
TAC emissions	–	LTS	LTS	LTS
Noise				
Temporary noise disturbance	–	SU	SU	SU
Groundborne vibration during construction	–	LTS	LTS	LTS
Transportation and Circulation				
Increase in traffic during construction	–	LTS	LTS	LTS

Table 8-1
Summary of the Environmental Effects of the Alternatives

Environmental Effect	No-Project Alternative	The Levee Strengthening Alternative (Alternative 1)	The Levee Strengthening and ASB Setback Levee Alternative (Alternative 2)	The Levee Strengthening and Intermediate Setback Levee Alternative (Alternative 3)
Traffic hazards during construction	–	LTS (m)	LTS (m)	LTS (m)
Public Services, Utilities, and Service Systems				
Effects on utility infrastructure	–	LTS	LTS (m)	LTS (m)
Effects on water supply and drainage	–	LTS	LTS	LTS
Effects on emergency response during construction	–	LTS (m)	LTS (m)	LTS (m)
Paleontological Resources				
Disturbance of unknown resources	–	LTS (m)	LTS (m)	LTS (m)

Notes: – = no impact; B = beneficial or potentially beneficial effect; LTS = less-than-significant impact; LTS (m) = significant or potentially significant impact that would be less than significant with mitigation; SU = significant impact, despite mitigation (i.e., significant and unavoidable)

Many of the impacts identified as less than significant or as less than significant with mitigation cannot be predicted with certainty to occur. For example, whether construction activity would affect various special-status wildlife species would depend on the presence (or absence) of individuals of these species at the project site at the time of construction; nevertheless, because there is the potential for various species to be adversely affected by construction under any of the alternatives, the potential for significant effects is identified and appropriate actions have been included as required mitigation to ensure that any such effects are reduced to a less-than-significant level.

For purposes of this comparison, the following levels of effect are generally considered to be equivalent: potentially significant and significant impacts that would be less than significant with the required mitigation, which are identified in Table 8-1 as LTS (m), and impacts that would be less than significant even without mitigation, which are identified as LTS. In addition, where effects are identified in the impact analysis as less than significant but are considered to be minimal, they are considered for purposes of this comparison to be negligible.

The potential adverse and beneficial effects of the proposed Levee Strengthening and ASB Setback Levee Alternative (Alternative 2) and Levee Strengthening and Intermediate Setback Levee Alternative (Alternative 3) are generally the same. Therefore, the number and magnitude of potential environmental impacts as shown in Table 8-1 are the same for both alternatives. However, the potential adverse effects of Alternative 2 would be somewhat greater because this alternative includes a larger levee setback area and would therefore entail more land disturbance and more construction activity. The potential environmental benefits, including flood control benefits, are also greatest with Alternative 2. Several impacts related to water resources and river geomorphology and to fisheries, and one impact related to land use and one related to geology,

soils, and mineral resources, would specifically result from construction of a setback levee and creation of a levee setback area. These include beneficial impacts and impacts in the LTS and LTS (m) categories in Table 8-1. These impacts would not occur under The Levee Strengthening Alternative (Alternative 1), where no setback levee is proposed. Most of the adverse impacts associated with any of the three project alternatives are short-term, temporary construction-related impacts, whereas the environmental benefits would be long-term.

Following is a summary of the main points of comparison between the environmental effects of the alternatives for each resource area:

Land Use: Alternatives 2 and 3 would have significant unavoidable effects related to land use planning conflicts. All three alternatives would have significant unavoidable impacts related to the conversion of Prime Farmland to nonagricultural uses. The No-Project Alternative would not have any direct effects on land use, although lack of levee strengthening under the FRLRP could lead to future levee failure, flooding of the RD 784 area, and related adverse effects on Prime Farmland and other productive agricultural land, homes, and individuals.

Geology, Soils, and Mineral Resources: All three project alternatives would enhance the stability of levees in the project area and reduce the risk of catastrophic levee failure. Construction erosion hazards would be less than significant under all three alternatives. Impacts associated with erosion in the levee setback area would also be less than significant, but would occur only under Alternatives 2 and 3. The No-Project Alternative would not have any effects (either beneficial or adverse impacts) related to geology, soils, and mineral resources.

Water Resources and River Geomorphology: Construction activities under any of the three project alternatives could potentially result in significant adverse effects on water quality. However, implementation of mitigation measures would reduce these impacts to less-than-significant levels. All three alternatives could also affect groundwater levels; however, impacts would be less than significant. Remaining impacts on water resources and river geomorphology relate to the presence of a setback levee and/or related levee setback area and would not apply to Alternative 1. For each of these impacts, whether beneficial or adverse, the effects would be somewhat less under Alternative 3 than under Alternative 2 because of the smaller size of the levee setback area. Alternatives 2 and 3 would result in a beneficial effect by reducing flood stage elevations upstream of the levee setback area. These alternatives would also have a hydraulic impact that would increase downstream flood flows by relatively minor amounts, resulting in less-than-significant potential increases in flood risk. A small benefit in water supply may be associated with Alternatives 2 and 3, depending on changes in land use that could accompany the levee setback. Alternatives 2 and 3 would also result in impacts related to changes in local drainage systems, changes in water quality during flooding of the levee setback area, sediment deposition in the levee setback area, and erosion potential resulting from changes in geomorphic processes. Depending on the impact, these impacts would be less than significant either before or after mitigation. The No-Project Alternative would not have any effects (either beneficial or adverse impacts) related to water resources and river geomorphology.

Fisheries: All three project alternatives could potentially affect fish habitat during construction. Implementation of mitigation measures would reduce these construction-related impacts to less-than-significant levels. All three project alternatives could also result in the loss of overhead

cover/instream woody material. However, this impact would be less than significant under all alternatives. Remaining fisheries impacts relate to the presence of a setback levee and/or related levee setback area and would not apply to Alternative 1. For each of these impacts, whether beneficial or adverse, the effects would be somewhat less under Alternative 3 than under Alternative 2 because of the smaller size of the levee setback area. Alternatives 2 and 3 could both result in fish stranding and adverse effects on water quality when floodwaters come in contact with soils in the levee setback area. Both of these impacts would be mitigated to less-than-significant levels. Inundation of the levee setback area and potential habitat restoration under Alternatives 2 and 3 would provide benefits to fish species. The No-Project Alternative would not have any effects (either beneficial or adverse impacts) on fisheries.

Terrestrial Biological Resources: All three project alternatives would have less-than-significant effects on general biological resources, special-status birds, Pacific western big-eared bats, and wildlife corridors. All three alternatives would have significant impacts on sensitive habitats, special-status plants, valley elderberry longhorn beetle, northwestern pond turtle, giant garter snake, and Swainson's hawk and other raptors. However, each of these impacts would be reduced to a less-than-significant level with mitigation. The No-Project Alternative would not have any effects on terrestrial biological resources.

Recreation: None of the project alternatives would have a significant effect on recreation. The No-Project Alternative would not have any effects related to recreation.

Aesthetic Resources: None of the project alternatives would have a significant effect on aesthetic resources. The No-Project Alternative would not have any effects on aesthetic resources.

Cultural Resources: All three project alternatives have the potential to adversely affect sites that may contain significant cultural resources. Each of the project alternatives could also potentially affect an unknown/subsurface cultural resource site or human remains. However, implementation of required mitigation would ensure that any effect on known or unknown cultural resources would be less than significant. The No-Project Alternative would not have any effects on cultural resources.

Air Quality: All three project alternatives are expected to contribute to exceedances of relevant air quality standards during construction. Construction emissions would be less under Alternative 1 than under Alternatives 2 and 3 because of the reduced disturbance area and the need for fewer haul trips to carry borrow material. Implementation of mitigation measures would reduce construction emission impacts for each alternative, but not to less-than-significant levels. All three alternatives would result in less-than-significant impacts related to the emission of TACs. Alternatives 2 and 3 could have a small long-term beneficial effect on air quality because of the potential reduction in agricultural use of some lands associated with the levee setback area. This beneficial effect would not occur under Alternative 1 because this alternative does not include a levee setback area. The No-Project Alternative would not have any effects (either beneficial or adverse impacts) related to air quality.

Noise: Construction activities associated with all three project alternatives would result in noise levels that exceed Yuba County noise standards at sensitive receptors. Noise associated with

construction activities would not be mitigated to less-than-significant levels, although the significant and unavoidable noise effect would likely last only a few weeks. All three project alternatives would result in less-than-significant impacts related to construction-generated groundborne vibration. The No-Project Alternative would not have any effects related to noise and vibration.

Transportation and Circulation: All three project alternatives would have less-than-significant impacts related to increases in traffic during construction. Each alternative would result in significant impacts related to the generation of traffic hazards during construction. However, this impact would be reduced to a less-than-significant level with mitigation. Although none of the three alternatives would result in significant traffic impacts after mitigation, construction traffic would be less under Alternative 1 than under Alternatives 2 and 3 because of the smaller number of haul trips to carry borrow material. The No-Project Alternative would not have any effects on traffic and circulation.

Public Services, Utilities, and Service Systems: With implementation of the required mitigation, the three project alternatives would not significantly affect emergency response services during construction. Although each alternative would have some effect on existing water supply and drainage infrastructure in the project area, these effects would be less than significant. Under Alternatives 2 and 3 utilities retained in the levee setback area could be damaged when the levee setback area is inundated, resulting in interruptions in service. This impact would be reduced to a less-than-significant level with mitigation. Alternative 1 does not include a levee setback area and impacts on existing utilities would be less than significant. The No-Project Alternative would not have any effects on public services, utilities, and service systems.

Paleontological Resources: All three project alternatives could potentially affect an unknown paleontological resource site. However, implementation of the required mitigation would ensure that any effect on paleontological resources would be less than significant. The No-Project Alternative would not have any effects on paleontological resources.

8.5 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

The State CEQA Guidelines call for identification of an environmentally superior alternative and specify that “if the environmentally superior alternative is the ‘no project’ alternative, the EIR shall also identify an environmentally superior alternative among other alternatives.”

However, there are a number of interconnected as well as opposing factors to consider when evaluating the various FRLRP alternatives that result in no clear environmentally superior alternative. These factors include:

- minimizing environmental effects,
- providing flood protection to the RD 784 area,
- the potential for providing more regional flood protection benefits,
- effects on lands and landowners that might be included in a levee setback area, and
- potential beneficial environmental effects associated with creating a levee setback area.

From the perspective of purely minimizing effects on the existing environment, the No-Project Alternative would be the superior alternative because it would result in no changes in the existing condition. However, the No-Project Alternative would result in no improvements to flood protection facilities in the project area and would perpetuate the existing risks for levee failure, flooding, and related adverse effects on the environment, people, and property. The No-Project Alternative would not meet key project objectives of securing flood protection for at least the 1-in-200 year event and securing FEMA certification of the subject levee reaches (see Section 8.2.2, "Feather River Levee Repair Project"). This alternative would have no direct effects on property owners in the area, but also would not provide them the flood protection benefits inherent in Alternatives 1, 2, and 3. The No-Project Alternative also would not provide potential beneficial effects related to fisheries, biological resources, water resources, and air quality associated with Alternatives 2 and 3.

Alternative 1, The Levee Strengthening Alternative, would meet all project objectives related to increasing flood protection and would not affect lands and residences that might be included within a levee setback area as would occur under Alternatives 2 and 3. Compared to Alternatives 2 and 3, Alternative 1 would also have fewer direct effects on the environment, primarily because it does not include a setback levee (see Table 8-1). However, because Alternative 1 does not include a setback levee, potential beneficial effects related to fisheries, biological resources, water resources, and air quality associated with Alternatives 2 and 3 would not occur. In particular, Alternative 1 would not provide regional flood control benefits (i.e., decreases in upstream flood stage elevations, including through the urbanized areas of Marysville and Yuba City) associated with creation of a setback levee. In addition, as past levee repair efforts would indicate, based on the condition of soils in levee foundations and embankments, the success of repairs to the existing levee is not assured. Additional repairs or other remedial actions may be required after initial repairs are complete. These conditions are less likely to occur where a new levee (e.g., a setback levee) is constructed using modern methods on stable foundation soils.

From the perspective of maximizing flood protection benefits, Alternative 2, The Levee Strengthening and ASB Setback Levee Alternative, would be the superior alternative. Flood protection benefits under Alternative 2 would derive from:

- addressing deficiencies associated with the existing levees,
- providing increased flood protection designed to withstand the 1-in-200 AEP event,
- providing a new setback levee in project Segment 2 constructed on a more stable foundation using modern engineering methods, and
- reducing flood stage elevations upstream of the setback levee area by more than 1 foot depending on the location and size of the flood event. Reductions in flood stage elevations would extend upstream on the Feather and Yuba Rivers into river reaches adjacent to Marysville and Yuba City.

As identified above, the last two of these benefits are directly associated with the construction of a setback levee and would not occur under Alternative 1. Because these two benefits are associated with a setback levee, they would also occur under Alternative 3, The Levee Strengthening and Intermediate Setback Levee Alternative; however, the level of benefit would

be less because soil conditions in the area considered for the intermediate setback levee alignment are not as favorable for levee construction and operation as those found along the ASB setback levee alignment (i.e., the soil is more porous and susceptible to underseepage) and the smaller setback area would provide reduced upstream benefits.

If maximizing flood protection is a priority, the flood protection benefits associated with Alternative 2 could be considered to outweigh this alternative's additional direct impacts on the environment relative to Alternative 1, and effects on property and property owners from placing lands in a levee setback area. In addition, Alternative 2 provides the potential for substantial long-term benefits associated with possible habitat improvement and/or restoration in the levee setback area, such as increases in fish and wildlife habitat, riparian corridor width, ecosystem complexity, and recreation opportunities.

Alternative 3 would provide flood control and environmental benefits similar to those of Alternative 2, but to a lesser degree because of the smaller levee setback area in Segment 2. Because of the smaller setback area, Alternative 3 would have a lesser effect related to placing property in the levee setback area, although approximately the same number of residences would be affected.

As stated at the beginning of this discussion, because there are a number of interconnected as well as opposing factors to consider when evaluating the various FRLRP alternatives, there is no clear environmentally superior alternative. If strictly minimizing direct environmental effects is the top priority, then the No-Project Alternative and Alternative 1 would be superior. If providing flood protection to the RD 784 area is the discriminating factor, then Alternatives 1, 2, and 3 are almost equal, although Alternative 2 would be somewhat superior. If providing regional flood protection benefits is desired, then Alternative 2 would be superior, with Alternative 3 providing similar benefits, but to a lesser degree. If effects on lands and landowners are to be minimized, then Alternative 1 would be superior because it does not include a setback levee, yet provides flood control benefits. If the focus is on potential beneficial environmental effects associated with creating a levee setback area (mostly related to the possible creation/restoration of native habitat), then Alternative 2 provides the greatest potential for these benefits, with Alternative 3 allowing for similar benefits to a lesser degree.

When evaluating these factors, it is difficult to weigh such things as the various gradients of flood protection and associated increased or decreased risks to life and property against the variety of types and extents of environmental effects associated with each alternative. Although the No-Project Alternative can be removed from consideration as the environmentally superior alternative because it does not meet the basic project objective, a distinct environmentally superior alternative is not identified among Alternatives 1, 2, and 3.

CHAPTER 9 CONSULTATION AND COORDINATION

This chapter describes initial and ongoing consultation and coordination efforts made by the flood control study team led by Three Rivers Levee Improvement Authority (TRLIA) to engage the local community; stakeholders; and federal, state, and local agencies in identifying solutions to flooding in the Reclamation District (RD) 784 service area. Consultation and coordination efforts of Yuba County Water Agency (YCWA) regarding the Yuba-Feather Supplemental Flood Control Project (Y-FSFCP) are also included in this chapter because the levee setback included in Alternatives 2 and 3 of the Feather River Levee Repair Project (FRLRP), the current project, is a modification of the Feather River levee setback element of the Y-FSFCP. As described below, focused consultation and coordination efforts have been conducted through three primary mechanisms with three key groups:

- public involvement,
- Yuba-Feather Work Group (Y-FWG) involvement, and
- agency consultation.

9.1 PUBLIC INVOLVEMENT

Public and stakeholder involvement is an important element of efforts to improve flood control in the RD 784 area and is critical to reaching solutions that meet the needs of the local community and the region. Section 15083 of the California Environmental Quality Act Guidelines (State CEQA Guidelines) authorizes and encourages an early consultation or scoping process to help identify the range of actions, alternatives, mitigation measures, and significant effects to be analyzed in depth in an EIR and to help resolve concerns of affected agencies and individuals.

As mentioned above, the potential setback of the Feather River levee included in the current project, the FRLRP, is a modification of one of the segments of the Feather River levee setback that was proposed and evaluated in the Y-FSFCP programmatic EIR. Therefore, a number of public outreach activities that were conducted for the Y-FSFCP laid a foundation for the subsequent consideration of a levee setback under the current project. These activities are summarized below, followed by a description of scoping activities for the FRLRP.

9.1.1 PRIOR PUBLIC INVOLVEMENT ACTIVITIES

Representatives of YCWA and RD 784 began coordination with landowners well before the FRLRP was initiated by TRLIA and the CEQA process was started for the current project. Flood control elements of the Y-FSFCP were defined through a process that included public scoping. These elements included a levee setback along the Feather River downstream of the Yuba River. The Y-FSFCP levee setback was proposed for two segments, which were referred to as the Above Star Bend and Below Star Bend levee setbacks.

On October 23, 2001, YCWA issued a Notice of Preparation (NOP) informing agencies and the general public that an EIR for the Y-FSFCP was being prepared and inviting specific comments on the scope and content of the document at public scoping meetings. The NOP included a

description of the project and the alternatives being considered. YCWA held scoping meetings in Marysville and Oroville in August 2001 to solicit public comments and to determine the scope of the EIR. Notices were published in local newspapers announcing the date, time, location, and purpose of the meetings. Each scoping meeting presented an overview of the meeting's purpose and a description of the Y-FSFCP, and identified potentially significant environmental issues. More than 20 attendees gave written and/or oral comments.

A scoping report was prepared that summarized the input received at the scoping meetings and the written comments received in response to the NOP. YCWA reconsidered and reformulated proposed flood control elements based in part on this input. In addition, in spring 2002, the YCWA Board of Directors held a public workshop to present the progress of its development of flood control elements and solicit feedback.

Public comments were subsequently solicited on the Y-FSFCP programmatic EIR, including the Feather River levee setback in the Above Star Bend segment. Comments were received in a public meeting held December 9, 2003, and in comment letters received during the public comment period (Yuba County Water Agency 2004).

9.1.2 SCOPING FOR THE FEATHER RIVER LEVEE REPAIR PROJECT

On June 14, 2006, TRLIA issued an NOP informing agencies and the general public that an EIR for the FRLRP was being prepared and inviting specific comments on the scope and content of the document. The NOP was sent individually to approximately 100 local landowners in the project area, in addition to approximately 150 representatives of federal, state, regional, and local agencies. The NOP included a description of the project and the alternatives being considered.

TRLIA held a scoping and informational meeting in Marysville on June 29, 2006, to solicit public comments and to determine the scope of this EIR, and to provide information on TRLIA's full program of completed and ongoing flood control improvements. Notices were published in local newspapers announcing the date, time, location, and purpose of the meeting. Information on the date, time, location, and purpose of the scoping meeting was also included in the NOP. The scoping meeting presented an overview of the meeting's purpose and a description of the FRLRP, and identified potentially significant environmental issues. Several attendees discussed project features with board members, management, and the consultant flood control team, and some attendees provided oral and written comments. A transcript of the comments received at the scoping meeting and the written comments received in response to the NOP is included in Appendix A of this EIR. All comments received during the scoping process have been considered during preparation of this EIR. At least one public meeting will be held during the public review period for this draft environmental impact report (DEIR) (see Section 2.12, "Public Participation and Additional Steps in the CEQA Review Process," in Chapter 2), as well as a subsequent public meeting to consider certification of the final environmental impact report (FEIR).

9.2 YUBA-FEATHER WORK GROUP INVOLVEMENT

The Y-FWG was formed in 2000 as an advisory group focused on evaluating and making recommendations regarding ecologically sustainable, no-new-dam flood control elements for the Yuba-Feather River system. The Y-FWG membership includes 12 participating entities,

including the key federal, state, and local agencies and major stakeholders in Yuba-Feather River flood management and ecosystem restoration activities. Consequently, the Y-FWG is a unique combination of agencies and stakeholders focused on flood control and resource management issues related to the Yuba-Feather River system. Y-FWG discussions have greatly enhanced the member organizations' understanding and agreement about approaches to flood control in the RD 784 area. The group's recommendations have helped shape the Y-FSFCP's integrated approach to flood management and ecosystem restoration, particularly the development of TRLIA's levee setback options, and Y-FWG members have spoken before The State of California Reclamation Board (The Reclamation Board) in support of the TRLIA projects.

9.3 INFORMAL CONSULTATION WITH AGENCIES

Representatives of TRLIA and YCWA have consulted informally with various agencies regarding RD 784 flood management activities. As discussed above, the potential setback of the Feather River levee is an expansion and modification of the Above Star Bend segment of the Feather River levee setback element of YCWA's Y-FSFCP programmatic EIR; therefore, a considerable amount of informal agency consultation for what became the FRLRP was completed for the Y-FSFCP, before the FRLRP was formally initiated. These consultation activities are described in detail in Chapter 9, "Consultation and Coordination," of the Y-FSFCP programmatic EIR (Yuba County Water Agency 2003). Comment letters were also received from several agencies, including the California Department of Conservation, California Department of Fish and Game (DFG), California Department of Transportation, California Department of Water Resources (DWR), the Sacramento Area Flood Control Agency, and the Sutter County Community Services Department, on the Y-FSFCP programmatic EIR (Yuba County Water Agency 2004). These comments were taken into consideration in the development of the FRLRP.

TRLIA's Phase 2 and 3 flood control improvements have included very close coordination with the U.S. Army Corps of Engineers (Corps), DWR, The Reclamation Board, Sutter County, Yuba County, RD 784, RD 1001, and federal and state resource agencies; these coordination efforts are continuing into the FRLRP effort. Moreover, the key agencies are part of the Y-FWG and receive updates and participate in planning discussions through the Y-FWG.

9.4 NOTIFICATION AND CONSULTATION LIST

The following entities will receive a copy of the DEIR or notice of its availability. Individuals who have expressed an interest in the DEIR will receive a notice of its availability and public libraries in Marysville, Yuba City, and Sacramento will receive a copy of the DEIR for public review.

Local Agencies

City of Marysville

City of Yuba City

Feather River Air Quality Management District

Olivehurst Public Utilities District

Reclamation District 784

Reclamation District 1001

Sacramento Area Council of Governments

Sacramento Area Flood Control Agency

Sutter County Board of Supervisors

Sutter County Department of Public Works

Sutter County Planning Department

Yuba County Agriculture Department

Yuba County Board of Supervisors

Yuba County Community Development Department

Yuba County Water Agency

State of California

California Air Resources Board

California Department of Boating and Waterways

California Department of Conservation

California Department of Fish and Game – Region II

California Department of Toxic Substances Control

California Department of Transportation

California Department of Water Resources

Central Valley Regional Water Quality Control Board

Governor's Office of Planning and Research – State Clearinghouse

Native American Heritage Commission

Office of Historic Preservation

State Lands Commission

State Water Resources Control Board – Water Quality

The Reclamation Board

The Resources Agency

Federal Agencies

U.S. Army Corps of Engineers – Regulatory Branch and Civil Works Branch

U.S. Department of Agriculture, Natural Resources Conservation Service

U.S. Environmental Protection Agency – Region IX

Federal Emergency Management Agency

U.S. Fish and Wildlife Service – Ecological Services Division

National Marine Fisheries Service

Elected Representatives

California State Assembly – Assemblymember Rick Keene

California State Assembly – Assemblymember Doug LaMalfa

California State Assembly – Assemblymember Tim Leslie

California State Senate – Senator Sam Aanestad

California State Senate – Senator Dave Cox

U.S. House of Representatives – Congressman Wally Herger

U.S. House of Representatives – Congressman Dan Lungren

U.S. Senate – Senator Dianne Feinstein

U.S. Senate – Senator Barbara Boxer

Stakeholder Groups

Environmental Defense

Friends of the River

Sierra Club

South Yuba River Citizens League

CHAPTER 10 REFERENCES

CHAPTER 1, "SUMMARY"

Yuba County Water Agency. 2004 (March). *Final Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project.* State Clearinghouse #2001072062. Marysville, CA. Prepared by EDAW, Jones & Stokes, and Flood Control Study Team.

CHAPTER 2, "INTRODUCTION"

California Floodplain Management Task Force. 2002 (December). *California Floodplain Management Task Force Final Recommendations Report.* Sacramento, CA.

U.S. Army Corps of Engineers and State of California Reclamation Board. 2002 (December 20). *Interim Report, Sacramento and San Joaquin River Basins Comprehensive Study.* Sacramento, CA.

Yuba County Water Agency. 2003 (October). *Draft Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project.* State Clearinghouse #2001072062. Marysville, CA. Prepared by EDAW, Jones & Stokes, and Flood Control Study Team.

Yuba County Water Agency. 2004 (March). *Final Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project.* State Clearinghouse #2001072062. Marysville, CA. Prepared by EDAW, Jones & Stokes, and Flood Control Study Team.

CHAPTER 3, "PROJECT PURPOSE, NEED, AND DEVELOPMENT"

Three Rivers Levee Improvement Authority. 2004 (May). *Bear River and Western Pacific Interceptor Canal Levee Improvements Project Draft Environmental Impact Report.* State Clearinghouse #2004032118. Marysville, CA. Prepared by Jones & Stokes, Sacramento, CA.

Yuba County Water Agency. 2003 (October). *Draft Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project.* State Clearinghouse #2001072062. Marysville, CA. Prepared by EDAW, Jones & Stokes, and Flood Control Study Team.

Yuba County, Yuba County Water Agency, and Reclamation District No. 784. 2004 (March). *Achieving FEMA Certification for Reclamation District No. 784.* Staff report (unpublished). Prepared by Yuba County Water Agency staff, MBK Engineers, and GEI Consultants. Marysville and Sacramento, CA.

CHAPTER 4, "DESCRIPTION OF THE PROPOSED PROJECT"

Kleinfelder, Inc. 2006 (February 20). *Problem Identification Report, TRLIA Phase 4 Feather River and Yuba River Left Bank Levees, Reclamation District No. 784.* Sacramento, CA.

MBK Engineers. 2006 (February 20). *Three Rivers Levee Improvement Authority Phase IV Erosion Investigation.* Sacramento, CA.

U.S. Army Corps of Engineers. 2000 (April 30). *Engineering and Design—Design and Construction of Levees.* Engineering Manual EM 1110-2-1913. Washington, DC.

Yuba County Water Agency. 2003a (October). *Draft Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project.* Marysville, CA. State Clearinghouse #2001072062. Prepared by EDAW, Jones & Stokes, and Flood Control Study Team.

Yuba County Water Agency. 2003b (May). *Report on Feasibility, Yuba-Feather Supplemental Flood Control Project.* Marysville, CA.

SECTION 5.1, "LAND USE"

California Department of Conservation. 2004. Yuba County 2002–2004 Land Use Conversion. Farmland Mapping and Monitoring Program. Available: <http://www.consrv.ca.gov/dlrp/fmmp/pubs/2002–2004/conversion_tables/yubcon04.xls>. Sacramento, CA.

California Department of Conservation. 2006 (May). Map Categories, Criteria and Uses: Important Farmland Categories. <http://www.consrv.ca.gov/DLRP/fmmp/mccu/map_categories.htm>. Farmland of Local Importance. <http://www.consrv.ca.gov/DLRP/fmmp/pubs/Local_definitions_00.pdf>. Division of Land Resource Protection, Farmland Mapping and Monitoring Program website. Last edited May 19, 2006.

Natural Resources Conservation Service. 1998. *Soil Survey of Yuba County, California.* Prepared by D. J. Lytle. Washington, DC.

Three Rivers Levee Improvement Authority. 2004 (September). *Draft Environmental Impact Report for the Feather-Bear Rivers Levee Setback Project.* State Clearinghouse #2004072113. Marysville, CA. Prepared by EDAW and Flood Control Study Team.

U.S. Census Bureau. 2006. American FactFinder—Decennial Census Data for Marysville City, California. Available: <http://factfinder.census.gov/home/saff/main.html?_lang=en>. Accessed August 1, 2006.

Yuba County. 1994 (May). *Yuba County General Plan.* Volume I. Environmental Setting and Background. Department of Planning and Building Services. Marysville, CA. Prepared by QUAD Consultants, Sacramento, CA, in association with Brown-Buntin Associates, kdAnderson Transportation Engineers, and Youngdahl and Associates.

Yuba County. 1996. *Yuba County General Plan.* Volume II. Land Use, Circulation, Conservation and Open Space. Yuba County Planning Department. Marysville, CA. Prepared by QUAD Consultants, Sacramento, CA. Adopted December 10, 1996, by Yuba County Board of Supervisors.

Yuba County. 2005 (April). Yuba County Zoning and Specific Plan Designations. Available: <http://www2.co.yuba.ca.us/gis/portal/mapimages/ZoningMap.pdf#search='yuba%20county%20zoning>. Last modified April 8, 2005. Accessed May 2006.

Yuba County Economic Development Department. 2006. Housing and Real Estate Data for Yuba County. Available: <http://www.yubacounty.org/Demographics/2_Housing %20&%20Real%20Estate.pdf>. Accessed August 1, 2006.

Yuba County Water Agency. 2003 (October). *Draft Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project.* Marysville, CA. State Clearinghouse #2001072062. Prepared by EDAW, Jones & Stokes, and Flood Control Study Team.

SECTION 5.2, "GEOLOGY, SOILS, AND MINERAL RESOURCES"

California Department of Water Resources. 1979. *The August 1, 1975 Oroville Earthquake Investigations.* Bulletin 203-78. Sacramento, CA.

California Geological Survey. 1999. Index to Official Maps of Alquist-Priolo Earthquake Fault Zones. Available: <http://www.consrv.ca.gov/CGS/rghm/ap/Map_index/index.htm> Accessed June 20, 2006.

Habel, R. S., and L .F. Campion. 1988. *Mineral Land Classification: Portland Cement Concrete-Grade Aggregate in the Yuba City–Marysville Production-Consumption Region.* California Division of Mines and Geology. Special Report 132. Sacramento, CA.

Hart, E. W., and W. A. Bryant. 1999. *Fault-Rupture Hazard Zones in California, Alquist-Priolo Earthquake Fault Zoning Act with Index to Earthquake Fault Zone Maps.* California Division of Mines and Geology, Special Publication 42. Sacramento, CA.

Jennings, C. W. 1994. Fault Activity Map of California and Adjacent Areas. California Division of Mines and Geology. Geologic Data Map No. 6. Sacramento, CA.

Kleinfelder, Inc. 2006 (February 20). *Problem Identification Report, TRLIA Phase 4 Feather River and Yuba River Left Bank Levees, Reclamation District No. 784.* Sacramento, CA.

Natural Resources Conservation Service. 1998. *Soil Survey of Yuba County, California.* Prepared by D. J. Lytle. Washington, DC.

Petersen, M. D., W. A. Bryant, C. H. Cramer, T. Chao, M. S. Reichle, A. D. Frankel, J. J. Lienkaemper, P. A. McCory, and D. P. Schwartz. 1996. *Probabilistic Seismic Hazard Assessment for the State of California.* California Division of Mines and Geology Open-File Report 96-08 and U.S. Geological Survey Open-File Report 96-706. Sacramento, CA.

Philip Williams & Associates, Ltd. 2006 (July 20). *Geomorphic Assessment of Project Alternatives for Feather River Levee Improvements Between the Bear and Yuba Rivers*. Draft Report. Prepared for Bookman-Edmonston Engineering and Three Rivers Levee Improvement Authority. Sacramento, CA.

Saucedo, G. L., and D. L. Wagner. 1992. Geologic Map of the Chico Quadrangle. California Division of Mines and Geology. Regional Geologic Map Series, Map No. 7A. Sacramento, CA.

U.S. Army Corps of Engineers. 2000 (April 30). *Engineering and Design—Design and Construction of Levees.* Engineering Manual 1110-2-1913. Washington, DC.

Yuba County. 1994. *Yuba County General Plan.* Volume I. Environmental Setting and Background. Department of Planning and Building Services. Marysville, CA. Prepared by QUAD Consultants, Sacramento, CA, in association with Brown-Buntin Associates, kdAnderson Transportation Engineers, and Youngdahl and Associates.

Yuba County Water Agency. 2003 (May). *Report on Feasibility, Yuba-Feather Supplemental Flood Control Project*. Appendix E. Preliminary Design. Marysville, CA. Prepared by Flood Control Study Team.

SECTION 5.3, "WATER RESOURCES AND RIVER GEOMORPHOLOGY"

Boles, Jerry. Hydrologist. California Department of Water Resources, Red Bluff, CA. May 17, 2001—unpublished groundwater data.

Bookman-Edmonston Engineering. 2000 (January). *Groundwater Substitution Opportunity in the Yuba-Sutter Basin.* Rancho Cordova, CA.

California Department of Fish and Game. 2000. *Water Quality Criteria for Diazinon and Chlorpyrifos.* Office of Spill Prevention and Response. Administrative Report 00-3. Sacramento, CA.

California Department of Water Resources. 1995. *Compilation of Sediment and Soil Standards, Criteria, and Guidelines.* Division of Local Assistance. Sacramento, CA.

California Department of Water Resources. 2003. *California's Groundwater—Bulletin 118, Update 2003.* Available: <http://www.groundwater.water.ca.gov/bulletin118/update2003/index.cfm>. Last revised 2003. Accessed July 1, 2004.

Central Valley Regional Water Quality Control Board. 1989 (June). *Designated Level Methodology for Waste Classification and Cleanup Level Determination.* Sacramento, CA.

Countryman, Joe. President. MBK Engineers, Sacramento, CA. June 7, 2004—e-mail to EDAW regarding level of flood protection for RD 784; July 20, 2004—e-mail to EDAW regarding discussions with RD 1001 and The Reclamation Board about levee maintenance requirements.

Environmental Data Resources, Inc. 2004a. *The EDR Radius Map with GeoCheck, Feather-Bear Rivers Levee Setback, Northern Bear Alignment.* Inquiry Number: 01219159.1r.

Environmental Data Resources, Inc. 2004b. *The EDR Radius Map with GeoCheck, Feather-Bear Rivers Levee Setback, Southern Bear Alignment.* Inquiry Number: 01219163.1r.

Foothill Associates. 1999. *Water Quality Impact Assessment—State Route 70/Motorplex Parkway Interchange.* Administrative Draft Technical Report. Prepared for URS Greiner-Woodward Clyde and California Department of Transportation. Roseville, CA.

Goff, Rick. Reclamation District 784, Marysville, CA. October 15, 2003—conversation with Roberta Childers of EDAW about well yields in RD 784.

Hoover, M. B., H. E. Rensch, E. G. Rensch, and W. N. Abeloe. 1990. *Historic Spots in California.* Stanford University Press. Stanford, CA.

Larry Walker Associates. 2001. *1999–2000 Annual Monitoring Report.* Prepared for the Sacramento River Watershed Program. Davis, CA.

MacDonald, D. D., and T. A. Berger. 2000. Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems. *Archives of Environmental Contamination and Toxicology* 39:20–31.

MBK Engineers. 2006. *Hydraulic and Hydrologic Analysis of the Three Rivers Levee Improvement Authority's Phase IV Project—Feather River Levee Repair Project.* Prepared for Three Rivers Levee Improvement Authority. Sacramento, CA.

MHM. n.d. Reclamation District Number 784 Boundary Line, Drainage, and Flood Control Improvements Map. Marysville, CA.

Philip Williams & Associates, Ltd. 2006 (July 20). *Geomorphic Assessment of Project Alternatives for Feather River Levee Improvements Between the Bear and Yuba Rivers*. Draft Report. Prepared for Bookman-Edmonston Engineering and Three Rivers Levee Improvement Authority. Sacramento, CA.

State Water Resources Control Board. 2002. *Central Valley Regional Water Quality Control Board, CWA Section 303(d) List of Water Quality Limited Segments.* Sacramento, CA.

Trieu, Don. Engineer. MBK Engineers, Sacramento, CA. June 6, 2006—e-mail to Diane Wagner of EDAW regarding hydraulics associated with ASB levee setback.

U.S. Army Corps of Engineers. 2000 (April 30). *Engineering and Design—Design and Construction of Levees.* Engineering Manual 1110-2-1913. Washington, DC.

U.S. Army Corps of Engineers and State of California Reclamation Board. 1998 (January). *Yuba River Basin Investigation, California: Draft Feasibility Report, Appendixes and Environmental Impact Statement/Environmental Impact Report.* U.S. Army Corps of Engineers Sacramento District, Sacramento, CA, and The Reclamation Board, Sacramento, CA.

U.S. Army Corps of Engineers and State of California Reclamation Board. 2002 (December). *Sacramento and San Joaquin River Basins California Comprehensive Study, Interim Report.* U.S. Army Corps of Engineers Sacramento District, Sacramento, CA, and The Reclamation Board, Sacramento, CA.

U.S. Geological Survey. 2000. *Water-Quality Assessment of the Sacramento River Basin, California: Water-Quality, Sediment and Tissue Chemistry, and Biological Data, 1995–1998.* Open-File Report 00-391. Sacramento, CA.

U.S. Geological Survey. 2001. *Water Resources Data—California, Water Year 2001*. Volume 4. Northern Central Valley Basins and the Great Basin from Honey Lake Basin to Oregon State Line. Water-Data Report CA-01-4. Sacramento, CA.

U.S. Geological Survey. 2006. Surface-Water Monthly Statistics for California. Available: <http://waterdata.usgs.gov/ca/nwis/sw>. Accessed June 2006.

Yuba County. 1994 (May). *Yuba County General Plan.* Volume I. Environmental Setting and Background. Department of Planning and Building Services. Marysville, CA. Prepared by QUAD Consultants, Sacramento, CA, in association with Brown-Buntin Associates, kdAnderson Transportation Engineers, and Youngdahl and Associates.

Yuba County Water Agency. 2002a (June). *Report on Feasibility, Yuba-Feather Supplemental Flood Control Project.* Appendix A, Hydrology. Marysville, CA. Prepared by MBK Engineers and Flood Control Study Team.

Yuba County Water Agency. 2002b (September). *Report on Feasibility, Yuba-Feather Supplemental Flood Control Project.* Appendix B, Flood Operations. Marysville, CA. Prepared by MBK Engineers and Flood Control Study Team.

Yuba County Water Agency. 2003a (October). *Draft Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project*. State Clearinghouse #2001072062. Marysville, CA. Prepared by EDAW, Jones and Stokes, and Flood Control Study Team.

Yuba County Water Agency. 2003b (May). *Report on Feasibility, Yuba-Feather Supplemental Flood Control Project.* Appendix E, Preliminary Design. Marysville, CA. Prepared by Flood Control Study Team.

Yuba County Water Agency. 2004 (June). *Land Acquisition and Management Plan for the Feather-Bear River Levee Setback Project*. Marysville, CA. Prepared by EDAW and Flood Control Study Team.

Yuba County Water Agency and Three Rivers Levee Improvement Authority. 2004 (October). *Report on Feasibility of RD 784 Supplemental Flood Control Improvements of the Yuba-Feather Supplemental Flood Control Project. Appendix I, Hydraulic Analyses.* Marysville, CA. Prepared by MBK Engineers and Flood Control Study Team.

SECTION 5.4, "FISHERIES"

Barnhart, R. A. 1986 (June). *Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (Pacific Southwest)—Steelhead.* (Biological Report 82 [11.60], TREL-82-4.) U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, Coastal Ecology Group, Waterways Experiment Station. Slidell, LA.

Baxter, R., W. Harrell, and L. Grimaldo. 1996. 1995 Splittail Spawning Investigations. *Interagency Ecological Program for the Sacramento–San Joaquin Estuary Newsletter* 9(4):27–31.

Baxter, R. D. 1999. Status of Splittail in California. *California Fish and Game* 85(1):28–30.

Bell, M. C. 1991. *Fisheries Handbook of Engineering Requirements and Biological Criteria*. Third edition. U.S. Army Corps of Engineers, Office of the Chief of Engineers, Fish Passage Development and Evaluation Program. Portland, OR.

Bryan, M., P. Bratovich, W. Mitchell, S. Grinnell, and Y. H. Sun. 2000. Expert testimony on Yuba River fisheries issues by Surface Water Resources, Inc., Jones & Stokes Associates, and Bookman-Edmonston Engineering, Inc., aquatic and engineering specialists for Yuba County Water Agency. Prepared for California State Water Resources Control Board, Water Rights Hearings on the Lower Yuba River. Sacramento, CA.

CALFED Bay-Delta Program. 2000 (July). *Ecosystem Restoration Program Plan. Volume II: Ecological Management Zone Visions.* Final Programmatic Environmental Impact Statement/Environmental Impact Report Technical Appendix. Sacramento, CA.

CALFED Bay-Delta Program. 2001. *Ecosystem Restoration Program, Draft Stage 1 Implementation Plan.* Sacramento, CA.

California Department of Fish and Game. 1991. *Lower Yuba River Fisheries Management Plan*. Stream Evaluation Report No. 91-1. Sacramento, CA.

California Department of Fish and Game. 1998. *A Status Review of the Spring-Run Chinook Salmon (*Oncorhynchus tshawytscha*) in the Sacramento River Drainage*. Report to the Fish and Game Commission, Candidate Species Status Report 98-01. Sacramento, CA.

California Department of Fish and Game. 2006. Weekly Anadromous Fish Counts. Available: <http://www.dfg.ca.gov/lands/fh/weekly_counts/feather.htm>. Accessed June 8, 2006.

California Department of Water Resources. 1997. *Implications of the Delay at the Suisun Marsh Salinity Control Gates on Chinook Salmon Upstream Migrants.* Environmental Services Office. Sacramento, CA.

California Department of Water Resources and California Department of Fish and Game. 1983 (August). *Agreement Concerning the Operation of the Oroville Division of the State Water Project for Management of Fish & Wildlife.* Sacramento, CA.

California Natural Diversity Database. 2006 (March). Results of electronic record search. California Department of Fish and Game, Wildlife and Habitat Data Analysis Branch. Sacramento, CA.

Cramer, S. P., and D. B. Demko. 1997. *The Status of Late-Fall and Spring Chinook Salmon in the Sacramento River Basin Regarding the Endangered Species Act*. Submitted to the National Marine Fisheries Service on behalf of the Association of California Water Agencies and California Urban Water Agencies.

Fisher, F. W. 1994. Past and Present Status of Central Valley Chinook Salmon. *Conservation Biology* 8(3):870–873.

Hallock, R. J., and F. W. Fisher. 1985. *Status of the Winter-Run Chinook Salmon (*Oncorhynchus tshawytscha*) in the Sacramento River*. Anadromous Fisheries Branch Office Report. California Department of Fish and Game. Sacramento, CA.

Jones & Stokes. 1999. *Use of Restored Floodplain Habitat on the American River by Juvenile Chinook Salmon and Other Fish Species.* Sacramento, CA. Prepared for Sacramento Area Flood Control Agency, Sacramento, CA.

Jones & Stokes. 2001 (June 20). *Change in Potential Stranding Losses of Splittail and Juvenile Chinook Salmon in the Sacramento Bypass, 1999–2001.* Final Report. Sacramento, CA. Prepared for U.S. Army Corps of Engineers, Sacramento, CA.

Kohlhorst, D. W., L. W. Botsford, J. S. Brennan, and G. M. Cailliet. 1991. Aspects of the Structure and Dynamics of an Exploited Central California Population of White Sturgeon (*Acipenser transmontanus*). Pages 277–283 in P. Williot (ed.), *Acipenser: Actes du Premier Colloque International sur l'Esturgeon.* CEMAGREF, Bordeaux, France.

McEwan, D., and T. A. Jackson. 1996. *Steelhead Restoration and Management Plan for California*. California Department of Fish and Game, Inland Fisheries Division. Sacramento, CA.

Moyle, P. B. 2002. *Inland Fishes of California, Revised and Expanded*. Second edition. University of California Press. Berkeley, CA.

Moyle, P. B., P. J. Foley, and R. M. Yoshiyama. 1992. *Status of Green Sturgeon,* Acipenser medirostris*, in California.* Final Report submitted to National Marine Fisheries Service. University of California, Davis. Davis, CA.

Moyle, P. B., R. D. Baxter, T. Sommer, T. C. Foin, and R. R. Abbot. 2000. *Sacramento Splittail White Paper.*

Moyle, P. B., R. M. Yoshiyama, J. E. Williams, and E. D. Wikramanayoke. 1995. *Fish Species of Special Concern of California*. California Department of Fish and Game. Rancho Cordova, CA.

National Marine Fisheries Service. 2005. *Green Sturgeon* (Acipenser medirostris) *Status Review Update.* Prepared by Biological Review Team, Santa Cruz Laboratory, Southwest Fisheries Science Center. Santa Cruz, CA.

Painter, R. E., L. H. Wixom, and S. N. Taylor. 1977. *An Evaluation of Fish Populations and Fisheries in the Post–Oroville Project Feather River*. A report submitted to California Department of Water Resources in accordance with Federal Power Commission License No. 2100. Sacramento, CA.

Raleigh, R. F., W. J. Miller, and P. C. Nelson. 1986. *Habitat Suitability Index Models and Instream Flow Suitability Curves: Chinook Salmon.* Biological Report 82 (10.122). U.S. Fish and Wildlife Service. Washington, DC.

Reynolds, F. L., T. Mills, R. Benthin, and A. Low. 1993. *Central Valley Anadromous Fisheries and Associated Riparian and Wetlands Areas Protection and Restoration Action Plan*. Draft. California Department of Fish and Game, Inland Fisheries Division. Sacramento, CA.

Rich, A. A. 1997. Testimony of Alice A. Rich, Ph.D., regarding water rights applications for the Delta Wetlands Project, proposed by Delta Wetlands Properties for water storage on Webb Tract, Bacon Island, Bouldin Island, and Holland Tract in Contra Costa and San Joaquin Counties. July 1997. California Department of Fish and Game Exhibit DFG-7. Submitted to State Water Resources Control Board. Sacramento, CA.

Sommer, T. R., L. Conrad, G. O'Leary, F. Feyrer, and W. C. Harrell. 2002. Spawning and Rearing of Splittail in a Model Floodplain Wetland. *Transactions of the American Fisheries Society* 131:966–974.

Sommer, T. R., M. L. Nobriega, W. C. Harrell, W. Batham, and W. J. Kimmerer. 2001. Floodplain Rearing of Juvenile Chinook Salmon: Evidence of Enhanced Growth and Survival. *Canadian Journal of Fisheries and Aquatic Sciences* 58:325–333.

Sommer, T. R., R. Baxter, and B. Herbold. 1997. Resilience of Splittail in the Sacramento–San Joaquin Estuary. *Transactions of the American Fisheries Society* 126:961–976.

State Water Resources Control Board. 2001 (March 1). Water Right Decision 1644. In the Matter of Protection of Fishery Resources and Other Issues Relating to Diversion and Use of Water from the Lower Yuba River. Sacramento, CA.

State Water Resources Control Board. 2003. Revised Water Right Decision 1644. In the Matter of Fishery Resources and Water Right Issues of the Lower Yuba River. Sacramento, CA.

State Water Resources Control Board. 2006. Yuba County Water Agency Change Petition Hearing regarding Revised Water Right Decision 1644. Sacramento, CA. Available: <http://www.waterrights.ca.gov/hearings/January%202006%20Hearing-YCWA%20Change%20Petition.htm>. Last updated April 24, 2006. Accessed June 6, 2006.

Stevens, D. E. 1989 (June 19). *When Do Winter-Run Chinook Salmon Smolts Migrate through the Sacramento–San Joaquin Delta?* Memorandum. California Department of Fish and Game. Stockton, CA.

Tracy, C. 1990. *Memorandum: Green Sturgeon Meeting and Comments.* Washington Department of Fisheries. Olympia, WA.

U.S. Fish and Wildlife Service. 1993. *Abundance and Survival of Juvenile Chinook Salmon in the Sacramento–San Joaquin Estuary.* (1992 Annual Progress Report.) Stockton, CA.

Wang, J. C. S. 1986. *Fishes of the Sacramento–San Joaquin Estuary and Adjacent Waters, California: A Guide to the Early Life Histories*. (FS/10-4ATR86-9.) California Department of Water Resources. Sacramento, CA. Prepared for Interagency Ecological Study Program for the Sacramento–San Joaquin Estuary, Sacramento, CA.

Waters, T. F. 1995. *Sediment in Streams: Sources, Biological Effects, and Control*. American Fisheries Society Monograph 7. Bethesda, MD.

Yoshiyama, R. M., F. W. Fisher, and P. B. Moyle. 1998. Historical Abundance and Decline of Chinook Salmon in the Central Valley Region of California. *North American Journal of Fisheries Management* 18:487–521.

Yuba County. 1996. *Yuba County General Plan.* Volume II. Land Use, Circulation, Conservation and Open Space. Yuba County Planning Department. Marysville, CA. Prepared by QUAD Consultants, Sacramento, CA. Adopted December 10, 1996, by Yuba County Board of Supervisors.

SECTION 5.5, "TERRESTRIAL BIOLOGICAL RESOURCES"

California Department of Fish and Game. 1995 (October). *Staff Report on Burrowing Owl Mitigation.* Memorandum to Division Chiefs and Regional Managers. Sacramento, CA.

California Native Plant Society. 2006. *Inventory of Rare and Endangered Vascular Plants of California* (online edition, v7-06b 4-18-06). Rare Plant Scientific Advisory Committee. Sacramento, CA.

California Natural Diversity Database. 2006 (March). Results of electronic record search. California Department of Fish and Game, Wildlife and Habitat Data Analysis Branch. Sacramento, CA.

Holland, R. 1986. *Preliminary Descriptions of Plant Communities in California*. California Department of Fish and Game. Sacramento, CA.

Swainson's Hawk Technical Advisory Committee. 2000 (May). *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley.*

U.S. Fish and Wildlife Service. 1999 (July). *Conservation Guidelines for the Valley Elderberry Longhorn Beetle.* Sacramento Fish and Wildlife Office. Sacramento, CA.

Yuba County. 1996. *Yuba County General Plan.* Volume II. Land Use, Circulation, Conservation and Open Space. Yuba County Planning Department. Marysville, CA. Prepared by QUAD Consultants, Sacramento, CA. Adopted December 10, 1996, by Yuba County Board of Supervisors.

Yuba County Water Agency. 2003 (October). *Draft Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project.* State Clearinghouse #2001072062. Marysville, CA. Prepared by EDAW, Jones & Stokes, and Flood Control Study Team.

Yuba County Water Agency. 2004 (June). *Land Acquisition and Management Plan for the Feather-Bear Rivers Levee Setback Project.* Prepared for Yuba County Water Agency.

SECTION 5.6, "RECREATION"

California Department of Fish and Game. 2006. Feather River Wildlife Area. Available: <http://www.dfg.ca.gov/lands/wa/region2/featherriver.html>. Last updated January 2006. Accessed May 2006.

City of Marysville. 1985 (August). *City of Marysville General Plan.* Marysville, CA. Available: <http://208.186.112.160/apadmin/img/upload/General%20Plan%20Intro.PDF>. Accessed June 12, 2006.

EDAW, Inc. 2001. *Environmental Analysis: Proposed Temporary Transfer of Water from Yuba County Water Agency to California Department of Water Resources, Year 2001.* Sacramento, CA.

Sacramento Audubon Society. 2006. Bobelaine Audubon Sanctuary. Available: <http://www.sacramentoaudubon.org/boblaine.htm>. Last updated May 7, 2006. Accessed May 10, 2006.

State Water Resources Control Board. 1997. Draft Environmental Impact Report for Implementation of the 1995 Bay/Delta Water Quality Control Plan. Sacramento, CA.

Three Rivers Levee Improvement Authority. 2004a (May). *Bear River and Western Pacific Interceptor Canal Levee Improvements Project Draft Environmental Impact Report.* State Clearinghouse #2004032118. Marysville, CA. Prepared by Jones & Stokes, Sacramento, CA.

Three Rivers Levee Improvement Authority. 2004b (September). *Draft Environmental Impact Report for the Feather-Bear Rivers Levee Setback Project.* State Clearinghouse #2004072113. Marysville, CA. Prepared by EDAW and Flood Control Study Team.

U.S. Bureau of Reclamation. 1997. Central Valley Project Improvement Act Draft Programmatic Environmental Impact Statement. Mid-Pacific Region. Sacramento, CA.

Wanket, Dan. Project Manager. GEI Consultants, Oakland, CA. June 7, 2006—e-mail to Sean Bechta of EDAW regarding access to the Star Bend Boat Launch and Fishing Access during project construction.

Whitmore, Dale. Wildlife Biologist. California Department of Fish and Game, Marysville, CA. May 24, 2006—telephone conversation with Jeanine Hinde of EDAW regarding recreational uses of management units within the Feather River Wildlife Area.

Yuba County. 1994 (May). *Yuba County General Plan.* Volume I. Environmental Setting and Background. Department of Planning and Building Services. Marysville, CA. Prepared by QUAD Consultants, Sacramento, CA, in association with Brown-Buntin Associates, kdAnderson Transportation Engineers, and Youngdahl and Associates.

Yuba County. 1996. *Yuba County General Plan. Volume II. Land Use, Circulation, Conservation and Open Space.* Yuba County Planning Department. Marysville, CA. Prepared by QUAD Consultants, Sacramento, CA. Adopted December 10, 1996, by Yuba County Board of Supervisors.

Yuba Sutter Tourism Board. 2004. Yuba Sutter—Visit Us Today!: Recreation—Yuba-Sutter Wildlife. Available: <http://www.visityubasutter.com/recreation/wildlife.htm>. Accessed May 2006.

Yuba County Water Agency. 2003 (October). *Draft Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project.* State Clearinghouse #2001072062. Marysville, CA. Prepared by EDAW, Jones & Stokes, and Flood Control Study Team.

Yuba County Water Agency. 2004 (June). *Land Acquisition and Management Plan for the Feather-Bear Rivers Levee Setback Project.* Marysville, CA. Prepared by EDAW and Flood Control Study Team.

SECTION 5.7, "AESTHETIC RESOURCES"

California Department of Transportation. 2003. Officially Designated State Highways. Available: <http://www.dot.ca.gov/hq/LandArch/scenic/schwy1.html>. Last updated June 2, 2003. Accessed May 24, 2006.

Federal Highway Administration. 1983. *Visual Impact Assessment for Highway Projects.* (Contract DOT-FH-11-9694.) Washington, DC.

Three Rivers Levee Improvement Authority. 2006 (February). *Three Rivers Levee Improvement Authority Phase IV Erosion Investigation.* Prepared by MBK Engineers, Sacramento, CA.

Yuba County. 1994 (May). *Yuba County General Plan.* Volume I. Environmental Setting and Background. Department of Planning and Building Services. Marysville, CA. Prepared by QUAD Consultants, Sacramento, CA, in association with Brown-Buntin Associates, kdAnderson Transportation Engineers, and Youngdahl and Associates.

SECTION 5.8, "CULTURAL RESOURCES"

Abeloe, W. N. 1966. *Historic Spots in California.* 3rd ed. Stanford University Press. Stanford, CA.

Beardsley, R. K. 1954. Temporal and Areal Relationships in Central California Archeology. *University of California Archaeological Survey Reports*, Nos. 24, 25. Berkeley, CA.

Bouey, P. D. 1990. *Sacramento River Flood Control System Evaluation, Marysville–Yuba City Area Cultural Resources Survey.* Prepared by Far Western Anthropological Research Group, Inc., Davis, CA. Prepared for U.S. Army Corps of Engineers, Sacramento District, Sacramento, CA. On file, North Central Information Center of the California Historical Resources Information System, California State University, Sacramento.

California Office of Historic Preservation. 1995 (March). *Instructions for Recording Historical Resources.* Sacramento, CA.

Derby, L. 1849. Map of the Sacramento Valley from the American River to Butte Creek. Surveyed and Drawn by Order of General Riley, Commanding 10th Military Department, by Lieutenant Derby, Topographical Engineers, September and October 1849. On file, North Central Information Center of the California Historical Resources Information System, California State University, Sacramento, CA.

EDAW, Inc. 2006. *National Register Of Historic Places Evaluation for CA-Yub-1312 and CA-Yub-1313, Feather-Bear Rivers Levee Setback Project, Yuba and Sutter Counties, California.* Sacramento, CA. Prepared for Three Rivers Levee Improvement Authority.

Elsasser, A. B. 1953. *Archaeological Site Survey Record for CA-Yub-6 (P-58-24), State of California Division of Beaches and Parks.* On file, North Central Information Center of the California Historical Resources Information System, California State University, Sacramento, CA.

Elsasser, A. B., and M. A. Baumhoff. 1953. *Archaeological Site Survey Record for CA-Yub-5.* On file, North Central Information Center of the California Historical Resources Information System, California State University, Sacramento.

General Land Office. 1859. Plat of the New Helvetia Rancho. Map on file, North Central Information Center of the California Historical Resources Information System, California State University, Sacramento, CA.

Gordon, M. 1988. *Changes in Harmony: An Illustrated History of Yuba and Sutter Counties.* Windsor Publications. Northridge, CA.

Hoover, M., H. E. Rensch, and E. G. Rensch. 1966. *Historic Spots in California.* Third edition revised by W. N. Abeloe. Stanford University Press. Stanford, CA.

Jensen, P. M. 2005. *Class I Archaeological Survey. Reclamation District 784 Master Plan Update, Yuba County, California.* Report prepared for Foothill Associates, Inc., Rocklin, CA. On file, North Central Information Center of the California Historical Resources Information System, California State University, Sacramento, CA.

Johnson, J. J., C. M. Blount, S. D. Dondero, and D. J. Theodoratus. 1984. *Black Butte Lake Intensive Cultural Resources Survey.* The Foundation of California State University, Sacramento. Prepared for the U.S. Army Corps of Engineers, Sacramento, CA.

Jones & Stokes. 2003. Cultural Resources Inventory and Evaluation Report for the Yuba-Feather Supplemental Flood Control Project, Yuba County, California. Sacramento, CA.

Jones & Stokes. 2005. *Archaeological Testing and Evaluation Report for the Feather-Bear Rivers Setback Levee Project, Yuba County, California.* Sacramento, CA. Report prepared for the Three Rivers Levee Improvement Authority, Marysville, CA. On file, North Central Information Center of the California Historical Resources Information System, California State University, Sacramento, CA.

JRP Historical Consulting Services. 1994. *Historic Resource Evaluation Report: Reclamation Facilities, RD 1001 and RD 784.* Davis, CA. Prepared for California Department of Transportation, District 3, Marysville, CA.

Kroeber, A. L. 1925. *Handbook of the Indians of California.* Reprinted in 1976 by Dover Publications. New York, NY.

Lillard, J. B., R. F. Heizer, and F. Fenenga. 1939. *An Introduction to the Archaeology of Central California.* Sacramento Junior College, Department of Anthropology Bulletin 2.

Littlejohn, H. W. 1928. *Nisenan Geography.* Manuscript at University of California Archives, Department of Anthropology, Document 18. Berkeley, CA.

McGowan, J. A. 1961. *History of the Sacramento Valley.* Lewis Historical Publishing Company. New York, NY.

Moratto, M. J. 1984. *California Archaeology.* Academic Press. Orlando, FL.

Nelson, W. J., M. Carpenter, and K. L. Holanda. 2000. *Cultural Resources Survey for the Level (3) Communications Long Haul Fiber Optics Project—Segment WS04: Sacramento to Bakersfield.* Prepared by Far Western Anthropological Research Group, Davis, CA. Prepared for Parsons Brinckerhoff Network Services, Pleasanton, CA. On file, North Central Information Center of the California Historical Resources Information System, California State University, Sacramento, CA.

Offerman, J. 1992. *Negative Archaeological Survey Report. California Department of Transportation, Expenditure Authorization 297300.* On file, North Central Information Center of the California Historical Resources Information System, California State University, Sacramento, CA.

Offerman, J. 2001. *Negative Archaeological Survey Report. California Department of Transportation, Expenditure Authorization OA2900 and 4A8900.* On file, North Central Information Center of the California Historical Resources Information System, California State University, Sacramento, CA.

Olsen, W. H. 1957. *Archaeological Site Survey Record for CA-Yub-13.* On file, North Central Information Center of the California Historical Resources Information System, California State University, Sacramento, CA.

Olsen, W. H., and F. A. Riddell. 1960. *Archaeological Site Survey Record for CA-Yub-13.* On file, North Central Information Center of the California Historical Resources Information System, California State University, Sacramento, CA.

Olsen, W. H., and F. A. Riddell. 1962. *Salvage of the Rio Oso Site, Yuba County, California.* California Department of Parks and Recreation, Division of Beaches and Parks. Sacramento, CA.

Peak & Associates, Inc. 1988. *Cultural Resource Assessment of the Proposed Wastewater Treatment Plant Modification Along the Southern Bank of the Yuba River, Yuba County, California.* Sacramento, CA. Report prepared for Jones & Stokes Associates, Inc., Sacramento, CA. On file, North Central Information Center of the California Historical Resources Information System, California State University, Sacramento, CA.

Riddell, F. A. 1960. *Archaeological Site Survey Record for CA-Yub-6, University of California Archaeological Survey.* On file, North Central Information Center of the California Historical Resources Information System, California State University, Sacramento, CA.

Shipley, W. F. 1978. Native Languages of California. Pages 80–90 in R. F. Heizer (vol. ed.), *California. Handbook of North American Indians,* Vol. 8, W. C. Sturtevant, gen. ed. Smithsonian Institution Press. Washington, DC.

Stoll, M., and S. Thompson. 1961. *Report on the Archeological Survey of the Bear River.* Submitted to W. Beeson, Department of Anthropology, Sacramento State College. On file, North Central Information Center of the California Historical Resources Information System, California State University, Sacramento, CA.

Storm, D. J. n.d. *Cultural Resources Statement, West Linda Drainage Project.* On file, North Central Information Center of the California Historical Resources Information System, California State University, Sacramento, CA.

Thompson, J. 1958. *The Settlement and Geography of the Sacramento–San Joaquin Delta, California.* University Microfilms International. Ann Arbor, MI.

Thompson & West. 1879. *History of Yuba County, California.* Oakland, CA.

U.S. Army Corps of Engineers. 1993. *Cultural Resources Survey and Investigation. Sacramento River Flood Control Project Marysville–Yuba City Mitigation Area, Yuba County, California.* On file, North Central Information Center of the California Historical Resources Information System, California State University, Sacramento, CA.

U.S. Geological Survey. 1910. 7.5-minute Nicolaus, California, quadrangle. On file, North Central Information Center of the California Historical Resources Information System, California State University, Sacramento, CA.

U.S. Geological Survey. 1911. 7.5-minute Ostrum, California, quadrangle. On file, North Central Information Center of the California Historical Resources Information System, California State University, Sacramento, CA.

Wilson, N. L., and A. H. Towne. 1978. Nisenan. Pages 387–397 in R. F. Heizer (vol. ed.), *California. Handbook of North American Indians,* Vol. 8, W. C. Sturtevant, gen. ed. Smithsonian Institution. Washington, DC.

Yuba County Water Agency. 2003 (October). *Draft Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project.* State Clearinghouse #2001072062. Marysville, CA. Prepared by EDAW, Jones & Stokes, and Flood Control Study Team.

SECTION 5.9, "AIR QUALITY"

California Air Resources Board. 1994 (February). *California Surface Wind Climatology*. Sacramento, CA.

California Air Resources Board. 2003. EMission FACtors Computer Model Version 2.2. Sacramento, CA.

California Air Resources Board. 2005 (March). *Air Quality and Land Use Handbook: A Community Health Perspective.* Sacramento, CA.

California Air Resources Board. 2006a. Area Designation Maps/State and National. Available: <www.arb.ca.gov/desig/adm/adm.htm#state>. Accessed June 2006.

California Air Resources Board. 2006b. Air Quality Data Statistics. Available: <www.arb.ca.gov/adam/welcome.html>. Accessed June 2006.

Feather River Air Quality Management District. 1998. *Indirect Source Review Guidelines*. Marysville, CA.

Feather River Air Quality Management District. 2006. CEQA Planning: Air Quality CEQA Review. Available: <http://www.fraqmd.org/PlanningTools.htm>. Accessed June 2006.

Godish, T. 1991. *Air Quality*. Lewis Publishers, Inc. Chelsea, MI.

Sacramento Metropolitan Air Quality Management District. 2004 (July). *Guide to Air Quality Assessment in Sacramento County.* Sacramento, CA.

Salinas, Julio. Staff Toxicologist. Office of Health Hazard Assessment, Sacramento, CA. August 3, 2004—telephone conversation with Kurt Legleiter of EDAW regarding exposure period for determining heath risk.

South Coast Air Quality Management District. 1993. *CEQA Air Quality Handbook*. Diamond Bar, CA.

Three Rivers Levee Improvement Authority. 2004 (September). *Draft Environmental Impact Report for the Feather-Bear Rivers Levee Setback Project*. State Clearinghouse #2004072113. Marysville, CA. Prepared by EDAW and Flood Control Study Team.

U.S. Environmental Protection Agency. 1985. *Compilation of Air Pollutant Emission Factors* (EPA AP-42). Washington, DC.

U.S. Environmental Protection Agency. 2006a. Criteria Air Pollutant Information and Attainment Designations. Available: <http://www.epa.gov>. Accessed June 2006.

U.S. Environmental Protection Agency. 2006b. National Ambient Air Quality Standards. Available: <www.epa.gov/air/criteria.html>. Accessed June 2006.

U.S. Environmental Protection Agency. 2006c. Monitor Value Report (NAAQS). Available: <www.epa.gov/air/data/geosel.html>. Accessed June 2006.

Zhu, Y., W. C. Hinds, S. Kim, and S. Shen. 2002. Study of Ultrafine Particles Near a Major Highway with Heavy-duty Diesel Traffic. *Atmospheric Environment* 36:4323–4335.

SECTION 5.10, "NOISE"

California Air Resources Board. 2002. URBEMIS2002 Version 8.7.0 computer model. Sacramento, CA.

California Department of Transportation. 1998 (October). *Traffic Noise Analysis Protocol: Technical Noise Supplement.* Sacramento, CA.

California Department of Transportation. 2002 (February 20). *Transportation Related Earthborne Vibrations.* Sacramento, CA.

California Department of Transportation. 2006. *2005 Traffic Volumes on the California State Highway System.* Traffic and Vehicle Data Systems Unit. Sacramento, CA. Available: <http://www.dot.ca.gov/hq/traffops/saferesr/trafdata/2005all.htm>. Accessed July 27, 2006.

Egan, M. D. 1972. *Concepts in Architectural Acoustics.* McGraw-Hill Science/Engineering/ Math. New York, NY.

Federal Highway Administration. 1988. FHWA Traffic Noise Prediction Model. Washington, DC.

Federal Transit Administration. 1995 (April). *Transit Noise and Vibration Impact Assessment.* Washington, DC.

Governor's Office of Planning and Research. 2003. *State of California General Plan Guidelines.* Sacramento, CA.

Three Rivers Levee Improvement Authority. 2004 (September). *Draft Environmental Impact Report for the Feather-Bear Rivers Levee Setback Project*. State Clearinghouse #2004072113. Marysville, CA. Prepared by EDAW and Flood Control Study Team.

U.S. Department of Housing and Urban Development. 2002. *The Noise Guidebook.* Washington, DC.

U.S. Environmental Protection Agency. 1971 (December). *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances.* Washington, DC.

Yuba County. 1980 (August). *Yuba County General Plan* Noise Element. Yuba County Community Development Department. Marysville, CA.

Yuba County. 1994 (May). *Yuba County General Plan.* Volume I. Environmental Setting and Background. Department of Planning and Building Services. Marysville, CA. Prepared by QUAD Consultants, Sacramento, CA, in association with Brown-Buntin Associates, kdAnderson Transportation Engineers, and Youngdahl and Associates.

Yuba County Water Agency. 2003 (October). *Draft Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project.* State Clearinghouse #2001072062. Marysville, CA. Prepared by EDAW, Jones & Stokes, and Flood Control Study Team.

SECTION 5.11, "TRANSPORTATION AND CIRCULATION"

California Department of Transportation. 2006. *2005 Traffic Volumes on the California State Highway System.* Traffic and Vehicle Data Systems Unit. Sacramento, CA. Available: <http://www.dot.ca.gov/hq/traffops/saferesr/trafdata/2005all.htm>. Accessed July 27, 2006.

Cucci, Daniel. Assistant Planner. Yuba County Community Development Department, Marysville, CA. May 12, 2006—e-mail to Jason Barrett of EDAW regarding emergency access in the project area.

Institute of Transportation Engineers. 1989. *Traffic Access and Impact Studies for Site Development.* Transportation Planners Council. Washington, DC.

Yuba County. 1994 (May). *Yuba County General Plan.* Volume I. Environmental Setting and Background. Department of Planning and Building Services. Marysville, CA. Prepared by QUAD Consultants, Sacramento, CA, in association with Brown-Buntin Associates, kdAnderson Transportation Engineers, and Youngdahl and Associates.

Yuba County. 1996. *Yuba County General Plan.* Volume II. Land Use, Circulation, Conservation and Open Space. Yuba County Planning Department. Marysville, CA. Prepared by QUAD Consultants, Sacramento, CA. Adopted December 10, 1996, by Yuba County Board of Supervisors.

SECTION 5.12, "PUBLIC SERVICES, UTILITIES, AND SERVICE SYSTEMS"

Boeck, Van. Managing Engineer. Yuba County Public Works Department, Marysville, CA. September 2002—telephone conversation with Craig Cross of EDAW; July 26, 2004—telephone conversation with Jeanine Hinde of EDAW.

California Department of Water Resources. 1981 (December). *Water Well Standards: State of California.* Bulletin 74–81. Sacramento, CA.

California Department of Water Resources. 1991 (June). *California Well Standards.* Bulletin 74–91. Sacramento, CA.

Chambers, Don. Land Agent. Pacific Gas and Electric Company. Chico, CA. July 21, 2004—telephone conversation with Jeanine Hinde of EDAW regarding PG&E electric distribution maps numbered S-23, S-24, T-23, and T-24.

Cucci, Daniel. Assistant Planner. Yuba County Community Development Department, Marysville, CA. May 12, 2006—e-mail to Jason Barrett of EDAW regarding Yuba County public services and utilities.

Freeman, Gregg. Engineer. SBC Communications. Grass Valley, CA. November 11, 2002—telephone conversation with Sara Martin of Jones & Stokes.

GEI Consultants. 2006. *Levee Strengthening Basis of Design Report.* Oakland, CA.

Klein, John. Engineer. SBC Communications. Chico, CA. July 10, and July 31, 2002—telephone conversations with Sara Martin of Jones & Stokes.

Lee, Michael. Assistant Director. Yuba County Public Works Department, Marysville, CA. May 10, 2006—telephone conversation with Jason Barrett of EDAW concerning Yuba County roadways, utilities, and public services.

MHM Inc. n.d. Reclamation District Number 784 Boundary Line, Drainage and Flood Control Improvements Map. Marysville, CA.

Pacific Gas and Electric Company. 2001 (November). Electric Distribution Maps R-22, R-23, Q-22, Q-23, S-23, T-23, Q-23-12, and Q-23-17.

Pujol, Alberto. GEI Consultants, Oakland, CA. July 6, 2006—e-mail to Sean Bechta of EDAW regarding requirements for well abandonment and protection.

Shaw, Tim. General Manager. Olivehurst Public Utility District, Marysville, CA. May 8, 2006—telephone conversation with Jason Barrett of EDAW concerning local public services and utilities.

Wanket, Dan. Project Manager. GEI Consultants, Oakland, CA. May 18, 2006—e-mail to Sean Bechta of EDAW regarding public services, utilities, and service systems in the project area.

Yuba County Water Agency. 2003 (May). *Report on Feasibility, Yuba-Feather Supplemental Flood Control Project.* Appendix E, Preliminary Design. Marysville, CA. Prepared by Flood Control Study Team.

SECTION 5.13, "PALEONTOLOGICAL RESOURCES"

Albright, L. B., III. 2000. *Biostratigraphy and Vertebrate Paleontology of the San Timoteo Badlands, Southern California.* University of California Publications, Geological Sciences, Vol. 144. University of California Press. Berkeley, CA.

Atwater, B. F. 1982. Geologic Maps of the Sacramento–San Joaquin Delta, California. U.S. Geological Survey Map MF-1401.

Bartow, J. A. 1991. *The Cenozoic Evolution of the San Joaquin Valley, California.* U.S. Geological Survey Professional Paper 1501. Washington, DC.

Davis, S. N., and F. R. Hall. 1959. *Water Quality of Eastern Stanislaus and Northern Merced Counties, California.* Stanford University Publications, Geological Sciences, Vol. 6, No. 1.

Gale, H. S., H. E. Thomas, and A. M. Piper. 1938. *Geologic and Hydrologic Map of the Mokelumne Area, California.* U.S. Geological Survey.

Graham, S. A., and H. C. Olson (eds.). 1988. *Studies of the Geology of the San Joaquin Basin.* Pacific Section, Society of Economic Paleontologists and Mineralogists.

Hackel, O. 1966. Great Valley Province. Pages 217–238 in E. H. Bailey (ed.), *Geology of Northern California*. U.S. Geological Survey Bulletin 190. San Francisco, CA.

Hay, O. P. 1927. *The Pleistocene of the Western Region of North American and its Vertebrated Animals.* Carnegie Institute Washington, Publication 322B.

Helley, E. J., and D. W. Harwood. 1985. Geologic Map of the Late Cenozoic Deposits of the Sacramento Valley and Northern Sierran Foothills, California. U.S. Geological Survey MF-1790.

Hilton, R. P., D. C. Dailey, and H. G. McDonald. 2000. A Late Pleistocene Biota from the Arco Arena Site, Sacramento, California. *PaleoBios Abstracts* 20(1), April 15, 2000. University of California Museum of Paleontology. Berkeley, CA.

Jefferson, G. T. 1991a. *A Catalogue of Late Quaternary Vertebrates from California: Part One, Nonmarine Lower Vertebrate and Avian Taxa.* Natural History Museum of Los Angeles County, Technical Report no. 5.

Jefferson, G. T. 1991b. *A Catalogue of Late Quaternary Vertebrates from California: Part Two: Mammals.* Natural History Museum of Los Angeles County, Technical Report no. 7.

Kolber, M. 2004. Mammoth Coup: Discovery of Huge Fossil Near Elk Grove is a Big Deal for Northern California. *Sacramento Bee,* July 27, 2004.

Louderback, G. D. 1951. *Geologic History of San Francisco Bay.* California Division of Mines and Geology Bulletin 154.

Lundelius, E. L. Jr., R. W. Graham, E. Anderson, J. Guilday, J. A. Holman, D. W. Steadman, and S. D. Webb. 1983. Terrestrial Vertebrate Faunas. Pages 311–353 in H. E. Wright, Jr. and S. C. Porter (eds.), *Late-Quaternary Environments of the United States, Volume 1, The Late Pleistocene.* University of Minnesota Press.

Marchand, D. E., and A. Allwardt. 1981. *Late Cenozoic Stratigraphic Units, Northeastern San Joaquin Valley, California.* U.S. Geological Survey Bulletin 1470.

Page, R. W. 1986. *Geology of the Fresh Ground-Water Basin of the Central Valley, California.* U.S. Geological Survey Professional Paper 1401-C.

Piper, A. M., H. S. Gale, H. E. Thomas, and T. W. Robinson. 1939. *Geology and Ground-Water Hydrology of the Mokelumne Area, California.* U.S. Geological Survey Water-Supply Paper 780.

Saucedo, G. J., and D. L. Wagner. 1992. Geologic Map of the Chico Quadrangle. California Division of Mines and Geology, Regional Geologic Map Series, Map No. 7A. Sacramento, CA.

Savage, D. E. 1951. Late Cenozoic Vertebrates of the San Francisco Bay Region. *University of California Department of Geological Sciences Bulletin* 28(10):215–314.

Society of Vertebrate Paleontology. 1995. Assessment and Mitigation of Adverse Impacts to Nonrenewable Paleontologic Resources—Standard Guidelines. *Society of Vertebrate Paleontology News Bulletin* 163:22–27.

Society of Vertebrate Paleontology. 1996. Conditions of Receivership for Paleontologic Salvage Collections. Final draft. *Society of Vertebrate Paleontology News Bulletin* 166:31–32.

Stirton, R. A. 1939. Cenozoic Mammal Remains from the San Francisco Bay Region. *University of California Department of Geological Sciences Bulletin* 24(13).

University of California Museum of Paleontology. 2004. Paleontology Collections Database. University of California, Berkeley. Available: <http://elib.cs.berkeley.edu/ucmp/>. Accessed July 19, 2004.

University of California Museum of Paleontology. 2006. Paleontology Collections Database. University of California, Berkeley. Available: <http://bscit.berkeley.edu/ucmp/loc.shtml>. Accessed May 30, 2006.

CHAPTER 6, "CUMULATIVE IMPACTS"

CALFED Bay-Delta Program. 2000 (July). *Ecosystem Restoration Program Plan. Volume II: Ecological Management Zone Visions.* Final Programmatic EIS/EIR Technical Appendix. Sacramento, CA.

California Department of Conservation. 1996. *Farmland Conversion Report 1992 to 1994.* Prepared by the Farmland Mapping and Monitoring Program, Sacramento, CA.

California Department of Conservation. 1998. *Farmland Conversion Report 1994 to 1996.* Prepared by the Farmland Mapping and Monitoring Program, Sacramento, CA.

California Department of Conservation. 2000. *Farmland Conversion Report 1996 to 1998.* Prepared by the Farmland Mapping and Monitoring Program, Sacramento, CA.

California Department of Conservation. 2002a. *Farmland Conversion Report 1998 to 2000.* Prepared by the Farmland Mapping and Monitoring Program, Sacramento, CA.

California Department of Conservation. 2002b. Important Farmland in California, 2002. Available: <http://www.consrv.ca.gov/dlrp/FMMP/map_products/index.htm>.

California Department of Conservation. 2004a. *Farmland Conversion Report 2000 to 2002.* Prepared by the Farmland Mapping and Monitoring Program, Sacramento, CA.

California Department of Conservation. 2004b. *2004 Field Report for Yuba County.* Prepared by the Farmland Mapping and Monitoring Program, Sacramento, CA.

California Department of Conservation. 2006. *Farmland Conversion Report 2002 to 2004.* Prepared by the Farmland Mapping and Monitoring Program, Sacramento, CA.

California Department of Finance. 2000. *California State Census Data Center, Census 2000. Table One, Population Changes 1990–2000.* Prepared by Demographic Research Unit, Sacramento, CA.

California Department of Finance. 2006 (May). E-1 Population Estimates for Cities, Counties and the State with Annual Percent Change—January 1, 2005 and 2006. Sacramento, California. Available: <http://www.dof.ca.gov/HTML/DEMOGRAP/E-1table.xls>.

California Department of Water Resources. 2003 (February 25). *NEPA Scoping Document 2 and Amended CEQA Notice of Preparation, Oroville Facilities Relicensing, FERC Project No. 2100.* Sacramento, CA.

California Department of Water Resources. 2005. Proposed New Gauges for the Yuba-Feather Forecast-Coordinated Operations Program. Boone Lek, November 18, 2005. Available: <http://cdec.water.ca.gov/snow/meeting/CCSS_2005_Meeting/New_Gages_F-CO_Program_2005_CCSS_meeting.pdf>. Accessed July 3, 2006.

California Department of Water Resources. 2006a (June). Governor's Leadership Secures Permits for DWR Critical Levee Site Repair Schwarzenegger Helps to Expedite Process, Protect Environmental Concerns. Public Affairs Office. Available: <http://www.publicaffairs.water.ca.gov/newsreleases/2006/06-27-06oped.cfm>.

California Department of Water Resources. 2006b (April). 29 Critical Erosion Sites in the Sacramento River Flood Control System. Public Affairs Office. Available: <http://www.publicaffairs.water.ca.gov/newsreleases/2006/04-20-06added_critical.pdf>.

Cotter, Colleen. Assistant Planner. Yuba County Planning Department, Marysville, CA. April 15, 2003—e-mail to Jenifer King of EDAW.

EIP Associates. 2006 (May). *Notice of Preparation and Initial Study: Feather River Setback Levee at Star Bend.* Prepared for Levee District No. 1 of Sutter County. Sacramento, CA.

Feather River Air Quality Management District. 1998. *Indirect Source Review Guidelines.* Marysville, CA.

Feather River Air Quality Management District. 2006. CEQA Planning: Air Quality CEQA Review. FRAQMD Web site. <http://www.fraqmd.org/PlanningTools.htm>. Accessed June 2006.

Feather River Coordinated Resource Management. 2006. Feather River Coordinated Resource Management Web site. Available: <http://www.feather-river-crm.org>. Accessed June 2006.

Nature Conservancy, The. 2002. Sacramento River Project. The Nature Conservancy Web site. Available: <http://www.tnccalifornia.org/our_proj/sacto_river/>. Last updated 2002. Accessed March 25, 2003.

Sacramento Area Council of Governments. 2004 (December). SACOG Projection Data. Jurisdictions from 2005 to 2025. Available: <http://www.sacog.org/demographics/projections/files/split/Sacog%20Projections%20Adopted%2012.16.04%20for%20Jurisdictions%202005%20-%202025.xls>.

Sacramento River Conservation Area Forum. 2002 (June). *Sacramento River Conservation Area Forum Handbook.* Prepared for the State of California Resources Agency. Prepared by the Sacramento River Advisory Council. Revised and updated by the Sacramento River Conservation Area Forum. Available: <http://www.sacramentoriver.ca.gov>.

Sacramento River Partners. 2002. Sacramento River Projects 1998–2004. Sacramento River Partners Web site. Available: <http://www.riverpartners.org>. Last updated March 2003. Accessed June 14, 2006.

Sacramento River Partners. 2005. Sacramento River Partners Journal. Fall 2005. Volume I, Issue I. Available: <http://www.riverpartners.org/documents/journal_fall_2005.pdf>.

South Yuba River Citizens League. 2003. South Yuba River Citizens League Web site. Available: <http://www.syrcl.org/whatwedo/whatwedo-loweryuba.asp>. Accessed June 14, 2006.

Upper Yuba River Studies Program. 2005. Upper Yuba River Studies Program Web site. Available: <http://calwater.ca.gov/Programs/EcosystemRestoration/UpperYuba/aboutProject-1.asp.htm>. Accessed June 2006.

U.S. Army Corps of Engineers and State of California Reclamation Board. 2002 (December). *Sacramento and San Joaquin River Basins California Comprehensive Study. Interim report.* U.S. Army Corps of Engineers Sacramento District, Sacramento, CA, and The Reclamation Board, Sacramento, CA.

U.S. Environmental Protection Agency. 2004. "Intent to Prepare a Draft Supplemental Environmental Impact Statement/Environmental Impact Report for the Yuba River Basin Project, Yuba County, CA." *Federal Register*, March 17, 2004 (Volume 69, Number 52).

Yuba County Community Development Department. 2004 (December). *Draft Housing Element 2004.* Prepared by Cotton/Bridges Associates, Sacramento, CA. Available: <http://www2.co.yuba.ca.us/yubacomdev/planning/he/default.asp>.

Yuba County Community Development and Public Works. 2005. Planning Division Web site. Available: <http://www.yubacomdev.org/planning>. Accessed June 14, 2006.

Yuba County Water Agency. 2002a (August). *Technical Memorandum on Controlled Surcharge of Lake Oroville for Additional Flood Control.* Prepared for submittal to California Department of Water Resources, Sacramento, CA.

Yuba County Water Agency. 2002b (August). *Technical Memorandum on Thermalito Afterbay Emergency Reoperation for Flood Control.* Prepared for submittal to California Department of Water Resources, Sacramento, CA.

Yuba County Water Agency. 2002c (May 7). Minutes of Meeting of the Yuba County Water Agency Board of Directors. Marysville, CA.

Yuba County Water Agency. 2003a (October). *Draft Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project.* State Clearinghouse #2001072062. Marysville, CA. Prepared by EDAW, Jones & Stokes, and Flood Control Study Team.

Yuba County Water Agency. 2003b. *Report on Feasibility, Yuba-Feather Supplemental Flood Control Project. Appendix E, Preliminary Design.* Marysville, CA. Prepared by Flood Control Study Team.

Yuba County Water Agency. 2003c (January). *Report on Feasibility, Yuba-Feather Supplemental Flood Control Project. Appendix D, Benefit Analysis.* Marysville, CA. Prepared by David Ford Consulting Engineers and Flood Control Study Team.

Yuba County Water Agency, MBK Engineers, and GEI Consultants. 2004 (March). Staff Report: *Achieving FEMA Certification for Reclamation District No. 784.* Prepared for Yuba County, Yuba County Water Agency, and Reclamation District No. 784.

Yuba Foothills Associates, LLC. 2002 (September). *Draft Yuba Highlands Specific Plan.* Prepared for Yuba County Planning Department, Marysville, CA.

CHAPTER 7, "OTHER CEQA-REQUIRED SECTIONS"

Yuba County. 1990a. *East Linda Specific Plan.* Yuba County Planning Department. Marysville, CA. Prepared by Wade Associates, Roseville, CA, and Terrance Lowell & Associates, Inc., Rocklin, CA. Adopted by the Yuba County Board of Supervisors May 14, 1990.

Yuba County. 1990b. *Draft Environmental Impact Report for the East Linda Specific Plan.* State Clearinghouse #1989081407. Marysville, CA.

Yuba County. 1990c. *Final Environmental Impact Report for the East Linda Specific Plan.* State Clearinghouse #1989081407. Marysville, CA.

Yuba County. 1992a (October). *Plumas Lake Specific Plan.* Yuba County Department of Planning and Building Services. Marysville, CA. Prepared by Richard Floch & Associates, Omni-means, Inc., and Economic & Planning Systems. Adopted by Yuba County Planning Commission August 4, 1993. Adopted by Yuba County Board of Supervisors September 21, 1993.

Yuba County. 1992b (November). *Draft Environmental Impact Report for the Plumas Lake Specific Plan.* State Clearinghouse #92072070. Marysville, CA. Prepared by OMNI-Means, Ltd., Roseville, CA.

Yuba County. 1993 (June). *Final Environmental Impact Report for the Plumas Lake Specific Plan.* State Clearinghouse #92072070. Marysville, CA. Prepared by OMNI-Means, Ltd., Roseville, CA.

Yuba County. 1994a (May). *Yuba County General Plan.* Volume I. Environmental Setting and Background. Department of Planning and Building Services. Marysville, CA. Prepared by QUAD Consultants, Sacramento, CA, in association with Brown-Buntin Associates, kdAnderson Transportation Engineers, and Youngdahl and Associates.

Yuba County. 1994b (May). *Draft Yuba County General Plan Environmental Impact Report.* State Clearinghouse #92112053. Yuba County Planning Department. Marysville, CA. Prepared by QUAD Consultants, Sacramento, CA.

Yuba County. 1996a. *Yuba County General Plan.* Volume II. Land Use, Circulation, Conservation and Open Space. Yuba County Planning Department. Marysville, CA. Prepared by QUAD Consultants, Sacramento, CA. Adopted December 10, 1996, by Yuba County Board of Supervisors.

Yuba County. 1996b (October). *Final Yuba County General Plan Environmental Impact Report.* State Clearinghouse #92112053. Yuba County Planning Department. Marysville, CA. Prepared by QUAD Consultants, Sacramento, CA.

CHAPTER 8, "ALTERNATIVES"

Kleinfelder, Inc. 2006 (February 20). *Problem Identification Report, TRLIA Phase 4 Feather River and Yuba River Left Bank Levees, Reclamation District No. 784.* Sacramento, CA.

MBK Engineers. 2006 (February 20). *Three Rivers Levee Improvement Authority Phase IV Erosion Investigation.* Sacramento, CA.

Yuba County Water Agency. 2002 (August). *Alternatives Analysis Report for the Yuba-Feather Supplemental Flood Control Project*. Prepared by Yuba-Feather Flood Control Study Team. Marysville, CA.

Yuba County Water Agency. 2003 (October). *Draft Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project.* Marysville, CA. State Clearinghouse #2001072062. Prepared by EDAW, Jones & Stokes, and Flood Control Study Team.

CHAPTER 9, "CONSULTATION AND COORDINATION"

Yuba County Water Agency. 2003 (October). *Draft Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project.* State Clearinghouse #2001072062. Marysville, CA. Prepared by EDAW, Jones & Stokes, and Flood Control Study Team.

Yuba County Water Agency. 2004 (March). *Final Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project.* State Clearinghouse #2001072062. Marysville, CA. Prepared by EDAW, Jones & Stokes, and Flood Control Study Team.

CHAPTER 11 PREPARERS OF THE ENVIRONMENTAL DOCUMENT

This environmental impact report (EIR) was prepared by EDAW in cooperation with the other members of the flood control study team. EDAW was responsible for project management and EIR preparation. The EIR technical team and other flood control study team members provided technical expertise, as presented below.

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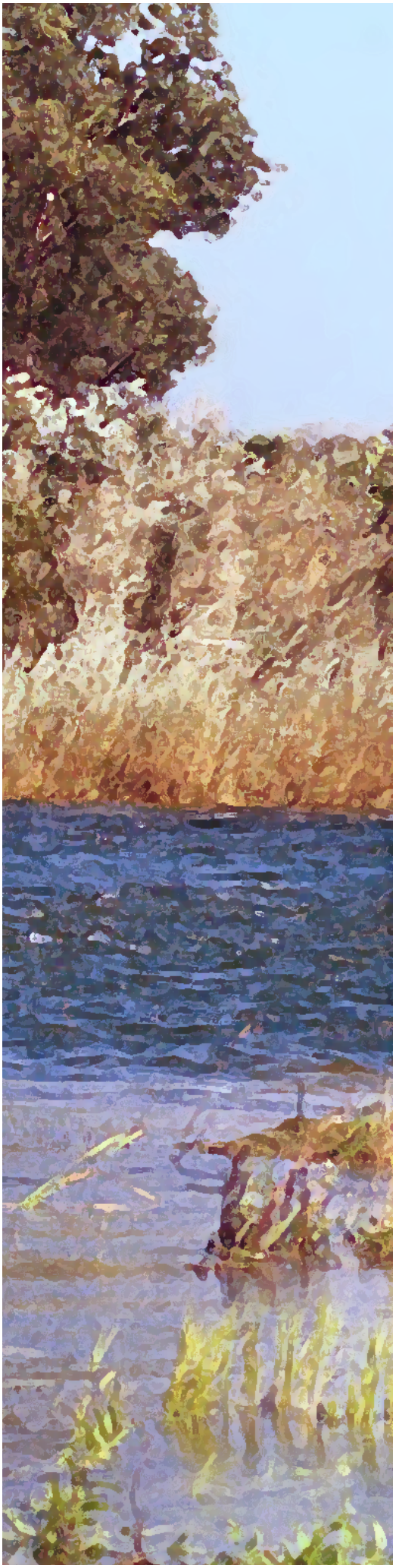

DRAFT ENVIRONMENTAL IMPACT REPORT

FOR THE FEATHER RIVER LEVEE REPAIR PROJECT

AN ELEMENT OF THE YUBA-FEATHER SUPPLEMENTAL FLOOD CONTROL PROJECT

VOLUME II: APPENDICES

STATE CLEARINGHOUSE NO. 2006062071

PREPARED FOR

THREE RIVERS LEVEE IMPROVEMENT AUTHORITY

PREPARED BY

EDAW
FLOOD CONTROL STUDY TEAM

August 2006

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APPENDIX A

Project Scoping

THREE RIVERS LEVEE IMPROVEMENT AUTHORITY

Notice of Preparation

To: Agencies and Interested Parties

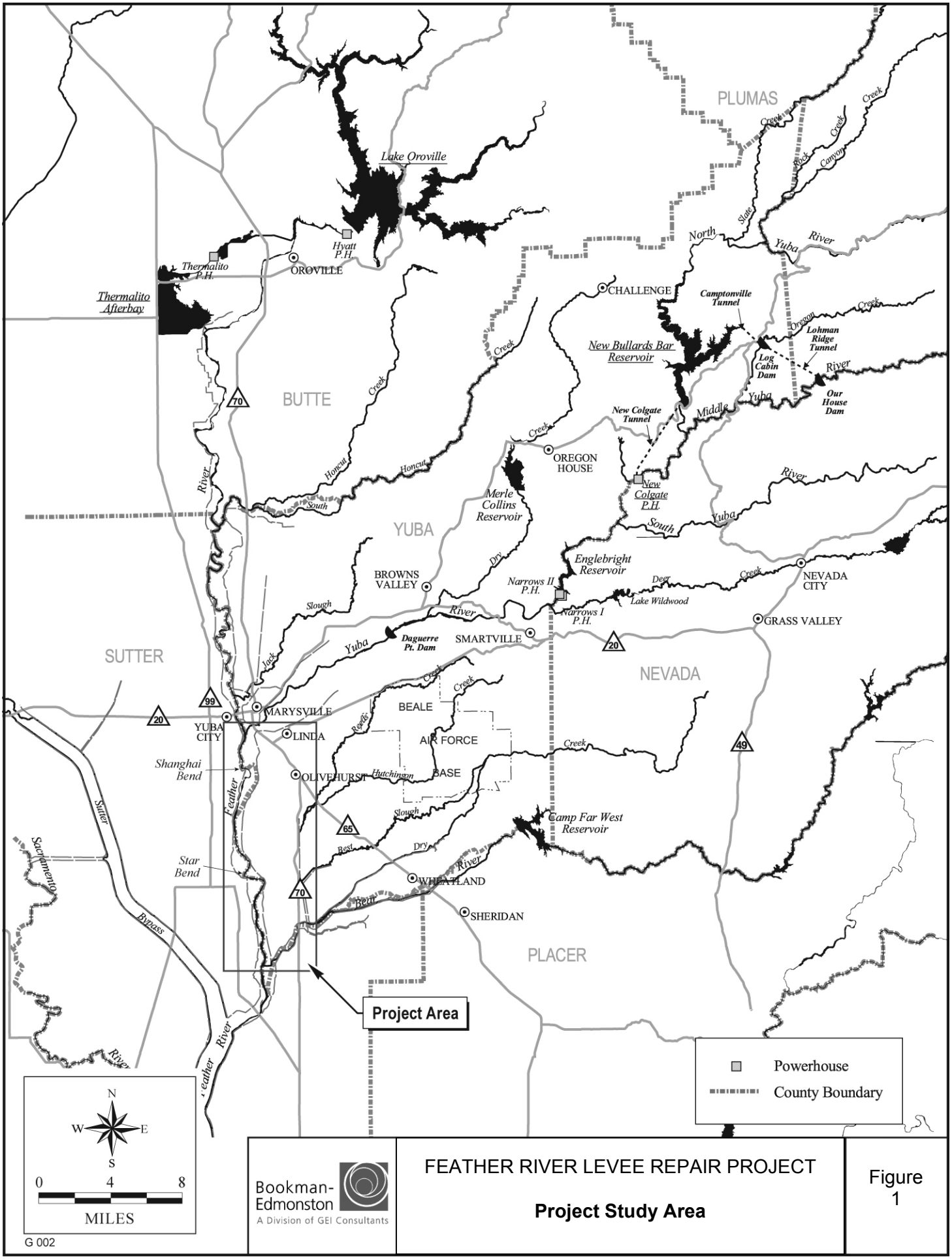
From: Paul Brunner, Executive Director, Three Rivers Levee Improvement Authority

Date: June 13, 2006

Subject: Notice of Preparation of a Draft Environmental Impact Report on the Feather River Levee Repair Project, and Announcement of a Public Scoping Meeting to be held on June 29, 2006, from 5:30 to 7:30 p.m. at the Yuba County Government Center, 915 Eighth Street, Marysville, CA 95901.

The Three Rivers Levee Improvement Authority (TRLIA) is proposing the Feather River Levee Repair Project (FRLRP), an element of the Yuba-Feather Supplemental Flood Control Project (Y-FSFCP), to increase flood protection in the Reclamation District (RD) 784 area of Yuba County. RD 784 is bounded by the Yuba River on the north, the Feather River on the west, the Bear River on the south, and the Western Pacific Interceptor Canal (WPIC) on the east. The project would address identified deficiencies in the Feather River levee, and would make related improvements to the Yuba River levee near its confluence with the Feather River. It would entail strengthening the existing Feather River left (east) bank levee from Project Levee Mile (PLM) 13.3 to PLM 17.1 and from PLM 23.6 to PLM 26.1, and strengthening the existing Yuba River left (south) bank levee from the confluence with the Feather River (PLM 0.0) upstream to PLM 0.3. (Note: References to the “left” bank indicate the left side of the river when facing downstream.) The segment of the Feather River left bank levee between PLM 17.1 and PLM 23.6 would be either strengthened in its current location or set back following one of two possible alignment scenarios.

Constructing a setback levee a sufficient distance from the existing levee would remove current channel constrictions in the Feather River, thereby improving the level of flood protection for the RD 784 area and for the Marysville and Yuba City areas by lowering upstream water surface elevations. If a levee setback option is selected, land uses in the setback area could consist of agricultural operations and/or habitat restoration activities that would not impede the flood flow function of the setback area. Figure 1 shows the general study area for the project in a regional context. Figure 2 shows the extent of the project site. The project is described in more detail in “Overview of the Proposed Feather River Levee Repair Project” below.



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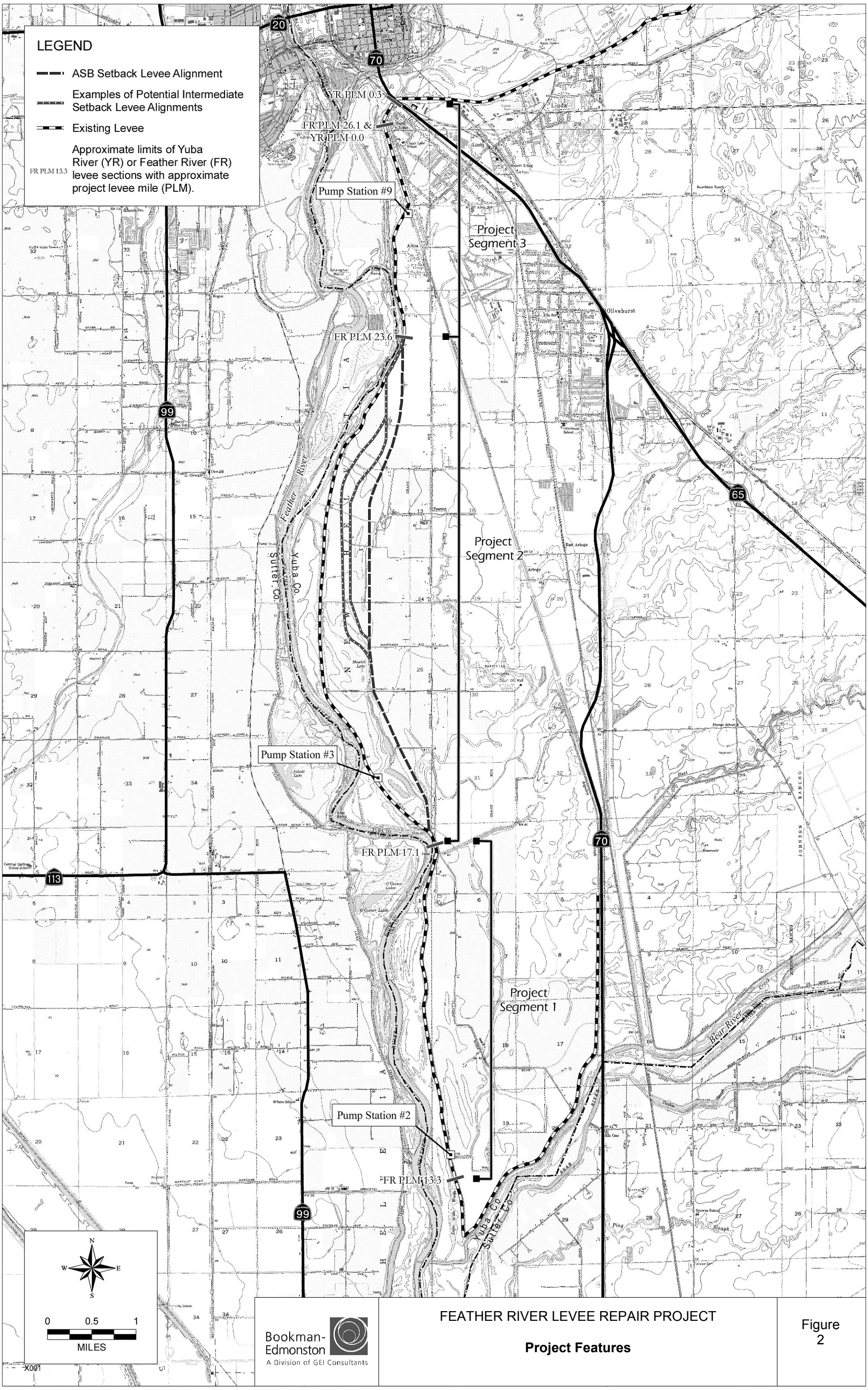
FEATHER RIVER LEVEE REPAIR PROJECT

Project Study Area

Figure 1

Source: Yuba County Water Agency 2001



FEATHER RIVER LEVEE REPAIR PROJECT

Project Features

Figure 2

Sources: EDAW 2004; GEI Consultants, Inc. 2004; Topo basemap provided by GEI Consultants, Inc.

Purpose of the Notice of Preparation

The California Environmental Quality Act (CEQA) specifies that a public agency must prepare an environmental impact report (EIR) on any project that it proposes to carry out or approve that may have a significant direct or indirect impact on the environment (Public Resources Code Section 21100[a]). TRLIA has determined that the FRLRP may have significant impacts on the environment. Therefore, TRLIA, as the lead agency for CEQA compliance, intends to prepare an EIR on the proposed project and has prepared this notice of preparation (NOP) as an initial step in the CEQA process.

The purpose of this notice is twofold:

1. to solicit input, by July 14, 2006, from interested agencies, organizations, and individuals about the content and scope of the draft EIR (DEIR) to be prepared for the proposed project; and

2. to announce a public scoping meeting on the proposed project, to be held from 5:30 to 7:30 p.m. on Thursday June 29, 2006, at the Yuba County Government Center, 915 Eighth Street, Marysville, CA 95901.

Purpose of and Need for the Feather River Levee Repair Project

Background

Yuba County has a long history of flooding. Floods in the Central Valley in 1986 and again in 1997 were catastrophic for Yuba County, inundating tens of thousands of acres, destroying thousands of homes and businesses, and causing loss of life. Two major flood protection efforts resulted from the 1986 Central Valley floods. First, the U.S. Army Corps of Engineers (Corps) and California Department of Water Resources (DWR) initiated the System Evaluation Project, which restored federally constructed levees in RD 784 to current design standards and reestablished the 1957 design top-of-levee profile. Most of the System Evaluation levee reconstruction work in RD 784 was completed in 1998. (Note that the 1997 floods resulted in the identification of additional levee seepage problems, which led to the Corps's System Evaluation Site 7 Extension project.)

The second effort was Yuba County Water Agency's (YCWA's) initiation in 1988 of the Yuba Basin Project, which led to a Corps project designed to achieve what was then considered to be a "200-year" level of protection for RD 784 levees. The Yuba Basin

Project was approved by Congress in 1998, and a construction start was authorized in 2002. In 2003, however, new Corps underseepage guidelines led to reevaluation of the project, which substantially increased the estimated cost. Because of this cost increase, the Yuba Basin Project must be reauthorized by Congress. A General Reevaluation Report is currently being prepared to obtain a new project authorization and to initiate construction.

Ongoing Local Agency Efforts

In response to the catastrophic flood of 1997, YCWA initiated a seven-phase program of flood control studies to identify methods to achieve a higher level of protection, particularly for the areas in RD 784 that had been subject to flooding several times in the past. The goal of this effort was to substantially improve the flood protection that would be provided by the System Evaluation Project and the Yuba Basin Project.

Following the passage of the Costa-Machado Water Act (Proposition 13) by California voters in 2000, YCWA's flood control study team turned the focus of its seven-phase program of studies to those measures that could be achieved within the budget provisions of Proposition 13, which provided for a total of $90 million in bond funds targeted for the Yuba-Feather River basin. This effort, funded through Proposition 13 grant monies, is the Y-FSFCP. As part of the Y-FSFCP studies, YCWA prepared a feasibility study, including a DEIR (released in October 2003). The feasibility study and EIR evaluated combinations of three flood control elements: an outlet capacity increase at New Bullards Bar Reservoir, forecast-coordinated operations of New Bullards Bar Reservoir and Lake Oroville, and a setback of the left bank levee of the Feather River between Shanghai Bend and the Bear River. The levee setback was proposed for two segments, which were referred to as the Above Star Bend and Below Star Bend levee setback areas. (The Y-FSFCP Above Star Bend levee setback area generally corresponds to the area considered for a levee setback as part of the FRLRP [i.e., the proposed project described in this NOP]). The final EIR for the Y-FSFCP was certified and the program of elements was approved by the YCWA Board in March 2004.

In May 2003, while YCWA was completing the first level of Y-FSFCP studies, the Corps, in a separate draft floodplain mapping study for DWR on the Feather River and its tributaries, identified several deficiencies in freeboard on the Bear River and WPIC levees that prevent these levees from meeting the Federal Emergency Management Agency (FEMA) criteria for providing protection for RD 784 from a "100-year" flood event. This information was unexpected by Yuba County officials because the 1998 Corps Yuba Basin study did not recommend any work for the WPIC and Bear River levees to achieve a 200-year level of protection for the RD 784 area. In addition, it was found that a 2,800-foot stretch of the Yuba River levee on the upstream side of State Route (SR) 70 did not meet slope stability requirements.

In 1993, following the initiation of the System Evaluation Project and the Yuba Basin Project, and before the most recent devastating flood (in 1997), Yuba County approved the Plumas Lake Specific Plan, which provides for a 12,000-home development on

5,200 acres in the southern portion of the RD 784 area. Development was initiated in the Plumas Lake Specific Plan area in 2002. The results of the 2003 Corps floodplain mapping study indicate that people and property in the RD 784 area, including homes that had already been built in the Plumas Lake Specific Plan area before the release of the Corps study, are subject to a much higher flood risk than previously believed.

Consequently, YCWA, RD 784, and Yuba County, in consultation with landowners and developers in the south county, elected to move aggressively on a program for improving flood control for the RD 784 area. One step was the formation of TRLIA, a joint powers authority composed of Yuba County and RD 784 focused on addressing funding and implementation of levee repairs for the RD 784 area. Based on the results of studies completed by RD 784, TRLIA, and others, the improvement program was planned to be implemented in four phases. Priority was given to implementing improvements to the Yuba River levee above SR 70 (Phase 1); improvements to the upper Bear River and WPIC levees, modifications of RD 784 Pump Station No. 6, and construction of the Olivehurst Detention Basin (Phase 2); and construction of a setback levee along the lower Bear River, tying into the Feather River levee just below Clark Slough (Phase 3). These projects are all either completed or under way. The Bear River levee setback precludes the need to improve the Feather River levee below Pump Station No. 2.

The project that is the subject of this NOP, the FRLRP, consists of repairs to the Feather River levee and a small portion of the Yuba River levee near the confluence with the Feather River, from approximately Pump Station No. 2 to the railroad crossing just west of SR 70 (approximately Feather River PLM 13.3 to PLM 26.1 and Yuba River PLM 0.0 to PLM 0.3). An alternative approach to improving the existing levee segment from Feather River Levee PLM 17.1 to PLM 23.6 is a levee setback, which would be a modification of the Above Star Bend segment of the Feather River levee setback that was previously proposed and evaluated in the Y-FSFCP EIR.

Overview of the Proposed Feather River Levee Repair Project

Project Location

The project site is in Yuba County. The site consists of portions of the left (east) bank levee of the Feather River, the left (south) bank levee of the Yuba River, and adjacent lands in the RD 784 area. As shown in Figure 2, the project site extends along the Feather River from PLM 13.3 in the south to PLM 26.1 in the north. Along the Yuba River, the project site extends from PLM 0.0 (which corresponds to PLM 26.1 on the Feather River) north to PLM 0.3. The project site is divided into three segments, with the middle segment, project Segment 2, considered for either improvements to the existing levee or a potential setback levee. Setback levee alignments being considered are shown in Figure 2

and are described in more detail below. Existing land uses in the project area include agriculture, rural residential, and residential.

Project Purpose

The primary purpose of the proposed project is to correct deficiencies in the Feather and Yuba River left bank levees, and consequently to improve flood protection for the RD 784 area of Yuba County. To a large extent, levee deficiencies in the project area relate to the potential for water to seep under (underseepage) and through (through-seepage) the levee soils during flood events, potentially leading to levee failures. The project design objectives focus on measures to bring the levees into compliance with FEMA geotechnical certification requirements for underseepage or through-seepage, as well as engineering and design standards of the State of California Reclamation Board (The Reclamation Board) and the Corps. The proposed project is also intended to address areas along the Feather River levee where erosion of the levee is a concern.

Summary Description of the Proposed Project

Three project alternatives are being considered to meet the objectives of correcting underseepage, through-seepage, and erosion concerns identified along the Feather River and Yuba River levees. Under all project alternatives, it is anticipated that the detailed design of proposed activities in project Segments 1 and 3 (see Figure 2) would be completed in 2006 and construction would take place in 2007. For activities in project Segment 2, detailed design would occur in late 2006 and through 2007, and construction would take place in 2008.

Alternative 1 – The Levee Strengthening Alternative

Under this alternative, levee repair and strengthening activities would be completed along the existing Feather River left bank levee from PLM 13.3 to PLM 26.1 and along the Yuba River left bank levee from PLM 0.0 to PLM 0.3 (Figure 2). Levee repairs/ strengthening would consist of various activities, including installation of cutoff walls and relief wells and placement of buried cobble in areas where erosion of the levee embankment has been identified as a problem. Note that areas where erosion is a concern are all located in project Segment 2, between PLM 17.1 and PLM 23.6 (Figure 2). In addition, the existing Pump Station No. 3 would be removed and a new pump station would be constructed farther to the east (farther from the existing levee) to correct existing seepage deficiencies related to the existing pump station location. The capacity of Pump Station No. 3 may also need to be increased to accommodate flows from operation of new relief wells installed during levee repairs.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Under this alternative, levee repair and strengthening activities would be completed along the existing Feather River left bank levee from PLM 13.3 to PLM 17.1 and PLM 23.6 to PLM 26.1 and along the Yuba River left bank levee from PLM 0.0 to PLM 0.3 (project

Segments 1 and 3 shown in Figure 2). Levee repair and strengthening activities along these segments would be the same as for Alternative 1. From PLM 17.1 to PLM 23.6 on the Feather River left bank (project Segment 2 in Figure 2), a setback levee would be constructed roughly following the Above Star Bend (ASB) setback levee alignment identified in the Y-FSFCP EIR. Portions of the existing levee along the setback alignment would be removed to allow water to flow into the new floodway/setback area (i.e., the area between the existing levee and the setback levee) during high river stages.

The ASB setback levee alignment considered for this project would be approximately 5.7 miles (roughly 30,000 feet) long. The setback levee height would typically range from 20 to 30 feet above existing ground, with an average height of about 25 feet. The levee would average about 170 feet wide at its base and would cover a total of roughly 120 acres. In addition, a 50-foot-wide access corridor would be maintained along the toe of both sides of the setback levee. Approximately 2.7 million cubic yards of borrow material would be required to construct the setback levee. Borrow material could potentially come from lands on either side of the setback levee alignment and/or from the existing levee embankment.

Because of unfavorable soil conditions, various seepage control measures are anticipated to be needed for the setback levee. These could include zoned embankments, slurry cutoff walls, seepage berms, and relief wells. In addition, local surface drainage patterns would be changed by the setback levee on the land side (i.e., east side) of the levee, necessitating the creation of one or more detention basins to prevent adverse flooding effects on nearby properties. Pump Station No. 3 would need to be moved from its existing location to the land side of the setback levee. The capacity of Pump Station No. 3 may also need to be increased to accommodate flows from the operation of new relief wells installed as part of the project.

Approximately 1,600 acres of land would become part of the new floodway/setback area. This area contains several residences and approximately 30 other structures that would need to be removed. Removal or protection of utilities and wells in the levee setback area would also be required. Appropriate compensation would be negotiated with landowners affected by the setback levee footprint, the access corridor along the levee toe, and the expansion of the Feather River floodway.

Land uses in the levee setback area could consist of agricultural operations and/or habitat restoration activities that would not impede the flood flow function of the setback area. There are no specific plans for habitat restoration in the levee setback area at this time, although this is considered a potential future use. Lands in the floodway would be contoured and managed to prevent fish stranding after high flows recede.

Construction of the setback levee would correct underseepage, through-seepage, and erosion deficiencies in the existing levee by providing a replacement levee that meets design requirements of FEMA, The Reclamation Board, and the Corps. In addition, the setback levee would provide increased flood storage capacity in the levee setback area and would remove an existing narrow area in the levee system. Both of these changes

would result in a reduction in Feather River and Yuba River flood stages upstream of the setback area.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

FRLRP Alternative 3 is the same as Alternative 2 except for modifications to a portion of the setback levee alignment. The same levee repair and strengthening activities described previously would be completed along the existing Feather River left bank levee from PLM 13.3 to PLM 17.1 and from PLM 23.6 to PLM 26.1, and along the Yuba River left bank levee from PLM 0.0 to PLM 0.3 (project Segments 1 and 3 shown in Figure 2). From PLM 17.1 to PLM 23.6 on the Feather River left bank (project Segment 2 in Figure 2) a setback levee would be constructed. The southern one-third of this setback levee alignment would follow the ASB setback levee alignment identified in Alternative 2. However, in the vicinity of Anderson Avenue, the setback levee alignment would shift west several hundred feet. This westward shift in the intermediate setback levee alignment would allow less overall land to be placed in the new floodway and would reduce the number of houses, structures, and other facilities that would be affected by levee construction or would need to be removed from the floodway.

For the portion of the intermediate setback levee that deviates from the ASB setback levee alignment, a specific route has not yet been confirmed and several options are currently being considered. Figure 2 shows two examples of potential intermediate setback levee routes. Considerations for final route selection include the suitability of underlying soil conditions for levee construction and the extent of flood control benefits as the setback levee is moved westward (i.e., less widening of the Feather River high-water channel would result in fewer flood control benefits).

The intermediate setback levee alignment would be approximately 5.5 miles (roughly 29,000 feet) long. The setback levee height would typically range from 20 to 30 feet above existing ground, with an average height of about 25 feet. The levee would average about 170 feet wide at its base and would cover a total of roughly 110 acres. Approximately 2.6 million cubic yards of borrow material would be required to construct the setback levee.

Most of the design, construction, and operational characteristics of the ASB setback levee described for Alternative 2 would also apply to the intermediate setback levee under Alternative 3, including the following:

- A 50-foot-wide access corridor would be maintained along the toe of both sides of the setback levee.
- Borrow material could potentially come from lands on either side of the setback levee alignment, or from the existing levee embankment.
- Because of unfavorable soil conditions, various seepage control measures are anticipated to be needed for the setback levee that could include zoned embankments, slurry cutoff walls, seepage berms, and relief wells.

- Local land side drainage patterns would be changed by the setback levee, necessitating the creation of detention basin(s) to prevent adverse flooding effects on nearby properties.
- Pump Station No. 3 would need to be relocated to the east side of the setback levee.
- The capacity of Pump Station No. 3 may need to be increased to accommodate flows from the operation of new relief wells installed as part of the project.
- Land uses in the levee setback area could consist of agricultural operations and/or habitat restoration activities that would not impede the flood flow function of the setback area. (There are no specific plans for habitat restoration in the setback area at this time, although this is considered a potential future use.)
- Lands in the floodway would be contoured and managed to prevent fish stranding after high flows recede.

Approximately 1,300 acres of land would become part of the new floodway/setback area. This area contains several residences (although somewhat fewer residences than under Alternative 2) and approximately 30 other structures that would need to be removed. Removal or protection of utilities and wells in the levee setback area would also be required. Appropriate compensation would be negotiated with landowners affected by the setback levee footprint, the access corridor along the levee toe, and the expansion of the Feather River floodway.

Type of EIR

The FRLRP EIR is a project EIR. The Y-FSFCP EIR evaluated the environmental effects of an ASB setback levee similar to the levee setback considered under Alternatives 2 and 3 of the FRLRP. Therefore, much of the information in the Y-FSFCP EIR is applicable to the FRLRP impact analysis, and the appropriate portions of the Y-FSFCP EIR will be incorporated by reference into the FRLRP EIR.

Issues to Be Addressed in the EIR

The FRLRP EIR will describe the adverse and beneficial environmental effects of implementing the proposed project. The document will also evaluate any indirect effects of the proposed project, such as potential growth-inducing effects, and the cumulative effects of implementing the proposed project in conjunction with other related past, present, and reasonably foreseeable future projects. All three project alternatives described above will be analyzed at an equal level of detail in the FRLRP EIR.

The EIR will also evaluate a No Project Alternative. In addition, the EIR will describe the alternatives selection process and discuss other alternatives considered but not carried forward for detailed analysis.

On the basis of preliminary consideration of the project, TRLIA has determined that one or more of the proposed project alternatives could result in significant and potentially significant environmental impacts in the following resource areas:

- Land Use (including agriculture)
- Geology and Soils
- Water Resources and Geomorphology
- Fisheries
- Terrestrial Biological Resources
- Recreation
- Aesthetic Resources
- Cultural Resources
- Air Quality
- Noise
- Transportation and Circulation
- Public Services, Utilities, and Service Systems
- Paleontological Resources

On the basis of the preliminary consideration of the project elements, no environmental impacts are anticipated for the following resource areas: Mineral Resources and Population and Housing. There are no known mineral resources in the project area, and the project would not directly result in substantial population growth or create the need for a substantial amount of new housing. Therefore, these topics will not be analyzed in detail in the EIR. However, as described above, the EIR will include analysis of various additional topics required by CEQA, such as cumulative impacts and growth-inducing effects.

Project Scoping and Agency Roles/Responsibilities

Project Scoping

Scoping is an important initial component of the CEQA review process for the proposed project. Scoping will help to identify the final range of project actions, site design options, impact mechanisms considered, mitigation measures, and other elements of the EIR review. The scoping process may also help eliminate from detailed study those issues that are not critical to the decision at hand. It is also an effective way to bring together and resolve the concerns of interested federal, state, and local agencies; specific stakeholder groups; and the general public.

Role of TRLIA

As the lead agency under CEQA for the FRLRP EIR, TRLIA will continue to coordinate with responsible and trustee agencies (as defined by CEQA), relevant federal agencies, and other interested parties. TRLIA will be principally responsible for conducting the environmental review process, including scoping, preparing appropriate environmental documentation, deciding whether to certify the EIR, and selecting and approving a preferred alternative. If the project moves forward, TRLIA would coordinate with the Corps, DWR, and The Reclamation Board to implement the project.

Other Agency Roles

The following other public agencies may have jurisdiction over elements of the FRLRP or have responsibility for resources that could be affected by the project:

- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- National Marine Fisheries Service
- California Department of Water Resources
- The Reclamation Board
- California Department of Fish and Game (Region 2)
- California Environmental Protection Agency
- Central Valley Regional Water Quality Control Board (Region 5)
- California State Lands Commission
- California State Office of Historic Preservation
- California Department of Transportation
- Yuba County
- Yuba County Water Agency
- Reclamation District 784
- Feather River Air Quality Management District

Compliance with the National Environmental Policy Act (NEPA) is also necessary when there is federal participation in a project; a federal discretionary permit, entitlement, authorization, or federal funding is required; or the project would occur on federal lands. Because the proposed project involves the modification of federal levees, it is expected to involve some level federal permitting, authorizations, and/or funding. Project elements are also expected to require Corps permitting under Section 404 of the Clean Water Act. The project is therefore expected to require NEPA compliance. NEPA compliance would be undertaken separately from the CEQA review process.

Scoping Meeting

A public scoping meeting for the proposed Feather River Levee Repair Project will be held from 5:30 to 7:30 p.m. on Thursday, June 29, 2006, at at the Yuba County Government Center, 915 Eighth Street, Marysville, CA 95901.

The objectives of the meeting will be to:

- brief interested parties on the current status of flood control studies and flood control projects that have been completed or are under way,

- provide background information on the proposed Feather River Levee Repair Project and the alternatives being considered, and

- obtain the views of agency representatives and the public on the scope and content of the proposed EIR.

An informational presentation will be held in conjunction with the scoping meeting. This presentation will provide updates on the various flood control projects being undertaken

by TRLIA and will offer an opportunity to ask questions on projects other than the FRLRP.

The scoping meeting will be accessible to persons with disabilities. Individuals needing special services will be accommodated to the fullest extent possible. For more information, contact Danielle Wilson at (916) 737-3000 (e-mail dwilson@jsanet.com) at least 48 hours prior to the meeting.

Providing Comments on the NOP

Interested parties are invited to provide comments in response to this NOP at the scoping meeting described above and may also provide TRLIA with written comments. Because of time limits mandated by state law, written comments should be provided to TRLIA no later than 5:00 p.m. on July 14, 2006. Agencies that will need to use the EIR when considering permits or other approvals for the proposed project should provide TRLIA with the name of the staff contact person. Please send all written comments to:

Paul Brunner
Attn: Three Rivers Levee Improvement Authority
Government Center
915 Eighth Street, Suite 115
Marysville, CA 95901-5273
Telephone: (530) 749-5679
Fax: (530) 749-7312

Document Details Report
State Clearinghouse Data Base

SCH# 2006062071
Project Title Feather River Levee Repair Project
Lead Agency Three Rivers Levee Improvement Authority

Type NOP Notice of Preparation

Description TRLIA is proposing the Feather River Levee Repair Project, an element of the Yuba-Feather Supplemental Flood Control Project, to increase flood protection in the Reclamation District (RD) 784 area of Yuba County. RD 784 is bounded by the Yuba River on the north, the Feather River on the west, the Bear River on the south, and the Western Pacific Interceptor Canal on the east. The project would address identified deficiencies in the Feather River levee, and would make related improvements to the Yuba River levee near its confluence with the Feather River. It would entail strengthening the existing Feather River left (east) bank levee from Project Levee Mile (PLM) 13.3 to PLM 17.1 and from PLM 23.6 to PLM 26.1, and strengthening the existing Yuba River left (south) bank levee from the confluence with the Feather River (PLM 0.0) upstream to PLM 0.3. The segment of the Feather River left bank levee between PLM 17.1 and PLM 23.6 would be either strengthened in its current location or set back following one of two possible alignment scenarios.

Lead Agency Contact

Name Paul Brunner
Agency Three Rivers Levee Improvement Authority
Phone (530) 749-5679 **Fax**
email
Address Government Center
915 8th Street, Suite 115
City Marysville **State** CA **Zip** 95901-5273

Project Location

County Yuba
City Marysville, Yuba City
Region
Cross Streets State Route 70 / Feather River Boulevard
Parcel No.
Township 13-15N **Range** 3E, 4E **Section** Multip **Base** MDBM

Proximity to:

Highways 70
Airports Yuba County Airport
Railways Western Pacific
Waterways Yuba and Feather Rivers
Schools Alicia Intermediate and Notre Dame HS
Land Use Valley Agriculture, Exclusive Agricultural

Project Issues Aesthetic/Visual; Agricultural Land; Air Quality; Archaeologic-Historic; Biological Resources; Cumulative Effects; Drainage/Absorption; Flood Plain/Flooding; Geologic/Seismic; Growth Inducing; Landuse; Noise; Public Services; Recreation/Parks; Soil Erosion/Compaction/Grading; Toxic/Hazardous; Traffic/Circulation; Vegetation; Water Quality; Wetland/Riparian; Wildlife

Reviewing Agencies Resources Agency; Regional Water Quality Control Bd., Region 5 (Sacramento); Department of Parks and Recreation; Native American Heritage Commission; Reclamation Board; Office of Historic Preservation; Department of Fish and Game, Region 2; Department of Water Resources; California Highway Patrol; Caltrans, District 3; State Lands Commission

Date Received 06/14/2006 **Start of Review** 06/14/2006 **End of Review** 07/13/2006

Note: Blanks in data fields result from insufficient information provided by lead agency.

NOP Distribution List

County: Yuba

SCH# 2006062071

Resources Agency

- ■ **Resources Agency**
  Nadell Gayou
- ☐ **Dept. of Boating & Waterways**
  David Johnson
- ☐ **California Coastal Commission**
  Elizabeth A. Fuchs
- ☐ **Colorado River Board**
  Gerald R. Zimmerman
- ☐ **Dept. of Conservation**
  Roseanne Taylor
- ☐ **California Energy Commission**
  Paul Richins
- ☐ **Dept. of Forestry & Fire Protection**
  Allen Robertson
- ■ **Office of Historic Preservation**
  Wayne Donaldson
- ■ **Dept of Parks & Recreation**
  Environmental Stewardship Section
- ■ **Reclamation Board**
  DeeDee Jones
- ☐ **S.F. Bay Conservation & Dev't. Comm.**
  Steve McAdam
- ■ **Dept. of Water Resources**
  Resources Agency
  Nadell Gayou
- ☐ _____
  Conservancy

Fish and Game

- ☐ **Depart. of Fish & Game**
  Scott Flint
  Environmental Services Division
- ☐ **Fish & Game Region 1**
  Donald Koch
- ■ **Fish & Game Region 2**
  Banky Curtis
- ☐ **Fish & Game Region 3**
  Robert Floerke
- ☐ **Fish & Game Region 4**
  Julie Vance
- ☐ **Fish & Game Region 5**
  Don Chadwick
  Habitat Conservation Program
- ☐ **Fish & Game Region 6**
  Gabrina Gatchel
  Habitat Conservation Program
- ☐ **Fish & Game Region 6 I/M**
  Tammy Allen
  Inyo/Mono, Habitat Conservation Program
- ☐ **Dept. of Fish & Game M**
  George Isaac
  Marine Region

Other Departments

- ☐ **Food & Agriculture**
  Steve Shaffer
  Dept. of Food and Agriculture
- ☐ **Depart. of General Services**
  Public School Construction
- ☐ **Dept. of General Services**
  Robert Sleppy
  Environmental Services Section
- ☐ **Dept. of Health Services**
  Veronica Malloy
  Dept. of Health/Drinking Water

Independent Commissions,Boards

- ☐ **Delta Protection Commission**
  Debby Eddy
- ☐ **Office of Emergency Services**
  Dennis Castrillo
- ☐ **Governor's Office of Planning & Research**
  State Clearinghouse
- ■ **Native American Heritage Comm.**
  Debbie Treadway
- ☐ **Public Utilities Commission**
  Ken Lewis
- ■ **State Lands Commission**
  Jean Sarino
- ☐ **Tahoe Regional Planning Agency (TRPA)**
  Cherry Jacques

Business, Trans & Housing

- ☐ **Caltrans - Division of Aeronautics**
  Sandy Hesnard
- ☐ **Caltrans - Planning**
  Terri Pencovic
- ■ **California Highway Patrol**
  Shirley Kelly
  Office of Special Projects
- ☐ **Housing & Community Development**
  Lisa Nichols
  Housing Policy Division

Dept. of Transportation

- ☐ **Caltrans, District 1**
  Rex Jackman
- ☐ **Caltrans, District 2**
  Marcelino Gonzalez
- ■ **Caltrans, District 3**
  Jeff Pulverman
- ☐ **Caltrans, District 4**
  Tim Sable
- ☐ **Caltrans, District 5**
  David Murray
- ☐ **Caltrans, District 6**
  Marc Birnbaum
- ☐ **Caltrans, District 7**
  Cheryl J. Powell
- ☐ **Caltrans, District 8**
  Dan Kopulsky
- ☐ **Caltrans, District 9**
  Gayle Rosander
- ☐ **Caltrans, District 10**
  Tom Dumas
- ☐ **Caltrans, District 11**
  Mario Orso
- ☐ **Caltrans, District 12**
  Bob Joseph

Cal EPA

Air Resources Board

- ☐ Airport Projects
  Jim Lerner
  - ☐ Transportation Projects
    Ravi Ramalingam
  - ☐ Industrial Projects
    Mike Tollstrup
- ☐ **California Integrated Waste Management Board**
  Sue O'Leary
- ☐ **State Water Resources Control Board**
  Jim Hockenberry
  Division of Financial Assistance
- ☐ **State Water Resources Control Board**
  Student Intern, 401 Water Quality Certification Unit
  Division of Water Quality
- ☐ **State Water Resouces Control Board**
  Steven Herrera
  Division of Water Rights
- ☐ **Dept. of Toxic Substances Control**
  CEQA Tracking Center
- ☐ **Department of Pesticide Regulation**

Regional Water Quality Control Board (RWQCB)

- ☐ **RWQCB 1**
  Cathleen Hudson
  North Coast Region (1)
- ☐ **RWQCB 2**
  Environmental Document Coordinator
  San Francisco Bay Region (2)
- ☐ **RWQCB 3**
  Central Coast Region (3)
- ☐ **RWQCB 4**
  Teresa Rodgers
  Los Angeles Region (4)
- ■ **RWQCB 5S**
  Central Valley Region (5)
  - ☐ **RWQCB 5F**
    Central Valley Region (5)
    Fresno Branch Office
  - ☐ **RWQCB 5R**
    Central Valley Region (5)
    Redding Branch Office
- ☐ **RWQCB 6**
  Lahontan Region (6)
  - ☐ **RWQCB 6V**
    Lahontan Region (6)
    Victorville Branch Office
- ☐ **RWQCB 7**
  Colorado River Basin Region (7)
- ☐ **RWQCB 8**
  Santa Ana Region (8)
- ☐ **RWQCB 9**
  San Diego Region (9)

☐ **Other** _____

Last Updated on 04/28/06

Sean / Brian

State of California - The Resources Agency
ARNOLD SCHWARZENEGGER, Governor

DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
Sacramento Valley - Central Sierra Region
1701 Nimbus Road, Suite A
Rancho Cordova, CA 95670
(916) 358-2900

June 27, 2006

RECEIVED
JUN 28 2006
DMINISTRATION

Mr. Paul Brunner
Executive Director
Three Rivers Levee Improvement Authority
Government Center
915 8th Street, Suite 115
Marysville, CA 95901-5273

Dear Mr. Brunner:

The Department of Fish and Game (DFG) has reviewed the Notice of Preparation (NOP) of a Draft Environmental Impact Report (DEIR) for the Feather River Levee Repair Project (SCH# 2006062071). The project proposes levee repair or construction as part of the Yuba-Feather Supplemental Flood Control Project along the southern portion of the Yuba River immediately to the south of the City of Marysville and along the east side of the Feather River to the confluence with the Bear River, Yuba County.

Significant natural resources of the plan area include agricultural lands, wetlands, riverine and riparian habitats, and the potential for associated listed and sensitive wildlife species.

The DFG is providing comments in response to the NOP under The California Environmental Quality Act (CEQA) as both a responsible and trustee agency. As trustee for the State's fish and wildlife resources, the DFG has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of such species. In that capacity, the DFG administers the California Endangered Species Act (CESA), the Native Plant Protection Act (NPPA), and other provisions of the California Fish and Game Code that affords protection to the State's fish and wildlife trust resources. The DFG recommends that the DEIR include discussion and evaluation of the following:

1. Analyze and discuss all reasonably foreseeable direct and indirect project-related impacts on biological resources due to project implementation. The analysis should focus, in particular, on the presence of and potential habitats for all state and federal listed species and species of concern and the evaluation of direct, indirect and cumulative project impacts to these

species and their respective habitat. Specifically address issues related to fish passage and fish stranding principally but not solely focused on listed species. This analysis should include discussion of adjacent habitats outside of the project area that support or could support listed species or species of concern and that may be impacted as a result of project implementation or other proposed or potential projects in Yuba or Sutter Counties.

2. Identify and discuss potentially feasible mitigation measures to address all reasonably foreseeable project-related impacts on biological resources. This must include identification of mitigation measures that minimize and fully mitigate all project impacts to state and federally listed species and species of concern. Analysis should include discussion of the ability to conserve natural resources onsite that may be achieved through project design and take avoidance measures and offsite mitigation obtained through acquisition of existing natural resources.

3. Identification of any offsite infrastructure improvements required as part of this project and evaluation of potential project impacts due to these activities. Subsequently, the DEIR should identify and analyze potentially feasible mitigation measures that avoid or substantially lessen, minimize, and fully mitigate all reasonably foreseeable direct and indirect impacts to biological resources.

4. Growth-inducing impacts due to the significantly enhanced flood protection provided by the proposed project. This would constitute land, not including the previously approved Plumas Lake Specific Plan area, which would be provided 200-year flood protection that is currently not afforded such protection.

5. We suggest the development of alternative development/design scenarios for the proposed project that will achieve most of the project objectives, and which will avoid or substantially lessen the project-related impacts on biological resources. The DFG believes such a potentially feasible alternative exists with respect to reduced impacts on biological resources generally and, in the alternative, at a minimum, that such potentially feasible alternative exists with respect to listed species and species of special concern. Accordingly, the DFG believes that such alternatives should comprise part of the reasonable range of alternatives addressed in the DEIR.

6. Specifically develop alternative designs that consider significant expansion of setback levees generally and, specifically, on both the Yuba and Sutter County sides of the Feather River. As noted in the NOP, setback levees can be used to gain flood capacity and provide land available for either agriculture or habitat restoration. We believe that setback levees can provide a necessary mitigation component that is and will be needed for habitat and agricultural impacts associated with current and potential future urban growth in the area.

7. In order to comply with Public Resources Code Section 21081.6, a detailed monitoring program must be developed for all mitigation conditions. The monitoring program should include the following:

   a. Specific criteria to measure the effectiveness of mitigation.

   b. Annual monitoring for a minimum of five years. Annual written reports submitted to the lead agency and the DFG's Sacramento Valley-Central Sierra Region.

   c. Annual monitoring reports, each of which includes corrective recommendations that shall be implemented in order to ensure that mitigation efforts are successful.

The project applicant is advised that Notification to the DFG is required, pursuant to Fish and Game Code Section 1600 et sec., for proposed projects that may:

- Divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake;
- Use material from a streambed; or
- Result in the disposal or deposition of debris, waste, or other material where it may pass into any river, stream, or lake.

The notification requirement applies to any work undertaken in or near a river, stream, or lake that flows at least intermittently through a bed or channel. This includes ephemeral streams and water courses.

Subsequent to notification, if the DFG determines that your proposed project or activity could have substantial adverse effects on fish or wildlife, a Lake or Streambed Alteration Agreement (LSAA) will be required. The resource protection conditions which

are made a part of the LSAA are subject to CEQA review and should be included in the environmental document prepared for your project. These conditions may include, but are not limited to, the following:

1. Protection and maintenance of the riparian, wetland, stream, or lake systems to ensure a "no-net-loss" of habitat value and acreage. Vegetation removal should not exceed the minimum necessary to complete operations.

2. Provisions for the protection of fish and wildlife resources at risk that consider various life stages, maintain migration and dispersal corridors, and protect essential breeding (i.e., spawning, nesting) habitats.

3. Delineation of buffers along streams and wetlands to provide adequate protection to the aquatic resource. No grading or construction activities should be allowed within these buffers.

4. Placement of construction materials, spoils, or fill so that they cannot be washed into a stream or lake.

5. Prevention of downstream sedimentation and pollution. Provisions may include but not be limited to oil/grit separators, detention ponds, buffering filter strips, silt barriers, etc., to prevent downstream sedimentation and pollution.

6. Restoration plans must include performance standards such as the types of vegetation to be used, the timing of implementation, and contingency plans if the replanting is not successful. Restoration of disturbed areas should utilize native vegetation.

Early notification to the DFG is recommended in order to determine the need for a LSAA. Specific conditions in the LSAA may include site-specific conditions for construction activities and timing. Any work subject to the LSAA may not be initiated until certification of the CEQA document and payment of the appropriate fees. Obtaining a LSAA does not satisfy the requirements of either the State or Federal Endangered Species Act. Please contact the Sacramento Valley-Central Sierra Region for a notification packet and fee schedule by calling (916) 358-2932.

Thank you for the opportunity to review this project. If we can be of further assistance, please contact Mr. Jeff Finn, Environmental Scientist, at (530) 477-0308 or Mr. Kent Smith, Acting Assistant Regional Manager, at (916) 358-2382.

Sincerely,

Sandra Morey
Regional Manager

cc: Mr. Kent Smith
Mr. John Nelson
Mr. Jeff Finn
Sacramento Valley-Central Sierra Region 2
1701 Nimbus Road, Suite A
Rancho Cordova, CA 95670

STATE OF CALIFORNIA

Governor's Office of Planning and Research

State Clearinghouse and Planning Unit

Arnold Schwarzenegger
Governor

Sean Walsh
Director

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ADMINISTRATION

Notice of Preparation

June 14, 2006

To: Reviewing Agencies

Re: Feather River Levee Repair Project
SCH# 2006062071

Attached for your review and comment is the Notice of Preparation (NOP) for the Feather River Levee Repair Project draft Environmental Impact Report (EIR).

Responsible agencies must transmit their comments on the scope and content of the NOP, focusing on specific information related to their own statutory responsibility, within 30 days of receipt of the NOP from the Lead Agency. This is a courtesy notice provided by the State Clearinghouse with a reminder for you to comment in a timely manner. We encourage other agencies to also respond to this notice and express their concerns early in the environmental review process.

Please direct your comments to:

Paul Brunner
Three Rivers Levee Improvement Authority
Government Center
915 8th Street, Suite 115
Marysville, CA 95901-5273

with a copy to the State Clearinghouse in the Office of Planning and Research. Please refer to the SCH number noted above in all correspondence concerning this project.

If you have any questions about the environmental document review process, please call the State Clearinghouse at (916) 445-0613.

Sincerely,

Scott Morgan
Project Analyst, State Clearinghouse

Attachments
cc: Lead Agency

1400 TENTH STREET P.O. BOX 3044 SACRAMENTO, CALIFORNIA 95812-3044
TEL (916) 445-0613 FAX (916) 323-3018 www.opr.ca.gov

DEPARTMENT OF TRANSPORTATION
DISTRICT 3
703 B STREET
P. O. BOX 911
MARYSVILLE, CA 95901-0911
PHONE (530) 741-4025
FAX (530) 741-4825
TTY (530) 741-4509

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DMINISTRATION

Flex your power!
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July 10, 2006

06YUB0032
03YUB70/PM 00.00 –02.00
NOP SCH #2006062071
Feather River Levee Improvement

Paul Brunner
Three Rivers Levee Improvement Authority
915 8th Street, Ste. 115
Marysville, CA 95901-5273

Dear Mr. Brunner:

Thank you for the opportunity to review and comment on the Notice of Preparation of a Draft Environmental Impact Report (DEIR) for the above mentioned project. The project proposes to increase flood protection in the Reclamation District (RD) 784 area of Yuba County. RD 784 is bounded by the Yuba River on the north, the Feather River on the west, the Bear River on the south, and the Western Pacific Interceptor Canal on the east. The project would address identified deficiencies in the Feather River levee, and would make related improvements to the Yuba River levee near its confluence with the Feather River. Our comments are as follows:

A project of this size is expected to have traffic impacts to the State Highway adjacent to the project. What nearby access points to State Route (SR) 70 will be impacted during construction? How much extra traffic will be generated during construction? What is the construction schedule?

Pages 8 and 9 of the Notice of Preparation mentions that approximately 2.6 – 2.7 million cubic yards of borrow will be required for Alternatives 2 and 3. Will any of this borrow be located off the project site? If so, what is the suggested truck route?

Caltrans should be included in the coordination of truck routes. In addition, Caltrans should also be included in the development of any traffic management plan that may be necessary where state facilities are involved.

The DEIR should discuss the mitigation measures that will be used for all impacts to the State Facility.

If you have questions or need additional information, please contact Susan Zanchi, Yuba and Sutter Counties IGR Coordinator, at (530) 741-4199 or e-mail at Susan_Zanchi@dot.ca.gov.

Sincerely,

WILLIAM A. DAVIS, Chief
Office of Planning - North
cc: Scott Morgan, State Clearinghouse

OFFICE OF THOMAS W. ERES
ATTORNEY AT LAW
4030 Winding Creek Road
Sacramento, CA 95864
Telephone 916.482.4021
Fax No. 916.488.5950

FAX COVER SHEET

FAX NUMBER TRANSMITTED TO: (530) 749-7312

To: Paul Brunner
Of: TRLIA
From: OFFICE OF THOMAS W. ERES
Client/Matter:
Date: July 14, 2006

(4 Pages including cover sheet)

Paul,
Attached comments for NOP for DEIR-FRLRP.
Thanks,
Tom

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OFFICE OF THOMAS W. ERES
ATTORNEY AT LAW
4030 Winding Creek Road
Sacramento, CA 95864
Telephone 916-482-4021
Fax No. 916-488-5950

Via Facsimile: (530) 749-7312

July 14, 2006

Paul Brunner
ATTN: Three Rivers Levee
Improvement Authority
Government Center
915 Eighth Street, Suite 115
Marysville, CA 95901-5273

RE: Comments – NOP
Content and Scope
DEIR – FRLRP

Dear Mr. Brunner:

I represent Hofman Ranch, a California general partnership, Emma Hofman and Frances Hofman. The following comments are offered with respect to the content and scope of the DEIR-FRLRP, as described in the NOP dated June 13, 2006:

- Page 4, BACKGROUND. Indeed, Yuba County has a long history of flooding. The discussion of history should note how significant these flood events were dated back to at least the 1930's (less than 100 years ago!). This broader view will enhance an understanding of the nature of the events and the risks that need to be addressed.

- Page 5, ON-GOING LOCAL AGENCY EFFORTS. This Section should be re-named ON-GOING FEDERAL, STATE, LOCAL AND PRIVATE EFFORTS. It needs to be understood that flood risk, drainage and design, construction, operation and maintenance of flood works is part of an intergovernmental and intragovernmental responsibility to protect the health, safely, and welfare of the people. Consequently, no flood protection project can be viewed nor undertaken in isolation. Flood protection in this region is complex and inextricably interwoven. The FRLRP must be placed in this broader context so that it can be viewed as a component of a huge system. Its impacts must be viewed in a statewide, regional, areawide and local context. Intended, as well as unintended consequences must be understood and evaluated.

- REPAIR/MODIFY. The repair of one side of the Feather River and Yuba River levees impact the other side of the levee. Terms like repair, strengthen, alter, modify, reconstruct (e.g. set-back levee) need to be analyzed with respect to upstream, downstream, surge, peak flow, emergencies (e.g. dam failure or seismic events).

- RE-EVALUATION. The current project to construct a substantial set-back levee on the Bear River needs to be re-addressed in connection with a flood system, not just to validate whether its completion precludes the need to improve a larger portion of FRLRP.

- CONTENT AND SCOPE. TRLIA has been requested on numerous occasions to locate and make available to the public, the source documents that created the initial Sacramento River Flood Control Project, dating back to the California Debris Commission, Sacramento and San Joaquin Drainage District, and the plans, specifications and studies of flood and flood control issues affecting Yuba County, including the Bear River Levee System, Western Pacific Interceptor Canal, Best Slough, Reeds Creek, Hutchison Creek, and other human-made alterations to the natural flow and drainage of the basins in and around Yuba County. Without this historical and factual grounding, it is not possible to provide meaningful public input on the FRLRP.

- PATCHWORK AND PIECEMEAL. The content and scope of the DEIR, once the source documents have been made public, will allow for a broader and more comprehensive understanding of whether the FRLRP is a patchwork or piecemeal approach to addressing a much greater threat and risk to health, safety and welfare. New knowledge of levee vulnerability (e.g. underseepage) as well as post Katrine-New Orleans experiences are challenging the old comfortable analysis of levees that has resulted in recycling old paradigms. FEMA and the U.S. Army Corps of Engineers have the unenviable task to alerting local entities, such as TRLIA, that such things as channel capacity (e.g. CFS, peak flow duration, weight of water, storm surge, global warming, stress failure, and overtopping) are the real world, and micro projects may not provide the flood protection promised to the public.

- OVERRELIANCE ON COMPUTER MODELING. The assumptions programmed into the analysis of the impacts of these alternatives of the FRLRP will dictate the perception of environmental impact. The CEQA process must be integrated with the NEPA process in one document in order to effectively integrate all federal, state, and local agencies, as well as private interests. It is imperative that a thorough "calibrating" session be undertaken with, at a minimum, the entities identified at Pages 11 and 12, at the front end of the review process, to assure best available factual information and assumptions are synthesized before embarking on a path of environmental

review. Comment to a source document as a responder is not as helpful as collaboration with shared responsibility.

- WHEN THE FLOOD EVENT OCCURS. It is not a question of if, but rather when the flood event will occur. It is important that the scope and content of the DEIR inform the public and decision-makers that the FRLRP will only provide a limited amount of protection for a limited amount of time. The DEIR should aggressively address anachronistic notions of 100, 200, or 300 year flood protection, or notion of a 10 year event, 20 year event or 50 year event. These terms have outlived their usefulness and are not meaningful to the public's understanding of actual, measured risk of floods. Frankly, it is more effective to look at and publish photographs of the "rings" in trees!

- FEMA AND THE PMR PROCESS. Efforts to assist development with limited projects such as undertaken by TRLIA, need to integrate with the FEMA PMR process at the beginning of the analysis. Efforts to obtain CLOMAR's and LOMAR's are short sighted. The understanding generated by the re-certification of the Oroville Dam caused a re-awakening of conditions of levees and risks by, among other things, freeboard, erosion, closure devices, penetrations, internal drainage, in addition to underseepage.

Thank you for the opportunity to comment.

Very truly yours,

Thomas W. Eres

cc: Hofman Ranch
Emma Hofman
Frances Hofman

THREE RIVERS LEVEE IMPROVEMENT AUTHORITY

Feather River Comment Card

PLEASE PRINT

Date: 5 July 06

Name: Jeanette Rice

Title (if applicable): Farmer / Owner

Telephone: (530) 742-3575

Fax:

Organization/Business (if applicable): Rice River Ranch

E-Mail: jlrice@sonic.net

Address: 671 Plumas Ave.

City: Marysville

State: CA

Zip: 95901

Thank you for your interest in the Three Rivers Levee Improvement Authority's projects. Your comments are appreciated and encouraged. Please write legibly.

I am in favor of strengthening the existing Feather River levee. I oppose the levee setback due to the following environmental impact of agricultural land uses. The setback levee would be unacceptable, because of unfavorable soil conditions, including local surface drainage patterns would be changed with a setback levee, adding to the costs of new detention basins to prevent adverse flooding on nearby properties, removal of wells on these existing 1600 acres of farmland, and the cost of 1600 acres of lost farmlands. Adverse community impacts include: loss of rural residential and residential properties. These properties would have to be purchased, dramatically increasing the costs of the levee setback project on an already burdened budget. A setback levee would include: a loss of environmental habitat restoration activities, loss of agricultural production, jobs, residences, loss of economic revenue for farming operations, loss of valuable resources of specialty crops: peaches, nectarines, plums, prunes, apricots, pears, apples, citrus, cherries, walnuts, etc. I favor strengthening the existing Feather River Levee and not a setback levee

Please submit your comments to a project representative or fold this form in half, seal with tape and mail to:
Three Rivers Levee Improvement Authority, Attn: Paul Brunner, 915 8th Street, Suite 109, Marysville, CA 95901

(Con't.) page #2

THREE RIVERS LEVEE IMPROVEMENT AUTHORITY

Feather River Comment Card

PLEASE PRINT

Date: 5 July 06

Name: Jeanette Rice Title (if applicable): Farmer/Owner

Telephone: (530) 742-3575 Fax:

Organization/Business (if applicable): Rice River Ranch E-Mail: jlrice@sonic.net

Address: 671 Plumas Ave.

City: Marysville State: CA Zip: 95901

Thank you for your interest in the Three Rivers Levee Improvement Authority's projects. Your comments are appreciated and encouraged. Please write legibly.

...as the most feasible option for levee improvement for the safety for all Yuba County residents.

As a personal note, our family and neighbors suffered devasting losses in 1986 and in 1997. I don't want to be penalized again by losing my income-producing property by a levee setback. I left a good paying civil service position with the federal goverment in 2002 to become a full-time farmer. By moving the Levee it would take my valuable agricultural land resource and I would have no job, no income, no future, and no agricultural products to sell. The Levee setback would ruin me economically.

I have already sacrificed enough by losing my home in 1997! Don't take away my home again in 2006!

* I urge Three Rivers Levee Improvement Authority to make the right choice - to strengthen the existing Feather River Levee, so no one's lives or homes will be sacrificed again.

Please submit your comments to a project representative or fold this form in half, seal with tape and mail to:
Three Rivers Levee Improvement Authority, Attn: Paul Brunner, 915 8th Street, Suite 109, Marysville, CA 95901

Three Rivers Levee Improvement Authority
Open house and Scoping Meeting
Sign-In Sheet
June 29, 2006

Name	Organization	Phone	E-mail
John Pearson		749-2920	
James Pearson		742-5091	jpp@syix.com
Bill Hampton	LD-1	673-2454	LD1@syix.com
ELEANOR HEROLD			
HELEN HEROLD			
Richard Webb		7425609	rwebb@syiccee.net
Jeremy Goulart	Homes by Towne	782-2424	jgoulart@hbtsac.com
Larry Cummings		674-0148	
Michael [illegible]	Riverside Restor Ctr.	742-4673	
Don Witter	Appeal Democrat	749-4712	dwitter@appeal-democrat.com
Phil HENDRIX	PLUMAS LAKE ESD	870-6933	phendrix@plusd.org

Three Rivers Levee Improvement Authority
Open house and Scoping Meeting
Sign-In Sheet
June 29, 2006

Name	Organization	Phone	E-mail
THOMAS RICE	RICE RIVER RANCH	742 3575	tar@sonic.net
Peter Sutherlin	Consultant	432-9585	Petherlingemsn
Jerry R Rogers	Citizen	916-257-6894	
Cleo S. Ledbetter		530-701-7560	
Tom Engler	KB Home	916-576-5899	tengler@kbhome.com
Tania Ramirez	Hofman Ranch	530-713-6801	
Walter Wheeler	CITIZEN	530-743-8381	
Seth Marantz	Plumas Lake Owners Group	916 443 3900	smarantz@
VINCE ROSELLINI	PLUMAS LAKE RESIDENT	530-749-9287	STARENTZ@COMCAST.NET
Tej Maan	Yuba County E.H	749-5475	
John Taylor	Self	530-743-1942	jptaylor@comcast.net
Ron M Nelson			
DON L. Graham	EA 784	742-6074	
Alberto Pujol	GES	510-350-2908	apujol@geiconsultants.com
BLAKE JOHNSON	HDR	916-817-4700	blake.johnson@hdrinc.com
Al McKinney	HDR	530-749-0629	alfred.mckinney@hdrinc.com

THREE RIVERS LEVEE IMPROVEMENT AUTHORITY

Feather River Comment Card

Date: June 29, 2006

PLEASE PRINT

Name: Don L. Gadhem Title (if applicable) :

Telephone: 530-742-6074 Fax:

Organization/Business (if applicable): Bd. member RD784 E-Mail:

Address: 1049 Anderson Ave.

City: Marysville State: CA Zip: 95901

Thank you for your interest in the Three Rivers Levee Improvement Authority's projects. Your comments are appreciated and encouraged. Please write legibly.

While I do not like to see the farm land lost next to the left bank of the Feather, that levee is a "leaky leaky" the only way to permanently solve the boil and flow problems around Ramp 113 is to set the levee back. Get on the the decision and planning.

Please submit your comments to a project representative or fold this form in half, seal with tape and mail to:
Three Rivers Levee Improvement Authority, Attn: Paul Brunner, 915 8th Street, Suite 109, Marysville, CA 95901

THREE RIVERS LEVEE IMPROVEMENT AUTHORITY

Yuba River Comment Card

PLEASE PRINT

Date: June 29, 2006

Name: DON L. Graham Title (if applicable) :

Telephone: 530-742-6074 Fax:

Organization/Business (if applicable): E-Mail:

Address: 1049 Anderson Ave.

City: Marysville State: CA Zip: 95901

Thank you for your interest in the Three Rivers Levee Improvement Authority's projects. Your comments are appreciated and encouraged. Please write legibly.

Strengthening of the Yuba left bank levee is essential. Continue with the upgrade proposals. If the Yuba breaches the water runs into the populated areas of Elicia & Olivehurst lake. Stop the flows before they begin.

Please submit your comments to a project representative or fold this form in half, seal with tape and mail to:
Three Rivers Levee Improvement Authority, Attn: Paul Brunner, 915 8th Street, Suite 109, Marysville, CA 95901

1
2
3
4 SOUTH YUBA COUNTY LEVEE REPAIRS
5 BEAR RIVER, WESTERN PACIFIC INTERCEPTOR CANAL,
6 YUBA RIVER & FEATHER RIVER
7
8
9
10
11 OPEN HOUSE
12 &
13 FEATHER RIVER LEVEE REPAIR SCOPING MEETING
14
15
16
17 Thursday, June 29, 2006
18 Reported by: Stacey M. Gates, CSR #9255
19
20
21 Presenters: PAUL BRUNNER
RIC REINHARDT
22 SEAN BECHTA
23
24
25

MARYSVILLE, CALIFORNIA, JUNE 29, 2006
--o0o--
MR. BRUNNER: Good evening and welcome to the Feather River meeting and also the overall project meeting that we have for the entire Three Rivers project. I'm Paul Brunner the executive director for Three Rivers. I appreciate you -- you can't hear. It's not on.
(Brief interruption.)
MR. BRUNNER: I'm Paul Brunner the new executive director for Three Rivers, and I really appreciate you coming tonight to hear what we have to say about the levee project, see our poster boards and engage with us.
Tonight we're going to have the scoping meeting for the Feather River environmental impact report. What that means is a chance to interact with us and share your concepts and thoughts about what we're doing on the Feather River. We're also going to describe for you briefly the other types of levee improvement that we have on the Yuba along the Western Pacific Interceptor Canal and also the Bear.
So I'll be doing a couple briefings here. Ric Reinhardt my program manager will also be here working with me and then we have scattered staff

throughout, and they'll answer questions for you, too, throughout the evening. Sean Bechta will be giving something on the Feather River, a briefing himself, a little bit later in the program tonight.
Let me orient you to what we have in the room here. Back in the back are the poster boards. That's where you can go and ask questions while people man the booths for interaction, for comments, so you can do that.
I'll be wandering around along with Ric Reinhardt. You might stand up so they can see who you are. Ric is our lead engineer. He's the man who knows everything about the project as to its working so far.
We also have over to the right where the computer is sitting there is a reporter that will be taking an opportunity for people to go over, particularly on the Feather River, and let her know your comments, if you have a comment, so she can record it down.
We have multiple opportunities for you to record down your comments tonight. We also have these cards that you have right here, and they're available in the back for you to write down your comments and they are color coded by river. The blue is on the

Western Pacific Interceptor Canal. The purple, which is one of my favorite colors because I'm a big Kings fan, is on the Bear River. The green is the Feather River comment and then we also have the Yuba River which is kind of like a beige color. If you feel comfortable doing that, fill these out on the project as to if you have comments or questions about the particular project that we have.
On the environmental impact report if you have a general comment and you don't feel comfortable asking it, write it down here also and we can then answer you back by telephone or respond to your comments. If you don't feel comfortable turning anything in here, you also have the opportunity of taking one of the comment cards, writing it at home and then mailing it to us, and we'll get back to you on your comment.
Did I leave something out?
UNKNOWN SPEAKER: Perfect.
MR. BRUNNER: Okay. I would also at this time like to introduce some of the folks that have come that you also have a chance to interact with during the evening. We have Don Schrader, the Board of Supervisors chair right there. Mary Jane Griego who has two areas. She's on the Board of Supervisors

and also on the Three Rivers Board. She's right there. We have Richard Webb who has a dual hat, too. He's on the Three Rivers Board. I'll explain that a little bit more in detail in a second. He's the chair of that and he's also an RD 784. That's the people that do the operations and maintenance on the levees. He's on that particular board. Where are you at, Richard? Right over here. And then we have Don Graham also on the RD 784 Board. Where are you at? Right there. Welcome.
So during the evening if you have questions and comments, they're here. Feel free to approach them and interact with them at that time, too.
Okay. All right. What I'd like to do here for you is I'm going to go through and use the Power Point slide presentation here and kind of just give you some background about 784 -- not 784. Maybe a little bit on 784, but on Three Rivers, and then we'll describe for you about the project, what the scope of work is and then we'll go into the Feather River discussion.
You know who I am, so let's go to the next slide.
All right. Many of you probably already know what Three Rivers is, but Three Rivers is the

1 Three Rivers Levee Improvement Authority. It was
2 created in 2004 as a joint powers authority which
3 means we're a combination of many different things.
4 We do link between 784 which does the operations and
5 maintenance and also with the County of Sacramento --
6 or forgive me, County of Yuba to form this joint
7 powers authority.
8 So as the director I am really somewhat an
9 economist, but I do report somewhat to the County, but
10 most importantly I report to the Three Rivers Board.
11 I introduced to you a couple people here Richard Webb
12 and Maryann -- Mary Jane Griego who is on that Board.
13 They're the ones who give me direction as to what we
14 should be doing for the levee work. There is two
15 other people on the board, Dan Logue, who is a Board
16 of Supervisor and also Rick Brown, who is on the Board
17 from RD 784. They're not here tonight, but if there
18 is an interaction with that, there is an opportunity
19 to talk to them also.
20 One of the things that I'd like to point out
21 and all the efforts that we have for our improvements
22 on the levees that makes it really pretty exciting for
23 me as I've come on board is that there is a
24 relationship with Three Rivers and with the developers
25 where we're working with them to help under -- to help

1 fund the improvement of our levees.
2 We currently have in the Plumas Lake area
3 and the South Yuba Basin about 30,000 people that
4 already live there that potentially could get flooded.
5 In fact, they've been flooded before. I personally
6 relate to that because in 1995 my home where I live
7 was flooded, and I'm going to do everything I can to
8 prevent that from happening to the residents here.
9 You don't want to be flooded at all.
10 So what has transpired here starting in 2004
11 is this relationship between the County, 784, creation
12 of Three Rivers and now with the developers to help
13 underwrite and bring funding to the table that allows
14 us to improve the levees in the area to protect the
15 residents there. By 2008 when we hope to be done or
16 plan to be done, there would be about 40,000 people
17 living there.
18 If we do not do this levee project to
19 improve them and describing it for you, it might take
20 somewhere between 15 to 20 to 30 years to get funding
21 to improve the levees. So what we've done is
22 compressed the effort to improve the levees from a
23 longer period of time waiting for state funds, waiting
24 for federal funds, to a very short period of time to
25 get the people protected, and that's really a main

1 focus of this effort.
2 And I also have a web site now with Three
3 Rivers. If you go to that web site, listed on that
4 site are all the various minutes, meetings, brochures,
5 information. I know at least one member in the
6 community has come forward. I know Walt out there has
7 come to me several times and has used it, and I
8 encourage you to go there. It has a contact point in
9 there. You can send me e-mails. I will respond to
10 you and interact with you as to what's going on.
11 And one of the things I was talking to one
12 of the members of the community about recently is is
13 this going to be the only open house and different
14 things that we do, and I don't think so. I think we
15 should be out there talking. A few weeks ago I was
16 with Mary Jane at the Plumas Lake Homeowners
17 Association giving a talk and explaining what we're
18 doing, and I think we have a responsibility to do that
19 and interact and provide the information of where
20 we're going. There is a direct link with FEMA and
21 flood hazards and protection and the public, and we
22 should share what we're doing. So it's all related.
23 While I do this transition here and give you
24 an update, Ric, I think the next one is where I'll be
25 turning to you.

1 We do have a goal to complete all of the
2 levee work that we'll be describing for you by 2008,
3 and the magnitude of that is we do have four phases.
4 We started in 2004, and we've been working hard to
5 improve these 29 miles of levees that protect the
6 South Yuba Basin. There is approximately 40 percent
7 that is under construction, 10 percent is done now,
8 and we would project that the remaining work to be
9 done mostly on the Feather in 2007 and 2008 and
10 repeating it on the Feather. What we're here tonight
11 mainly for, other than sharing with the other
12 projects, is for you to have a chance on the
13 environmental document to make your comments on the
14 Feather River project.
15 The Phase 1 through 3 costs is about 110
16 million dollars and about half so far have been paid
17 by the developers, and what's important about that is,
18 like I was saying before, they have provided up-front
19 money to do this improvement, and that allows us to
20 move forward to start building on the levees and
21 improve them in a very rapid pace. If we did not have
22 this money coming forward, we wouldn't be able to be
23 doing what we're doing. And they've also committed to
24 us as we work through this arrangement another 130
25 million on what we call Phase 4 which is predominantly

on the Feather River. Phase 4 does have a connection to the Yuba that we hope to be building this year and we'll be describing for you in a second as to what we're doing.

So with that up-front money we can then move forward. There are some matching funds that we get back from grants from the state, but you can't get that money from the state until you spend money. So there is a connection there and that we work there, so I think it's a very good relationship that we developed with the landowners in the area.

And you'll probably hear throughout the timing, if you're involved in meetings, that we are very heavily involved in going through other types of finance agreements right now for Phase 4, and I'm going to come back to that slide after I have Ric go through the schedule here of what we're doing on the project. That kind of gives you an outline as to what we have done recently and the State Reclamation Board. You may have read in the paper about what has happened and what's been approved.

So I'm going to let Ric talk to this slide.

MR. REINHARDT: We've broken the construction of the Three Rivers program up into four phases. The first phase was Phase 1, and it was a

slurry wall in the Yuba River levee from Highway 70 up to about the '86 break. We felt that was a very critical site, and from a public safety standpoint we wanted to get out there quickly. That work was completed in October of 2004.

In approximately September of 2005 we initiated construction on Phase 2 of the program which was a seepage berm in the same vicinity from Highway 70 up to the Union Pacific Railroad and worked to deal with underseepage and freeboard issues on the Western Pacific Interceptor Canal and the upper Bear, and we started foundation work for Phase 3 which is a setback levee on the Bear River. The Phase 2 activities are going to be -- are underway now and they're going to be completed in October of 2006.

We've constructed --

(Brief interruption.)

MR. REINHARDT: The foundation of the setback levee was completed. The Bear River was completed in I think it was November or December of 2005, and we're about a third of the way constructed on the new setback levee. We're going to be going to the Reclamation Board on July 10th to ask their permission to be integrating the existing Bear River levee.

The final phase of our program is Phase 4 and that's looking at the entire Feather River levee and then the Yuba River levee upstream of the Union Pacific Railroad.

On the Feather River levee we're looking at strengthening it in place and then we're looking at an alternative that would set back approximately six miles of that levee.

On the Yuba River levee we have a component that we're trying to accelerate this year of Phase 4 and we'll go to construction in August of this year. That job is out for bid right now and the CEQA document is out for public review. The public review period on that document is going to close July 10th. If you'd like a copy of that document, Nancy Haley is in the back. She's raising her hand right now. She'll take down your name and get you a copy of that report.

The last remaining work that we need to do on the Yuba River levee is upstream towards the goldfields. There is a ditch where we had some erosion problems in the 1997 flood, and we'll be looking to fill that ditch some time in 2007.

Our current schedule is to complete all construction activities on Yuba and Feather River

levees in 2008, and we'll certify those levees meeting the minimum FEMA certification requirements, but we've also designed them so the entire Reclamation District 784 levees that protect the community of East Linda, Linda, Olivehurst and Plumas Lake will be the only community in the central valley that will have a two-levee protection.

So, Paul, that's all I've got on this program slide.

MR. BRUNNER: Okay. Leave that one on.

If you leave with no other handout, you should at least pick up this particular brochure that we have. Nancy back there is holding it up, too. They're available there. They're available over there. It's really this map in color, and it also has a schedule of work on the right-hand side here that lays out what we're doing on the phases of the project. We have a version of this that was a little bit older. This one was actually made up-to-date for currency on what we're doing, so you should at least pick this up and take that home with you, and I think it's a good reference material for you.

Is the pointer up here still? Is that this?

MR. BECHTA: That's it. Top button in the middle.

MR. BRUNNER: I want to kind of elaborate a little bit on what Ric was talking about. I'm not going to repeat what he said but to emphasize a couple things.

As far as timing goes, Phase 1 is up here in the Yuba. The phases are based upon priority of risk, and the highest risk that we had on all the levee work was right up in here where we had the break before. That was done in 2004 and moving forward, Phase 1. In 2005-2006 we're now working in Phase 2 and working down here in the WPIC, Bear River, this area in through here. Phase 4 deals with the Yuba which we hope to have under contract this year, this particular construction season, and then this blue area through here on the Feather is 2007-2008.

Again, the Feather is what you're here for, the environmental document that we're looking at right now to make a determination for. We are looking at different alternatives on the Feather which really the biggest issue runs right in through here and is the blue line. In the back is what we call the setback levee.

That's not a decision that's been made at all, but whenever you have alternatives on design and a major action that costs money to do, you do an

environmental review and the State of California environmental impact report. Let's look at the alternatives, what are the environmental impacts and to do that sufficiently you have to look at all the alternatives and make a determination of what is the impact from that.

So when you look at that document, there isn't any decision that's been made, but you have to get the right information for the decisionmakers to make the right decision in which way to go. So when you're commenting, keep that in mind as to what's going on on the alternatives on the project.

All right. I'm going to transition to something that came up, and I think it's still worthwhile to go over with you to at least give you some high points for the project.

Back on April 21st and then on May 16th we went to the State Reclamation Board, and the importance about this is this is the group that we go to to get permission to work on the levees and proceed forward. We ended up making six commitments to them of which the Rec Board then granted the developers, the landowners in that area and the County of Yuba to go ahead and potentially lift the building restrictions.

Now, those buildings restrictions have not been lifted, but they will be lifted if we do these items that are here. So they do have some authority still not to do this, but our goal is to do all these things and put it in place very soon so that we can go forward and then have that capital finance come in, the 135 million, or up to that so we can move forward and complete the levee projects and the schedules that we have and achieve that in that time frame.

So the six areas that we are committed to is that we make our best efforts to get this project done, and it isn't just the County of Yuba. It's Three Rivers, it's RD 784, it's the developers all pulling together in this big train that's going down the tracks to all make it happen, and it's not easy, but we are all committed to making it happen. I know the Board of Supervisors are, the Three Rivers Board are, I am. It's really a Herculean effort to get here, but we're committed to doing that, and I think the efforts that I just got done describing along with Ric will demonstrate that where else in the State of California are we doing something like this of locally funding a project and making this happen for the County of Yuba? You all should really be proud of that effort from my perspective in what we're doing in

pulling together to make this happen.

The second commitment is by the landowners for a comprehensive financing plan to fund the Phase 4, and I referenced before that's what we're doing right now. The month of July will be a very busy month. We plan to try to award Phase 4 in the Yuba this month. Our plans for that financing agreement needs to be in place for us to make that award, and there is a lot of details to work out to make that happen, and the group is committed. It's spent many hours in the last few days working. Hopefully we won't be working on the 4th. That's kind of a comment to Seth in the audience that works very much with us on that to pull that together. So that is being worked on.

The third commitment is remedies available to the Reclamation Board in the event that these commitments aren't made. Part of the agreement when we went down to them even though the building permit could get lifted is that if we don't do these things, they could say stop, and there is a set of criteria of four different levels, but it reaches down to the crescendo to say don't go any farther. We don't want to get there on that, but they're not powerless in this process as we move forward.

There is also a commitment with the landowners to provide, at no cost to all the residents affecting the area, flood insurance to project completion which hopefully is at the end of 2008 or soon thereafter or up to 2010, whichever occurs first.

I know I spoke at the Plumas Lake Group and there was some comments about that, I took the action to get back, about where does that fit for the people that may have bought out there before we had these commitments being made and how that works through. I'm still gathering the facts working with the landowners to do that, and I'm still committed to putting that out.

We're going to have newsletters from Three Rivers that will start to be published out to the residents, and one of the very first stories I'm going to put in that newsletter and also on our web site is that information about where we are at with flood insurance for the people in the area and what's going on so you know what's happening.

If I can, again, relating back to my flooding experience, flood insurance is very important. If you don't have it, it is a major impact on your family. So you need to have that. And the landowners here have committed to doing that for the

folks in the development areas.

Then there is also a commitment by Three Rivers to continue to make reports to the Reclamation Board on the progress. If you're interested in that, if you see them come up on our web site, I go down there usually -- I think it's the third Friday of the month and do a presentation as to where we are on our progress on our project and give them that update.

The sixth commitment is by Yuba County to continue to use reasonable diligence to inform residents within the 784 district, which essentially -- I don't have the map here, but on your map it's there. It's pretty close although not exact. I'm sure Richard Webb can explain that further for you if you have great detail on the map, but pretty much the levee area on this map here represents 784, and again 784 is the group that maintains the levee operations and maintenance to make sure that they're in place.

Three Rivers currently is the construction agency that is working for the short period of time starting in 2004 and potentially going out of existence by 2008, maybe as soon as certification of the levees. That could take a little longer as it goes away which means in a few years I'll be out of a

job. That's okay.

I recently retired from the United States Air Force working a whole bunch of different efforts, major construction projects, environmental programs nationally for the United States Air Force retired and I was approached to come here to work for you all in this project, and I thought it was really pretty exciting so I said, okay, I'll come and do that over here and see this to the end and make it happen.

But the thing on here is that we really do -- part of our commitment to the Reclamation Board is on the FEMA and flood hazard aspect, and I know Pat Beauchamp is here. Pat, you might raise your hand, too. Pat is our OES, Office of Emergency Services, person for Yuba County. It's a commitment to get out and know about how you evacuate if there was a flood, if something breaks between now and 2008, and it could happen during that time period, so there is some risk there. There is risk there even if we don't do the levee project on it. So if something does happen or if something happens even if we get the levees done for some reason, there is really an importance that we have the right evacuation routes, people know what to do and those systems are in place, and we have the need to let you know what's going on, and that's what

Pat does and her group and works with us here.

So we have a station back there available if there is a question about that for you to interact with that, and they'll come up at other meetings, too. I know Pat was at the Plumas Lake Homeowners Association visit that we had.

So those are the six items that we committed to. If we don't do any of those, the Reclamation Board could say, "Kings X, don't go there" on the building permit limitations and what we're doing. So I think they have quite a bit of hammer, and there is a lot of commitment from all those players I talked about before to make it happen on the project.

We're on the transition now. Ask Sean Bechta to come up, and he's going to give you a briefing specifically on the Feather River project for us. So, Sean.

MR. BECHTA: Let me set this up here.

I'm Sean Bechta. I'm with EDAW. I'm the project manager for preparation of the environmental impact report for the Feather River repair levee project and for tonight a very poor temporary microphone, lighting and IT person.

As Paul talked about, this meeting has two components to it. There is really an informational

1 meeting about a lot of the activities going on related
2 to the work that the Three Rivers Levee Improvement
3 Authority is doing, but a big part of the meeting is
4 specifically related to the environmental impact
5 report for the Feather River levee repair project and
6 complying with the California Environmental Quality
7 Act or CEQA's process for the preparation of that EIR.
8 So for this component of the meeting related
9 to the EIR there is two things I would like to do.
10 One, is to provide an overview of the proposed project
11 and the alternatives we're considering in the EIR, and
12 the second purpose is to seek public agency work on
13 the scope and content of the EIR as the project
14 elements and alternatives and environmental effects
15 and mitigation, and I'll explain more of that as we go
16 along.
17 So as an overview of the project, the
18 purpose of this particular element of the flood
19 improvement is to correct deficiencies in the Feather
20 and Yuba River and Bear River levees and consequently
21 to improve flood protection for the RD 784 area of
22 Yuba County. And when I say "levee deficiencies,"
23 what I'm talking about for these particular levees are
24 related to underseepage and through seepage and also
25 correcting some areas that have been identified along

1 the water side of the levee that have been shown to
2 either experience erosion or be susceptible to
3 erosion.
4 And the project area, and I've heard some
5 justified critiques on the map here, and these maps
6 get better. Just to show you quickly, it starts down
7 near the confluence with the Bear River, continues up
8 the Feather River up to the confluence with the Yuba
9 River and then goes three-tenths of a mile officially
10 up the Yuba River levee which basically is the
11 railroad line that goes across the Yuba River right
12 next to Highway 70.
13 The design objectives of this particular
14 project are to provide 200-year flood protection so
15 these levees could be certified as providing 200-year
16 flood protection, to help secure FEMA certification
17 for these levees and to avoid increasing downstream
18 flows. With any levee improvement project there is a
19 potential that if you change the hydrology of the
20 system, you may affect flood concerns either upstream
21 or downstream if you were altering the location of the
22 levees, and so that's one of the design elements of
23 this project.
24 To achieve these objectives as soon as
25 possible, as Paul mentioned, the Three Rivers Levee

1 Improvement Authority have a limited time frame and
2 there is a definite motivation to accelerate this and
3 move these projects forward, and I think we've been
4 very successful so far and also for this particular
5 project to incorporate environmental mitigation as
6 appropriate. There is not a specific environmental
7 mitigation component for this project as there was for
8 the Bear River, but it's something that may be
9 considered.
10 Back to some of the past work that's been
11 done. This project, the Feather River levee
12 improvement or levee repair project, a portion of it
13 I'll talk about in a bit, corresponds to the above
14 Star Bend levee setback that was initially evaluated
15 in 2003-2004 related to the Yuba/Feather River
16 supplemental flood control project. That project was
17 in 2003-4 and looked at the potential for a setback
18 levee above Star Bend, another setback levee below
19 Star Bend and also some changes to the management of
20 Bullards Bar Reservoir. The project goes back to the
21 above Star Bend component of that. You'll see on some
22 of the exhibits the acronym "ASB." That's above Star
23 Bend, and it evaluates that particular setback levee
24 as an alternative in this project.
25 The below Star Bend setback levee is not

1 part of this project and actually is no longer needed
2 based on the improvements that are going on on the
3 confluence at the Bear and Feather rivers. So the
4 project area is divided into three segments.
5 I'll talk about now the EIR. The EIR is
6 going to evaluate three alternatives to the project.
7 First segment, project segment one, is the southern
8 segment. The term "PLM" is "project levee miles."
9 It's just a way to designate the distance along the
10 levees. It goes from PLM 13.3 to 17.1. So go down
11 here to Star Bend. So below the existing pump station
12 number two to Star Bend.
13 The activity being considered here is
14 strengthening of the existing levee. Strengthening
15 could include slurry cutoff walls, could potentially
16 include stability berms or relief wells, and final
17 determination of what methods will be used and where
18 they'll be placed will be done during the specific
19 project design. Right now we have a preliminary
20 design that we're using to evaluate the EIR, and it's
21 perfectly appropriate for the environmental impact
22 report process required by CEQA.
23 I mentioned the three alternatives. For all
24 three alternatives it would be the same activity in
25 this segment. It would be levee strengthening through

this segment. I'm going to jump up to project segment three at the north end, and you'll see why in a bit.

This particular north segment goes from Feather River PLM 23.6 up to 26.1 and includes that short segment of what's officially considered the Yuba River levee, so from mile 0.0 to 0.3 which is at the railroad crossing there by Highway 70.

Again, the activity being evaluated here is purely levee strengthening, correcting the deficiency in the existing levee in place, using those three potential same methods of slurry walls or other cutoff walls, relief wells or stability berms. And, again, under all three alternatives it would be the same approach being analyzed for this particular levee segment.

Project segment two starts down at Star Bend at PLM 15.1 and goes north to PLM 23.6. This is where we have the variability amongst the three alternatives being evaluated in the EIR alternative.

One involves levee strengthening. Just like the other levee strengthening alternatives or segments, it would be the three methods that I talked about: Slurry walls, seepage berms, relief wells. That would be determined during detailed design. So if that alternative was selected, it would be the

existing levee all the way from the bottom all the way to the top would stay in existing location and would be strengthened and the issues would be corrected.

On this particular segment there are five areas that have been identified that are either susceptible to erosion or have experienced erosion during flood events in the past. So part of this alternative, because that levee segment remains in place, is those erosion areas would be corrected which would involve taking out some of the existing soil, putting in some cobble or riprap and then shoring that up with soil again is the approach that we're evaluating in the EIR.

Alternative two is a setback levee alternative. We're calling it the ASB setback levee. As I said, that's above Star Bend. This is a variation to the -- small variation to the ASB setback levee alignment evaluated back in 2003-2004. It follows this alignment here.

So in this case a new levee would be constructed approximately following this alignment. During detail design the actual levee location may shift east or west based on soil conditions, engineering and other factors, and then the existing levee, various portions of it would be taken out and

so when flood events happen, this would then be the new floodway and this would be then the new levee protecting the areas to the east.

Alternative three is another setback levee option, and this one follows the same ASB alignment here and then would move the alignment some distance to the west and these are some various options being considered. And again, looking at detail design, engineering, soil, other factors, the EIR will ultimately look at this area, but again, during detail design, specific alignment will be determined.

For both of these because the existing levee portions of it will be removed and it would no longer provide any flood protection benefit, there would be no need to do the correction of the erosion areas on that levee, so that is not part of these two projects.

You'll see on here we've got these two potential soil areas. This one would be a soil borrow area that would be to get soil to build the new levee to get appropriate soils that have a good mix of impervious material so that the levee provides much better protection, the existing levees, and is not susceptible to through seepage and underseepage.

Another area being considered -- again, these are areas being considered for borrow areas and

all or a portion of that may be used.

Another area to be considered is down here. This area is also being considered for a detention basin. If this levee -- if a setback levee is constructed, the flow of storm water towards the river would be altered and so there would be a need for a temporary detention basin to hold storm water in the area, and this is the area being considered for that potential basin.

Additional project components. I talked about the borrow areas and detention basins. The project would also involve replacing and relocating pump station number three down here. This is an area that's currently experiencing through seepage and underseepage, and there is a desire to move that pump station out of there and correct those concerns there.

If alternative one were selected and the levee were retained in place, the pump station would be moved somewhere to the east to an area with more stable soil conditions. If either of the setbacks were selected, the pump station would be moved to the land side of the setback levee.

One issue in the setback area is land use planning. If you are involved with the Feather/Bear project at all, they have a fairly detailed land

1 management plan for the setback area. In this case,
2 as is said in the NOP, that's gone, and I'll talk
3 about that for a bit. We don't know -- at least in
4 the EIR we don't know what the land uses are going to
5 be in the setback area if a setback alternative is
6 selected. We're saying it could be ongoing
7 agriculture, it could be habitat restoration, it could
8 be a mix of both, it could be all of one or all of the
9 other. We just don't know at this point.
10 The approximate construction schedule for
11 segments one and three for levee strengthening design
12 and permitting is scheduled to happen 2006 through
13 2007 with construction beginning later in 2007 after
14 all the environmental permits have been received.
15 Segment two, whether it is a setback levee or levee
16 strengthening design, specific design and permitting
17 would go from 2007 through 2008 with construction
18 scheduled in 2008.
19 So from the project description going to the
20 EIR and scope progress. What is an environmental
21 impact report? It's a document that describes the
22 proposed project alternatives. It tells the public,
23 the agencies and the decisionmakers the environmental
24 effects of the project. It identifies mitigation
25 measures to correct or compensate or reduce

1 significant adverse environmental effects to try to
2 get them to a less-than-significant level and
3 identifies effects that cannot be mitigated or
4 avoided.
5 Again, EIRs are driven by the California
6 Environmental Quality Act, CEQA, which has specific
7 guidelines in how the EIR is prepared and how the
8 process for an EIR goes through public involvement
9 which is part of why we're here and the content of the
10 EIR.
11 What's scoping? According to the CEQA
12 process, this is a scoping meeting. Before an EIR is
13 prepared, there is guidance to go out to the public,
14 to go to the agencies and get input on the scope and
15 content of the EIR. We're not doing this analysis in
16 a vacuum. Scoping is intended to inform the public
17 and agencies of the project, to receive public and
18 agency input and that input is specifically looking
19 towards helping to refine the description of the
20 project to be studied, to help to refine the range of
21 alternatives and environmental effects to be evaluated
22 in the EIR, to help identify impact assessment methods
23 and if there is a specific concern or issue as far as
24 what environmental impacts might be expected, we are
25 anxious to receive input on that and to identify

1 issues that are not applicable to the project.
2 So, for example, this particular project, in
3 our initial analysis we've identified that it's not
4 going to have an adverse effect on the ability to
5 extract mineral resources, which under CEQA that's
6 something you're supposed to look at. That's not an
7 issue here, so that won't be evaluated further in the
8 EIR so we can take input on that.
9 In this particular EIR, as Paul said, none
10 of these alternatives has been selected as a preferred
11 alternative. Traditionally in an EIR you will have a
12 preferred alternative that's selected that will be
13 evaluated in detail and then you'll have other
14 alternatives that will be evaluated in less detail and
15 kind of at a comparative level which is a typical CEQA
16 process, and CEQA allows for that.
17 In this particular case TRLIA is going to be
18 using this EIR as part of the decision process on
19 which alternatives to select. So we are looking at
20 all three alternatives at an equal level of detail.
21 They will all have the same impact analysis, the same
22 inclusion of mitigation measures and will all be
23 addressed at an equal level in the EIR.
24 The EIR also, as is required by CEQA, will
25 look at a no-project alternative, and that will follow

1 the traditional approach of having more of a
2 comparative level of analysis.
3 The EIR process to date and in the future.
4 The notice of preparation, which you may have received
5 in the mail or heard about. The NOP was issued June
6 13th. That is the notice of preparation. It is just
7 what the name says. It's a notice that an EIR is
8 being prepared, gives a brief description of the
9 project, gives some information on how to provide
10 input and scoping.
11 We have the scoping meeting tonight. The
12 scoping period started June 13th when the NOP went out
13 and will end July 14th, so comments on the scope and
14 content of the EIR can be received through July 14th.
15 Our schedule has us releasing a draft EIR on
16 August 7th. That opens up another public comment
17 period, a 45-day period, from August 7th to September
18 14th where we can receive comments on the draft EIR,
19 and then a final EIR and project decision is expected
20 by the end of October.
21 So we're in scoping. We've got the EIR
22 being prepared. How can the public and the agencies
23 participate? You have multiple opportunities, as Paul
24 said, to provide your input tonight. You can provide
25 written comments on comment cards either here at the

table, over there or mailed in later. We have a laptop computer set up if you would like to type in comments. We have a court reporter here. You can sit down with her and dictate comments to her if you would like, and we'll get those.

Written comments, whether on the comment cards or on a letter, can be provided to Paul at the address there. That address is also provided on the notice of preparation which we have extra copies of here. If anyone would like those, we can copy them in the back.

And then also outside of the CEQA process we have the open house format set up here. This really is an opportunity to talk to the technical specialists, talk to me, talk to other members of the EIR team engineers and get your questions answered in an informal manner.

If after talking to people and getting the information you felt that you want to provide something official on the record that's part of the CEQA process for this particular project, we encourage you to provide comments on any of those methods that we identified there. Then, as I said, the draft EIR is scheduled to go out August 7th and that provides another opportunity to provide comments specific to

the EIR.

We talked about scoping which has set parameters in CEQA which is why we're here tonight for this project. So really what we're looking for for this Feather River levee project is to get input on the project elements and alternatives, the environmental effects and mitigation and analysis methodology, all items related to the scope and content of the EIR. So that finishes that up.

Paul, if you want to have some closing comments.

MR. BRUNNER: Yeah. Thank you, Sean.

I'm going to emphasize a point that Sean was talking about at the end, and that is this whole process, particularly the environmental document for the Feather, one of the main reasons why we're here tonight is so you'll have multiple opportunities to provide comments on the document. I did respond to an inquiry tonight that came in to me about timing and getting a chance to share comments.

So tonight is really a chance for folks to provide input as to what the review would be as they go through. Sean was talking about there will be opportunities to provide your comments on how we're doing on the documents as they come up for public

review. So you'll get a chance to make a comment again. This will not be your last time to make a comment as to what we're doing on that. So take advantage of the opportunities to do that so we have the best document we can and make the best decision that we can.

I've also been asked -- I realize that I've been moving around from different offices as I've been here, I see a smile from the audience there, and sometimes people have trouble finding me in the building, but I am right now in administrative services right down here. The intent is for eventually Three Rivers to have an office outside this building of which I'm looking to find that space. So hopefully that will happen soon as we work through that.

In the meantime I came to realize that people don't have my phone number. So if you're interested in that, I have some business cards, too, that I'll -- I'll just make that comment. I get enough messages already, but I'll give it out. It's (530) 749-5679. That's again (530) 749-5679. So if you do have a question, a comment or where we are, give me a call. I may not be there to answer right away, but I'll get back to you on it. It's also on

the back of the brochure. Okay. People are waving at me back there.

So with that, that really does conclude the formal presentation that we have tonight. I would like for you to really take the opportunity -- we did invest time and energy to put the posters together. We'll be using them again for other opportunities, but we do have folks here to interact with you. I'll be here, Ric will be here and Sean will be here and other folks at the poster boards will be glad to interact with you and answer questions.

Please, if you have comments, use your cards, turn them in, wander on over to the court reporter as she types and give her your verbal input. She'll type it down for you and save you from writing. If you don't feel comfortable with those, go ahead and take those home and send them to us. I would really appreciate your feedback.

So at that I'll call this part of the meeting to the end and let's have the interaction. Thank you.

Richard.

MR. WEBB: Yeah. One question I think I discussed with you is an issue about West Linda. At least some people are concerned about a 50-foot

investigation area from the levee. Can you explain that a little bit more fully for these people?

MR. BRUNNER: I'm actually drawing a little bit of a blank on that one, Richard, on the 50 feet that we're talking about. You're talking about along the Yuba?

MR. WEBB: Some people in the West Linda area have -- I think as a result of receiving this initial notification there is something about a 50-foot area, and that was explained to me as being an area in which they are making an investigation or could make an investigation of potential EIR hazard or hazardous materials that would be there, but it does not in any way imply that you would -- there would be 50 feet of your property taken to help accommodate the levee repairs, and is there any -- can you fully explain this because -- or can somebody?

MR. BRUNNER: We're not currently looking at any property acquisition on the Yuba River.

MR. BECHTA: Feather.

MR. WEBB: West Linda.

MR. BECHTA: Right now we're scoping and looking at alternatives. We haven't defined anything. That will be included in the EIR, a full description of what's proposed, and we would be interested in

public input on those activities.

MR. BRUNNER: If there is a question about that, we'll interact with you, Richard, as we go through that. I actually did draw a blank. I still do somewhat as to the point, but if there is a question we can't -- well, I'll commit to you if there is a question during the interaction here that we can't answer, I'm not going to give you an answer that's wrong. I'll take it and come back and get back to you and give you the right answer for where we're going to go.

So with that, why don't we go ahead and break. Enjoy the cookies and let's provide the input and start answering the questions and interact with you. Thank you. Thanks for coming.

(End of presentation.)

(The following are comments made by spectators.)

CLEO LEADBETTER: My concern is they're focusing on maintaining the pressure of the water within the levees. They don't seem to be concerned with reducing the pressure of the water against the levee. They're trying to harness the pressure of the water instead of reducing the pressure of the water within the levees.

THOMAS RICE: I'm Thomas Rice. I'm the owner of Rice River Ranch. I'm an engineer as well as a farmer. I understand and support the need for the improvements as my family was hit by the last two floods.

Most of the alternatives seem reasonable with the exception of the full ASB option. This one is too extensive and too destructive of the community, land and environmental livelihood for no real advantage. You do not protect the community and environment by destroying it.

I will support and actively work with and for any of the other options and vigorously oppose the full ASB approach. Even minor reductions to the scope of the full ASB approach could also remove any objections. I know that one particular area proposed for the full ASB route is over highly-porous soil and that would mandate moving the line significantly westward. Making such a decision quickly would gain my support. Thank you.

(Proceedings concluded.)

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REPORTER'S CERTIFICATE

STATE OF CALIFORNIA)
)
COUNTY OF YUBA)

I do hereby certify that the foregoing transcript, consisting of 41 pages hereof, was taken by me in shorthand at the time of the proceedings, and that the foregoing is a full, true and correct transcription of the proceedings held at said time.

DATED: July 17, 2006.

STACEY M. GATES,
Certified Shorthand Reporter #9255

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APPENDIX B

Hydraulic and Hydrologic Analysis

Hydraulic and Hydrologic Analysis of the Three Rivers Levee Improvement Authority's Phase IV Project

Feather River Levee Repair Project

July 2006

Prepared by

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1. Background

This document explains the hydraulic analysis of the proposed alternatives for the Reclamation District No. 784 (RD 784) Feather River Levee Repair Project (FRLRP) that is proposed by the Three Rivers Levee Improvement Authority (TRLIA) under the Phase IV program. Included in this document are:

- Background on the hydraulic model used for the analysis.
- A description of the hydrology.
- Description of the existing condition that was modeled.
- Description of the alternatives that were modeled.
- Water surface profiles derived from the modeling analysis.

2. Hydraulic Model

2.1 Description

MBK Engineers was provided a copy of the Feather River HEC-RAS model, dated Jan. 12, 2004 that was developed by the U.S. Army Corps of Engineers, Sacramento District (Corps) for the Lower Feather River Floodplain Mapping Study. This model was the basis for the results displayed in this report. Included with the model were the calibration analysis and synthetic hydrology for the 1-in-2, 1-in-10, 1-in-25, 1-in-50, 1-in-100, 1-in-200, and 1-in-500 annual exceedence probabilities (AEP) for two hydrologic centerings: Feather River at Shanghai with Yuba River emphasis (Shanghai-Yuba) and Bear River.

The model represents the Feather River and its tributaries from the major reservoirs within the basin to its confluence with the Sacramento River. Specifically, the major upstream boundaries of the model are:

- Feather River at Oroville.
- Yuba River about 2 miles upstream of Daguerre Point Dam.
- Bear River at Wheatland Gage.
- Sutter Bypass upstream of Feather River.
- Sacramento River upstream of Fremont Weir.

The model also includes the following minor tributaries:

- Honcut Creek (Feather River) – modeled reach, 0.8 miles long.
- Jack-Simmerly Slough – modeled reach, 6.25 miles long.
- Dry Creek (Yuba River) – lateral inflow.
- Deer Creek (Yuba River) – lateral inflow.
- Yankee Slough (Bear River) – modeled reach, 6.2 miles long.
- Dry Creek (Bear River) – modeled reach, 4.4 miles long.
- WP Interceptor (Bear River) – modeled reach, 4.9 miles long.
- Best Slough (WP Interceptor) – modeled reach, 1 mile long.
- Natomas Cross Canal (Sacramento River) – modeled reach, 6.2 miles long.

The model has two downstream boundaries: Sacramento River at Verona Gage and Yolo Bypass at Woodland Gage. The downstream boundary conditions are represented by rating curves at these locations. The cross-section and reach geometry in this model comes primarily from the Sacramento-San Joaquin Rivers Comprehensive Study (Comp Study) Sacramento Basin UNET model. Figure 1 shows the geographic extent of the model and the waterways contained in the model.

2.2 Corps of Engineers Calibration

The HEC-RAS model was calibrated by the Corps to the January 1997 flood event. For reference, the estimated AEP of the January 1997 flood one-day volume is summarized in Table 1 for locations within the model study area.

Table 1. January 1997 Flood – Annual Exceedence Probabilities, 1-day Duration

Location	Annual Exceedence Probability
Feather River at Oroville	1-in-100
Yuba River at Marysville	1-in-100[1]
Bear River at Wheatland	1-in-33
Latitude of Verona	1-in-91

Source: Sacramento and San Joaquin River Basins Comprehensive Study
[1] Estimated by MBK Engineers

The following is an excerpt from the model description that accompanied the model when provided by the Corps, which explains the Corps' calibration methodology. Additional information on the Corps calibration is documented in *"Lower Feather River Floodplain Mapping Study; Army Corps of Engineers, Sacramento District, February 17, 2005."*

> *Manning's n values, flow roughness factors, and weir coefficients were adjusted to best fit the rising limb of the computed hydrographs with the observed hydrographs at seven stream gage locations. These locations are:*
>
> 1. *Feather River: Yuba City gage.*
> 2. *Feather River: Nicolaus gage.*
> 3. *Yuba River: "Near Marysville" gage.*
> 4. *Bear River: Wheatland gage.*
> 5. *Bear River: Forty Mile Road gage.*
> 6. *Sacramento River: Verona gage.*
> 7. *Sacramento River: Upstream end of Fremont Weir.*
>
> *The model has not been calibrated upstream of the Yuba City gage.*

The gages within the study area for which observed data were available for the calibration event are summarized in Table 2, and a comparison of observed and computed peak stages and flows at the gages for the calibration event is provided in Table 3.

Table 2. Calibration Analysis – Available Data at Gages in Study Area

Gage	Agency	Stage Data (source)	Flow Data (source)
Feather River near Gridley	USGS 11407150	Hourly (CDEC) Peak (USGS)	Hourly (Corps data file) Peak (USGS) Mean Daily (USGS)
Feather River at Yuba City	Ca. DWR	Hourly (CDEC)	N/A
Feather River at Nicolaus	Ca. DWR	Hourly (CDEC)	N/A
Yuba River near Marysville	USGS 11421000	Hourly (Corps data file) Peak (USGS)	Peak (USGS) Mean Daily (USGS
Bear River near Wheatland	USGS 11424000	15 min. (Corps data file) Peak (USGS) Measured (USGS) 12/31/96 15:20 1/1/97 14:55 1/2/97 12:30	15 min. (Corps data file) Peak (USGS) Measured (USGS) 12/31/96 15:20 1/1/97 14:55 1/2/97 12:30 Mean Daily (USGS)
Bear River at Forty Mile Road (Pleasant Grove Road)	Unknown	15 min. (Corps data file)	N/A
Sacramento River at Fremont Weir	Ca. DWR	Hourly (CDEC)	N/A
Sacramento River at Verona	USGS 11425500	Hourly (CDEC) Peak (USGS) Measured (USGS) 1/2/97 11:30	Hourly (CDEC) Peak (USGS) Measured (USGS) 1/2/97 11:30 Mean Daily (USGS)
Yolo Bypass near Woodland	USGS 11453000	10 min. (Corps data file) Peak (USGS) Measured (USGS) 1/3/97 09:30 1/3/97 11:30	Peak (USGS) Measured (USGS) 1/3/97 09:30 1/3/97 11:30 Mean Daily (USGS)

Table 3. Corps of Engineers Calibration Study Results – Peak Stages and Flows at Gages

Gage	Peak Stage (ft.-NGVD)			Peak Flow (cfs)		
	Observed	Computed	Difference (ft.)	Observed	Computed	% Diff
Feather River						
Near Gridley	97.51	99.15	+1.64	163,000	157,740	-3.2%
at Yuba City	75.23	75.51	+0.28	N/A		
at Nicolaus	47.20	47.34	+0.14	N/A		
Yuba River						
Near Marysville	88.69	88.71	+0.02	161,000	172,510	+7.1%
Bear River						
Near Wheatland	95.65	95.68	+0.03	34,900	34,360	-1.5%
at 40 Mile Rd.	70.78	70.99	+0.21	N/A		
Sacramento River						
at Fremont Weir	39.47	38.97	-0.50	N/A		
at Verona	39.09	38.75	-0.34	102,000	101,780	-0.2%
Yolo Bypass						
Near Woodland	31.43	30.81	-0.62	357,000	404,670	+13.4%

2.3 MBK Engineers Re-Calibration for Phase IV Project

MBK Engineers refined and re-calibrated the Corps HEC-RAS model for use in designing the levee improvements under the TRLIA Phase II program. Those levee improvements consisted of work on the Western Pacific Interceptor Canal, Bear River, Yuba River, and Olivehurst Detention Pond. The refinements made to the Corps HEC-RAS model and the re-calibration results are documented in *"Hydraulic and Hydrologic Analysis for Three Rivers Levee Improvement Authority's Phase 2 Project, Basis of Design for the Bear River, Western Pacific Interceptor Canal, Yuba River Levee Improvements and Olivehurst Detention Basin Project (Revision 1); MBK Engineers, March 2006"* (HEC-RAS Phase II model).

Phase IV of the TRLIA project includes levee strengthening on the Feather River and evaluates levee setback alternatives on the Feather River reach river mile (RM) 17 to 24 (Figure 37). It also addresses freeboard issues on the Yuba River levee. The HEC-RAS model developed by the Corps of Engineers and re-calibrated by MBK Engineers for Phase II, included flow roughness factors in the reach of the Feather and Yuba Rivers. These flow roughness factors increased the Manning's n value as the flow increased and were assigned to cross sections on the Feather River from RM 17 to 29.25 and Yuba River from RM 1.6 to 8.34. The TRLIA Phase IV project is evaluating a setback levee which could potentially include habitat enhancement projects along the project reach. Habitat enhancement projects typically consist of re-vegetation which would require simulation of the project condition vegetation types. This is typically done by changing the Manning's n value to represent the change in vegetation type due to the project. The complex nature of the flow roughness factor makes this type of analysis difficult and uncertain; therefore, the HEC-RAS Phase II model was refined and re-calibrated to remove the flow roughness factors. Following are the changes made to the HEC-RAS Phase II model for the current Phase IV analysis:

1. The flow roughness factors in the following reaches were eliminated
    a. Feather River – Yuba River to Bear River, RM 17 to 24.25.
    b. Feather River – Yuba River to Bear River, RM 24.5 to 27.0.
    c. Feather River – Jack Sough. to Yuba River, RM 27.25 to 29.25.
    d. Yuba River (upper) – RM 1.6 to 8.34.

2. For the Feather River reach in item 1.a. above, the Manning's n value from the HEC-RAS Phase II model for the January 1997 calibration, corresponding to the maximum water surface elevation, was used as a single Manning's n value at each of the cross sections in the reach.

3. For the reaches in items 1.b., 1.c. and 1.d., the flow roughness factor in the HEC-RAS Phase II model were converted to a vertical variation of Manning's n value for each cross section. This was done by assigning an elevation to each break point in the flow roughness factor. The Manning's n value at each break point was calculated using the flow roughness factor and the original geometry Manning's n value in the HEC-RAS Phase II model. The output water surface elevations and flows from HEC-RAS Phase II model were then used to assign the elevation at each break point. Minor modifications were made to the Manning's n value to calibrate to the stage gage at Yuba City and Marysville. A vertical variation Manning's n value is needed in these reaches to better match the rising and falling limb of the stage hydrographs at Feather River at Yuba City and Yuba River near Marysville. Using a single Manning's n value for the cross sections matched the peak well at those gage locations but resulted in higher stages on the rising and falling limbs for the January 1997 calibration.

2.4 Results of the Phase IV Re-Calibration

Results of the model re-calibration made by MBK Engineers are presented in Figures 2 through 19. Figures 2 through 5 show the computed maximum water surface profile versus the surveyed high water marks for the Bear, Feather and Yuba Rivers. Figures 6 through 19 show stage and flow hydrographs at available gage locations in the study area. The following descriptions are included to further identify some of the data used to create these figures:

a.) Observed (Corps): from data files compiled by Corps ("1997_event_input.dss" from Lower Feather river HEC-RAS study and "sac97.dss" from Comprehensive Study).

b.) Observed – CDEC (datum adjusted): gage height from CDEC adjusted to NGVD 1929 datum.

c.) Observed (CDEC – adj.): gage height from CDEC adjusted to NGVD 1929 datum.

d.) Observed, est. (Corps): from data files compiled by Corps ("1997_event_input.dss" from Lower Feather river HEC-RAS study and "sac97.dss" from Comprehensive Study).

e.) Observed (Corps data file): from data files compiled by Corps ("1997_event_input.dss" from Lower Feather river HEC-RAS study and "sac97.dss" from Comprehensive Study).

f.) Computed Mean Daily Peak (MBK): mean daily flow from MBK simulated hourly.

Table 4 provides a summary of observed and computed stages and flows at the gage locations in the study area.

Table 4. MBK Engineers Re-Calibration Study Results – Peak Stages and Flows at Gages

Gage	Peak Stage (ft.-NGVD)			Peak Flow (cfs)		
	Observed	Computed	Difference (ft.)	Observed	Computed	% Diff
Feather River						
Near Gridley	97.51	99.14	+1.63	163,000	157,779	-3.2%
at Yuba City	75.23	75.15	-0.08	N/A		
at Nicolaus	47.20	46.6	-0.60	N/A		
Yuba River						
Near Marysville	88.69	87.9	-0.79	161,000	161,655	+0.4%
Bear River						
Near Wheatland	95.65	Boundary Condition		34,900	Boundary Condition	
at 40 Mile Rd.	70.78	70.99	+0.21	N/A		
Sacramento River						
at Fremont Weir	39.47	39.24	-0.23	N/A		
at Verona	39.09	38.92	-0.17	102,000	102,638	+0.6%
Yolo Bypass						
Near Woodland	31.43	31.34	-0.09	357,000	354,755	-0.6%

3. Hydrology

The hydrology used for the analysis of the project alternatives is based on the model inflows developed by the Corps for two storm centerings:

1. Feather River at Shanghai with Yuba River emphasis (SHY).
2. Bear River (BR).

Studies were made for two annual exceedence probabilities: 1-in-100 and 1-in-200 AEP. Table 5 shows the peak flow rate at the upstream boundary of each major reach for each of the combinations of these centerings and frequencies. From Table 5, the SHY centering produces greater flows for all frequencies on the Yuba and Feather Rivers and in the Sutter Bypass. The BR centering has greater flows on the Bear River. The peak flows from the two centerings are comparable on the Sacramento River.

Table 5. Summary of Major River Peak Flow Rates at Upstream Model Boundaries for Feather River at Shanghai with Yuba River Emphasis (SHY) and Bear River (BR) Storm Centerings and Analyzed Frequencies (values are 1,000 cfs).

AEP	Feather River		Yuba River		Bear River		Sutter Bypass		Sacramento R.	
	SHY	BR	SHY	BR	SHY	BR	SHY	BR	SHY	BR
1-in-100	150	150	141	122	41	44	193	173	37	34
1-in-200	174	150	211	135	48	49	232	213	40	38

The study alternatives were simulated with each of the two centerings and two AEP floods. For a given AEP flood, the results presented in this report are for the composite water surface, defined as the maximum of the two water surface elevations for the respective centerings at each model cross-section.

4. Levee Performance Assumptions

An important assumption in performing hydraulic simulations of leveed systems on a regional basis is defining if, when, and how levee failures will occur. The analysis as presented herein assumes that levees would not fail before and after overtopping. Top of levee profiles were compared to 1-in-200 water surface profiles to determine low spots where levee overtopping may occur. The locations were defined in the HEC-RAS model for the without project. Table 6 documents the locations.

Table 6. Potential Levee Overtopping Locations

River	Model River Mile	Side
Bear River	6.49	right
Bear River	5.49	right
Bear River	4.99	left
Bear River	3.855	left
Bear River	3.21	left
Cross Canal	3.99	right
Cross Canal	3.98	left
Dry Creek	2.85	right
Feather River	40.1	right
Feather River	40	left
Feather River	28.9	right
Feather River	24.74	left
Feather River	24.24	right
Feather River	16.49	left
Feather River	14.74	right
Sutter Bypass	66	right

River	Model River Mile	Side
UP Intercept	3.49	left
UP Intercept	1.24	left
Yankee Slough	1.84	right
Yankee Slough	1.81	left
Yuba Overbank	0.42	right
Yuba Overbank	4.57	left
Yuba Overbank	2.82	right
Yuba Overbank	2.487	left
Yuba Overbank	1.787	left

Note: The model also contains potential levee overtopping locations on both banks of the upper Yuba River, Sacramento River, and Sutter Bypass which were not listed individually here due to their volume.

5. Study Alternatives

The following describe each one of the alternatives that were analyzed as part of the work. Three alternatives were analyzed which consisted of levee improvements along the Feather River. For all alternatives, it assumes the existing flood control system with the addition of the Bear River setback as part of TRLIA Phase III program. Also, in a few locations along the Bear River and Yankee Slough in Sutter County where the levees are below the 1957 design criteria, as shown in Figure 20, the existing condition was represented by the 1957 design profile levee elevation (1957 design water surface + 3 feet for freeboard). In other words, top of levee elevations that are below design specifications were elevated to original specified design elevations. This is necessary because the work to raise the low spots in the levee will not be accomplished under the Yuba-Feather Supplemental Flood Control Program (Y-FSFCP) and benefits from such work should not be credited to the Y-FSFCP.

5.1 Alternative 1 – Levee Strengthening Alternative

Under this alternative, levee repair and strengthening activities would be completed along the existing Feather River left bank levee from Project Levee Mile (PLM) 13.3 to PLM 26.1 and along the Yuba River left bank levee from PLM 0.0 to PLM 0.3 (Figure 21). Levee repairs/strengthening would consists of various activities, including installation of cutoff walls and relief wells and placement of buried cobble in areas where erosion of the levee embankment has been identified as a problem.

5.2 Alternative 2 – Levee Strengthening and ASB Setback Levee

Under this alternative, levee repair and strengthening activities would be completed along the existing Feather River left bank levee from PLM 13.3 to PLM 17.1 and PLM 23.6 to PLM 26.1 and along the Yuba River left bank levee from PLM 0.0 to PLM 0.3 (Figure 21). Levee repair and strengthening activities along these segments would be the same as for Alternative 1. From

PLM 17.1 to PLM 23.6 on the Feather River left bank, a setback levee would be constructed roughly following the Above Star Bend (ASB) setback levee alignment identified in the Y-FSFCP EIR. Portions of the existing levee along the setback alignment would be removed to allow water to flow into the new floodway/setback area (i.e., the area between the existing levee and the setback levee) during high river stages.

The setback levee alternative was modeled by modifying the cross sections in the HEC-RAS model to reflect the ASB setback levee alignment and modifying the Manning's roughness value to reflect the land use in the setback area (Figure 22). The land use between the existing levee and new levee was assumed to be habitat restoration. Agricultural operations may occur in this area as the alternative further progresses through planning and design. It is likely that habitat restoration land use would have the higher of the two water surface elevations thus was chosen to be simulated. Habitat restoration land use was simulated using a Manning's roughness value of 0.1. For the area between the riverbank and the existing levee, it was assumed no land use changes thus the Manning's roughness value remained unchanged.

5.3 Alternative 3 – Levee Strengthening and Intermediate Setback Levee

FRLRP Alternative 3 is the same as Alternative 2 except for modifications to a portion of the setback levee alignment. The same levee repair and strengthening activities described previously would be completed along the existing Feather River left bank levee from PLM 13.3 to PLM 17.1 and from PLM 23.6 to PLM 26.1, and along the Yuba River left bank levee from PLM 0.0 to PLM 0.3 (Figure 22). From PLM 17.1 to PLM 23.6 on the Feather River left bank a setback levee would be constructed. The southern one-third of this setback levee alignment would follow the ASB setback levee alignment identified in Alternative 2. However, in the vicinity of Anderson Road, the setback levee alignment would shift west several hundred feet. This westward shift in the intermediate setback levee alignment allows less overall land to be placed in the new floodway and reduces the number of houses, structures, and other facilities that would be affected by levee construction or would need to be removed from the floodway.

The setback levee alternative was modeled by modifying the cross sections in the HEC-RAS model to reflect the intermediate setback levee alignment and modifying the Manning's roughness value to reflect the land use in the setback area (Figure 23). The land use between the existing levee and new levee was assumed to be habitat restoration. Agricultural operations may occur in this area as the alternative further progresses through planning and design. It is likely that habitat restoration land use would have the higher of the two water surface elevations thus was chosen to be simulated. Habitat restoration land use was simulated using a Manning's roughness value of 0.1. For the area between the riverbank and the existing levee, it was assumed no land use changes thus the Manning's roughness value remained unchanged.

6. Results

The hydraulic modeling results of each of the three alternatives are presented in this report in terms of location-stage for each hydrologic frequency analyzed. This data is presented in Tables 7 and 8. Figure 24 shows the location of the index points. Alternative 1 is considered the "Existing Condition" for which impacts will be compared to. Impacts to flows on the Feather River from river mile 9 to 27 are tabulated in Tables 9 and 10 for each of the frequency analyzed.

Water surface profiles for the 1-in-100 and 1-in-200 AEP water surface profiles are also included in the report for the Feather River (Figure 25 to 36). The figures include the water surface profiles and top of levee.

Table 7, Hydraulic Impacts to Maximum Stage, 1-in-100 AEP

				Alternative 1	**Alternative 2**		**Alternative 3**	
Impact Area	**Description**	**River**	**Model River Mile**	**Maximum Stage (ft-NGVD)**	**Maximum Stage (ft-NGVD)**	**Impact (ft.)**	**Maximum Stage (ft-NGVD)**	**Impact (ft.)**
RD 784	RD 784	Bear	1.75R	53.46	53.47	0.01	53.47	0.01
SAC30	RD 1001	Bear	3.86L	57.07	57.08	0.01	57.08	0.01
SAC30	RD 1001	Feather	7.17L	47.51	47.54	0.03	47.54	0.03
SAC24	LD 1	Feather	9.0R	49.55	49.58	0.03	49.57	0.02
RD 784	RD 784	Feather	19.0L	61.49	60.67	-0.82	60.66	-0.83
RD 784	RD 784	Feather	26.0L	71.02	69.29	-1.73	69.68	-1.34
SAC25	Yuba City	Feather	29.0R	74.48	73.35	-1.13	73.60	-0.88
RD 784	RD 784	Interceptor Canal	2.44R	57.71	57.71	0.00	57.71	0.00
	Verona Gage	Sacramento	78.75R	39.72	39.74	0.02	39.74	0.02
SAC34	RD 1500	Sacramento	86.5L	40.40	40.43	0.03	40.42	0.02
RD 784	RD 784	Yuba	1.14L	73.34	72.24	-1.10	72.48	-0.86
	YR 3	Yuba	1.48L	73.71	72.63	-1.08	72.86	-0.85
Marysville		Yuba	2.6R	74.41	73.64	-0.77	73.80	-0.61

Table 8, Hydraulic Impacts to Maximum Stage, 1-in-200 AEP

				Alternative 1	Alternative 2		Alternative 3	
Impact Area	**Description**	**River**	**Model River Mile**	**Maximum Stage (ft-NGVD)**	**Maximum Stage (ft-NGVD)**	**Impact (ft.)**	**Maximum Stage (ft-NGVD)**	**Impact (ft.)**
RD 784	RD 784	Bear	1.75R	55.95	56.01	0.06	56.00	0.05
SAC30	RD 1001	Bear	3.86L	58.42	58.44	0.02	58.43	0.01
SAC30	RD 1001	Feather	7.17L	49.48	49.52	0.04	49.51	0.03
SAC24	LD 1	Feather	9.0R	51.72	51.77	0.05	51.76	0.04
RD 784	RD 784	Feather	19.0L	64.94	64.11	-0.83	64.11	-0.83
RD 784	RD 784	Feather	26.0L	74.85	72.86	-1.99	73.29	-1.56
SAC25	Yuba City	Feather	29.0R	77.87	76.61	-1.26	76.87	-1.00
RD 784	RD 784	Interceptor Canal	2.44R	58.94	58.96	0.02	58.95	0.01
	Verona Gage	Sacramento	78.75R	40.99	41.02	0.03	41.01	0.02
SAC34	RD 1500	Sacramento	86.5L	41.61	41.63	0.02	41.63	0.02
RD 784	RD 784	Yuba	1.14L	77.41	76.03	-1.38	76.33	-1.08
	YR 3	Yuba	1.48L	78.05	76.70	-1.35	76.99	-1.06
Marysville		Yuba	2.6R	78.42	77.22	-1.20	77.47	-0.95

Table 9: Hydraulic Impacts to Flow, 1-in-100 AEP

			Flow (cfs) [1]		Difference (cfs)		% Difference	
Model River Mile	**Description**	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 2**	**Alternative 3**	**Alternative 2**	**Alternative 3**
27	Yuba River	274,480	275,343	275,117	863	637	0.31%	0.23%
26		274,355	275,215	274,993	860	638	0.31%	0.23%
25		274,263	275,098	274,891	835	628	0.30%	0.23%
24		274,177	274,924	274,770	748	594	0.27%	0.22%
23		274,113	274,742	274,628	630	515	0.23%	0.19%
22		274,025	274,471	274,399	446	375	0.16%	0.14%
21		273,857	274,108	274,014	251	157	0.09%	0.06%
20		273,642	273,918	273,806	277	164	0.10%	0.06%
19		273,554	273,781	273,679	226	124	0.08%	0.05%
18	Star Bend	273,391	273,677	273,573	286	182	0.10%	0.07%
17		273,209	273,541	273,434	332	225	0.12%	0.08%
16		273,047	273,385	273,285	338	238	0.12%	0.09%
15		272,735	273,113	272,998	379	264	0.14%	0.10%
14		272,360	272,773	272,652	414	292	0.15%	0.11%
13		271,938	272,406	272,262	468	324	0.17%	0.12%
12	Bear River	319,986	320,209	320,145	224	160	0.07%	0.05%
11		319,210	319,472	319,378	261	168	0.08%	0.05%
10		317,751	317,960	317,893	209	142	0.07%	0.04%
9	Nicolaus	314,018	313,966	314,144	-51	126	-0.02%	0.04%

Note: [1] Flow at maximum water surface.

Table 10: Hydraulic Impacts to Flow, 1-in-200 AEP

			Flow (cfs) [1]		Difference (cfs)		% Difference	
Model River Mile	**Description**	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 2**	**Alternative 3**	**Alternative 2**	**Alternative 3**
27	Yuba River	353,413	356,948	356,343	3,535	2,930	1.00%	0.83%
26		353,177	356,451	355,955	3,274	2,778	0.93%	0.79%
25		352,999	355,955	355,600	2,957	2,602	0.84%	0.74%
24		352,805	355,356	355,140	2,552	2,335	0.72%	0.66%
23		352,665	354,870	354,751	2,206	2,086	0.63%	0.59%
22		352,405	354,218	354,151	1,813	1,745	0.51%	0.50%
21		352,010	353,587	353,395	1,577	1,384	0.45%	0.39%
20		351,563	353,160	353,019	1,597	1,456	0.45%	0.41%
19		351,404	352,955	352,764	1,552	1,360	0.44%	0.39%
18	Star Bend	351,070	352,735	352,544	1,665	1,474	0.47%	0.42%
17		350,707	352,445	352,253	1,738	1,546	0.50%	0.44%
16		350,328	352,063	351,868	1,736	1,541	0.50%	0.44%
15		349,473	351,216	351,016	1,743	1,543	0.50%	0.44%
14		348,256	350,207	349,885	1,951	1,629	0.56%	0.47%
13		347,031	348,879	348,624	1,848	1,593	0.53%	0.46%
12	Bear River	399,555	401,246	401,030	1,691	1,475	0.42%	0.37%
11		398,576	400,320	400,032	1,743	1,456	0.44%	0.37%
10		396,429	398,883	398,786	2,454	2,357	0.62%	0.59%
9	Nicolaus	391,598	393,279	393,085	1,680	1,487	0.43%	0.38%

Note: [1] Flow at maximum water surface.

Figures

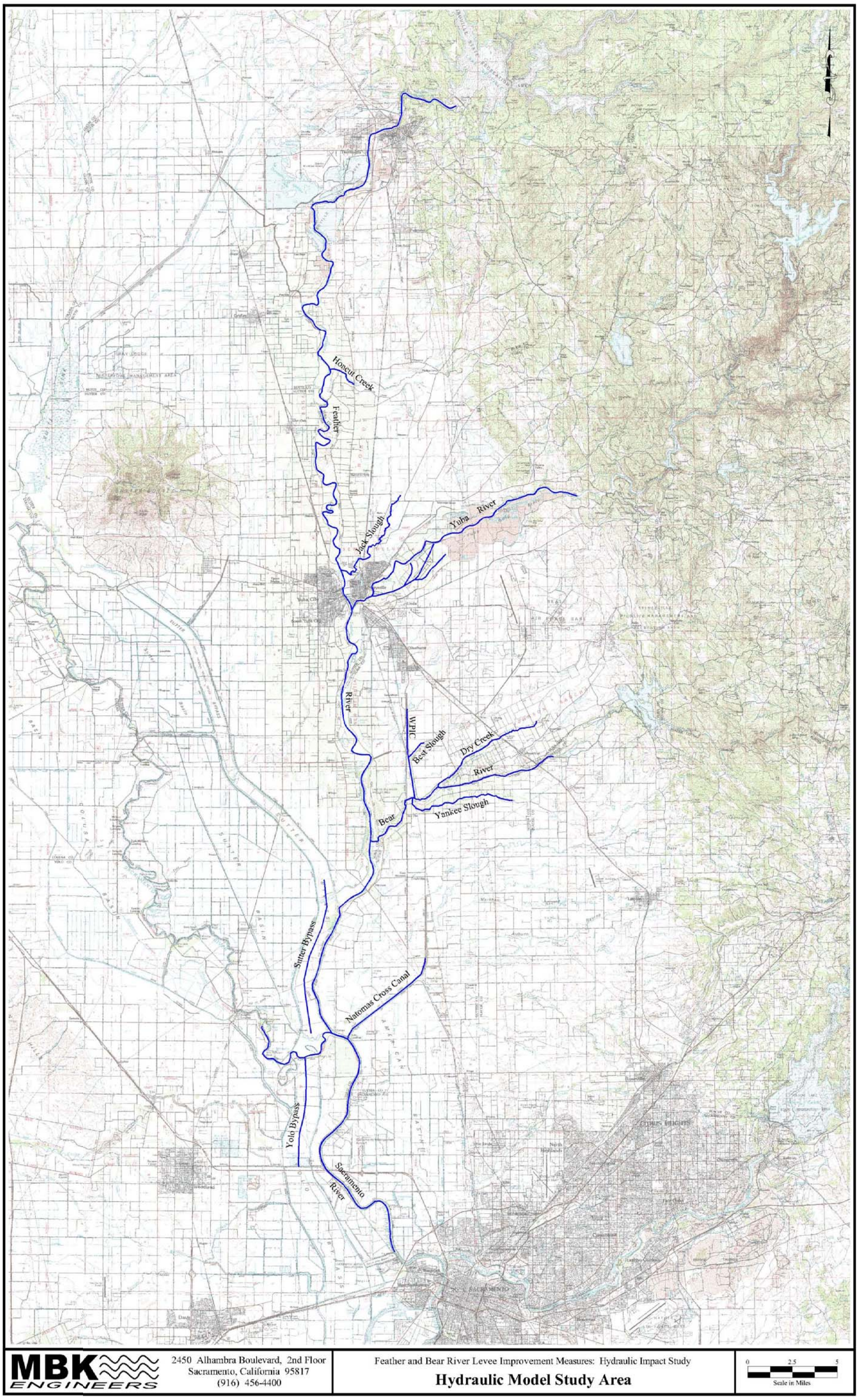

Honcut Creek
Feather
Jack Slough
Yuba River
River
WPIC
Best Slough
Dry Creek
River
Yankee Slough
Bear
Sutter Bypass
Natomas Cross Canal
Yolo Bypass
Sacramento
River
MBK ENGINEERS
2450 Alhambra Boulevard, 2nd Floor
Sacramento, California 95817
(916) 456-4400
Feather and Bear River Levee Improvement Measures: Hydraulic Impact Study
Hydraulic Model Study Area
0 2.5 5
Scale in Miles

FIGURE 1

FIGURE 2

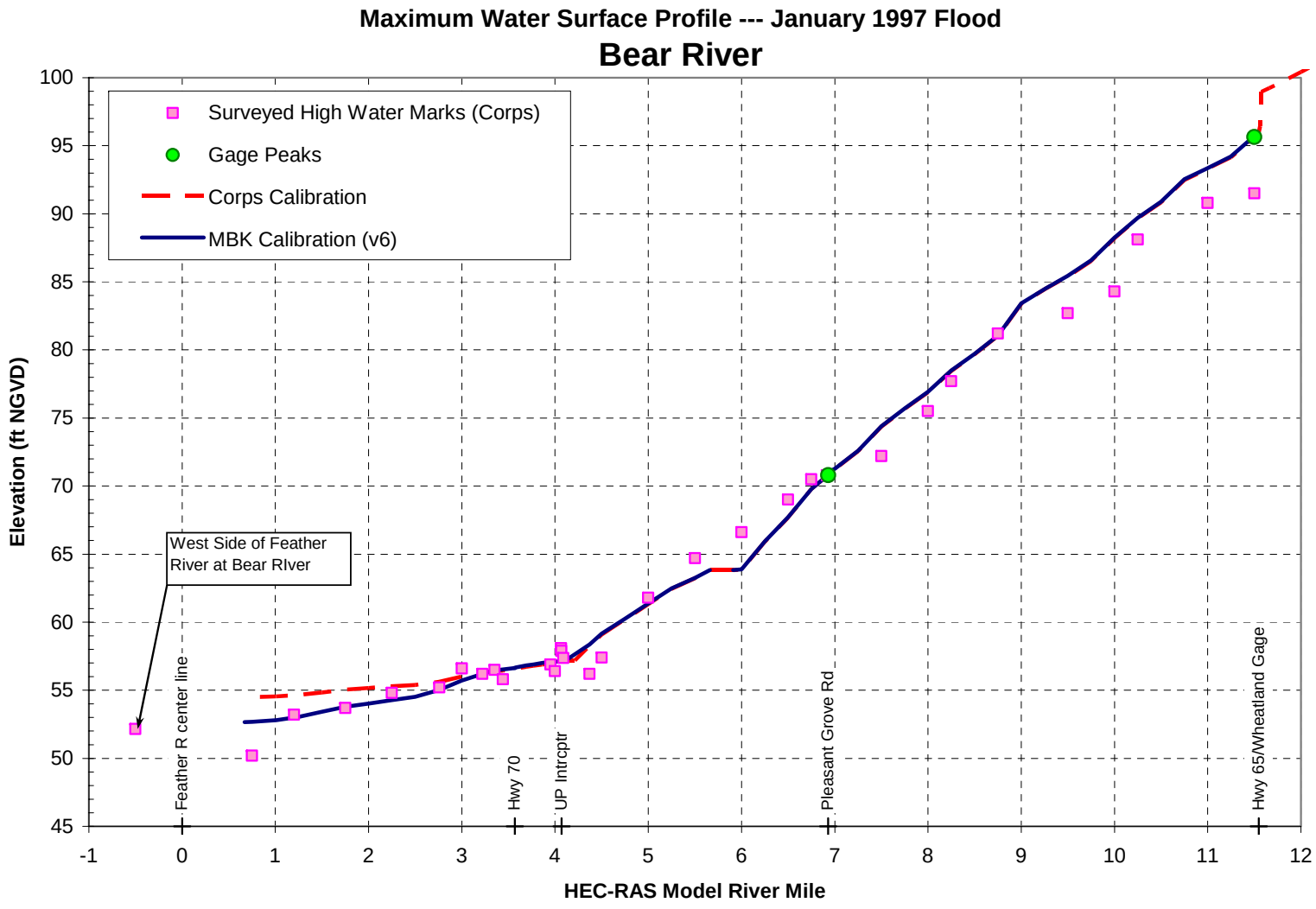

Maximum Water Surface Profile --- January 1997 Flood
Bear River
Surveyed High Water Marks (Corps)
Gage Peaks
Corps Calibration
MBK Calibration (v6)
West Side of Feather River at Bear RIver
Feather R center line
Hwy 70
UP Intrcptr
Pleasant Grove Rd
Hwy 65/Wheatland Gage
Elevation (ft NGVD)
HEC-RAS Model River Mile
100
95
90
85
80
75
70
65
60
55
50
45
-1
0
1
2
3
4
5
6
7
8
9
10
11
12

FIGURE 3

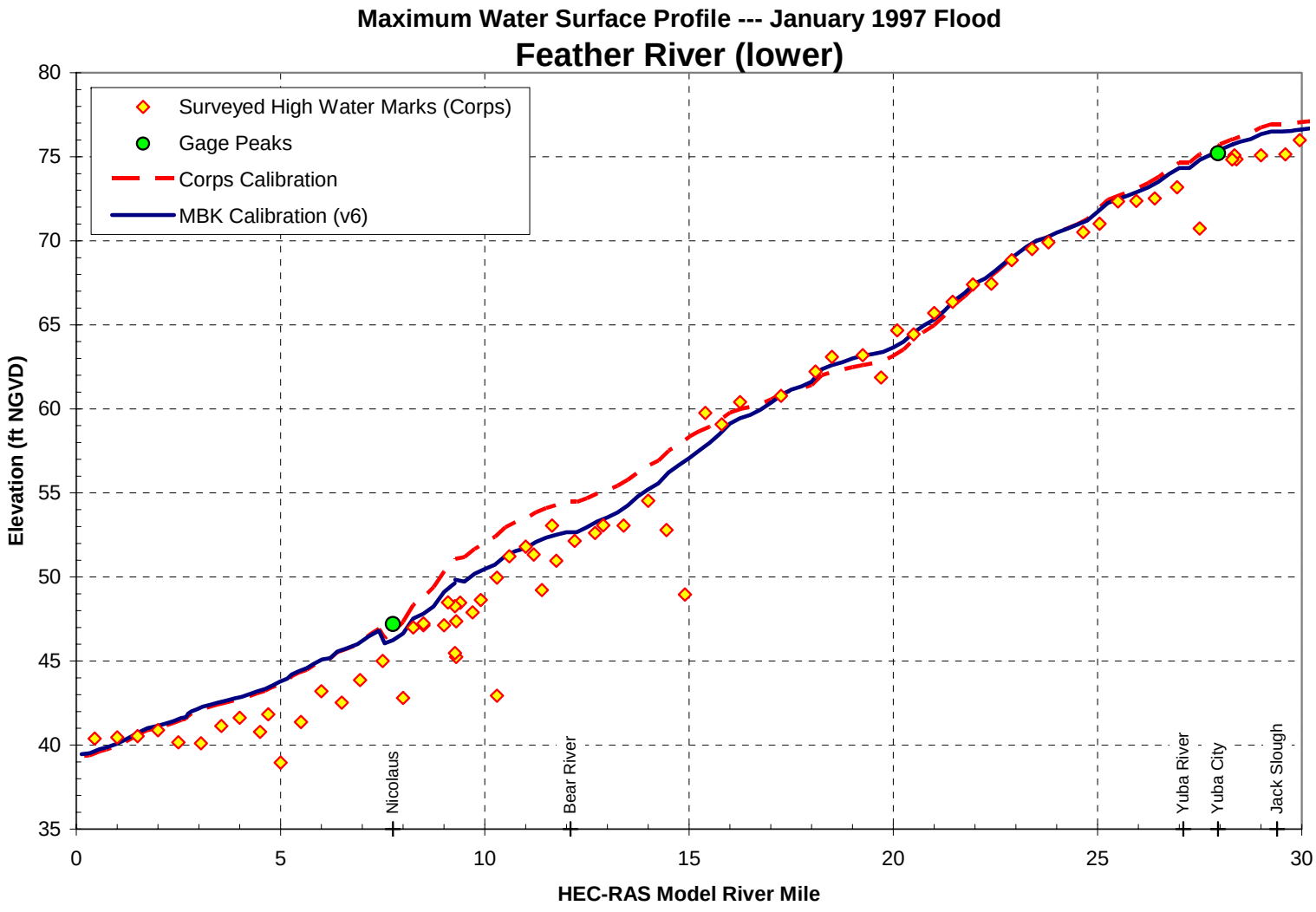

Maximum Water Surface Profile --- January 1997 Flood
Feather River (lower)
Surveyed High Water Marks (Corps)
Gage Peaks
Corps Calibration
MBK Calibration (v6)
Elevation (ft NGVD)
80
75
70
65
60
55
50
45
40
35
0
5
10
15
20
25
30
HEC-RAS Model River Mile
Nicolaus
Bear River
Yuba River
Yuba City
Jack Slough

FIGURE 4

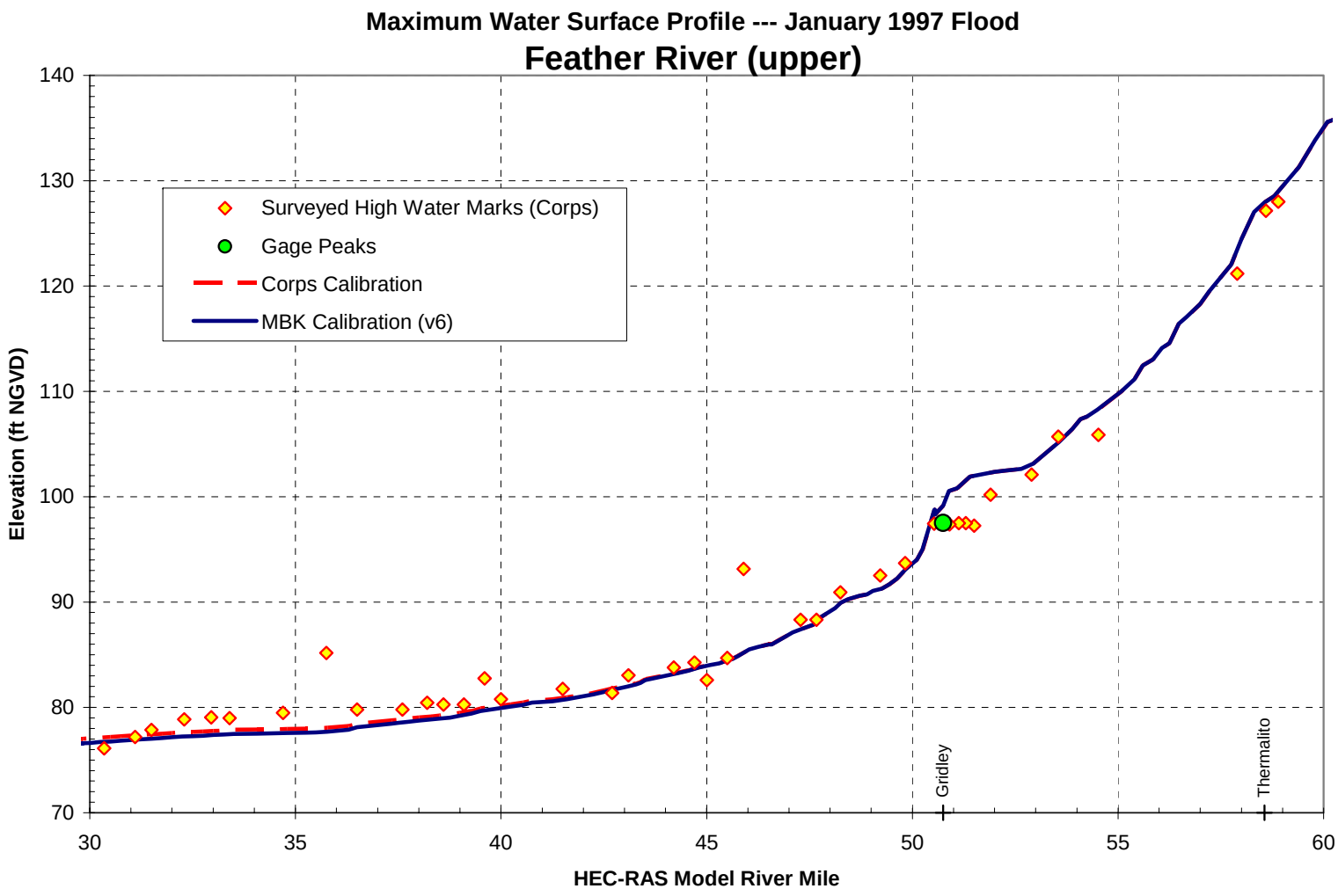

Maximum Water Surface Profile --- January 1997 Flood
Feather River (upper)
Surveyed High Water Marks (Corps)
Gage Peaks
Corps Calibration
MBK Calibration (v6)
Elevation (ft NGVD)
140
130
120
110
100
90
80
70
30
35
40
45
50
55
60
HEC-RAS Model River Mile
Gridley
Thermalito

FIGURE 5

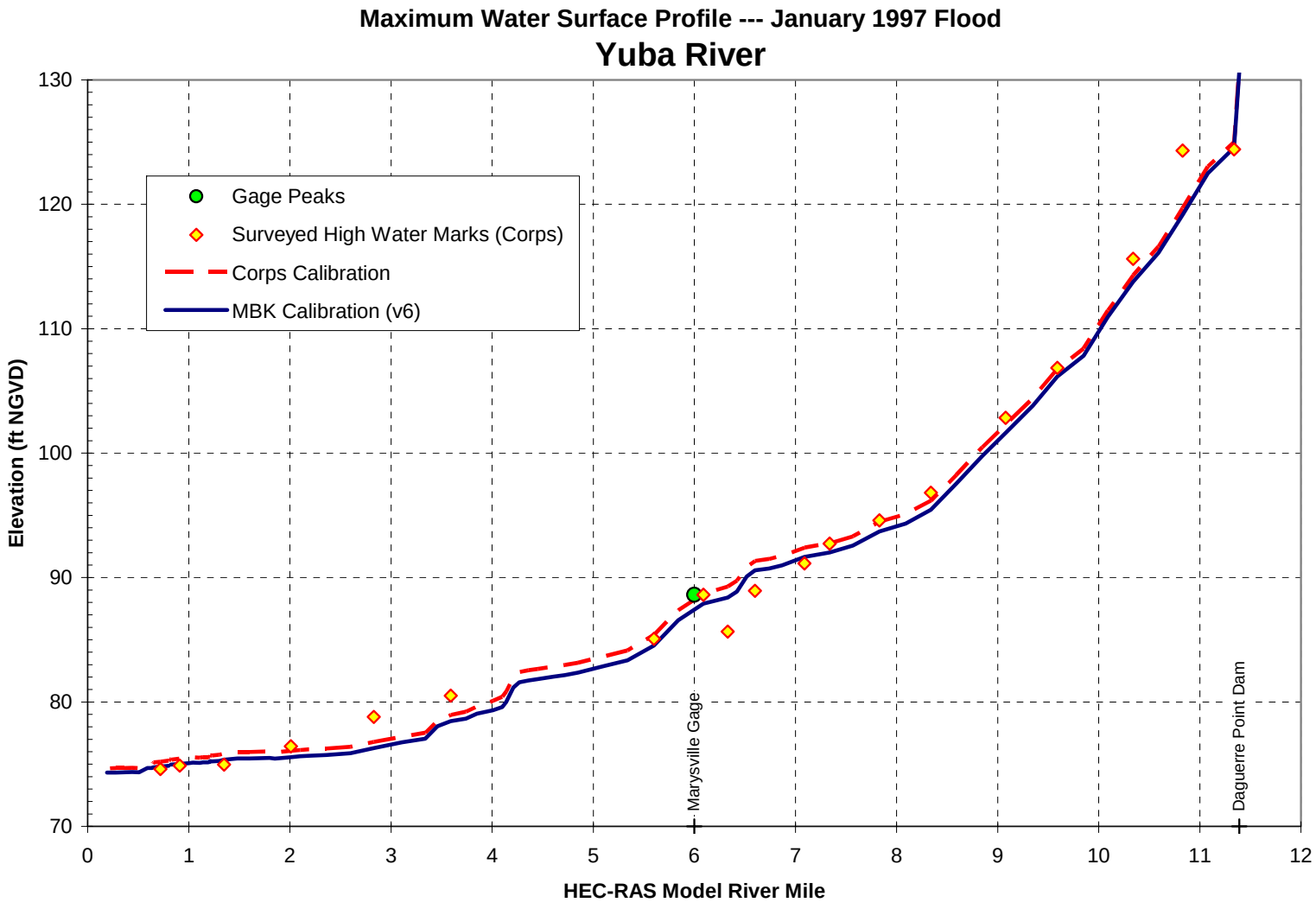

Maximum Water Surface Profile --- January 1997 Flood
Yuba River
Gage Peaks
Surveyed High Water Marks (Corps)
Corps Calibration
MBK Calibration (v6)
Elevation (ft NGVD)
130
120
110
100
90
80
70
0
1
2
3
4
5
6
7
8
9
10
11
12
HEC-RAS Model River Mile
Marysville Gage
Daguerre Point Dam

FIGURE 6

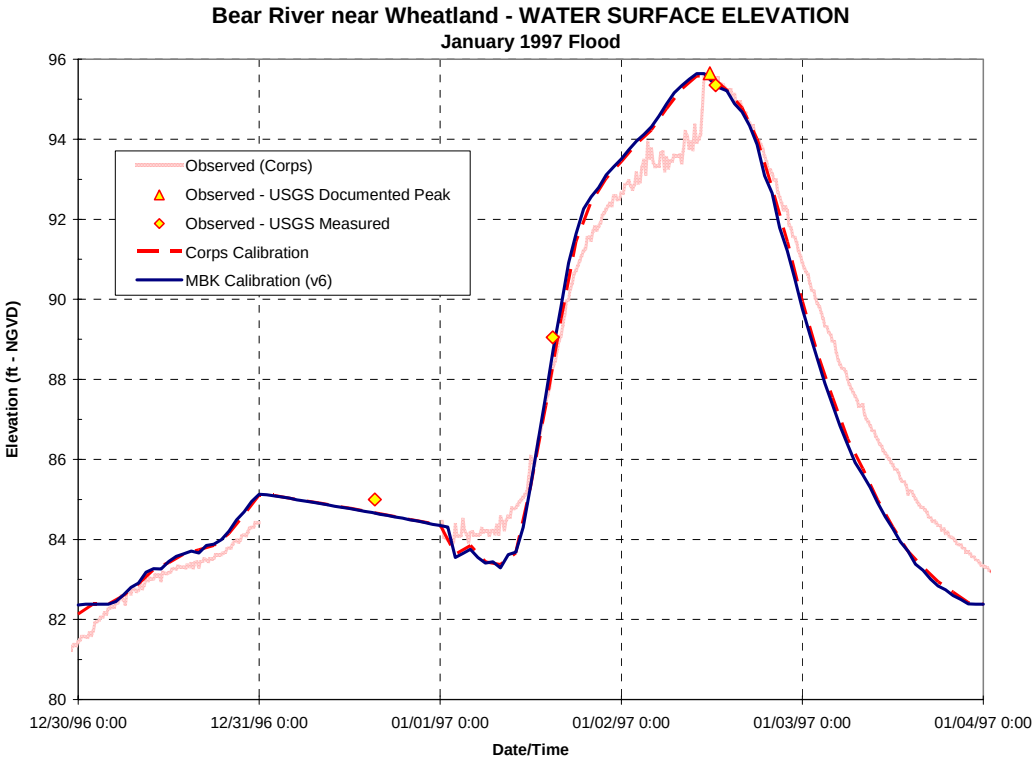


FIGURE 7

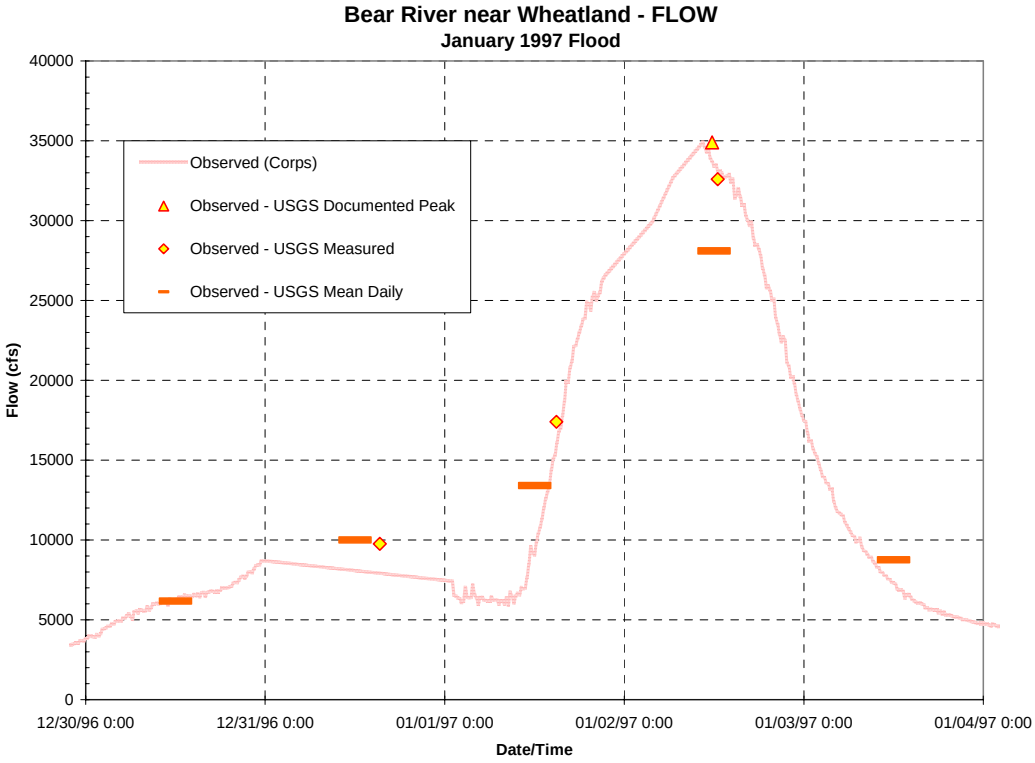


FIGURE 8

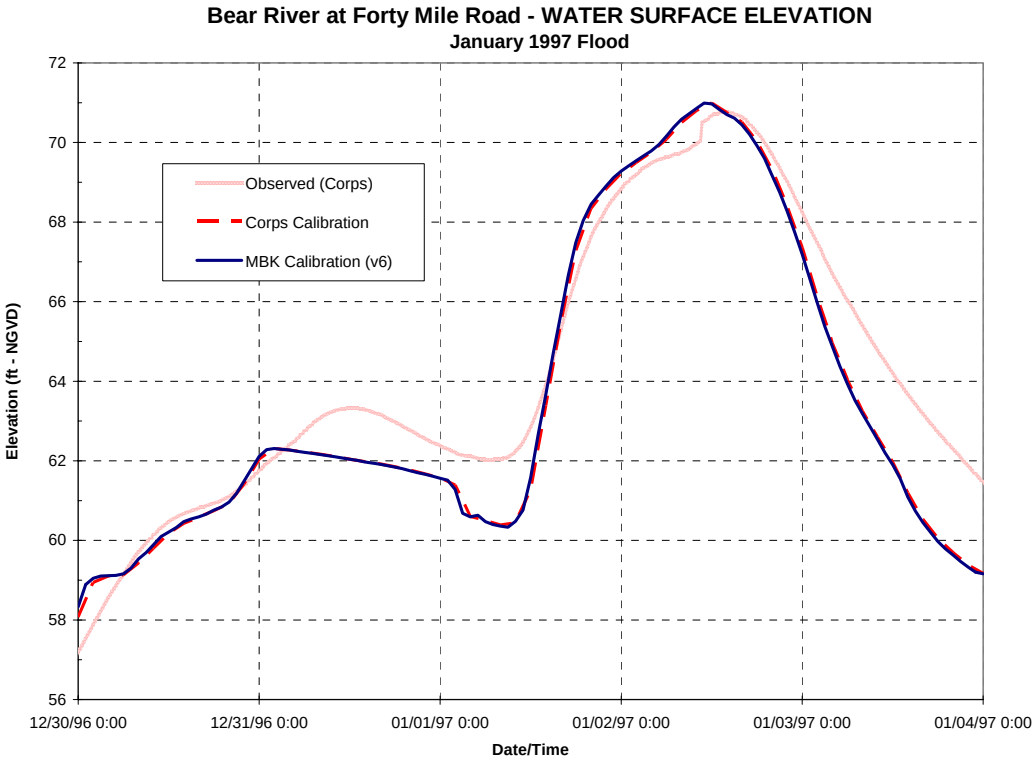


FIGURE 9

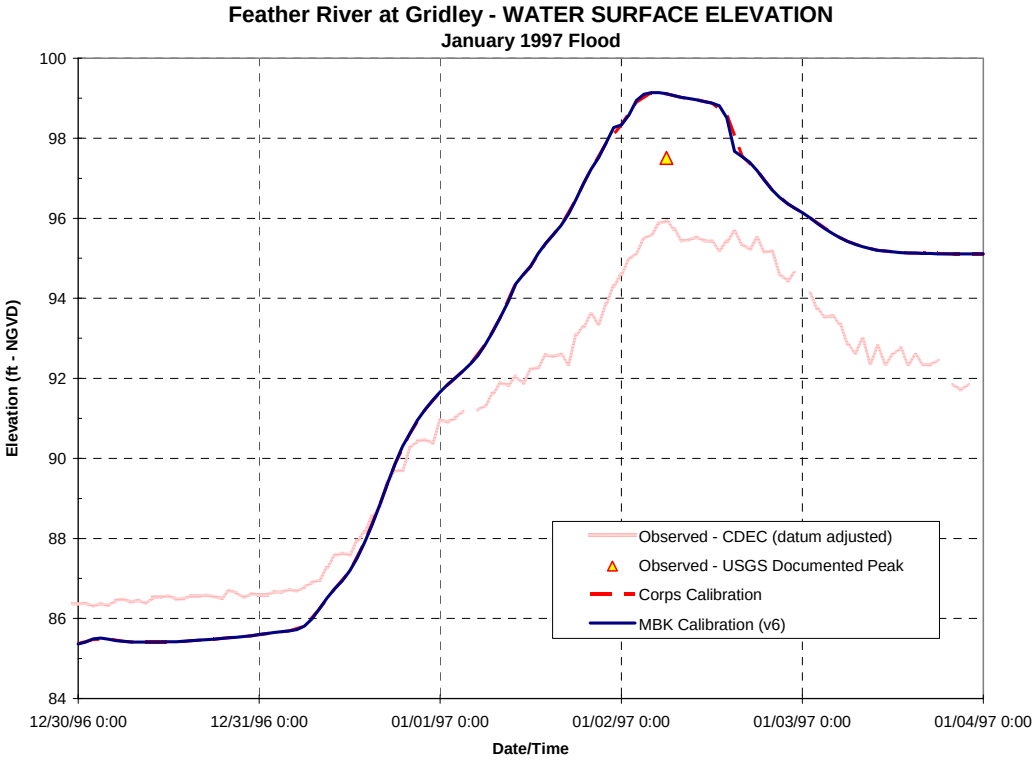


FIGURE 10

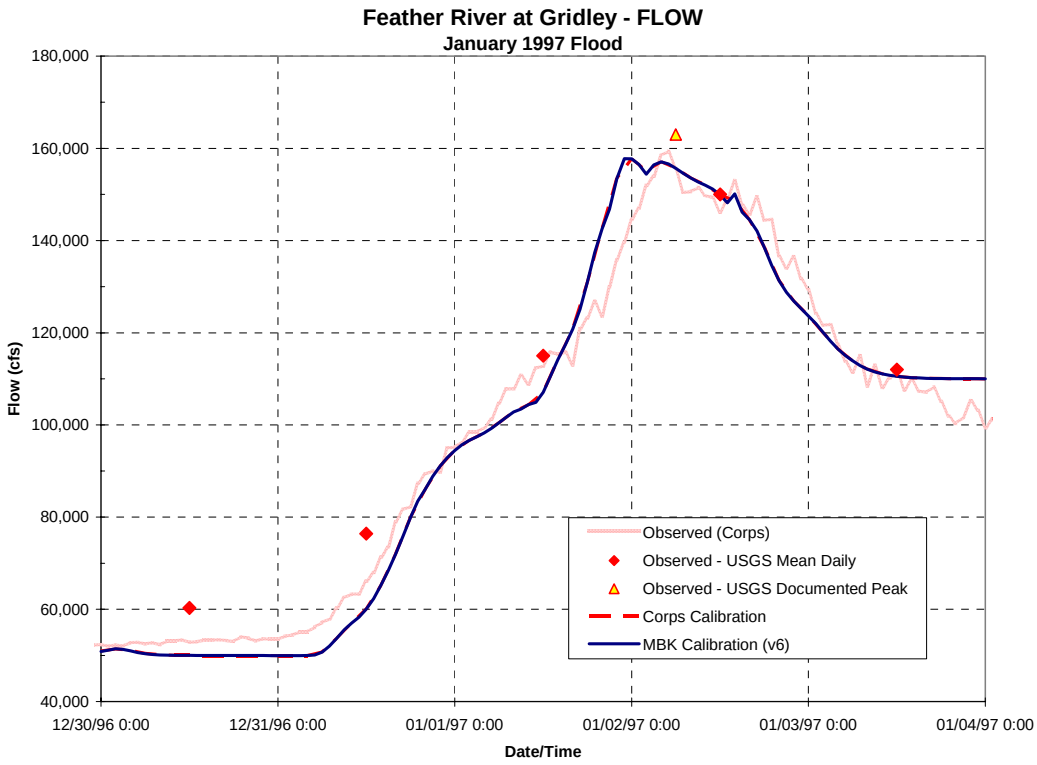


FIGURE 11

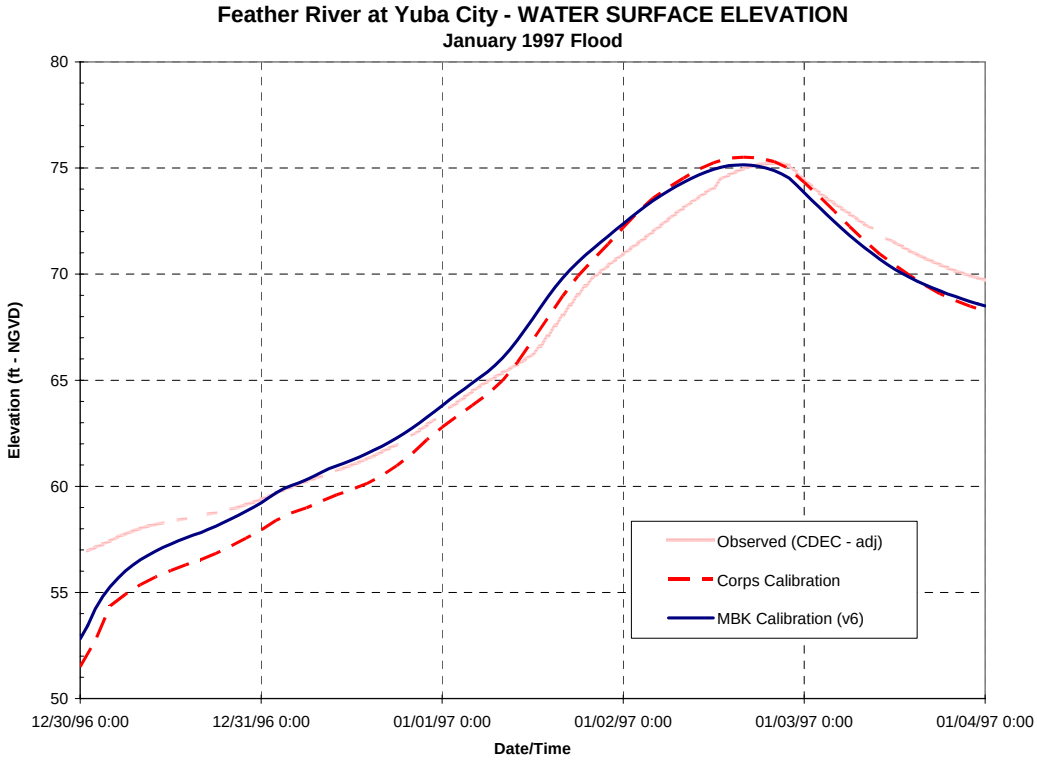


FIGURE 12

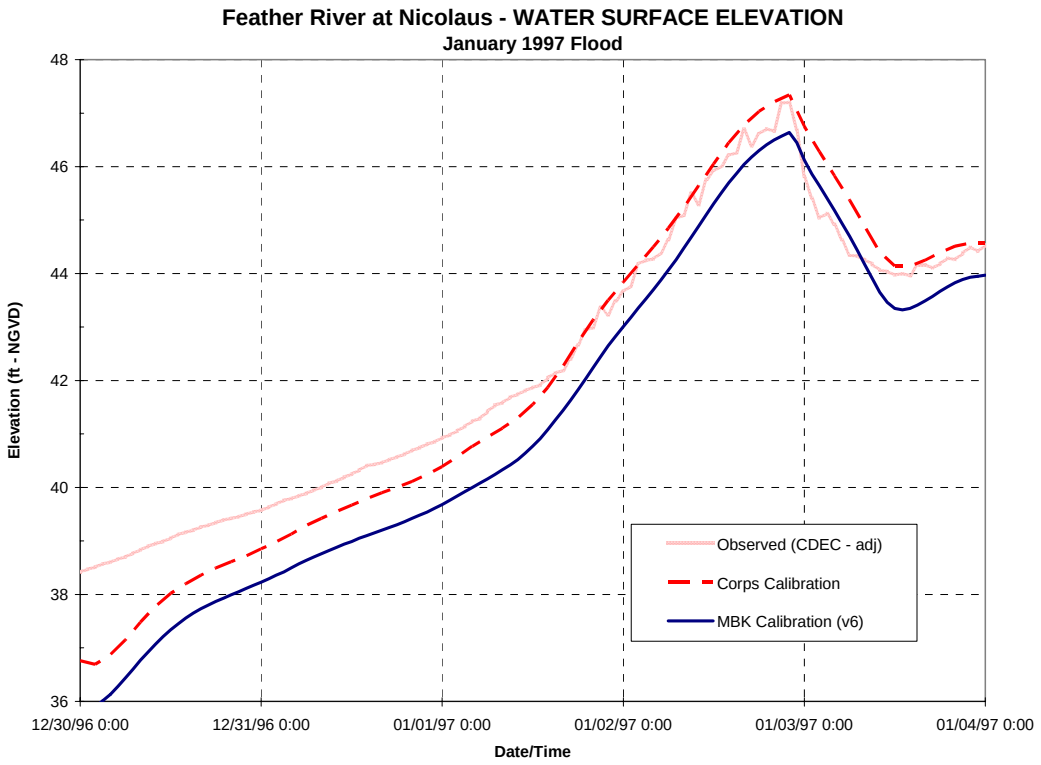


FIGURE 13

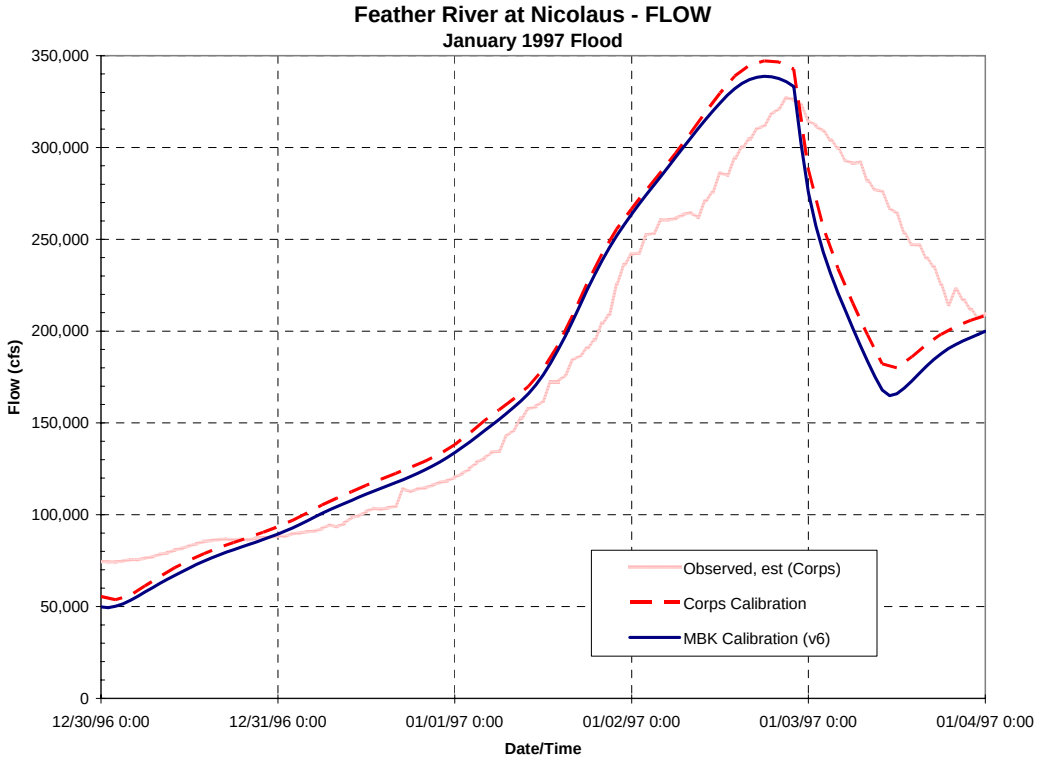


FIGURE 14

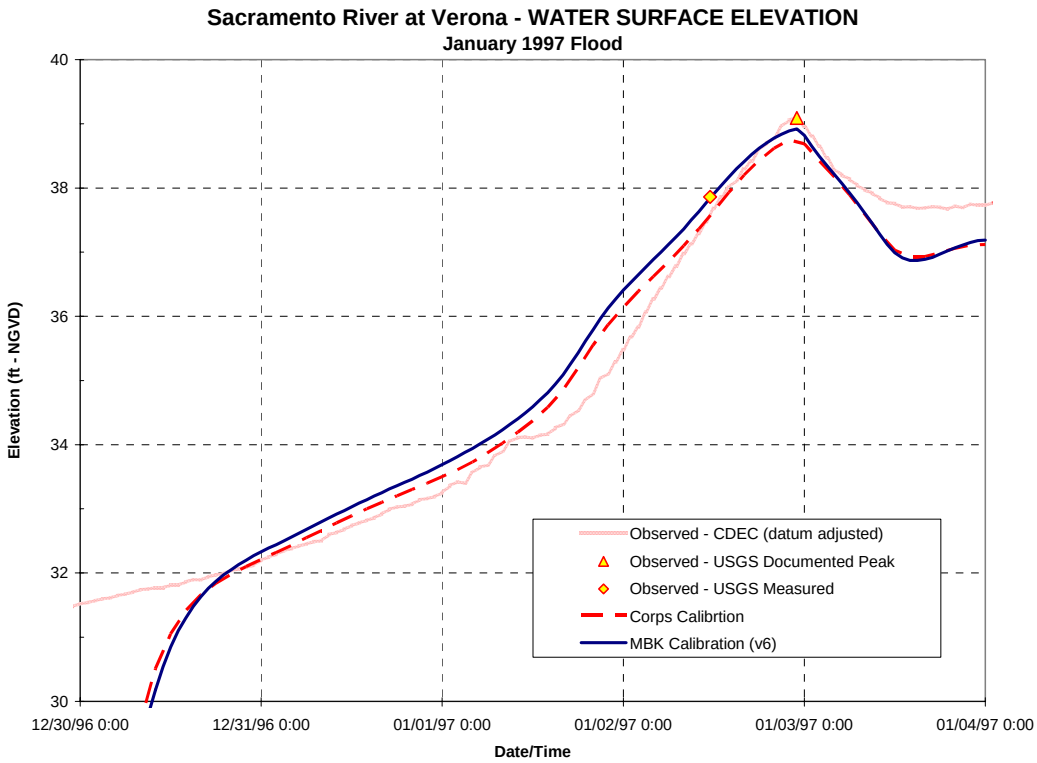


FIGURE 15

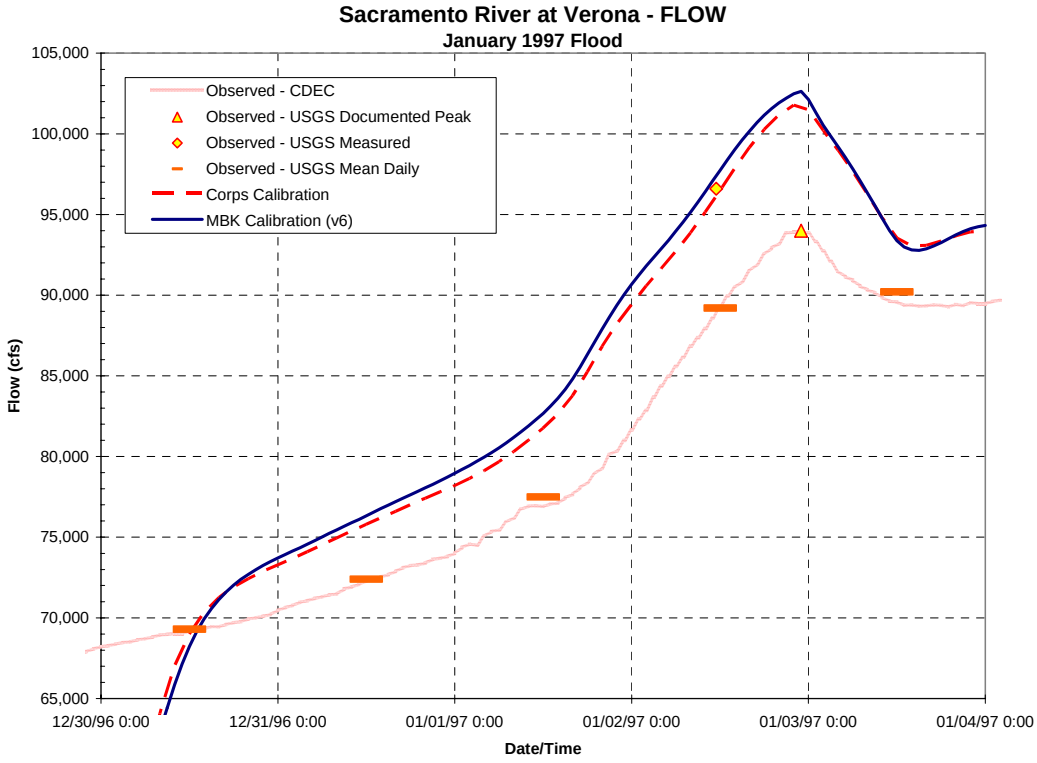


FIGURE 16

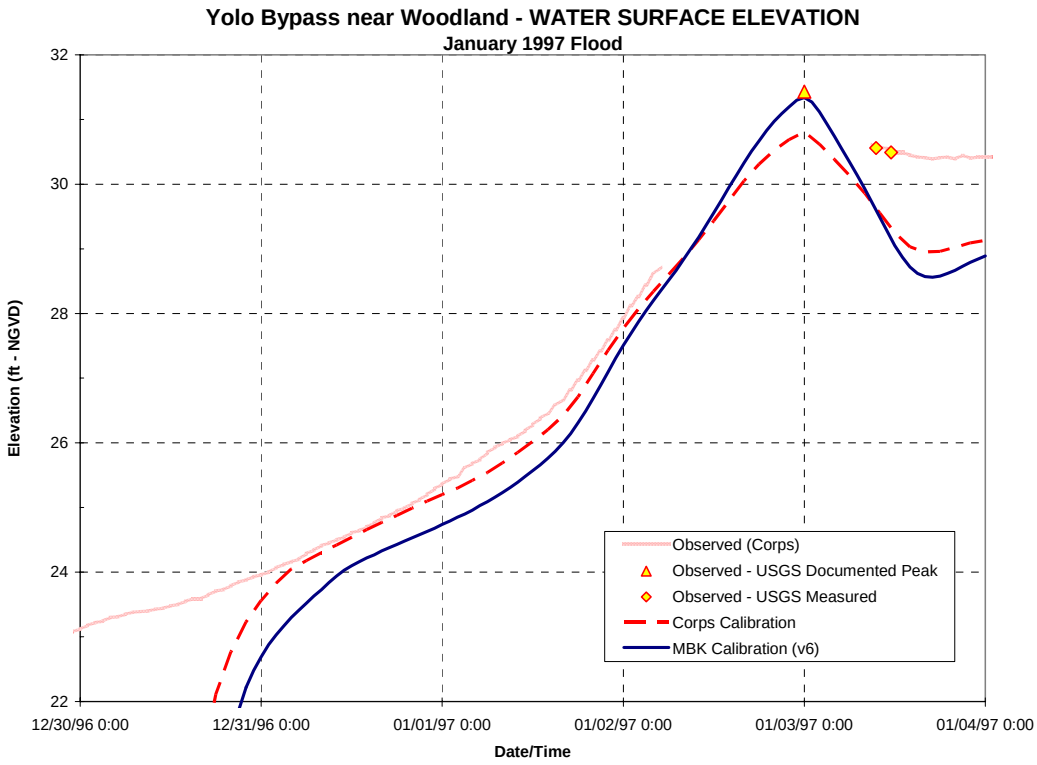


FIGURE 17

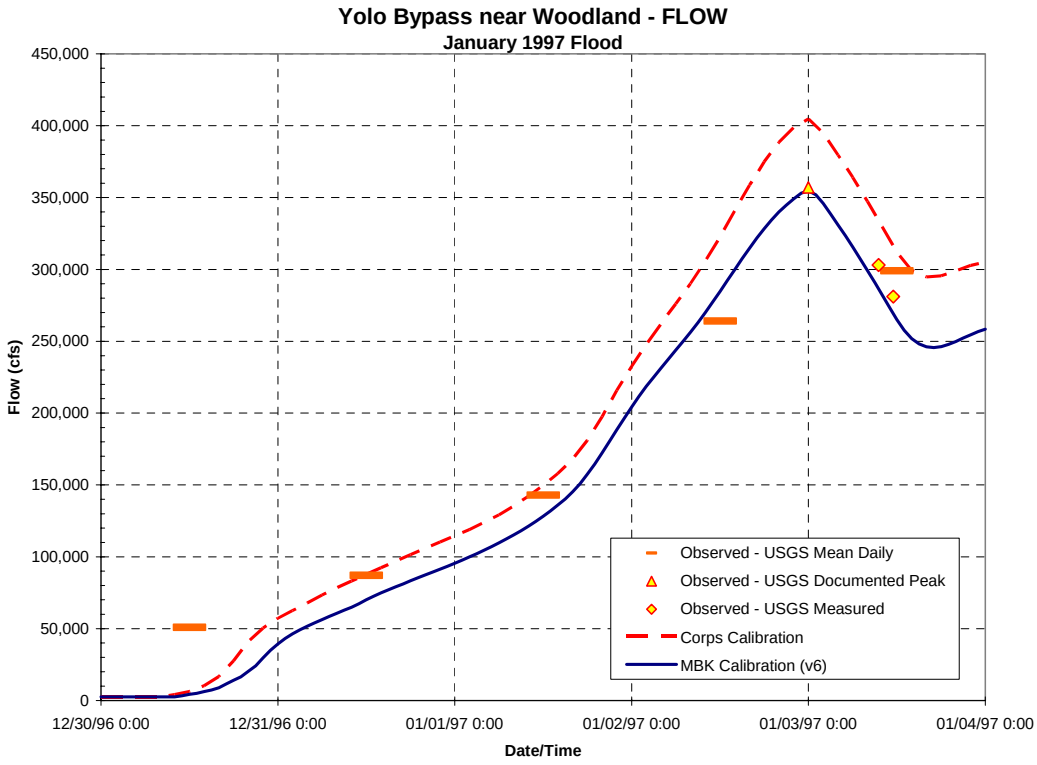


FIGURE 18

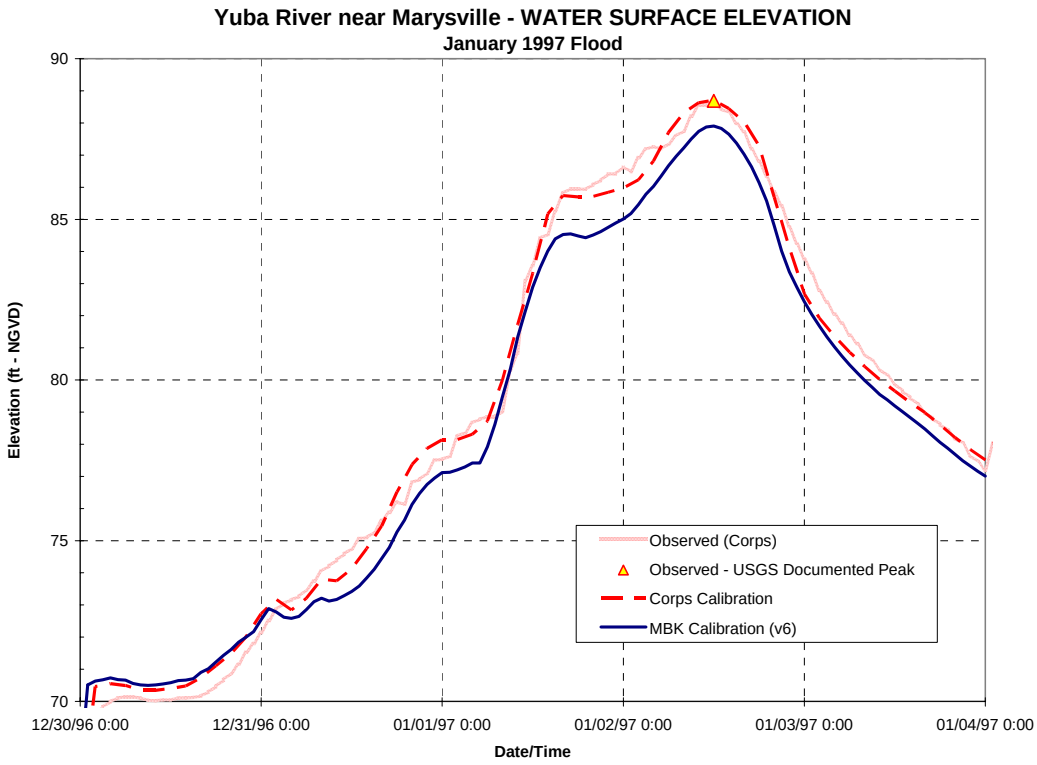


FIGURE 19

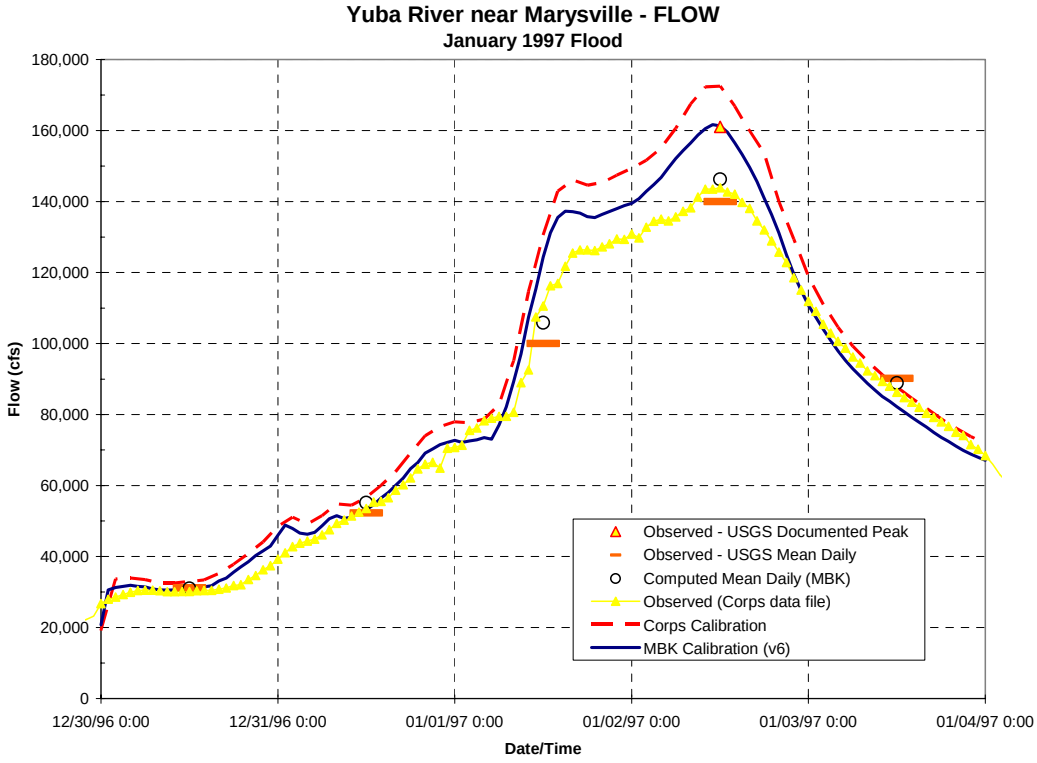
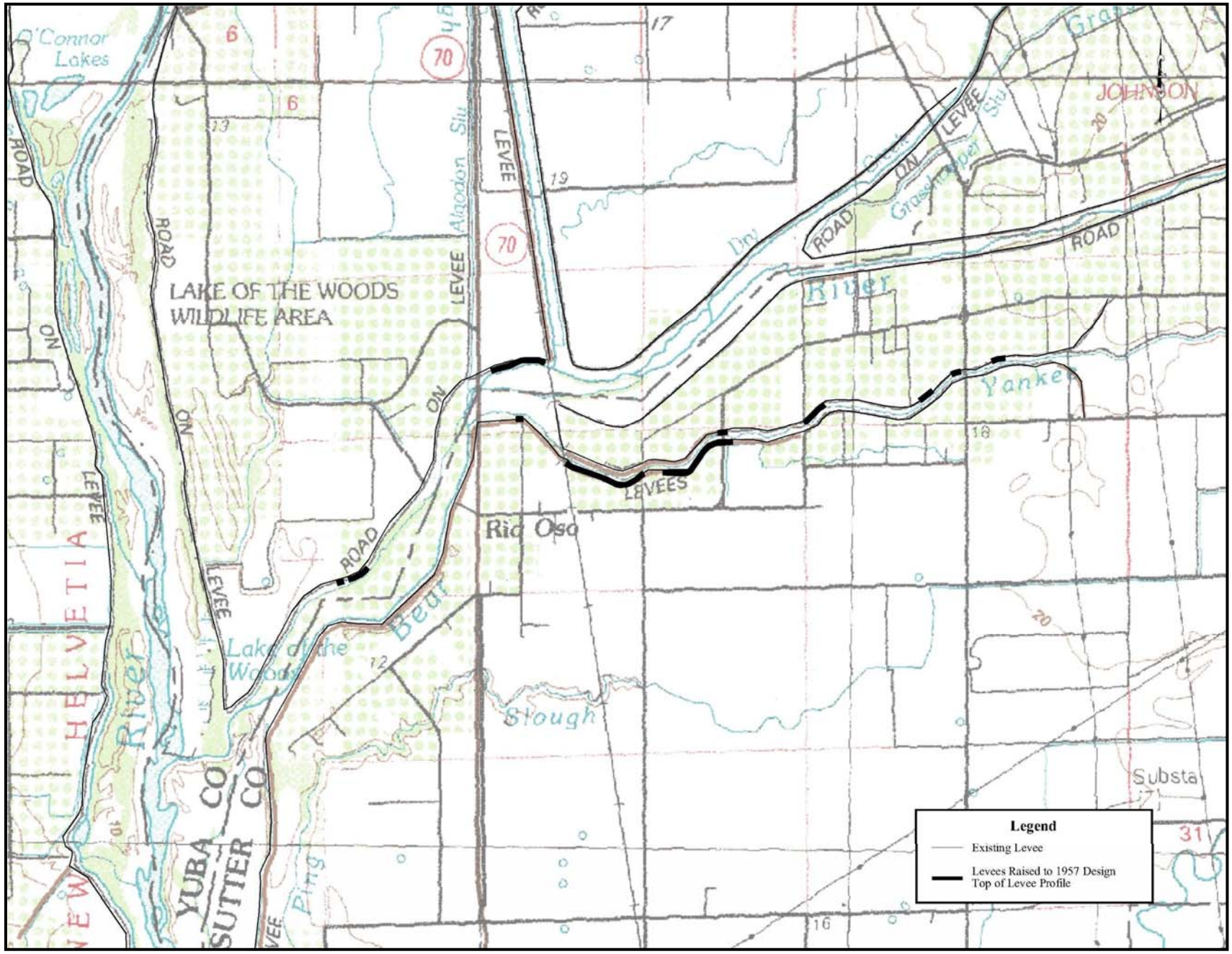
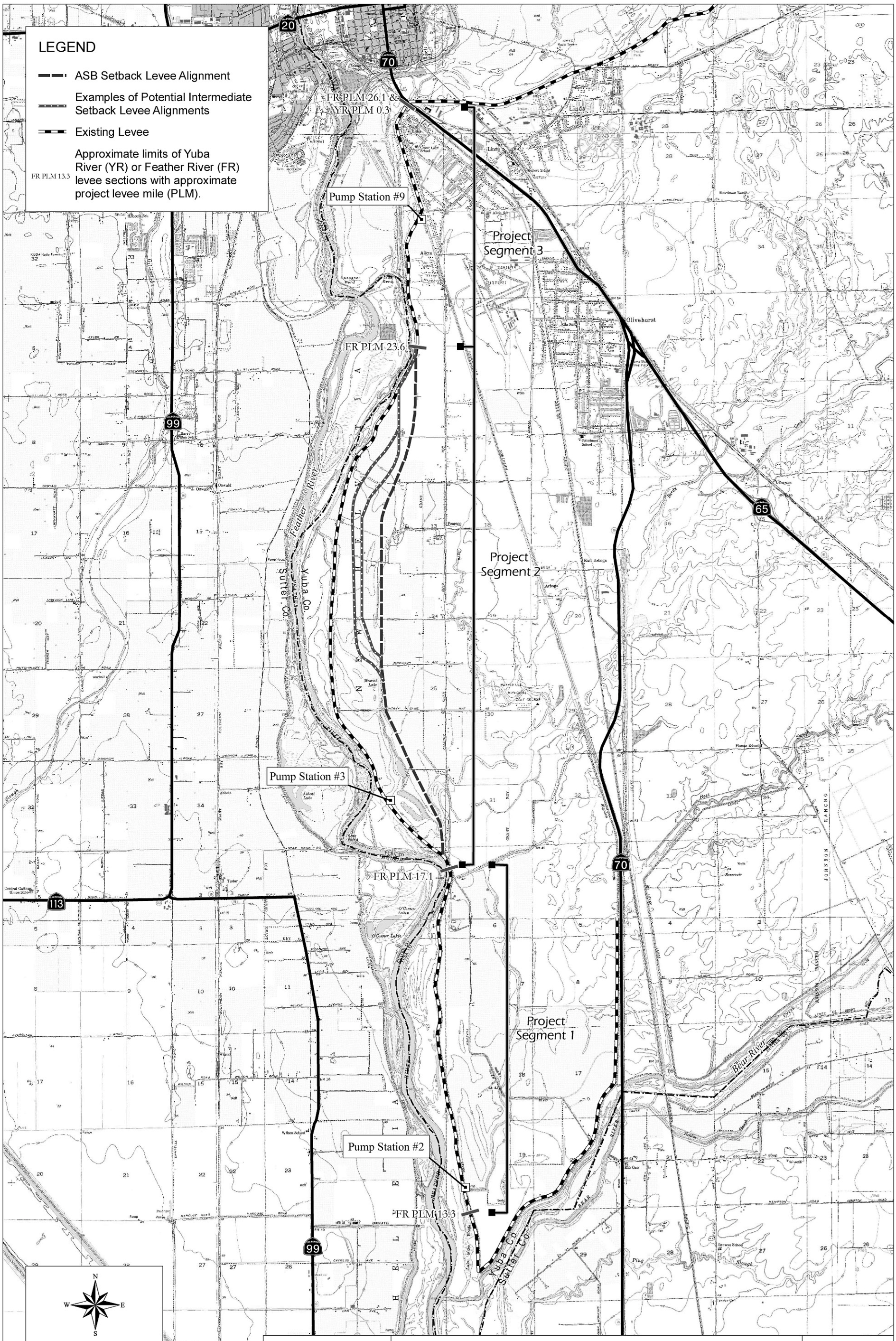


FIGURE 20
Levees Reaches Below 1957 Design Elevation





Bookman-Edmonston
A Division of GEI Consultants

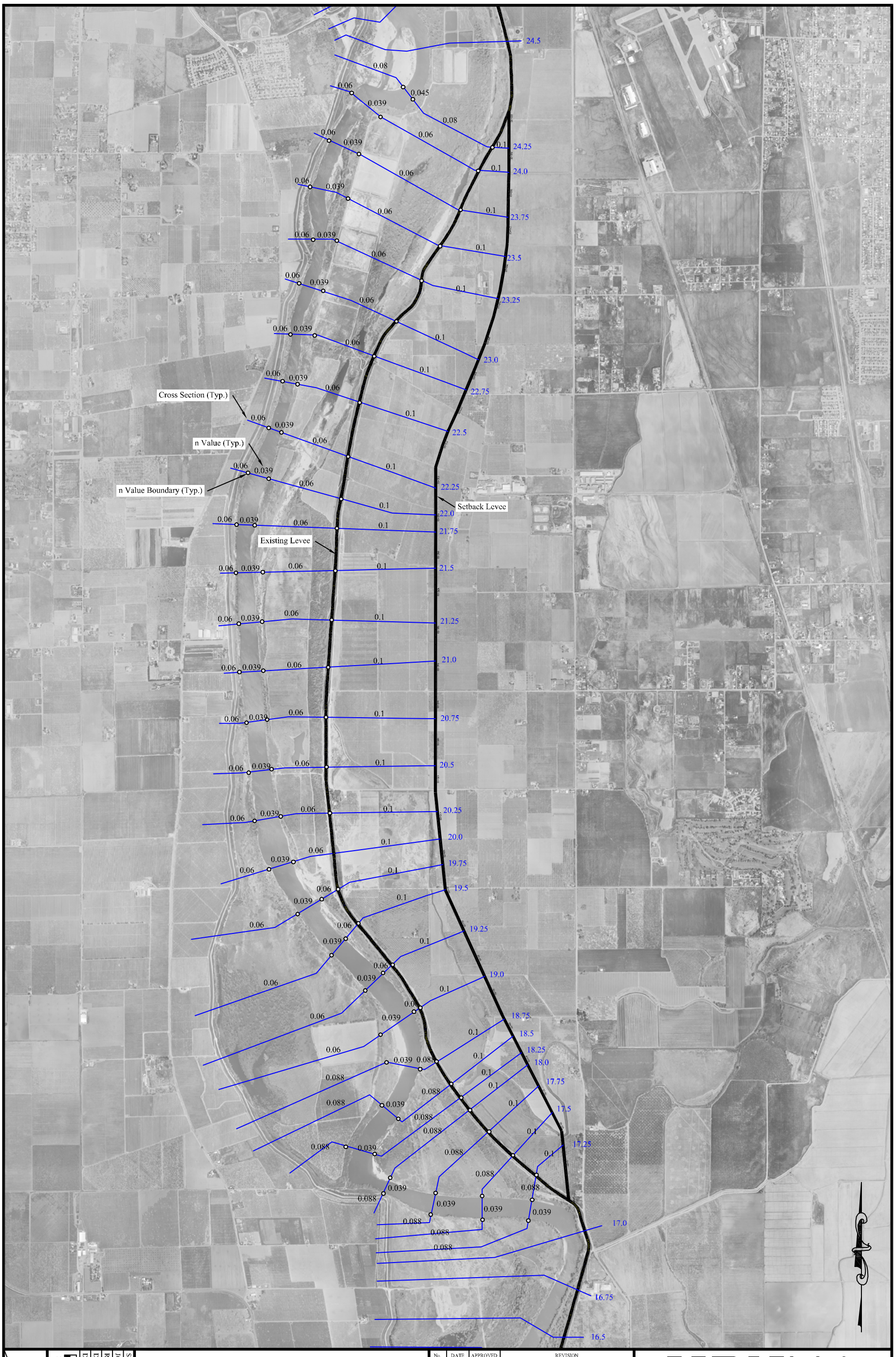
FEATHER RIVER LEVEE REPAIR PROJECT

Project Features

Reclamation District No. 784, Yuba County, California

Sources: EDAW 2004; GEI Consultants, Inc. 2004; Topo baseman provided by GEI Consultants, Inc.

FIGURE 21



Three Rivers Levee Improvement Authority
Phase IV

Alternative 2 Project Features

No.	DATE	APPROVED	REVISION

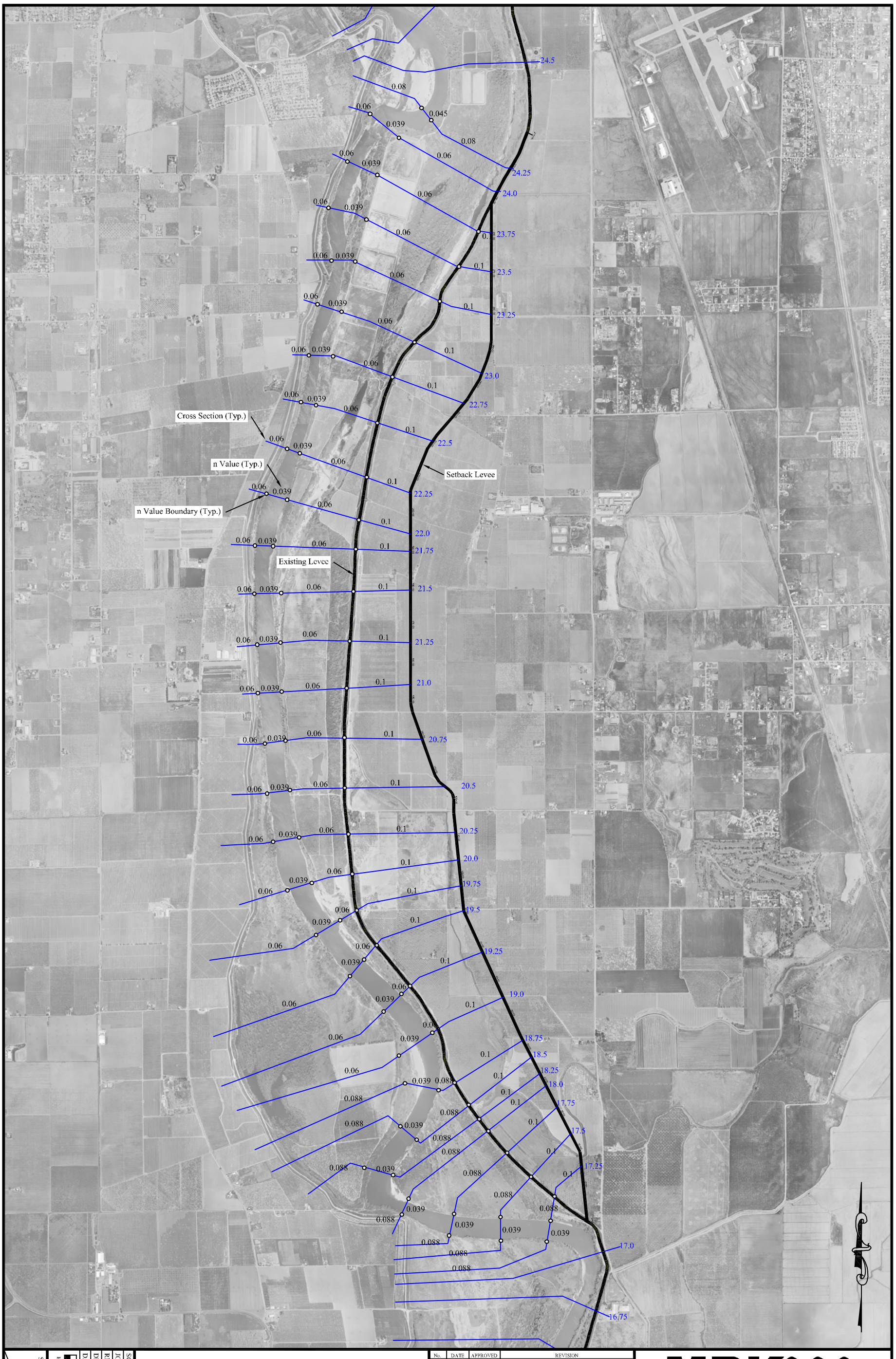
SCALE: 1" = 2500'
JOB NUMBER: 5141
REQUESTED BY: DT
DRAWN BY: DT
DATE: May 2006

Bar Length On Original Drawing Equals One Inch. Adjust Scale Accordingly.

SHEET 1 OF 1 SHEETS

MBK ENGINEERS
2450 Alhambra Boulevard, 2nd Floor
Sacramento, California 95817
Phone: (916) 456-4400 • Fax: (916) 456-0253

FIGURE 22



Three Rivers Levee Improvement Authority
Phase IV

Alternative 3 Project Features

No.	DATE	APPROVED	REVISION

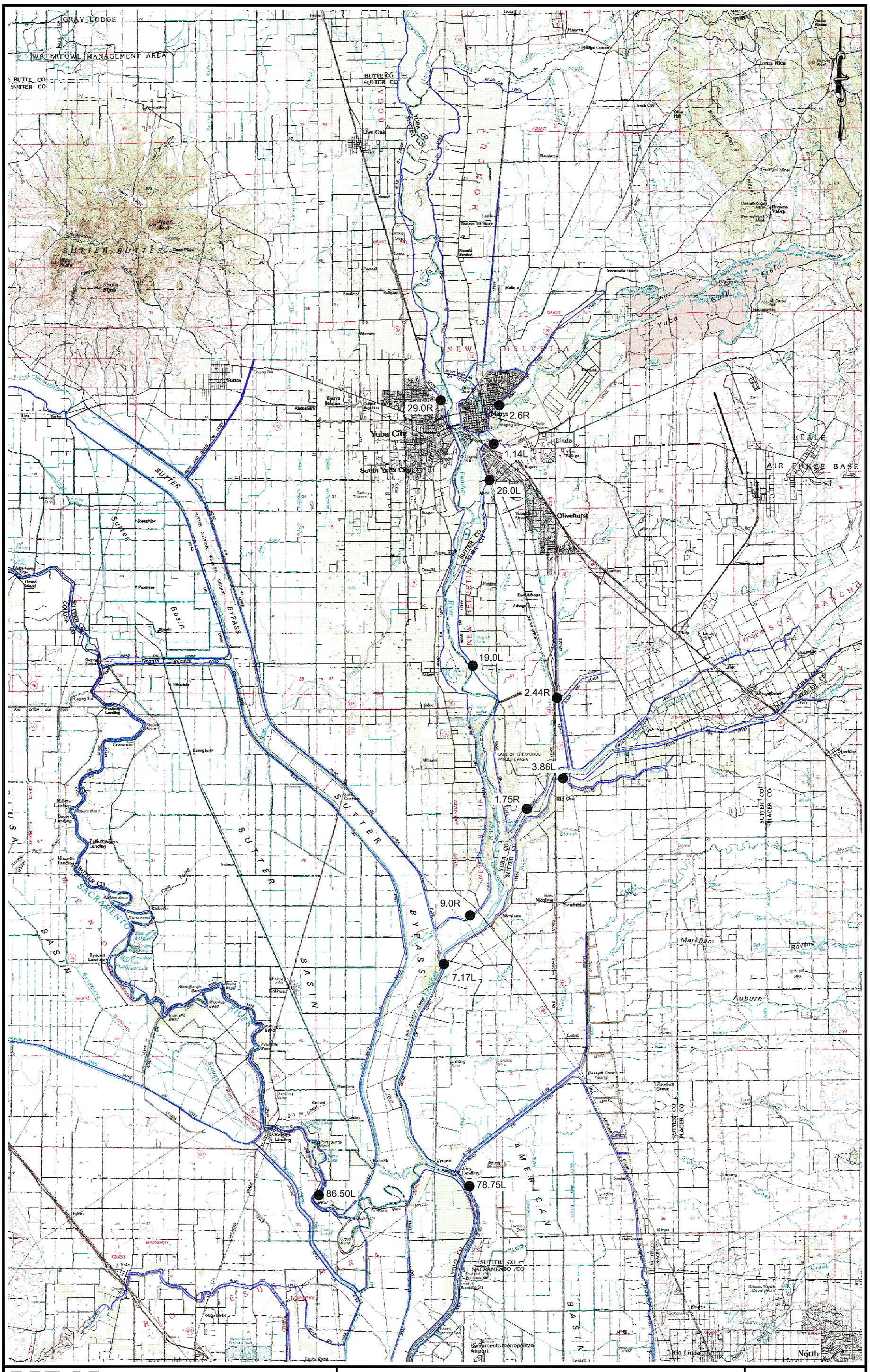
SCALE: 1" = 2500'
JOB NUMBER: 5141
REQUESTED BY: DT
DRAWN BY: DT
DATE: May 2006

Bar Length On Original Drawing Equals One Inch. Adjust Scale Accordingly

SHEET 1 OF 1 SHEETS

MBK ENGINEERS
2450 Alhambra Boulevard, 2nd Floor
Sacramento, California 95817
Phone: (916) 456-4400 • Fax: (916) 456-0253

FIGURE 23



MBK ENGINEERS
2450 Alhambra Boulevard, 2nd Floor
Sacramento, California 95817
(916) 456-4400

Feather River Levee Repair Project

Flood Impact Index Points

0 1.5 3
Scale in Miles

FIGURE 24

FIGURE 25

Feather River (RM 6 to 22)
1-in-100 AEP Water Surface Profile for Alternative 2

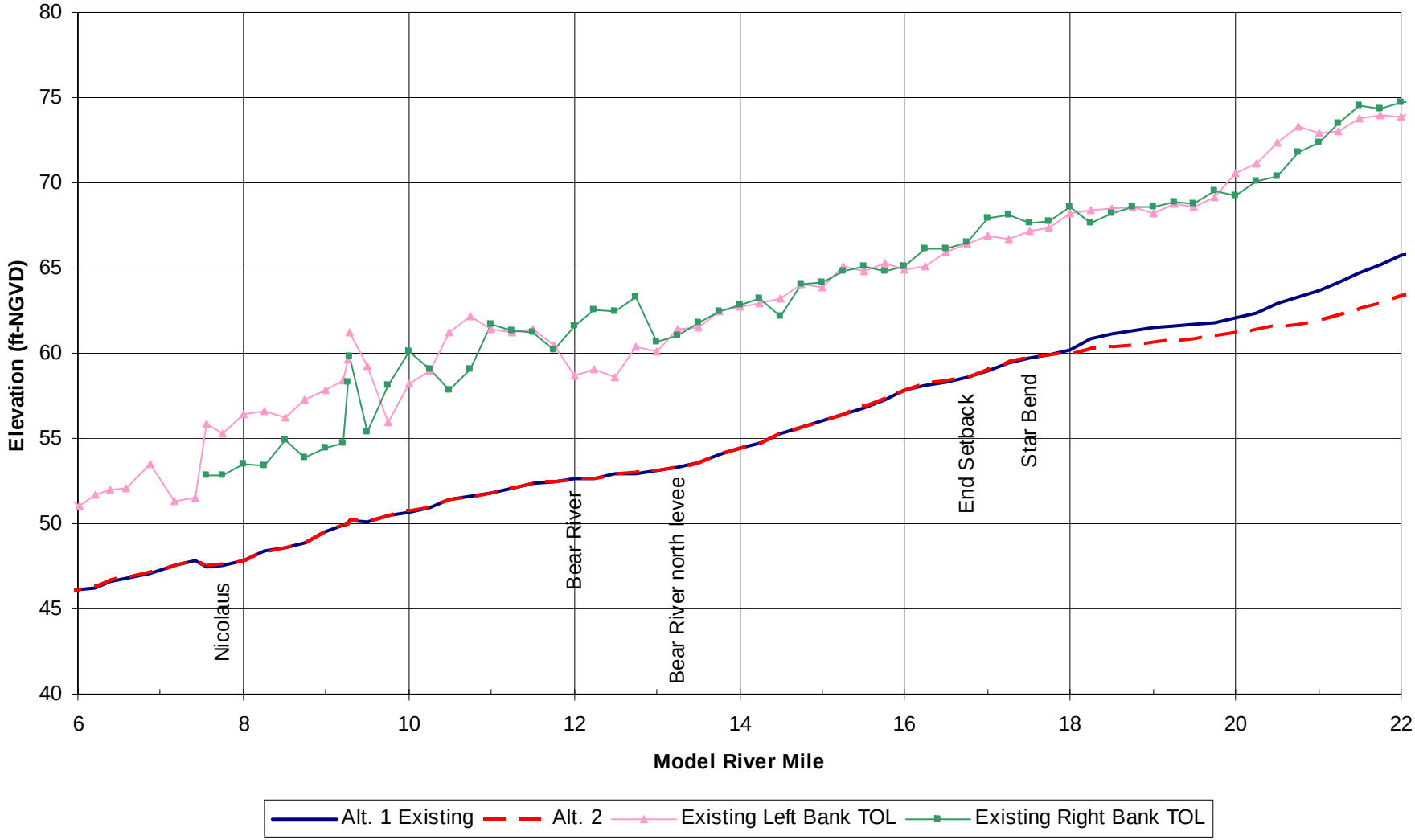


FIGURE 26

Feather River (RM 20 to 36)
1-in-100 AEP Water Surface Profile for Alternative 2

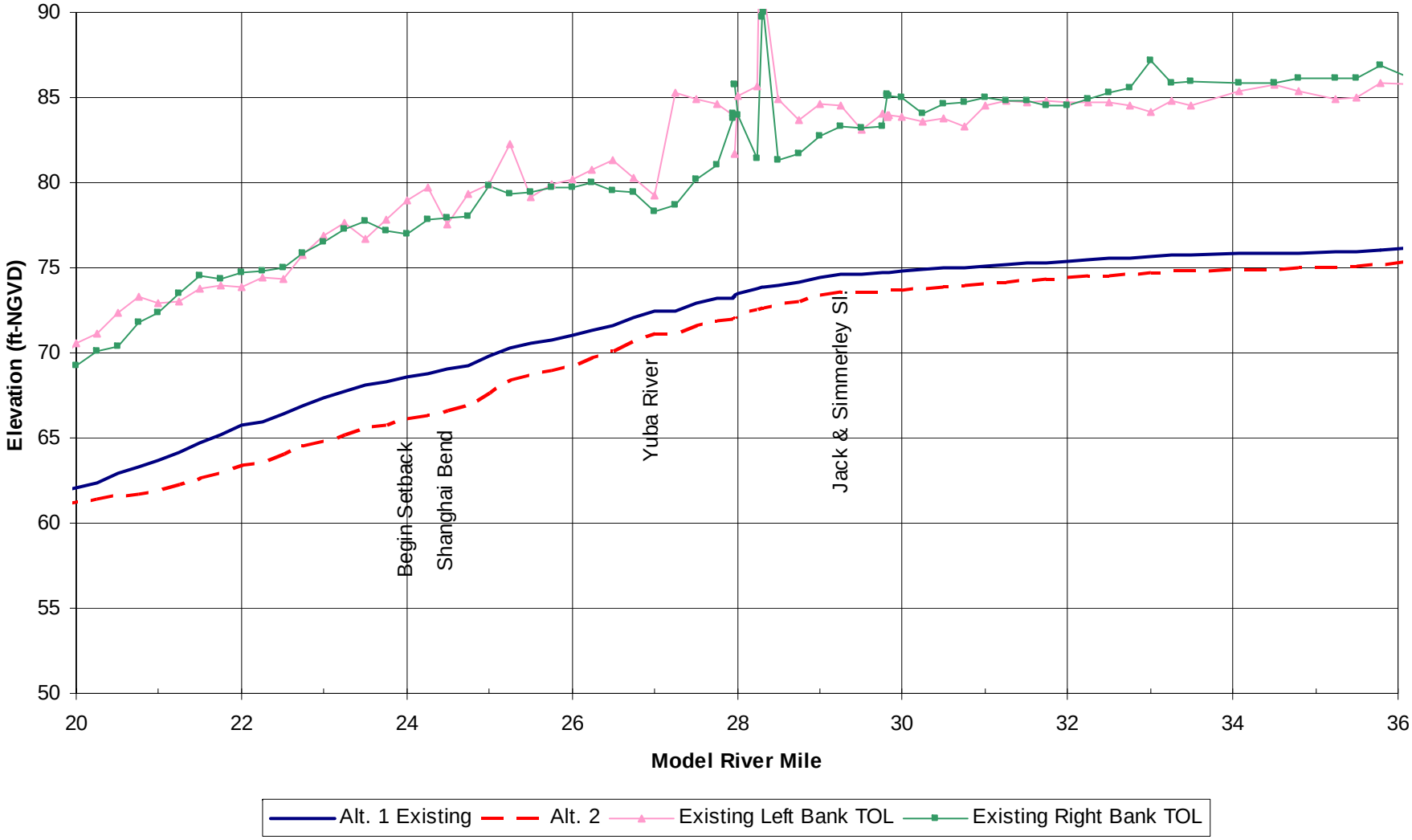


FIGURE 27

Feather River RM (34 to 50)
1-in-100 AEP Water Surface Profile for Alternative 2

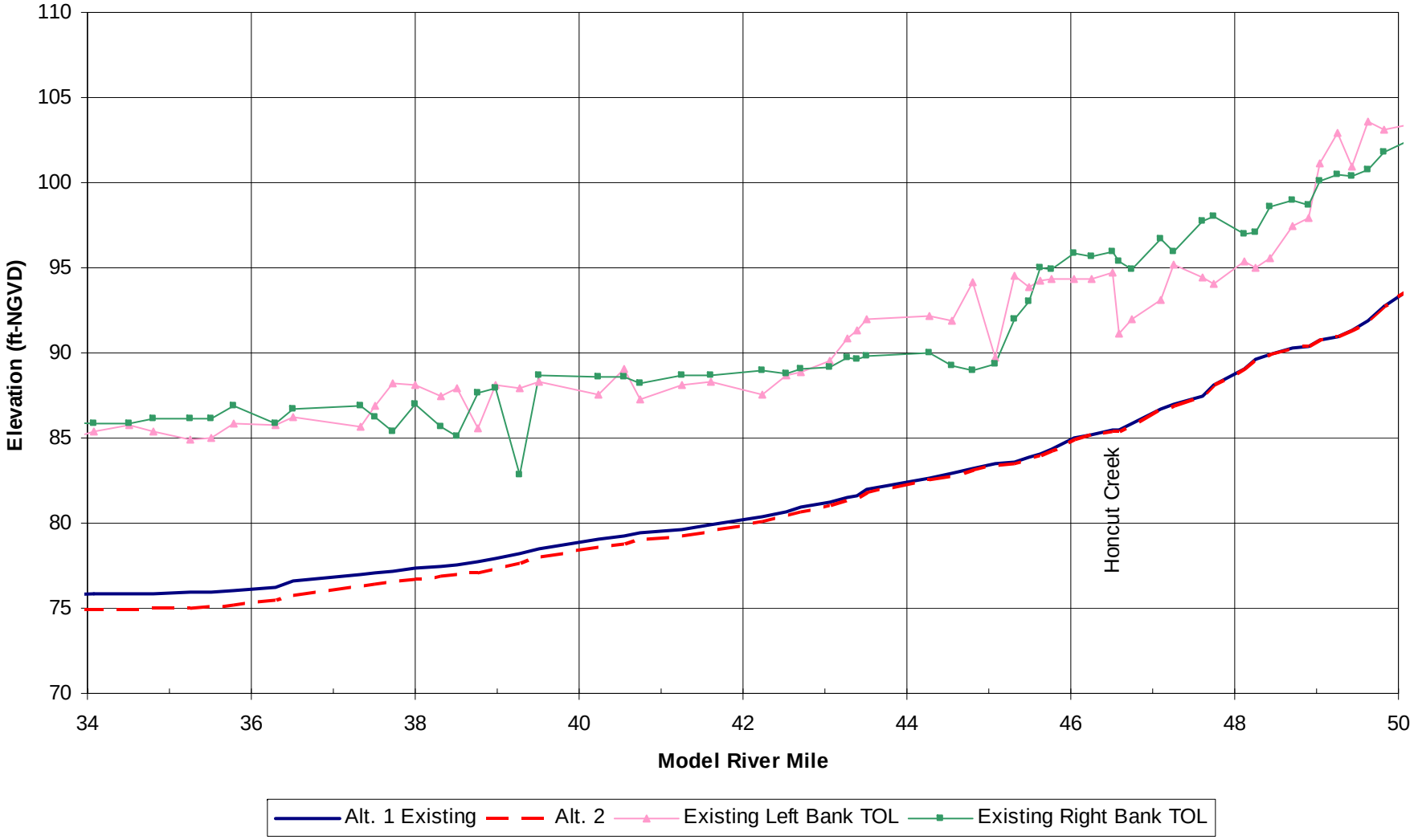


FIGURE 28

Feather River (RM 6 to 22)
1-in-200 AEP Water Surface Profile for Alternative 2

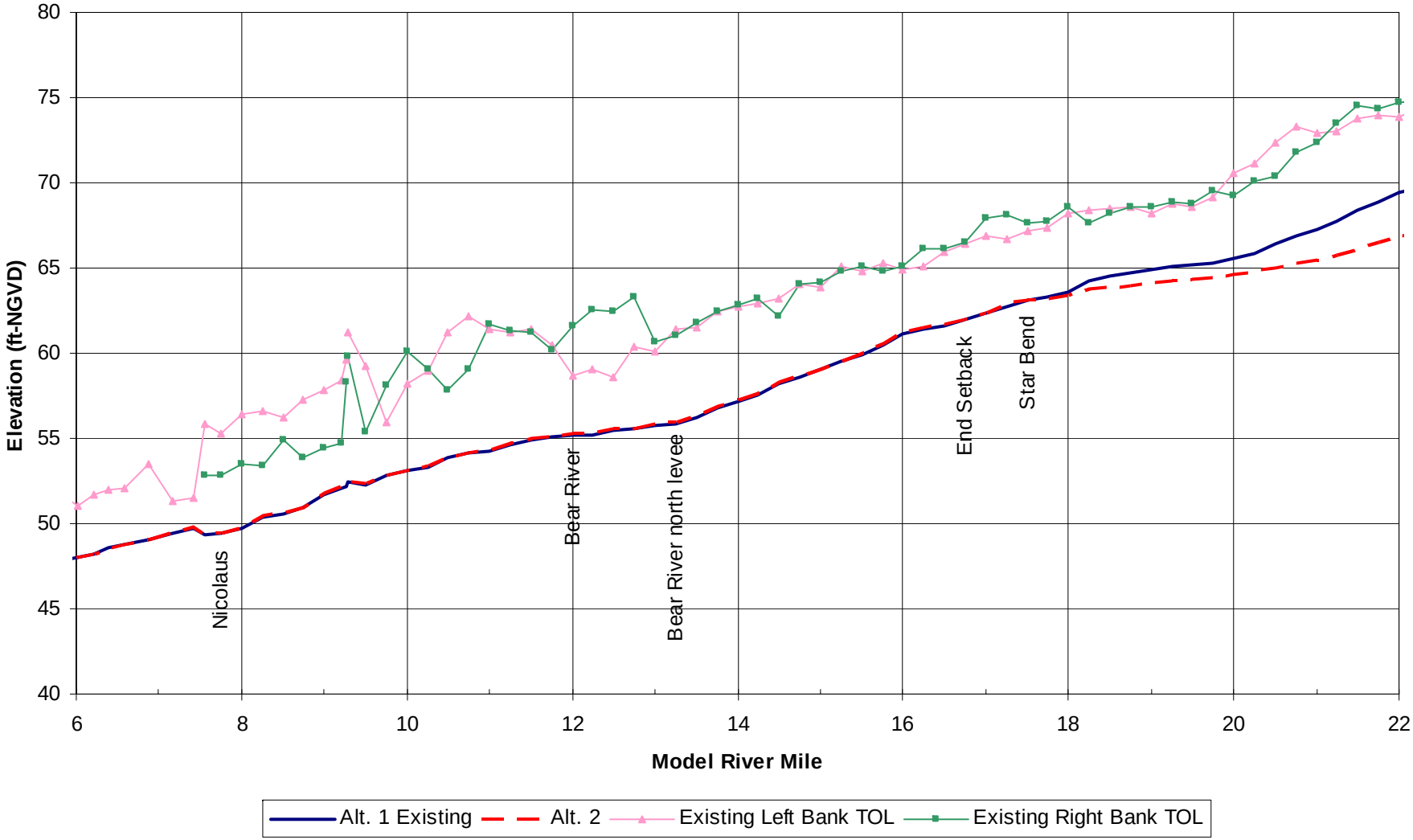


FIGURE 29

Feather River (RM 20 to 36)
1-in-200 AEP Water Surface Profile for Alternative 2

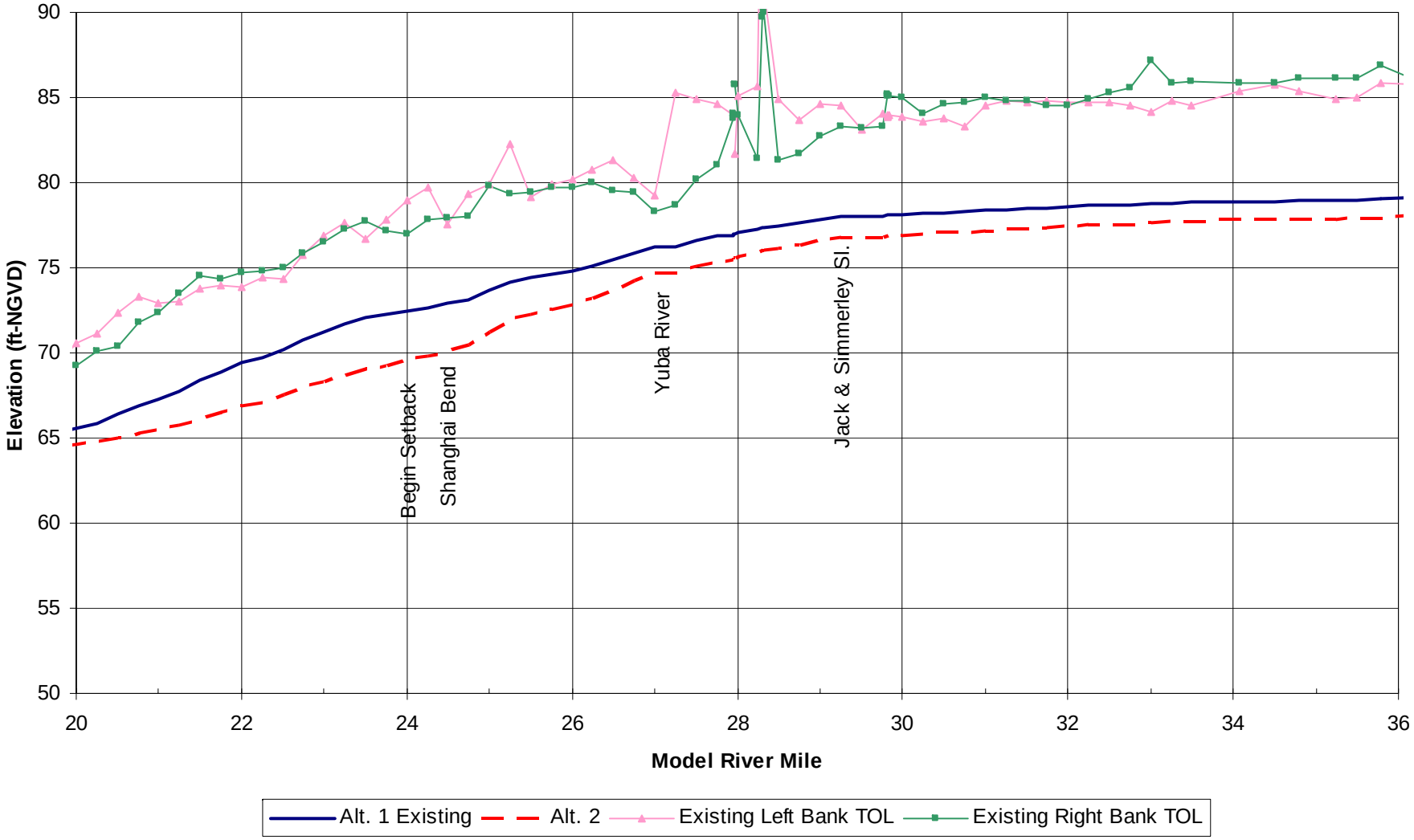


FIGURE 30

Feather River RM (34 to 50)
1-in-200 AEP Water Surface Profile for Alternative 2

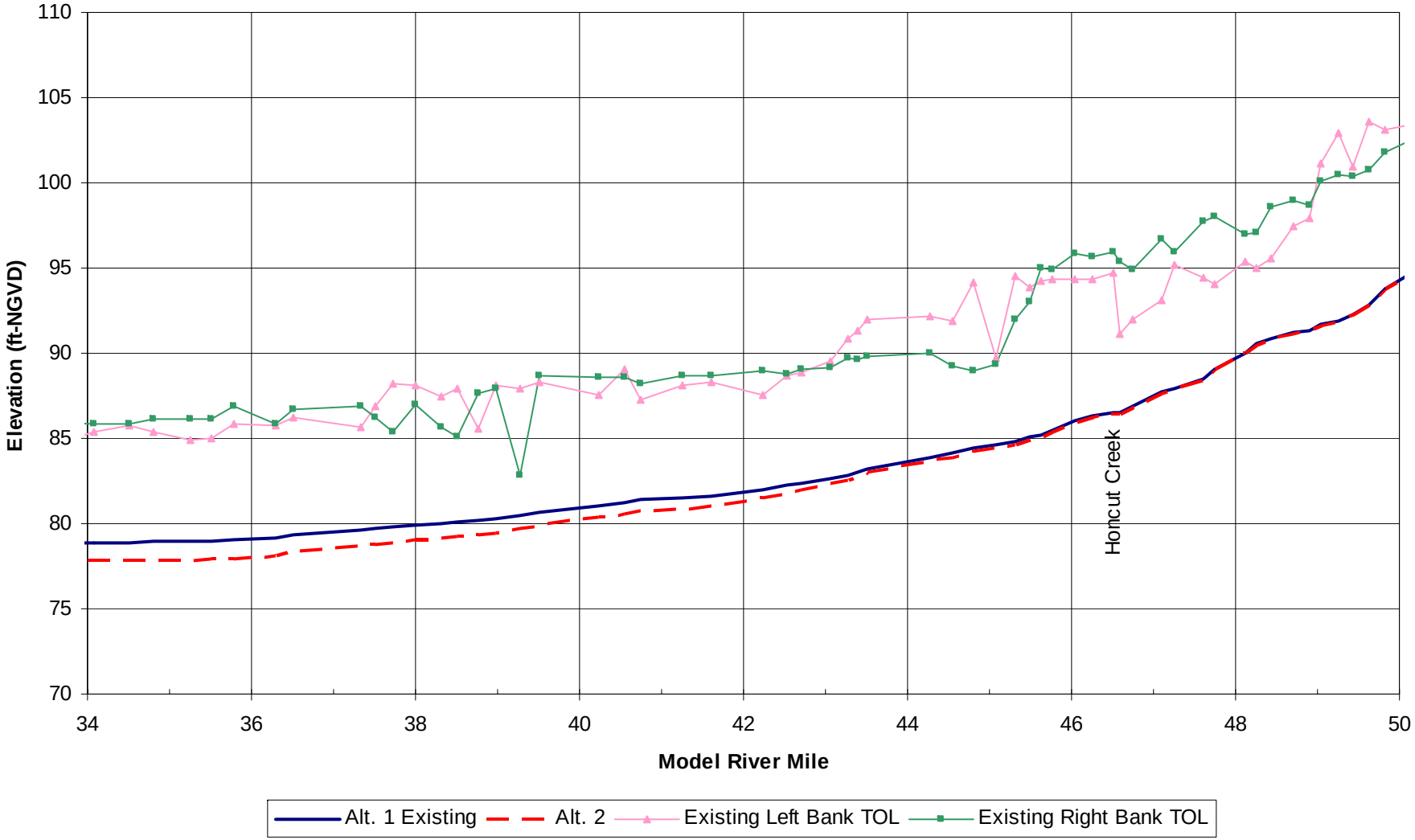


FIGURE 31

Feather River (RM 6 to 22)
1-in-100 AEP Water Surface Profile for Alternative 3

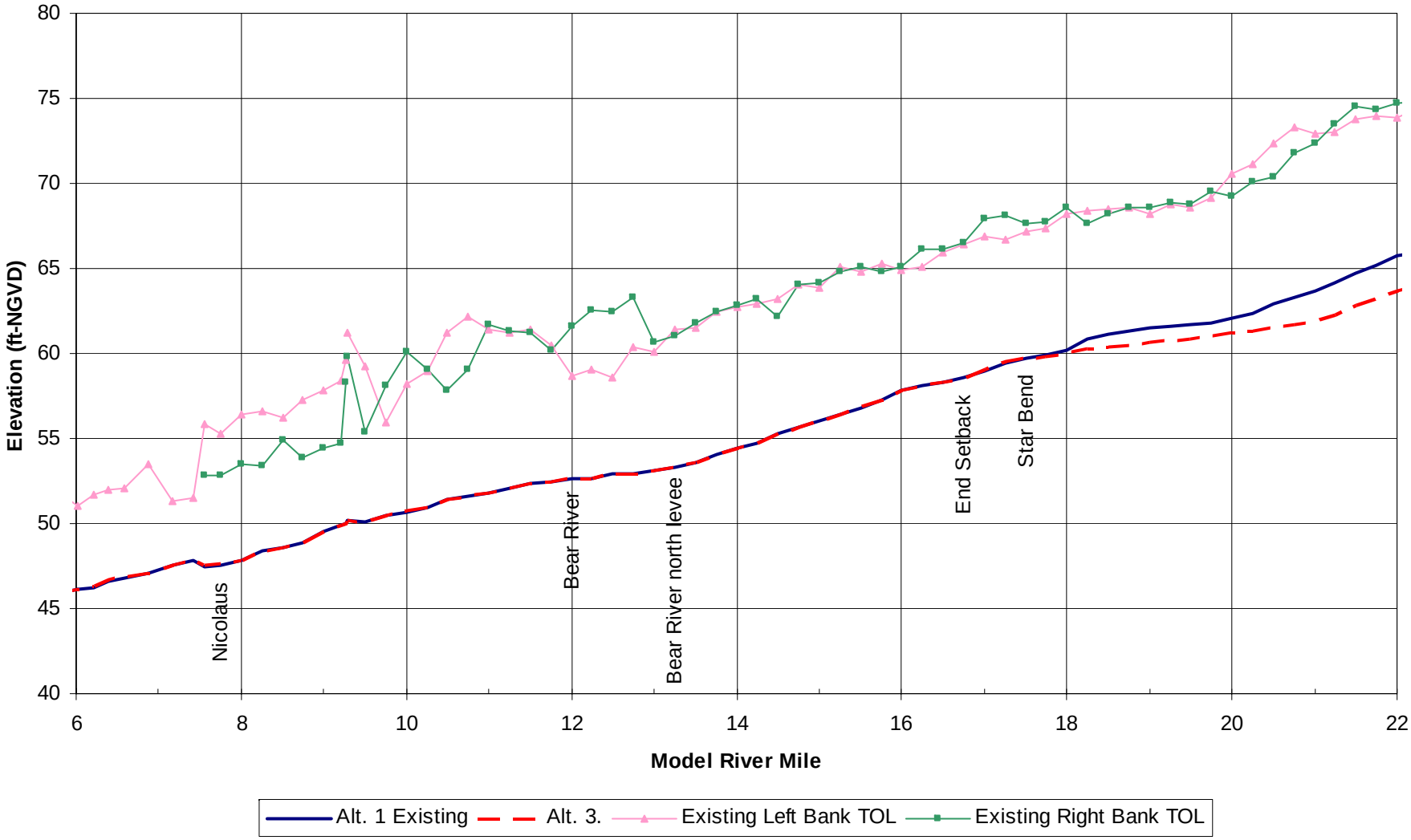


FIGURE 32

Feather River (RM 20 to 36)
1-in-100 AEP Water Surface Profile for Alternative 3

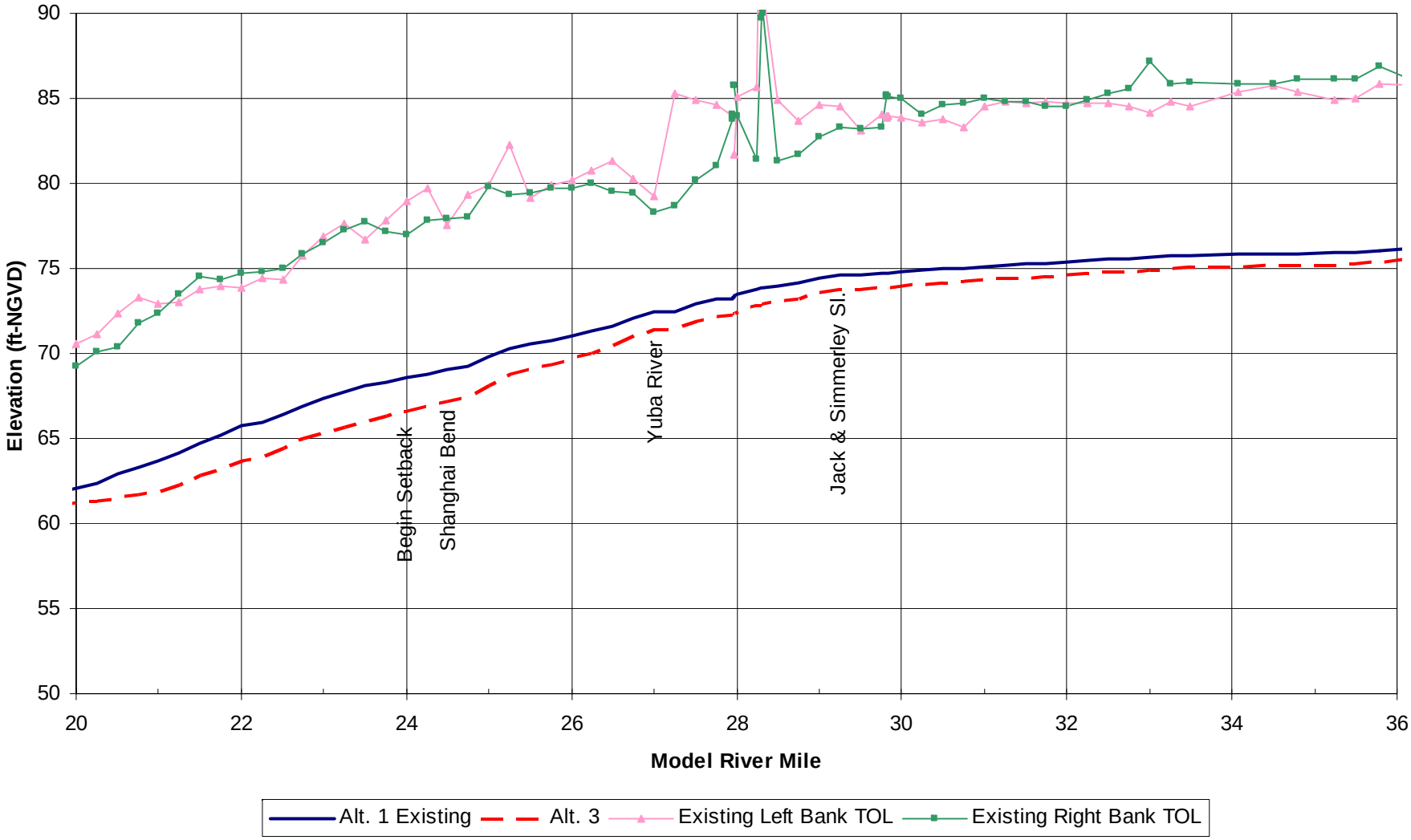


FIGURE 33

Feather River RM (34 to 50)
1-in-100 AEP Water Surface Profile for Alternative 3

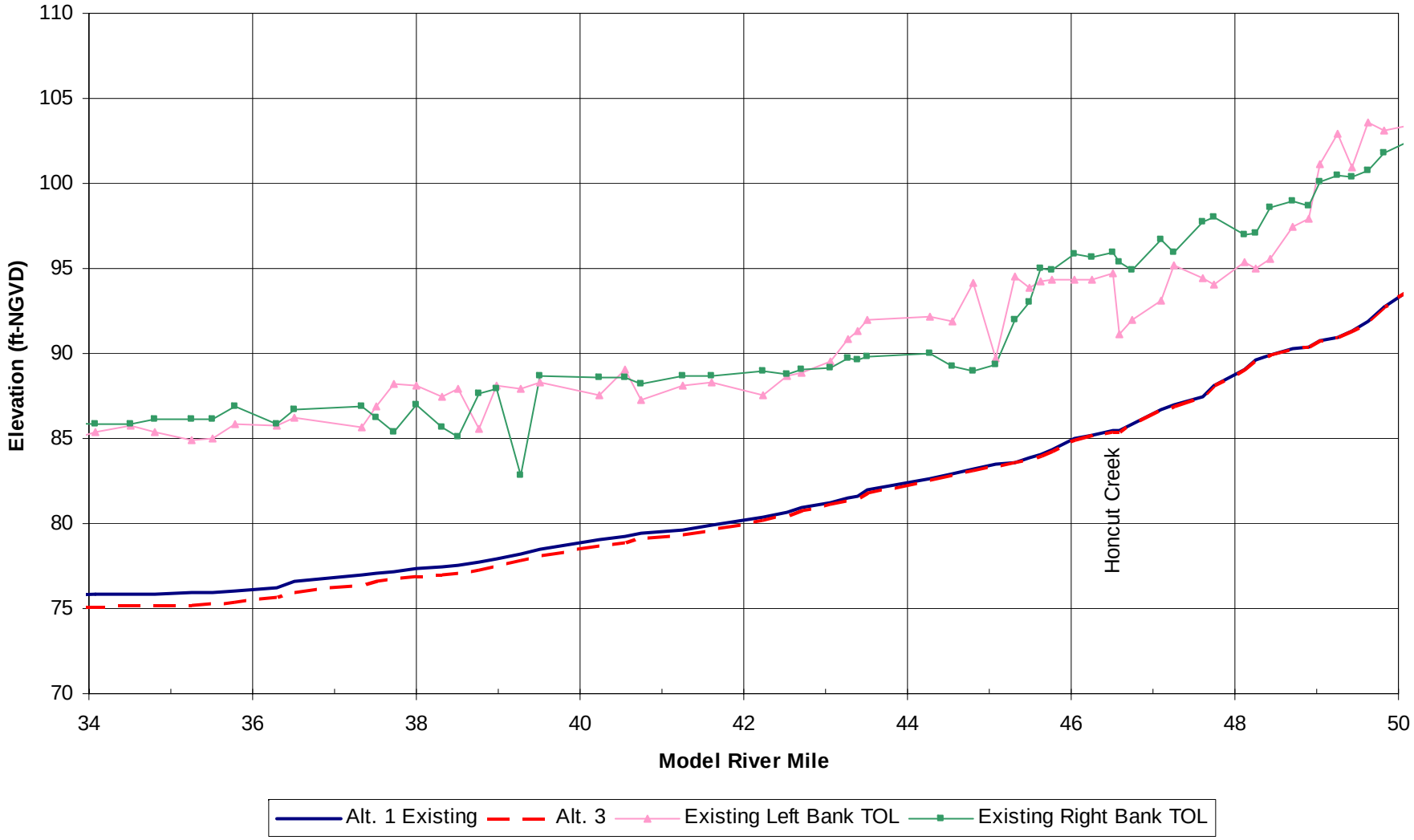


FIGURE 34

Feather River (RM 6 to 22)
1-in-200 AEP Water Surface Profile for Alternative 3

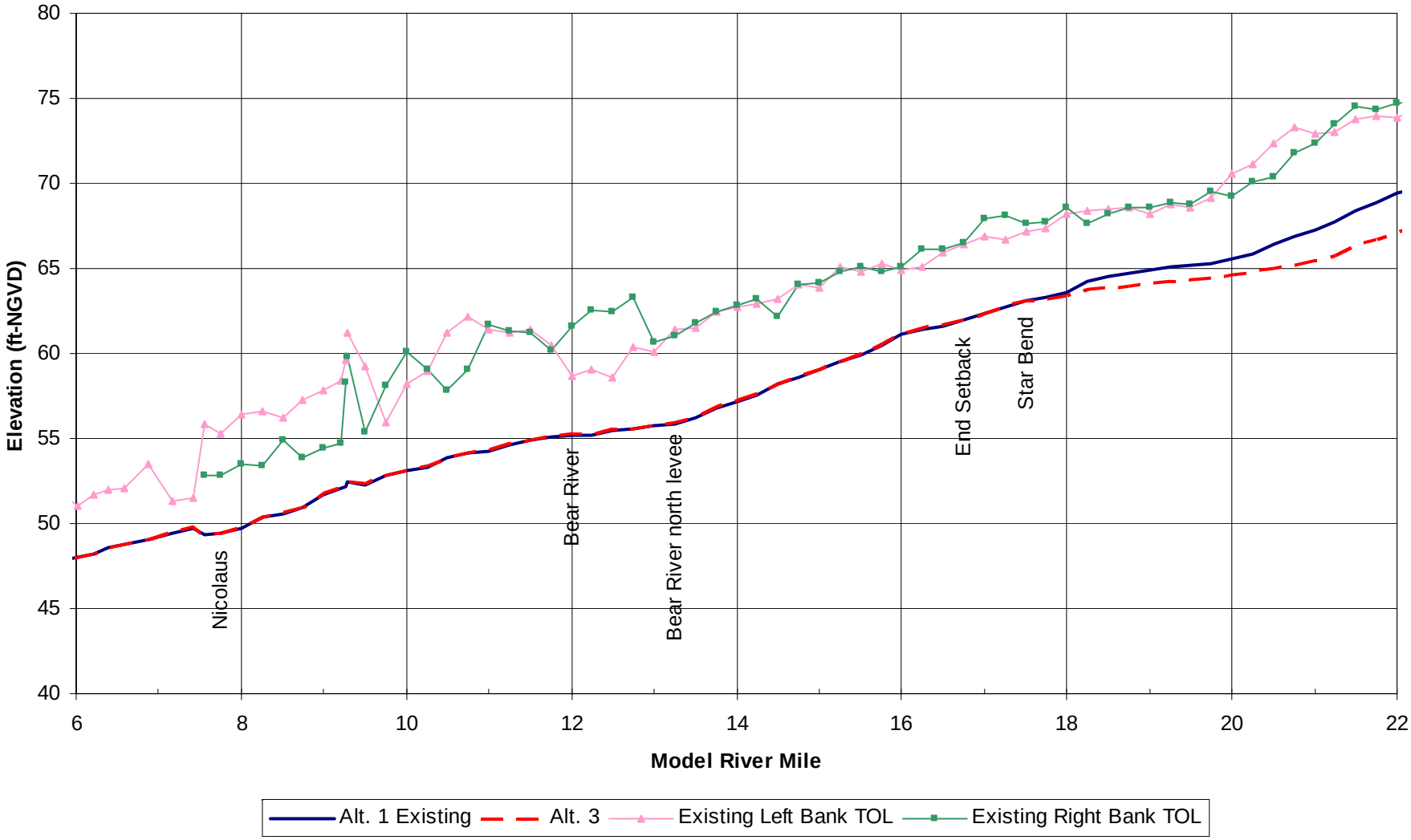


FIGURE 35

Feather River (RM 20 to 36)
1-in-200 AEP Water Surface Profile for Alternative 3

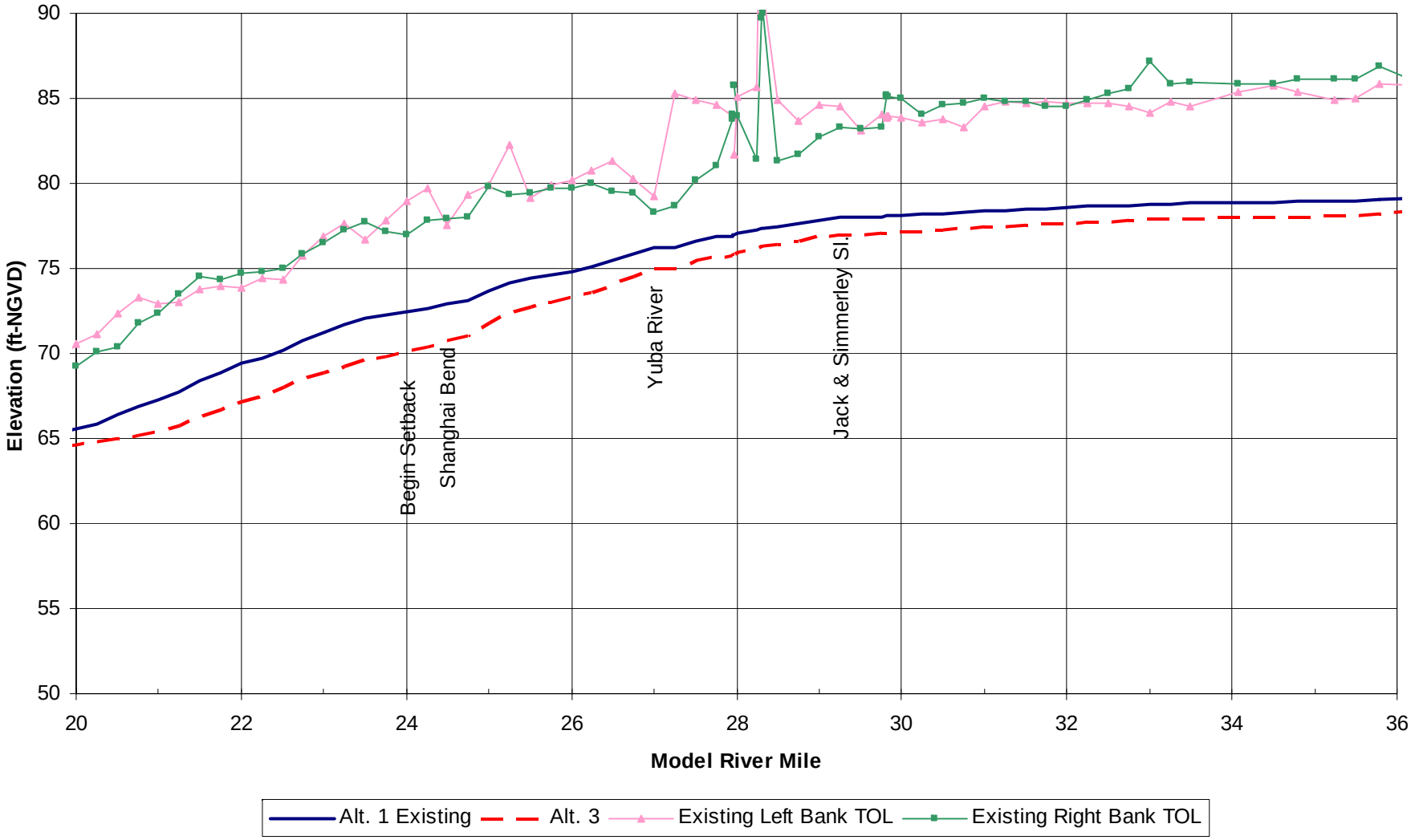
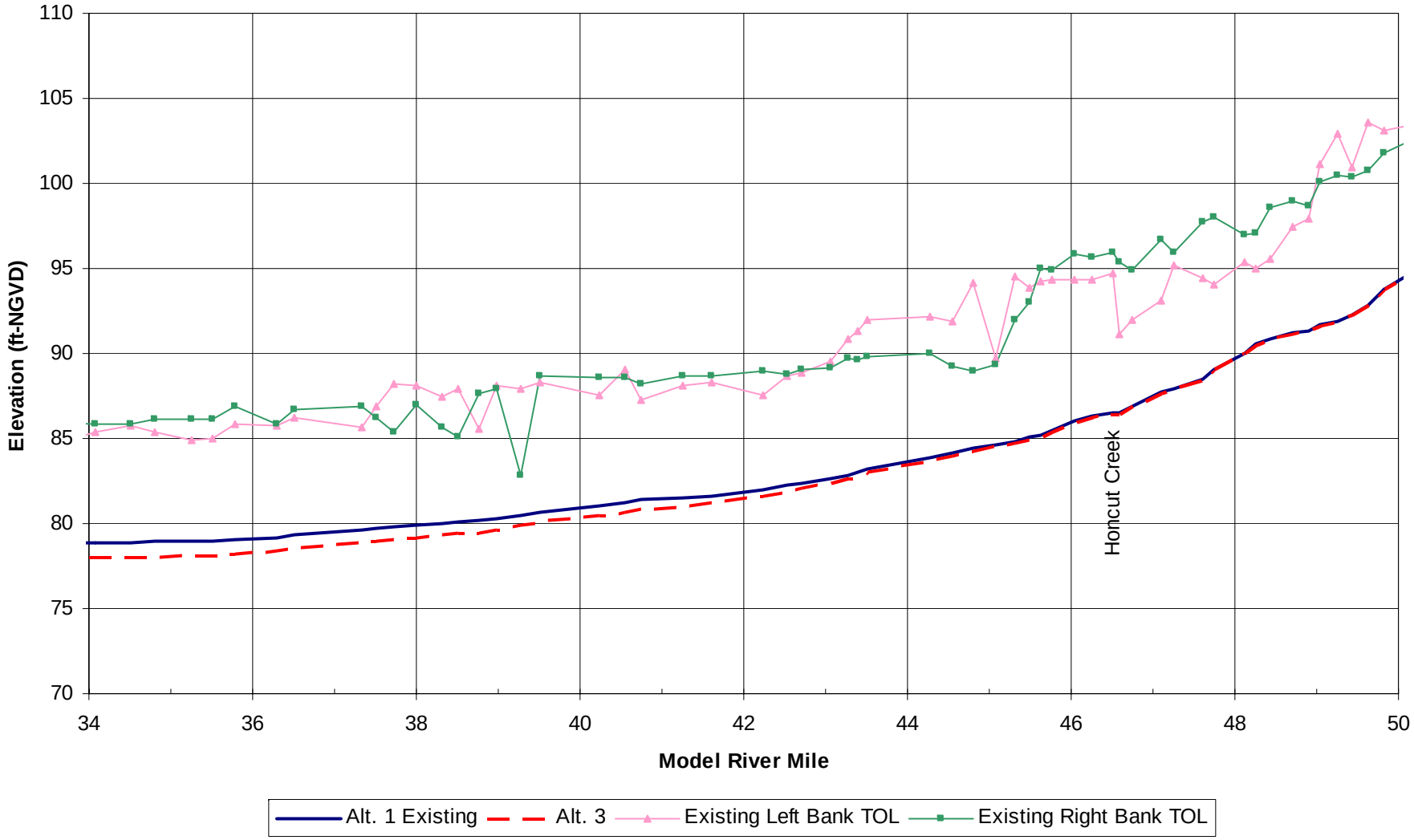
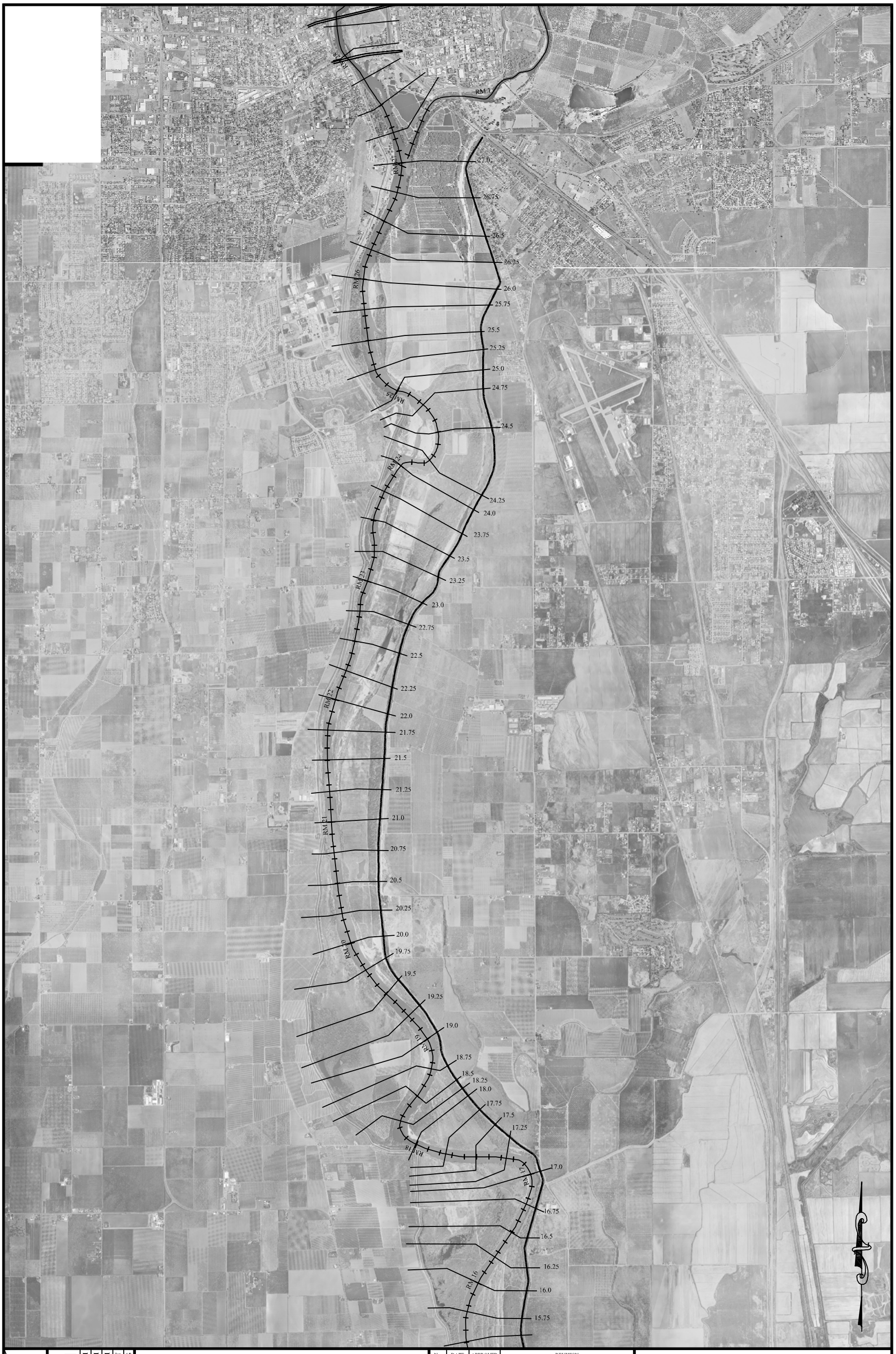


FIGURE 36

Feather River RM (34 to 50)
1-in-200 AEP Water Surface Profile for Alternative 3





Three Rivers Levee Improvement Authority
Phase IV

Feather River Cross Section Locations

No.	DATE	APPROVED	REVISION

MBK ENGINEERS
2450 Alhambra Boulevard, 2nd Floor
Sacramento, California 95817
Phone: (916) 456-4400 • Fax: (916) 456-0253

SCALE: 1" = 4000'
JOB NUMBER: 5141
REQUESTED BY: DT
DRAWN BY: DT
DATE: May 2006

Bar Length On Original Drawing Equals One Inch. Adjust Scale Accordingly.

SHEET 1 OF 1 SHEETS

FIGURE 37

APPENDIX C

Geomorphic Analysis

Draft Report

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Geomorphic Assessment of Project Alternatives for Feather River Levee Improvements Between the Bear and Yuba Rivers

Prepared for

Bookman Edmonston - GEI

and

Three Rivers Levee Improvement Authority

Prepared by

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1. SUMMARY AND CONCLUSIONS

1.1 BACKGROUND

TRILIA is planning to improve levees on the east bank of the Feather River between Project Levee Mile (PLM) 13.3 and 26.1 along the east bank of the Feather River and from PLM 0.0 to 0.3 along the south bank of the Yuba River (Figure 1-1). The levee improvements are planned to strengthen flood protection in a constricted reach of the Feather River where there are erosion concerns and which constitutes a flow constriction. Three project alternatives have been proposed:

Alternative 1. Strengthen the existing levees in their current location.

Alternative 2. Strengthen the existing levees and set back the levees between River Mile (RM) 25 and RM 17.75 along an alignment that is maximum of approximately 2,500 feet east of the present alignment (the "ASB setback levee" alternative).

Alternative 3. Strengthen the existing levees and set back the levees between River Mile (RM) 25 and RM 17.75 along an alignment that is a maximum of approximately 1,500 feet east of the present alignment (the "intermediate setback levee" alternative).

PWA performed an assessment as part of the CEQA environmental review process including the following tasks:

1. Review of existing sediment and geomorphic studies including the WET Report (1991), Ayres and Associates Report (1997), Feather River Levee EIR (2003), and Oroville Relicensing Report (DWR, 2004).
2. Review of historic data on channel migration rates and locations.
3. Geomorphic reconnaissance of the project area by boat.
4. Comparison of hydraulic model (HEC-RAS) output produced by MBK Engineers with published values for bank erosion thresholds (Fischenich, 2001).
5. Comparison of with- and without-project shear stresses using data from MBK Engineers.
6. Development of a shear stress index to compare with- and without-project erosion potential accounting for the cumulative effects of both high and low frequency flood events.
7. Qualitative assessment of the likely effects of the three alternatives on erosion and sedimentation rates and patterns in the Feather River.

1.2 CONCLUSIONS

1. Comparison of historic maps shows that the Feather River has had a consistent channel configuration since the start of the 20th century. However, within that overall configuration the WET report (WET, 1991) reveals that the area around Star Bend has undergone migration of approximately 1.6 feet per year and Shanghai Bend has migrated by approximately 10.3 feet per year. The bend below Shanghai Bend has migrated by 22.7 feet per year.

2. Between the 1850s and 1912 the Feather River aggraded by approximately 20 feet in the project area in response to the deposition of hydraulic mining debris transported from goldfields along the Yuba River, and as a result, lost sinuosity. Between 1912 and 1992 the river incised by between 4 and 20 feet through the sediment as damming and the cessation of hydraulic mining lowered sediment inputs, with most lowering occurring before the 1960s (Ayres, 1997). There is still a pronounced knick zone and headcut at RM 24.6 which has been observed to slowly migrate upstream over time.

3. PWA conducted a geomorphic reconnaissance and found areas of accelerated or active erosion concentrated in three river bank locations: around the north bank of the Yuba River near the confluence with the Feather River, in a reach from RM 24 to RM 26 encompassing Star Bend and the knick zone, and around Shanghai Bend from RM 17 to RM 19.

4. Alternative 1 (*levee strengthening in place*) is expected to have less than significant geomorphic impacts on the Feather River. Since the levee width, height and hydraulic roughness will be very similar to existing conditions there should not be any significant change in hydraulic characteristics or in the resulting sediment erosion and transport characteristics of the Feather River. Local erosion and sediment control (BMPs and revegetation) will be required during and after construction work on the levee and its surroundings to prevent erosion and sediment from being generated by grading and newly exposed bare earth surfaces.

5. Alternative 2 (*ASB setback levee*) is expected to increase the width of flood flows and decrease the depth and velocity of flood flows in the setback area, while leaving the roughness of the floodplain similar to existing conditions. (The latter assumption could change if environmental enhancement is carried out in the setback area. This scenario was not assessed.) Overall Alternative 2 is expected to have less than significant impacts.

   5.1. Alternative 2 will have the same need for local erosion and sediment control on newly graded surfaces as Alternative 1. Provided that standard BMPs and revegetation are carried out, there are not expected to be significant geomorphic impacts from construction and grading.

   5.2. Alternative 2 is expected to have no significant effect between the lower boundary of the project (RM 12.5 at the Bear River confluence) and RM 17.

5.3. Alternative 2 between RM 17 and RM 23 (encompassing Star Bend) will lower average boundary shear stresses during flows higher than the 5-year flood and will reduce the risk of bank and levee erosion compared with existing conditions. The estimated reduction in shear stress index (an estimate of the cumulative impacts of flood events) at Star Bend under Alternative 2 is 3% for the channel and 14% for the overbank area (including the levees).

5.4. Alternative 2 between RM 24.25 and the upstream project boundaries is estimated to slightly change shear stresses during flows equal to or greater than the 5-year flood. This reach includes Shanghai Bend and the knick zone downstream. Shear stress index in the vicinity of Shanghai Bend and the knick zone is estimated to increase by 5 to 8% for the channel and to vary by a decrease of 4% to an increase of 8% in the overbank area (including the levees). In the Feather and Yuba Rivers upstream of the setback levee the increase in shear stress index is 3 to 6% for both the channel and the overbank areas.

5.5. It is possible that Alternative 2 could slightly accelerate the rate of channel bank erosion in some locations upstream of the levee setback area unless shear stresses are mitigated by bank protection. Existing and predicted stresses are high enough to erode bare, non-cohesive and weakly cohesive alluvial sediments but are within the range that can be mitigated by vegetation covers or rock protection. There is also potential for Alternative 2 to slightly accelerate the headward migration of the knick zone upstream, contributing to channel bank erosion in the bend downstream of Shanghai Bend (east bank). However, the cumulative increase in shear stress over a 100-year period is small in the context of natural variations in erosion forces, and the impact on the channel banks is less than significant.

5.6. Alternative 2 will slightly increase shear stresses along the levees upstream of the setback area. However, the increase is very slight in the context of natural variations in erosion forces, the magnitude of erosive stresses is within the resistance tolerance of levee materials, and the impact on the levees is less than significant.

6. Alternative 3 (*intermediate setback*) is expected to increase the width of flood flows and decrease the depth and velocity of flood flows in the setback area, while leaving the roughness of the floodplain similar to existing conditions. (The latter assumption could change if environmental enhancement is carried out in the setback area. This scenario was not assessed.) Overall Alternative 3 is expected to have less than significant impacts.

6.1. Alternative 3 will have the same need for local erosion and sediment control on newly graded surfaces as Alternatives 1 and 2. Provided that standard BMPs and revegetation are carried out there are not expected to be significant geomorphic impacts from construction and grading.

6.2. Alternative 3 is expected to have no significant effect between the lower boundary of the project (RM 12.5 at the Bear River confluence) and RM 17.

6.3. Alternative 3 between RM 17 and RM 23 (encompassing Star Bend) will lower average boundary shear stresses during flows higher than the 5-year flood and will reduce the risk of bank and levee erosion compared with existing conditions. The estimated reduction in shear stress index at Star Bend under Alternative 3 is 3% for the channel and 14% for the overbank area (including the levees).

6.4. Alternative 3 between RM 24.25 and the upstream project boundaries is estimated to slightly increase shear stresses during flows equal to or greater than the 5-year flood. This reach includes Shanghai Bend and the knick zone downstream. Shear stress index in the vicinity of Shanghai Bend and the knick zone is estimated to increase by 5 to 7% for the channel and to vary from neutrality to an increase of 7% in the overbank area (including the levees). In the Feather and Yuba Rivers upstream of the setback levee the increase in shear stress index is 2 to 4% for the channel and the overbank areas.

6.5. It is possible that Alternative 3 could slightly accelerate the rate of channel bank erosion in some locations upstream of the levee setback area unless shear stresses are mitigated by bank protection. Existing and predicted stresses are high enough to erode bare, non-cohesive and weakly cohesive alluvial sediments but are within the range that can be mitigated by vegetation covers or rock protection. There is also potential for Alternative 3 to slightly accelerate the headward migration of the knick zone upstream, contributing to channel bank erosion in the bend downstream of Shanghai Bend (east bank). However, the cumulative increase in shear stress over a 100-year period is small in the context of natural variations in erosion forces, and the impact on the channel banks is less than significant.

6.6. Alternative 3 will slightly increase shear stresses along the levees upstream of the setback area. However, the increase is very slight in the context of natural variations in erosion forces, the magnitude of erosive stresses is within the resistance tolerance of levee materials, and the impact on the levees is less than significant.

7. Ayres, (1997) raises the possibility that reductions in sediment delivery to the Feather River could trigger channel asymmetry and subsequently greater rates of lateral channel migration. This hypothesis was not directly tested and no sediment transport assessment was carried out as part of this study. The reduction in boundary shear stress between RM 24 and RM 17 under Alternatives 2 and 3 could result in an increase in sediment trapping, and thus a reduction in sediment delivery downstream of RM 17. However, increased sediment trapping in the setback reach is likely to be partially balanced by increased erosion upstream, so there may be little net change in sediment delivery to the downstream reach. In addition, the downstream reach is relatively wide and has a densely vegetated riparian corridor between the banks and the levee, so it is less sensitive to an increase in lateral migration tendency than other reaches. It is therefore unlikely that Alternatives 2 or 3 will have a significant effect on channel stability downstream of RM 17.

8. The area of land that would be reconnected to the Feather River under Alternatives 2 and 3 has a high restoration potential. Preliminary comparisons of elevation at the site compared with the Bear – Feather River confluence suggests that the setback area would be inundated on an annual or bi-annual basis and would provide for physical and biological processes that would be highly conducive for floodplain habitat restoration

2. DESCRIPTION OF PROPOSED PROJECT (EDAW, 2005)

Studies by the DWR, Corps, and TRLIA indicate that several reaches of the left (east) Feather River levee between the mouth of the Yuba River and the Reclamation District No. 784 (RD 784) Pump Station No. 2 do not satisfy geotechnical criteria for seepage at the 100-year water surface (EDAW, 2006). In addition, constrictions in the Feather and Bear Rivers create backwater effects that raise the flood stage at upstream locations. Most of the levee system in Yuba County was constructed during the 1920s using construction practices of that era. This EIR evaluates three alternative levee improvement projects (shown in Figure 2-1):

- Alternative 1 – Strengthen the existing Feather River left bank levee from Project Levee Mile (PLM) 13.3 to 26.1, and the Yuba River left bank levee from PLM 0.0 to 0.3 (Pump Station No. 2 to the mouth of the Yuba River). This alternate is referred to as *Levee Strengthening* in subsequent sections.

- Alternative 2 - Strengthen the existing Feather River left bank levee from PLM 13.3 to 17.1 and PLM 23.6 to 26.1, and the Yuba River left bank levee from PLM 0.0 to 0.3 (below Star Bend and from approximately the private road east of the Yuba County Airport to the Yuba River), and construct a new setback levee along approximately the 2003 Above-Star-Bend (ASB) setback levee alignment (ASB Setback Levee) between approximately Feather River levee PLM 17.1 and 23.6. This alternate is referred to as *ASB Setback Levee* in subsequent sections.

- Alternative 3 - Strengthen the existing Feather River left bank levee from PLM 13.3 to 17.1 and PLM 23.6 to 26.1, and the Yuba River left bank levee from PLM 0.0 to 0.3 (below Star Bend and from approximately the private road east of the Yuba County Airport to the Yuba River), and construct a new setback levee along an intermediate setback levee alignment (Intermediate Setback Levee) between approximately Feather River levee PLM 17.1 and 23.6. This alternate is referred to as *Intermediate Setback Levee* in subsequent sections.

The subject levee is divided into three segments as follows:

- Segment 1 - Existing Feather River left bank levee from PLM 13.3 to 17.1 (Pump Station No. 2 to Star Bend). Repairs to this segment of the levee are identical for each alternative and would consist of strengthening the existing levee in place to improve seepage and/or stability deficiencies.

- Segment 2 - Existing Feather River left bank levee from approximately PLM 17.1 and 23.6 (Star Bend to approximately west of the Yuba County Airport). This component is different for each alternative and is briefly described below.
  - Alternative 1 - strengthen the existing levee in place to improve seepage and/or stability deficiencies.
  - Alternative 2 – replace the existing levee with a new setback levee approximately along the ASB Setback Levee alignment studied as part of the 2003 feasibility report (ASB Setback Levee).
  - Alternative 3 – replace the existing levee with a new setback levee with an alignment mostly west of the 2003 ASB Setback Levee (Intermediate Setback Levee).
  - Relocation and replacement of the existing RD 784 Pump Station No. 3 is also included with Segment 2. The work would be similar for each alternative, although the location of the new pump station would depend on the alternative.
- Segment 3 - Existing Feather River left bank levee from PLM 23.6 to 26.1, and the Yuba River left bank levee from PLM 0.0 to 0.3 (west of the Yuba County Airport to the railroad crossing at the Highway 70 Bridge). Repairs to this segment of the levee are identical for each alternative and would consist of strengthening the existing levee in place to improve seepage and/or stability deficiencies.

3. PROJECT GEOMORPHIC SETTING AND HISTORY

3.1 PHYSICAL SETTING

The Feather River watershed is a subbasin within the Sacramento River Basin and lies along the western portion of the Sierra Nevada mountain range (Figure 3-1). It includes parts of Plumas, Sierra, Butte, Nevada, Placer, Lassen, Shasta, and Yuba Counties. The watershed has a Mediterranean climate with wet winters and dry summers. Average precipitation ranges from 75 inches in the upper watershed to 30 inches in the lower watershed. Flow in both the Feather and Yuba Rivers is affected by several large flood control facilities. Oroville Reservoir controls flows on the Feather River while Englebright and New Bullards Bar Reservoirs control flows on the Yuba River. The lower Feather River is affected by transferred flows from the Sacramento River that pass through the Sutter Bypass into the Feather River 3 miles downstream of the Bear River confluence. These modifications reduce flood peaks on the Feather River, while reducing coarse sediment load and creating backwater conditions in the lower reaches.

The upper portion of the watershed is characterized by high mountain valleys and contains streams with low to moderate slopes. The North Fork originates in the Cascade Range whereas the Middle Fork Feather River flows northwesterly along the crest of the Sierra Nevada. The North Fork and Middle Fork Feather Rivers comprise 3,222 square miles and the smaller South Fork and West Branch comprise the additional 389 square miles.

The watershed above Oroville Reservoir is bounded on the northwest and north by volcanic ridges and mountains, including Mt. Lassen, which constitute the southern portion of the Cascade Range geomorphic province. It is bounded on the east and northeast by prominent, east-facing fault scarps, including the Honey Lake escarpment of the Basin and Range geomorphic province. This roughly corresponds to the northern and eastern boundary of the Sierra Nevada geomorphic province. The Sacramento Valley geomorphic province bounds the western edge of the watershed.

3.2 HISTORIC CHANGES IN THE PHYSICAL SETTING

The pattern of sediment transport and channel erosion in the project area is intimately linked to the history of the watershed. Hydraulic mining in the Yuba, Bear and Feather River watersheds significantly changed the geomorphic characteristics of the entire basin. Between 1848 and 1909, approximately 18.5 billion cubic feet of hydraulic mining debris was washed into the Yuba River, while another 2.7 and 6.8 billion cubic feet was washed into the upper Feather and Bear Rivers (Hagwood, 1981). The lower Feather River within the project area has been significantly altered by all three sources, but most significantly by the Yuba River.

Mining-derived sediment led to massive channel aggradation and a significant loss in channel capacity, which in turn led to extensive flooding and overbank deposition onto urban and agricultural lands within the lower Feather River. By the late 1860's, aggradation was so extensive that the beds of the Yuba and Feather Rivers were higher than the city streets in Marysville. In the mid 1870's levees were breached by flood flows in Marysville and a large section of the city was buried by hydraulic mining sediment. As a result of this and other damage, the courts acted and the Sawyer decision of 1884 halted the disposal of tailings into drainages by hydraulic mining operators.

Table 3-1 displays a timetable of events that are relevant to the current geomorphic character of the lower Feather River (WET, 1991). The main sediment influx occurred between 1853 and 1884, but maximum aggradation on the Yuba River at Marysville was delayed until 1905, where a total of nearly 20 feet of aggradation was observed. After mining ceased the sediment supply was dramatically reduced and the Feather River began to incise into the deposited hydraulic mining sediment. Incision continued until the 1960's when the bed began to rest upon pre-hydraulic material that was more resistant to erosion. As a result of the rapid aggradation and subsequent incision, the banks of the Feather River are principally composed of hydraulic mining material. The lowest mining deposits (called slickens) are relatively resistant to erosion while the upper mining deposits are less cohesive and more erodible. Beneath the mining deposits the upper native alluvial materials are relatively resistant to erosion, but are underlain by less erosion resistant sediments. Thus, the depth of incision of the river is critical to bank stability, depending on whether more or less erosion resistant sediments are exposed. It has been hypothesized that either incision through the erosion resistant layer, or aggradation that raises the bed above the erosion resistant layer could trigger more rapid lateral bank migration.

Table 3-1. Historical Events that Have Affected the Feather River (WET 1991)

Date	Event
1848	James Marshall discovers gold on the American River.
1853	Edward Matteson employs hydraulic mining techniques on American Hill.
1861	Invention of crinole hole: water pressure tripled. Blasting used for first time in hydraulic mining.
1862	Major flood resulting in loss of agricultural lands: followed by levee construction.
1868	Channel beds of Feather and Yuba rivers higher than streets of Marysville. Additional levee construction.
1875	Major flood results in levee breakage and burying of parts of Marysville.
1884	Sawyer decision prohibits tailing disposal into drainages.
1891	Onset of erosion of upper drainage.
1893	Caminetti Act results in formation of the California Debris Commission which allows mining after construction of approved tailings impoundment.
1934	Caminetti Act amended to allow for construction of high dams.
1940	Englebright Dam on Yuba River constructed.
1967	Completion of Oroville Dam on the Feather River.

3.3 CHANGES IN CHANNEL MORPHOLOGY

Understanding past and present rates of channel morphological change is valuable in predicting how the river will respond to future changes. We reviewed several existing reports of channel erosion and migration rates to produce the synthesis below.

3.3.1 Summary of Previous Geomorphic Studies

WET (1991) assessed channel migration rates along the Feather River and estimated the time before the channel eroded to within 30 feet of the levees using historic data. In the project area the three principal areas of concern were Star Bend (west bank), Shanghai Bend (west bank) and the bend immediately downstream of Shanghai Bend (east bank). At Star Bend the annual migration rate was found to be 1.6 feet per year, but the 80-foot distance to the levee resulted in an estimated 50-year time span before the levee was endangered. At Shanghai Bend the erosion rate is much higher (10.3 feet/year) but is partially offset by the distance of 335 feet to the levee, resulting in 33 year expectancy. The fastest rate of bank retreat (22.7 feet/year) is on the bank below Shanghai Bend (RM 25 opposite the ponds) although the levee in this location is 2,145 feet from the river and is therefore not threatened in the foreseeable future. The treatment ponds, however, are 280 feet from the eroding bank, and we would estimate that the channel could migrate to the proximity of the treatment ponds (30 feet) in 11 years.

Ayres Associates (1997) conducted a major geomorphic and sediment transport study of the Feather River for the USACE that included comparison of historic cross sections and thalweg profiles (see cross sections on Figures 3-1 to 3-13 and thalwegs on Figures 3-14 to 3-15). They concluded that the main phase of channel incision through the hydraulic mining-derived sediment on the Feather River had occurred by the mid-1960s, although the knickpoint continues to migrate upstream to this day. Although the Feather River has eroded through the hydraulic mining debris into the pre-mining floodplain sediments, as yet there has been little mass bank failure that could lead to lateral migration of the channel, and therefore, threaten the stability of the levees. Ayres argued that further large-scale degradation of the Feather River was unlikely, at least within an engineering timeframe, because base level for the channel is controlled by sediment deposition in the lower reaches. This in turn was controlled by influxes of sediment from the Bear River, backwater effects from the Sacramento River, and deposition due to loss of conveyance as water from the Feather River escapes into the Sutter Bypass during large flows. However, the Ayres report warns of potential serious consequences if the knickpoint migrated through Shanghai Bend, since channel incision here could expose less resistant sediment beneath the slickens and the upper, cohesive native sediments, allowing the channel to migrate much more rapidly.

Ayres also hypothesize that the influx of sediment from the Yuba and Bear Rivers is crucial to maintaining a symmetrical channel cross section, and a symmetrical cross section in turn prevents

accelerated channel lateral migration that could endanger the levees. They point out that the Feather River has a very low sinuosity for a river of its size and type, and that the present condition should be considered a historic anomaly that will eventually be reversed as sediment delivery from the Yuba and Bear Rivers fall; reductions in sediment delivery will likely trigger lateral migration.

California Department of Water Resources (DWR, 2004) carried out a geomorphic study and a FLUVIAL-12 sediment transport study of the Feather River as part of the FERC relicensing of Oroville Dam. They found that the average rate of channel migration on the Feather River has decreased since dam construction from 2.3 to 1.7 feet/year. This rate is low when compared to the Sacramento River (6 to 14 feet per year). DWR monitored bank migration rates at Shanghai Bend and found that the right bank upstream of the rip-rapped portion has eroded at a maximum average rate of 7.4 feet/year (their definition of the term 'maximum average' is unclear). At Shanghai Bend the left bank is eroding at a maximum average rate of 9.5 feet/year. Below Shanghai Bend the right bank is eroding at a maximum average rate of 9.3 feet/year, with 200 feet of floodplain remaining between the bank and the levee. DWR's investigation found that about 8 percent of the banks from are rip-rapped in the 28 mile stretch from Yuba City to Verona. DWR also found that the present day sinuosity was not substantially different from that of the 1920's. Because of the entrenchment of the Feather River into hydraulic mining debris and the flood control functions of the Oroville Project, DWR expects that the sinuosity will not change substantially in the next fifty years.

4. EXISTING CHANNEL CONDITIONS

PWA conducted a geomorphic reconnaissance of the project area by boat on May 10th 2006. The reconnaissance focused on visually identifying areas of channel bank erosion and deposition along the project area to assess relative erosion levels. Erosion was qualitatively classified into low, medium and high categories based on estimated bank height, bank angle, vegetation cover and visual evidence for erosion or repair work. Note that the classification was for the banks as viewed from a boat, and did not cover the levees, which were generally hidden from view. The assessment should be considered a reconnaissance level only. Flows were relatively high for May conditions, with a flood elevation of 44 feet at Yuba City (discharge of approximately 26,000 cfs).

4.1 REACH CHARACTERIZATION

The project area on the Feather River between the Yuba and Bear Rivers can be divided into five geomorphic reaches based on observed erosion patterns, with additional upstream reaches on the Feather between the Yuba River confluence and the Southern Pacific Railroad Bridge and on the Yuba River between the confluence and the Southern Pacific Railroad Bridge (see Figure 4-1). The reaches are discussed from upstream to downstream.

4.1.1 Reach 1. Yuba River between Southern Pacific Railroad Bridge and Confluence with Feather River

This reach is characterized by ‘moderate’ to ‘high’ levels of bank erosion on the outside bank (river right, looking downstream, to the north), and deposition of gravel and cobbles on the left bank (south). There are several areas where riprap has been placed to protect the banks from erosion, and in general the north bank is at a steep angle. All 1.2 miles of the north bank is characterized as moderately to highly eroded, while all the inside bend is classified as having low levels of erosion.

4.1.2 Reach 2. Feather River between River Mile 30 and Confluence with Yuba River (RM 27.5)

This reach is characterized by ‘moderate’ levels of bank erosion on outside bends and ‘low’ levels of erosion on inside bends. There are small areas of bank stabilization using riprap, and some very high, steep banks in the upstream part of the reach.

4.1.3 Reach 3. Feather River from the Yuba River Confluence (RM 27.5) to Upstream of Shanghai Bend (RM 26.25)

This reach is relatively stable, with 'low' to 'medium' levels of bank erosion relative to the rest of the project reach. Many areas of the banks are well vegetated with relatively well established cottonwood trees. In many areas there is a small bank toe or terrace that provides some protection to the banks. Erosion is concentrated on outside bends, where there are steep to vertical sections of approximately 8-10 feet.

4.1.4 Reach 4. Feather River from River Mile 26.25 (Shanghai Bend) to River Mile 23

This reach has the greatest continuous extent of erosion of the project reach, and is dominated by three geomorphic features: Shanghai Bend, the knick zone downstream, and a confined reach downstream of the knick zone. The outside banks of Shanghai Bend (west bank) and the unnamed bend downstream (east bank) are actively eroding, while there is also some erosion on inside bend and straight sections. Erosion on Shanghai Bend is intense but very localized in extent while the bend downstream has a more extensive area of erosion and a hotspot of high erosion close to the ponds. The banks on both sides of the knick zone are actively eroding, with high steep to vertical banks and falling trees. Downstream of the knick zone, between RM 24.25 and RM 23.5, the channel becomes very confined with vertical 15 foot high banks and evidence of severe erosion. From RM 23.5 to RM 23 erosion is moderate. In total Reach 4 has 1.8 miles of highly-eroded bank on the west and 1.4 miles of highly eroded bank on the east, with most of the remaining bank classified as 'medium' erosion level.

4.1.5 Reach 5. Feather River from River Mile 23 to River Mile 19

This reach is relatively stable, with low to medium levels of bank erosion. In most of this reach the channel is not as confined as in Reach 4, and most of the banks have good riparian cover and areas of natural protection. There is some local moderate bank erosion on the east bank where the channel runs alongside the levee upstream of Star Bend. It appears that the wider area of floodplain around Abbots Lake has relieved some of the shear stresses in this reach, reducing overall bank erosion. The majority of this reach is classified as having low erosion levels (3.3 miles versus 0.7 miles of medium erosion on the west bank, and 2.8 miles of 'low' versus 0.4 miles of medium erosion on the east bank).

4.1.6 Reach 6. Feather River from River Mile 19 to River Mile 17 (Including Star Bend)

Reach 6 is dominated by Star Bend (eroding the west bank) and an unnamed bend downstream. This reach is characterized by locally severe erosion on the outside banks of the bends where the levee is in close proximity, but in general the reach is less erosive than conditions upstream, potentially because of the wide floodplain in most parts of the reach. A total of 0.4 miles of the

west bank are highly eroded around Star Bend, while 0.6 miles of the east bank downstream of Star Bend are highly eroded.

4.1.7 Reach 7. Feather River from River Mile 17 to the Confluence with the Bear River (RM 12.5)

Reach 7 is the most stable reach in the project area, with no areas of highly eroded bank. This section of the river has low, well vegetated banks and appears to be geomorphically-stable to slightly depositional. There is floodplain between the river and the levees along the entire reach, contributing to stability.

5. POTENTIAL GEOMORPHIC IMPACTS OF THE PROJECT ALTERNATIVES

PWA assessed the potential impacts of the project by comparing predicted with- and without-project shear stresses and overlaying them on the existing conditions map of the river. CEQA provides two potential thresholds of significance that are relevant to this report. The first defines increases in erosion risk as significant if they "expose people and structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam". The second definition relates to erosion that "substantially alters the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on- or off-site". For the purposes of this report we consider changes in shear stress greater than 20% to be potentially significant impacts. It is important to note the assumptions made in the analysis.

- The analysis is based on peak flow data extracted from a one-dimensional unsteady state hydrodynamic model. Changes in peak flow timing may increase or reduce the actual shear stress by creating backwater effects or locally steeper gradients.
- Shear stresses used in the analysis are average one-dimensional boundary shear stresses from the channel and overbank portion of the HEC-RAS model. It should be recognized that instantaneous and local shear stresses along outside meander bends will likely be higher than average boundary shear stress.
- The estimates reported below do not include a factor of safety.

5.1 COMPARISON OF WITH- AND WITHOUT-PROJECT SHEAR STRESSES

Average boundary shear stresses for the channel and overbank area were estimated by MBK Engineers using the HEC-RAS one-dimensional hydraulic model. The events simulated were the 2-, 5-, 10-, 100- and 200-year flood. Three runs were performed using identical flows and boundary conditions but three varied cross section geometries: existing conditions geometry (assumed to be the same for Existing Conditions and Alternative 1), ASB setback levee geometry (Alternative 2) and intermediate setback levee geometry (Alternative 3). The project area was divided into eight reaches based on geomorphic characteristics; Marysville along the Yuba River (RM 0 – 1.48), Yuba City along the Feather River (RM 27 – 35), Shanghai Bend along the west bank (RM 23.75 – 25.25), east bank downstream of Shanghai bend (RM 23.5 – 19.25), knickzone where incision on the Feather River has currently held up on a cohesive layer (RM 23.75 – 24.25), levee setback reach (RM 24.25 – 17.25), Star Bend along the west bank (RM 19.25 – 15.75) and downstream of Star Bend (RM 15.5 – 12.25). For each reach the maximum shear stress was identified and is reported in Table 5-1, shown graphically in Figures 5-1 to 5-10. In addition, a shear stress index was developed to allow comparison of the project effects taking into account the recurrence frequencies of different flow events. The use of an index enables us to compare the effect of a change in shear stress during a large but infrequent event with a change in

shear stress for a smaller but more frequent event, and is based on the geomorphic principal of dominant discharge. Dominant discharge refers to the observation that moderate, frequent flows such as the 2-year flood do more geomorphic work than larger but less frequent events. The index takes the maximum shear stress associated with an event in one reach and multiplies it by the frequency with which that event occurs in a one hundred year period. The shear stresses of all events are then summed and divided by 100. For the project alternatives we assessed the difference between the shear stress index for the alternative and the index for the existing condition/Alternative 1, and reported it in Table 5-1 as a percentage increase or decrease. Shear stresses can be compared with the list of allowable shear stresses for stream channel materials shown in Table 5-2.

5.1.1 Existing Conditions

Under existing conditions the estimated average boundary shear stresses through the project reach of the Feather River are highest between Shanghai Bend and Star Bend (the proposed levee setback area in Alternatives 2 and 3). Maximum channel stresses are 0.69 lb/square foot during the 2-year flood and increase to 1.25 lb/square foot during the 200-year flood. Maximum shear stresses along the levee range from 0.23 lb/square foot during the 2-year flood to 0.62 lb/square foot in the 200-year flood. High shear stresses in Star and Shanghai Bends exceed the shear resistance of most unvegetated alluvial materials and correlate well with observed areas of bank instability. The reach between RM 21 and RM 23 was classified as having only ‘medium’ levels of erosion, and it is likely that the straight course limits the effects of erosion as there are no impinging bank flows or accelerated outside bend flows. Channel shear stresses under the 100- and 200-year events are mostly greater than those that can be resisted by alluvial silt (similar in composition to the material making up the upper bank sections in most of the project reach) but are mostly less than the critical shear stress for grass- or tree-covered banks, and markedly less than the critical shear stress for riprap. Shear stresses in the overbank area during are higher than most unvegetated alluvial materials can withstand but are well within the range of values that can be overcome by grass covers or coarse gravel.

5.1.2 Alternative 1 (Strengthen Levees in Existing Location)

Alternative 1 does not have any effect on estimated boundary shear strength since the levee alignment, height and roughness are unchanged over existing conditions.

Table 5-1. Shear Stress Comparisons

Reach location	River Mile	Channel - Max Shear Stress (lb/sq ft) - Existing Conditions						Change in stress index
		2 yr flow	5 yr flow	10 yr flow	100 yr flow	200 yr flow	shear stress index	
Marysville - Yuba River (both banks)	0 - 1.48	0.11	0.07	0.36	0.61	0.72	0.11	~
Yuba City (both banks)	27 - 35	0.32	0.32	0.54	0.7	0.83	0.29	~
Shanghai Bend (west bank)	23.75 - 25.25	0.46	0.63	0.73	0.84	0.87	0.44	~
Below Shanghai Bend (east bank)	23.5 - 19.25	0.69	0.54	0.72	0.87	1.03	0.54	~
Knickpoint	23.75 - 24.25	0.34	0.33	0.38	0.41	0.46	0.28	~
Levee Setback (east bank)	24.25 - 17.25	0.69	0.66	0.89	1.06	1.25	0.58	~
Star Bend (west bank)	19.25 - 15.75	0.54	0.77	0.89	1.06	1.25	0.53	~
Below Star Bend (both banks)	15.5 - 12.25	0.4	0.45	0.67	0.81	0.99	0.37	~

Reach location	River Mile	Channel - Max Shear Stress (lb/sq ft) - 2003 ASB Setback						Change in stress index
		2 yr flow	5 yr flow	10 yr flow	100 yr flow	200 yr flow	shear stress index	
Marysville - Yuba River (both banks)	0 - 1.48	0.11	0.07	0.41	0.69	0.85	0.12	6%
Yuba City (both banks)	27 - 35	0.32	0.34	0.58	0.79	0.96	0.30	3%
Shanghai Bend (west bank)	23.75 - 25.25	0.45	0.72	0.9	1.07	1.18	0.48	8%
Below Shanghai Bend (east bank)	23.5 - 19.25	0.68	0.69	0.75	0.8	0.87	0.57	5%
Knickpoint	23.75 - 24.25	0.33	0.41	0.46	0.48	0.52	0.30	7%
Levee Setback (east bank)	24.25 - 17.25	0.68	0.69	0.75	0.8	0.87	0.57	-3%
Star Bend (west bank)	19.25 - 15.75	0.53	0.77	0.84	0.83	0.99	0.52	-3%
Below Star Bend (both banks)	15.5 - 12.25	0.39	0.45	0.67	0.81	0.99	0.37	-1%

Reach location	River Mile	Channel - Max Shear Stress (lb/sq ft) – Intermediate Setback						Change in stress index
		2 yr flow	5 yr flow	10 yr flow	100 yr flow	200 yr flow	shear stress index	
Marysville - Yuba River (both banks)	0 - 1.48	0.11	0.07	0.4	0.67	0.82	0.12	4%
Yuba City (both banks)	27 - 35	0.32	0.34	0.57	0.77	0.93	0.30	3%
Shanghai Bend (west bank)	23.75 - 25.25	0.46	0.7	0.86	1.02	1.1	0.47	7%
Below Shanghai Bend (east bank)	23.5 - 19.25	0.68	0.68	0.78	0.87	0.97	0.57	5%
Knickpoint	23.75 - 24.25	0.33	0.4	0.47	0.51	0.56	0.30	7%
Levee Setback (east bank)	24.25 - 17.25	0.68	0.68	0.78	0.87	0.97	0.57	-3%
Star Bend (west bank)	19.25 - 15.75	0.53	0.77	0.84	0.83	0.99	0.52	-3%
Below Star Bend (both banks)	15.5 - 12.25	0.39	0.45	0.67	0.81	0.99	0.37	-1%

Note: stress index is cumulative stress of events divided by duration of events

Reach location	River Mile	Overbank - Max Shear Stress (lb/sq ft) - Existing Conditions						Change in stress index
		2 yr flow	5 yr flow	10 yr flow	100 yr flow	200 yr flow	shear stress index	
Marysville - Yuba River (both banks)	0 - 1.48	0.04	0.03	0.13	0.28	0.36	0.04	~
Yuba City (both banks)	27 - 35	0.1	0.15	0.13	0.34	0.33	0.10	~
Shanghai Bend (west bank)	23.75 - 25.25	0.03	0.11	0.25	0.38	0.44	0.07	~
Below Shanghai Bend (east bank)	23.5 - 19.25	0.23	0.19	0.33	0.47	0.59	0.19	~
Knickpoint	23.75 - 24.25	0.03	0.1	0.16	0.23	0.29	0.05	~
Levee Setback (east bank)	24.25 - 17.25	0.23	0.21	0.33	0.48	0.62	0.20	~
Star Bend (west bank)	19.25 - 15.75	0.12	0.21	0.33	0.48	0.62	0.14	~
Below Star Bend (both banks)	15.5 - 12.25	0.13	0.17	0.3	0.38	0.5	0.14	~

Reach location	River Mile	Overbank - Max Shear Stress (lb/sq ft) - 2003 ASB Setback						Change in stress index
		2 yr flow	5 yr flow	10 yr flow	100 yr flow	200 yr flow	shear stress index	
Marysville - Yuba River (both banks)	0 - 1.48	0.04	0.03	0.15	0.3	0.41	0.05	6%
Yuba City (both banks)	27 - 35	0.1	0.16	0.13	0.38	0.36	0.10	3%
Shanghai Bend (west bank)	23.75 - 25.25	0.03	0.12	0.27	0.44	0.56	0.07	8%
Below Shanghai Bend (east bank)	23.5 - 19.25	0.23	0.23	0.30	0.33	0.4	0.20	1%
Knickpoint	23.75 - 24.25	0.03	0.08	0.17	0.25	0.36	0.05	-4%
Levee Setback (east bank)	24.25 - 17.25	0.23	0.23	0.3	0.33	0.4	0.20	-1%
Star Bend (west bank)	19.25 - 15.75	0.12	0.15	0.27	0.36	0.44	0.12	-14%
Below Star Bend (both banks)	15.5 - 12.25	0.13	0.17	0.3	0.39	0.51	0.14	0%

Reach location	River Mile	Overbank - Max Shear Stress (lb/sq ft) - Intermediate Setback						Change in stress index
		2 yr flow	5 yr flow	10 yr flow	100 yr flow	200 yr flow	shear stress index	
Marysville - Yuba River (both banks)	0 - 1.48	0.04	0.03	0.14	0.29	0.4	0.04	3%
Yuba City (both banks)	27 - 35	0.1	0.16	0.13	0.37	0.36	0.10	2%
Shanghai Bend (west bank)	23.75 - 25.25	0.03	0.12	0.27	0.43	0.53	0.07	7%
Below Shanghai Bend (east bank)	23.5 - 19.25	0.23	0.22	0.29	0.37	0.46	0.19	0%
Knickpoint	23.75 - 24.25	0.03	0.09	0.18	0.25	0.34	0.06	1%
Levee Setback (east bank)	24.25 - 17.25	0.23	0.22	0.29	0.37	0.46	0.19	-2%
Star Bend (west bank)	19.25 - 15.75	0.12	0.15	0.27	0.36	0.44	0.12	-14%
Below Star Bend (both banks)	15.5 - 12.25	0.13	0.17	0.3	0.38	0.51	0.14	0%

Note: stress index is cumulative stress of events divided by duration of events

Table 5-2. Allowable Velocities and Shear Stresses for Streambank Materials (Fischenich, 2001)[1]

Boundary Category	Boundary Type	Permissible Shear Stress (lb/sq ft)	Permissible Velocity (ft/sec)	Citation(s)
Soils	Fine colloidal sand	0.02 - 0.03	1.5	A
	Sandy loam (noncolloidal)	0.03 - 0.04	1.75	A
	Alluvial silt (noncolloidal)	0.045 - 0.05	2	A
	Silty loam (noncolloidal)	0.045 - 0.05	1.75 – 2.25	A
	Firm loam	0.075	2.5	A
	Fine gravels	0.075	2.5	A
	Stiff clay	0.26	3 – 4.5	A, F
	Alluvial silt (colloidal)	0.26	3.75	A
	Graded loam to cobbles	0.38	3.75	A
	Graded silts to cobbles	0.43	4	A
	Shales and hardpan	0.67	6	A
Gravel/Cobble	1-in.	0.33	2.5 – 5	A
	2-in.	0.67	3 – 6	A
	6-in.	2.0	4 – 7.5	A
	12-in.	4.0	5.5 – 12	A
Vegetation	Class A turf	3.7	6 – 8	E, N
	Class B turf	2.1	4 - 7	E, N
	Class C turf	1.0	3.5	E, N
	Long native grasses	1.2 – 1.7	4 – 6	G, H, L, N
	Short native and bunch grass	0.7 - 0.95	3 – 4	G, H, L, N
	Reed plantings	0.1-0.6	N/A	E, N
	Hardwood tree plantings	0.41-2.5	N/A	E, N
Temporary Degradable RECPs	Jute net	0.45	1 – 2.5	E, H, M
	Straw with net	1.5 – 1.65	1 – 3	E, H, M
	Coconut fiber with net	2.25	3 – 4	E, M
	Fiberglass roving	2.00	2.5 – 7	E, H, M
Non-Degradable RECPs	Unvegetated	3.00	5 – 7	E, G, M
	Partially established	4.0-6.0	7.5 – 15	E, G, M
	Fully vegetated	8.00	8 – 21	F, L, M
Riprap	6 – in. d_{50}	2.5	5 – 10	H
	9 – in. d_{50}	3.8	7 – 11	H
	12 – in. d_{50}	5.1	10 – 13	H
	18 – in. d_{50}	7.6	12 – 16	H
	24 – in. d_{50}	10.1	14 – 18	E
Soil Bioengineering	Wattles	0.2 – 1.0	3	C, I, J, N
	Reed fascine	0.6-1.25	5	E
	Coir roll	3 - 5	8	E, M, N
	Vegetated coir mat	4 - 8	9.5	E, M, N
	Live brush mattress (initial)	0.4 – 4.1	4	B, E, I
	Live brush mattress (grown)	3.80-9.2	12	B, C, E, I, N
	Brush layering (initial/grown)	0.4 – 6.25	12	E, I, N
	Live fascine	1.25-3.10	6 – 8	C, E, I, J
	Live willow stakes	2.10-3.10	3 – 10	E, N, O
Hard Surfacing	Gabions	10	14 – 19	D
	Concrete	12.5	>18	H

[1] Ranges of values generally reflect multiple sources of data or different testing conditions.

A. Chang, H.H. (1988).
B. Florineth. (1982)
C. Gerstgraser, C. (1998).
D. Goff, K. (1999).
E. Gray, D.H., and Sotir, R.B. (1996).
F. Julien, P.Y. (1995).
G. Kouwen, N.; Li, R. M.; and Simons, D.B., (1980).
H. Norman, J. N. (1975).
I. Schiechtl, H. M. and R. Stern. (1996).
J. Schoklitsch, A. (1937).
K. Sprague, C.J. (1999).
L. Temple, D.M. (1980).
M. TXDOT (1999)
N. Data from Author (2001)
O. USACE (1997).

[1] Allowable and permissable in this context refer to the velocities and shear stresses for the referenced materials before erosion will start to occur.

5.1.3 Alternative 2 (Strengthen Levees with ASB Levee Setback)

Alternative 2 is expected to increase the width of flood flows and decrease the depth and velocity of flood flows in the setback area, while leaving the roughness of the floodplain similar to existing conditions. (The latter assumption could change if riparian vegetation is replanted or allowed to re-establish in the setback area.) The change in water surface elevation translates into three zones of differing response within the project area:

- Downstream of the proposed setback between the Bear River confluence (RM 12.5) and O'Connor Lakes (RM 17) there is a very small predicted decrease in shear stress index, equivalent to 1% in the channel and 0% in the overbank area.
- From O'Connor Lakes (RM 17) to a point half a mile downstream of the start of the setback (RM 24) Alternative 2 is predicted to lower the water surface elevation and the water surface gradient for all the flood events simulated, resulting in a 3% reduction in shear stress index along the channel at Star Bend and a 14% reduction in shear stress index in the overbank area.
- For most of the river upstream of the setback (from RM 24 to above the upstream project boundary) the setback is predicted to increase water surface gradient and slightly increase shear stresses at flows equal to or greater than the 5-year flood, as water responds to the lower base level downstream. The increase in shear stress index at the channel is predicted to be 7% at the knickpoint, 5% at the bend downstream of Shanghai Bend (east bank) and 8% at Shanghai Bend (west bank). For the overbank areas the respective changes are -4% opposite the knickpoint, 1% in the bend below Shanghai Bend and 8% for Shanghai Bend. Continuing upstream the increase in both channel and overbank shear stress index at Yuba City are 3% while at Marysville the increases are 6%.

5.1.4 Alternative 3 (Strengthen Levees with Intermediate Setback)

Alternative 3 is expected to have the same distribution of impacts as Alternative 2, but a slightly lower magnitude of impacts (both beneficial and adverse) due to the smaller hydraulic effect of the intermediate levee setback.

- Downstream of the proposed setback between the Bear River confluence (RM 12.5) and O'Connor Lakes (RM 17) there is a very small predicted decrease in shear stress index, equivalent to 1% in the channel and 0% in the overbank area.
- From O'Connor Lakes (RM 17) to a point half a mile downstream of the start of the setback (RM 24) Alternative 2 is predicted to lower the water surface elevation and the water surface gradient for all the flood events simulated, resulting in a 3% reduction in shear stress index along the channel at Star Bend and a 14% reduction in shear stress index in the overbank area.

- For most of the river upstream of the setback (from RM 24 to above the upstream project boundary) the setback is predicted to increase water surface gradient and slightly increase shear stresses at flows equal to or greater than the 5-year flood, as water responds to the lower base level downstream. The increase in shear stress index at the channel is predicted to be 7% at the knickpoint, 5% at the bend downstream of Shanghai Bend (east bank) and 7% at Shanghai Bend (west bank). For the overbank areas the respective changes are 1% opposite the knickpoint, 0% in the bend below Shanghai Bend and 7% for Shanghai Bend. Continuing upstream the increase in shear stress index at Yuba City is 2% while at Marysville the increase is 4%. For the overbank areas the increases are 2% and 3% respectively.

5.2 EFFECT OF THE ALTERNATIVES ON GEOMORPHIC PROCESSES IN THE PROJECT AREA

Based on the shear stress comparison and a qualitative understanding of geomorphic processes the alternatives are expected to have the following effects:

5.2.1 Predicted Geomorphic Effects of Alternative 1 (Strengthen Levee in Existing Location)

Alternative 1 is expected to have less than significant geomorphic impacts on the Feather River. Since the levee width, height and hydraulic roughness will be very similar to existing conditions there should not be any significant change in hydraulic characteristics or in the resulting sediment erosion and transport characteristics of the Feather River. As with existing conditions, Alternative 1 shear stresses under high flow events are mostly greater than those that can be resisted by alluvial silt (similar in composition to the material making up the upper bank sections in most of the project reach) but are mostly less than the critical shear stress for grass- or tree-covered banks, and significantly less than the critical shear stress for riprap.

The main potential for erosion will be associated with the grading involved in the levee upgrades. This is expected to generate temporary areas of bare earth that will be treated with erosion control BMPs such as revegetation, mulching and the use of erosion control fabrics. Such BMPs will be required to avoid localized erosion and runoff of sediment during rainfall and flow events. Because of the relatively high shear stresses exerted by the Feather River under high flow conditions it will be necessary to ensure that a grass cover is established on newly graded areas as soon as practical after construction, to maximize the cover before winter flood events occur.

5.2.2 Predicted Geomorphic Effects of Alternative 2 (Strengthen Levees with ASB Levee Setback)

We do not expect there to be significant geomorphic impacts in the lower project reach from RM 12.5 to RM 17. This reach appears to be stable to depositional under current conditions, and

potential increases in erosion in the upstream reach (above RM 24) are likely to be balanced by reductions in the middle reach (RM 17 to 24).

In the middle reach (RM 17 to RM 24) shear stresses along both the banks and levees will be reduced compared to existing conditions. The alternative will reduce shear stresses in the area that currently has the highest shear stresses. We expect the setback alternative to result in a slight reduction in bank and levee erosion risk in this area, including the Star Bend meanders. We may expect this reach to experience a minor increase in deposition in response to both the reduction in shear stress and the anticipated slight increase in erosion upstream.

In the reach above the setback area (RM 24 – upstream project boundary) shear stresses will slightly increase. We expect Alternative 2 to slightly increase bank and bed erosion potential in unvegetated or unprotected sections of the channel upstream of the setback levee during large flood events, especially on the outside of Shanghai Bend and the unnamed bend downstream, and through the knick zone. There is also potential for Alternative 2 to slightly increase the rate of headward migration of the knick zone upstream, slightly accelerated bank erosion in Shanghai Bend. There is very slight potential for increases in erosion on the north bank of the Yuba near Marysville and along the Feather River upstream of the 10th Street Bridge.

5.2.3 Predicted Geomorphic Effects of Alternative 3 (Strengthen Levees with Intermediate Setback)

Alternative 3 has the same distribution of impacts as Alternative 2, but very slightly different magnitudes in places. The greatest difference in shear stress index between Alternatives 2 and 3 is 2% in the channel and 3% in the overbank area.

We do not expect there to be significant geomorphic impacts in the lower project reach from RM 12.5 to RM 17. This reach appears to be stable to depositional under current conditions, and potential increases in erosion in the upstream reach (above RM 24) are likely to be balanced by reductions in the middle reach (RM 17 to 24).

In the middle reach (RM 17 to RM 24) shear stresses along both the banks and levees will be reduced compared to existing conditions. The alternative will reduce shear stresses in the area that currently has the highest shear stresses. We expect Alternative 3 to result in a slight reduction in bank and levee erosion risk in this area, including the Star Bend meanders. We may expect this reach to experience a minor increase in deposition in response to both the reduction in shear stress and the anticipated slight increase in erosion upstream.

In the reach above the setback area (RM 24 – upstream project boundary) shear stresses will slightly increase. We expect Alternative 3 to slightly increase bank and bed erosion potential in unvegetated or unprotected sections of the channel upstream of the setback levee during large flood events, especially on the outside of Shanghai Bend and the unnamed bend downstream, and

through the knick zone. There is also potential for Alternative 3 to slightly increase the rate of headward migration of the knick zone upstream, slightly accelerated bank erosion in Shanghai Bend. There is very slight potential for increases in erosion on the north bank of the Yuba near Marysville and along the Feather River upstream of the 10th Street Bridge.

6. PRELIMINARY GEOMORPHIC EVALUATION OF SETBACK AREA RESTORATION AND MITIGATION

PWA conducted a reconnaissance-level assessment of the geomorphic potential for restoration in the proposed setback area (Alternatives 2 and 3). Under Alternative 2 the setback would add approximately 1,350 acres of floodplain, while under Alternative 3 the setback would add approximately 1,100 acres (Figure 6-1).

Floodplains that are regularly inundated for extended periods are important for their high production of organic matter and invertebrates as well as for the provision of seasonal spawning and/or rearing habitat for native fishes. A recent CALFED-sponsored study identified criteria for the flow associated with such floodplains, the "floodplain activation flow" or FAF. The FAF was defined as a flow that inundates a floodplain area for a minimum of a week during the spring in two years out of three. The study hypothesized that there is very little remaining FAF floodplain in the Central Valley, because of a combination of flow regulation, channel incision and levee construction. As a result of development on floodplains, there may be few areas where FAF floodplains can readily be restored without either dramatic changes in reservoir management, levee setbacks or floodplain lowering. Those areas where FAF floodplains can be restored should be high priorities for the restoration community since they offer floodplain function benefits across a broad range of flood magnitudes and support essential ecosystem functions and anadromous fish habitat.

The consultant team has carried out hydraulic analyses that identified the confluence of the Bear and Feather Rivers as one such site. We have not conducted a hydraulic analysis of flood frequency for the potential Feather River levee setback, but can extrapolate some of our findings from the Bear – Feather River confluence to that site. The majority of the setback floodplain area at the Bear – Feather River confluence is inundated every one to two years, with a large proportion of this area meeting FAF criteria. It is located at an average elevation of 30-35 feet above sea level. Alternatives 2 and 3 would create setback areas that were mostly between 35 and 45 feet above sea level, with some higher ground adjacent to the river bank where out of bank deposition has been highest. Since the channel thalweg rises by approximately 7 feet in the intervening 10 miles, the floodplain in the Alternative 2 and 3 setback areas should be inundated with a similar frequency to the floodplain in the Bear – Feather River confluence. Though additional hydraulic analysis would be required to confirm this, it suggests that the newly created floodplain areas would be frequently inundated and would have a high restoration value. Because the topography is highest closest to the river and decreases with distance away from the banks, the ASB levee setback alignment would create much more frequently inundated floodplain than the intermediate levee setback.

7. REFERENCES

Ayres and Associates, 1997. Yuba River Basin, California Project: Geomorphic, Sediment Engineering and Channel Stability Analysis. For USACE Sacramento District, Contract No. DACW005-92-C-0077.

Department of Water Resources (DWR), 2004. SP-G2: Effects of project operations on geomorphic processes downstream of Oroville dam. Task 6 – Channel meanders and bank erosion monitoring. Oroville Facilities Relicensing FERC Project No. 2100.

Chang, H.H., 1988. Fluvial Processes in River Engineering, John Wiley and Sons, New York, citing Fortier, S. and Scobey, F.C., 1926. "Permissible canal velocities," Transactions of the ASCE, 89:940-984.

Fischenich, C., 2001. Stability thresholds for stream restoration materials. EMRRP Technical Notes Collection (ERDC TN-EMRRP-SR-29), U.S. Army Engineer Research and Development Center, Vicksburg, MS.

Water Engineering & Technology, Inc. (WET), 1991. Geomorphic analysis and bank protection alternative report for Sacramento River (RM (0-78), Feather River (RM 28-61), Yuba River (RM 0-11), Bear River (RM 0-17), American River (RM 0-23), and portions of Three Mil, Steamboat, Sutter, Miner, Georgian, Elk, and Cache Soughs: prepared for Sacramento District, Corps of Engineers, Contract DACW05-88-D-0044, 334 p

8. LIST OF PREPARERS

This report was prepared by the following PWA staff:

Chris Bowles, PhD – Project Director
Andrew Collison, PhD – Project Manager
John Stofleth, MS – Project Hydrologist
Elizabeth Andrews, P.E. – QA and Technical Support

9. FIGURES

Figure 1-1. Feather River Watershed

Figure 2-1a&b. Project Alternatives

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Figure 3-2. Historic Cross Sections RM 12.9

Figure 3-3. Historic Cross Sections – RM 15.1

Figure 3-4. Historic Cross Sections – RM 16.4

Figure 3-5. Historic Cross Sections – RM 17.5

Figure 3-6. Historic Cross Sections – RM 18.3

Figure 3-7. Historic Cross Sections – RM 19.5

Figure 3-8. Historic Cross Sections – RM 20.4

Figure 3-9. Historic Cross Sections – RM 21.75

Figure 3-10. Historic Cross Sections – RM 23.0

Figure 3-11. Historic Cross Sections – RM 24.5

Figure 3-12. Historic Cross Sections – RM 25.75

Figure 3-13. Historic Cross Sections – RM 27.3

Figure 3-14. Thalweg Profiles 1912 – 1992

Figure 3-15. Thalweg Profiles 1909, 1964

Figure 4-1a. Existing Channel Bank Erosion Conditions (north)

Figure 4-1b. Existing Channel Bank Erosion Conditions (south)

Figure 5-1. Channel Shear Stress, 2-year Flood

Figure 5-2. Channel Shear Stress, 5-year Flood

Figure 5-3. Channel Shear Stress, 10-year Flood

Figure 5-4. Channel Shear Stress, 100-year Flood

Figure 5-5. Channel Shear Stress, 200-year Flood

Figure 5-6. Overbank Shear Stress, 2-year Flood

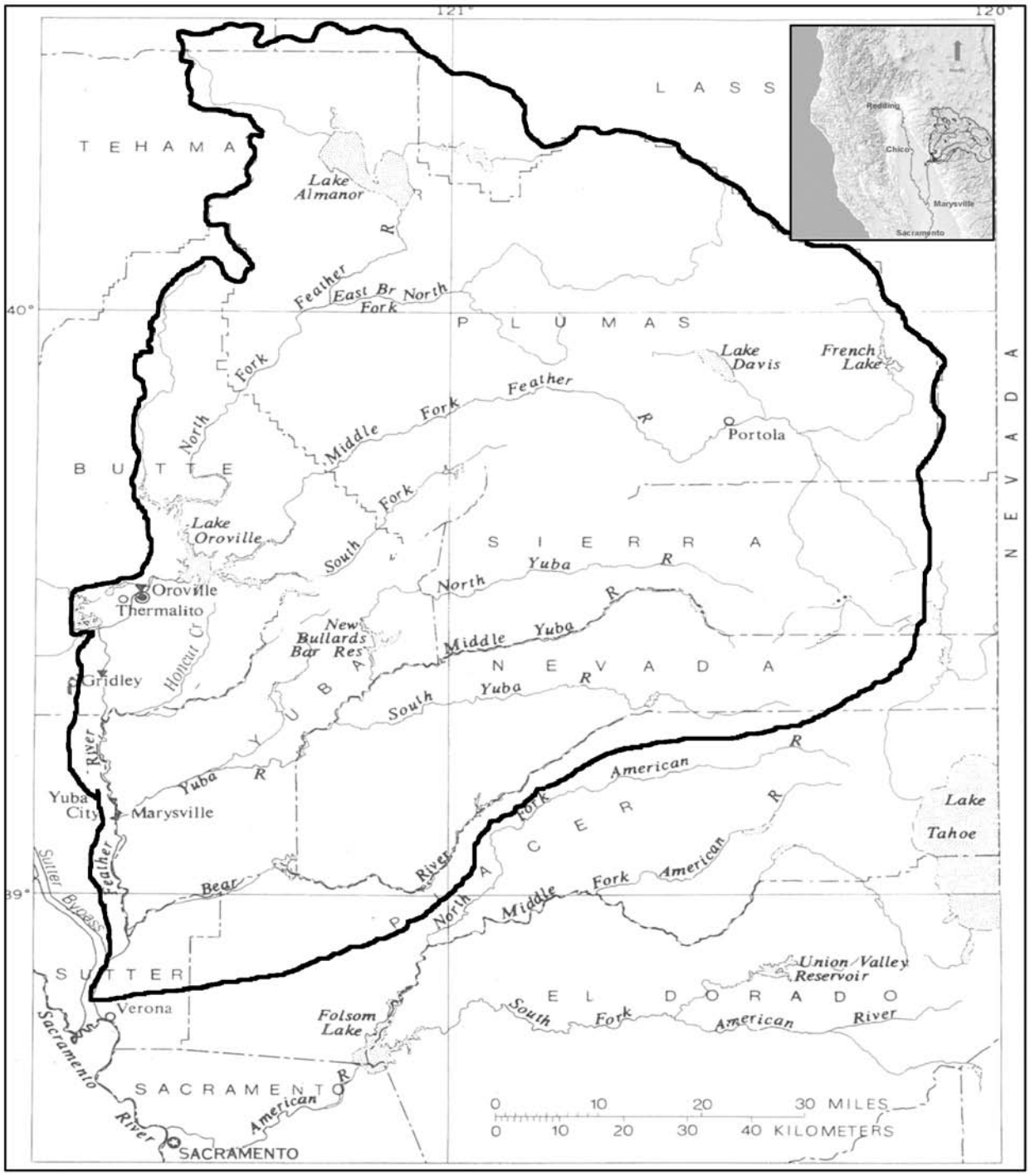
Figure 5-7. Overbank Shear Stress, 5-year Flood

Figure 5-8. Overbank Shear Stress, 10-year Flood

Figure 5-9. Overbank Shear Stress, 100-year Flood

Figure 5-10. Overbank Shear Stress, 200-year Flood

Figure 6-1. Elevation within Setback



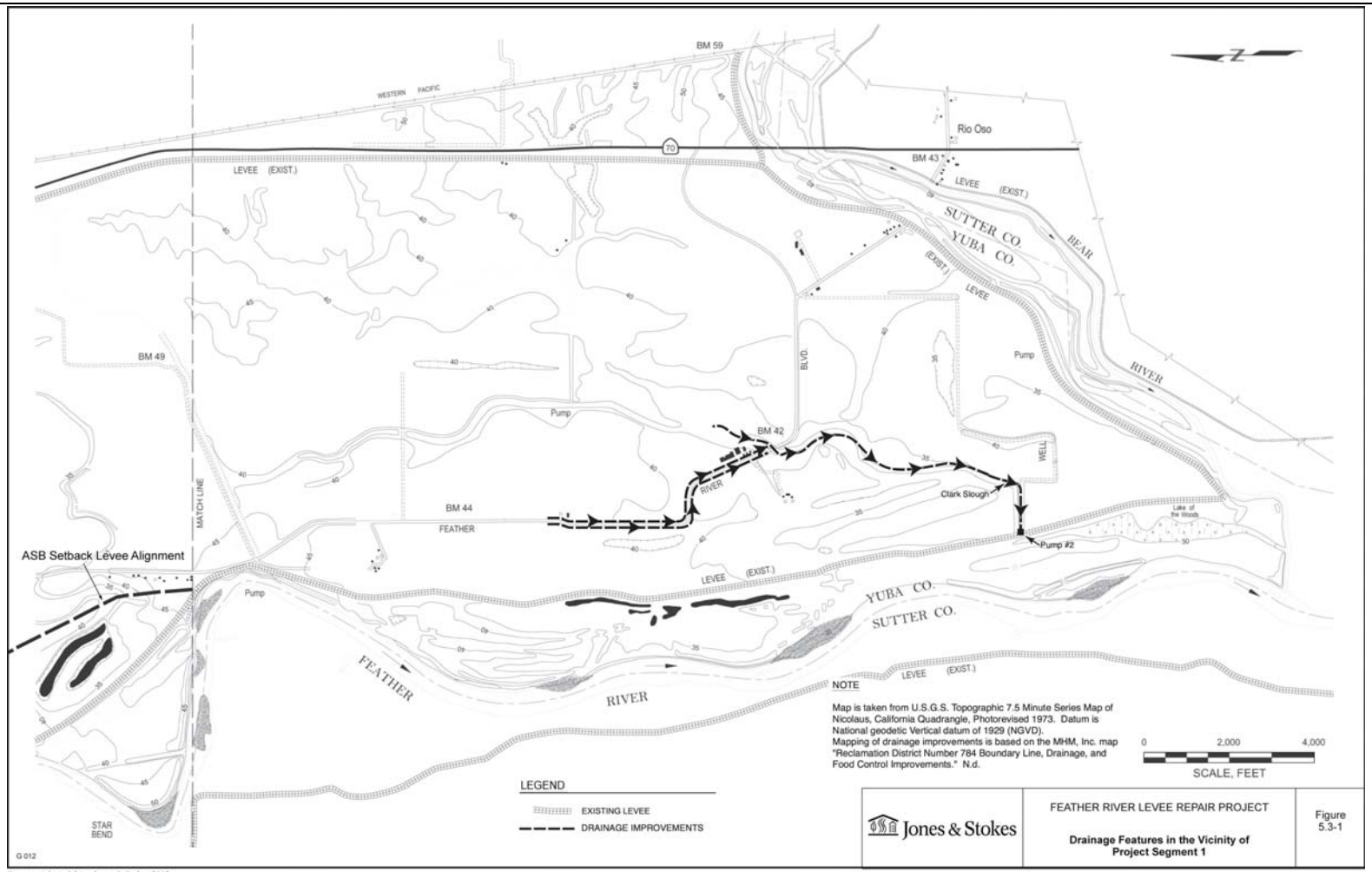
Source: DWR 2004
Notes:

figure 1-1
Feather River Levee Setback

Feather River Watershed

PWA Ref# 1833

PWA



Source: Adapted from Jones & Stokes 2002

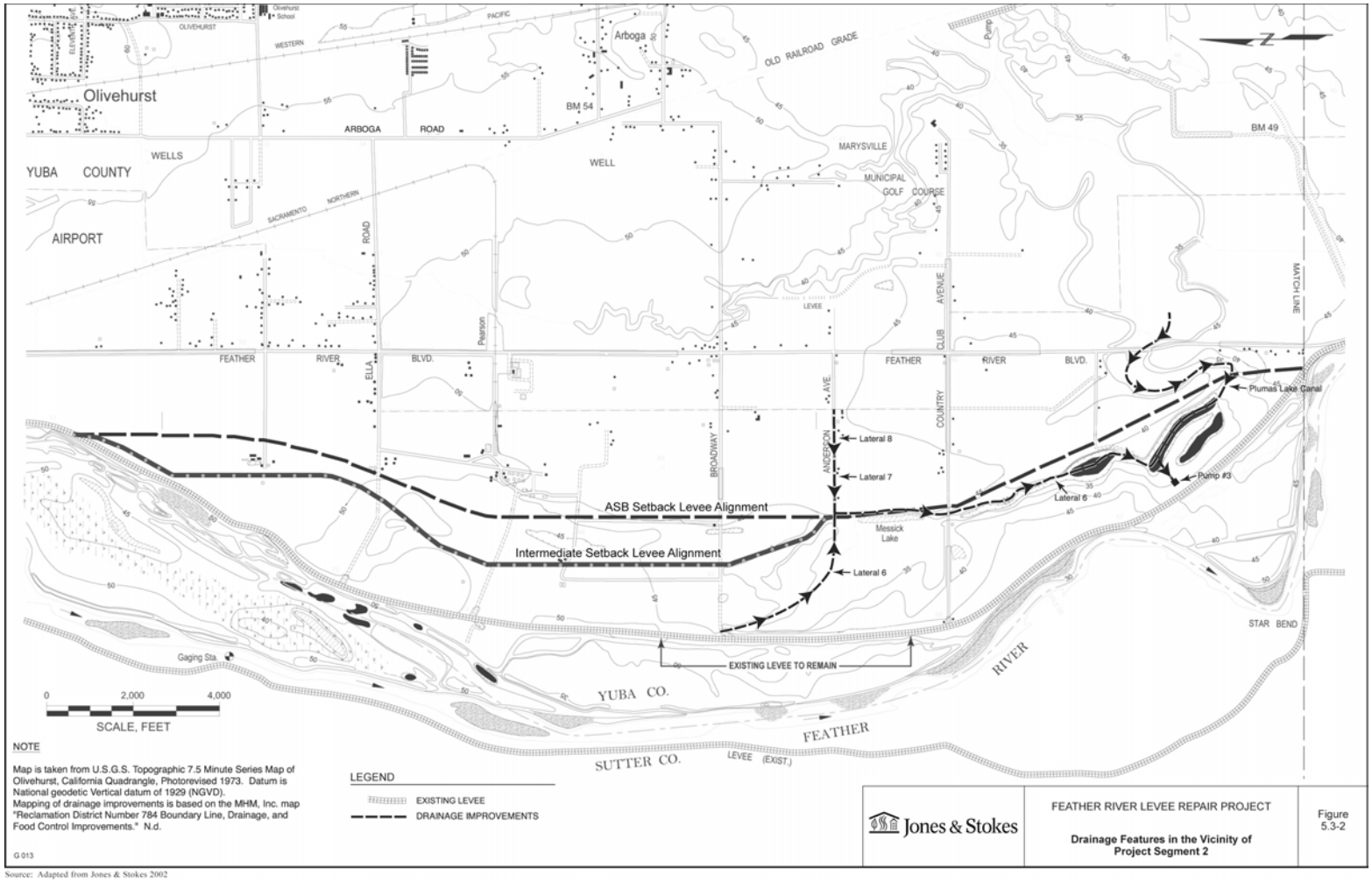
Source: Jones and Stokes, 2002

figure 2-1a
Feather River Levee Assessment

Project Alternatives

PWA Ref# 1833

PWA



Source: Jones and Stokes, 2002

figure 2-1b
Feather River Levee Assessment

Project Alternatives

PWA Ref# 1833

PWA

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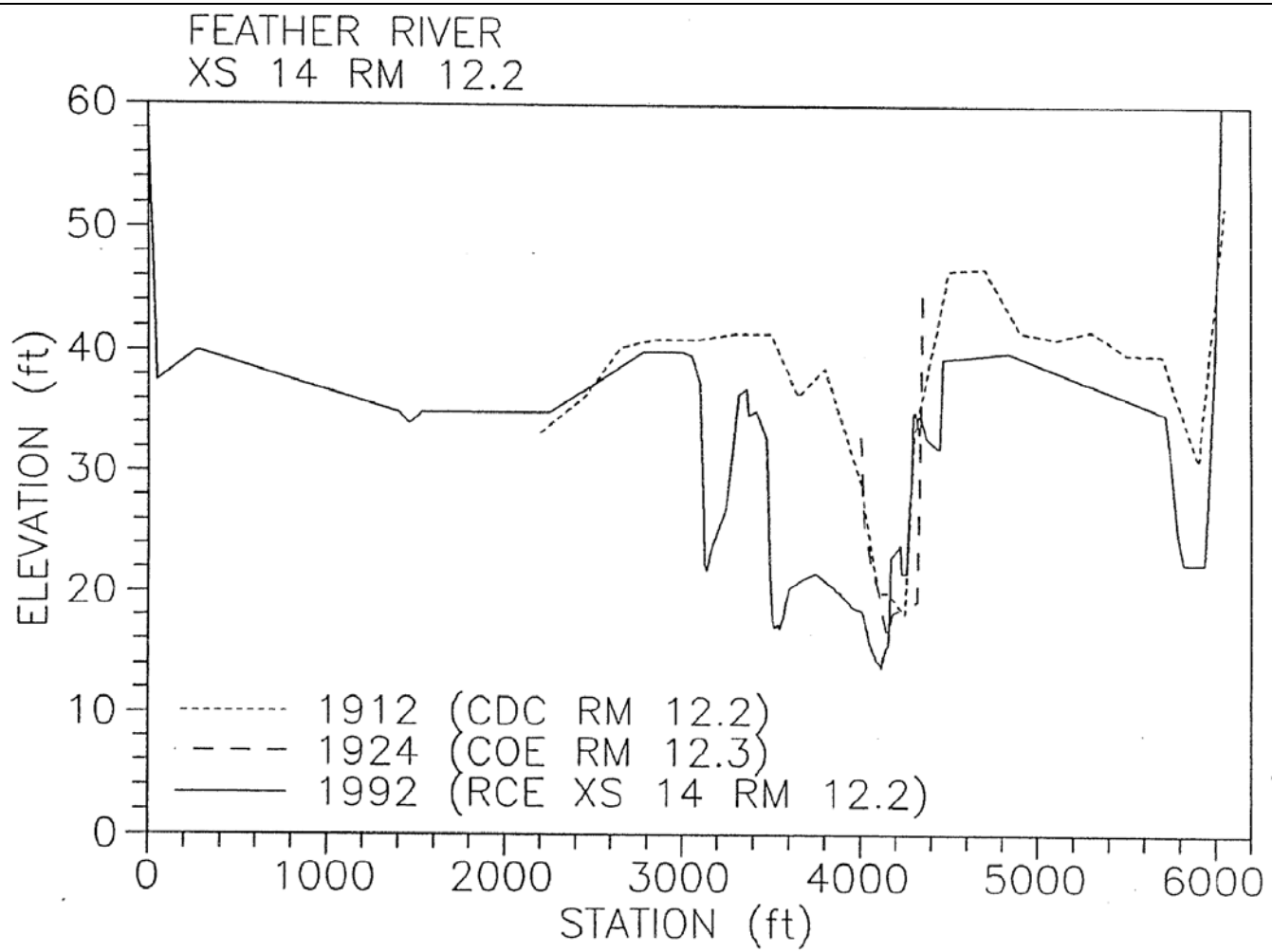


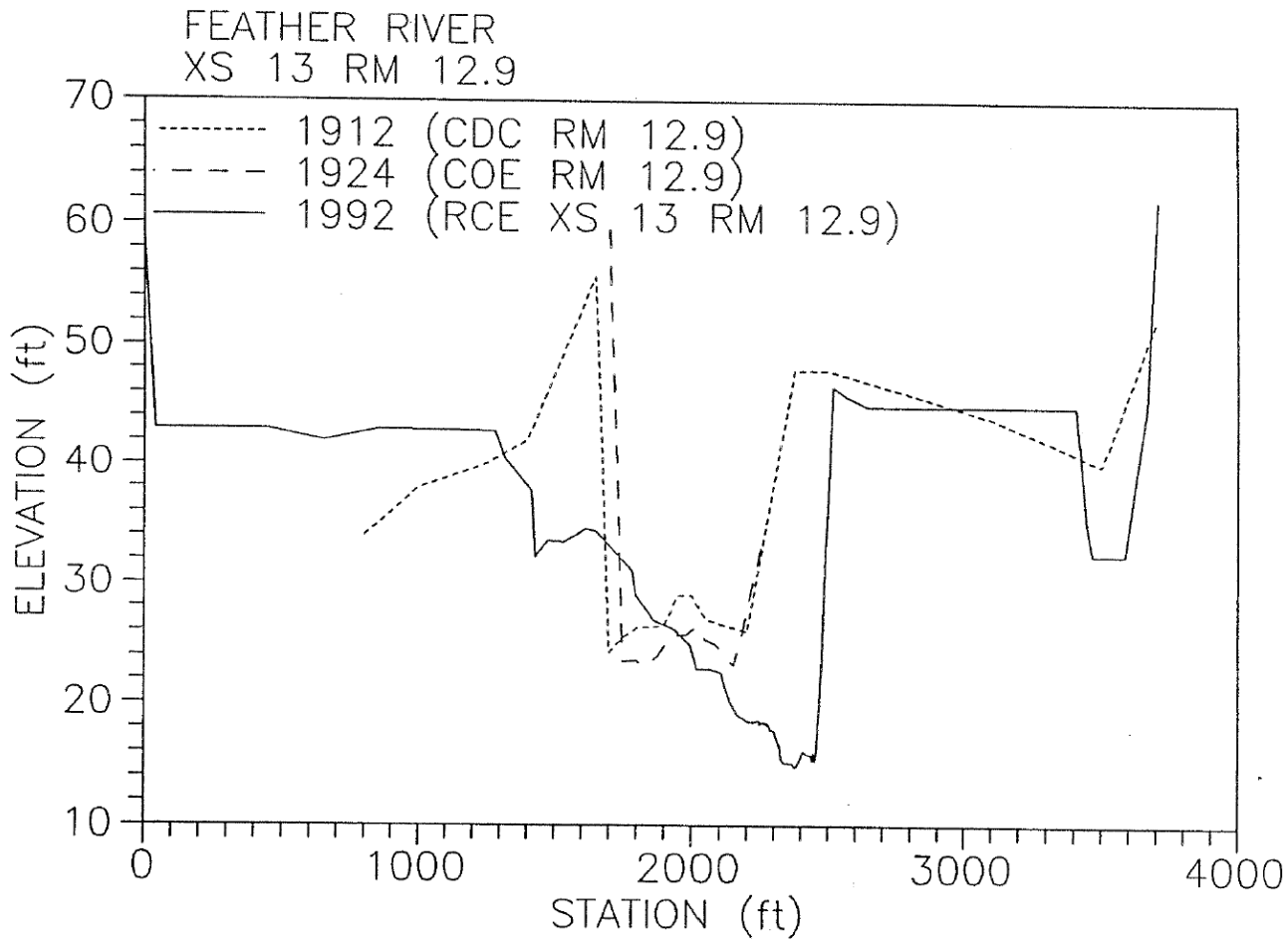
Source: Ayres, 1997
Notes:

figure 3-1
Feather River Levee Setback

Historic Cross Sections – RM 12.2

PWA Ref# 1833

PWA



Source: Ayres, 1997
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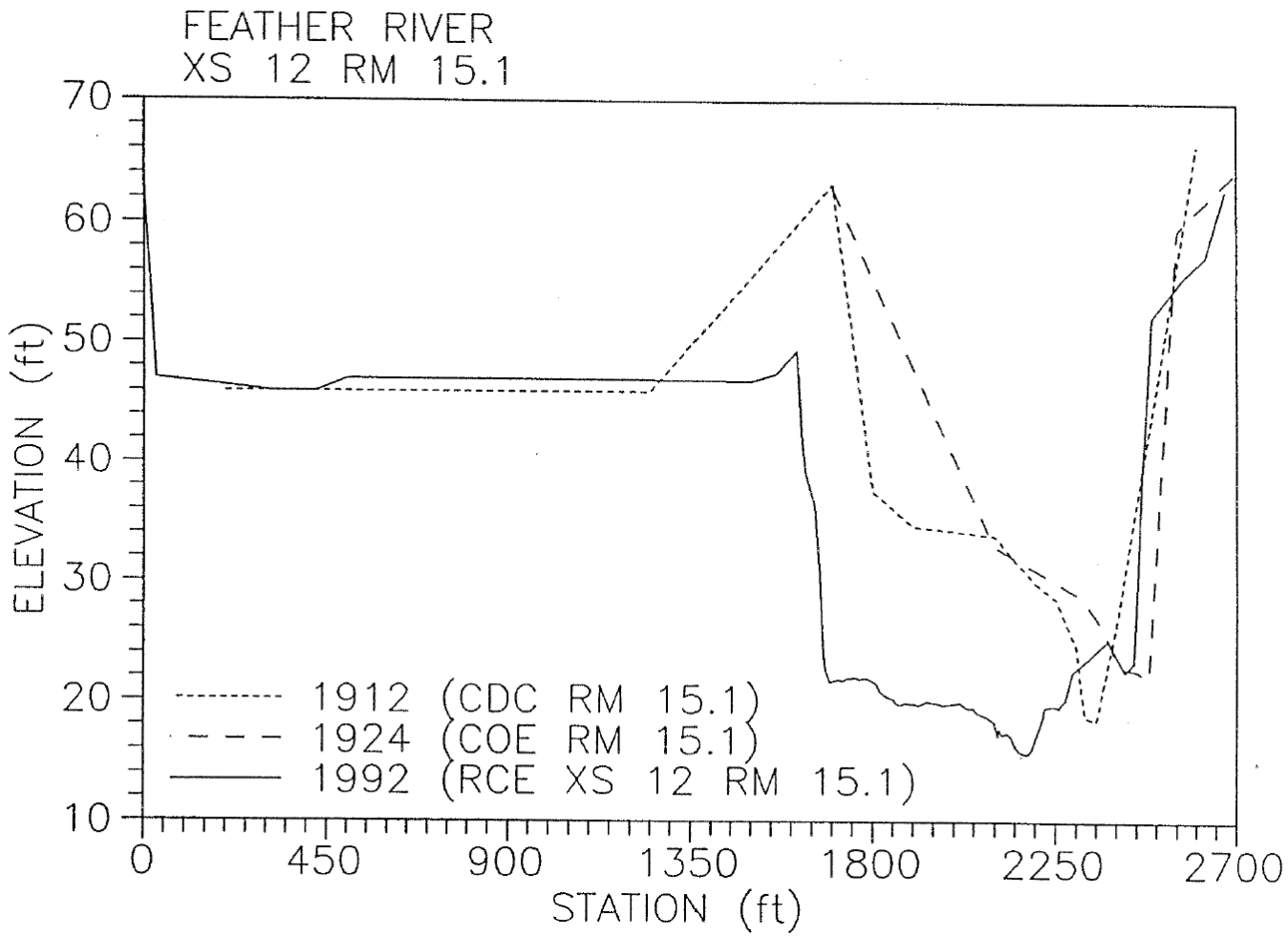
figure 3-2
Feather River Levee Setback

Historic Cross Sections RM 12.9

PWA Ref# 1833

PWA



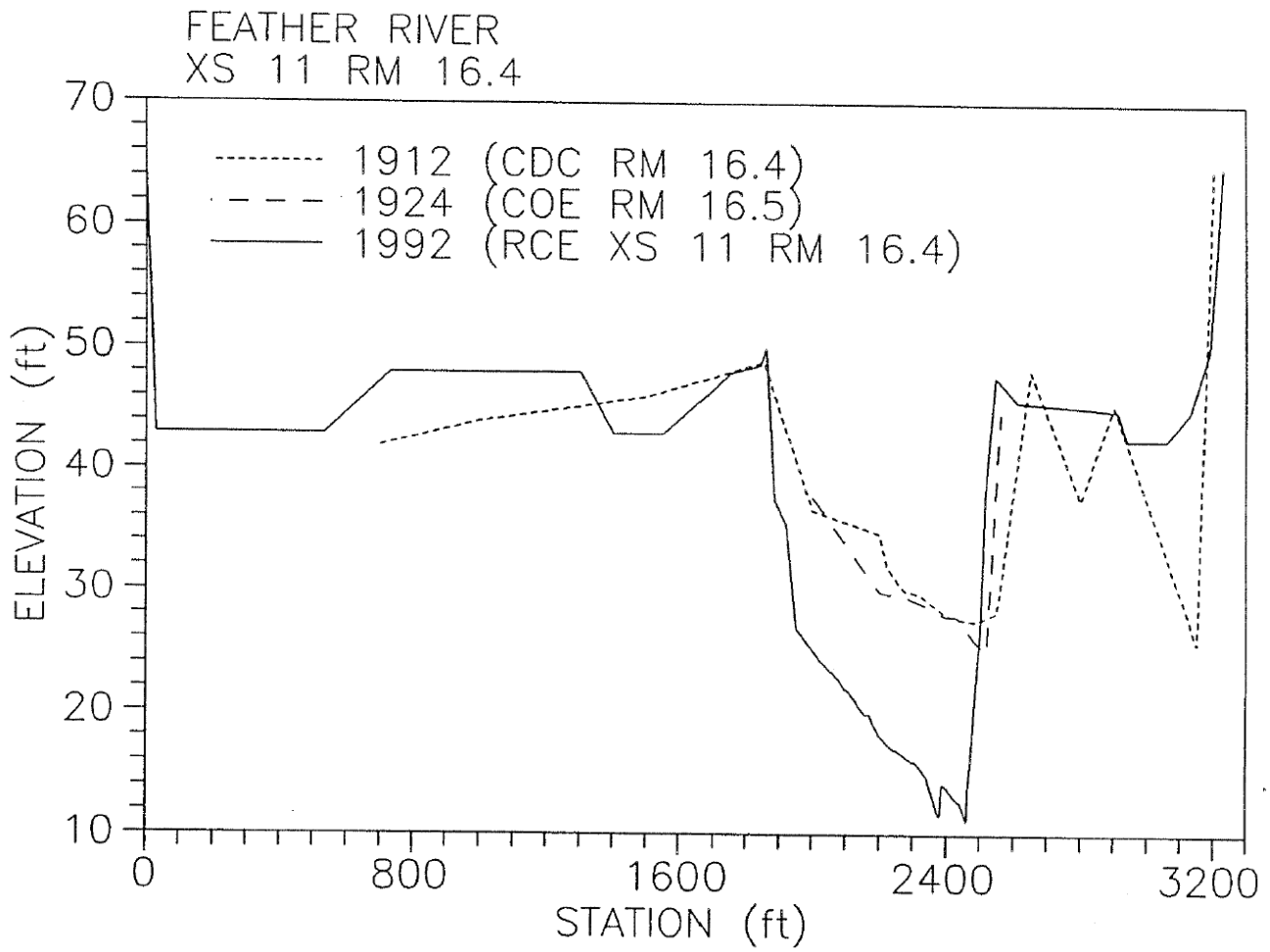
Source: Ayres, 1997
Notes:

figure 3-3
Feather River Levee Setback

Historic Cross Sections – RM 15.1

PWA Ref# 1833

PWA



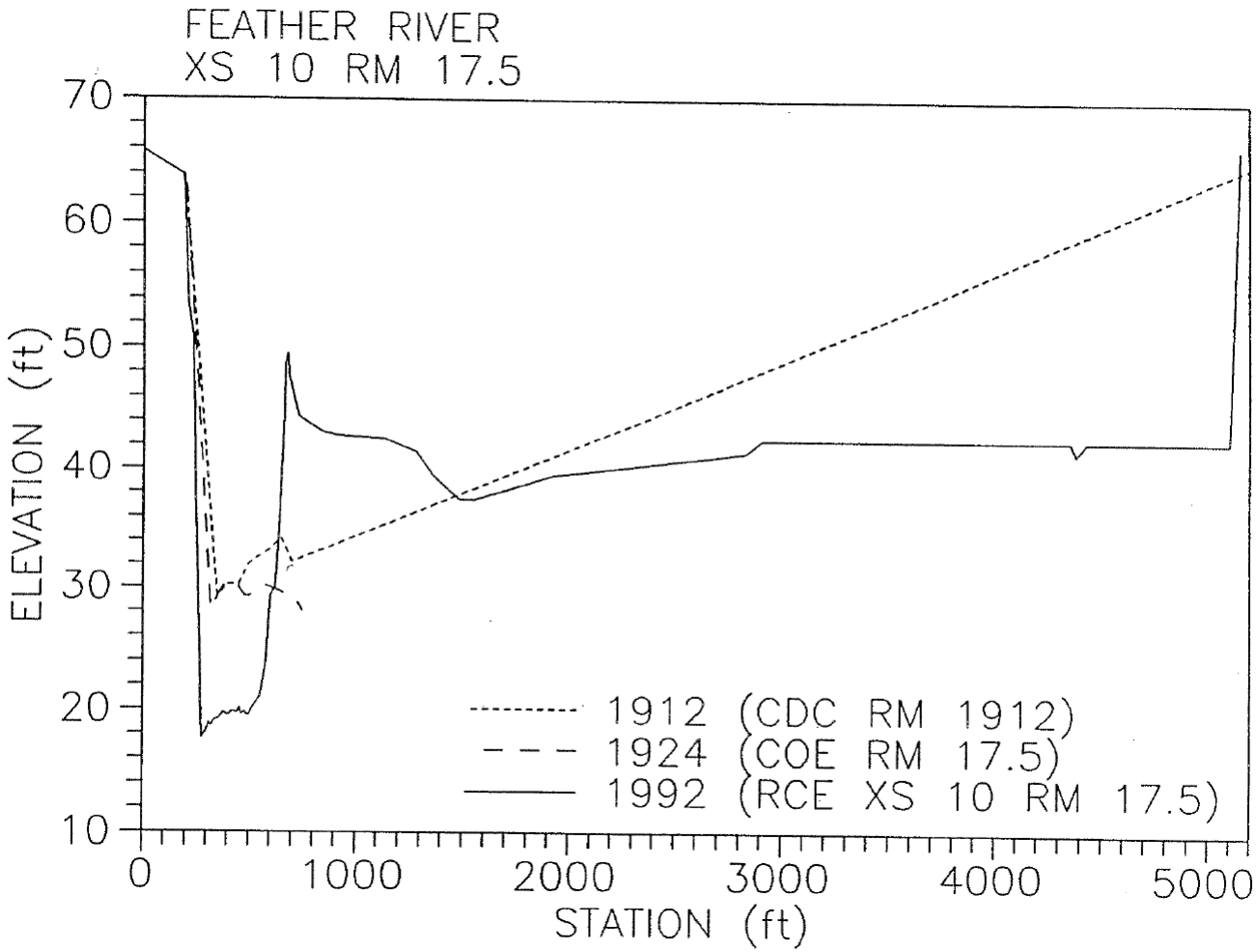
Source: Ayres, 1997
Notes:

figure 3-4
Feather River Levee Setback

Historic Cross Sections – RM 16.4

PWA Ref# 1833

PWA



Source: Ayres, 1997
Notes:

figure 3-5
Feather River Levee Setback

Historic Cross Sections – RM 17.5

PWA Ref# 1833

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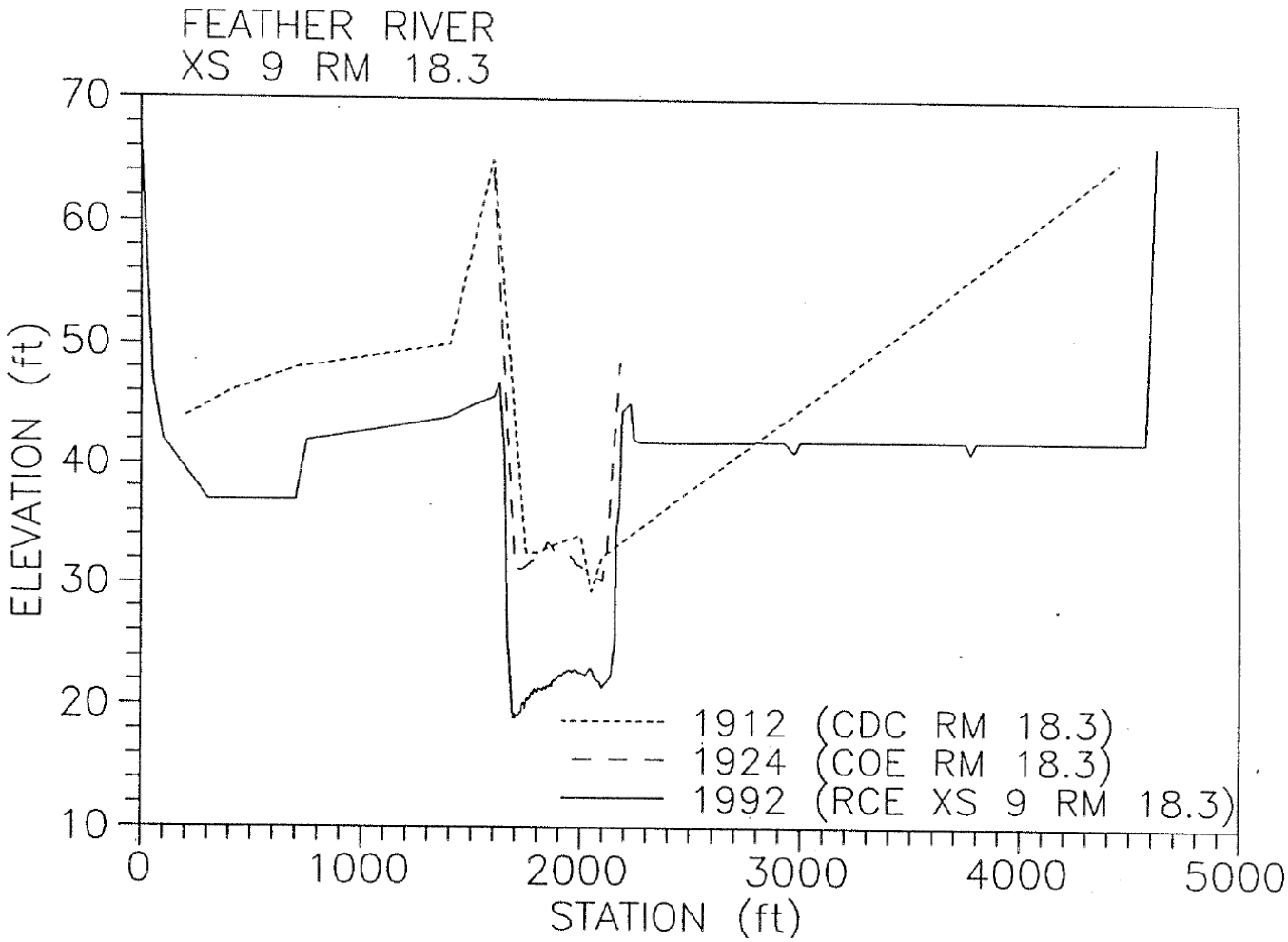


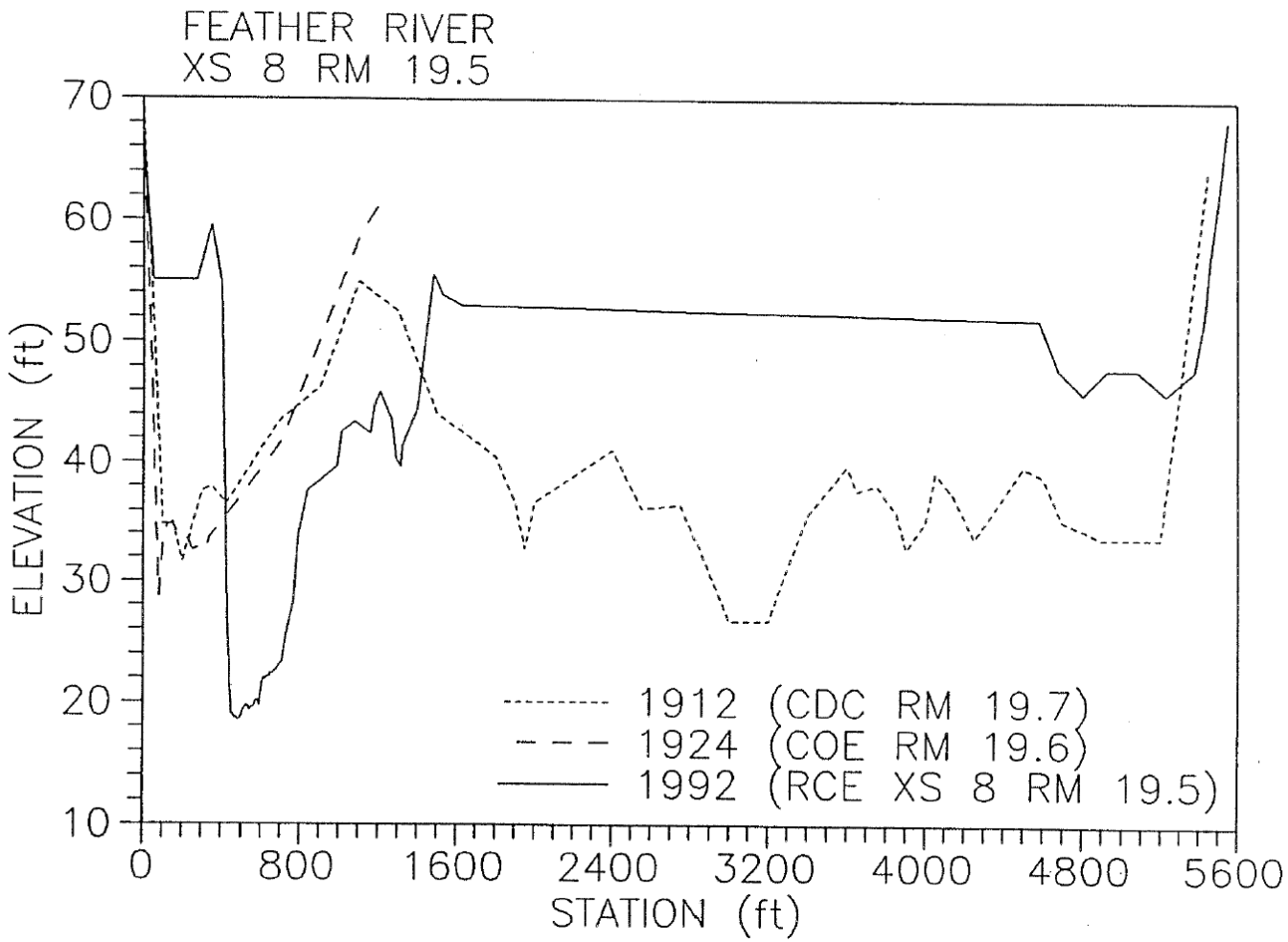
Source: Ayres, 1997
Notes:

figure 3-6
Feather River Levee Setback

Historic Cross Sections – RM 18.3

PWA Ref# 1833

PWA



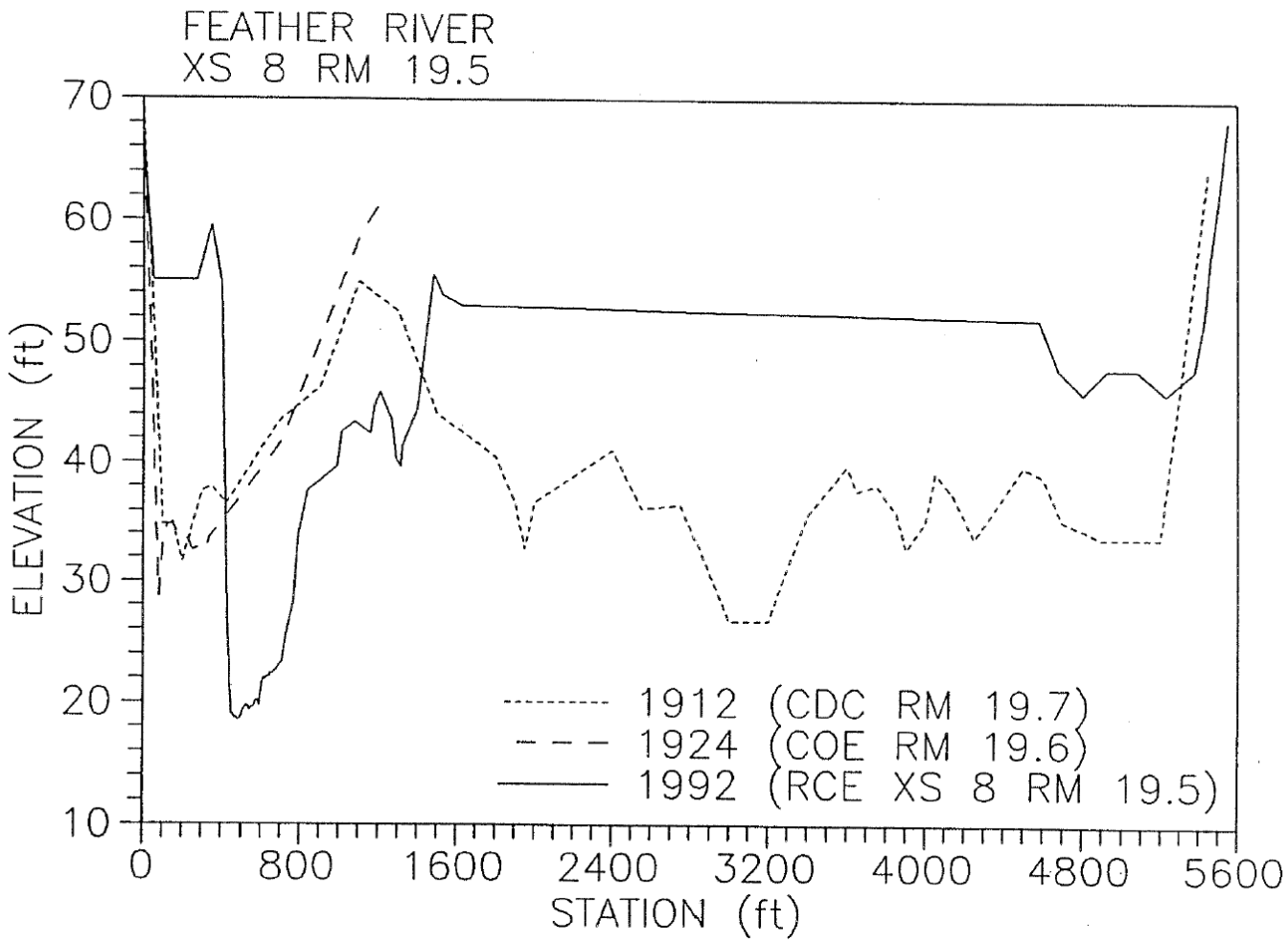
Source: Ayres, 1997
Notes:

figure 3-7
Feather River Levee Setback

Historic Cross Sections – RM 19.5

PWA Ref# 1833

PWA



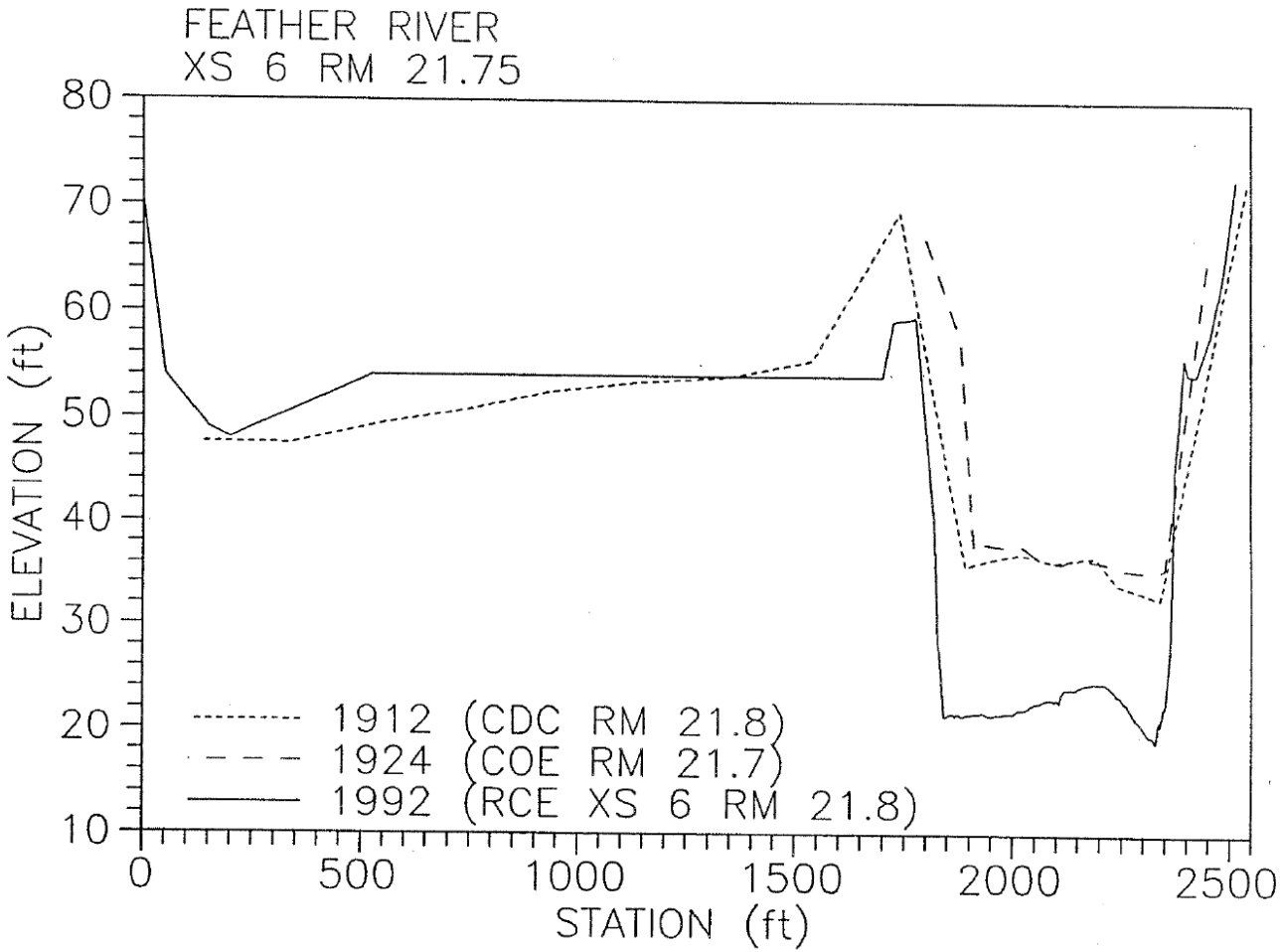
Source: Ayres, 1997
Notes:

figure 3-8
Feather River Levee Setback

Historic Cross Sections – RM 20.4

PWA Ref# 1833

PWA



Source: Ayres, 1997
Notes:

figure 3-9
Feather River Levee Setback

Historic Cross Sections – RM 21.75

PWA Ref# 1833

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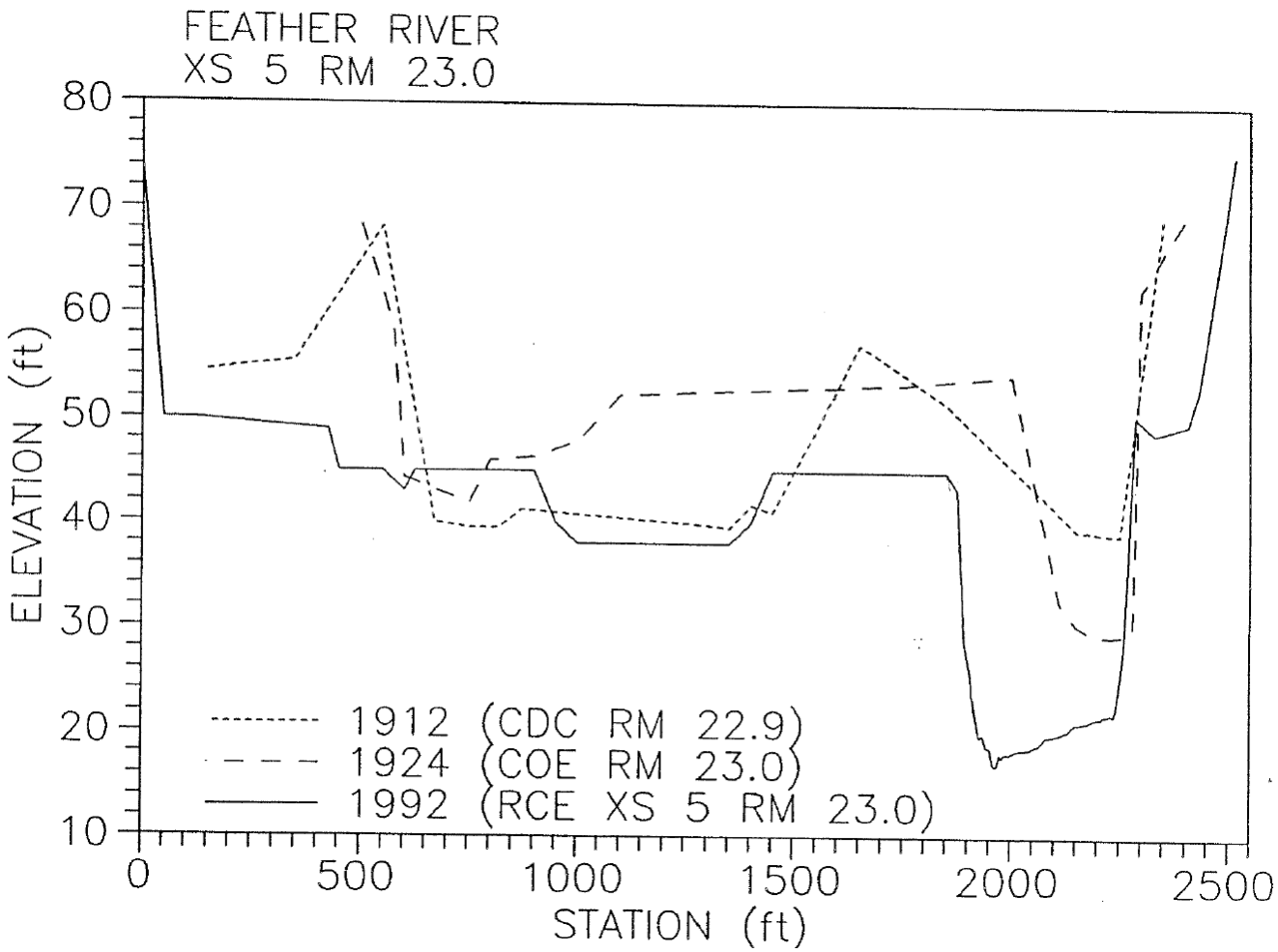

Source: Ayres, 1997
Notes:

figure 3-10
Feather River Levee Setback

Historic Cross Sections – RM 23.0

PWA Ref# 1833

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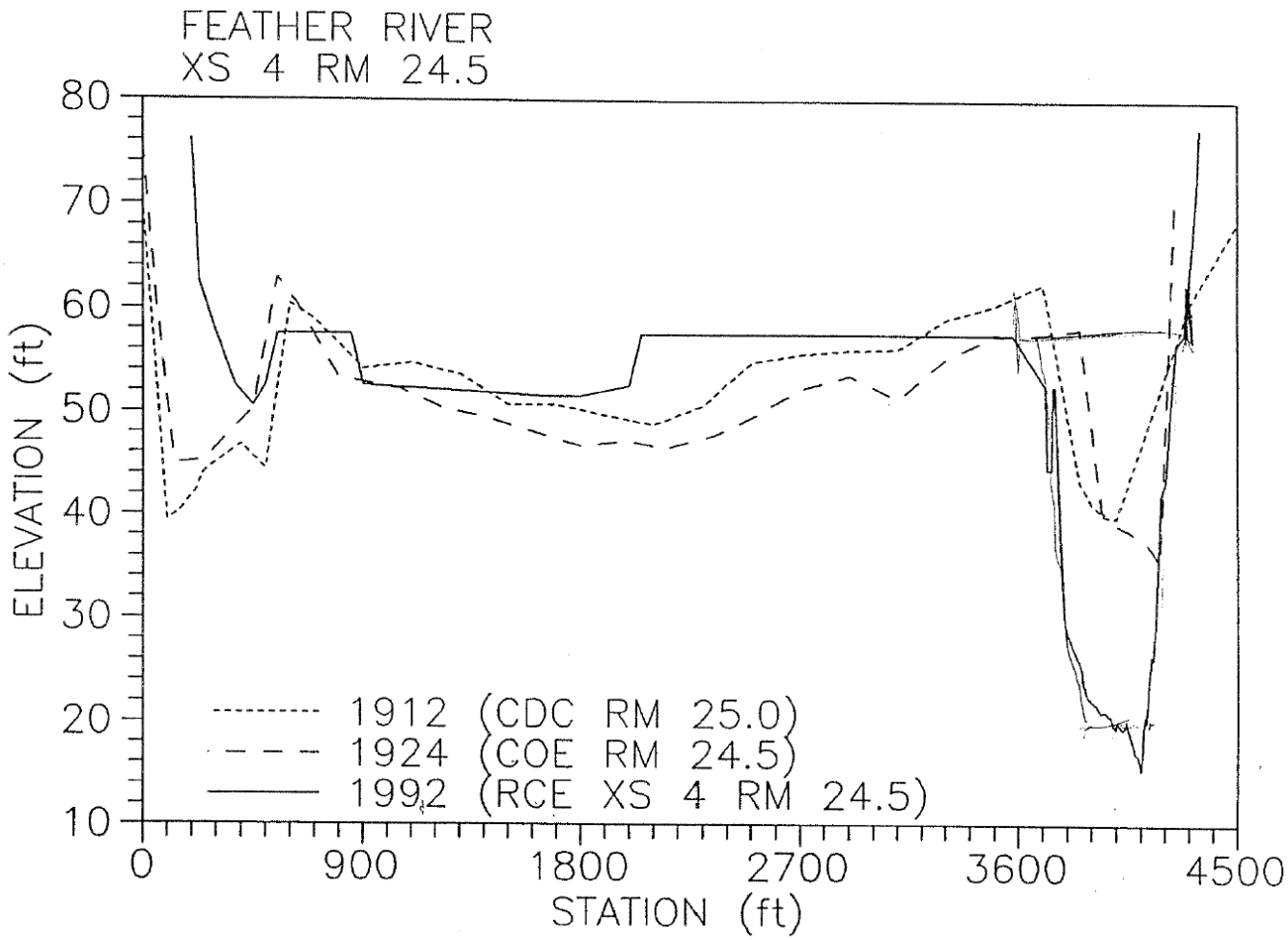

Source: Ayres, 1997
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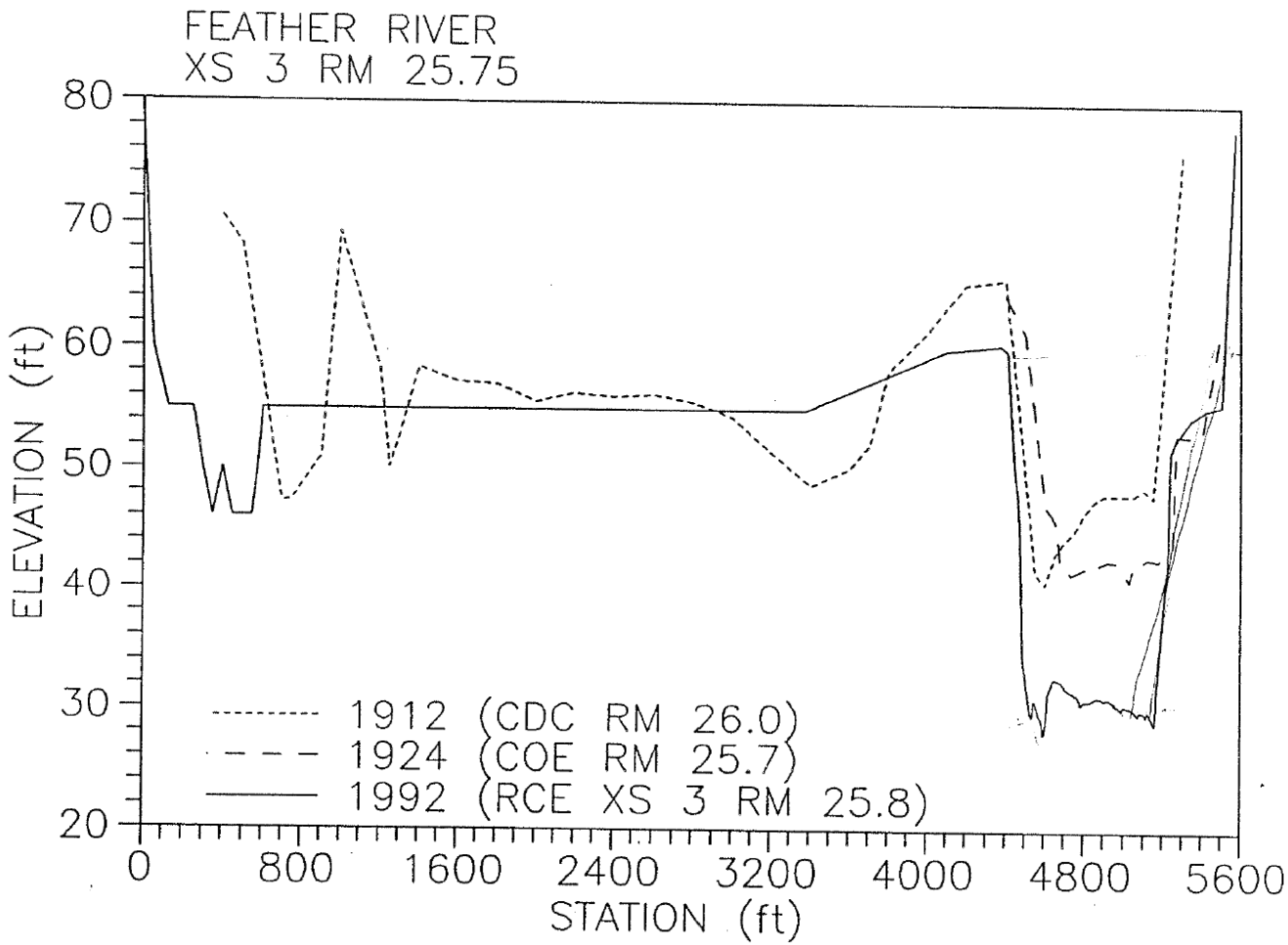
figure 3-11
Feather River Levee Setback

Historic Cross Sections – RM 24.5

PWA Ref# 1833

PWA



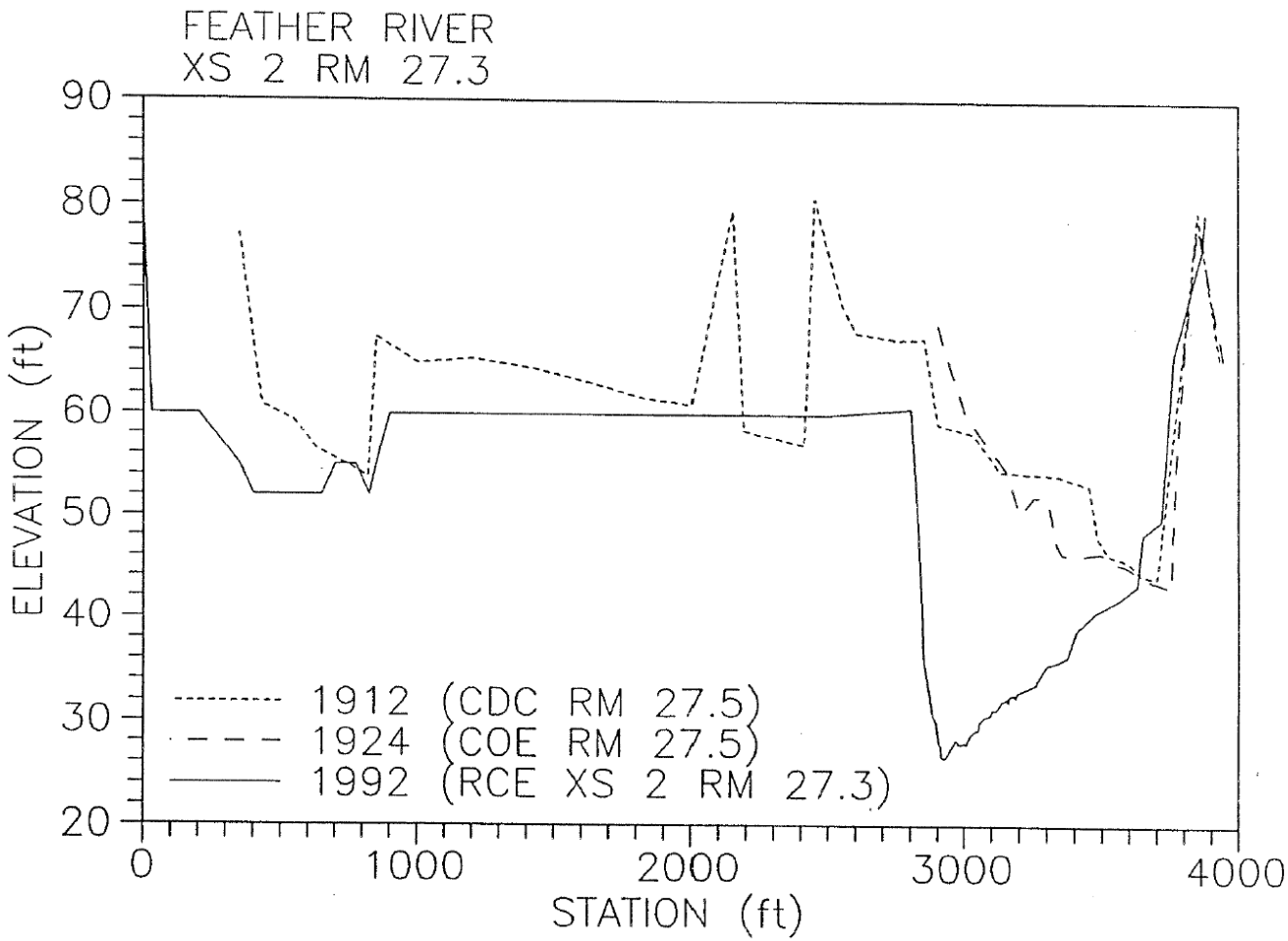
Source: Ayres, 1997
Notes:

figure 3-12
Feather River Levee Setback

Historic Cross Sections – RM 25.75

PWA Ref# 1833

PWA



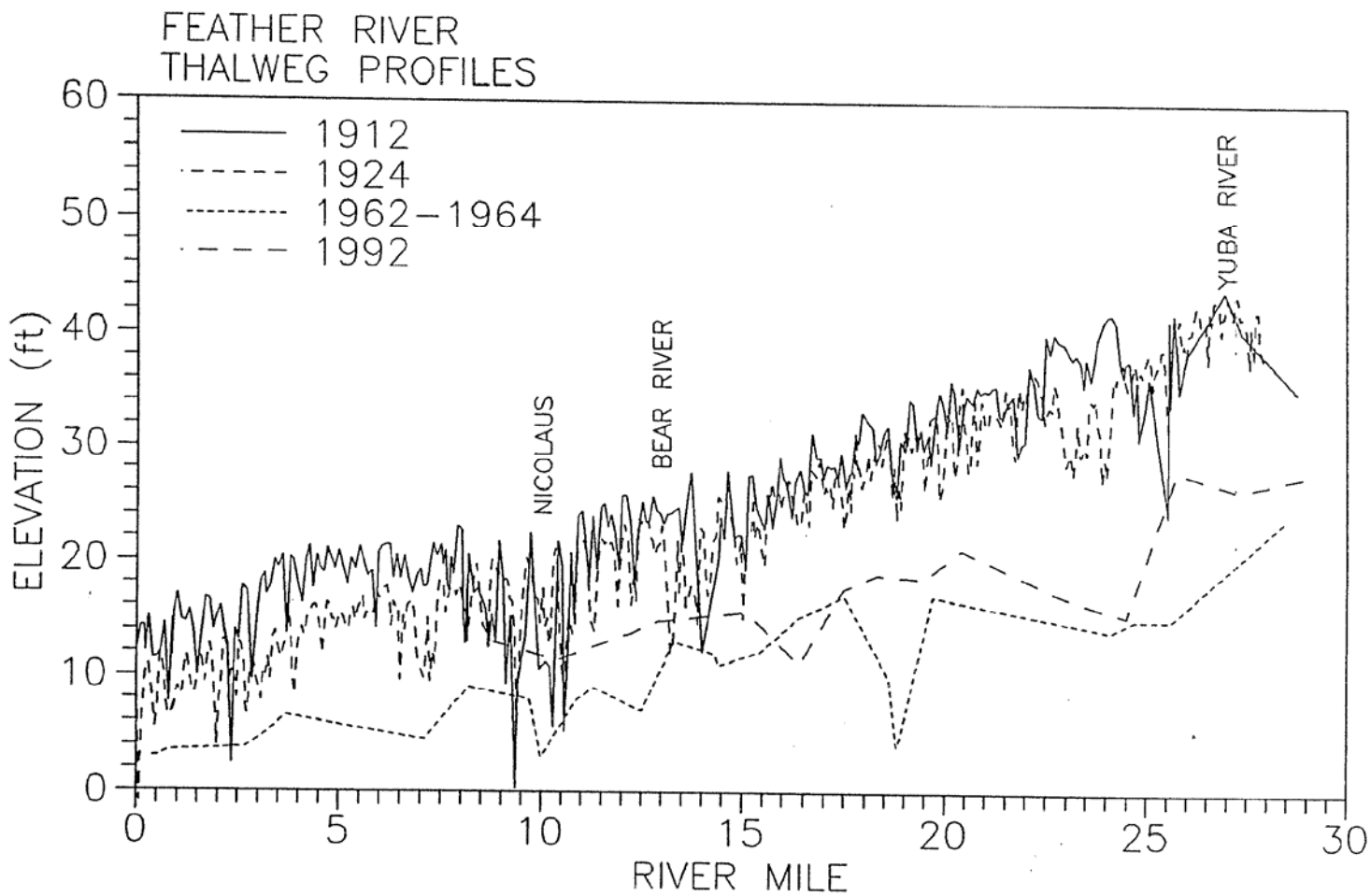
Source: Ayres, 1997
Notes:

figure 3-13
Feather River Levee Setback

Historic Cross Sections – RM 27.3

PWA Ref# 1833

PWA



Source: Ayres, 1997
Notes:

Figure ***3-14***
Feather River Levee Setback

Thalweg Profiles 1912 – 1992

PWA Ref# 1833

PWA

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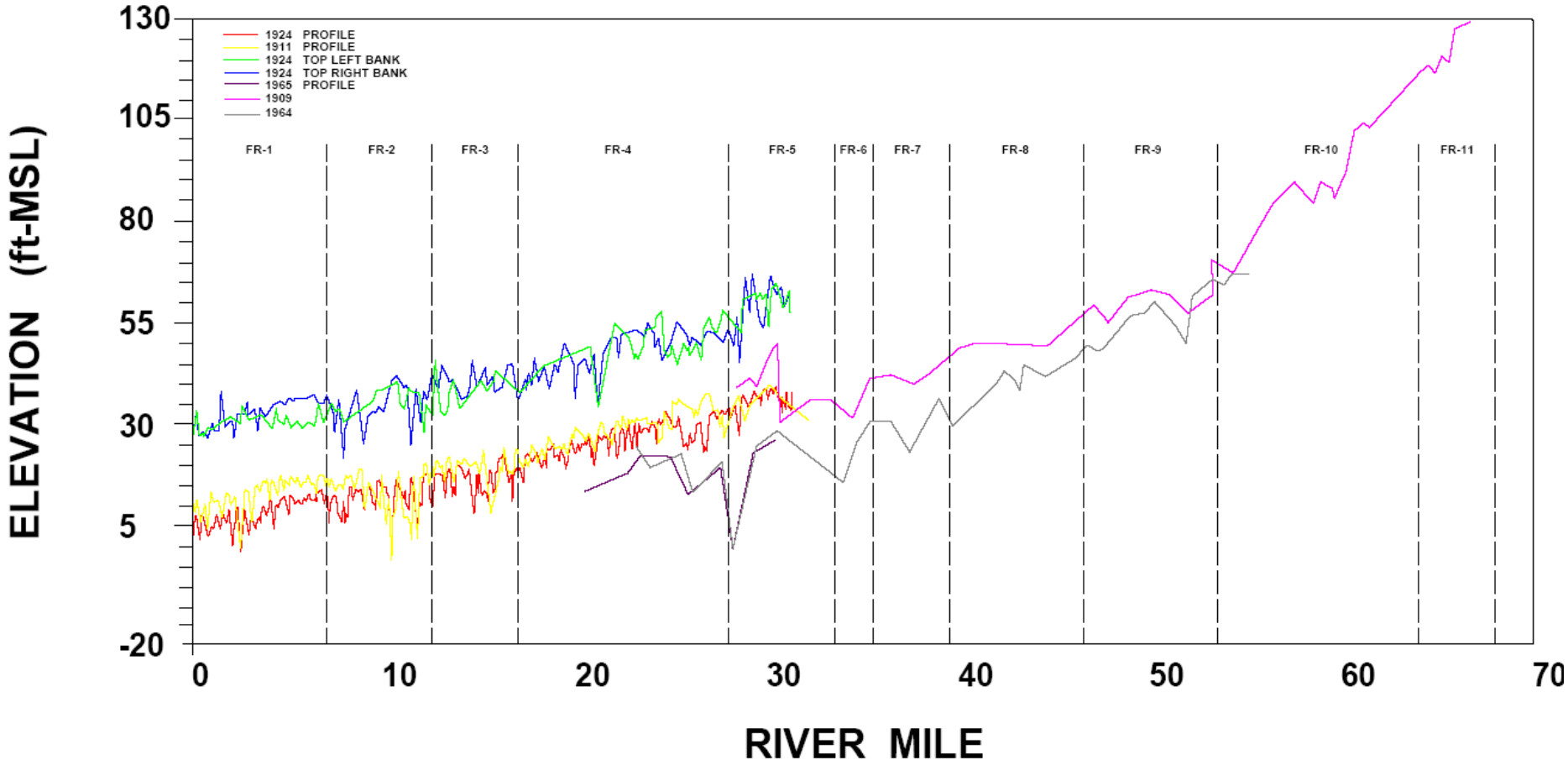

Source: Ayres, 1997
Notes:

figure 3-15
Feather River Levee Setback

Thalweg Profiles 1909, 1964

PWA Ref# 1833

PWA

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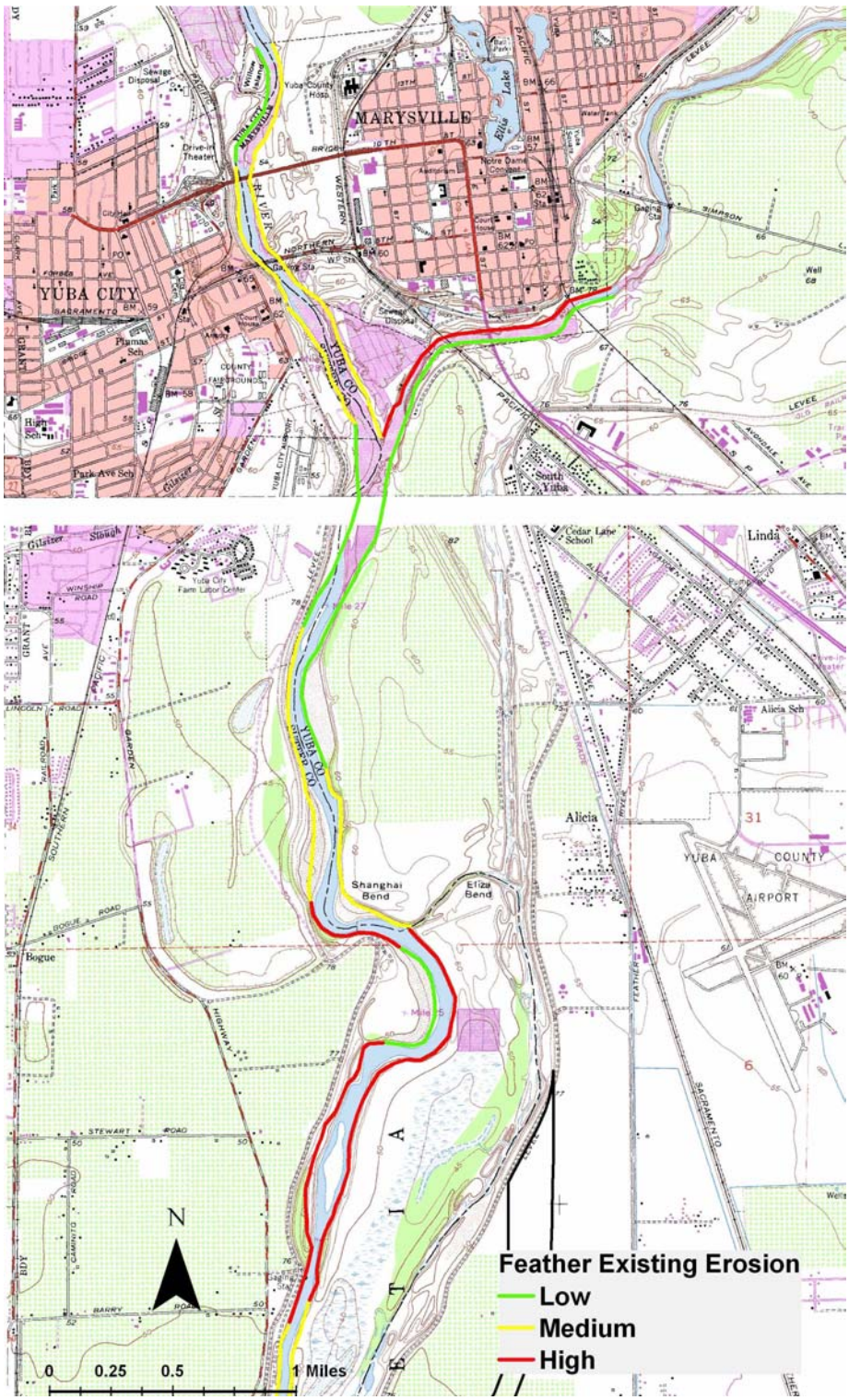


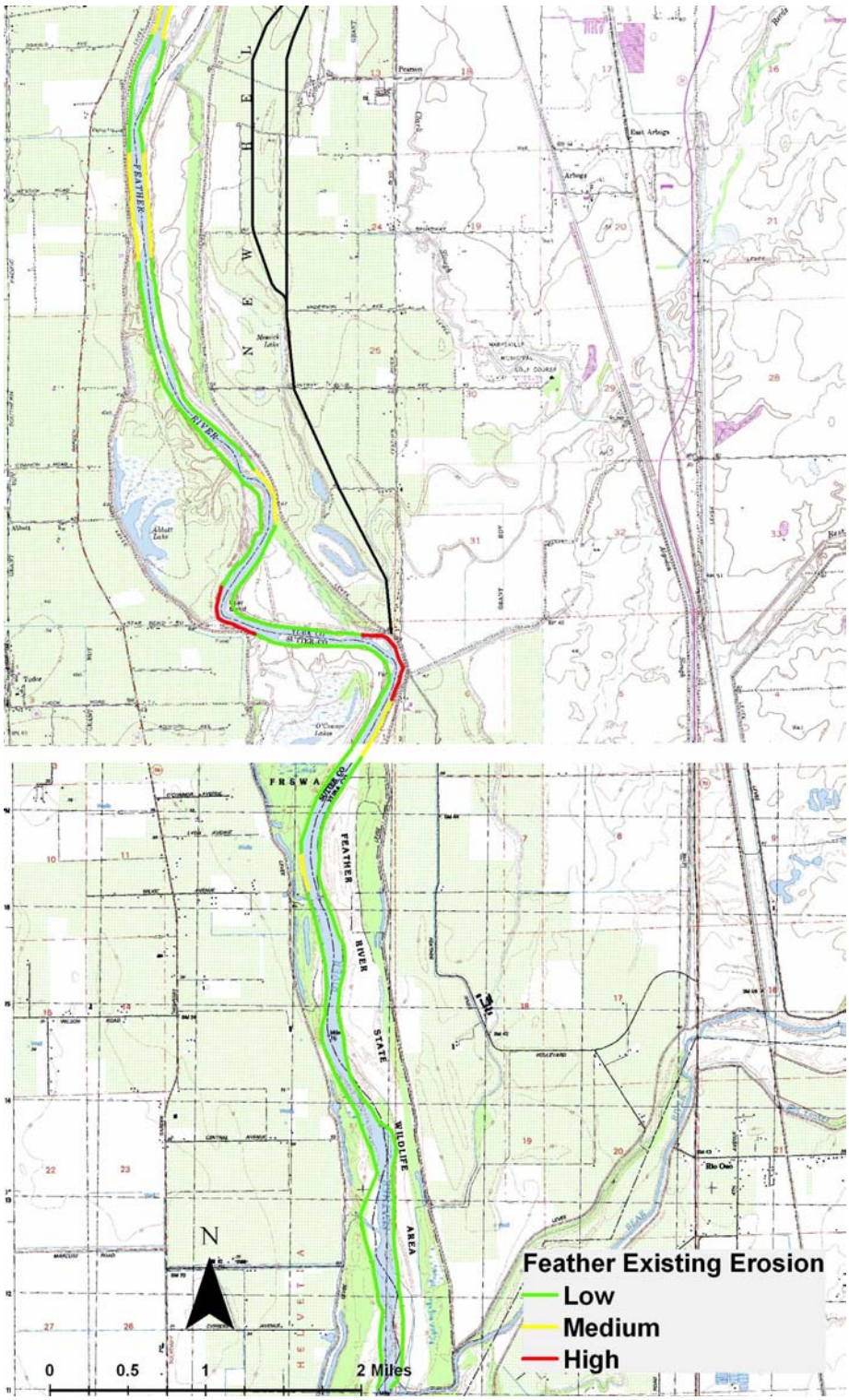
Source:
Notes: Erosion status based on observations from field reconnaissance on 5/10/2006.

figure 4-1a
Feather River Levee Setback

Existing Channel Bank Erosion Conditions

PWA Ref# 1833

PWA



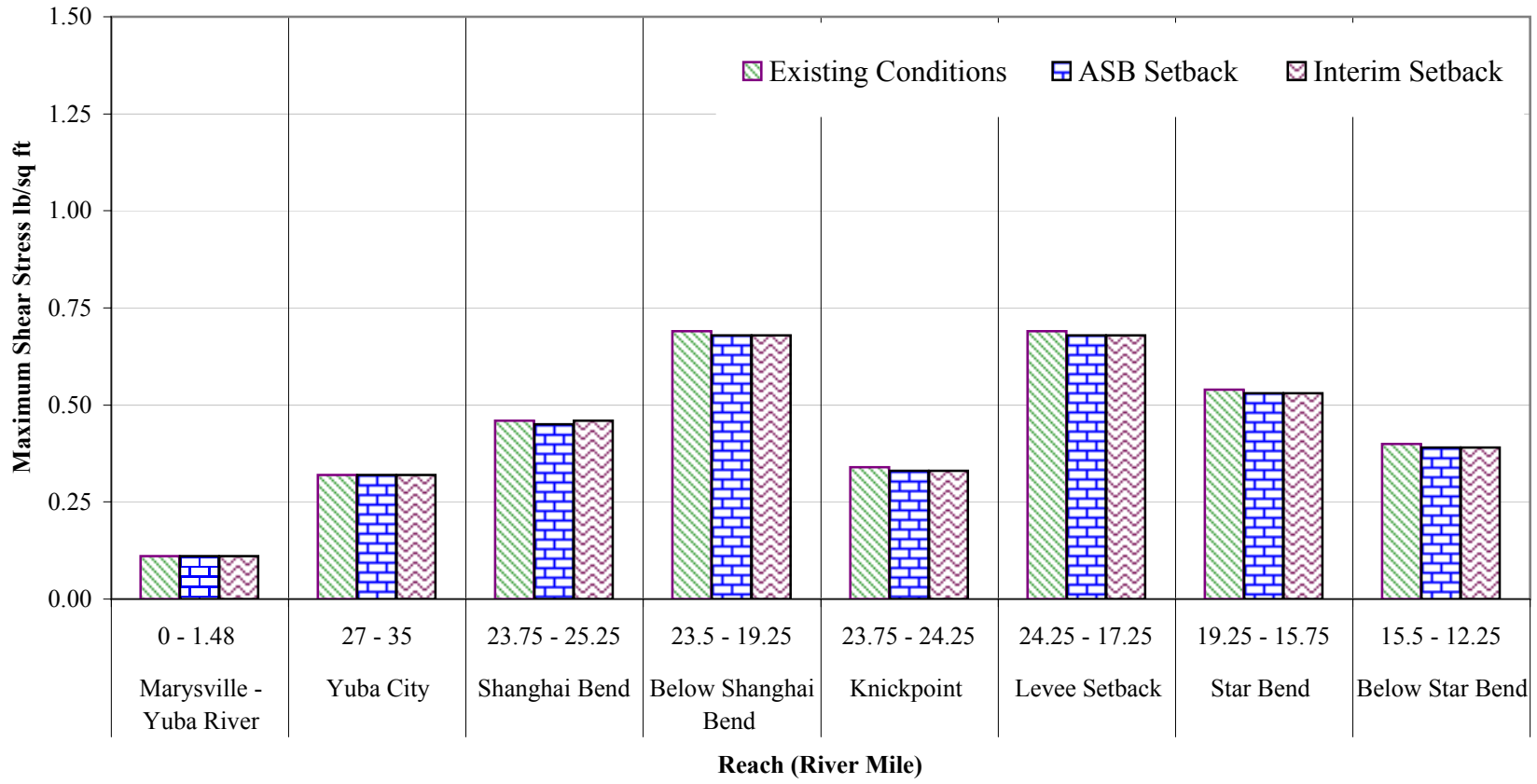
Source:
Notes: Erosion status based on observations from field reconnaissance on 5/10/2006.

figure 4-1b
Feather River Levee Setback

Existing Channel Bank Erosion Conditions

PWA Ref# 1833

PWA



Source: Hydraulic data from MBK Engineers
Notes: Average boundary shear stress for the channel area

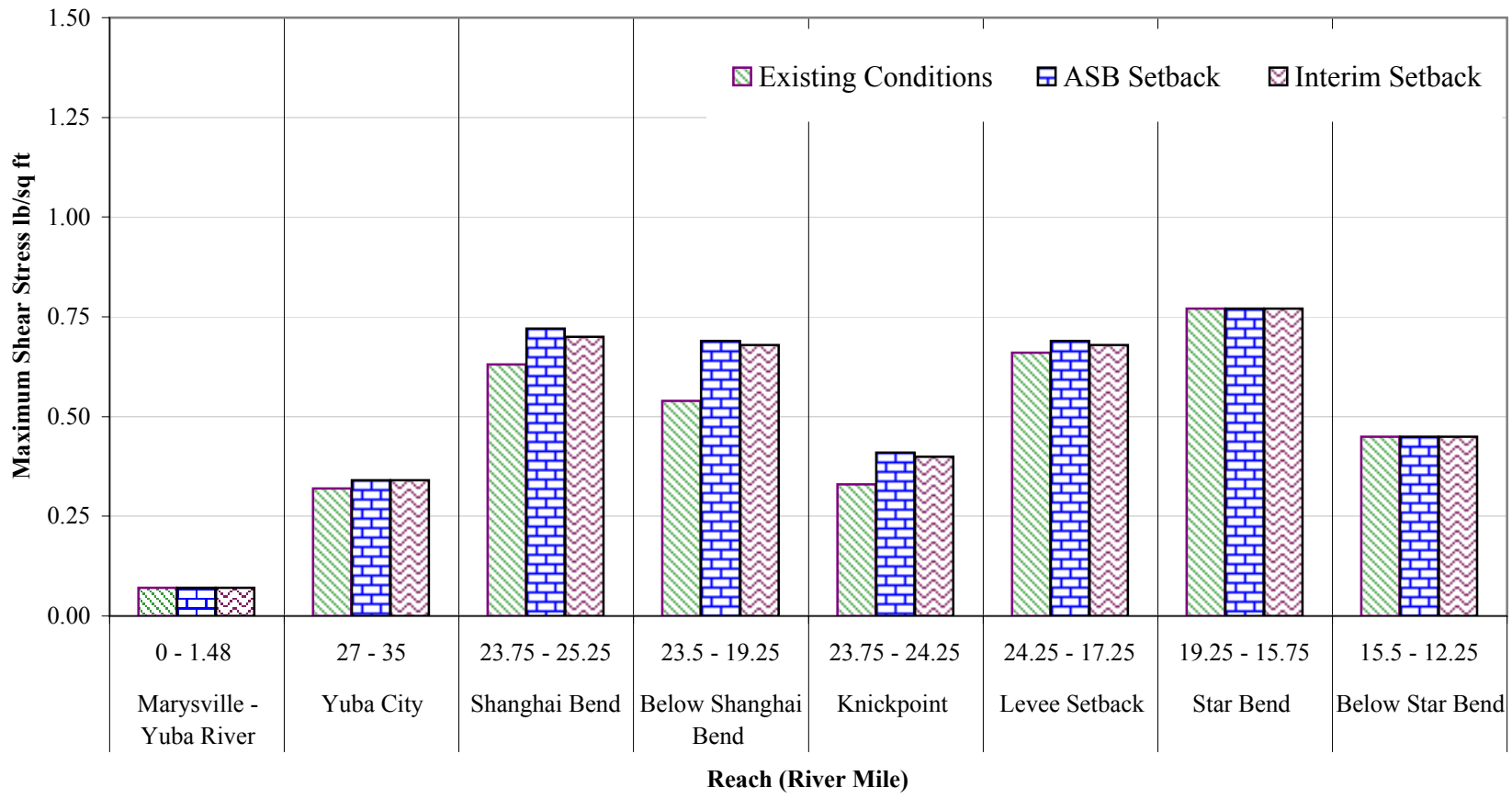
figure 5-1

Feather River Levee Setback

Channel Shear Stress, 2-year Flood

PWA Ref. # 1833

PWA



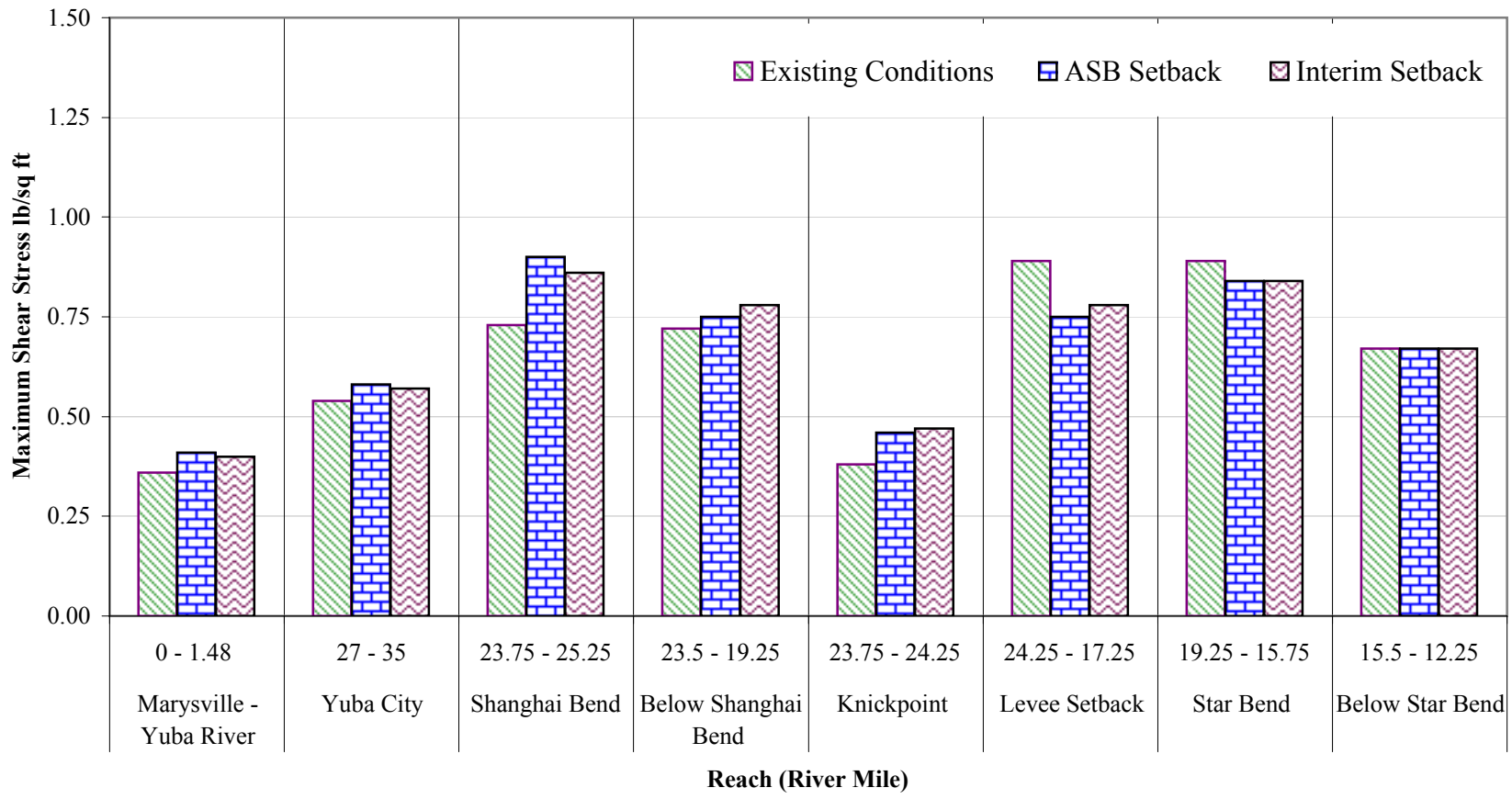
Source: Hydraulic data from MBK Engineers
Notes: Average boundary shear stress for the channel area

figure 5-2
Feather River Levee Setback

Channel Shear Stress, 5-year Flood

PWA Ref. # 1833

PWA



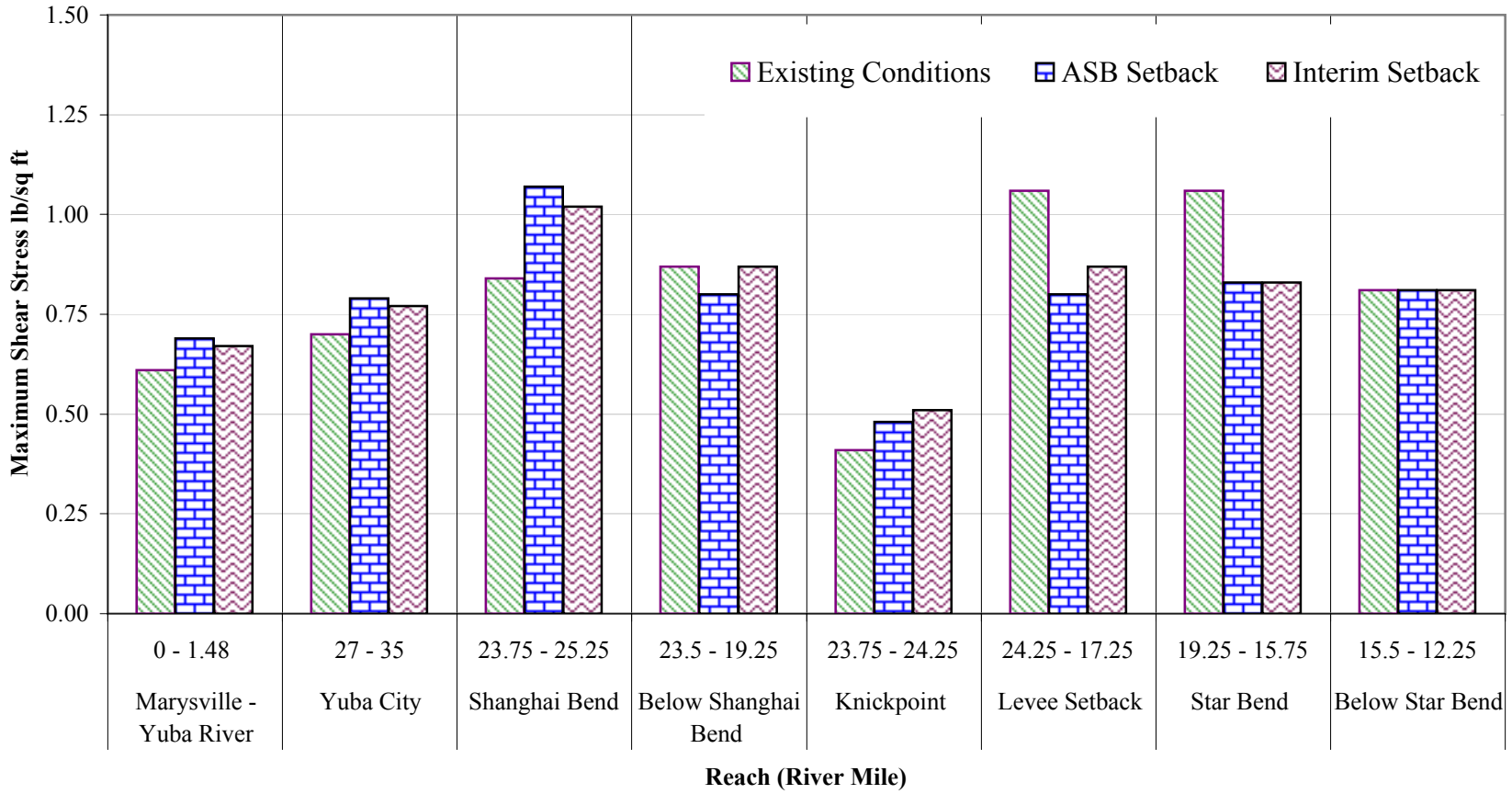
Source: Hydraulic data from MBK Engineers
Notes: Average boundary shear stress for the channel area

figure 5-3
Feather River Levee Setback

Channel Shear Stress, 10-year Flood

PWA Ref. # 1833

PWA



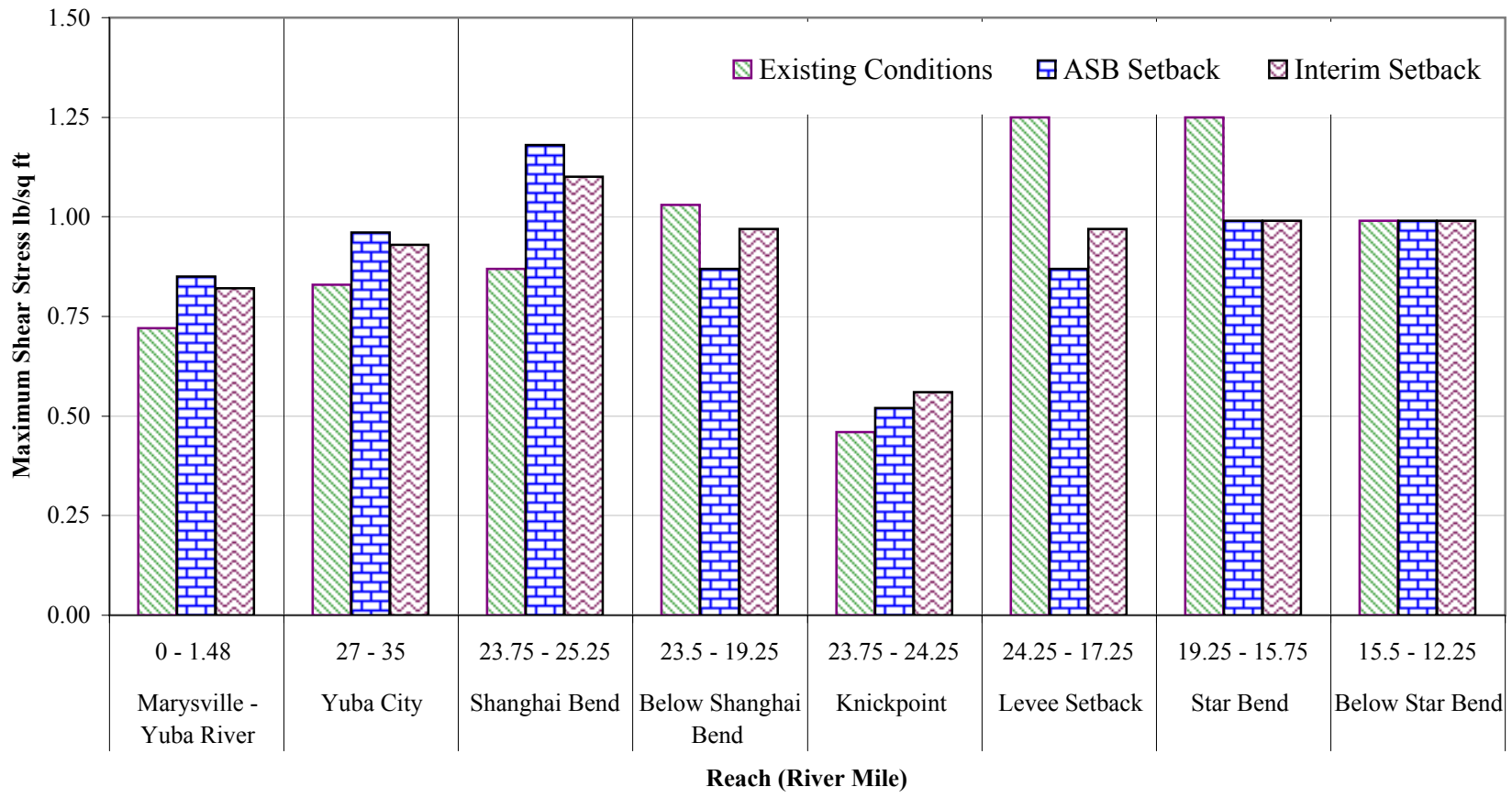
Source: Hydraulic data from MBK Engineers
Notes: Average boundary shear stress for the channel area

figure 5-4
Feather River Levee Setback

Channel Shear Stress, 100-year Flood

PWA Ref. # 1833

PWA



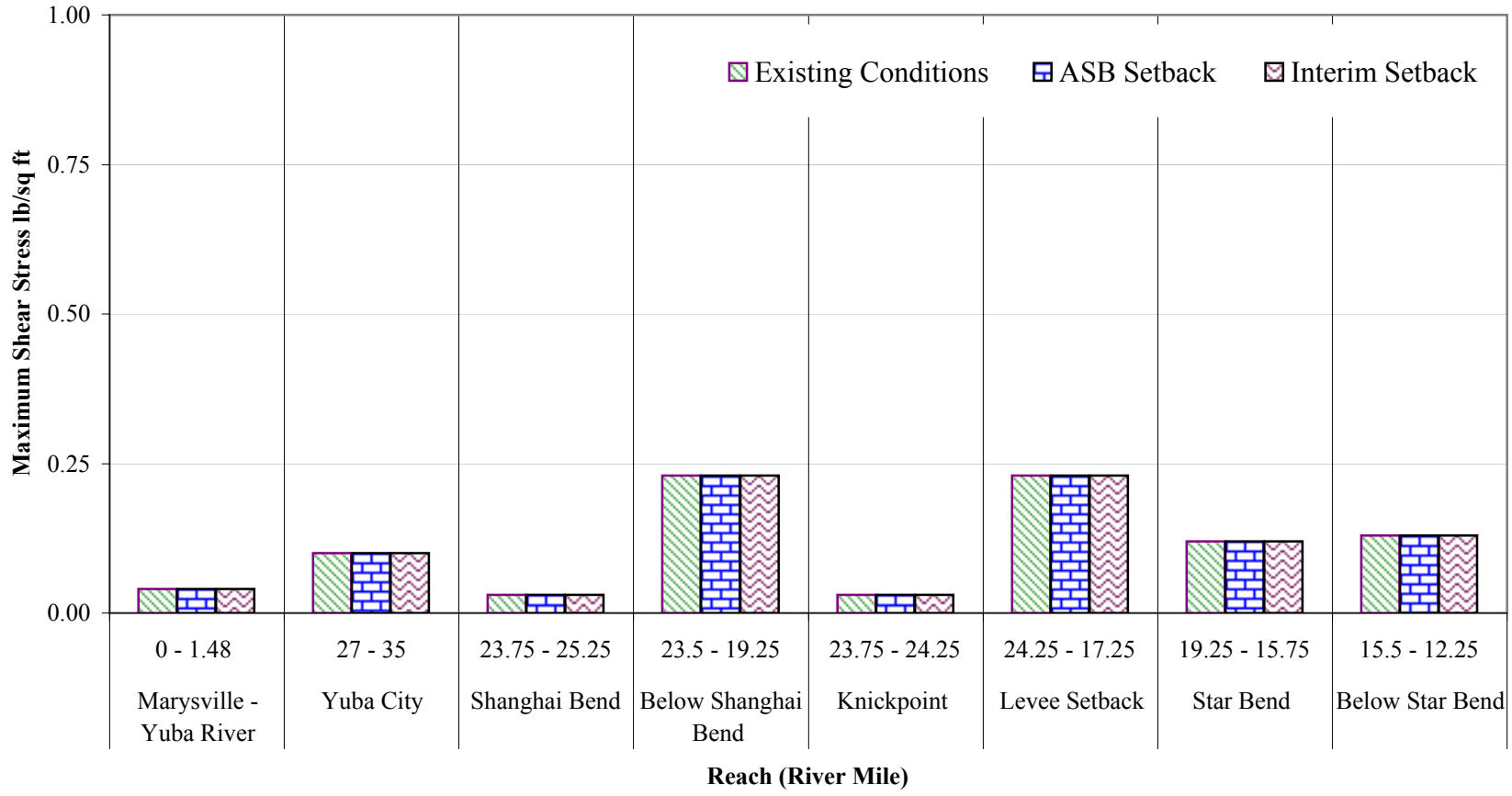
Source: Hydraulic data from MBK Engineers
Notes: Average boundary shear stress for the channel area

figure 5-5
Feather River Levee Setback

Channel Shear Stress, 200-year Flood

PWA Ref. # 1833

PWA



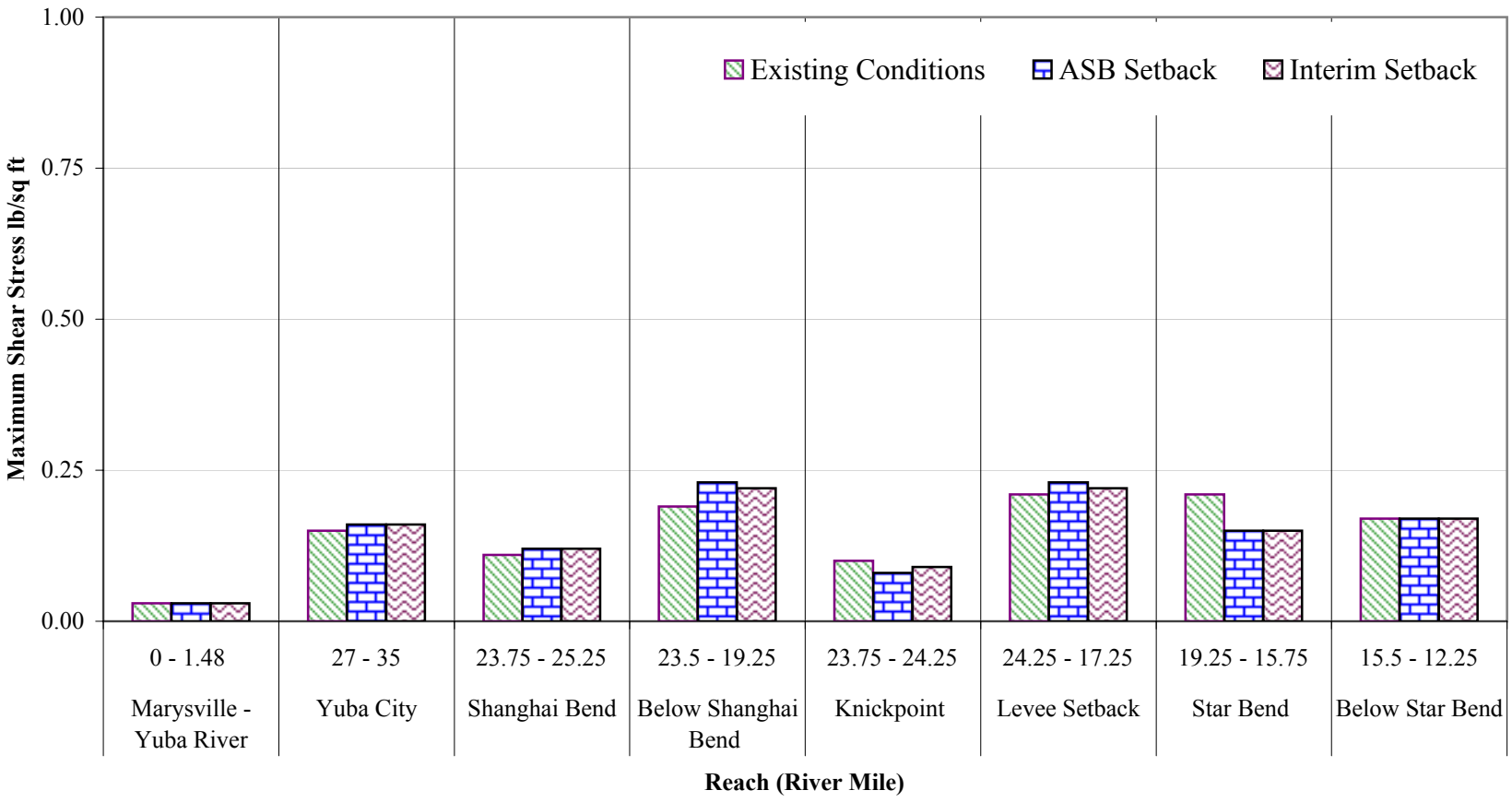
Source: Hydraulic data from MBK Engineers
Notes: Average boundary shear stress for the overbank area

figure 5-6
Feather River Levee Setback

Overbank Shear Stress, 2-year Flood

PWA Ref. # 1833

PWA



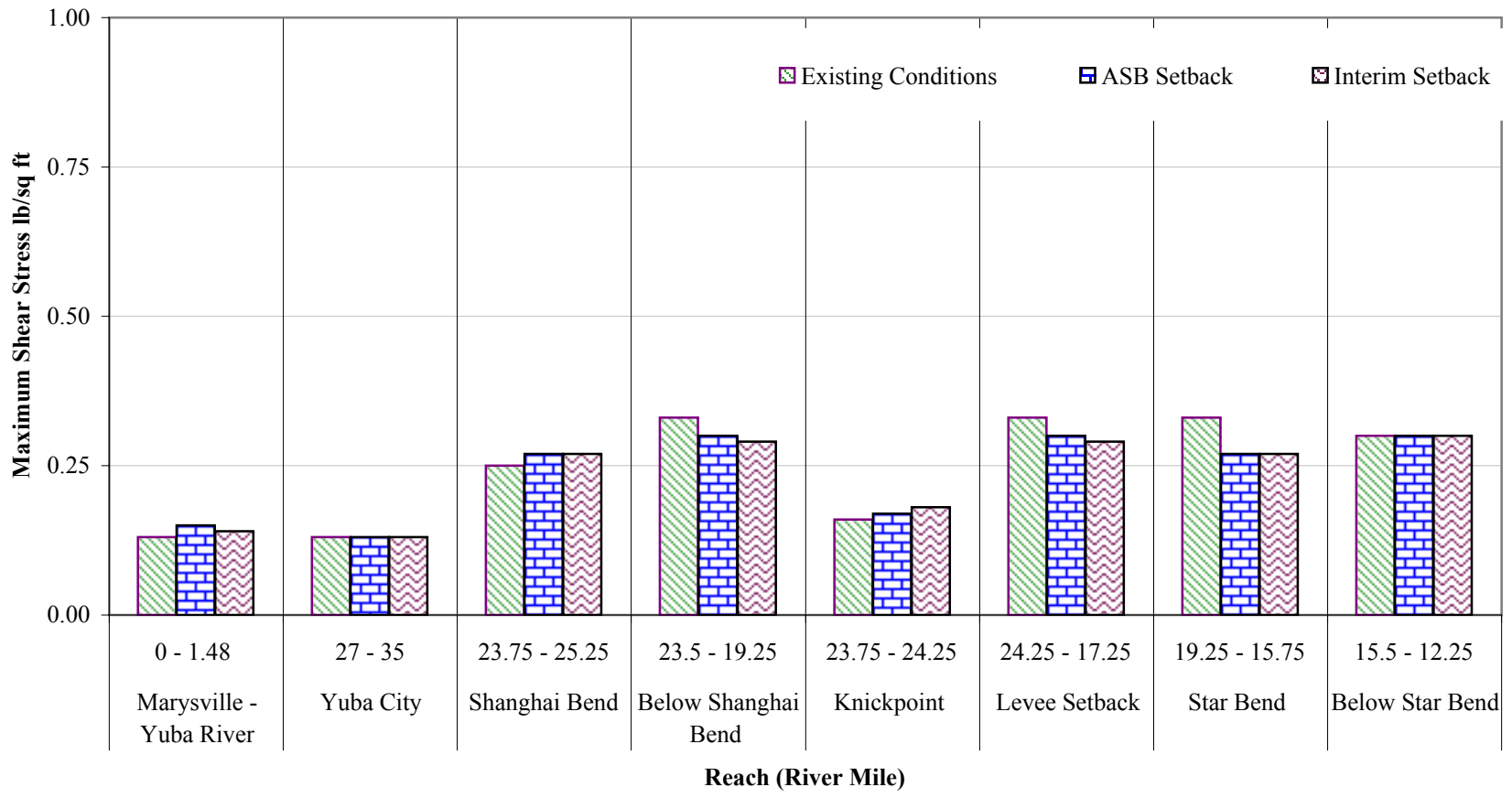
Source: Hydraulic data from MBK Engineers
Notes: Average boundary shear stress for the overbank area

figure 5-7
Feather River Levee Setback

Overbank Shear Stress, 5-year Flood

PWA Ref. # 1833

PWA



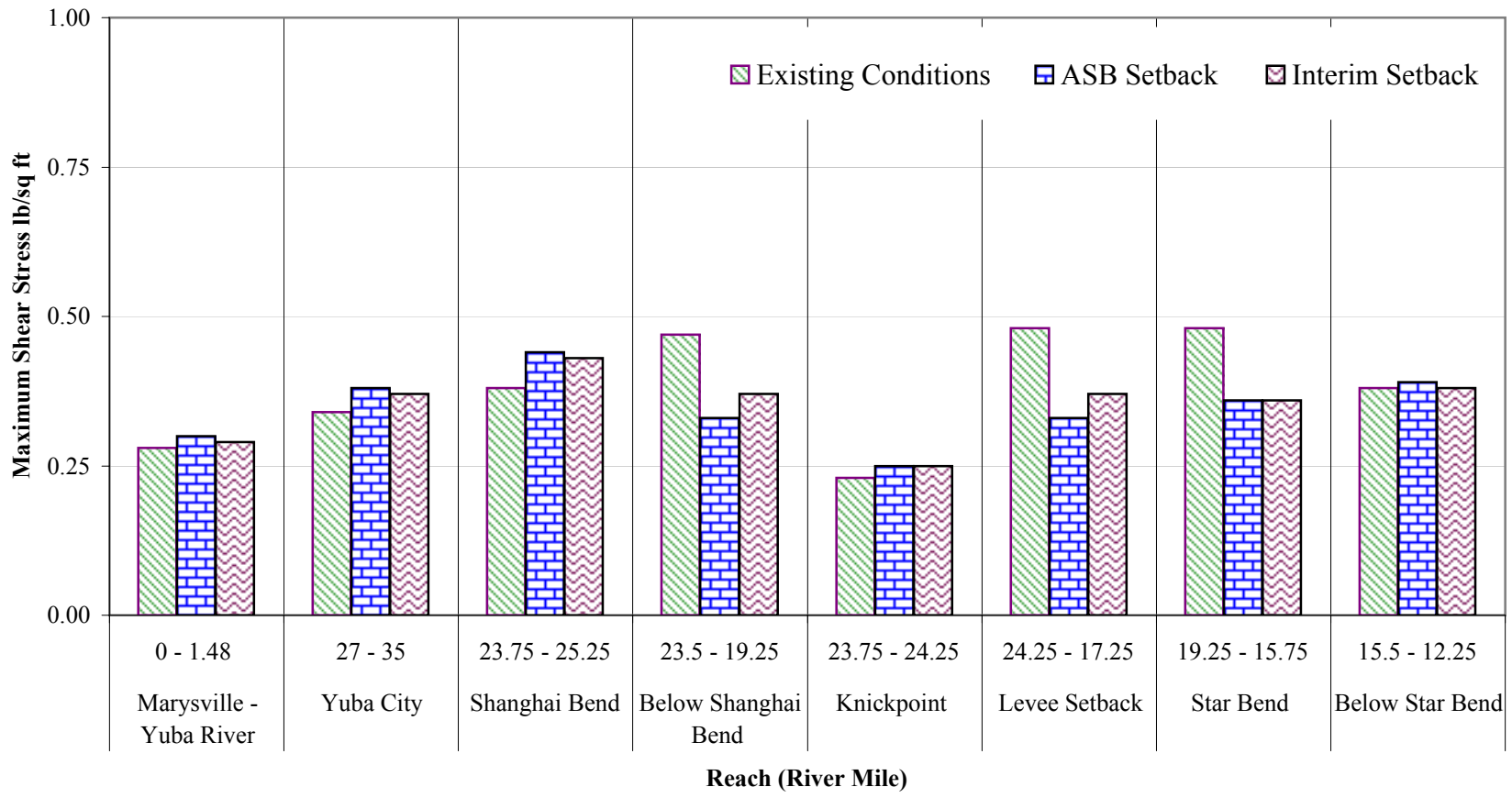
Source: Hydraulic data from MBK Engineers
Notes: Average boundary shear stress for the overbank area

figure 5-8
Feather River Levee Setback

Overbank Shear Stress, 10-year Flood

PWA Ref. # 1833

PWA



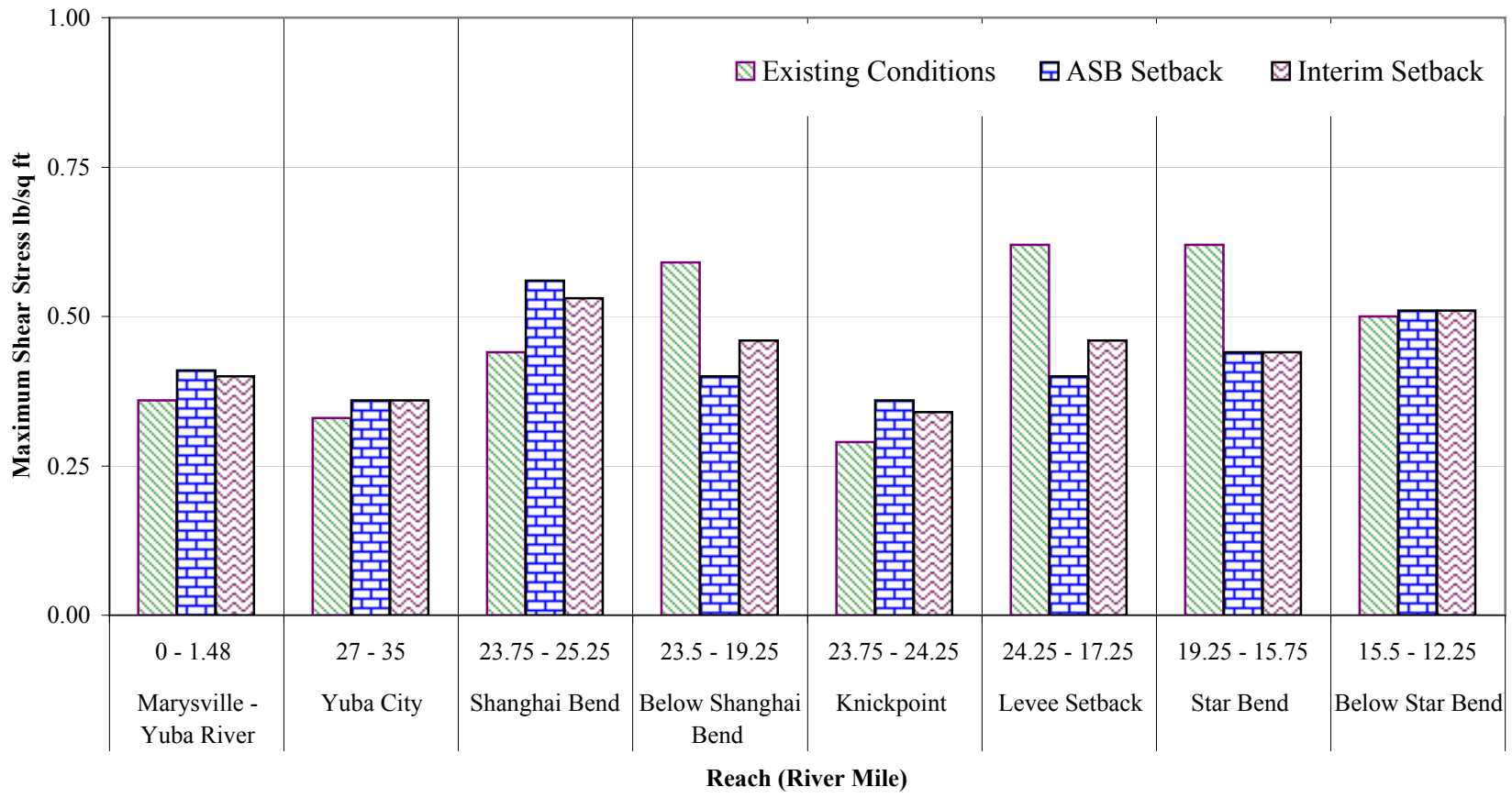
Source: Hydraulic data from MBK Engineers
Notes: Average boundary shear stress for the overbank area

figure 5-9
Feather River Levee Setback

Overbank Shear Stress, 100-year Flood

PWA Ref. # 1833

PWA



Source: Hydraulic data from MBK Engineers
Notes: Average boundary shear stress for the overbank area

figure 5-10
Feather River Levee Setback

Overbank Shear Stress, 200-year Flood

PWA Ref. # 1833

PWA

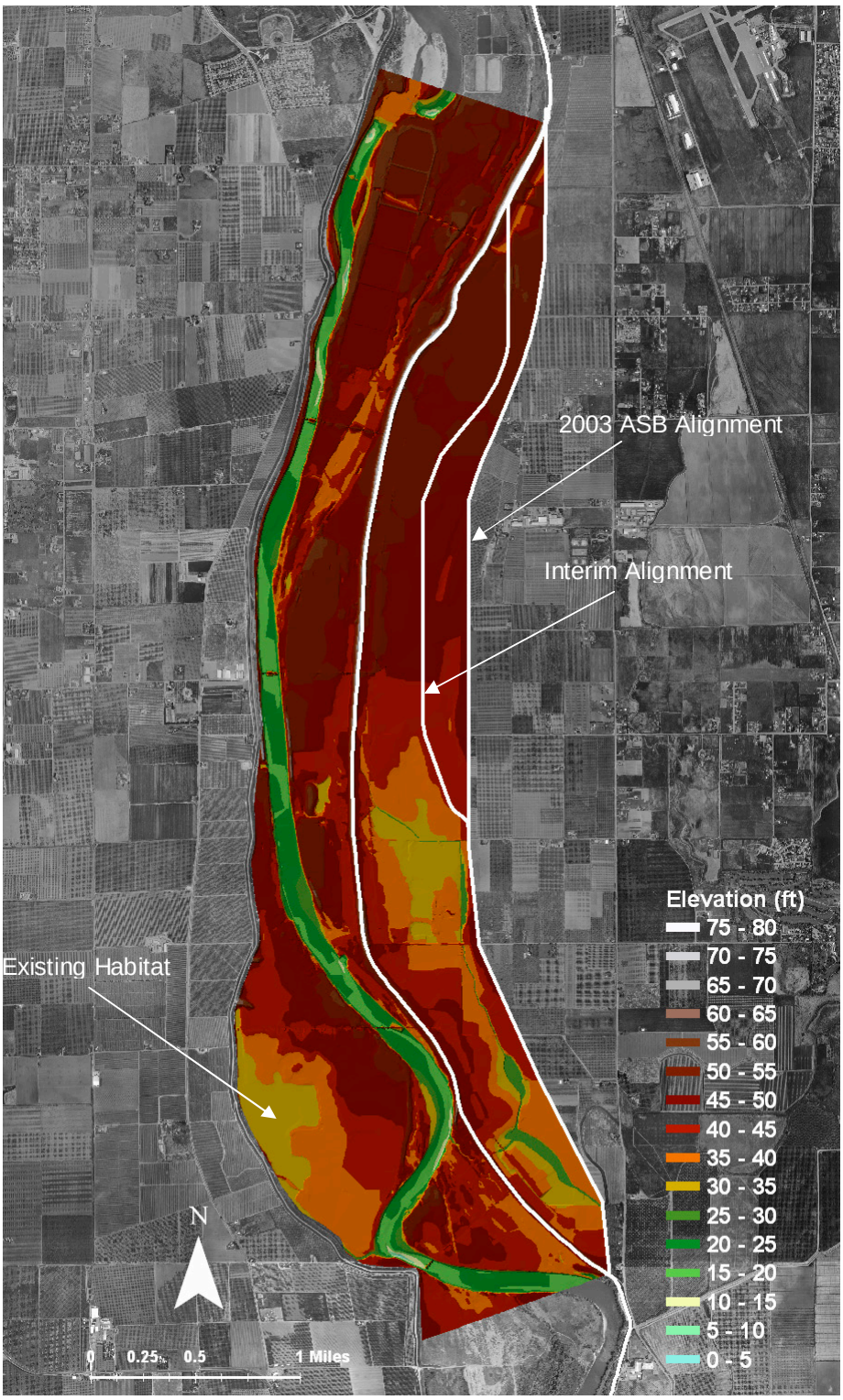


figure 6-1
Feather River Levee Setback

Elevation within Setback

PWA Ref# 1833

PWA

APPENDIX D

Native American Consultation

EDAW

EDAW INC

2022 J STREET

SACRAMENTO CALIFORNIA

95814

TEL 916 414 5800

FAX 916 414 5850

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July 19, 2006

Debbie Pilas-Treadway
Native American Heritage Commission
915 Capitol Mall, Room 364
Sacramento, Ca 95814

Subject: Cultural Resource Investigations for the Proposed Feather River Levee Setback Project, Yuba County, California

Dear Ms. Treadway

The Three Rivers Levee Improvement Authority is assessing three alternatives to correct deficiencies on the existing left (east) levee of the Feather River and the left (south) levee of the Yuba River, a project which will require approval from the U.S. Army Corps of Engineers. As outlined by the Advisory Council on Historic Preservation (ACHP) in regulations implementing Section 106 of the National Historic Preservation Act (NHPA) (36 CFR Section 800.2(c)(2), federal agencies, are required to consult with Indian tribes that attach religious and traditional significance to historic properties that may be affected by an undertaking [Section 101(d)(6)(A)]. Moreover, historic properties of religious and cultural significance to Indian tribes may be eligible for listing in the National Register, and Section 101(d)(6)(B). On behalf of the Army Corps of Engineers we are bringing this project to your attention in order to solicit input and concerns

Three alternatives are being assessed for the project. The first would consist of strengthening the existing levees in areas which are highlighted on the attached maps. Alternatives 2 and 3 would consist of strengthening portions of the existing levee as well as replacement of a portion with a new levee, setback to the east, and depicted by the red and green alignments depicted on the attached maps. The Area of Potential Affects (APE) for this undertaking consists of the existing levee, 300 foot rights-of-way for the proposed new levees, lands between the existing levee and proposed realignments which would be subjected to seasonal flooding, and as yet to be defined borrow pit locations. Construction will involve excavations up to 10 meters in depth and grading using heavy equipment.

Preliminary records search information indicates the location of one site adjacent to the easternmost proposed levee realignment, and two others in the vicinity. All three sites are known to contain human remains within an occupational matrix, and indicate the potential for other cultural sensitive locales to be present.

We would appreciate any additional information you can provide regarding prehistoric, historic, or ethnographic Native American land use, and contemporary Native American values that may be present near or within the project area. We would also like to request a search of the NAHC Sacred Land files.

Please send via mail or facsimile a listing of local Native American groups or representatives at your earliest convenience, so that we may contact appropriate

EDAW

individuals and include their concerns and any additional information in the planning process.

If you have any questions or comments feel free to contact me at my office. I can be reached by email at deisr@edaw.com, or by phone at 916-414-5878. I look forward to hearing from you soon.

Sincerely,

Richard W. Deis
Project Archaeologist

Enclosures: Copies of Nicholas and Olivehurst Quad Maps

STATE OF CALIFORNIA Arnold Schwarzenegger, Governor

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Fax (916) 657-5390
Web Site www.nahc.ca.gov

May 26, 2006

Richard W. Deis
Project Archaeologist
EDAW

Sent by Fax: 916-414-5850
Number of Pages : 2

Re: Proposed Feather River Levee Setback project, Yuba County.

Dear Mr. Deis:

A record search of the sacred land file has failed to indicate the presence of Native American cultural resources in the immediate project area. The absence of specific site information in the sacred lands file does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Enclosed is a list of Native Americans individuals/organizations who may have knowledge of cultural resources in the project area. The Commission makes no recommendation or preference of a single individual, or group over another. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated, if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe or group. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from any of these individuals or groups, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact me at (916) 653-4038.

Sincerely,

Debbie Pilas-Treadway
Environmental Specialist III

Native American Contacts
Yuba County
May 25, 2006

Butte Tribal Council
Ren Reynolds
1693 Mt. Ida Road Maidu
Oroville , CA 95966
(530) 589-1571

Strawberry Valley Rancheria
Calvine Rose, Chairperson
PO Box 667 Maidu
Marysville , CA 95901 Miwok
redfoxcornish@saber.net
530-478-8833
530-653-2760

Enterprise Rancheria of Maidu Indians
Frank Watson, Vice Chairperson
1940 Feather River Blvd., Suite B Maidu
Oroville , CA 95965
eranch@cncnet.com
(530) 532-9214
(530) 532-1768 FAX

Strawberry Valley Rancheria
Robert Kerfoot
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530-653-2760

Enterprise Rancheria of Maidu Indians
Glenda Nelson, Chairperson
1940 Feather River Blvd., Suite B Maidu
Oroville , CA 95965
eranch@cncnet.com
(530) 532-9214
(530) 532-1768 FAX

Maidu Nation
Clara LeCompte
P.O Box 204 Maidu
Susanville , CA 96130
(530) 257-9691

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural for the proposed * Feather River Levee Setback project, Yuba County.

APPENDIX E

Construction-Related Emissions Calculations and Fugitive Dust Control Requirements

Short-Term Construction Emissions (Alternative 1 - Levee Strengthening Alternative)

				ROG	NOx	PM10	
Light Duty Trk (grams/mile)				0.24	0.44	0.04	
HH Trk Diesel (grams/mile)				0.65	7.23	0.24	

Assumptions: EMFAC2002 emission factors for 2007 conditions based on an average trip speed of 30 mph, 60%/40% cold/hot start, and 75 degrees Fahrenheit.

Mobile Source Emissions (Levee and Slurry Wall)

Equipment	Number			ROG	NOx	PM10	
Excavator	8.00			29.44	103.52	5.44	
Other Construction	4.00			16.64	75.44	4.16	
Rubber Tired Dozer	6.00			43.56	258.60	13.44	
Cranes	1.00			2.88	12.32	0.68	
Grader	3.00			7.20	58.38	3.18	
Off-Highway Trucks	2.00			14.40	55.92	2.88	
Roller	3.00			3.54	26.82	1.44	
Scraper	6.00			43.68	191.52	10.20	
Loader	1.00			1.34	9.08	0.76	
Subtotal				**162.68**	**791.60**	**42.18**	lbs/day

Assumptions: Emission factors from the Road Construction Emissions Model, Version 5.1 (Sacramento Metropolitan Air Quality Management District 2004), which assumes equipment operates for 16 hrs/day, and equipment usage information from preliminary design information.

	Total Trips/Day	Miles/Trip	Total Miles/Day				
Con. Employee Trips	200.00	10.00	2000.00	**1.06**	**1.94**	**0.17**	lbs/day

Assumptions: Based on a maximum of 100 employees (2 trips/day/employee) with an average trip length of 10.0 miles and EMFAC2002 emission factors for 2007 conditions based on an average trip speed of 30 mph, 60%/40% cold/hot start, and 75 degrees Fahrenheit.

Haul Truck Trips Onsite and Offsite (Transport of Fill)	181.80	2.00	363.60	**0.52**	**5.80**	**0.19**	lbs/day
Haul Truck Trips Offsite (Aggregate base, Concrete, Drain Rock)	126.67	5.50	696.69	**1.00**	**11.10**	**0.37**	lbs/day
Haul Truck Trips Offsite (Materials Delivery)	4.40	80.00	352.00	**0.50**	**5.61**	**0.19**	lbs/day

Assumptions: Transportation of 1,600,000 yd^3 of fill 2 miles and 38,000 y^3 of aggregate base and other material 5.5 miles, 658 truck loads for transport of misc. material (dry bentonite, geotextile fabric, concrete, demolition debris, etc.) from Marysville, 440 (22 days/month for 20 months) work days from 2007-2008, truck capacity of 20 yd^3, and EMFAC2002 emission factors for 2007 conditions based on an average trip speed of 30 mph, 60%/40% cold/hot start, and 75 degrees Fahrenheit.

Fugitive Dust Source Emissions

	(acre)						
Disturbance Area	0.88					**53.42**	lbs/day

Assumptions: SMAQMD emission factor of 60.71 lbs/acre/day (Sacramento Metropolitan Air Quality Management District 1994) for a total daily disturbance of 0.88 acres.

	Total Cubic Yards	Duration(Days)	Tons/Cubic Yards	Total Tons/Day			
Scraper (Loading)	1600000.00	440.00	1.25	**4545.45**		**263.64**	lbs/day
Scraper (Batch Unloading)	1600000.00	440.00	1.25	**4545.45**		**181.82**	lbs/day

Scraper (Travel Mode)

E(lbs/VMT)=(6.2) (10)^-6 (s)^1.4 (W)^2.5 (0.60)

Where:

W=Weight of Scraper:	50	(tons)
s=Silt Content of Material:	10	(percent)
	1.65	lbs/VMT

	Total Trips/Day	Miles/Trip	Total Miles/Day				
	121.21	0.75	90.91			**150.16**	lbs/day

Assumptions: Transportation of 1,600,000 yd^3 of fill .75 mile onsite, 440 work days from 2007-08, load capacity of 30 yd^3, and AP-42 emission factors (U.S. Environmental Protection Agency 1995).

	ROG	NOx	PM10	
Total Mobile Equipment	164.70	814.11	42.93	
Total Employee	1.06	1.94	0.17	
Total Fugitive Dust			649.04	
Total (Total Construction North)-unmitigated	**165.76**	**816.05**	**692.14**	**lbs/day**
Total (Total Construction North)-mitigated	**157.53**	**653.23**	**186.04**	**lbs/day**

Short-Term Construction Emissions (Alternatives 2 & 3 - ASB and ISL Alternatives)

				ROG	NOx	PM10	
Light Duty Trk (grams/mile)				0.24	0.44	0.04	
HH Trk Diesel (grams/mile)				0.65	7.23	0.24	

Assumptions: EMFAC2002 emission factors for 2007 conditions based on an average trip speed of 30 mph, 60%/40% cold/hot start, and 75 degrees Fahrenheit.

Mobile Source Emissions (Slurry Wall and Levee)

Equipment	Number			ROG	NOx	PM10	
Excavator	6.00			22.08	77.64	4.08	
Other Construction	3.00			12.48	56.58	3.12	
Rubber Tired Dozer	6.00			43.56	258.60	13.44	
Cranes	1.00			2.88	12.32	0.68	
Grader	4.00			9.60	77.84	4.24	
Off-Highway Trucks	2.00			14.40	55.92	2.88	
Roller	4.00			4.72	35.76	1.92	
Scraper	10.00			72.80	319.20	17.00	
Loader	1.00			1.34	9.08	0.76	
Subtotal				**183.86**	**902.94**	**48.12**	lbs/day

Assumptions: Emission factors from the Road Construction Emissions Model, Version 5.1 (Sacramento Metropolitan Air Quality Management District 2004), which assumes equipment operates for 16 hrs/day, and equipment usage information from preliminary design information.

	Total Trips/Day	Miles/Trip	Total Miles/Day				
Con. Employee Trips	200.00	10.00	2000.00	**1.06**	**1.94**	**0.17**	lbs/day

Assumptions: Based on a maximum of 100 employees (2 trips/day/employee) with an average trip length of 10.0 miles and EMFAC2002 emission factors for 2007 conditions based on an average trip speed of 30 mph, 60%/40% cold/hot start, and 75 degrees Fahrenheit

Haul Truck Trips Onsite and Offsite (Transport of Fill)	375.00	2.00	750.00	**1.07**	**11.95**	**0.40**	lbs/day
Haul Truck Trips Offsite (Aggregate base, Concrete, Drain Rock)	56.00	5.50	308.00	**0.44**	**4.91**	**0.16**	lbs/day
Haul Truck Trips Offsite (Materials Delivery)	13.00	80.00	1040.00	**1.49**	**16.58**	**0.55**	lbs/day

Assumptions: Transportation of 3,300,000 yd^3 of fill 2 miles and 17,000 y^3 of aggregate base and other material 5.5 miles, 2,700 truck loads for transport of misc. material (dry bentonite, geotextile fabric, concrete, demolition debris, etc.) from Marysville, 440 (22 days/month for 20 months) work days from 2007-2008, truck capacity of 20 yd^3, and EMFAC2002 emission factors for 2007 conditions based on an average trip speed of 30 mph, 60%/40% cold/hot start, and 75 degrees Fahrenheit.

Fugitive Dust Source Emissions

	(acre)						
Disturbance Area	2.80					**169.99**	lbs/day

Assumptions: SMAQMD emission factor of 60.71 lbs/acre/day (Sacramento Metropolitan Air Quality Management District 1994) for a total daily disturbance of 2.8 acres.

	Total Cubic Yards	Duration(Days)	Tons/Cubic Yards	Total Tons/Day			
Scraper (Loading)	3300000.00	440.00	1.25	**9375.00**		**543.75**	lbs/day
Scraper (Batch Unloading)	3300000.00	440.00	1.25	**9375.00**		**375.00**	lbs/day

Scraper (Travel Mode)

E(lbs/VMT)=(6.2) (10)^-6 (s)^1.4 (W)^2.5 (0.60)

Where:

W=Weight of Scraper:	50	(tons)
s=Silt Content of Material:	10	(percent)
	1.65	lbs/VMT

	Total Trips/Day	Miles/Trip	Total Miles/Day				
	250.00	0.75	187.50			**309.72**	lbs/day

Assumptions: Transportation of 3,300,000 yd^3 of fill .75 mile onsite, 440 work days from 2007-08, load capacity of 30 yd^3, and AP-42 emission factors (U.S. Environmental Protection Agency 1995).

	ROG	NOx	PM10	
Total Mobile Equipment	186.87	936.38	49.23	
Total Employee	1.06	1.94	0.17	
Total Fugitive Dust			1398.46	
Total (Total Construction North)-unmitigated	**187.92**	**938.32**	**1447.86**	**lbs/day**
Total (Total Construction North)-mitigated	**178.58**	**751.04**	**376.86**	**lbs/day**

FEATHER RIVER AIR QUALITY MANAGEMENT DISTRICT

Serving the Counties of Yuba and Sutter
938 14th Street, Marysville, CA 95901
(530) 634-7659 FAX: (530) 634-7660 Burn Information: (530) 741-6299
Email: fraqmd@fraqmd.org Web Site: http://www.fraqmd.org

Steven A. Speckert
Air Pollution Control Officer

REQUIREMENTS FOR THE CONTROL OF FUGITIVE DUST EMISSIONS

Introduction

The Feather River Air Quality Management District (FRAQMD) is designated nonattainment for the California PM10 health standard (particulate matter less than 10 microns in size; also referred to in this document as respirable particulate matter and fugitive dust). This means that Yuba and Sutter Counties violate the state PM10 air quality health standard. Construction activities, agricultural operations, unpaved roads, and windblown dust contribute heavily to these emissions. According to the U.S. EPA, exposure to high concentrations of particulate matter, including airborne dust, affects breathing, aggravates existing respiratory and cardiovascular disease, and alters the body's defenses against foreign materials, lung damage, skin cancer and premature death. Further studies have linked respirable particulate matter with health problems like asthma and chronic bronchitis.

This document serves to address the aforementioned health concerns by informing the public of applicable state laws and local rules and regulations governing fugitive dust emissions and the capacity for the air district to issue violations (refer to Attachment A). Also attached to this document are a list of approved mitigation measures (refer to Attachment B) and a fugitive dust control plan to be submitted by the project proponent for FRAQMD approval (refer to Attachment C).

Discussion

Frequent nuisance complaints are received at the air district in regard to construction site fugitive dust emissions. Standard CEQA mitigation recommendations approved for the project are not always implemented by the project proponent. Appropriate emphasis on the need for fugitive dust controls and the potential impacts of air district enforcement actions need to be stressed.

In accordance with California Health and Safety Code (H&S) section 42400 et seq., the FRAQMD can assess civil and criminal penalties for violations of the FRAQMD Rules and Regulations and the H&S. Violations are misdemeanors and can carry potential penalties from $1,000 to $1,000,000 per day per violation and/or imprisonment in the county jail.

This document cites applicable air pollution regulations, defines performance criteria and acceptable control strategies to implement, and specifies emission levels and standards not to exceed in order to prevent a violation (refer to Attachment A). The project proponent should have a thorough understanding of these regulations. If additional information is required please contact the District at the location provided above.

Prevention

Fugitive dust control strategies are composed of a balance of available dust mitigation techniques applied on an as needed basis by construction site supervision to

- prevent dust from exiting the property,
- prevent visible emissions from exceeding opacity regulations, and
- prevent public nuisance.

This implies the use of adequate measures during the appropriate evolution of each construction activity and may include wind breaks and barriers, frequent water applications, application of soil additives, control of vehicle access, vehicle speed restrictions, covering of piles, use of gravel at site exit points to remove caked on dirt from tires and tracks, washing of equipment at the end of each work day and prior to site removal, wet sweeping of public thoroughfares, and work stoppage (refer to Attachment B).

Site-Specific Considerations

Time of year, length of project, and acres per day undergoing vegetative removal, excavation, backfilling, hauling and grading should be the primary focus for implementation of dust control measures. The plan must also consider dust emissions associated with construction activities after completion of grading activities including installation of infrastructure (including water, electric, roads, sidewalks, and sewer), digging of building foundations, site vehicle traffic, and landscaping activities.

Knowledge of soil types may be important to understand the free silt content and the ability to hold moisture. Some soils are hydrophobic – repel water - and may require the addition of surfactants during water applications to facilitate penetration and achieve appropriate moisture adsorption. Surfactants may also be used to reduce the amount of water needed.

Activities occurring near sensitive receptors should receive a higher level of preventative planning. Sensitive receptors include school-aged children (schools, daycare, playgrounds), the elderly (retirement community, nursing homes), the infirm (medical facilities/offices), and those who exercise outdoors regularly (public and private exercise facilities, parks).

Other Regulatory Requirements

The project proponent should evaluate water quality, flora and fauna and other environmental impacts (e.g. wildlife, drinking water, stormwater runoff, and surface water impacts) prior to the use of water/soil additives including binders, tackifiers, surfactants, and other materials and methods. All additives at a minimum must meet Regional Water Quality Control Board (RWQCB) requirements and all applicable federal, state, and local environmental regulations regarding the use of the material.

Fugitive Dust Control Plan Submittal

Complete and sign Attachment C, Fugitive Dust Control Plan, and submit to FRAQMD prior to start of work.

ORIGINAL SIGNED

Larry D. Matlock
Senior Air Quality Planner

Note: This document may be downloaded from our web site at
http:// www.fraqmd.org/Downloads/FugitiveDustControlPlan.doc or
http:// www.fraqmd.org/Downloads/FugitiveDustControlPlan.pdf

FugitiveDustControlPlan09_09_03.doc

LOCAL AND STATE REGULATIONS APPLICABLE TO FUGITIVE DUST

I. FRAQMD Rules and Regulations

Note: The following District Rules and Regulations are enforced for each project regardless of lead agency or Board approved project CEQA mitigation requirements.

FRAQMD RULE 3.0 - VISIBLE EMISSIONS *(Adopted 6/91)*

As provided by Section 41701 of the California Health and Safety Code, a person shall not discharge into the atmosphere from any single source of emissions whatsoever, any air contaminants for a period or periods aggregating more than three minutes in any one hour which is:

a. As dark or darker in shade as that designated as No. 2 on the Ringlemen Chart, as published by the United States Bureau of Mines; or

b. Of such opacity as to obscure an observer's view to a degree equal to or greater than does smoke described in Subsection 'a' above.

Enforcement: The District has trained staff capable of performing a Visible Emissions Evaluation (VEE). VEE courses are offered to regulators and the regulated community (for a fee) at regular intervals by staff of the California Air Resources Board.

FRAQMD RULE 3.16 - FUGITIVE DUST EMISSIONS *(Adopted 4/11/94)*

A. PURPOSE
The purpose of this Rule is to reasonably regulate operations which periodically may cause fugitive dust emissions into the atmosphere.

B. DEFINITION
For the purpose of this Rule, the following definitions shall apply:

B.1 Fugitive Dust: Solid airborne matter emitted from any non-combustion source.
B.2 Emergency: Any act of God, but only if the owner of the property from which fugitive dust emissions originate establishes for the Feather River Air Quality Management District, by a preponderance of evidence, that he or she took reasonable precautions in light of the relevant facts and circumstances to minimize emissions.
B.3 Property Line: Adjacent properties which are owned by the same person shall be considered the same property for the purpose of determining the property line.

C. REQUIREMENTS
A person shall take every reasonable precaution not to cause or allow the emissions of fugitive dust from being airborne beyond the property line from which the emission originates, from any construction, handling or storage activity, or any wrecking, excavation, grading, clearing of land or solid waste disposal operation.

Reasonable precautions shall include, but are not limited to:

C.1 use, where possible, of water or chemicals for control of dust in the demolition of existing buildings or structures, construction operations, construction of roadways, or the clearing of land;
C.2 application of asphalt, oil, water, or suitable chemical on dirt roads, material stockpiles, and other surfaces which can give rise to airborne dusts;
C.3 other means approved by the Air Pollution Control Officer.

D. EXEMPTIONS
The provisions of this Rule shall not apply to the following:

D.1 Agricultural Operations
D.2 Currently unworked land designated as reclaimed for agriculture
D.3 An Emergency
D.4 Unpaved roads open to public travel (this inclusion shall not apply to industrial or commercial facilities).

II. State Laws

California Health and Safety Code

Section 41700. Except as otherwise provided in Section 41705, no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.

Section 41701. Except as otherwise provided in Section 41704, or Article 2 (commencing with Section 41800) of this chapter other than Section 41812, or Article 2 (commencing with Section 42350) of Chapter 4, no person shall discharge into the atmosphere from any source whatsoever any air contaminant, other than uncombined water vapor, for a period or periods aggregating more than three minutes in any one hour which is: (a) As dark or darker in shade as that designated as No. 2 on the Ringelmann Chart, as published by the United States Bureau of Mines, or (b) Of such opacity as to obscure an observer's view to a degree equal to or greater than does smoke described in subdivision (a).

California Vehicle Code

Section 23114 requires: No vehicle shall transport any aggregate material upon a highway unless the material is covered. Exception 23114(e)(4): Vehicles transporting loads of aggregate materials shall not be required to cover their loads if the load, where it contacts the sides, front, and back of the cargo container area, remains six inches from the upper edge of the container area, and if the load does not extend, at its peak, above any part of the upper edge of the cargo container area. For purposes of this section, "aggregate material" means rock fragments, pebbles, sand, dirt, gravel, cobbles, crushed base, asphalt, and other similar materials.

FRAQMD - FUGITIVE DUST CONTROL MITIGATION MEASURES

Sources: FRAQMD Indirect Source Review Guidelines and Best Available Mitigation Measures compiled by the air districts of the Greater Sacramento Region and approved for implementation by the FRAQMD Board of Directors.

All grading operations on a project should be suspended when winds exceed 20 miles per hour or when winds carry dust beyond the property line despite implementation of all feasible dust control measures.

Construction sites shall be watered as directed by the Department of Public Works or Air Quality Management District and as necessary to prevent fugitive dust violations.

An operational water truck should be onsite at all times. Apply water to control dust as needed to prevent visible emissions violations and offsite dust impacts.

Onsite dirt piles or other stockpiled particulate matter should be covered, wind breaks installed, and water and/or soil stabilizers employed to reduce wind blown dust emissions. Incorporate the use of approved non-toxic soil stabilizers according to manufacturer's specifications to all inactive construction areas.

All transfer processes involving a free fall of soil or other particulate matter shall be operated in such a manner as to minimize the free fall distance and fugitive dust emissions.

Apply approved chemical soil stabilizers according to the manufacturers' specifications, to all-inactive construction areas (previously graded areas that remain inactive for 96 hours) including unpaved roads and employee/equipment parking areas.

To prevent track-out, wheel washers should be installed where project vehicles and/or equipment exit onto paved streets from unpaved roads. Vehicles and/or equipment shall be washed prior to each trip. Alternatively, a gravel bed may be installed as appropriate at vehicle/equipment site exit points to effectively remove soil buildup on tires and tracks to prevent/diminish track-out.

Paved streets shall be swept frequently (water sweeper with reclaimed water recommended; wet broom) if soil material has been carried onto adjacent paved, public thoroughfares from the project site.

Provide temporary traffic control as needed during all phases of construction to improve traffic flow, as deemed appropriate by the Department of Public Works and/or Caltrans and to reduce vehicle dust emissions. An effective measure is to enforce vehicle traffic speeds at or below 15 mph.

Reduce traffic speeds on all unpaved surfaces to 15 miles per hour or less and reduce unnecessary vehicle traffic by restricting access. Provide appropriate training, onsite enforcement, and signage.

Reestablish ground cover on the construction site as soon as possible and prior to final occupancy, through seeding and watering.

Disposal by Burning: Open burning is yet another source of fugitive gas and particulate emissions and shall be prohibited at the project site. No open burning of vegetative waste (natural plant growth wastes) or other legal or illegal burn materials (trash, demolition debris, et. al.) may be conducted at the project site. Vegetative wastes should be chipped or delivered to waste to energy facilities (permitted biomass facilities), mulched, composted, or used for firewood. It is unlawful to haul waste materials offsite for disposal by open burning.

ATTACHMENT C

Fugitive Dust Control Plan

This plan, upon signature and submittal to the FRAQMD, will serve as an approved Fugitive Dust Control Plan to be implemented at the designated site. This plan must be submitted by the project proponent and received at the air district prior to start of work.

The approved plan serves as an acknowledgment by the project proponent of their duty to address state and local laws governing fugitive dust emissions and the potential for first offense issuance of a Notice of Violation by the air district where violations are substantiated by District staff.

- Site Location: _____
- Project Type (circle all that apply): Residential Commercial Industrial Transportation
- List of responsible persons:

  Office (name, title, address, phone): _____

  _____

  Field (name, title, phone): _____
- Projected Start and End Dates: _____

Project Proponent: _____ _____
Printed Name Company/Phone

Signature: _____ Title: _____

By signing this document I acknowledge that I have read the accompanying literature regarding state and local fugitive dust emission laws and understand that it is my responsibility as the project proponent to ensure that appropriate materials and instructions are available to site employees to implement fugitive dust mitigation measures (Attachment B) appropriate for each development phase of this project.

I further acknowledge that it is my responsibility to ensure that site employees are made formally aware of fugitive dust control laws, requirements, and available mitigation techniques, and that appropriate measures are to be implemented at the site as necessary to prevent fugitive dust violations.

Please Submit to: FRAQMD, 938 14th Street, Marysville, CA 95901 Attn: Planning
Phone: 530-634-7659 x202 FAX: 530-634-7660 Email: lmatlock@fraqmd.org

APPENDIX F

Traffic Noise Measurements and Construction Noise Calculations

FHWA MODEL OUTPUT - EXISTING CONDITIONS (YEAR 2005)

```
      TRAFFIC DISTRIBUTION PERCENTAGES
      DAY        EVENING    NIGHT
      ---        -------    -----
AUTOS
      68.70      11.21       8.50
M-TRUCKS
       7.30       1.19       0.90
H-TRUCKS
       1.71       0.28       0.21

   RUN NAME: SR 70 (BETW YUBA CO LINE AND FEATHER RIVER BLVD)
RUN DATE: 090206

ADT:  16300      SPEED:  55      ACTIVE HALF WIDTH (FT):  24
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  72.46
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  104.8      221.1      473.9     1019.9

   RUN NAME: SR 70 (BETW FEATHER RIVER BLVD AND MC GOWAN RD)
RUN DATE: 090206

ADT:  13300      SPEED:  55      ACTIVE HALF WIDTH (FT):  24
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  71.57
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
   92.3      193.4      414.0      890.6

   RUN NAME: SR 70 (BETW MC GOWAN RD AND JCT RT 65)
RUN DATE: 090206

ADT:  23800      SPEED:  55      ACTIVE HALF WIDTH (FT):  24
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  74.10
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  133.5      283.8      609.7     1312.4
```

RUN NAME: SR 70 (BETW JCT RT 65 AND OLIVEHURST AVE)
RUN DATE: 090206

ADT: 39500 SPEED: 55 ACTIVE HALF WIDTH (FT): 24
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 76.30
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *

70 CNEL	65 CNEL	60 CNEL	55 CNEL
185.6	397.2	854.3	1839.6

RUN NAME: SR 70 (BETW OLIVEHURST AVE AND ERLE RD)
RUN DATE: 090206

ADT: 45000 SPEED: 55 ACTIVE HALF WIDTH (FT): 24
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 76.87
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *

70 CNEL	65 CNEL	60 CNEL	55 CNEL
202.2	433.1	931.8	2006.6

RUN NAME: SR 70 (BETW ERLE RD AND FEATHER RIVER BLVD)
RUN DATE: 090206

ADT: 45500 SPEED: 55 ACTIVE HALF WIDTH (FT): 24
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 76.91
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *

70 CNEL	65 CNEL	60 CNEL	55 CNEL
203.7	436.3	938.7	2021.4

RUN NAME: SR 70 (BETW FEATHER RIVER BLVD AND N BEALE RD)
RUN DATE: 090206

ADT: 60000 SPEED: 55 ACTIVE HALF WIDTH (FT): 24
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 78.11
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *

70 CNEL	65 CNEL	60 CNEL	55 CNEL
244.4	524.4	1128.7	2430.7

Feather River			
Levee Strengthening/Alternative 1			
Projected Construction Noise Level at 50 feet	**Without Noise Control**	**With Feasible Noise Control**	
excavator	88	80	
excavator	88	80	
dozer	80	75	
dozer	80	75	
grader	85	75	
roller	74	74	
roller	74	74	
truck	91	75	
truck	91	75	
truck	91	75	
truck	91	75	
truck	91	75	
truck	91	75	
loader	85	75	
crane	83	75	
TOTAL	99.96	87.77	
NOISE DROP OFF CALCULATION			
(feet)	(dB)		
50	99.96	87.77	
180	88.83	76.64	
1988	67.97	55.78	
6536	57.63	45.44	
Assumptions: Equipment usage information from GEI Consultants.			
Source: FTA 1995; U.S. EPA 1971			
Slurry Wall			
Projected Construction Noise Level at 50 feet	**Without Noise Control**	**With Feasible Noise Control**	
excavator	88	80	
excavator	88	80	
excavator	88	80	
dozer	80	75	
dozer	80	75	
dozer	80	75	
excavator	88	80	
excavator	88	80	
excavator	88	80	
truck/tool carrier	91	75	
truck/tool carrier	91	75	
truck/tool carrier	91	75	
TOTAL	98.59	88.39	
NOISE DROP OFF CALCULATION			
(feet)	(dB)		
50	98.59	88.39	
180	87.47	77.26	
200	86.55	76.35	
500	78.59	68.39	
1988	66.60	56.40	
6536	56.27	46.06	
Levee Strengthening/Slurry Wall			
Projected Construction Noise Level at 50 feet	**Without Noise Control**	**With Feasible Noise Control**	
levee strengthening	99.96	87.77	
slurry wall	98.59	88.39	
TOTAL	102.34	91.10	
NOISE DROP OFF CALCULATION			
(feet)	(dB)		
50	102.34	91.10	
180	91.21	79.97	
200	90.30	79.06	
500	82.34	71.10	
1988	70.35	59.11	
6536	60.01	48.77	

Levee Setback/Alternatives 2 and 3			
Projected Construction Noise Level at 50 feet	**Without Noise Control**	**With Feasible Noise Control**	
excavator	88	80	
excavator	88	80	
scraper	88	80	
scraper	88	80	
scraper	88	80	
scraper	88	80	
scraper	88	80	
scraper	88	80	
scraper	88	80	
scraper	88	80	
scraper	88	80	
scraper	88	80	
dozer	80	75	
dozer	80	75	
dozer	80	75	
dozer	80	75	
grader	85	75	
grader	85	75	
grader	85	75	
grader	85	75	
roller	74	74	
roller	74	74	
roller	74	74	
roller	74	74	
truck	91	75	
truck	91	75	
truck	91	75	
truck	91	75	
truck	91	75	
truck	91	75	
loader	91	75	
crane	91	75	
TOTAL	102.88	92.57	
NOISE DROP OFF CALCULATION			
(feet)	(dB)		
50	102.88	92.57	
180	91.75	81.44	
1988	70.89	60.58	
6536	60.55	50.24	
Assumptions: Equipment usage information from GEI Consultants.			
Source: FTA 1995; U.S. EPA 1971			
Slurry Wall			
Projected Construction Noise Level at 50 feet	**Without Noise Control**	**With Feasible Noise Control**	
excavator	88	80	
excavator	88	80	
dozer	80	75	
dozer	80	75	
excavator	88	80	
excavator	88	80	
truck/tool carrier	91	75	
truck/tool carrier	91	75	
TOTAL	97.19	87.21	
NOISE DROP OFF CALCULATION			
(feet)	(dB)		
50	97.19	87.21	
180	86.07	76.09	
200	85.15	75.17	
500	77.19	67.21	
1988	65.21	55.22	
6536	54.87	44.89	

Levee Setback/Slurry Wall			
Projected Construction Noise Level at 50 feet	**Without Noise Control**	**With Feasible Noise Control**	
levee setback	102.88	92.57	
slurry wall	97.19	87.21	
TOTAL	103.92	93.68	
NOISE DROP OFF CALCULATION			
(feet)	(dB)		
50	103.92	93.68	
180	92.79	82.55	
200	91.88	81.64	
500	83.92	73.68	
1988	71.93	61.69	
6536	61.59	51.35	

PROJECTED AVERAGE DAILY NOISE LEVELS

Need to add penalty into evening/nighttime hours. Penalty is not included in the formula

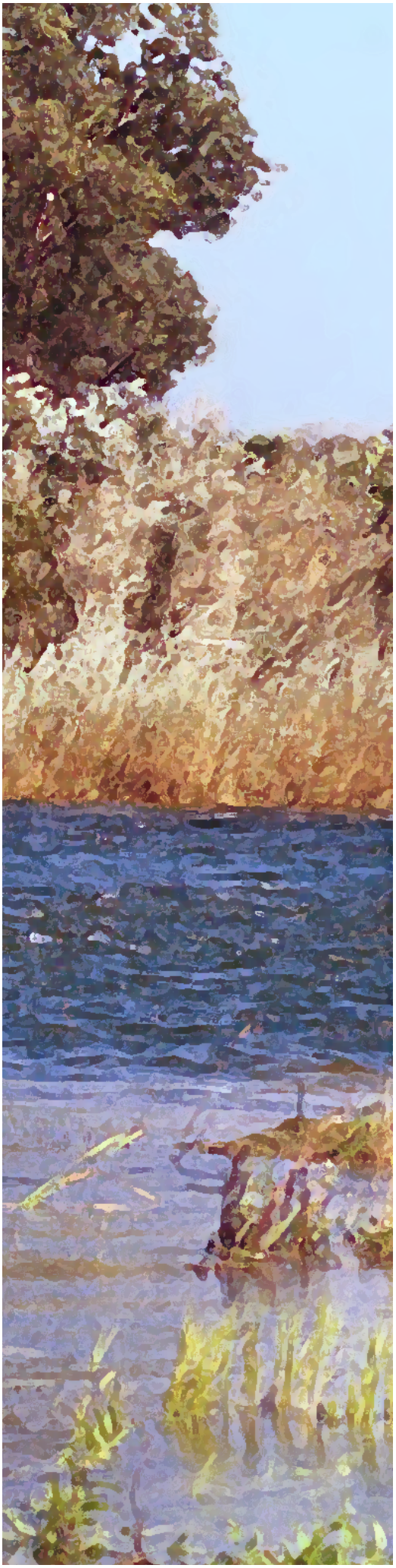
1	50	65	50	50	50	50
2	50	65	50	50	50	50
3	50	65	50	50	50	50
4	50	65	50	50	50	50
5	50	65	50	50	50	50
6	50	65	50	50	50	
7	77	55	73	71	70	
8	77	55	73	71	70	
9	77	55	73	71	70	
10	77	55	73	71	70	
11	77	55	73	71	70	
12	77	55	73	71	70	
13	77	55	73	71	70	
14	77	55	73	71	70	
15	77	55	73	71	70	
16	77	55	73	71	70	
17	77	55	50	50	50	
18	77	55	50	50	50	
19	77	55	50	50	50	
20	55	55	50	50	50	
21	55	55	50	50	50	
22	50	65	50	50	50	
23	50	65	50	50	50	
24	50	65	50	50	50	
	74.35	61.41	69.23	67.25	66.26	

Petaluma Substation

	OCTAVE CENTER FREQUENCY		CONVERSION TO A-WEIGHTED SCALE
Band 1	31.5	55	16
Band 2	63	57	31
Band 3	125	63	47
Band 4	250	63	54
Band 5	500	49	46
Band 6	1000	53	53
Band 7	2000	48	49
Band 8	4000	43	44
Band 9	8000	25	24
TOTAL:		67.14	58.11 dBA

NOISE DROP OFF CALCULATION

(feet)	(dB)
3	67.14
75	39.18
200	30.66
320	26.57
375	25.20
475	23.14
700	19.78



DRAFT ENVIRONMENTAL IMPACT REPORT

FOR THE FEATHER RIVER LEVEE REPAIR PROJECT

AN ELEMENT OF THE YUBA-FEATHER SUPPLEMENTAL FLOOD CONTROL PROJECT

VOLUME I: CHAPTERS 1–11

STATE CLEARINGHOUSE NO. 2006062071

PREPARED FOR

THREE RIVERS LEVEE IMPROVEMENT AUTHORITY

PREPARED BY

EDAW
FLOOD CONTROL STUDY TEAM

August 2006

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ACRONYMS

°C	degrees Celsius
°F	degrees Fahrenheit
µg/L	micrograms per liter
µS/cm	microsiemens per centimeter
AADT	Annual Average Daily Traffic
AEP	annual exceedance probability
af	acre-feet
AQAP	air quality attainment plan
ARB	California Air Resources Board
ASB	Above Star Bend
ASTM	American Society for Testing and Materials
ATCM	Airborne Toxic Control Measure
BACT	Best Available Control Techniques
BMP	best management practice
BOSC	Board of Senior Consultants
BP	Before Present
BSB	Below Star Bend
CAA	Clean Air Act
CAAA	Clean Air Act Amendments of 1990
$CaCo_3$	calcium carbonate
Cal-EPA	California Environmental Protection Agency
CALFED	CALFED Bay-Delta Program
Caltrans	California Department of Transportation
CCAA	California Clean Air Act of 1988
CCR	California Code of Regulations
CDMG	California Division of Mines and Geology
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CNDDB	California Natural Diversity Data Base
CNEL	community noise equivalent level
CNPS	California Native Plant Society
CO	carbon monoxide

Corps	U.S. Army Corps of Engineers
County	Yuba County
CRHR	California Register of Historical Resources
CTR	California Toxics Rule
CWA	Clean Water Act
cy	cubic yards
dB	decibel
dBA	A-weighted dB
DEIR	draft environmental impact report
Delta	Sacramento–San Joaquin Delta
DFG	California Department of Fish and Game
DHS	California Department of Health Services
DO	dissolved oxygen
DSM	deep soil-mixing
DTSC	California Department of Toxic Substances Control
DWR	California Department of Water Resources
EC	electrical conductivity
EFH	Essential Fish Habitat
EIR	Environmental Impact Report
EPA	U.S. Environmental Protection Agency
ER-L	Effects Range–Low
ER-M	Effects Range–Median
ERP	Ecosystem Restoration Program
ESA	Endangered Species Act
ESU	evolutionarily significant unit
F-BRLSP	Feather-Bear Rivers Levee Setback Project
F-CO	Forecast-Coordinated Operations of Lake Oroville and New Bullards Bar Reservoir for Major Storms
FEIR	final environmental impact report
FEMA	Federal Emergency Management Agency
FIP	Federal Implementation Plan
FIRM	Flood Insurance Rate Map
FMMP	Farmland Mapping and Monitoring Program
fossils	paleontological resources
FRAQMD	Feather River Air Quality Management District
FRCRM	Feather River Coordinated Resource Management
FRLRP	Feather River Levee Repair Project
GPS	Global Positioning System

H:V	horizontal:vertical
HAP	hazardous air pollutant
Holocene	Recent
ITE	Institute of Traffic Engineers
kV	kilovolt
lb/day	pounds per day
LD	Levee District
LESA	Land Evaluation and Site Assessment
LOS	level of service
MACT	Maximum Available Control Technology
MBTA	Migratory Bird Treaty Act
MCL	maximum contaminant level
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MLD	Most Likely Descendant
mm	millimeter
mph	miles per hour
MRL	method reporting limit
MRZ	Mineral Resource Zone
msl	mean sea level
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NAWQA	National Water Quality Assessment
NCIC	North Central Information Center
NEHRP	National Earthquake Hazards Reduction Program
NEHRPA	National Earthquake Hazards Reduction Program Act
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for HAPS
ng/L	nanograms per liter
NGVD	National Geodetic Vertical Datum
NMFS	National Marine Fisheries Service
NO	nitric oxide
NO_2	nitrogen dioxide
NO_3	nitrogen trioxide
NOI	Notice of Intent
NOP	Notice of Preparation

NO_X	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSVAB	Northern Sacramento Valley Air Basin
NWS	National Weather Service
O_3	ozone
OES	Governor's Office of Emergency Services
OPUD	Olivehurst Public Utility District
PG&E	Pacific Gas and Electric Company
PIR	*Problem Identification Report, TRLIA Phase 4 Feather River and Yuba River Left Bank Levees, Reclamation District No. 784*
PL	Public Law
PLM	Project Levee Mile
PM	particulate matter
PM&E	protection, mitigation, and enhancement
PM_{10}	respirable particulate matter
$PM_{2.5}$	fine particulate matter
Porter-Cologne Act	Porter-Cologne Water Quality Control Act
ppm	parts per million
PRG	preliminary remediation goal
RBDD	Red Bluff Diversion Dam
RCRA	Resource Conservation and Recovery Act
RD	Reclamation District
RM	river mile
ROG	reactive organic gases
RWQCB	Regional Water Quality Control Board
SACOG	Sacramento Area Council of Governments
SIP	State Implementation Plan
SMARA	California Surface Mining and Reclamation Act
SO_2	sulfur dioxide
SOP	*Standard Operating Procedure Engineering Design Guidance 2003 (SOP EDG-03) for Geotechnical Levee Practice*
SR	State Route
SRFCP	Sacramento River Flood Control Project
SVP	Society of Vertebrate Paleontology
SWP	State Water Project
SWPPP	Storm Water Pollution Prevention Plan

SWRCB	State Water Resources Control Board
TAC	toxic air contaminant
T-BACT	Best Available Control Techniques for TACs
TDS	total dissolved solids
TMDL	total maximum daily load
TPY	tons per year
TRLIA	Three Rivers Levee Improvement Authority
UCMP	University of California Museum of Paleontology
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WDR	waste discharge requirement
WPIC	Western Pacific Interceptor Canal
YCWA	Yuba County Water Agency
Y-FSFCP	Yuba-Feather Supplemental Flood Control Project
Y-FWG	Yuba-Feather Work Group

CHAPTER 1 SUMMARY

1.1 INTRODUCTION

This document is a draft environmental impact report (DEIR) that has been prepared to evaluate the potential environmental effects of the Feather River Levee Repair Project (FRLRP), which is proposed for implementation by the Three Rivers Levee Improvement Authority (TRLIA). The DEIR has been prepared on behalf of TRLIA in accordance with the requirements of the California Environmental Quality Act (CEQA) (Public Resources Code Section 21000 et seq.) and the State CEQA Guidelines (14 California Code of Regulations [CCR] Section 15000 et seq.).

The FRLRP would improve flood protection in the Reclamation District (RD) 784 area of Yuba County. The project is an element of the Yuba-Feather Supplemental Flood Control Project (Y-FSFCP), which was initiated in 2001 by the Yuba County Water Agency (YCWA) using funding available through the Costa-Machado Water Act of 2000 (Water Act of 2000). The FRLRP DEIR incorporates by reference the programmatic environmental impact report (EIR) prepared for the Y-FSFCP, which was certified by YCWA in March 2004 (Yuba County Water Agency 2004) (see Section 2.5, "Type of EIR," in Chapter 2, "Introduction," of this document).

1.2 SUMMARY DESCRIPTION OF THE PROJECT ALTERNATIVES

The purpose of the proposed FRLRP is to correct deficiencies in the left (east) bank levees of the Feather and lower Yuba Rivers, and consequently to improve flood protection for the RD 784 area in Yuba County. The overall objectives of the project are:

- to secure flood protection for at least a flood event with a 0.5% (or 1-in-200) annual chance of exceedance,
- to help secure Federal Emergency Management Agency (FEMA) certification of the subject reaches of levee,
- to avoid increasing downstream flow and stage during peak-flow conditions,
- to achieve these objectives as soon as possible, and
- to incorporate environmental mitigation as appropriate.

The FRLRP project area is divided into three project segments, as shown in Figure 2-3, "FRLRP Project Area":

- Project Segment 1 consists of the existing Feather River left bank levee from Project Levee Mile (PLM) 13.3 to PLM 17.1 (from approximately RD 784 Pump Station No. 2 upstream to Star Bend).
- Project Segment 2 consists of the existing Feather River left bank levee from PLM 17.1 to PLM 23.6 (from approximately Star Bend upstream to west of the Yuba County Airport).

- Project Segment 3 consists of the existing Feather River left bank levee from PLM 23.6 to PLM 26.1, and the Yuba River left bank levee from PLM 0.0 to PLM 0.3 (west of the Yuba County Airport to the railroad crossing adjacent to the SR 70 bridge).

The proposed project consists of implementation of one of three potential alternatives, each evaluated at an equal level of detail in this DEIR and described in detail in Chapter 4, "Description of the Proposed Project." These potential alternatives are being designed and engineered to meet the project objectives listed above and to correct levee deficiencies for the Feather and lower Yuba Rivers in Yuba County:

- *Alternative 1 – The Levee Strengthening Alternative.* Under this alternative, repair and strengthening of the existing levees would be completed along the entire length of FRLRP project Segments 1, 2, and 3 (Figure 2-3, "FRLRP Project Area," in Chapter 2). Implementation of Alternative 1 would involve removing existing RD 784 Pump Station No. 3 and installing a new pump station farther east of the Feather River levee, which would correct seepage deficiencies related to the existing pump station location. Establishment of soil borrow areas and construction of a detention basin is also included in this alternative.

- *Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative.* Under this alternative, repair and strengthening of the existing levees would be completed along project Segments 1 and 3. Repair and strengthening activities in these segments would be the same as for Alternative 1. In project Segment 2, a setback levee would be constructed roughly following the Above Star Bend (ASB) setback levee alignment identified in the Y-FSFCP EIR. Establishment of soil borrow areas and construction of a detention basin would be required. As under Alternative 1, a pump station would be installed to replace Pump Station No. 3, in this case just east of the ASB setback levee.

- *Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative.* Under this alternative, the same levee repair and strengthening activities described for Alternatives 1 and 2 would be conducted in project Segments 1 and 3. In Segment 2, a modified setback levee alignment (i.e., intermediate alignment) would be used that would allow less land to be placed in the new floodway than under Alternative 2. The general design, construction, and operational characteristics of an intermediate setback levee under Alternative 3, including the replacement of Pump Station No. 3, would be same as for the ASB setback levee under Alternative 2.

These three potential alternatives are evaluated at an equal level of detail in this DEIR. These alternatives are described in detail in Chapter 4, "Description of the Proposed Project." It should be noted that in much of the EIR a single alignment is shown for the intermediate setback levee. However, for the portion of the intermediate setback levee that deviates from the ASB setback levee alignment, a specific route has not yet been confirmed and several options are being considered. The actual alignment could be located to the east or west of the alignment shown (as indicated by the area considered for the intermediate setback levee alignment shown in Figure 2-3). Considerations for final route selection include the suitability of underlying soil conditions for levee construction and the extent of flood control benefits (i.e., moving the alignment westward and reducing the size of the Feather River high-water channel would result in fewer

flood control benefits). The route in this EIR is considered to be representative of the various options considered for the intermediate setback levee alignment.

This EIR also evaluates a No-Project Alternative. The No-Project Alternative represents conditions that "would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services" (State CEQA Guidelines Section 15126.6[e][2]). In this case, the No-Project Alternative consists of a continuation of existing conditions. As required by CEQA, a No-Project Alternative has been included to allow TRLIA to compare the impacts of approving the proposed project (either Alternative 1, Alternative 2, or Alternative 3) with the impacts of not approving the proposed project.

Table 1-1, "Summary Comparison of Features of the FRLRP Alternatives," shows some of the main features of the three project alternatives.

MBK Engineers performed hydraulic modeling that predicts water surface elevations at locations along the Feather River under different categories of flood events. Table 1-2, "Summary Comparison of Feather River Water Elevations of the FRLRP Alternatives," shows water elevations at three locations along the Feather River within the project area for the three project alternatives.

Table 1-1
Summary Comparison of Features of the FRLRP Alternatives

Project Feature	Alternative 1	Alternative 2	Alternative 3
Potential Seepage Control Measures *(usage and locations of these measures would vary only in project Segment 2)*	► Existing levee strengthened at select locations along project Segments 1, 2, and 3 with: ▪ Cutoff trenches/slurry cutoff walls ▪ Seepage/stability berms ▪ Relief wells ► Erosion repair and protection measures at identified locations along project Segment 2 (see note below)	Existing levee strengthened at select locations along project Segments 1 and 3; same seepage control measures as for Alternative 1. New setback levee in Segment 2 constructed using modern construction techniques and built on a better foundation, with: ► Cutoff trenches/slurry cutoff walls ► Seepage/stability berms ► Relief wells	Existing levee strengthened at select locations along project Segments 1 and 3; same seepage control measures as for Alternative 1. New setback levee along a modified alignment in Segment 2 constructed using modern construction techniques and built on a better foundation, with: ► Cutoff trenches/slurry cutoff walls ► Seepage/stability berms ► Relief wells
Borrow Volume *(approximate)*	1.6 million cubic yards	3.3 million cubic yards	3.3 million cubic yards
Length of Setback Levee *(approximate)*	NA	5.9 miles	5.5 miles
Size of Levee Setback Area and Levee Footprint *(approximate)*	NA	1,600 acres	1,250–1,300 acres

Table 1-1
Summary Comparison of Features of the FRLRP Alternatives

Project Feature	Alternative 1	Alternative 2	Alternative 3
Other Project Elements	▸ Removal and relocation of Pump Station No. 3 east of the existing levee ▸ Construction of a detention basin northeast of Star Bend	▸ Removal and relocation of Pump Station No. 3 east of the setback levee ▸ Removal of portions of the existing levee in Segment 2 ▸ Construction of detention basin northeast of Star Bend ▸ Relocation/reinforcement of some utilities and other facilities in the levee setback area ▸ Removal of approximately 40 structures, including five to 10 residences	▸ Removal and relocation of Pump Station No. 3 east of the setback levee ▸ Removal of portions of the existing levee in Segment 2 ▸ Construction of detention basin northeast of Star Bend ▸ Relocation/reinforcement of some utilities and other facilities in the levee setback area ▸ Removal of approximately 30 structures, including five to 10 residences
Land Uses in the Levee Setback Area	NA	Farming operations and the potential for habitat restoration, consistent with the flood control function of the levee setback area, may be feasible in parts of the expanded Feather River floodway, which would total approximately 1,200 acres	Farming operations and the potential for habitat restoration, consistent with the flood control function of the levee setback area, may be feasible in parts of the expanded Feather River floodway, which would total approximately 900 acres

Notes: FRLRP = Feather River Levee Repair Project; NA = not applicable
If additional areas in the existing levee along project Segments 1 and 3 are found to have similar erosion conditions as those identified in Segment 2, erosion protection measures could be implemented in these locations as well.
If either Alternative 2 or Alternative 3 is selected for implementation, the seepage control system for the setback levee would be refined based on detailed field investigations and analyses, to be performed during detailed design.
Source: Data compiled by EDAW in 2006

Table 1-2
Summary Comparison of Feather River Water Elevations of the FRLRP Alternatives

Location	AEP	Alternative 1 – Water elevation (feet—NGVD)	Alternative 2 – Water Elevation (feet—NGVD)	Alternative 3 – Water Elevation (feet—NGVD)
Upper End of Levee Setback Area	1 in 100	68.8	66.9	67.4
	1 in 200	72.7	69.5	69.8
Confluence of Feather and Yuba Rivers	1 in 100	72.5	71.2	71.4
	1 in 200	76.2	74.7	75.0
Downstream of Levee Setback Area	1 in 100	59.4	59.5	59.5
	1 in 200	62.8	62.9	62.9

Notes: AEP = annual exceedance probability (the probability that a given flow will be exceeded in any year; for example, an AEP of 1 in 125 has a 1/125 or 0.8 percent probability of being exceeded in any year); NGVD = National Geodetic Vertical Datum
Conditions for Alternative 1 would be the same as those under the No-Project Alternative (i.e., hydrologic conditions in the Feather River channel would be unchanged under this alternative).
Source: Data provided by MBK Engineers in 2006

1.3 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

1.3.1 ENVIRONMENTAL EFFECTS OF THE PROPOSED PROJECT

Tables 1-3a, 1-3b, and 1-3c, "Summary of Impacts and Mitigation Measures" (included at the end of this chapter), provide a summary of the environmental impacts of the three project alternatives, the level of significance of each impact before mitigation, recommended mitigation measures, and the level of significance of each impact after implementation of the mitigation. They also list the significant cumulative impacts to which the levee repair and strengthening activities and alternative levee setbacks would contribute. As shown in Tables 1-3a, 1-3b, and 1-3c, implementation of Alternative 1, Alternative 2, or Alternative 3 could significantly affect a number of environmental resources, mainly during construction of project features, but mitigation is included that would ensure the reduction of most of these impacts to a less-than-significant level. In addition, the three project alternatives have the potential to provide a substantial reduction of flood risk in the RD 784 area.

1.3.2 EFFECTS THAT WOULD REMAIN SIGNIFICANT FOLLOWING MITIGATION

As shown in Tables 1-3a, 1-3b, and 1-3c, Alternatives 1, 2, and/or 3 would result in direct or indirect significant and unavoidable impacts for the following issues:

- conflicts with land use policies for the preservation of agricultural land in agricultural use in the levee setback areas,
- conversion of Important Farmland to nonagricultural use in the levee setback areas,
- temporary construction-related air emissions, and
- temporary construction-related noise effects on sensitive receptors near the project area.

Implementation of any of the three project alternatives would also contribute to significant and unavoidable cumulative impacts on air quality and noise (during construction) and on Important Farmland (permanent conversion to nonagricultural uses). Mitigation has been included to reduce these direct, indirect, and cumulative impacts, but would not be sufficient to reduce them to a less-than-significant level.

1.4 AREAS OF CONTROVERSY

The primary areas of potential controversy associated with the FRLRP are the purchase of private land or easements on private land for project implementation, and the removal of Important Farmland from agricultural use. Alternative 1 would result in conversion of up to approximately 180 acres of farmland to another use (e.g., detention basin, seepage/stability berm). Under Alternative 2, a total of approximately 1,600 acres would be included in the setback levee footprint and the levee setback area (new floodway), most of which is privately owned and currently in cultivation. Alternative 3 would include approximately 1,250–1,300 acres of private land for the setback levee footprint and the setback area, most of which is privately owned and currently in cultivation. Aside from the acreage in the setback levee footprints, continued farming operations may be feasible in many parts of the levee setback areas

under Alternatives 2 and 3. Alternative 3 would include construction of a setback levee that would affect fewer acres of existing agricultural land; therefore, the effect on continued farming operations would be less than under Alternative 2.

Although no specific plans for habitat restoration in the setback area are proposed at this time, future management plans for portions of the levee setback areas under either Alternative 2 or Alternative 3 could include restoration of habitat and wetland areas as a substitute for agricultural uses where opportunities are present. Converting agricultural land to riparian and wildlife habitat is controversial in some agricultural communities, especially in the Sacramento Valley, where extensive areas are being converted or are proposed for conversion from agricultural use to riparian habitat. County tax revenues also may change as a result of potential land use changes.

This project would help resolve a current area of known and long-standing controversy, namely, the existing risk of flooding impacts in the RD 784 area, as demonstrated by recent catastrophic flooding events. The FRLRP would also address the deficiencies in the Feather River levee that have led to uncertainty and controversy surrounding the planned and ongoing development in the RD 784 area, which is subject to a higher flood risk than previously believed.

Overall, the FRLRP would reduce the ongoing concern and controversy over flood protection in the nearby communities. Any continuing controversy surrounding the project would be related primarily to the direct effects of the proposed levee setbacks under Alternatives 2 and 3 on landowners in the levee setback areas and/or the loss of productive agricultural land in the project area.

1.5 ISSUES TO BE RESOLVED

TRLIA will need to decide which alternative to approve among the three alternatives evaluated at an equal level of detail in this EIR. The decision will be based on numerous factors besides environmental impacts, including cost, availability of financing, effects on landowners, the potential for regional flood control benefits, future permitting requirements, and implementation schedule.

Regardless of which alternative is selected for implementation, detailed design of project features and planning of construction will need to be coordinated with mitigation requirements so that sensitive resources in the project area are avoided where practicable. Where sensitive resources cannot be physically avoided, detailed plans for mitigation of the loss of these resources will need to be developed (e.g., compensation for the loss of jurisdictional wetlands; refer to Section 5.5, “Terrestrial Biological Resources,” for further discussion). Land uses in the levee setback area under Alternatives 2 and 3 could consist of agricultural operations and/or habitat restoration activities. Special operations and maintenance plans would need to be prepared and implemented to ensure the long-term maintenance of any agricultural and/or habitat areas, and to ensure that such areas would not conflict with the flood control function of the levee setback area. Any future management plans would require consultation with affected landowners, resource agencies, and other stakeholders.

Table 1-3a
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
5.1 Land Use			
LS-5.1-a: Conflicts with Land Use Planning and Policies Resulting from Levee Repairs and the Levee Setback. Levee repair and strengthening could result in the removal of up to approximately 30 acres of agricultural land from production through the placement of seepage/stability berms and other structures. Construction of a detention basin would be required to accommodate peak flows from relief wells. Construction of the detention basin could result in the removal of up to approximately 150 additional acres of agricultural land. These uses would conflict with County land use policies regarding the preservation of agricultural land. However, the proposed improvements to the flood control system would benefit thousands of acres of valuable agricultural lands in the adjacent floodplain by providing increased protection from future flood damages. Therefore, while the direct land use changes associated with Alternative 1 would conflict with policies related to protection of agricultural lands, in the long term this alternative would provide greater protection for agricultural lands and soils, consistent with these policies. Therefore, this impact would be **less than significant**.	LTS	No mitigation is required.	LTS
LS-5.1-b: Conversion of Important Farmland to Nonagricultural Uses Resulting from Levee Repairs and Strengthening. Installation of seepage/stability berms and other structures associated with levee repairs and strengthening could permanently convert up to approximately 30	S	**Minimize Losses of Important Farmland to the Extent Feasible.** To minimize direct losses and indirect adverse effects on important farmland, TRLIA shall ensure that the following measures are implemented where feasible and practicable: (a) Minimize the disturbance of Important Farmland and continuing agricultural operations during construction by	SU

Table 1-3a
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
acres of Prime Farmland to nonagricultural uses. Construction of the detention basin under Alternative 1 could convert up to an additional approximately 150 acres of Prime Farmland to nonagricultural uses. This impact would be **significant.**		locating construction laydown and staging areas on sites that are fallow, that are already developed or disturbed, or that are to be discontinued for use as agricultural land, and by using existing roads to access construction areas to the extent possible. (b) When selecting the site and configuration of the detention basin, minimize the fragmentation of agricultural lands and retain contiguous parcels of agricultural land of sufficient size to support their efficient use for continued agricultural production.	
5.2 Geology, Soils, and Mineral Resources			
LS-5.2-a: Risk of Geologic Hazards to the Levees. Characteristics of the soils along the existing Feather River and Yuba River levees could lead to structural deficiencies or failure of the levees if not addressed in construction design. Although no active faults are in the immediate vicinity of the existing levee alignments, some ground shaking is possible from earthquakes at distant sites. The levees would be strengthened according to geotechnical engineering recommendations that incorporate seepage control features, making them more stable than the existing levee and less likely to fail. Therefore, this would be a **beneficial** effect.	B	No mitigation is required.	B
LS-5.2-b: Soil Erosion Hazards Associated with Levee Repair and Strengthening Activities. Although levee repair and strengthening activities would disturb earth, thereby potentially accelerating erosion, construction disturbance would be temporary, and soils in disturbed areas would be vegetated or otherwise stabilized after construction	LTS	No mitigation is required.	LTS

Table 1-3a
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
is complete. In addition, part of Alternative 1 includes correction of existing erosion problem areas on the water side of the Feather River left bank levee in project Segment 2. Levee repair and strengthening activities would not expose persons or property to erosion hazards. This impact would be **less than significant**.			
5.3 Water Resources and River Geomorphology			
LS-5.3-a: Temporary Effects on Water Quality Associated with Levee Repair and Strengthening Activities. Ground-disturbing activities associated with repair and strengthening of the existing levees could cause soil erosion and sedimentation of local drainages and the Feather and Yuba River channels. Construction activities could also discharge waste petroleum products or other construction-related substances that could enter these waterways in runoff. Because the release of soil or other materials into these waterways could adversely affect river water quality, this impact would be **potentially significant.**	PS	**(1): Prepare a SWPPP, File an NOI, and Comply with the NPDES Stormwater Permit for Project Construction Activities.** Before the start of any project construction work, site grading, or excavation, TRLIA or its primary construction contractor shall prepare a SWPPP detailing measures to control soil erosion and waste discharges from construction areas and shall submit an NOI to the Central Valley RWQCB for stormwater discharges associated with general construction activity. TRLIA shall require all contractors conducting construction-related work to implement the SWPPP to control soil erosion and waste discharges of other construction-related contaminants. The general contractor(s) and subcontractor(s) conducting the work shall be responsible for constructing or implementing, regularly inspecting, and maintaining the measures in good working order. The SWPPP shall identify the grading and erosion control BMPs and specifications that are necessary to avoid and minimize water quality impacts to the extent practicable. Standard erosion control measures (e.g., management, structural, and vegetative controls) shall be implemented for all construction activities that expose soil. Grading operations shall be conducted to eliminate direct routes for conveying potentially contaminated runoff to drainage channels. Erosion control barriers such as silt fences and mulching material shall be installed, and disturbed areas shall be	LTS

Table 1-3a
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		reseeded with grass or other plants where necessary. The SWPPP shall contain specific measures for stabilizing soils at construction-related sites before the onset of the winter rainfall season. These standard erosion control measures shall be designed to reduce the potential for soil erosion and sedimentation of drainage channels. The following specific BMPs are recommended for implementation: ▪ Conduct all work according to site-specific construction plans that identify areas for clearing, grading, and revegetation so that ground disturbance is minimized. ▪ Avoid riparian and wetland vegetation wherever possible and identify vegetation to be retained for habitat maintenance (i.e., as identified through preconstruction biological surveys), cover cleared areas with mulches, install silt fences near riparian areas or streams to control erosion and trap sediment, and reseed cleared areas with native vegetation. ▪ Stabilize disturbed soils at all construction sites (e.g., levee repair areas, borrow areas) and staging areas before the onset of the winter rainfall season. ▪ Stabilize and protect stockpiles from exposure to erosion and flooding. The SWPPP also shall specify appropriate hazardous materials handling, storage, and spill response practices to reduce the possibility of adverse impacts from use or accidental spills or releases of contaminants. Specific measures applicable to the project include, but are not limited to, the following: ▪ Develop and implement strict on-site handling rules to keep construction and maintenance materials out of drainages and waterways.	

Table 1-3a
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		▪ Conduct all refueling and servicing of equipment with absorbent material or drip pans underneath to contain spilled fuel. Collect any fluid drained from machinery during servicing in leakproof containers and deliver to an appropriate disposal or recycling facility. ▪ Maintain controlled construction staging, site entrance, concrete washout, and fueling areas at least 100 feet away from stream channels or wetlands to minimize accidental spills and runoff of contaminants in stormwater. ▪ Prevent raw cement; concrete or concrete washings; asphalt, paint, or other coating material; oil or other petroleum products; or any other substances that could be hazardous to aquatic life from contaminating the soil or entering watercourses. ▪ Maintain spill cleanup equipment in proper working condition. Clean up all spills immediately according to the spill prevention and response plan, and immediately notify DFG and the RWQCB of any spills and cleanup procedures. **(2): Obtain a Use Permit from Yuba County and Comply with Permit Conditions for Erosion Control.** Before the start of any project-related grading, excavation, or fill activity, TRLIA or its primary construction contractor shall obtain a use permit from the Yuba County Planning Department in compliance with the Yuba County Ordinance Code. TRLIA shall require all contractors conducting construction-related work to implement the conditions of the permit. The general contractor(s) and subcontractor(s) conducting the work shall be responsible for constructing or implementing, regularly inspecting, and maintaining the required measures in good working order.	
LS-5.3-b: Changes in Groundwater Levels Resulting from Seepage Control Measures. Slurry cutoff walls that would be installed in	LTS	No mitigation is required.	LTS

Table 1-3a
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
segments of the existing Feather River and Yuba River levees to control seepage could restrict groundwater flow and affect groundwater levels. Potential consequences are localized changes in well water levels and/or high groundwater levels east and south of the locations where slurry cutoff walls are installed. Such changes are not expected to substantially affect water supply or adversely affect land uses. This impact would be **less than significant.**			
5.4 Fisheries			
LS-5.4-a: Loss of Fish Habitat during Levee Repair and Strengthening Activities. Construction-related increases in sediments, turbidity, and contaminants could adversely affect fish habitats immediately adjacent to and downstream of project construction activities, possibly resulting in adverse effects on fish species listed or proposed for listing as threatened or endangered under ESA. This impact would be **potentially significant**.	PS	**(1): Prepare a SWPPP, File an NOI, and Comply with the NPDES Stormwater Permit for Project Construction Activities.** This measure is identical to Mitigation Measure LS-5.3-a(1) in Section 5.3, "Water Resources and River Geomorphology." **(2): Obtain a Use Permit from Yuba County and Comply with Permit Conditions for Erosion Control.** This measure is identical to Mitigation Measure LS-5.3-a(2) in Section 5.3, "Water Resources and River Geomorphology."	LTS
LS-5.4-b: Loss of Overhead Cover and Instream Woody Material Associated with Levee Repair and Strengthening Activities. Small amounts of riparian vegetation (i.e., individual trees) may need to be removed or cleared at the waterside toe of the existing levee during repairs at erosion problem areas in project Segment 2. The loss of overhead cover for fish would be negligible and temporary, however, and revegetation would occur over time. Therefore, this impact would be **less than**	LTS	No mitigation is required.	LTS

Table 1-3a
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
significant.			
5.5 Terrestrial Biological Resources			
LS-5.5-a: Effects on General Biological Resources. Levee repair and strengthening and related activities would result in disturbance and/or loss of vegetation along the Feather and Yuba River levees and at staging areas and detention basin and borrow sites. These areas provide habitat for many common plant and wildlife species. Although local populations of common species could be affected, these species are locally and regionally abundant. This impact would be **less than significant.**	LTS	No mitigation is required.	LTS
LS-5.5-b: Effects on Sensitive Habitats. Levee repair and strengthening and related activities could result in disturbance and/or loss of sensitive habitats, including jurisdictional wetlands, other waters of the United States, and riparian habitats. This impact would be **significant.**	S	**Avoid Disturbance of Sensitive Habitats to the Extent Feasible and Comply with Corps and DFG Processes to Mitigate Unavoidable Effects.** Three Rivers Levee Improvement Authority (TRLIA) and its primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize potential project effects on sensitive habitats. As noted in the setting and impact discussions above, for purposes of this EIR the potential presence of sensitive habitats was assessed through reconnaissance surveys (where access was allowed) and literature review. The mapping and surveys identified below are intended to supplement and clarify these initial surveys and reviews by providing timely, detailed, and finely tuned biological information within the specific geographical areas subject to impact under the alternative selected for implementation. Each measure is accompanied by one or more performance standards to control the ultimate level of impact: (a) <u>Map potential waters of the United States and riparian habitat in the project area and, to the extent feasible and</u>	LTS

Table 1-3a
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		practicable, plan project features and construction activity to avoid direct effects on these areas. Before the beginning of any ground-disturbing project activities, a qualified biologist shall delineate potential waters of the United States and shall formally map all riparian habitat that could be affected by the proposed project. This activity will be performed following the requirements of a formal delineation of waters of the United States for CWA Section 404 permitting as described below. The primary engineering and construction contractors shall ensure, through coordination with the biologist, that the footprints of construction zones, borrow areas, staging areas, and access routes are designed to prevent disturbance of waters of the United States and riparian habitat to the extent feasible and practicable. All avoidable jurisdictional habitats that could potentially be affected by ground-disturbing project activity shall be protected during construction by temporary fencing and/or flagging, as appropriate. Qualified biological monitors shall be present during all construction activities that could potentially affect these protected habitats to ensure that project activity is excluded from these areas. (b) Complete the Section 404 permitting process, and mitigate the acreage of affected jurisdictional wetland on a "no-net-loss" basis. Before the initiation of any ground-disturbing project activities in areas that contain potentially jurisdictional wetlands, qualified biologists shall complete a delineation of wetlands and other waters of the United States that would be affected by the proposed project. The findings shall be documented in a detailed report and submitted to the Corps for verification as part of the formal Section 404 wetland delineation process. For all jurisdictional areas that	

Table 1-3a
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		cannot be avoided as described above, TRLIA shall secure authorization for fill of wetlands and alteration of waters of the United States from the Corps through the Section 404 permitting process before project implementation. The acreage of jurisdictional wetland affected shall be mitigated (e.g., through restoration, rehabilitation, enhancement, and/or replacement) on a "no-net-loss" basis in accordance with Corps regulations. Habitat restoration, rehabilitation, and/or replacement shall be at a location and by feasible methods agreeable to the Corps. TRLIA shall implement the feasible mitigation measures adopted through the permitting process. (c) Obtain a streambed alteration agreement from DFG and mitigate affected riparian habitat on a "no-net-loss" basis. Because project implementation would result in changes to the natural flow and bed and bank of a waterway (e.g., vegetated drainage canal, the Feather River), the project would likely require a Section 1602 streambed alteration agreement from DFG. If complete avoidance of identified riparian habitat is not feasible, the acreage of riparian habitat that would be removed shall be mitigated on a "no-net-loss" basis in accordance with DFG regulations and as specified in the streambed alteration agreement, if needed. Habitat mitigation (e.g., restoration, rehabilitation, and/or replacement) shall be at a location and by methods agreeable to DFG.	
LS-5.5-c: Loss of Special-Status Plants. Levee repair and strengthening and related activities could result in the loss of rose mallow and Wright's trichocoronis if they exist in areas that would be disturbed during these activities. This impact would be **potentially significant.**	PS	**Conduct Detailed Special-Status Plant Surveys and Establish Construction Buffers as Necessary to Minimize Effects on Special-Status Plants.** TRLIA and its primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize potential project effects on special-status plants:	LTS

Table 1-3a
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		(a) Conduct detailed special-status plant surveys and document the results. Before the initiation of any ground-disturbing project activities, a qualified botanist shall conduct detailed/focused surveys for rose mallow and Wright's trichocoronis in appropriate habitat within the project area, in accordance with USFWS and DFG guidelines and at the appropriate time of year when the target species would be in flower or otherwise clearly identifiable (June to September for rose mallow and May to September for Wright's trichocoronis). The findings shall be documented in a letter report that is retained by TRLIA. If rose mallow and Wright's trichocoronis are not found during focused surveys, no further action shall be required. (b) Establish buffers wherever possible to protect identified special-status plants from construction activity. If special-status plants are found during focused surveys, the primary engineering and construction contractors shall ensure, through coordination with a qualified biologist, that the footprint of project features and construction zones, staging areas, and access routes are designed such that any disturbance of the plants is prevented to the extent feasible and practicable. The botanist shall clearly identify the locations of special-status plant populations in the field by staking or flagging before construction. No project activities shall be allowed within the marked areas. (c) Compensate for losses of special-status plants. If populations or individuals of rose mallow and Wright's trichocoronis are found during implementation of item (a) above, and the individuals or populations cannot be avoided during implementation of item (b), a mitigation and monitoring plan for the affected species shall be developed and implemented. The plan shall be prepared by a qualified	

Table 1-3a
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		biologist. Before disturbance of the individuals or populations of the effected species, the mitigation and monitoring plan shall be submitted to TRLIA for review and approval. The plan shall be submitted concurrently to DFG for review and comment, and TRLIA may consult with DFG before approval of the plan. Possible mitigation for individuals or populations removed during construction includes: ▪ removing and stockpiling topsoil with intact roots, rhizomes, and seed bank in the disturbance area, and either replacing the soil in the same location after construction is complete or placing it in a new area with suitable habitat; or ▪ collecting plants, seeds, or other propogules in the area to be disturbed, and placing propogules or cultivating nursery stock in the disturbed area after construction is complete or in a new area with suitable habitat. Mitigation will be considered successful if populations of the affected species in mitigation areas are sustained for a minimum of 3 years and are of similar size and quality as the affected populations.	
LS-5.5-d: Effects on Valley Elderberry Longhorn Beetle. Levee repair and strengthening and related activities could result in the loss of blue elderberry shrubs that are occupied by valley elderberry longhorn beetle. This impact would be **potentially significant**.	PS	**Conduct Protocol-Level Surveys, Establish Buffers, and Implement a Mitigation Plan as Necessary to Minimize Effects on Valley Elderberry Longhorn Beetle.** TRLIA and its primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize potential project effects on valley elderberry longhorn beetles: (a) <u>Conduct protocol-level elderberry shrub surveys in the project area</u>. Before the beginning of ground disturbance within 100 feet of any area that may support elderberry shrubs, a qualified biologist shall conduct an elderberry	LTS

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Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		shrub survey consistent with USFWS protocols for conservation of valley elderberry longhorn beetle (U.S. Fish and Wildlife Service 1999). All elderberry shrubs with potential to be affected by project activities shall be mapped and the number of stems greater than 1 inch in diameter on each shrub that may require removal shall be counted. (Elderberry plants with no stems measuring 1 inch or greater in diameter at ground level are considered unlikely to be habitat for the beetle because of their small size and/or immaturity [U.S. Fish and Wildlife Service 1999].) (b) Protect elderberry shrubs from disturbance. The primary engineering and construction contractors, through coordination with the biologist, shall ensure to the extent feasible and practicable that the footprint of project features and construction zones, staging areas, and access routes are designed to ensure that no project activities would affect an elderberry shrub with stems measuring 1 inch in diameter at ground level. Buffers of at least 100 feet shall be established around all elderberry shrubs with stems greater than 1 inch in diameter at ground level that can be retained undisturbed on-site. The buffer shall be clearly identified in the field by staking or flagging. All project activity shall be prohibited within the buffer areas. If complete avoidance of these buffers is not feasible, consultation with USFWS shall be conducted as described below. (c) If effects on shrubs cannot be avoided, develop and implement a mitigation plan approved by USFWS. If maintaining 100-foot protection buffers or otherwise avoiding construction-related effects on elderberry shrubs with a stem greater than 1 inch in diameter at ground level is not feasible, consultation with USFWS will be required, and an incidental take permit may be required. During this	

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Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		consultation, an appropriate and feasible mitigation plan shall be developed and provided to USFWS for approval. The plan may include, but would not necessarily be limited to, reducing buffers around shrubs that would not be removed; transplanting shrubs to a conservation area; and planting additional seedling or cuttings at a ratio ranging from 1:1 or 1:6, depending on the number of stems greater than or equal to 1 inch in diameter and whether beetle exit holes are found on the shrubs on-site (U.S. Fish and Wildlife Service 1999).	
LS-5.5-e: Effects on Northwestern Pond Turtle. Levee repair and strengthening and related activities could result in disturbance and/or loss of suitable aquatic habitat for northwestern pond turtle and could result in direct loss of individuals. This impact would be **potentially significant**.	PS	**Conduct Surveys as Part of Dewatering Activities and Minimize Effects on Northwestern Pond Turtle.** TRLIA and its primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize potential project effects on northwestern pond turtles: (a) Conduct surveys after dewatering. A qualified biologist shall conduct surveys for northwestern pond turtles in aquatic habitats to be dewatered and/or filled during project construction and grading of aquatic habitat within the setback area. Surveys shall be conducted immediately after any dewatering and before any fill of aquatic habitat. If no pond turtles are found, no further mitigation will be required. (b) Capture and move turtles. If any pond turtles are found, the biologist shall capture them and move them to suitable habitat in the vicinity of the project site.	LTS
LS-5.5-f: Effects on Giant Garter Snake. Levee repair and strengthening and related activities would result in disturbance and/or loss of suitable aquatic and upland habitat for giant garter snake. Construction activities also have the potential to result in direct take of individuals. This impact	S	**Implement Applicable Take Minimization Measures and a Mitigation Plan as Necessary for Giant Garter Snake.** TRLIA and its primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize potential project effects on giant garter snakes:	LTS

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THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
would be **significant.**		(a) Verify potential habitat in the project area and, to the extent feasible and practicable, plan project features and construction activity to avoid direct effects on these areas. Before the initiation of any ground-disturbing project activities, a qualified biologist approved by USFWS's Sacramento Fish and Wildlife Office shall verify where suitable habitat conditions for giant garter snake occur in areas that could be affected by the proposed project. The primary engineering and construction contractors shall ensure, through coordination with the biologist, that the footprint of project features and construction zones, staging areas, and access routes are designed to prevent any disturbance of potential giant garter snake habitat to the extent feasible and practicable. (b) Designate areas to be avoided during construction. The primary engineering and construction contractors, through coordination with the biologist, shall designate giant garter snake habitat to be avoided during project construction as Environmentally Sensitive Areas. These areas shall be flagged by the biologist and avoided by all construction personnel. (c) Limit the timing of construction activity within potential habitat. All construction activities that must take place within potential giant garter snake habitat (aquatic habitat and adjacent upland habitat within 200 feet) shall be limited to the period of May 1 to October 1 to the extent feasible. (d) Follow guidelines for habitat dewatering. Dewatering of aquatic habitat shall not occur between October 1 and April 15. Any dewatered habitat must remain dry for at least 15 consecutive days after April 15 and before the excavation or filling of the dewatered habitat. (e) Inspect suitable habitat within 24 hours of beginning	

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THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		construction. Within 24 hours before the initiation of construction activities within suitable habitat, a qualified biologist who is approved by USFWS's Sacramento Fish and Wildlife Office shall conduct preconstruction surveys for giant garter snakes. These areas shall be reinspected whenever a lapse of construction activity within suitable habitat occurs for a period greater than 2 weeks. If a giant garter snake is found, all activity that could result in death or injury of giant garter snake shall be delayed until consultation with USFWS and DFG has been completed and authorization to proceed has been received from those agencies. (f) Minimize clearing of wetland vegetation. Clearing of wetland vegetation shall be confined to the minimum area necessary. Excavation of channel banks shall be accomplished by using equipment located on and operated from the top of the bank, with the least interference practical for emergent vegetation that would not be affected by the project. (g) Restrict movement of equipment. Movement of heavy equipment to and from the project site shall be restricted to areas outside the identified suitable habitat, unless the equipment is being moved on established roadways or in areas that have been inspected by a qualified biologist. (h) Participate in environmental awareness program. Construction personnel shall participate in a USFWS-approved worker environmental awareness program. Under this program, workers shall be informed about the presence of giant garter snakes and habitat associated with the species and that unlawful take of the animal or destruction of its habitat is a violation of ESA. (i) Restore disturbed areas. After completion of construction	

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		activities, any construction debris shall be removed and disturbed areas within potential giant garter snake habitat shall be restored to preproject conditions. (j) <u>If impacts cannot be avoided, develop and implement a feasible mitigation plan approved by USFWS</u>. Consultation with USFWS and DFG shall be required for impacts that cannot be avoided, and an incidental take permit may be required. During this consultation, an appropriate and feasible mitigation plan shall be developed and provided to USFWS and DFG for approval. The mitigation plan may include, but would not necessarily be limited to, applicable take minimization measures outlined above, or modifications of those measures, and compensation for unavoidable impacts through replacement of habitat. Compensation ratios may range from 1:1 to 3:1 (replaced aquatic habitat to affected habitat), depending on the amount of habitat lost and the duration of the impact. Replacement habitat shall include both upland and aquatic habitat components at a ratio of 2:1 upland habitat to aquatic habitat.	
LS-5.5-g: Effects on Swainson's Hawk and Other Nesting Raptors. Levee repair and strengthening and related activities would result in disturbance and/or loss of suitable nesting and/or foraging habitat for Swainson's hawk and other raptors and could result in loss of active nests. This impact would be **potentially significant**.	PS	**(1): Conduct Preconstruction Surveys and Protect Active Nests to Minimize Effects on Swainson's Hawk.** TRLIA and its primary construction contractor shall ensure that the following measures are implemented to minimize potential project effects on Swainson's hawk: (a) <u>Conduct preconstruction surveys</u>. Because project construction activity would occur during the Swainson's hawk breeding season (March 1 to September 15), a qualified biologist shall conduct preconstruction surveys to identify active nests in the nonorchard trees within 1/2 mile of construction areas (including staging and borrow areas). Because of the mostly linear nature of project construction, preconstruction surveys may be phased to accommodate	LTS

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THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		construction activities; suitable nesting habitat shall be surveyed only when construction activities would encroach within 1/2 mile of unsurveyed areas. Surveys shall be conducted no less than 14 days and no more than 30 days before construction activities may encroach within 1/2 mile of unsurveyed areas. To the extent feasible, guidelines provided in *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (Swainson's Hawk Technical Advisory Committee 2000) shall be followed. (b) Establish protective buffers around active nests. If an active nest is found, an appropriate buffer to avoid impacts shall be determined by a qualified biologist. No project activities shall commence within the buffer area until a qualified biologist confirms that the nest is no longer active. The size of the buffer may vary, depending on the nest location, nest stage, and construction activity. Monitoring of the nest by a qualified biologist may be required if the activity could adversely affect the nest. **(2): Conduct Preconstruction Surveys, Protect Occupied Burrows, and Relocate Individuals as Necessary to Minimize Effects on Burrowing Owl.** TRLIA and its primary construction contractor shall ensure that the following measures are implemented to minimize potential project effects on burrowing owl: (a) Conduct preconstruction surveys. Before project-related activities in the project area, a qualified biologist shall conduct focused surveys for burrowing owls within 250 feet of construction areas (including staging and borrow areas). Surveys shall be conducted no less than 14 days and no more than 30 days prior to initiation of project activities, and surveys shall be conducted in accordance with DFG protocol	

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THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		(California Department of Fish and Game 1995). (b) Establish protective buffers around occupied burrows. If occupied burrows are found, an appropriate buffer shall be established to avoid impacts on the burrows. A buffer of 165 feet would be required during the nonbreeding season (September 1 through January 31), and a buffer of 250 feet would be required during the breeding season (February 1 through August 31). To the extent feasible, project activity shall be excluded from within the buffer areas. (c) Relocate owls if necessary. If impacts on occupied burrows are unavoidable, on-site passive relocation techniques approved by DFG shall be used to encourage owls to move to alternative burrows outside the impact area. However, no occupied burrows shall be disturbed during the nesting season unless a qualified biologist verifies through noninvasive methods that the burrow is no longer occupied. **(3): Conduct Preconstruction Surveys and Protect Active Nests to Minimize Effects on Other Nesting Raptors.** TRLIA and its primary construction contractor shall ensure that the following measures are implemented to minimize potential project effects on other nesting raptors: (a) Conduct preconstruction surveys. Because project construction activity would occur during the raptor breeding season (February 15 to September 15), a qualified biologist shall conduct preconstruction surveys to identify active nests in the nonorchard trees within 500 feet of potential construction areas (including staging and borrow areas). Because of the linear nature of project construction, preconstruction surveys may be phased to accommodate construction activities; suitable nesting habitat shall be surveyed only when construction activities would encroach within 500 feet of unsurveyed areas. Surveys shall be	

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THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		conducted no less than 14 days and no more than 30 days before construction encroaches within 500 feet of unsurveyed areas. If no active nests are found, no further mitigation shall be required. (b) Establish protective buffers around active nests. If an active nest is found, an appropriate buffer to avoid impacts shall be determined by a qualified biologist. No project activities shall commence within the buffer area until a qualified biologist confirms that the nest is no longer active. The size of the buffer may vary, depending on the nest location, nest stage, and construction activity. Monitoring of the nest by a qualified biologist may be required if an activity could adversely affect the nest.	
LS-5.5-h: Effects on Other Special-status Birds. Levee repair and strengthening and related activities would result in disturbance and/or loss of potential nesting and/or foraging habitat for several special-status bird species. Special-status species are unlikely to nest in areas that would be affected, and large areas of nesting and foraging habitat of equal or higher quality are available elsewhere in the project area. Therefore, this impact would be **less than significant.**	LTS	No mitigation is required.	LTS
LS-5.5-i: Effects on Pacific Western Big-Eared Bat. Levee repair and strengthening and related activities would not affect the suitability of foraging habitat or result in loss of important roost or maternity sites. This impact would be **less than significant.**	LTS	No mitigation is required.	LTS
LS-5.5-j: Effects on Wildlife Corridors. Levee repair and strengthening and related activities would	LTS	No mitigation is required.	LTS

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THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
result in limited temporary disturbance of the Feather River and Yuba River habitat corridors but are not expected to affect overall use of these corridors by wildlife. This impact would be **less than significant.**			
5.6 Recreation			
LS-5.6-a: Temporary Changes in Recreational Opportunities during Levee Repairs. Construction noise could disrupt recreational uses in the project area, particularly in areas adjacent to the existing levee alignment. Some wildlife species present in or inhabiting natural areas are likely to be disturbed by noise and by the presence of project construction crews and equipment. Portions of the Feather River State Wildlife Area in project Segment 1 may need to be closed temporarily to hunting and other recreational activities for safety reasons while adjacent sections of the existing Feather River levee are being repaired. There would be no public access to the Star Bend Boat Launch and Fishing Access for several days while levee repairs were conducted in this area. Although these temporary disturbances may affect the recreation experience for bird-watchers, hunters, boaters, and other recreational users, displaced recreational uses could be accommodated by other nearby facilities (Whitmore, pers. comm., 2006). For this reason, and because of the temporary nature of this effect, this impact would be **less than significant**.	LTS	No mitigation is required.	LTS

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THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
LS-5.6-b: Long-Term Changes in Recreational Opportunities Resulting from Levee Repairs. In the long term, recreational opportunities along the left bank levee of the Feather River would not be adversely affected by levee repairs. Levee repair and strengthening of the existing levee would not change Feather River flood stage elevations, and hence would not alter the duration or frequency of inundation of recreational facilities relative to existing conditions. After completion of construction activities, the project site would be restored and reclaimed as appropriate to preexisting conditions. Recreational opportunities after project construction are expected to be available to the extent that these opportunities are available under preproject conditions. No substantial changes in recreational opportunities would be associated with levee repair and strengthening of the existing levee. This impact would be **less than significant**.	LTS	No mitigation is required.	LTS
5.7 Aesthetic Resources			
LS-5.7-a: Temporary Changes in Visual Resources Associated with Levee Repairs. Levee repair and strengthening activities would temporarily reduce the aesthetic qualities of views by introducing earthmoving equipment and other construction equipment, materials, and work crews into the viewshed of recreationists, motorists on SR 70 and Feather River Boulevard, workers in nearby farming areas, and residents of the area. However, the construction areas would typically be distant from and/or screened from most viewers. Where residents would be near the construction area (e.g.,	LTS	No mitigation is required.	LTS

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Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
in project Segment 3), construction would pass by these areas relatively quickly and changes in aesthetic conditions would be short term and temporary. For these reasons, this impact would be **less than significant.**			
LS-5.7-b: Changes in Light and Glare. There would be no substantial long-term sources of light or glare associated with levee repairs. However, equipment staging areas may be temporarily lit at night during construction, and portions of the construction areas may also need to be lit at night. Although such nighttime lighting may be visible from various residences, particularly in project Segment 3, in most locations views of the construction areas would be largely shielded by orchards, other vegetation, and structures. Where lit construction areas are visible, lighting would be short term and temporary. For these reasons, this impact would be **less than significant.**	LTS	No mitigation is required.	LTS
LS-5.7-c: Long-Term Modifications of Views from Levee Repairs. Levee repair and strengthening activities would not dramatically change the appearance of the project area, which is of low to moderate aesthetic value. There would be no substantial adverse effect on any scenic vista, and these repairs would not substantially alter the general character of views of the area. This impact would be **less than significant.**	LTS	No mitigation is required.	LTS
5.8 Cultural Resources			
LS-5.8-a: Damage to or Destruction of Resources Associated with Prehistoric Archaeological Sites	PS	**(1): Conduct Further Evaluation and Subsurface Testing to Determine Whether Proposed Levee Improvements Could**	LTS

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Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
CA-Yub-13 and CA-Yub-14. Prehistoric site CA-Yub-13 was previously documented adjacent to the water side of the levee in project Segment 1, and prehistoric site CA-Yub-14 was documented just west of Segment 1. The eligibility of these resources for CRHR and NRHP listing has not been determined. Prehistoric remains that may be considered significant resources under CEQA may still be present near the documented locations of these sites and could be damaged or destroyed by proposed levee repair and strengthening activities. This impact would be **potentially significant**.		**Damage Significant Resources Associated with Prehistoric Archaeological Sites CA-Yub-13 and CA-Yub-14.** If levee improvements would include activities that could disturb subsurface soils in the vicinity (within 1,000 feet) of the recorded location of either CA-Yub-13 or CA-Yub-14, TRLIA shall have a qualified archaeologist conduct an evaluation designed to assess the potential for damage to resources associated with the site(s) before initiation of project-related ground-disturbing activities in these areas. The evaluation may require assessment of the condition and data potential of specific areas of anticipated construction disturbance and/or determination of whether one or both of the sites are eligible for inclusion in the CRHR and/or NRHP. This evaluation shall include additional surveys, subsurface test excavations, analyses of any discovered archaeological materials, and (if necessary) data recovery. If the testing indicates the presence of cultural resources, a qualified archaeologist shall evaluate the significance of the finds and shall recommend further mitigation measures. Because of the critical need to remedy weaknesses in the existing levee in Segment 1, it is unlikely that avoidance of any resources directly within the construction footprint would be possible, and data recovery would likely be required. Efforts involving testing, excavation, and monitoring shall be conducted in consultation with appropriate Native American representatives identified by the NAHC. **(2): Monitor Ground-Disturbing Activities in the Vicinity of Prehistoric Archaeological Sites CA-Yub-13 and CA-Yub-14.** A qualified professional archaeologist and a Native American representative shall monitor all project-related ground-disturbing activities at and near the locations of prehistoric archaeological sites CA-Yub-13 and CA-Yub-14. If intact archaeological materials or human burials not recovered during the subsurface	

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Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		testing and excavation programs described in Mitigation Measure LS-5.8-a(1) are uncovered during project-related ground-disturbing activities, the archaeologist shall determine their possible significance and shall formulate appropriate mitigation measures. Appropriate mitigation may include no action, avoidance of the resource, and potential additional data and burial recovery.	
LS-5.8-b: Damage to or Destruction of Cultural Resources in Unsurveyed Areas. Potential borrow or staging areas have not been definitively identified and therefore have not been surveyed for cultural resources. Significant cultural resources could be present in these areas, and could be damaged by project-related ground-disturbing activities. This impact would be **potentially significant.**	PS	**Survey Unexamined Areas before Project Ground-Disturbing Activities and Implement Further Mitigation As Necessary.** A qualified professional archaeologist shall conduct focused surveys of all portions of the project area that were not adequately surveyed during past efforts or during surveys for the current effort. The survey shall be conducted before activities associated with project preparation or construction are initiated, and during a fallow period, if possible, in the case of areas currently covered in agricultural crops or grasses. If cultural resources are identified as a result of the survey, the archaeologist shall evaluate the significance of the finds and recommend appropriate mitigation measures for significant resources. TRLIA and its construction contractors shall implement these mitigation measures. Mitigation may include, but shall not necessarily be limited to, the avoidance of significant and potentially significant resources through changes in project design and/or subsurface testing and data recovery. Such efforts, particularly those involving testing and excavation, shall be conducted in consultation with appropriate Native American representatives identified by the NAHC.	LTS
LS-5.8-c: Damage to or Destruction of Undocumented Buried Archaeological Resources during Construction. Project construction and related activities could damage or destroy previously	PS	**Stop Work and Implement Measures to Protect Archaeological Resources If Discovered during Ground-Disturbing Activities.** If previously undocumented archaeological materials such as historic building or structure	LTS

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THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
unknown significant or potentially significant buried archaeological resources. This impact would be **potentially significant**.		remains; historic artifact deposits or scatters; or prehistoric artifacts such as stone tool flaking debitage, mortars, pestles, shell, or bone are encountered during project construction, all ground-disturbing activity shall be suspended temporarily within a 100-foot radius of the find or a distance determined by a qualified professional archaeologist to be appropriate based on the potential for disturbance of additional resource-bearing soils. A qualified professional archaeologist shall identify the materials, determine their possible significance, and formulate appropriate mitigation measures. Appropriate mitigation may include no action, avoidance of the resource, and potential data recovery. Ground disturbance in the zone of suspended activity shall not recommence without authorization from the archaeologist.	
LS-5.8-d: Damage to or Destruction of Undocumented Human Remains during Construction. It is possible that buried human remains could be unearthed during project-related ground-disturbing activities, causing damage to or destruction of such remains. This impact would be **potentially significant**.	PS	**If Human Remains Are Discovered during Ground-Disturbing Activities, Stop Work and Comply with State Laws Pertaining to the Discovery of Human Remains.** If human remains are uncovered during project construction, all ground-disturbing activities shall immediately be suspended within a 100-foot radius of the find or a distance determined by a qualified professional archaeologist to be appropriate based on the potential for disturbance of additional remains, and TRLIA or its designated representative shall be notified. TRLIA shall immediately notify the Yuba County Coroner and a qualified professional archaeologist, if one is not already on-site. The coroner shall examine the discovery within 48 hours. If the coroner determines that the remains are those of a Native American, he or she shall contact the NAHC by phone within 24 hours. The NAHC shall contact the Most Likely Descendant (MLD) of the remains. TRLIA or its appointed representative and the archaeologist shall consult with the MLD regarding the removal or preservation and avoidance of the remains, and the	LTS

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Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		parties shall rebury or preserve the remains as appropriate. Ground disturbance in the zone of suspended activity shall not recommence without authorization from the archaeologist.	
5.9 Air Quality			
LS-5.9-a: Temporary Emissions of ROG, NO_X, and PM_{10} during Construction. Maximum daily emissions of ROG, NO_X, and PM_{10} associated with levee repair and strengthening activities would exceed FRAQMD's recommended significance thresholds and contribute to existing nonattainment conditions for ozone and PM_{10} in the NSVAB. This impact would be **significant**.	S	**Implement FRAQMD Pollution-Control Measures to Minimize Temporary Emissions of ROG, NO_X, and PM_{10} during Construction.** FRAQMD's *Indirect Source Review Guidelines* and online CEQA guidance provide mitigation measures for reducing short-term air quality impacts. As recommended by FRAQMD, Three Rivers Levee Improvement Authority shall ensure that the following mitigation measures (summarized from FRAQMD guidance) are implemented during all project construction activities to the extent practicable. In addition, construction of the proposed project is required to comply with all applicable FRAQMD rules and regulations, in particular Rule 3.0 ("Visible Emissions"), Rule 3.16 ("Fugitive Dust Emissions"), and Rule 3.15 ("Architectural Coatings"). 1. Implement a Fugitive Dust Control Plan that includes the following measures (see Appendix E): ▪ All grading operations on a project should be suspended when winds carry dust beyond the property line despite implementation of all feasible dust control measures. Consideration should be given to suspending all project grading when winds exceed 20 mph to minimize the risk of dust being carried beyond the property line. ▪ Construction sites shall be watered as directed by the [Yuba County] Department of Public Works or FRAQMD and as necessary to prevent fugitive dust violations. ▪ An operational water truck should be on-site at all times.	SU

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Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		Apply water to control dust as needed to prevent visible emissions violations and off-site dust impacts. ▪ On-site dirt piles or other stockpiled particulate matter should be covered, wind breaks installed, and water and/or soil stabilizers employed to reduce windblown dust emissions. Incorporate the use of approved nontoxic soil stabilizers according to manufacturer's specifications to all inactive construction areas. ▪ All transfer processes involving a free fall of soil or other particulate matter shall be operated in such a manner as to minimize the free fall distance and fugitive dust emissions. ▪ Apply approved chemical soil stabilizers according to the manufacturers' specifications, to all inactive construction areas (previously graded areas that remain inactive for 96 hours) including unpaved roads and employee/equipment parking areas. ▪ To prevent track-out, wheel washers should be installed where project vehicles and/or equipment exit onto paved streets from unpaved roads. Vehicles and/or equipment shall be washed prior to each trip. Alternatively, a gravel bed may be installed as appropriate at vehicle/equipment site exit points to effectively remove soil buildup on tires and tracks to prevent/diminish track-out. ▪ Paved streets shall be swept frequently (water sweeper with reclaimed water recommended; wet broom) if soil material has been carried onto adjacent paved, public thoroughfares from the project site. ▪ Provide temporary traffic control as needed during all phases of construction to improve traffic flow, as deemed appropriate by the Department of Public Works	

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Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		and/or Caltrans [California Department of Transportation] and to reduce vehicle dust emissions. ▪ Reduce traffic speeds on all unpaved surfaces to 15 mph or less and reduce unnecessary vehicle traffic by restricting access. Provide appropriate training, on-site enforcement, and signage. ▪ Reestablish ground cover on the construction site as soon as possible and prior to final occupancy, through seeding and watering. ▪ No open burning of vegetative waste (natural plant growth wastes) or other materials (trash, demolition debris et al.) may be conducted at the project site. Materials also may not be hauled off-site for disposal by open burning. Vegetative wastes should be chipped or delivered to waste to energy facilities (permitted biomass facilities), mulched, composted, or used for firewood. 2. Construction equipment exhaust emissions shall not exceed FRAQMD Regulation III, Rule 3.0 (“Visible Emissions”) limitations (40% opacity or Ringelmann 2.0). Operators of vehicles and equipment found to exceed opacity limits shall take action to repair the equipment within 72 hours or remove the equipment from service. Failure to comply may result in a Notice of Violation. 3. The primary contractor shall be responsible to ensure that all construction equipment is properly tuned and maintained prior to and for the duration of onsite operation. 4. Limit vehicle and equipment idling times to 10 minutes—saves fuel and reduces emissions. 5. Use existing power sources (e.g., power poles) or clean fuel generators rather than temporary power generators.	

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THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		6. Develop and implement a traffic plan to minimize traffic flow interference from construction activities. The plan may include advance public notice of routing, use of public transportation, and satellite parking areas with a shuttle service. Schedule operations affecting traffic for off-peak hours. Minimize obstruction of through-traffic lanes. Provide a flag person to guide traffic properly and ensure safety at construction sites. 7. Portable engines and portable engine-driven equipment units used at the project work site, with the exception of on-road and off-road motor vehicles, may require ARB Portable Equipment Registration with the state or a local district permit. The owner/operator shall be responsible for arranging appropriate consultations with ARB or the District [FRAQMD] to determine registration and permitting requirements prior to equipment operation at the site. 8. The proponent shall assemble a comprehensive inventory list (i.e., make, model, engine year, horsepower, and emission rates) of all heavy-duty off-road (portable and mobile) equipment (50 horsepower and greater) that will be used an aggregate of 40 or more hours for the construction project and apply the following mitigation measure: *Reducing NO_X emissions from off-road diesel powered equipment* The project shall provide a plan for approval by FRAQMD demonstrating that the heavy-duty (equal to or greater than 50 horsepower) off-road equipment to be used in the construction project, including owned, leased and subcontractor vehicles, will achieve a projectwide fleet-average 20% NO_X reduction[1] and 45% particulate reduction compared to the most recent ARB fleet average at time of	

Table 1-3a
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		construction. The FRAQMD Fugitive Dust Control Plan is included in Appendix E. ——— [1] Acceptable options for reducing emissions may include use of late-model engines, low-emission diesel products, alternative fuels, engine retrofit technology (Carl Moyer Guidelines), after-treatment products, voluntary off-site mitigation projects, provide funds for air district off-site mitigation projects, and/or other options as they become available. The District [FRAQMD] should be contacted to discuss alternative measures.	
LS-5.9-b: Long-Term Changes in Emissions of ROG, NO_X, and PM_{10} Associated with Levee Repairs and Strengthening. The proposed levee repairs and strengthening are expected to contribute only minimally, if at all, to long-term emissions of pollutants through potential vehicle trips related to occasional maintenance activities. The resulting increase in long-term emissions would be small; therefore, this impact would be **less than significant.**	LTS	No mitigation is required.	LTS
LS-5.9-c: Exposure of Sensitive Receptors to Toxic Air Emissions. Emissions of TACs associated with construction or operations under Alternative 1 would not result in exposure of receptors to concentrations of TACs in excess of applicable thresholds. This impact would be **less than significant.**	LTS	No mitigation is required.	LTS
5.10 Noise			
LS-5.10-a: Temporary Increase in Noise Levels	S	**Limit Generation of Noise by Equipment during Project**	SU

Table 1-3a
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
during Construction. Noise levels associated with construction activities could exceed the maximum permissible noise limits at residences. Construction equipment may operate between the hours of 10 p.m. and 7 a.m., and could operate within 500 feet of a residential zone during these hours. Therefore, construction activities occurring between 10 p.m. and 7 a.m. could result in annoyance and/or sleep disruption of certain receptors within the project area. In addition, construction operations may result in a noticeable temporary increase (3 dBA or more) in ambient noise levels at these residences. Therefore, this impact would be **significant**.		**Construction.** Three Rivers Levee Improvement Authority (TRLIA) shall ensure that the primary construction contractor implements the following mitigation measures during construction activities: (a) To the extent practicable, construction activities shall be limited to the hours of 7 a.m. to 10 p.m. when operations occur within 500 feet of a residential or other noise-sensitive land use. Decisions as to whether nighttime construction is needed within 500 feet of residential or other noise-sensitive land uses shall only consider the need to complete project activities before the beginning of the flood season and the associated need to maintain human safety and the integrity of the flood control system. (b) All construction equipment shall be properly maintained and equipped with noise control, such as mufflers, in accordance with manufacturers' specifications. (c) To the extent feasible, the simultaneous operation of construction equipment within 50 feet of the project boundary shall be limited. In addition, TRLIA shall implement the following measure: (d) Before construction at each site near noise-sensitive receptors, TRLIA shall provide written notification to potentially affected receptors, identifying the type, duration, and frequency of construction operations. Notification materials will also identify a mechanism for residents to register complaints with TRLIA and Yuba County (the agency responsible for enforcement of the Yuba County noise ordinance) if construction noise levels are overly intrusive or construction occurs outside the permitted hours. TRLIA and/or Yuba County would then take corrective action.	

Table 1-3a
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
LS-5.10-b: Exposure of Sensitive Receptors to Excessive Groundborne Vibration During Construction. Construction-generated vibration levels would not result in levels above 0.2 in/sec PPV (Caltrans's recommended standard with respect to the prevention of structural building damage) or 80 VdB (FTA's maximum acceptable vibration standard with respect to human response at residential uses) at the nearest land uses. Thus, this impact would be **less than significant**.	LTS	No mitigation is required.	LTS
5.11 Transportation and Circulation			
LS-5.11-a: Increase in Traffic on Local Roadways near the Project Site during Construction. During the anticipated 20-month construction period, commute trips and haul truck trips associated with levee repair and strengthening activities would increase traffic on Feather River Boulevard, SR 70, and local roadways that provide access to the project alignment (e.g., Anderson Avenue, Country Club Avenue, Riverside Drive). However, construction-related trips would not exceed the thresholds established by ITE for temporary traffic increases and would not represent a substantial increase in traffic levels on these roadways or other local roads. This impact would be **less than significant.**	LTS	No mitigation is required.	LTS
LS-5.11-b: Increase in Traffic Hazards on Local Roadways near the Project Site during Construction. Construction-related traffic could track mud and gravel onto local roadways, and haul truck traffic could interfere with the flow of traffic on these roads. These conditions could pose hazards	PS	**Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways.** To reduce hazards to vehicles on local roadways, Three Rivers Levee Improvement Authority (TRLIA) shall ensure that its primary construction contractor implements the following	LTS

Table 1-3a
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
for travelers on local roadways. This impact would be **potentially significant.**		measures: (a) <u>Develop and implement a traffic safety plan in coordination with the County and Caltrans</u>. The construction contractor shall develop a plan for traffic safety assurance for the county roadways in the project vicinity. The contractor shall submit the plan to the County Public Works Department for approval before the initiation of construction-related activity that could adversely affect traffic on county roadways. A similar plan shall be prepared for SR 70 and submitted to Caltrans for review before initiation of construction-related activity that could adversely affect traffic on the highway. If both the County and Caltrans will accept the same traffic safety plan, then only one plan need be prepared. The plan(s) may call for the following elements, based on the requirements of each agency: ▪ posting warnings about the potential presence of slow-moving vehicles; ▪ using traffic control personnel when appropriate; ▪ scheduling truck trips outside of peak morning and evening traffic periods to the extent feasible; ▪ placing and maintaining barriers and installing traffic control devices necessary for safety, as specified in Caltrans's *Manual of Traffic Controls for Construction and Maintenance Works Zones* and in accordance with County requirements; and ▪ maintaining routes for passage of emergency response vehicles through roadways affected by construction activities. The contractor shall train construction personnel in appropriate safety measures as described in the plan(s), and shall implement the adopted plan(s).	

Table 1-3a
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		(b) Minimize the accumulation of mud and dirt on local roadways. All operations shall limit or expeditiously remove the accumulation of project-generated mud or dirt from adjacent public streets at least once every 24 hours when operations are occurring. The construction contractor shall sweep the paved roadways (water sweeper with reclaimed water recommended) at the end of each day if substantial volumes of soil material have been carried onto adjacent paved, public roads from the project sites. Also see a similar requirement under Mitigation Measure LS-5.9-a, "Implement FRAQMD Pollution-Control Measures to Minimize Temporary Emissions of ROG, NO_X, and PM_{10} during Construction."	
5.12 Public Services, Utilities, and Service Systems			
LS-5.12-a: Damage of Public Utility Infrastructure and Disruption of Service in the Project Area. Various aboveground and buried utility lines identified in the project area either are near or cross the Feather River and Yuba River levee segments planned for repair and strengthening and the area considered for a detention basin/soil borrow site. The potential exists for additional buried gas, electrical, cable television, or telephone lines that have not already been identified to be located near or to cross these areas. Construction activities associated with project implementation could cause minor damage to public utility infrastructure or temporarily disrupt utility service. However, detailed project design would include consultation with all potential service providers to identify utility line locations and appropriate protection measures, and consultation would	LTS	No mitigation is required.	LTS

Table 1-3a
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
continue during construction to ensure avoidance/protection of these utilities as construction proceeds. Implementation of Alternative 1 would not result in substantial interference with gas, electrical, cable television, or telephone service. This impact would be **less than significant.**			
LS-5.12-b: Damage of Water Supply and Drainage Facilities and Interference with Service in the Project Area. Various aboveground and buried water supply and drainage lines identified in the project area either are near or cross the Feather River and Yuba River levee segments planned for repair and strengthening and the area considered for a detention basin/soil borrow site. The potential exists for additional buried water supply and drainage facilities that have not already been identified to be located near or to cross these areas. Construction activities associated with project implementation could damage water supply and drainage infrastructure or temporarily disrupt service. However, detailed project design would include consultation with appropriate agencies and individuals responsible for water delivery and drainage facilities in the area to identify facility locations and appropriate protection measures, and consultation would continue during construction to ensure avoidance/protection of these utilities as construction proceeds. In addition, the project would be designed to maintain water supply and drainage service equivalent to existing conditions. Implementation of Alternative 1 would not result in	LTS	No mitigation is required.	LTS

Table 1-3a
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
substantial interference with water supply or drainage service. This impact would be **less than significant.**			
LS-5.12-c: Potential for Conflicts with Emergency Response Vehicles during Construction. Feather River Boulevard is an emergency-vehicle route. The increased traffic on Feather River Boulevard associated with levee repair and strengthening activities could increase emergency response times and otherwise make access to the area more difficult for emergency service providers. This impact would be **potentially significant.**	PS	**Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways.** This measure is identical to Mitigation Measure LS-5.11-b, "Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways," in Section 5.11, "Transportation and Circulation."	LTS
5.13 Paleontological Resources			
LS-5.13-a: Disturbance of Unknown Paleontological Resources during Earthmoving Activities. Portions of the project area and immediate vicinity are underlain by the Modesto and Riverbank Formations, which are paleontologically sensitive rock formations. Construction activities in the Modesto and Riverbank Formations associated with proposed levee strengthening (e.g., slurry cutoff walls, relief wells), use of the soil borrow area/detention basin location, and related activities (e.g., relocation of Pump Station No. 3) could adversely affect unknown subsurface paleontological resources. This impact would be **potentially significant.**	PS	**Conduct Training for Construction Personnel, Cease Work if Paleontological Resources are Encountered, and Implement an Appropriate Mitigation Strategy.** Three Rivers Levee Improvement Authority (TRLIA) or its primary construction contractor shall implement the following measures: (a) Before the start of construction activities, construction personnel involved with earthmoving activities shall be informed of the possibility of encountering fossils, the appearance and types of fossils likely to be seen during construction activities, and proper notification procedures should fossils be encountered. This worker training may either be prepared and presented by an experienced field archaeologist at the same time as construction worker education on cultural resources, or be prepared and presented separately by a qualified paleontologist. (b) If paleontological resources are discovered during earthmoving activities, the construction crew shall	LTS

Table 1-3a
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING ALTERNATIVE (ALTERNATIVE 1)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		immediately cease work within at least 25 feet of the find. TRLIA shall retain a qualified paleontologist to evaluate the resource and prepare a proposed mitigation plan in accordance with SVP guidelines (1995). The proposed mitigation plan may include a field survey, construction monitoring, sampling and data recovery procedures, museum storage coordination for any specimen recovered, and a report of findings. Recommendations determined by TRLIA to be necessary and feasible shall be implemented before construction activities can resume at the site where the paleontological resources were discovered.	
Cumulative Impacts			
Alternative 1, The Levee Strengthening Alternative, would also contribute to significant cumulative impacts related to conversion of Important Farmland to nonagricultural uses; emissions of ROG, NO_X, and PM_{10} during construction; and potentially noise during construction. The mitigation described above would not reduce the project's contributions to these impacts to less-than-significant levels.			

B	=	Beneficial effect	LTS	=	Less than significant
PB	=	Potentially beneficial effect	PS	=	Potentially significant
NI	=	No impact	S	=	Significant

Table 1-3b
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
5.1 Land Use			
ASB-5.1-a: Conflicts with Land Use Planning and Policies Resulting from Levee Repairs and the Levee Setback. Levee repair and strengthening of the existing levee in Segments 1 and 3 would result in removal of small areas of agricultural land from production associated with installation of seepage/stability berms and other structures. The setback levee footprint and levee easements in Segment 2 would cover approximately 240–250 acres of agricultural land, and setting back the levee could indirectly result in the removal of more land from agricultural production by dividing land parcels and allowing periodic flooding of agricultural land. Construction of a detention basin would be required to prevent adverse flooding effects on area properties, and this would likely occur on several hundred acres of existing agricultural land. These uses would conflict with County land use policies regarding the preservation of agricultural land and would be inconsistent with the current land use and zoning designations for the area. Because of these inconsistencies, this impact would be **significant**.	S	**Resolve Inconsistencies between Proposed Uses of the Levee Setback Area and Yuba County Zoning.** TRLIA shall coordinate with the County Planning Department to appropriately address inconsistencies between proposed land uses and County-planned land uses and zoning designations. Before permanent changes in allowable land uses in the levee setback area need to be established (i.e., before degradation of the existing levee at the latest), TRLIA shall apply for a general plan amendment if necessary and for appropriate rezoning, a zoning amendment, or other measures determined by the Planning Department to be necessary to ensure the consistency of proposed land uses with zoning. Consistency is defined as land uses and activities permitted by the County in the levee setback area, as reflected by zoning and other land use guidelines, that do not conflict with the flood control function of the levee setback area. The approach to resolving any land use planning inconsistencies shall be determined by, and conducted in coordination with, the County Planning Department. Any necessary modifications of general plan land use designations or of zoning, or placement of restrictions on existing zoning, will be determined by the Planning Department and approved by the County Planning Commission and Board of Supervisors as appropriate.	SU
ASB-5.1-b: Conversion of Important Farmland to Nonagricultural Uses Resulting from Levee Repairs and the Levee Setback. Levee repair and strengthening activities in project Segments 1 and 3 could permanently remove up to approximately 10 acres of Prime Farmland from production. Relocation of Pump Station No. 3 could potentially convert up to 1 acre of Prime Farmland in Segment	S	**Preserve the Agricultural Productivity of Important Farmland to the Extent Feasible.** It is not known at this time whether lands in the levee setback area would be retained in agricultural production, converted to habitat, or a mixture of both land uses. If lands classified as Important Farmland in the levee setback area are to be retained in agricultural production, the following measures would apply to these lands. To support the continued productive use of Important Farmland	SU

Table 1-3b
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
2 to nonagricultural use. The levee setback footprint and levee easements in Segment 2 would permanently convert approximately 210 acres of Prime Farmland, 35 acres of Farmland of Statewide Importance, and 2 acres of Unique Farmland to nonagricultural uses, and would potentially convert several hundred additional acres of Important Farmland for the proposed detention basin. The ASB levee setback could potentially result in the conversion of up to approximately 1,025 acres of Prime Farmland, 10 acres of Farmland of Statewide Importance, and 10 acres of Unique Farmland to nonagricultural uses. Implementation of the levee setback also may indirectly lead to the conversion of additional Important Farmland to nonagricultural uses because some properties would be divided by the setback levee, which could make continued farming of some crops, or on some parcels, impractical. This impact would be **significant**.		in the levee setback area in project Segment 2, TRLIA shall ensure that the following measures are implemented, to the extent feasible and practicable, in the design and implementation of the levee setback: (a) When selecting sites for borrow excavation, minimize the fragmentation of lands that are to remain in agricultural use. Where practical, retain contiguous parcels of agricultural land of sufficient size to support their efficient use for continued agricultural production. (b) Where the setback levee would transect agricultural properties and the continuation of agricultural use on the portions within the levee setback area would occur, ensure convenience of access to the levee setback properties sufficient to support ongoing agricultural operations. (c) Make the most productive salvaged topsoil from the levee footprint available to landowners with less productive agricultural lands in the vicinity of, but outside the levee setback area that could benefit from the introduction of good-quality soil. By agreement between TRLIA or landowners of affected properties and the recipient(s) of the topsoil, the recipient(s) would be required to work the topsoil into the agricultural lands where it is delivered. (d) Ensure that utilities currently in the levee setback area that are needed for ongoing agricultural uses, including wells, pipelines, and power lines, are appropriately relocated, replaced, or retrofitted to withstand flooding. Ensure that these systems and drainage systems are functioning as necessary after the project is in place so that agricultural uses are not unduly disrupted. In addition, TRLIA shall ensure that the following measures are implemented, to the extent feasible and practical, inside and/or	

Table 1-3b
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		outside the levee setback area: (a) Minimize the disturbance of Important Farmland and continuing agricultural operations during construction by locating construction laydown and staging areas on sites that are fallow, that are already developed or disturbed, or that are to be discontinued for use as agricultural land, and by using existing roads to access construction areas to the extent possible. (b) When selecting the site and configuration of the detention basin, minimize the fragmentation of agricultural lands and retain contiguous parcels of agricultural land of sufficient size to support their efficient use for continued agricultural production.	
ASB-5.1-c: Displacement of Existing Housing in the Levee Setback Area. Implementation of the ASB levee setback would result in the removal of five to 10 residences from the levee setback area. There are sufficient available residences in the area to accommodate these households; therefore, project implementation would not necessitate the construction of replacement housing elsewhere. Although CEQA does not require that economic and social effects be evaluated or considered significant impacts, it is acknowledged that displacement of five to 10 residences would have both economic and social effects on the occupants of these residences (finding replacement housing, moving to a new residence). However, appropriate compensation would be negotiated with landowners displaced by the project. In addition, eligible homeowners, renters/tenants, businesses, and farm operations would receive relocation assistance consistent with	LTS	No mitigation is required.	LTS

Table 1-3b
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
the Federal Uniform Relocation Act and the California Relocation Assistance Law. This impact would be **less than significant**.			
5.2 Geology, Soils, and Mineral Resources			
ASB-5.2-a: Risk of Geologic Hazards to the Levees. Characteristics of the soils along the proposed ASB setback levee alignment could lead to structural deficiencies or levee failure if not addressed in construction design. Although no active faults are in the vicinity of the existing levees or the setback levee alignment, some ground shaking is possible from distant sites. Effects on the stability of the proposed ASB setback levee would be no greater than effects on the existing levee. Construction according to design recommendations by the geotechnical engineers, independent reviews of the project design and construction by a Board of Senior Consultants (BOSC), and engineering review and approval by the Corps and The Reclamation Board would ensure the incorporation of appropriate features to address any potential structural instability of the levee. The setback levee would be engineered and constructed to modern standards with appropriate seepage control features and, therefore, would be more stable than the existing levee and unlikely to fail. This would be a **beneficial** effect.	B	No mitigation is required.	B
ASB-5.2-b: Soil Erosion Hazards Associated with Construction of the ASB Setback Levee. Although construction activities associated with levee repair and strengthening and installation of the ASB setback levee would disturb earth, thereby	LTS	No mitigation is required.	LTS

Table 1-3b
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
potentially accelerating erosion, construction disturbance would be temporary and soils in disturbed areas would be vegetated or otherwise stabilized after construction is complete. In addition, the levee setback area is nearly level and is well drained, and the risk of erosion and associated hazards is slight. Levee repair and strengthening activities and construction of the ASB setback levee would not expose persons or property to erosion hazards. This impact would be **less than significant**.			
ASB-5.2-c: Soil Erosion Hazards Associated with Flood Operations with the ASB Setback Levee. Floodwaters passing through the levee setback area could erode soil that is not currently subjected to flood flows on a frequent basis. However, levee construction would increase the width and decrease the depth and velocity of flood flows in the levee setback area, minimizing erosive forces. In addition, vegetative cover in the levee setback area (agriculture or habitat) would reduce the potential for erosion. This impact would be **less than significant.**	LTS	No mitigation is required.	LTS
5.3 Water Resources and River Geomorphology			
ASB-5.3-a: Temporary Effects on Water Quality Associated with Levee Repair and Strengthening Activities and Setback Levee Construction. Ground-disturbing activities associated with repairs and strengthening of the existing levees and construction of the ASB setback levee could cause soil erosion and sedimentation of local drainages and the Feather and Yuba River channels. Construction activities could also discharge waste	PS	**(1): Prepare a SWPPP, File an NOI, and Comply with the NPDES Stormwater Permit for Project Construction Activities.** This measure is identical to Mitigation Measure LS-5.3-a(1) above. **(2): Obtain a Use Permit from Yuba County and Comply with Permit Conditions for Erosion Control.** This measure is identical to Mitigation Measure LS-5.3-a(2) above.	LTS

Table 1-3b
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
petroleum products or other construction-related substances that could enter these waterways in runoff. Because the release of soil or other materials into these waterways could adversely affect river water quality, this impact would be **potentially significant.**			
ASB-5.3-b: Disruption of Local Drainage Systems by the Levee Setback. The ASB setback levee would cross existing drainage infrastructure and sever parts of the drainage system for the local area. Drainage patterns within the levee setback area could be changed by project implementation as well. Because interruption of drainage patterns could cause or exacerbate local flooding, this impact would be **significant.**	S	**Coordinate with RD 784 to Modify Drainage Facilities that Would Be Affected by the Levee Setback and Ensure Appropriate Functioning of the Local Drainage System.** TRLIA or its primary construction contractor shall coordinate with RD 784 to evaluate local drainage needs before and after construction of the setback levee and shall prepare and implement a plan for modification of the portion of the drainage system that would be affected by the levee setback. A drainage study shall be prepared that evaluates the effects on local drainage that would result from the levee setback and any proposed changes in land uses in the levee setback area. The study shall consider the design flows of the existing facilities that cross the proposed setback levee footprint (e.g., Lateral 7/8 and the Plumas Lake Canal). It shall develop appropriate plans for relocation or other modification of these facilities and construction of new facilities, as needed, to ensure equivalent functioning of the system during and after construction of the setback levee. Facility modification will include relocating Pump Station No. 3, and may include removing, filling, and/or rerouting drainage canals and culverts; regrading drainage alignments to redirect drainage; constructing new ditches and canals; and installing new culverts. The plan shall also consider the continuing and proposed uses of the levee setback area and shall incorporate appropriate drainage requirements for those uses to prevent any unintended flooding from stormwater runoff. The plan shall integrate environmental	LTS

Table 1-3b
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		mitigation requirements and drainage of restored borrow sites to the extent feasible and practical. The final plan shall be approved by RD 784. TRLIA and its construction contractor(s) shall ensure that the necessary modifications are implemented without interruption of the adequate functioning of the drainage system. TRLIA shall also ensure that any necessary environmental review requirements have been met before the drainage modifications are implemented.	
ASB-5.3-c: Changes in Local Flood Hydrology Resulting from the Levee Setback. Setting back the left bank Feather River levee along the ASB setback levee alignment would decrease flood stages on the river. The levee setback would also provide a well-designed, well-constructed levee that would be more reliable and less subject to seepage than the existing levee. These changes would improve local flood protection. This effect would be **beneficial.**	B	No mitigation is required.	B
ASB-5.3-d: Changes in Flood Hydrology Downstream of the Setback Levee. The ASB levee setback would lower water levels upstream of the levee setback area, which could increase flows downstream of project Segment 2. This condition could lead to increased flooding downstream of Segment 2 if flood events should occur. However, the passage of floodwaters downstream to the Feather River would increase floodwater elevation within adequately sized levees, and the increased potential for levee failure and flooding downstream would be very slight. In addition, the implementation of Forecast-Coordinated Operations of Lake Oroville and New Bullards Bar Reservoir	LTS	No mitigation is required.	LTS

Table 1-3b
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
would reduce peak flows in the Feather-Yuba River system, and hence downstream of the levee setback area. Therefore, this impact would be **less than significant.**			
ASB-5.3-e: Change in Water Demand and Available Water Supply Resulting from the ASB Levee Setback. Implementation of the ASB levee setback would remove approximately 240–1,300 acres of land from irrigated agricultural use along the proposed setback levee footprint and in the setback area. Alternative uses (e.g., levee, habitat restoration) are not expected to increase demand for water supply but, rather, are expected to decrease water use. This would be a **beneficial** effect.	B	No mitigation is required.	B
ASB-5.3-f: Changes in Groundwater Levels Resulting from Installation of Slurry Cutoff Walls and the Levee Setback. Slurry cutoff walls that would be installed to control seepage in the existing Feather River and Yuba River levees in project Segments 1 and 3 and in the ASB setback levee in Segment 2 could restrict groundwater flow and affect groundwater levels. Potential consequences are localized changes in well water levels and/or high groundwater levels east of the setback levee and east and south of the locations where slurry cutoff walls are installed in Segments 1 and 3. Such changes are not expected to substantially affect water supply or adversely affect land uses. This impact would be **less than significant.**	LTS	No mitigation is required.	LTS

Table 1-3b
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
ASB-5.3-g: Long-Term Effects on Water Quality Resulting from the Levee Setback. Potentially hazardous materials related to agricultural activities could be transported downstream when the levee setback area becomes inundated during flood events. These materials could contaminate floodwater and adversely affect river water quality. Because of the potential for adverse effects on water quality in the Feather River, this impact would be **potentially significant.**	PS	**(1): Conduct a Phase I Environmental Site Assessment for the Levee Setback Area and Implement Recommendations.** Before the start of any ground-disturbing construction activity, TRLIA or its primary construction contractor shall have a qualified hazardous waste specialist perform a Phase I Environmental Site Assessment of the levee setback area to identify potential sources of surface and buried contaminants, and provide a report of assessment findings. The assessment shall include the following: ▪ review of available information on property history, including, as appropriate, historical and current topographic maps, aerial photographs, property title and permit information, interviews of environmental regulatory agency and Yuba County personnel, and interviews of current occupants and landowners regarding the current and past uses of the land; ▪ review of federal, state, and county governmental records and databases to determine whether any sites in the area are listed as hazardous waste sites; and ▪ reconnaissance-level surveys to observe visual evidence of hazardous materials use. A written report on the findings of the assessment, including recommendations for the disposition of any identified hazardous waste sites or potential hazardous waste sites, shall be provided to TRLIA. TRLIA or its construction contractor(s) shall implement recommendations made in the Phase I report. If hazardous materials or wastes are identified, recommendations could include, but would not be limited to, a Phase II assessment or cleanup of known identified hazardous waste sites. Presence of hazardous wastes would be determined using waste classification protocols described in CCR Title 22.	LTS

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Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		(2): Evaluate Levee Borrow Material for Potential Contaminants in Coordination with the RWQCB. Before the start of construction, TRLIA or its primary construction contractor shall have a qualified hazardous materials specialist collect and evaluate representative soil samples from the existing levee sections that would be used as sources of borrow, and from potential borrow sites. The soil samples shall be evaluated for contaminant residues (e.g., trace metals, organochlorine pesticides, polychlorinated biphenyls) that may be encountered in excavation and grading activities. This evaluation shall be conducted to address any requirements of the Central Valley RWQCB as part of the RWQCB's permitting and approval process for the project (e.g., Section 401 certification). Wastes that are encountered at hazardous levels shall be treated in accordance with CCR Title 22 procedures for hazardous materials reporting and disposal. Where the evaluation of soil samples detects the presence of wastes that are not present at hazardous levels, the results of the evaluation shall be reported to the RWQCB for classification in the RWQCB's designated waste classification program, and the RWQCB will determine the acceptability of the material for levee construction based on the potential of the waste to impair water quality and public health. Borrow material used for construction of the waterside levee face or other features with soil exposure to the aquatic environment (e.g., new drainage channels) that is deemed unacceptable by the RWQCB shall be properly disposed of in a landfill or made available for other approved uses. **(3): Remove Nonhazardous Waste and Debris from the Levee Setback Area.** Before the beginning of the first season of potential flood operations with the setback levee in place, TRLIA or its primary construction contractor shall ensure the removal from the levee setback area of all large slash and wood piles, nonhazardous waste dumps, and other nonhazardous debris that	

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Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		could adversely affect water quality or create a hazard if carried downriver in flood flows. All removed materials shall be properly disposed of in approved off-site landfills.	
ASB-5.3-h: Changes in Floodplain Sediment Deposition Associated with the Levee Setback. Inundation of the ASB levee setback area would result in the transport and deposition of sediments in the setback area that may contain elevated concentrations of trace metals and/or organic constituents. Because it is unlikely that the sediment constituent concentrations resulting from inundation would be any higher than existing concentrations in the levee setback area, this impact would be **less than significant.**	LTS	No mitigation is required.	LTS
ASB-5.3-i: Changes in Geomorphic Processes Along the River Channels Resulting from the Levee Setback. Increasing the conveyance area of the Feather River floodway along the ASB setback levee alignment would alter water velocities and depths in the existing river channel and floodway in this area and upstream during flood events large enough to inundate the levee setback area (greater than an approximately a 3-year flow). These changes in velocities and depths could lead to decreased shear stresses from Star Bend to just below Shanghai Bend (project Segment 2) and slightly increased shear stresses at Shanghai Bend (Segment 3) and some distance upstream on both the Feather River and the Yuba River. Shear stresses would not change downstream of the levee setback area. Portions of the riverbanks and channel bed along the Feather and Yuba Rivers where shear	LTS	No mitigation is required.	LTS

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Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
stresses increase could experience minor increases in erosive forces. However, any increases would not be sufficient to result in a substantial increase in the mobilization and/or deposition of sediments. This impact would be **less than significant.**			
ASB-5.3-j: Changes in Geomorphic Processes Along the Project Levees Resulting from the ASB Levee Setback. Increasing the conveyance area of the Feather River floodway along the ASB setback levee alignment would alter water velocities and depths in the existing floodway in this area and upstream during flood events large enough to inundate the levee setback area (greater than an approximately a 3-year flow). These changes in velocities and depths would lead to decreased shear stresses along the right and left bank Feather River levees from Star Bend to just below Shanghai Bend (project Segment 2) and increased shear stresses along the levees at Shanghai Bend (Segment 3) and some distance upstream on both the Feather River and the Yuba River. Shear stresses along the levees would not change downstream of the levee setback area. Portions of the levee area along the Feather and Yuba Rivers where shear stresses increase could experience minor increases in erosive forces. Any increases in shear stresses would not be sufficient to result in a substantial increase in the mobilization and/or deposition of sediments or increase exposure of persons or private property to flood hazards (i.e., through damage to the levees). This impact would be **less than significant.**	LTS	No mitigation is required.	LTS

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THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
5.4 Fisheries			
ASB-5.4-a: Loss of Fish Habitat during Levee Repair and Strengthening Activities and Setback Levee Construction. Construction-related increases in sediments, turbidity, and contaminants could adversely affect fish habitats immediately adjacent to and downstream of project construction activities, possibly resulting in adverse effects on fish species listed or proposed for listing as threatened or endangered under ESA. This impact would be **potentially significant**.	PS	**(1): Prepare a SWPPP, File an NOI, and Comply with the NPDES Stormwater Permit for Project Construction Activities.** This measure is identical to Mitigation Measure LS-5.3-a(1) in Section 5.3, "Water Resources and River Geomorphology." **(2): Obtain a Use Permit from Yuba County and Comply with Permit Conditions for Erosion Control.** This measure is identical to Mitigation Measure LS-5.3-a(2) in Section 5.3, "Water Resources and River Geomorphology." **(3): Obtain and Comply with Terms and Conditions of a Streambed Alteration Agreement for Construction Activities Associated with the Setback Levee.** Three Rivers Levee Improvement Authority (TRLIA) or its representative shall consult with DFG regarding potential disturbance to fish habitat as part of the process for obtaining a streambed alteration agreement, pursuant to Section 1602 of the California Fish and Game Code, for construction work associated with the setback levee. TRLIA shall comply with conditions set forth in the streambed alteration agreement to protect fish habitat.	LTS
ASB-5.4-b: Loss of Overhead Cover and Instream Woody Material Associated with Setback Levee Construction. In project Segment 2, vegetation may need to be removed to allow drainage from the levee setback area to the river channel, or it may be cleared at the waterside toe of the existing levee to accommodate levee removal. The loss in overhead cover for fish would be limited and temporary, however, and revegetation would occur over time. Therefore, this impact would be **less than significant**.	LTS	No mitigation is required.	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
ASB-5.4-c: Effects on Habitat from Contaminants in Borrow Material. If contaminants are present in soil in the levee setback area or in borrow material used for the setback levee, they could be released when the area is inundated during flood events, resulting in harm to sensitive fish and habitat. This impact would be **potentially significant**.	PS	**(1): Conduct a Phase I Environmental Site Assessment for the Levee Setback Area and Implement Recommendations.** This measure is identical to Mitigation Measure ASB-5.3-g(1) in Section 5.3, "Water Resources and River Geomorphology." **(2): Evaluate Levee Borrow Material for Potential Contaminants in Coordination with the RWQCB.** This measure is identical to Mitigation Measure ASB-5.3-g(2) in Section 5.3, "Water Resources and River Geomorphology." **(3): Remove Nonhazardous Waste and Debris from the Levee Setback Area.** This measure is identical to Mitigation Measure ASB-5.3-g(3) in Section 5.3, "Water Resources and River Geomorphology."	LTS
ASB-5.4-d: Fish Stranding Following Flooding of the Levee Setback Area. Following construction of the setback levee, the levee setback area may contain depressions where water could pond following inundation and fish could become trapped as floodwaters recede to the main river channel. Stranded fish, particularly juvenile chinook salmon and steelhead, would be exposed to predators and increasing water temperatures; with no means to return to the river, they would inevitably die. This impact would be **significant.**	S	**Develop and Implement a Drainage and Grading Plan that Minimizes Loss or Incidental Loss of Fish from Stranding.** TRLIA and its primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize the potential for fish stranding in the levee setback area: (a) <u>Plan and implement drainage improvements</u>. TRLIA or its designated construction contractors, through a combination of grading and drainage improvements, shall minimize the potential for floodwater to pond in the levee setback area in such a way that substantial numbers of fish become stranded and consequently become exposed to hostile environments (warm water temperatures and increased predation). As part of the development of the final design for the levee setback area, TRLIA or its representatives shall determine the specific topographic and hydrologic characteristics of the levee setback area and shall define the anticipated flooding regime (depth, duration, and extent of flooding), drainage patterns, and potential for fish stranding risks there. The	LTS

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THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		final project design shall include recontouring as necessary to ensure complete drainage and provide fish passage back to the main river channel as floodflows recede from the levee setback area. Features with substantial stranding risk shall be identified for filling and/or grading. Complete drainage is important to reduce the risk of stranding; however, maintaining some seasonal aquatic habitat in the levee setback area and/or hydrologic connectivity to the Feather River may also be important features if enhancement of fish habitat and production is selected as a management activity in the levee setback area. Before the design of the setback levee and levee setback area is finalized, TRLIA or its representatives shall obtain the approval of DFG and NMFS indicating that the planned drainage and grading features are sufficient to address concerns about fish stranding potential, similar to the process used for the Feather-Bear Rivers Levee Setback Project currently under construction downstream. The features of the setback levee and levee setback area shall be constructed in accordance with the approved final design. (b) <u>Monitor the success of the drainage features and adjust if necessary</u>. A long-term mitigation monitoring plan shall be developed by a qualified biologist on behalf of TRLIA and shall be approved by DFG and NMFS before implementation of the levee setback. This monitoring plan shall evaluate the effectiveness of the grading and drainage features in the levee setback area in reducing the risk of fish stranding and the stability of the drainage features and shall determine the need for maintenance or modification. The monitoring plan shall include provisions for remediation should the design of the levee setback area prove to be unsuccessful in preventing fish stranding. These measures	

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THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		shall include, as appropriate, such activities as regrading or filling depressions in the levee setback area. The recommended monitoring scheme shall include annual monitoring for a period of 5 years following the removal of any part of the existing levee. Additional monitoring may be required for areas where remediation is necessary. Monitoring is recommended to include the following actions: ▪ Visual assessment of the levee setback area by a qualified biologist before the flood season (i.e., by October 31). This assessment should note any substantial changes in the overall structure since implementation of the final design for the area, including reestablishment of vegetation and the presence of "holes" or pits. ▪ A visual survey by a qualified biologist at the end of each event that floods the levee setback area (i.e., after the recession of waters that inundate the floodplain). This survey should identify whether there is any ponding that would result in fish stranding, or whether channels have formed that flow through completely to the low-flow channel of the Feather River. Following each flood season (i.e., after April 16), a letter report shall be submitted to NMFS and DFG summarizing the overall condition of the floodplain area and any changes that have occurred from the previous year(s). If any remediation measures are required, they shall be outlined in the letter report, along with a schedule specifying when the remediation activities will occur. Appropriate remediation measures shall be implemented as soon as is practicable to minimize the potential for fish stranding while maintaining the desired habitat values (if habitat enhancement is included	

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THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		in the floodplain area) and hydraulic characteristics of the area. The performance of the mitigation measure shall be considered successful if there is no isolated standing water and/or barriers to fish passage capable of resulting in substantial fish stranding following a flood event that inundates the levee setback area.	
ASB-5.4-e: Increased Aquatic and Riparian Habitat in the Levee Setback Area. Setting back the Feather River levee in project Segment 2 could allow the expansion of the available aquatic and riparian habitat corridor and could improve the success of fish species that use the area. This effect would be **potentially beneficial.**	PB	No mitigation is required.	PB
5.5 Terrestrial Biological Resources			
ASB-5.5-a: Effects on General Biological Resources. Levee repair and strengthening activities in project Segments 1 and 3 would temporarily disturb ruderal habitat on the levee slopes and adjacent riparian and agricultural land. Construction of the ASB setback levee in Segment 2 would result in loss of primarily agricultural land. Agricultural lands could also be lost at potential borrow and detention basin sites. These temporary impacts and potential permanent land use changes would affect habitat for many common plant and wildlife species. Although local populations would be reduced by these activities, these species are locally and regionally abundant. This impact would be **less than significant.**	LTS	No mitigation is required.	LTS

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Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
ASB-5.5-b: Effects on Sensitive Habitats. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities would result in disturbance and/or loss of sensitive habitats, including jurisdictional wetlands, other waters of the United States, and riparian habitats. This impact would be **significant.**	S	**Avoid Disturbance of Sensitive Habitat to the Extent Feasible and Comply with Corps and DFG Processes to Mitigate Unavoidable Effects.** This measure is identical to Mitigation Measure LS-5.5-b above.	LTS
ASB-5.5-c: Loss of Special-Status Plants. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities could result in the loss of rose mallow and Wright's trichocoronis if they are present in areas that would be disturbed during these activities. This impact would be **potentially significant.**	PS	**Conduct Detailed Special-Status Plant Surveys and Establish Construction Buffers as Necessary to Minimize Effects on Special-Status Plants.** This measure is identical to Mitigation Measure LS-5.5-c above.	LTS
ASB-5.5-d: Effects on Valley Elderberry Longhorn Beetle. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities could result in loss of blue elderberry shrubs that are occupied by valley elderberry longhorn beetles. This impact would be **potentially significant**.	PS	**Conduct Protocol-Level Surveys, Establish Buffers, and Implement a Mitigation Plan as Necessary to Minimize Effects on Valley Elderberry Longhorn Beetle.** This measure is identical to Mitigation Measure LS-5.5-d above.	LTS
ASB-5.5-e: Effects on Northwestern Pond Turtle. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities would result in disturbance and/or loss of suitable aquatic habitat for northwestern pond turtle and could result in direct loss of individuals. This impact would be **potentially significant.**	PS	**Conduct Surveys as Part of Dewatering Activities and Minimize Effects on Northwestern Pond Turtle.** This measure is identical to Mitigation Measure LS-5.5-e above.	LTS
ASB-5.5-f: Effects on Giant Garter Snake. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities would	S	**Implement Applicable Take Minimization Measures and a Mitigation Plan as Necessary for Giant Garter Snake.** This measure is identical to Mitigation Measure LS-5.5-f above.	LTS

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Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
result in disturbance and/or loss of suitable aquatic and upland habitat for giant garter snake. Construction activities also have potential to result in direct take of individuals. This impact would be **significant**.			
ASB-5.5-g: Effects on Swainson's Hawk and Other Nesting Raptors. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities would result in disturbance and/or loss of suitable nesting and/or foraging habitat for Swainson's hawk and other raptors and could result in loss of active nests. This impact would be **potentially significant**.	PS	**(1): Conduct Preconstruction Surveys and Protect Active Nests to Minimize Effects on Swainson's Hawk.** This measure is identical to Mitigation Measure LS-5.5-g(1) above. **(2): Conduct Preconstruction Surveys, Protect Occupied Burrows, and Relocate Individuals as Necessary to Minimize Effects on Burrowing Owl.** This measure is identical to Mitigation Measure LS-5.5-g(2) above. **(3): Conduct Preconstruction Surveys and Protect Active Nests to Minimize Effects on Other Nesting Raptors.** This measure is identical to Mitigation Measure LS-5.5-g(3) above.	LTS
ASB-5.5-h: Effects on Other Special-status Birds. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities would result in disturbance and/or loss of potential nesting and/or foraging habitat for several special-status bird species. Special-status species are unlikely to nest in areas that would be affected, and large areas of nesting and foraging habitat of equal or higher quality are available elsewhere in the project area. Therefore, this impact would be **less than significant**.	LTS	No mitigation is required.	LTS
ASB-5.5-i: Effects on Pacific Western Big-Eared Bat. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities would not affect suitability of foraging habitat or result in loss of important roost or	LTS	No mitigation is required.	LTS

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Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
maternity sites. This impact would be **less than significant**.			
ASB-5.5-j: Effects on Wildlife Corridors. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities would result in limited temporary disturbance of the Feather River and Yuba River habitat corridors and minor corridors associated with canals and ditches in the levee setback area. However, such disturbance is not expected to affect overall use of these corridors by wildlife. This impact would be **less than significant.**	LTS	No mitigation is required.	LTS
5.6 Recreation			
ASB-5.6-a: Temporary Changes in Recreational Opportunities during Levee Repairs and Setback Levee Construction. Construction noise could disrupt recreational uses in the project area, particularly in areas adjacent to the existing levee. Some wildlife species present in or inhabiting natural areas are likely to be disturbed by noise and by the presence of project construction crews and equipment. Portions of the Feather River State Wildlife Area in project Segment 1 may need to be closed temporarily to hunting and other recreational activities for safety reasons while adjacent sections of the existing Feather River levee are being repaired. There would be no public access to the Star Bend Boat Launch and Fishing Access for several days while levee repairs were conducted in this area. Although these temporary disturbances may affect the recreation experience for bird-watchers, hunters, boaters, and other recreational	LTS	No mitigation is required.	LTS

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Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
users, displaced recreational uses could be accommodated by other nearby facilities (Whitmore, pers. comm., 2006). For this reason, and because of the temporary nature of this effect, this impact would be **less than significant**.			
ASB-5.6-b: Long-Term Changes in Recreational Opportunities Resulting from Levee Repairs and Setback Levee Construction. Implementing levee repairs along project Segments 1 and 3 would have little or no effect on recreational uses in the Lake of the Woods Management Unit or along the Feather River channel in these project segments. Implementing the levee setback in Segment 2 would slightly modify Feather River flood stage elevations in the project vicinity during high flows, possibly affecting recreational uses, and could affect survival rates of wildlife following high-flow periods, which could temporarily affect associated wildlife-related recreation. The changes in Feather River flood stage elevations that would result from expansion of the Feather River floodway in Segment 2, however, would be infrequent, of short duration, and during periods when river stage is already high; therefore, no new effects on recreational uses are expected. Sections of the existing Feather River levee would be left in place as part of the proposed project, which would minimize losses of wildlife that could adversely affect long-term recreational activities. This impact would be **less than significant**.	LTS	No mitigation is required.	LTS

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Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
5.7 Aesthetic Resources			
ASB-5.7-a: Temporary Changes in Visual Resources Associated with Levee Repairs and Setback Levee Construction. Levee repair and strengthening activities and construction of the ASB setback levee would temporarily reduce the aesthetic qualities of views by introducing earthmoving equipment and other construction equipment, materials, and work crews into the viewshed of recreationists, motorists on SR 70 and Feather River Boulevard, workers in nearby farming areas, and residents of the area. However, the construction areas would typically be distant from and/or screened from most viewers. Where residents would be near the construction area (e.g., in project Segment 3), construction would pass by these areas relatively quickly and changes in aesthetic conditions would be short term and temporary. For these reasons, this impact would be **less than significant.**	LTS	No mitigation is required.	LTS
ASB-5.7-b: Changes in Light and Glare. There would be no substantial sources of light or glare associated with levee repairs or with the long-term presence of the ASB setback levee and detention basin. However, equipment staging areas may be temporarily lit at night during construction, and portions of the construction areas may also need to be lit at night. Although such nighttime lighting may be visible from various residences, particularly in project Segment 3, in most locations views of the construction areas would be largely shielded by orchards, other vegetation, and structures. Where lit	LTS	No mitigation is required.	LTS

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Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
construction areas are visible, lighting would be short term and temporary. For these reasons, this impact would be **less than significant.**			
ASB-5.7-c: Long-Term Modifications of Views from Levee Repairs and Installation of the Setback Levee. Levee repair and strengthening activities would not dramatically change the appearance of project Segments 1 and 3. Construction of the ASB setback levee would change the appearance of Segment 2. However, all three project segments are of low to moderate aesthetic value, there would be no substantial adverse effect on any scenic vista, and these changes would not substantially alter the general character of views of the area. This impact would be **less than significant.**	LTS	No mitigation is required.	LTS
5.8 Cultural Resources			
ASB-5.8-a: Damage to or Destruction of Prehistoric Archaeological Site CA-Yub-5. Prehistoric archaeological site CA-Yub-5, which may be eligible for listing in the CRHR and NRHP, could be damaged or destroyed by construction activities or by inundation or scouring when flood flows pass through the levee setback area. Because this site may be a significant cultural resource, this impact would be **potentially significant**.	PS	**Evaluate the Significance of Archaeological Site CA-Yub-5 and, If Determined to Be Significant, Protect the Site from Damage and/or Conduct Data Recovery Excavation.** TRLIA shall have a qualified archaeologist evaluate the extent and significance/eligibility for NRHP and CRHR listing of site CA-Yub-5 through test excavations and analysis of the site's stratigraphy and artifactual constituents. If the site is determined to lack eligibility for NRHP and CRHR listing and is not found to be a significant cultural resource under CEQA, the archaeologist shall report these findings in a site investigation report and ensure that all remains discovered at the site are recorded and reported in accordance with professional practices, and no further protective measures will be necessary. If intact stratigraphy, features, additional human remains, or	LTS

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Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		artifacts indicate that the site may be eligible for NRHP or CRHR listing and therefore a significant historical resource according to CEQA criteria, TRLIA shall implement one or both of the measures described below in consultation with a professional archaeologist familiar with CA-Yub-5 to ensure that no significant cultural resources are damaged there. Two basic approaches are described: protecting the site from damage and conducting data recovery at the site. All site testing shall be conducted in consultation with appropriate Native American representatives designated by the NAHC, and a Native American monitor shall be present for monitoring during any excavation. <u>Option 1: Protect CA-Yub-5 from Damage</u> CA-Yub-5 can be protected from direct construction damage if the setback levee is realigned such that the site is beyond the footprint of ground-disturbing levee construction activity. This would require moving the levee alignment to the east of the site boundaries, thus placing the entire site within the levee setback area. It would be highly impractical to move the alignment to the west to place the site outside the project site and thereby avoid damaging it. Based on characteristics observed during archaeological field surveys, it is estimated that the setback levee would need to be constructed approximately 500 feet west of the proposed alignment in the area of CA-Yub-5 to ensure complete avoidance of the site. Geotechnical considerations render such a western shift of the alignment unrealistic because it would place this portion of the levee on a far less stable foundation (old riverbed) than under the proposed alignment. Once situated within the levee setback area (i.e., the expanded floodway), the site should be protected from future erosion and scour from surface flows, as well as human disturbance, through the use of engineered features and/or strategic plantings. In addition, sufficient site data should be collected and analyzed to	

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Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		establish the important archaeological characteristics of the site. One of the most potentially significant characteristics of CA-Yub-5 is the presence of at least 12 inches of midden soil, which can be a source of information regarding the age of the site (through radiocarbon dating) and prehistoric diets and paleoenvironmental reconstruction (through microconstituent and chemical analyses). Because floodwaters passing through the levee setback area could alter the soil properties that permit accurate radiometric dating or hasten the degradation of macrobotanical and microbotanical remains, scientific data would need to be collected, recorded, and reported before the site is subjected to inundation. It has been previously suggested that the site may be protected from future damage by use of a protective covering that is impermeable to water, which is also termed “capping.” However, “capping” CA-Yub-5 to protect it from water damage would be very impractical, if not impossible. It would be necessary to have a clear definition of the horizontal and vertical boundaries of CA-Yub-5, and the site would need to be completely encased in the covering so that it would be protected from saturation from all sides, including rising groundwater from below. <u>Option 2: Conduct Data Recovery at CA-Yub-5</u> Data recovery through destructive excavation is considered an acceptable mitigation measure for damage to archaeological sites if other mitigation measures are less feasible or wholly infeasible. The purpose of data recovery is to obtain scientifically consequential information from an archaeological site that would be partially or completely destroyed. Although much of the work required for data recovery is similar to that conducted during test excavations, the requirements for data recovery call for more extensive manual and perhaps mechanical excavation. Recovered materials shall be subjected to laboratory analysis (e.g., stone tool	

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		analysis, faunal analysis, radiocarbon assays, and obsidian hydration studies), and a report and interpretive material shall be prepared that documents the site investigation and findings.	
ASB-5.8-b: Damage to or Destruction of Resources Associated with Prehistoric Archaeological Sites CA-Yub-13 and CA-Yub-14. This impact would be the same as Impact LS-5.8-a, described under Alternative 1 above. For the same reasons as described above, this impact would be **potentially significant**.	PS	**(1): Conduct Further Evaluation and Subsurface Testing to Determine Whether Proposed Levee Improvements Could Damage Significant Resources Associated with Prehistoric Archaeological Sites CA-Yub-13 and CA-Yub-14.** This measure is identical to Mitigation Measure LS-5.8-a(1) above. **(2): Monitor Ground-Disturbing Activities in the Vicinity of Prehistoric Archaeological Sites CA-Yub-13 and CA-Yub-14.** This measure is identical to Mitigation Measure LS-5.8-a(2) above.	LTS
ASB-5.8-c: Damage to or Destruction of Cultural Resources in Unsurveyed Areas. Portions of the project area could not be surveyed for cultural resources because of ground conditions and lack of site access, and potential borrow or staging areas also have not been surveyed. Significant cultural resources could be present in these areas, and could be damaged by project-related ground-disturbing activities. This impact would be **potentially significant**.	PS	**Survey Unexamined Areas before Project Ground-Disturbing Activities and Implement Further Mitigation As Necessary.** This measure is identical to Mitigation Measure LS-5.8-b above.	LTS
ASB-5.8-d: Damage to or Destruction of Undocumented Buried Archaeological Resources during Construction. This impact would be similar to Impact LS-5.8-c, described under Alternative 1 above. In addition, ground-disturbing activities associated with the proposed levee setback in project Segment 2, such as construction of the slurry cutoff wall and the setback levee foundation, have the potential to damage or destroy previously	PS	**Stop Work and Implement Measures to Protect Archaeological Resources If Discovered during Ground-Disturbing Activities.** This measure is identical to Mitigation Measure LS-5.8-c above.	LTS

Table 1-3b
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
unidentified archaeological resources in the setback levee construction area. For the same reasons as described for Alternative 1, this impact would be **potentially significant**.			
ASB-5.8-e: Damage to or Destruction of Undocumented Human Remains during Construction. This impact would be similar to Impact LS-5.8-d, described under Alternative 1 above. In addition, ground-disturbing activities associated with the proposed levee setback in project Segment 2, such as construction of the slurry cutoff wall and the setback levee foundation, have the potential to damage or destroy undocumented human remains in the setback levee construction area. For the same reasons as described for Alternative 1, this impact would be **potentially significant**.	PS	**If Human Remains are Discovered during Ground-Disturbing Activities, Stop Work and Comply with State Laws Pertaining to the Discovery of Human Remains.** This measure is identical to Mitigation Measure LS-5.8-d above.	LTS
5.9 Air Quality			
ASB-5.9-a: Temporary Emissions of ROG, NO_X, and PM_{10} during Construction. Maximum daily emissions of ROG, NO_X, and PM_{10} associated with levee repair and strengthening activities in project Segments 1 and 3 and construction of the Above Star Bend (ASB) setback levee in Segment 2 would exceed FRAQMD's recommended significance thresholds and contribute to existing nonattainment conditions for ozone and PM_{10} in the NSVAB. This impact would be **significant**.	S	**Implement FRAQMD Pollution-Control Measures to Minimize Temporary Emissions of ROG, NO_X, and PM_{10} during Construction.** This measure is identical to Mitigation Measure LS-5.9-a above.	SU
ASB-5.9-b: Long-Term Changes in Emissions of ROG, NO_X, and PM_{10} Associated with Levee Repairs and Strengthening and the Levee	PB	No mitigation is required.	PB

Table 1-3b
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Setback. The proposed levee repairs and strengthening in project Segments 1 and 3 and the ASB levee setback in Segment 2 would be expected to contribute only minimally, if at all, to long-term emissions of pollutants through vehicle trips related to occasional maintenance activities. The potential cessation of agricultural uses on some lands in the levee setback area could result in a decrease in long-term pollutant emissions in this area, particularly PM_{10} emissions associated with agricultural land disturbance and burning operations. Such a reduction would be a small **potentially beneficial** effect on air quality.			
ASB-5.9-c: Exposure of Sensitive Receptors to Toxic Air Emissions. Emissions of TACs associated with construction or operations under Alternative 2 would not result in exposure of receptors to concentrations of TACs in excess of applicable thresholds. This impact would be **less than significant.**	LTS	No mitigation is required.	LTS
5.10 Noise			
ASB-5.10-a: Temporary Increase in Noise Levels during Construction. Noise levels associated with construction activities could exceed the maximum permissible noise limits at residences. Construction equipment may operate between the hours of 10 p.m. and 7 a.m. and could operate within 500 feet of a residential zone during these hours. Therefore, construction activities occurring between 10 p.m. and 7 a.m. could result in annoyance and/or sleep disruption of certain receptors within the project area. In addition, construction operations may result	S	**Limit Generation of Noise by Equipment during Project Construction.** This measure is identical to Mitigation Measure LS-5.10-a above.	SU

Table 1-3b
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
in a noticeable temporary increase (3 dBA or more) in ambient noise levels at these residences. This impact would be **significant**.			
ASB-5.10-b: Exposure of Sensitive Receptors to Excessive Groundborne Vibration During Construction. This impact would be the same as Impact LS-5.10-b, described under Alternative 1 above. Construction processes under Alternative 2 would not occur any closer to sensitive land uses than discussed under Alternative 1, and no new construction equipment or processes that would generate additional groundborne vibration would be used. For the same reasons as described above, this impact would be **less than significant**.	LTS	No mitigation is required.	LTS
5.11 Transportation and Circulation			
ASB-5.11-a: Increase in Traffic on Local Roadways near the Existing Levee and Setback Levee Alignment during Construction. During the anticipated 20-month construction period, commute trips and haul truck trips associated with levee repair and strengthening activities and setback levee construction would increase traffic on Feather River Boulevard, SR 70, and local roadways that provide access to the project alignment (e.g., Anderson Avenue, Country Club Avenue, Riverside Drive). However, construction-related trips would not exceed the thresholds established by ITE for temporary traffic increases and would not represent a substantial increase in traffic levels on these roadways or other local roads. This impact would be	LTS	No mitigation is required.	LTS

Table 1-3b
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
less than significant.			
ASB-5.11-b: Increase in Traffic Hazards on Local Roadways near the Existing Levee and Setback Levee Alignment during Construction. Construction-related traffic could track mud and gravel onto local roadways, and haul truck traffic could interfere with the flow of traffic on these roads. These conditions could pose hazards for travelers on local roadways. This impact would be **potentially significant.**	PS	**Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways.** This measure is identical to Mitigation Measure LS-5.11-b above.	LTS
5.12 Public Services, Utilities, and Service Systems			
ASB-5.12-a: Damage of Public Utility Infrastructure and Disruption of Service in the Levee Repair and ASB Levee Setback Areas. Impacts related to utilities in project Segments 1 and 3 and the area considered for a detention basin/soil borrow site would be the same as those described above in Impact LS-5.12-a under Alternative 1. Most of the public utilities in the proposed ASB levee setback area in Segment 2 would no longer be needed and would be removed. However, a PG&E transmission line and two PG&E distribution lines cross this area and would remain in place under project implementation, and floodwaters could threaten the stability of the steel towers and wooden poles that support these lines. In addition, buried utilities could be present in locations that have not been identified in preliminary surveys and contact with service providers. Utilities infrastructure remaining in the levee setback area could be damaged by levee construction, by a proposed soil borrow area, or by floodwaters passing through the	PS	**Coordinate with Utility Providers to Remove, Reinforce, and Modify Public Utility Infrastructure in the ASB Levee Setback Area and Prevent Damage of Facilities.** TRLIA, the design engineers, or the primary construction contractor for the levee setback, as appropriate, shall implement the following measures before the beginning of construction to ensure that the levee setback does not adversely affect public utility infrastructure or result in interruption of utility service: (a) <u>Coordinate with PG&E to protect electrical lines that cross the levee setback area</u>. To maintain PG&E electrical service through the Bogue Loop 115-kV high-power transmission line and the two standard electrical lines that run along Ella Avenue and Country Club Avenue, TRLIA or its representative shall coordinate with PG&E to raise, relocate, or reinforce the steel towers and wood poles that stand in the proposed bypass area. (b) <u>Ensure that all utility lines in the setback area have been identified and removed or reinforced as necessary</u>. TRLIA or its representative shall ensure that any electrical, telephone, gas, and cable television lines within the levee setback area	LTS

Table 1-3b
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
setback area, possibly resulting in interruption of service. This impact would be **potentially significant.**		have been identified before the initiation of any ground-disturbing construction activity. Before the beginning of any construction-related ground disturbance, TRLIA or its representative shall coordinate with all potential service providers known to have, or potentially having, utility infrastructure in the levee setback area, including but not limited to PG&E, AT&T, Comcast, OPUD, and RD 784, to ensure that the utility lines are removed or reinforced as appropriate.	
ASB-5.12-b: Damage of Water Supply and Drainage Facilities and Interference with Service in the Levee Repair and ASB Levee Setback Areas. Impacts on water supply and drainage facilities in project Segments 1 and 3 and the area considered for a detention basin/soil borrow site would be the same as those described above in Impact LS-5.12-b under Alternative 1. Implementation of the levee setback would cut off local drainage systems and could damage privately owned water supply systems that serve agricultural uses. The preliminary design for the setback levee includes conceptual plans for abandoning, relocating, and modifying these systems. Three Rivers Levee Improvement Authority (TRLIA) and its design engineers would coordinate with RD 784 and local landowners to relocate pumps and replace wells and irrigation systems as necessary, as determined in final design. Effects of the levee setback on the drainage system are addressed in Section 5.3, “Water Resources and River Geomorphology.” The impact on water supply and drainage facilities would be **less than significant.**	LTS	No mitigation is required.	LTS

Table 1-3b
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
ASB-5.12-c: Potential for Conflicts with Emergency Response Vehicles during Construction. This impact would be similar to Impact LS-5.12-a described under Alternative 1 above. However, construction traffic on Feather River Boulevard would potentially be greater under Alternative 2 because of the greater number of truck haul trips associated with construction of the setback levee. For the same reasons as described above, this impact would be **potentially significant.**	PS	**Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways.** This measure is identical to Mitigation Measure LS-5.11-b, "Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways," in Section 5.11, "Transportation and Circulation."	LTS
5.13 Paleontological Resources			
ASB-5.13-a: Disturbance of Unknown Paleontological Resources during Earthmoving Activities. Portions of the project area and immediate vicinity are underlain by the Modesto and Riverbank Formations, which are paleontologically sensitive rock formations. Construction activities in the Modesto and Riverbank Formations associated with proposed levee strengthening (e.g., slurry cutoff walls, relief wells), construction of the ASB setback levee, use of the soil borrow area/detention basin location, and related activities (e.g., relocation of Pump Station No. 3) could adversely affect unknown subsurface paleontological resources. This impact would be **potentially significant.**	PS	**Conduct Training for Construction Personnel, Cease Work if Paleontological Resources are Encountered, and Implement an Appropriate Mitigation Strategy.** This measure is identical to Mitigation Measure LS-5.13-a.	LTS
Cumulative Impacts			
Alternative 2, The Levee Strengthening and ASB Setback Levee Alternative, would also contribute to significant cumulative impacts related to conversion of Important Farmland to nonagricultural uses; emissions of ROG, NO_X, and PM_{10} during construction; and potentially noise during construction. The mitigation described above would not reduce the project's contributions to these impacts to less-than-significant levels.			

B	=	Beneficial effect	LTS	=	Less than significant
PB	=	Potentially beneficial effect	PS	=	Potentially significant
NI	=	No impact	S	=	Significant

Table 1-3c
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 3)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
5.1 Land Use			
IS-5.1-a: Conflicts with Land Use Planning and Policies Resulting from Levee Repairs and the Levee Setback. Levee repair and strengthening of the existing levee in project Segments 1 and 3 could result in removal of small areas of agricultural land from production associated with the installation of seepage/stability berms and other structures. The setback levee footprint and levee easements in project Segment 2 would cover approximately 220–230 acres of agricultural land, and setting back the levee could indirectly result in the removal of more land from agricultural production by dividing land parcels and allowing periodic flooding of agricultural land. Construction of a detention basin would be required to prevent adverse flooding effects on area properties, and this would likely occur on several hundred acres of existing agricultural land. These uses would conflict with County land use policies regarding the preservation of agricultural land and would be inconsistent with the current land use and zoning designations for the area. Because of these inconsistencies, this impact would be **significant**.	S	**Resolve Inconsistencies between Proposed Uses of the Levee Setback Area and Yuba County Zoning.** This measure is identical to Mitigation Measure ASB-5.1-a above.	SU
IS-5.1-b: Conversion of Important Farmland to Nonagricultural Uses Resulting from Levee Repairs and the Levee Setback. Levee repair and strengthening activities in project Segments 1 and 3 could permanently remove up to approximately 10 acres of Prime Farmland from production. Relocation of Pump Station No. 3 could potentially	S	**Preserve the Agricultural Productivity of Important Farmland to the Extent Feasible.** This measure is identical to Mitigation Measure ASB-5.1-b above.	SU

Table 1-3c
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 3)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
convert up to 1 acre of Prime Farmland in Segment 2 to nonagricultural use. The levee setback footprint and levee easements in Segment 2 would permanently convert approximately 210 acres of Prime Farmland, 10 acres of Farmland of Statewide Importance, and 5 acres of Unique Farmland to nonagricultural uses, and would potentially convert several hundred additional acres of Important Farmland for the proposed detention basin. The intermediate levee setback area could potentially result in the conversion of approximately 700 acres of Prime Farmland, 10 acres of Farmland of Statewide Importance, and 10 acres of Unique Farmland to nonagricultural uses. Implementation of the levee setback also may indirectly lead to the conversion of additional Important Farmland to nonagricultural uses because some properties would be divided by the setback levee, which could make continued farming of some crops, or on some parcels, impractical. This impact would be **significant**.			
IS-5.1-c: Displacement of Existing Housing in the Levee Setback Area. This impact would be the same as Impact ASB-5.1-c, described under Alternative 2 above. Both Alternative 2 and Alternative 3 would result in the removal of five to 10 residences in the levee setback area. For the same reasons as described above, this impact would be **less than significant.**	LTS	No mitigation is required.	LTS
5.2 Geology, Soils, and Mineral Resources			
IS-5.2-a: Risk of Geologic Hazards to the Levees. This impact would be the same as Impact ASB-5.2-	LTS	No mitigation is required.	LTS

Table 1-3c
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 3)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
a, described under Alternative 2 above. For the same reasons as described above, this impact would be **less than significant**.			
IS-5.2-b: Soil Erosion Hazards Associated with Construction of the Setback Levee. This impact would be the same as Impact ASB-5.2-b, described under Alternative 2 above. For the same reasons as described above, this impact would be **less than significant**.	LTS	No mitigation is required.	LTS
IS-5.2-c: Soil Erosion Hazards Associated with Flood Operations with the Intermediate Setback Levee. This impact would be the same as Impact ASB-5.2-c, described under Alternative 2 above. For the same reasons as described above, this impact would be **less than significant**.	LTS	No mitigation is required.	LTS
5.3 Water Resources and River Geomorphology			
IS-5.3-a: Temporary Effects on Water Quality Associated with Levee Repair and Strengthening Activities and Setback Levee Construction. This impact would be the same as Impact ASB-5.3-a, described under Alternative 2 above. For the same reasons as described above, this impact would be **potentially significant.**	PS	**(1): Prepare a SWPPP, File an NOI, and Comply with the NPDES Stormwater Permit for Project Construction Activities.** This measure is identical to Mitigation Measure LS-5.3-a(1) above. **(2): Obtain a Use Permit from Yuba County and Comply with Permit Conditions for Erosion Control.** This measure is identical to Mitigation Measure LS-5.3-a(2) above.	LTS
IS-5.3-b: Disruption of Local Drainage Systems by the Levee Setback. The intermediate setback levee would cross existing drainage infrastructure and sever parts of the drainage system for the local area. Drainage patterns within the levee setback area could be changed by project implementation as well. Because interruption of drainage patterns could	S	**Coordinate with RD 784 to Modify Drainage Facilities that Would Be Affected by the Levee Setback and Ensure Appropriate Functioning of the Local Drainage System.** This measure is identical to Mitigation Measure ASB-5.3-b above.	LTS

Table 1-3c
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 3)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
cause or exacerbate local flooding, this impact would be **significant.**			
IS-5.3-c: Changes in Local Flood Hydrology Resulting from the Levee Setback. Setting back the left bank Feather River levee along the intermediate setback levee alignment would decrease flood stages on the river. The levee setback would also provide a well-designed, well-constructed levee that would be more reliable and less subject to seepage than the existing levee. These changes would improve local flood protection. This effect would be **beneficial.**	B	No mitigation is required.	B
IS-5.3-d: Changes in Flood Hydrology Downstream of the Setback Levee. The intermediate levee setback would lower water levels upstream of the levee setback area, which could increase flows downstream of project Segment 2. This condition could lead to increased flooding downstream of Segment 2 if flood events should occur. However, the passage of floodwaters downstream to the Feather River would result in a increase in floodwater elevation within adequately sized levees, and the increased potential for levee failure and flooding downstream would be very slight. In addition, implementation of the F-CO for Lake Oroville and New Bullards Bar Reservoir would reduce peak flows in the Feather-Yuba River system, and hence downstream of the levee setback area. Therefore, this impact would be **less than significant.**	LTS	No mitigation is required.	LTS
IS-5.3-e: Change in Water Demand and	B	No mitigation is required.	B

Table 1-3c
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 3)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Available Water Supply Resulting from the Intermediate Levee Setback. Implementation of the intermediate levee setback would remove approximately 220–950 acres of land from irrigated agricultural use along the proposed setback levee footprint and in the setback area. Alternative uses (e.g., levee, habitat restoration) are not expected to increase demand for water supply but, rather, are expected to decrease water use. This would be a **beneficial** effect.			
IS-5.3-f: Changes in Groundwater Levels Resulting from Installation of Slurry Cutoff Walls and the Levee Setback. This impact would be the same as Impact ASB-5.3-f, described under Alternative 2 above. For the same reasons as described above, this impact would be **less than significant.**	LTS	No mitigation is required.	LTS
IS-5.3-g: Long-Term Effects on Water Quality Resulting from the Levee Setback. Potentially hazardous materials related to agricultural activities could be transported downstream when the levee setback area becomes inundated during flood events. These materials could contaminate floodwater and adversely affect river water quality. Because of the potential for adverse effects on water quality in the Feather River, this impact would be **potentially significant.**	PS	**(1): Conduct a Phase I Environmental Site Assessment for the Levee Setback Area and Implement Recommendations.** This measure is identical to Mitigation Measure ASB-5.3-g(1) above. **(2): Evaluate Levee Borrow Material for Potential Contaminants in Coordination with the RWQCB.** This measure is identical to Mitigation Measure ASB-5.3-g(2) above. **(3): Remove Nonhazardous Waste and Debris from the Levee Setback Area.** This measure is identical to Mitigation Measure ASB-5.3-g(3) above.	LTS
IS-5.3-h: Changes in Floodplain Sediment deposition Associated with the Levee Setback. Inundation of the levee setback area would result in the transport and deposition of sediments in the	LTS	No mitigation is required.	LTS

Table 1-3c
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 3)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
setback area that may contain elevated concentrations of trace metals and/or organic constituents. Because it is unlikely that the sediment constituent concentrations resulting from inundation would be any higher than existing concentrations in the levee setback area, this impact would be **less than significant.**			
IS-5.3-i: Changes in Geomorphic Processes Along the River Channels Resulting from the Levee Setback. Increasing the conveyance area of the Feather River floodway along the intermediate setback levee alignment would alter water velocities and depths in the existing river channel and floodway in this area and upstream during flood events large enough to inundate the levee setback area (greater than an approximately 3-year flow). These changes in velocities and depths could lead to decreased shear stresses from Star Bend to just below Shanghai Bend (project Segment 2) and slightly increased shear stresses at Shanghai Bend (Segment 3) and some distance upstream on both the Feather River and the Yuba River. Shear stresses would not change downstream of the levee setback area. Portions of the riverbanks along the Feather and Yuba Rivers where shear stresses increase could experience minor increases in erosive forces. However, any increases would not be sufficient to result in a substantial increase in the mobilization and/or deposition of sediments. This impact would be **less than significant.**	LTS	No mitigation is required.	LTS

Table 1-3c
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 3)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
IS-5.3-j: Changes in Geomorphic Processes Along the Project Levees Resulting from the Intermediate Levee Setback. Increasing the conveyance area of the Feather River floodway along the intermediate setback levee alignment would alter water velocities and depths in the existing floodway in this area and upstream during flood events large enough to inundate the levee setback area (greater than an approximately a 3-year flow). These changes in velocities and depths would lead to decreased shear stresses along the right and left bank Feather River levees from Star Bend to just below Shanghai Bend (project Segment 2) and increased shear stresses along the levees at Shanghai Bend (Segment 3) and some distance upstream on both the Feather River and the Yuba River. Shear stresses along the levees would not change downstream of the levee setback area. Any increases in shear stresses would not be sufficient to result in a substantial increase in the mobilization and/or deposition of sediments or increase exposure of persons or private property to flood hazards (i.e., through damage to the levees). This impact would be **less than significant.**	LTS	No mitigation is required.	LTS
5.4 Fisheries			
IS-5.4-a: Loss of Fish Habitat during Levee Repair and Strengthening Activities and Setback Levee Construction. This impact would be the same as Impact ASB-5.4-a, described under Alternative 2 above. For the same reasons as described above, this impact would be **potentially significant**.	PS	**(1): Prepare a SWPPP, File an NOI, and Comply with the NPDES Stormwater Permit for Project Construction Activities.** This measure is identical to Mitigation Measure LS-5.3-a(1) in Section 5.3, "Water Resources and River Geomorphology." **(2): Obtain a Use Permit from Yuba County and Comply with Permit Conditions for Erosion Control.** This measure is	LTS

Table 1-3c
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 3)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		identical to Mitigation Measure LS-5.3-a(2) in Section 5.3, "Water Resources and River Geomorphology." **(3): Obtain and Comply with Terms and Conditions of a Streambed Alteration Agreement for Construction Activities Associated with the Setback Levee.** This measure is identical to Mitigation Measure ASB-5.4-a(3) above.	
IS-5.4-b: Loss of Overhead Cover and Instream Woody Material Associated with Setback Levee Construction. This impact would be the same as Impact ASB-5.4-b, described under Alternative 2 above. For the same reasons as described above, this impact would be **less than significant**.	LTS	No mitigation is required.	LTS
IS-5.4-c: Effects on Habitat from Contaminants in Borrow Material. If contaminants are present in soil in the levee setback area or in borrow material used for the setback levee, they could be released when the area is inundated during flood events, resulting in harm to sensitive fish and habitat. This impact would be **potentially significant**.	PS	**(1): Conduct a Phase I Environmental Site Assessment for the Levee Setback Area and Implement Recommendations.** This measure is identical to Mitigation Measure ASB-5.3-g(1) in Section 5.3, "Water Resources and River Geomorphology." **(2): Evaluate Levee Borrow Material for Potential Contaminants in Coordination with the RWQCB.** This measure is identical to Mitigation Measure ASB-5.3-g(2) in Section 5.3, "Water Resources and River Geomorphology." **(3): Remove Nonhazardous Waste and Debris from the Levee Setback Area.** This measure is identical to Mitigation Measure ASB-5.3-g(3) in Section 5.3, "Water Resources and River Geomorphology."	LTS
IS-5.4-d: Fish Stranding Following Flooding of the Levee Setback Area. Following construction of the setback levee, the levee setback area may contain depressions where water could pond following inundation and fish become trapped as floodwaters recede to the main river channel. Stranded fish, including chinook salmon and	S	**Develop and Implement a Drainage and Grading Plan that Minimizes Loss or Incidental Loss of Fish from Stranding.** This measure is identical to Mitigation Measure ASB-5.4-d above.	LTS

Table 1-3c
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 3)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
steelhead, would be exposed to predators and increasing water temperatures; with no means to return to the river, they would inevitably die. This impact would be **significant.**			
IS-5.4-e: Increased Aquatic and Riparian Habitat in the Levee Setback Area. Setting back the Feather River levee in project Segment 2 could allow the expansion of the available aquatic and riparian habitat corridor and could improve the success of fish species that use the area. This effect would be **potentially beneficial.**	PB	No mitigation is required.	PB
5.5 Terrestrial Biological Resources			
IS-5.5-a: Effects on General Biological Resources. This impact would be the same as Impact ASB-5.5-a, described under Alternative 2 above, although the extent of the impact would be slightly less because of the reduced setback area associated with the intermediate setback levee alignment. For the same reasons as described above, this impact would be **less than significant.**	LTS	No mitigation is required.	LTS
IS-5.5-b: Effects on Sensitive Habitats. This impact would be the same as Impact ASB-5.5-b, described under Alternative 2 above, although the extent of the impact would be slightly less because of the reduced setback area associated with the intermediate setback levee alignment. For the same reasons as described above, this impact would be **significant.**	S	**Avoid Disturbance of Sensitive Habitat to the Extent Feasible and Comply with Corps and DFG Processes to Mitigate Unavoidable Effects.** This measure is identical to Mitigation Measure LS-5.5-b above.	LTS

Table 1-3c
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 3)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
IS-5.5-c: Loss of Special-Status Plants. This impact would be the same as Impact ASB-5.5-c, described under Alternative 2 above, although the extent of the impact would be slightly less because of the reduced setback area associated with the intermediate setback levee alignment. For the same reasons as described above, this impact would be **potentially significant.**	PS	**Conduct Detailed Special-Status Plant Surveys and Establish Construction Buffers as Necessary to Minimize Effects on Special-Status Plants.** This measure is identical to Mitigation Measure LS-5.5-c above.	LTS
IS-5.5-d: Effects on Valley Elderberry Longhorn Beetle. This impact would be the same as Impact ASB-5.5-d, described under Alternative 2 above, although the extent of the impact could be slightly less because of the reduced setback area associated with the intermediate setback levee alignment. For the same reasons as described above, this impact would be **potentially significant.**	PS	**Conduct Protocol-Level Surveys, Establish Buffers, and Implement a Mitigation Plan as Necessary to Minimize Effects on Valley Elderberry Longhorn Beetle.** This measure is identical to Mitigation Measure LS-5.5-d above.	LTS
IS-5.5-e: Effects on Northwestern Pond Turtle. This impact would be the same as Impact ASB-5.5-e, described under Alternative 2 above, although the extent of the impact would be slightly less because of the reduced setback area associated with the intermediate setback levee alignment. For the same reasons as described above, this impact would be **potentially significant.**	PS	**Conduct Surveys as Part of Dewatering Activities and Minimize Effects on Northwestern Pond Turtle.** This measure is identical to Mitigation Measure LS-5.5-e above.	LTS
IS-5.5-f: Effects on Giant Garter Snake. This impact would be the same as Impact ASB-5.5-f, described under Alternative 2 above, although the extent of the impact would be slightly less because of the reduced setback area associated with the intermediate setback levee alignment. For the same	S	**Implement Applicable Take Minimization Measures and a Mitigation Plan as Necessary for Giant Garter Snake.** This measure is identical to Mitigation Measure LS-5.5-f above.	LTS

Table 1-3c
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 3)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
reasons as described above, this impact would be **significant.**			
IS-5.5-g: Effects on Swainson's Hawk and Other Nesting Raptors. This impact would be the same as Impact ASB-5.5-g, described under Alternative 2 above, although the extent of the impact would be slightly less because of the reduced setback area associated with the intermediate setback levee alignment. For the same reasons as described above, this impact would be **potentially significant.**	PS	**(1): Conduct Preconstruction Surveys and Protect Active Nests to Minimize Effects on Swainson's Hawk.** This measure is identical to Mitigation Measure LS-5.5-g(1) above. **(2): Conduct Preconstruction Surveys, Protect Occupied Burrows, and Relocate Individuals as Necessary to Minimize Effects on Burrowing Owl.** This measure is identical to Mitigation Measure LS-5.5-g(2) above. **(3): Conduct Preconstruction Surveys and Protect Active Nests to Minimize Effects on Other Nesting Raptors.** This measure is identical to Mitigation Measure LS-5.5-g(3) above.	LTS
IS-5.5-h: Effects on Other Special-status Birds. This impact would be the same as Impact ASB-5.5-h, described under Alternative 2 above, although the extent of the impact would be slightly less because of the reduced setback area associated with the intermediate setback levee alignment. For the same reasons as described above, this impact would be **less than significant.**	LTS	No mitigation is required.	LTS
IS-5.5-i: Effects on Pacific Western Big-Eared Bat. This impact would be the same as Impact ASB-5.5-i, described under Alternative 2 above, although the extent of the impact would be slightly less because of the reduced setback area associated with the intermediate setback levee alignment. For the same reasons as described above, this impact would be **less than significant.**	LTS	No mitigation is required.	LTS

Table 1-3c
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 3)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
IS-5.5-j: Effects on Wildlife Corridors. This impact would be the same as Impact ASB-5.5-j, described under Alternative 2 above. For the same reasons as described above, this impact would be **less than significant.**	LTS	No mitigation is required.	LTS
5.6 Recreation			
IS-5.6-a: Temporary Changes in Recreational Opportunities during Levee Repairs and Setback Levee Construction. Construction noise could disrupt recreational uses in the project area, particularly in areas adjacent to the existing levee. Some wildlife species present in or inhabiting natural areas are likely to be disturbed by noise and by the presence of project construction crews and equipment. Portions of the Feather River State Wildlife Area in project Segment 1 may need to be closed temporarily to hunting and other recreational activities for safety reasons while adjacent sections of the existing Feather River levee are being repaired. There would be no public access to the Star Bend Boat Launch and Fishing Access for several days while levee repairs were conducted in this area. Although these temporary disturbances may affect the recreation experience for bird-watchers, hunters, boaters, and other recreational users, displaced recreational uses could be accommodated by other nearby facilities (Whitmore, pers. comm., 2006). For this reason, and because of the temporary nature of this effect, this impact would be **less than significant**.	LTS	No mitigation is required.	LTS
IS-5.6-b: Long-Term Changes in Recreational Opportunities Resulting from Levee Repairs and	LTS	No mitigation is required.	LTS

Table 1-3c
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 3)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Setback Levee Construction. Implementing levee repairs along project Segments 1 and 3 would have little or no effect on recreational uses in the Lake of the Woods Management Unit or along the Feather River channel in these project segments. Implementing the levee setback in Segment 2 would slightly modify Feather River flood stage elevations in the project vicinity during high flows, possibly affecting recreational uses, and could affect survival rates of wildlife following high-flow periods, which could temporarily affect associated wildlife-related recreation. The changes in Feather River flood stage elevations that would result from expansion of the Feather River floodway in Segment 2, however, would be infrequent, of short duration, and during periods when river stage is already high; therefore, no new effects on recreational uses are expected. Sections of the existing Feather River levee would be left in place as part of the proposed project, which would minimize losses of wildlife that could adversely affect long-term recreational activities. This impact would be **less than significant**.			
5.7 Aesthetic Resources			
IS-5.7-a: Temporary Changes in Visual Resources Associated with Levee Repairs and Setback Levee Construction. Levee repair and strengthening activities and construction of the intermediate setback levee would temporarily reduce the aesthetic qualities of views by introducing earthmoving equipment and other construction equipment, materials, and work crews into the viewshed of recreationists, motorists on SR	LTS	No mitigation is required.	LTS

Table 1-3c
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 3)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
70 and Feather River Boulevard, workers in nearby farming areas, and residents of the area. However, the construction areas would typically be distant from and/or screened from most viewers. Where residents would be near the construction area (e.g., in project Segment 3), construction would pass by these areas relatively quickly and changes in aesthetic conditions would be short term and temporary. For these reasons, this impact would be **less than significant.**			
IS-5.7-b: Changes in Light and Glare. There would be no substantial long-term sources of light or glare associated with levee repairs or with the long-term presence of the intermediate setback levee and detention basin. However, equipment staging areas may be temporarily lit at night during construction, and portions of the construction areas may also need to be lit at night. Although such nighttime lighting may be visible from various residences, particularly in project Segment 3, in most locations views of the construction areas would be largely shielded by orchards, other vegetation, and structures. Where lit construction areas are visible, lighting would be short-term and temporary. For these reasons, this impact would be **less than significant.**	LTS	No mitigation is required.	LTS
IS-5.7-c: Long-Term Modifications of Views from Levee Repairs and Installation of the Setback Levee. Levee repair and strengthening activities would not dramatically change the appearance of project Segments 1 and 3. Construction of the intermediate setback levee	LTS	No mitigation is required.	LTS

Table 1-3c
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 3)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
would change the appearance of Segment 2. However, all three project segments are of low to moderate aesthetic value, there would be no substantial adverse effect on any scenic vista, and these changes would not substantially alter the general character of views of the area. This impact would be **less than significant.**			
5.8 Cultural Resources			
IS-5.8-a: Damage to or Destruction of Prehistoric Archaeological Site CA-Yub-5. This impact would be the same as Impact ASB-5.8-a, described under Alternative 2 above. For the same reasons as described above, this impact would be **potentially significant**.	PS	**Evaluate the Significance of Archaeological Site CA-Yub-5 and, If Determined to Be Significant, Protect the Site from Damage and/or Conduct Data Recovery Excavation.** This measure is identical to Mitigation Measure ASB-5.8-a above.	LTS
IS-5.8-b: Damage to or Destruction of Resources Associated with Prehistoric Archaeological Sites CA-Yub-13 and CA-Yub-14. This impact would be the same as Impact LS-5.8-a, described under Alternative 1 above. For the same reasons as described above, this impact would be **potentially significant**.	PS	**(1): Conduct Further Evaluation and Subsurface Testing to Determine Whether Proposed Levee Improvements Could Damage Significant Resources Associated with Prehistoric Archaeological Sites CA-Yub-13 and CA-Yub-14.** This measure is identical to Mitigation Measure LS-5.8-a(1) above. **(2): Monitor Ground-Disturbing Activities in the Vicinity of Archaeological Sites CA-Yub-13 and CA-Yub-14.** This measure is identical to Mitigation Measure LS-5.8-a(2) above.	LTS
IS-5.8-c: Damage to or Destruction of Cultural Resources in Unsurveyed Areas. Portions of the project area could not be surveyed for cultural resources because of ground conditions and lack of access, and potential borrow or staging areas also have not been surveyed. Significant cultural resources could be present in these areas, and could be damaged by project-related ground-disturbing activities. This impact would be **potentially**	PS	**Survey Unexamined Areas before Project Ground-Disturbing Activities and Implement Further Mitigation As Necessary.** This measure is identical to Mitigation Measure LS-5.8-b above.	LTS

Table 1-3c
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 3)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
significant.			
IS-5.8-d: Damage to or Destruction of Undocumented Buried Archaeological Resources during Construction. This impact would be the same as Impact ASB-5.8-d, described under Alternative 2 above. For the same reasons as described above, this impact would be **potentially significant**.	PS	**Stop Work and Implement Measures to Protect Archaeological Resources If Discovered during Ground-Disturbing Activities.** This measure is identical to Mitigation Measure LS-5.8-c above.	LTS
IS-5.8-e: Damage to or Destruction of Undocumented Human Remains during Construction. This impact would be the same as Impact ASB-5.8-e, described under Alternative 2 above. For the same reasons as described above, this impact would be **potentially significant**.	PS	**If Human Remains Are Discovered during Ground-Disturbing Activities, Stop Work and Comply with State Laws Pertaining to the Discovery of Human Remains.** This measure is identical to Mitigation Measure LS-5.8-d above.	LTS
5.9 Air Quality			
IS-5.9-a: Temporary Emissions of ROG, NO_X, and PM_{10} during Construction. This impact would be the same as Impact ASB-5.9-a, described under Alternative 2 above. For the same reasons as described above, this impact would be **significant**.	S	**Implement FRAQMD Pollution-Control Measures to Minimize Temporary Emissions of ROG, NO_X, and PM_{10} during Construction.** This measure is identical to Mitigation Measure LS-5.9-a above.	SU
IS-5.9-b: Long-Term Changes in Emissions of ROG, NO_X, and PM_{10} Associated with Levee Repairs and Strengthening and the Levee Setback. This impact would be the same as Impact ASB-5.9-b, described under Alternative 2 above. Potential beneficial effects on air quality could be slightly less because the levee setback area would be smaller, and, thus, slightly less agricultural land has the potential to be converted to nonagricultural use. However, operational emissions would still be	PB	No mitigation is required.	PB

Table 1-3c
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 3)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
negligible under Alternative 3. As a result, for the same reasons as described above, this impact would be **potentially beneficial.**			
IS-5.9-c: Exposure of Sensitive Receptors to Toxic Air Emissions. This impact would be the same as Impact ASB-5.9-c, described under Alternative 2 above. For the same reasons as described above, this impact would be **less than significant.**	LTS	No mitigation is required.	LTS
5.10 Noise			
IS-5.10-a: Temporary Increase in Noise Levels during Construction. This impact would be similar to Impact ASB-5.10-a, described under Alternative 2 above. Although the intermediate setback levee alignment is in a different location than the ASB alignment relative to some sensitive receptors, and traffic generation may be somewhat different based on needs for borrow material, the extent and nature of the impact would not be appreciably different. For the same reasons as described above, this impact would be **significant**.	S	**Limit Generation of Noise by Equipment during Project Construction.** This measure is identical to Mitigation Measure LS-5.10-a above.	SU
IS-5.10-b: Exposure of Sensitive Receptors to Excessive Groundborne Vibration During Construction. This impact would be the same as Impact LS-5.10-b, described under Alternative 1 above. Construction processes under Alternative 2 would not occur any closer to sensitive land uses than those discussed under Alternative 1, and no new construction equipment or processes that would generate additional groundborne vibration would be used. For the same reasons as described above, this	LTS	No mitigation is required.	LTS

Table 1-3c
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 3)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
impact would be **less than significant**.			
5.11 Transportation and Circulation			
IS-5.11-a: Increase in Traffic on Local Roadways near the Existing Levee and Setback Levee Alignment during Construction. During the anticipated 20-month construction period, commute trips and truck haul trips associated with levee repair and strengthening activities and setback levee construction would increase traffic on Feather River Boulevard, SR 70, and local roadways that provide access to the project alignment (e.g., Anderson Avenue, Country Club Avenue, Riverside Drive). However, construction-related trips would not exceed the thresholds established by ITE for temporary traffic increases and would not represent a substantial increase in traffic levels on these roadways or other local roads. This impact would be **less than significant**.	LTS	No mitigation is required.	LTS
IS-5.11-b: Increase in Traffic Hazards on Local Roadways near the Existing Levee and Setback Levee Alignment during Construction. Construction-related traffic could track mud and gravel onto local roadways, and haul truck traffic could interfere with the flow of traffic on these roads. These conditions could pose hazards for travelers on local roadways. This impact would be **potentially significant.**	PS	**Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways.** This measure is identical to Mitigation Measure LS-5.11-b above.	LTS
5.12 Public Services, Utilities, and Service Systems			
IS-5.12-a: Damage of Public Utility Infrastructure and Disruption of Service in the Levee Repair and Intermediate Levee Setback	PS	**Coordinate with Utility Providers to Remove, Reinforce, and Modify Public Utility Infrastructure in the Intermediate Levee Setback Area and Prevent Damage of Facilities.** This	LTS

Table 1-3c
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 3)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Areas. This impact would be similar to Impact ASB-5.12-a, described under Alternative 2 above. However, the extent of affected utilities would be somewhat less under Alternative 3 because the intermediate setback levee alignment is located farther to the west, resulting in a smaller setback area and effects on fewer facilities. For the same reasons as described above, this impact would be **potentially significant.**		measure is identical to Mitigation Measure ASB-5.12-a above.	
IS-5.12-b: Damage of Water Supply and Drainage Facilities and Interference with Service in the Levee Repair and Intermediate Levee Setback Areas. This impact would be similar to Impact ASB-5.12-b, described under Alternative 2 above. However, the extent of affected water supply and drainage facilities would be somewhat less under Alternative 3 because the intermediate setback levee alignment is located farther to the west, resulting in a smaller setback area and effects on fewer facilities. For the same reasons as described above, this impact would be **less than significant.**	LTS	No mitigation is required.	LTS
IS-5.12-c: Potential for Conflicts with Emergency Response Vehicles during Construction. This impact would be the same as Impact ASB-5.12-c, described under Alternative 2 above. For the same reasons as described above, this impact would be **potentially significant.**	PS	**Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways.** This measure is identical to Mitigation Measure LS-5.11-b, "Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways," in Section 5.11, "Transportation and Circulation."	LTS
5.13 Paleontological Resources			
IS-5.13-a: Disturbance of Unknown Paleontological Resources during Earthmoving Activities. Portions of the project area and	PS	**Conduct Training for Construction Personnel, Cease Work if Paleontological Resources are Encountered, and Implement an Appropriate Mitigation Strategy.** This measure is identical	LTS

Table 1-3c
SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 3)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
immediate vicinity are underlain by the Modesto and Riverbank Formations, which are paleontologically sensitive rock formations. Construction activities in the Modesto and Riverbank Formations associated with proposed levee strengthening (e.g., slurry cutoff walls, relief wells), construction of the intermediate setback levee, use of the soil borrow area/detention basin location, and related activities (e.g., relocation of Pump Station No. 3) could adversely affect unknown subsurface paleontological resources. This impact would be **potentially significant.**		to Mitigation Measure LS-5.13-a.	
Cumulative Impacts			
Alternative 3, The Levee Strengthening and Intermediate Setback Levee Alternative, would also contribute to significant cumulative impacts related to conversion of Important Farmland to nonagricultural uses; emissions of ROG, NO_X, and PM_{10} during construction; and potentially noise during construction. The mitigation described above would not reduce the project's contributions to these impacts to less-than-significant levels.			

B	=	Beneficial effect	LTS	=	Less than significant
PB	=	Potentially beneficial effect	PS	=	Potentially significant
NI	=	No impact	S	=	Significant

CHAPTER 2 INTRODUCTION

2.1 PURPOSE AND PREPARATION OF THIS DOCUMENT

This document is a draft environmental impact report (DEIR) that has been prepared on behalf of the Three Rivers Levee Improvement Authority (TRLIA) to evaluate the potential environmental effects of the Feather River Levee Repair Project (FRLRP). TRLIA is a joint powers authority with the mission of advancing the flood safety of Yuba County, California. The FRLRP would improve flood protection in the Reclamation District (RD) 784 area of Yuba County, which is bounded by the Yuba, Feather, and Bear Rivers and the Western Pacific Interceptor Canal (WPIC). The project was initially considered by the Yuba County Water Agency (YCWA) as an element of the Yuba-Feather Supplemental Flood Control Project (Y-FSFCP), which YCWA initiated in 2001 using funding available through the Costa-Machado Water Act of 2000 (Water Act of 2000). As described later in this chapter, the FRLRP DEIR incorporates by reference the programmatic environmental impact report (EIR) prepared for the Y-FSFCP, which was certified by YCWA in March 2004 (Yuba County Water Agency 2004).

This DEIR has been prepared in accordance with the requirements of the California Environmental Quality Act (CEQA) (California Public Resources Code Section 21000 et seq.) and the State CEQA Guidelines (14 California Code of Regulations [CCR] Section 15000 et seq.). A state or local public agency must comply with CEQA when it undertakes an activity that may cause a direct or reasonably foreseeable indirect change in the physical environment. The proposed project may cause a direct or indirect change in the environment and is therefore subject to CEQA. As specified in State CEQA Guidelines Section 15367, the public agency that has the principal responsibility for carrying out or approving a project is the lead agency for CEQA compliance.

TRLIA began the CEQA environmental review process for the FRLRP by issuing a notice of preparation (NOP) of an EIR dated June 14, 2006 (see Appendix A). A public scoping meeting was held on June 29, 2006. Comments received in response to the NOP and at the scoping meeting are included in Appendix A. Comments pertinent to the scope and content of the EIR are reflected in this document.

An EIR is an informational document used to inform public agency decision makers and the general public of any significant environmental effects of a project, identify feasible ways to minimize the significant effects, and describe reasonable alternatives to the project that can reduce environmental impacts. TRLIA, as required by CEQA, will consider the information presented in the EIR when determining whether to approve the proposed project. Other public agencies with discretionary approval authority over aspects of the project, referred to under CEQA as “responsible agencies,” will also use the EIR when deciding whether to approve or permit the project (see Section 2.7, “Agency Roles and Responsibilities”).

2.2 PROJECT BACKGROUND

The FRLRP is proposed to provide increased protection from flooding from the Feather and lower Yuba Rivers in Yuba County. The regional setting of the FRLRP is shown in Figure 2-1, "Regional Setting."

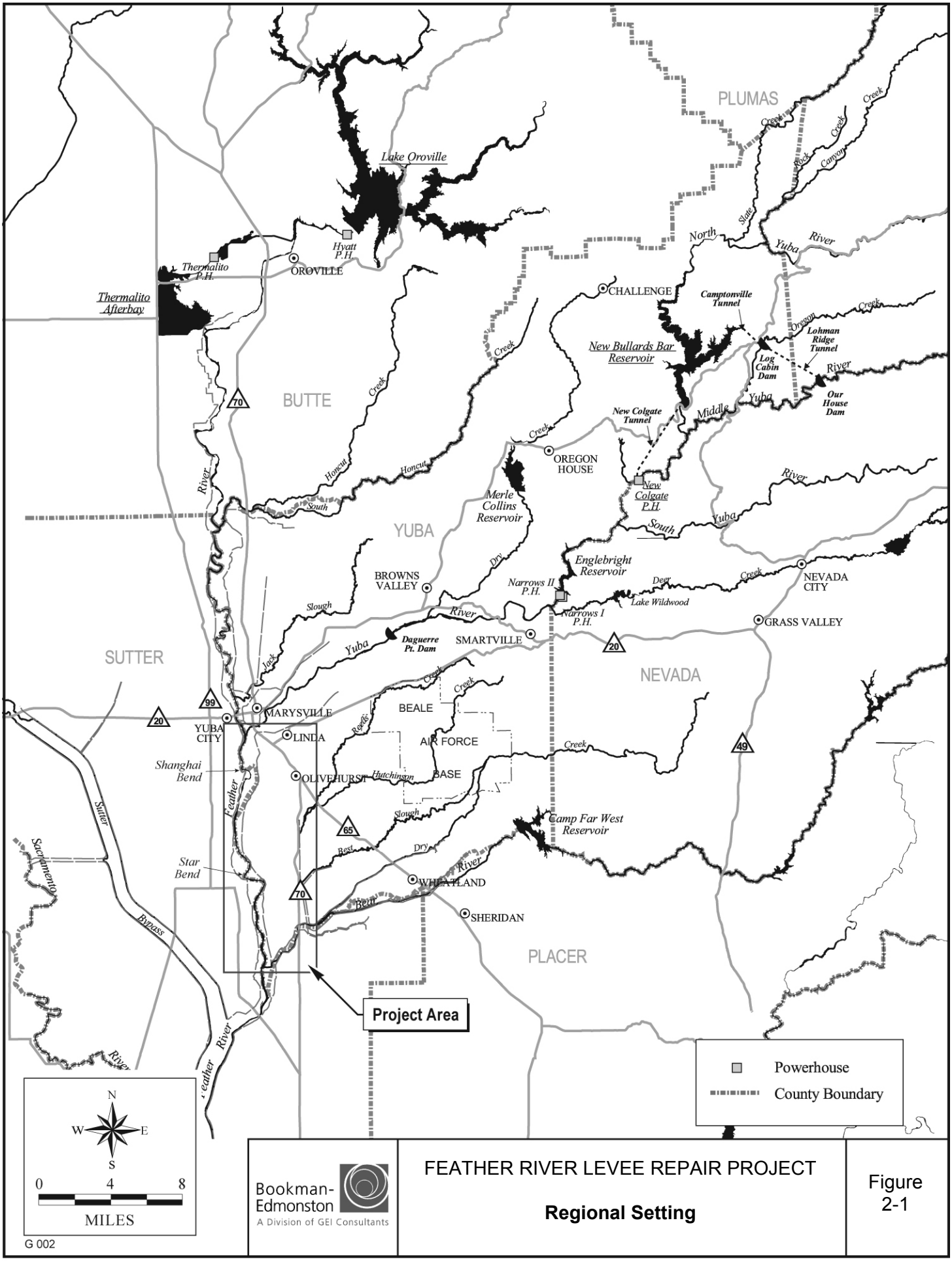
Catastrophic floods have occurred in Yuba County since the mid-1800s. Figure 2-2, "Areas Flooded in January 1997," shows flooding during the most recent such event—the 1997 flood. Following the 1997 flood, YCWA formed a flood control study team and initiated a study of measures that could provide a higher level of protection to supplement the flood protection system for Yuba County. With passage of the Water Act of 2000, the efforts of the study team focused on those measures that could be achieved within the budget provisions of this act. This ongoing effort, funded through Water Act of 2000 grant monies, is the Y-FSFCP.

A program-level DEIR for the Y-FSFCP was completed in October 2003 (Yuba County Water Agency 2003). It evaluated three flood control elements, including a setback of the left (east) bank levee (the levee on the left side of the river when facing downstream) of the Feather River below the Yuba River. The Y-FSFCP levee setback was proposed for two segments of the Feather River (referred to as Above Star Bend and Below Star Bend) upstream of the Bear River. Most issues related to the levee setback component of the Y-FSFCP were addressed in the EIR at a project level of detail, while some issues were addressed at a general, or "programmatic," level of detail where project description detail was not sufficient to support a more detailed analysis. The final EIR (FEIR) was completed and certified and the program of elements approved by the YCWA Board in March 2004 (Yuba County Water Agency 2004).

In 2003, while YCWA was finishing its first level of Y-FSFCP studies of a select group of flood control elements, the U.S. Army Corps of Engineers (Corps) in a separate effort identified several deficiencies in the Bear River and WPIC levees that prevent these levees from meeting the Federal Emergency Management Agency (FEMA) criteria for providing protection from a 100-year flood event. In addition, it was found that a 2,800-foot stretch of the Yuba River levee on the upstream side of State Route (SR) 70 does not meet slope stability requirements.

Since 2003, various studies have been completed by Reclamation District (RD) 784, YCWA, TRLIA, the Corps, and others to determine necessary actions for RD 784 levees to meet current FEMA criteria. Based on the results of these studies, flood control improvements were planned to be implemented in several phases. Priority was given to implementing improvements to the Yuba River levee above SR 70 (Phase 1); improvements to the upper Bear River, WPIC, and Yuba River levees, and the Olivehurst detention basin (Phase 2); and construction of a setback levee along the lower Bear River, tying into the Feather River levee just below Clark Slough (Phase 3). These projects are either completed or under construction. In November 2004, the EIR for the Feather-Bear Rivers Levee Setback Project (F-BRLSP) (Phase 3) was certified and construction was initiated in 2005. This project precludes the need to improve the Feather River left bank levee below Pump Station No. 2.

The project that is the subject of this DEIR, the FRLRP, is a modification of the Above Star Bend (ASB) levee setback that was previously proposed and evaluated in the Y-FSFCP EIR. The FRLRP consists of repairing and strengthening the Feather River left bank levee as well as a



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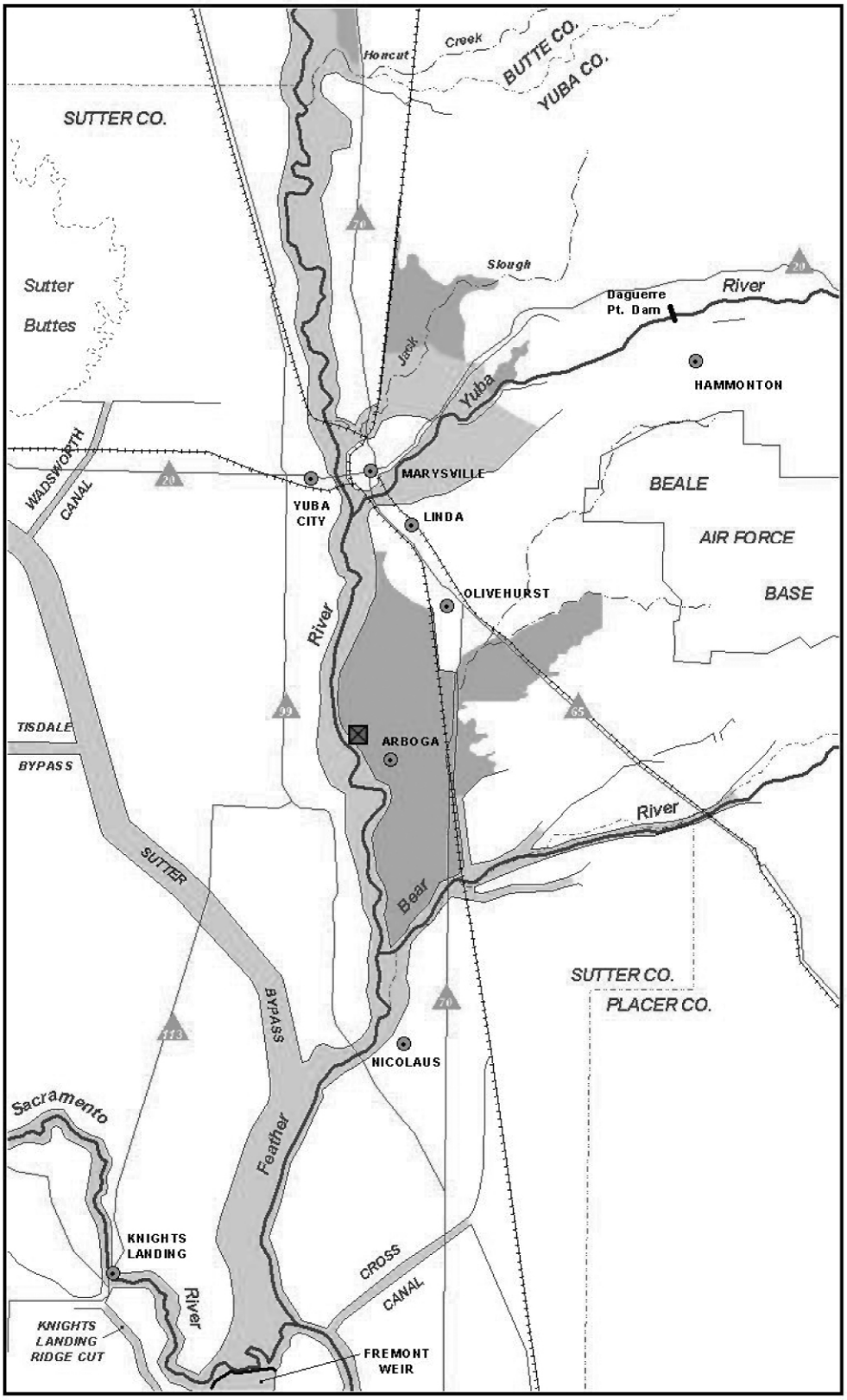
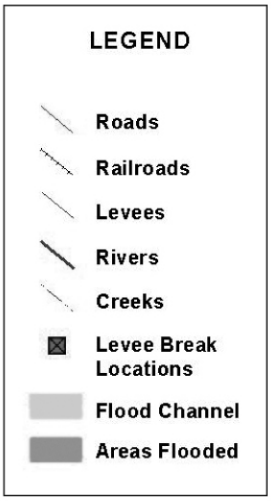
FEATHER RIVER LEVEE REPAIR PROJECT

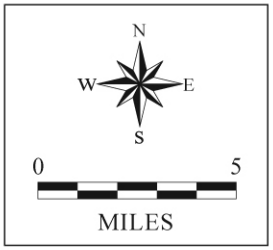
Regional Setting

Figure 2-1

Source: Yuba County Water Agency 2001







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FEATHER RIVER LEVEE REPAIR PROJECT

Areas Flooded in January 1997

Figure 2-2

G 003

Source: Yuba County Water Agency 2001

small portion of the left (south) bank levee of the lower Yuba River. An alternative approach to simply repairing and strengthening the existing levee is constructing a setback levee in the central portion of the project area following a modified version of the ASB levee setback alignment. The proposed FRLRP is described in summary form below and in detail in Chapter 4, "Description of the Proposed Project." The history and background of the FRLRP are described in detail in Chapter 3, "Project Purpose, Need, and Development."

2.3 SUMMARY DESCRIPTION OF THE PROPOSED PROJECT

The FRLRP project area is divided into three project segments, as shown in Figure 2-3, "FRLRP Project Area":

- Project Segment 1 consists of the existing Feather River left bank levee from Project Levee Mile (PLM) 13.3 to PLM 17.1 (from approximately RD 784 Pump Station No. 2 upstream to Star Bend).
- Project Segment 2 consists of the existing Feather River left bank levee from PLM 17.1 to PLM 23.6 (from approximately Star Bend upstream to west of the Yuba County Airport).
- Project Segment 3 consists of the existing Feather River left bank levee from PLM 23.6 to PLM 26.1, and the Yuba River left bank levee from PLM 0.0 to PLM 0.3 (west of the Yuba County Airport to the railroad crossing adjacent to the SR 70 bridge).

The proposed project consists of implementation of one of three potential alternatives, each evaluated at an equal level of detail in this DEIR. Under all project alternatives, it is anticipated that the detailed design of proposed activities in project Segments 1 and 3 would be completed in 2006 and that construction would take place in 2007. For activities in Segment 2, detailed design would occur from late 2006 through 2007, and construction is expected to take place in 2007 and 2008.

2.3.1 ALTERNATIVE 1 – THE LEVEE STRENGTHENING ALTERNATIVE

Under this alternative, levee repair and strengthening activities would be completed along the entire length of project Segments 1, 2, and 3. Levee repairs and strengthening would consist of various activities, including installation of slurry cutoff walls, relief wells, and stability/seepage berms and placement of buried cobble in areas where erosion of the levee embankment has been identified as a problem. RD 784 Pump Station No. 3 is located next to the existing levee (Figure 2-3). Implementation of Alternative 1 would involve removing Pump Station No. 3 and installing a new pump station east of the levee, which would correct seepage deficiencies related to the existing pump station. The capacity of Pump Station No. 3 would be increased to accommodate discharges from relief wells installed as part of levee repairs. A detention basin would also be constructed to temporarily hold relief well flows during peak discharge periods when discharge volumes could exceed the capacity of the new pump station.

2.3.2 ALTERNATIVE 2 – THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE

Under this alternative, levee repair and strengthening activities would be completed along project Segments 1 and 3. Repair and strengthening activities in these segments would be the same as for Alternative 1. In project Segment 2, a setback levee would be constructed roughly following the ASB setback levee alignment identified in the Y-FSFCP EIR. Setting back the levee along this alignment would provide a new levee constructed on a more stable foundation using the latest engineering methods. Various seepage control measures would be implemented along the setback levee. These could include zoned embankments, slurry cutoff walls, seepage/stability berms, and relief wells.

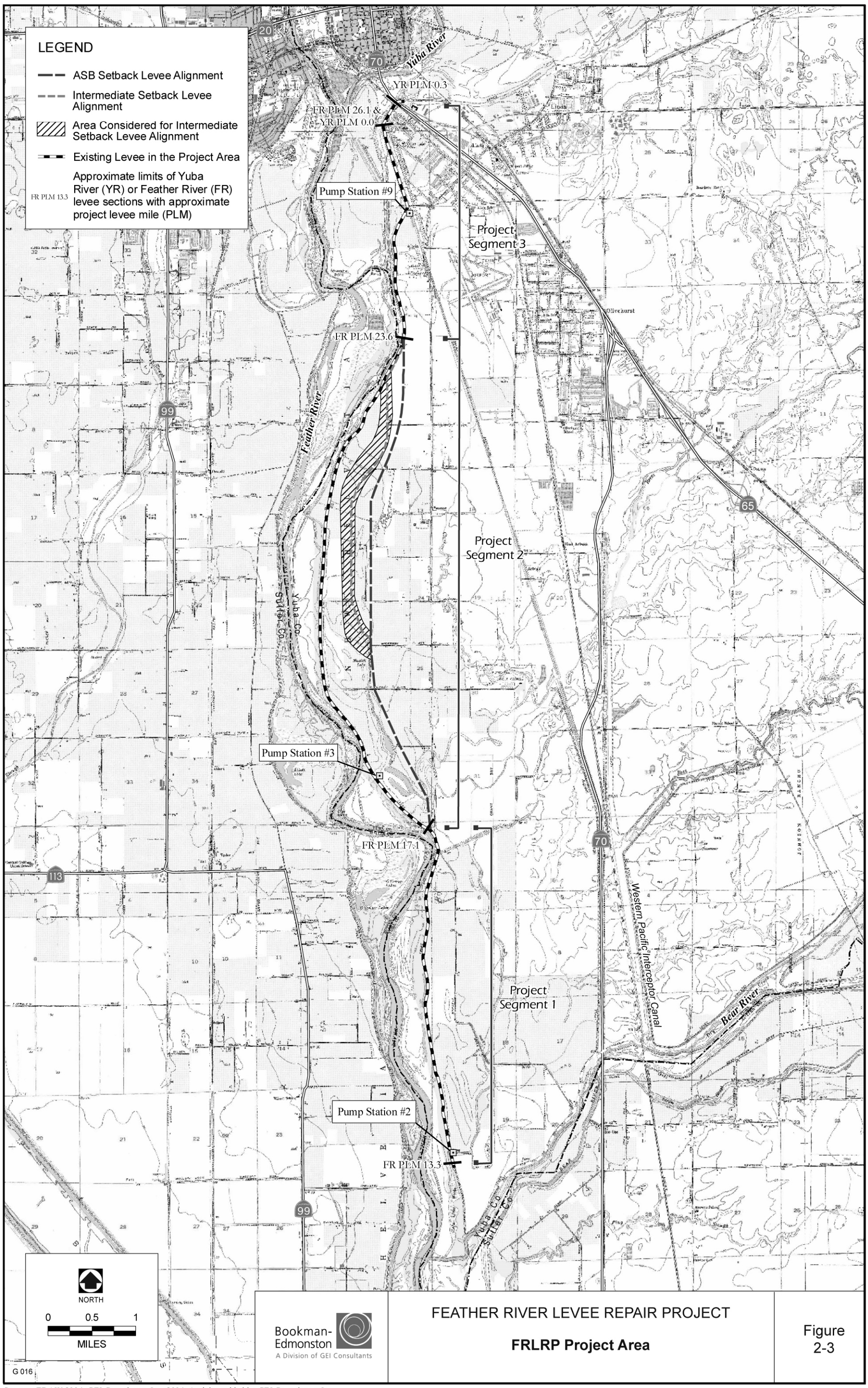
Portions of the existing levee along the setback alignment would be removed to allow water to flow into and out of the new floodway/setback area (i.e., the area between the existing levee and the setback levee) during high river stages. With removal of portions of the existing levee, approximately 1,600 acres of land would become part of the new floodway/setback area (i.e., the area between the existing levee and the new setback levee). This acreage includes residences and other structures; appropriate compensation would be negotiated with affected landowners. Removal or protection of utilities and wells in the floodway/setback area would also be required, and lands in this area would be contoured and managed to prevent fish stranding as high flows recede. Land uses in the levee setback area could consist of agricultural operations and/or habitat restoration activities that do not impede the flood flow function of the setback area. No specific plans for habitat restoration in the levee setback area are proposed at this time, although this is considered a potential future use.

In addition to providing a more structurally sound levee, a setback levee would improve flood protection by expanding the floodway and, consequently, lowering water surface elevations during high-flow events. However, the decision to remove any of the existing levee is a federal decision that would be made by the Corps, and the timing of such an action is uncertain. Therefore, the new levee may function as a “backup” levee for some time until this decision is made, during which time the hydraulic benefits of a setback levee (lowering of water surface elevation) would not be realized but the backup levee would provide the desired level of protection.

Because local drainage patterns would be changed by the setback levee, implementation of this project alternative would require construction of detention basins to prevent adverse flooding effects on nearby properties. Similar to Alternative 1, a pump station to replace Pump Station No. 3 would be installed. The new pump station would be located immediately east of the new setback levee.

2.3.3 ALTERNATIVE 3 – THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE

- FRLRP Alternative 3 is very similar to Alternative 2. The same levee repair and strengthening activities described for Alternatives 1 and 2 would be conducted in project



Sources: EDAW 2004; GEI Consultants, Inc. 2004; Aerial provided by GEI Consultants, Inc.

Segments 1 and 3. In Segment 2 a setback levee would be constructed. Approximately the southern one-third of this setback levee alignment would follow the ASB setback levee alignment identified in Alternative 2. However, in the vicinity of Anderson Avenue the setback levee would shift several hundred feet to the west of the alignment proposed under Alternative 2 (Figure 2-3). This westward shift would allow less land to be placed in the new floodway under Alternative 3 than under Alternative 2. Fewer houses, structures, and other facilities would be affected by levee construction or would need to be removed from the floodway/setback area. Approximately 1,300 acres of land would become part of the new floodway/setback area under Alternative 3.

Figure 2-3 shows a single alignment for the intermediate setback levee. However, for the portion of the intermediate setback levee that deviates from the ASB setback levee alignment, a specific route has not yet been confirmed and several options are being considered. The actual alignment could be located to the east or west of the alignment shown (as indicated by the area considered for the intermediate setback levee alignment shown in Figure 2-3). Considerations for final route selection include the suitability of underlying soil conditions for levee construction and the extent of flood control benefits (i.e., moving the alignment westward and reducing the size of the Feather River high-water channel would result in fewer flood control benefits). The route shown in Figure 2-3 and analyzed in this EIR is considered to be representative of the various options considered for the intermediate setback levee alignment.

The general design, construction, and operational characteristics of an intermediate setback levee under Alternative 3 would be same as for the ASB setback levee under Alternative 2, including land uses in the setback area, the relocation/replacement of Pump Station No. 3, and creation of detention basins. As described for Alternative 2, the setback levee could function temporarily as a “backup levee” while federal approval is sought for the removal of the existing levee in Segment 2.

2.4 PROJECT CONSISTENCY WITH REGIONAL FLOOD AND FLOODPLAIN MANAGEMENT EFFORTS

As described in the Y-FSFCP DEIR, in the last several years two major efforts have produced recommendations for regional flood and floodplain management activities in California. In 2002, the California Floodplain Management Task Force released its report on floodplain management in California (California Floodplain Management Task Force 2002). During that same year, the Corps and the State of California Reclamation Board (The Reclamation Board) drafted an integrated plan for flood damage reduction and environmental restoration for the Sacramento and San Joaquin River Basins in the Sacramento and San Joaquin River Basins California Comprehensive Study (Comprehensive Study) (U.S. Army Corps of Engineers and State of California Reclamation Board 2002). Because they provide an important part of the context of flood control planning in the Central Valley, the two efforts described in the Y-FSFCP are discussed again below.

2.4.1 CALIFORNIA FLOODPLAIN MANAGEMENT TASK FORCE

In 2000, Governor Davis signed Assembly Bill 1147, which recommended the creation of the California Floodplain Management Task Force. In February 2002, the governor delegated authority to the California Department of Water Resources to convene a Floodplain Management

Task Force. The newly formed task force sought to recommend floodplain management strategies designed to reduce flood losses and maximize the benefits of floodplains. The task force found that existing programs are inadequate to accomplish these goals and that time is of the essence in implementing improvements. The task force made recommendations to accomplish these goals in a report issued in December 2002 (California Floodplain Management Task Force 2002). The following recommendations are particularly relevant to the FRLRP:

- *Multiobjective Management Approach for Floodplains:* A multiobjective management approach to flood management projects should be promoted.
- *Flood Management Approaches to Ecosystem Restoration and Agricultural Conservation:* Flood management programs and projects, while providing for public safety, should maximize opportunities for agricultural conservation and ecosystem protection and restoration, where feasible.
- *Multijurisdictional Partnerships:* The state should encourage multijurisdictional partnerships when floodplain management projects are planned and implemented.
- *Proactive and Adaptive Management of Floodplains:* State and local agencies should manage floodplains proactively and adaptively by periodically adjusting to current physical and biological conditions, new scientific information, and knowledge.
- *Coordination among Agencies and Groups:* The state should encourage and create incentives for additional coordination among stakeholders.
- *Tools for Protection of Flood Compatible Land Uses:* The state should identify, develop, and support tools to protect flood-compatible land uses.

2.4.2 SACRAMENTO AND SAN JOAQUIN RIVER BASINS COMPREHENSIVE STUDY

The Comprehensive Study is a joint effort by The Reclamation Board and the Corps, in coordination with federal, state, and local agencies, and various groups and organizations in California's Central Valley. Responding to the flooding of 1997, the California Legislature and the U.S. Congress directed the Corps to develop a comprehensive plan for flood damage reduction and environmental restoration for the Sacramento and San Joaquin River Basins. This work is being performed in cooperation with The Reclamation Board.

In 2002, a draft interim report was released by the Comprehensive Study team (U.S. Army Corps of Engineers and State of California Reclamation Board 2002). The report identified the comprehensive plan as an approach to developing projects in the future to reduce damage from flooding and restore the ecosystem in the Sacramento and San Joaquin River Basins. The Comprehensive Study has proposed a set of guiding principles to govern implementation of projects that propose modifying the Sacramento or San Joaquin River flood control systems. These principles have been developed to ensure that projects proposed for implementation are consistent with the objectives established by the Corps and The Reclamation Board. The following are the Comprehensive Study's draft guiding principles:

- Recognize that public safety is the primary purpose of the flood management system.
- Promote effective floodplain management. Promote agriculture and open-space protection.
- Avoid hydraulic and hydrologic impacts.
- Plan system conveyance capacity that is compatible with all intended uses.
- Provide for sediment continuity.
- Use an ecosystem approach to restore and sustain the health, productivity, and diversity of the floodplain corridors.
- Optimize use of existing facilities.
- Integrate with the CALFED Bay-Delta Program and other programs.
- Promote multipurpose projects to improve flood management and ecosystem restoration.

The FRLRP lies in the Feather River Region of the Comprehensive Study. The draft interim report notes in the discussion of this region that:

> [l]evees along the Feather, Yuba, and Bear Rivers that are already set back from the river offer greater flexibility in accommodating flood management and ecosystem restoration. There are opportunities to widen selected reaches of the floodways to reduce constrictions and increase flow capacity. Reducing floodway constrictions along the lower Feather River would improve levee reliability in the Marysville–Yuba City urban area by reducing flood stage and could increase the opportunity for riparian habitat within the floodway.

2.4.3 PROJECT CONSISTENCY

The alternatives considered for the FRLRP have been designed to be consistent with federal and state flood management efforts. Applicable key recommendations and guiding principles listed above have been incorporated into one or more of the FRLRP alternatives in some form. While addressing local Yuba County needs for flood control, the FRLRP could provide opportunities for regional flood management. Although the FRLRP does not specifically include ecosystem restoration activities, habitat restoration/enhancement is identified as a potential land use in the expanded floodway area if a setback levee alternative is selected (i.e., Alternative 2 or Alternative 3). Coordination with numerous stakeholders through TRLIA participation in the Yuba-Feather Work Group (Y-FWG) has led to development of FRLRP alternatives with support from a diverse array of stakeholders. Coordination with the Corps is also ongoing, both through the Y-FWG and through separate briefings. Representatives from TRLIA have briefed The Reclamation Board on the regional benefits of ongoing flood management activities in Yuba County, including the FRLRP. By incorporating the flood and floodplain management recommendations and guidelines of federal and state agencies and seeking a broad coalition of support for the FRLRP, the local agencies have developed a proposed program that is consistent

with, and that promotes, regional flood management efforts in California, particularly in the Sacramento and San Joaquin River Basins.

2.5 TYPE OF EIR

This document is a "project" EIR. There is the potential to partially tier this FRLRP EIR from the Y-FSFCP EIR, which was certified by YCWA in March 2004. The CEQA concept of "tiering," as described in Section 15152 of the State CEQA Guidelines, refers to the analysis of environmental effects at a general level in one broad (i.e., first-tier) EIR, with subsequent (i.e., second-tier) environmental documents prepared for more defined projects. A second-tier document incorporates by reference the applicable general discussions from the broader, first-tier EIR and concentrates on the issues specific to the later project that warrant examination at a greater level of detail.

Partial tiering from the Y-FSFCP EIR (i.e., the first-tier document) is possible because the EIR evaluated the environmental effects of an ASB setback levee similar to that considered under Alternatives 2 and 3 in this FRLRP EIR (i.e., the second-tier document). However, because the FRLRP and Y-FSFCP EIRs have two different lead agencies under CEQA (TRLIA and YCWA, respectively), and because the Y-FSFCP EIR does not evaluate many of the levee strengthening components included in the FRLRP, it was determined that preparation of an independent project EIR for the FRLRP, rather than a tiered EIR, would be a clearer and more straightforward approach. However, much of the information in the Y-FSFCP EIR is still applicable to the FRLRP, and the Y-FSFCP EIR is incorporated by reference into the FRLRP EIR (see Section 2.8, "Documents Incorporated by Reference").

2.6 EIR SCOPE

Pursuant to CEQA and the State CEQA Guidelines, a lead agency may limit an EIR's discussion of environmental effects when such effects are not considered potentially significant (Public Resources Code Section 21002.1, State CEQA Guidelines Section 15143). A determination of which impacts would be potentially significant was made for this project based on reviews of the project proposal, information presented in the Y-FSFCP EIR, preliminary feasibility studies performed for the FRLRP, and comments received during a public scoping meeting and on the NOP issued for this EIR. See Chapter 3, "Project Purpose, Need, and Development," for a summary of the project scoping process.

It was determined that the FRLRP would not have the potential to result in significant impacts on mineral resources or on several elements related to population and housing, and that these resources would not require evaluation in this EIR. There are no known mineral resources in the project area or at other sites that could be affected by levee repairs or setback levee construction or by changes in hydrologic conditions under FRLRP implementation. The FRLRP would not involve the construction of new housing or require the addition of housing to accommodate workers. Project Alternatives 2 and 3 would result in the removal of five to 10 homes in the levee setback area. Displacement of housing is addressed in Section 5.1, "Land Use." The project would not bring into development any areas that are not already planned and approved for development. (Note that Chapter 7, "Other CEQA-Required Sections," includes a discussion of

growth inducement in relation to the FRLRP, including how increased flood protection provided by the project could remove an impediment to growth in the area.)

The EIR addresses potential impacts in the following resource areas:

- land use (including agricultural resources);
- geology, soils, and mineral resources;
- water resources and river geomorphology (including water quality and hazardous materials);
- fisheries;
- terrestrial biological resources;
- recreation;
- aesthetic resources;
- cultural resources;
- air quality;
- noise;
- transportation and circulation;
- public services, utilities, and service systems; and
- paleontological resources.

2.7 INTENDED USES OF THE EIR/AGENCY ROLES AND RESPONSIBILITIES

This EIR will be used by TRLIA and CEQA responsible agencies to fulfill the requirements of CEQA. It will also be used as an informational document by federal agencies that could have a permitting or approval authority for the project and by other local and state agencies, including CEQA trustee agencies that may have an interest in the project.

A CEQA responsible agency is a state agency, board, or commission or any local or regional agency, other than the lead agency, that has a legal responsibility for reviewing, carrying out, or approving aspects of a project. Responsible agencies must actively participate in the lead agency's CEQA process and review the lead agency's CEQA document. This EIR will be used by responsible agencies to ensure that they have met the requirements of CEQA before deciding whether to approve or permit project elements over which they have authority.

A trustee agency is a state agency that has jurisdiction by law over natural resources that are held in trust for the people of the State of California. Trustee agencies that have jurisdiction over resources potentially affected by the FRLRP are the California Department of Fish and Game (fish and wildlife resources) and the California State Lands Commission (navigable waterways).

The agencies that may have responsibility or jurisdiction over the implementation of aspects of the proposed project are listed below.

2.7.1 LEAD AGENCY

- Three Rivers Levee Improvement Authority: Overall project approval

2.7.2 RESPONSIBLE AGENCIES

- California Department of Fish and Game: California Endangered Species Act consultation and potential Section 2081 incidental take authorization; Section 1602 lake and streambed alteration agreement
- California Department of Water Resources: Possible administration of funds approved through state bonds
- Central Valley Regional Water Quality Control Board (Region 5): National Pollutant Discharge Elimination System permit pursuant to Section 402 of the federal Clean Water Act; water quality certification under Section 401 of the Clean Water Act
- State of California Reclamation Board: Encroachment permit
- California State Lands Commission: Possible land use lease; approval of work in the bed of a navigable waterway
- Reclamation District 784: Approval of levee modification through The Reclamation Board permit process
- Yuba County: Use permit for grading/excavation; other possible construction authorizations/permits and zoning changes
- California Department of Transportation: Possible authorization for Yuba River work in the vicinity of SR 70

2.7.3 FEDERAL AGENCIES WITH PERMITTING/APPROVAL AUTHORITY

- U.S. Army Corps of Engineers: Permitting under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act for discharge of fill into waters of the United States or work in, on, or under navigable waters of the United States; approval of project levee modification/setback and setback levee design; federal lead agency for the Yuba River Basin Project, which could incorporate the FRLRP as an element
- U.S. Fish and Wildlife Service: Federal Endangered Species Act (ESA) consultation and incidental take authorization
- National Marine Fisheries Service: ESA consultation and possible incidental take authorization

2.7.4 OTHER AGENCIES THAT MAY USE INFORMATION IN THE EIR

This EIR may be used for information by the following additional agencies that have responsibility for the protection of resources that could be affected by the proposed project:

- Feather River Air Quality Management District: Effects on air quality
- Native American Heritage Commission: Effects on Native American burials or artifacts

- State Office of Historic Preservation: Effects on historic and cultural resources

Compliance with the National Environmental Policy Act (NEPA) is also necessary when there is federal participation in a project; a federal discretionary permit, entitlement, or authorization or federal funding is required; or the project would occur on federal lands. Because the proposed project involves the modification of federal levees, it is expected to involve federal permitting, authorizations, and/or funding at some level. Project elements are also expected to require Corps permitting under Section 404 of the Clean Water Act. Therefore, the project is expected to require NEPA compliance, which would be undertaken separately from, but would be supported by, the CEQA review process.

2.8 NOTICE OF PREPARATION AND PUBLIC SCOPING

In a public involvement process that was begun by YCWA, TRLIA continues to coordinate with landowners; federal, state, and local agencies; organizations; and other parties to determine those parties' respective interests in implementing projects that are elements of the Y-FSFCP, including the FRLRP, and to guide further studies and actions. TRLIA issued an NOP on June 14, 2006, to inform public agencies and the general public of its intention to prepare an EIR on the FRLRP. The NOP initiated the public and agency scoping process and requested comments on the project alternatives and associated features. A scoping and informational meeting was held by TRLIA on June 29, 2006. The NOP and comments received on the NOP, including comments provided at the scoping meeting, are included in Appendix A. See Chapter 9, "Consultation and Coordination," for further information on public involvement.

2.9 DOCUMENTS INCORPORATED BY REFERENCE

In accordance with State CEQA Guidelines Section 15150, the following documents are incorporated by reference into this EIR, and relevant portions of these documents are summarized in this EIR:

- Yuba County Water Agency. 2003 (June). *Report on Feasibility, Yuba-Feather Supplemental Flood Control Project*, including supporting appendices. Marysville, CA. Prepared by Flood Control Study Team. Prepared for submittal to California Department of Water Resources, Sacramento, CA.

- Yuba County Water Agency. 2003 (October). *Draft Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project.* State Clearinghouse #2001072062. Marysville, CA. Prepared by EDAW, Jones & Stokes, and Flood Control Study Team.

- Yuba County Water Agency. 2004 (March). *Final Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project.* State Clearinghouse #2001072062. Marysville, CA. Prepared by EDAW, Jones & Stokes, and Flood Control Study Team.

- Three Rivers Levee Improvement Authority. 2004 (August). *Bear River and Western Pacific Interceptor Canal Levee Improvements Project Final Environmental Impact Report.* State Clearinghouse #2004032118. Marysville, CA. Prepared by Jones & Stokes, Sacramento, CA.

- Yuba County Water Agency and Three Rivers Levee Improvement Authority. 2004 (October). *Report on Feasibility of RD 784 Supplemental Flood Control Improvements of the*

Yuba-Feather Supplemental Flood Control Project. Marysville, CA. Prepared by Flood Control Study Team. Prepared for submittal to California Department of Water Resources, Sacramento, CA.

- Three Rivers Levee Improvement Authority. 2004 (September). *Draft Environmental Impact Report for the Feather Bear Rivers Levee Setback Project.* State Clearinghouse #2004072113. Marysville, CA. Prepared by EDAW and Flood Control Study Team.
- Three Rivers Levee Improvement Authority. 2004 (November). *Final Environmental Impact Report for the Feather Bear Rivers Levee Setback Project.* State Clearinghouse #2004072113. Marysville, CA. Prepared by EDAW and Flood Control Study Team.

2.10 ORGANIZATION OF THIS DOCUMENT

This DEIR is organized as follows:

- Chapter 1, "Summary," provides an overview of the findings and conclusions of this EIR.
- Chapter 2, "Introduction," provides an overview of the CEQA and EIR review process, summarizes the main features of the proposed project, outlines the scope and organization of this document, defines standard terms, and lists documents incorporated by reference.
- Chapter 3, "Project Purpose, Need, and Development," describes the purpose of and need for the FRLRP and explains the history of the project and the development of the project concept.
- Chapter 4, "Description of the Proposed Project," describes in detail the three project alternatives being considered and associated features.
- Chapter 5, "Environmental Analysis," describes—for the three proposed FRLRP alternatives and for each of the topics listed above in Section 2.6, "EIR Scope"—the regulatory background; environmental setting; less-than-significant, potentially significant, significant, and beneficial environmental effects; mitigation for potentially significant and significant effects; and any effects remaining significant after mitigation.
- Chapter 6, "Cumulative Impacts," describes the impacts of implementing the proposed FRLRP alternatives in combination with the impacts of related past, present, and reasonably foreseeable projects.
- Chapter 7, "Other CEQA-Required Sections," discusses growth-inducement potential of the project, known areas of controversy, irreversible and irretrievable commitment of resources, and unresolved issues.
- Chapter 8, "Alternatives," describes the alternatives that were considered but rejected for further evaluation, describes the alternatives carried forward for evaluation; compares the potential impacts of the three project alternatives evaluated in Chapter 5, "Environmental Analysis"; evaluates the No Project alternative; and discusses the "environmentally superior" alternative.

- Chapter 9, "Consultation and Coordination," describes the public and agency involvement effort associated with the project.
- Chapter 10, "References," lists the sources of information cited throughout the DEIR.
- Chapter 11, "Preparers of the Environmental Document," lists the individuals who contributed to preparation of the DEIR.
- Appendices provide background information.

2.11 STANDARD TERMINOLOGY

The DEIR uses several standard terms as follows:

- "Yuba-Feather Supplemental Flood Control Project," or "Y-FSFCP," is the set of flood control elements proposed by YCWA for implementation under the budget provisions of the Water Act of 2000.
- "Feather River Levee Repair Project," or "FRLRP," is the proposed project, an element of the Y-FSFCP, which would entail repairing and strengthening a portion of the Feather River and lower Yuba River left bank levees, and potentially constructing a setback levee along a portion of the Feather River using one of two possible alignment scenarios. Relocating and replacing RD 784 Pump Station No. 3 and constructing detention basins are also included in the project.
- "Feather-Bear Rivers Levee Setback Project," or "F-BRLSP," is an element of the Y-FSFCP that entails setting back a portion of the lower Bear River levee, as well as restoring riparian and other natural habitats in the levee setback area, removing the orchard from the lower Bear River floodway, and constructing detention basins. This project is currently under construction.
- "Proposed levee setback" means either the ASB levee setback or the intermediate levee setback, as evaluated in this EIR.
- "Proposed project" means any of the three project alternatives, consisting of levee repair and strengthening or a levee setback in conjunction with levee repair and strengthening, and associated features as summarized above in Section 2.3, "Summary Description of the Proposed Project," and described in detail in Chapter 4, "Description of the Proposed Project." Each of the three proposed project alternatives is evaluated at an equal level of detail in this EIR.
- "Project site" refers to all locations where project activities could occur, including but not limited to levee strengthening locations, setback levee alignments, the levee setback area, soil borrow areas, detention basins, construction staging areas, and pump station relocation sites.
- "Project area" generally means the project site (as defined above), areas immediately adjacent to the project site, and areas connecting portions of the project site, such as routes between soil borrow areas and the setback levee.

- "Project vicinity" generally refers to an area that is broader than the project area, and that encompasses all the lands that would be represented on a map depicting the project site.
- "No impact" means no change from existing conditions.
- "Less-than-significant impact" means no substantial adverse change in the physical environment (no mitigation needed).
- "Potentially significant impact" means a potential effect that may cause a substantial adverse change in the environment (mitigation is recommended, because in the CEQA process potentially significant impacts are treated as if they were significant impacts).
- "Significant impact" means a substantial adverse change in the physical environment (mitigation is recommended).
- "Significant and unavoidable impact" means a substantial adverse change in the physical environment that cannot feasibly be avoided, even with the implementation of mitigation.

2.12 PUBLIC PARTICIPATION AND ADDITIONAL STEPS IN THE CEQA REVIEW PROCESS

This DEIR is being distributed to interested agencies, stakeholder organizations, and individuals. This distribution ensures that interested parties have an opportunity to express their views regarding the environmental effects of the project, and to ensure that information pertinent to permits and approvals is provided to decision makers for the lead agency and CEQA responsible agencies. This document is available for review by the public during normal business hours at the office of the Yuba County Administrator at 915 Eighth Street, Suite 115, Marysville, California, as well as the Yuba County Library at 303 Second Street, Marysville, California.

The DEIR is being distributed for a 45-day review period that will end on September 18, 2006. Written comments should be sent directly to TRLIA by the close of business on September 18, 2006, at the following address:

Paul Brunner
Attn: Three Rivers Levee Improvement Authority
Government Center
915 Eighth Street, Suite 115
Marysville, CA 95901-5273
Fax: (530) 749-7312

Comments may also be provided via e-mail to pbrunner@co.yuba.ca.us. If comments are provided via e-mail, please include the project title in the subject line, attach comments in MS Word format, and include the commenter's U.S. Postal Service mailing address.

A public hearing on the DEIR will be held from 6:30 to 8:30 p.m. on September 6, 2006, in the Yuba County Government Center at 915 Eighth Street, Marysville. It is not necessary to provide testimony during the public hearing; comments on the DEIR will be accepted throughout the meeting and will be recorded at the public comment table. Comments may also be submitted throughout the comment period as described above.

Once all comments have been assembled and reviewed, responses will be prepared to address significant environmental issues that have been raised in the comments. The responses will be included in an FEIR.

CHAPTER 3 PROJECT PURPOSE, NEED, AND DEVELOPMENT

3.1 PROJECT PURPOSE AND OBJECTIVES

The Feather River Levee Repair Project (FRLRP), an element of the Yuba-Feather Supplemental Flood Control Project (Y-FSFCP), is proposed to increase flood protection in the Reclamation District (RD) 784 area of Yuba County. RD 784 is bounded by the Yuba River on the north, the Feather River on the west, the Bear River on the south, and the Western Pacific Interceptor Canal (WPIC) on the east. The proposed project would entail repairing and strengthening the existing Feather River left (east) bank levee from Project Levee Mile (PLM) 13.3 to PLM 17.1 and from PLM 23.6 to PLM 26.1, and repairing and strengthening the existing Yuba River left (south) bank levee from the confluence with the Feather River (PLM 0.0) upstream to PLM 0.3 (see Figure 2-3 in Chapter 2, "Introduction"). The segment of the Feather River left bank levee between PLM 17.1 and PLM 23.6 would either be repaired and strengthened in its current location, or set back following one of two possible alignment scenarios. Land uses in the levee setback area could consist of agricultural operations and/or habitat restoration activities that would be compatible with flood control objectives. However, no specific plans for habitat restoration in the setback area are proposed at this time.

The primary purpose of the proposed project is to correct identified deficiencies in the left bank levees of the Feather and Yuba Rivers, and consequently to improve flood protection for the RD 784 area of Yuba County. To a large extent, levee deficiencies in the project area relate to the potential for water to seep under (underseepage) and through (through-seepage) the levee soils during flood events, potentially leading to levee failure. The project design objectives focus on measures to bring the levees into compliance with Federal Emergency Management Agency (FEMA) geotechnical certification requirements for underseepage or through-seepage, as well as engineering and design standards of the State of California Reclamation Board (The Reclamation Board) and the U.S. Army Corps of Engineers (Corps). The proposed project is also intended to address areas along the Feather River levee where erosion of the levee is a concern. These specific project design objectives are consistent with the following overall project objectives:

- to secure flood protection for at least a flood event with a 0.5% (or 1-in-200) annual chance of exceedance,
- to help secure FEMA certification of the subject reaches of levee,
- to avoid increasing downstream flow and stage during peak-flow conditions,
- to achieve these objectives as soon as possible, and
- to incorporate environmental mitigation as appropriate.

The proposed actions to achieve these objectives are the subject of this environmental impact report (EIR). These objectives are consistent with the requirements in Section 15124(a) of the State CEQA Guidelines and were used in the development and assessment of project alternatives.

3.2 NEED FOR IMPROVED FLOOD PROTECTION

3.2.1 BACKGROUND

Yuba County has a long history of flooding. Several conditions combine to pose unique challenges for flood control operations in the Yuba-Feather River system. These conditions are described in detail in the *Draft Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project* (Yuba County Water Agency 2003). Historical accounts describe large floods on the Feather and Yuba Rivers in 1839-40, 1847, 1850, 1852, 1853, 1861-62, 1867-68, 1881, 1886, and 1889-90. Despite the construction of a system of flood control levees beginning in the early 20th century, recorded floods occurred in 1907, 1909, 1928, 1937, 1940, 1962, and 1963, and five major floods—in 1950, 1955, 1964, 1986, and 1997—caused substantial property damage and loss of life. (Yuba County Water Agency 2003.) The floods of 1986 and 1997 were especially catastrophic for Yuba County, inundating tens of thousands of acres, destroying thousands of homes and businesses, and causing loss of life. More than 100,000 people were evacuated from the region during the 1997 flood, the largest evacuation in California history.

Two major flood protection efforts resulted from the 1986 Central Valley floods. First, the Corps and California Department of Water Resources (DWR) initiated the System Evaluation Project, which restored federally constructed levees in RD 784 to current design standards and reestablished the 1957 design top-of-levee profile. (In general, on the Feather and Yuba Rivers, the 1957 design level for water surface elevation is greater than the water surface elevation for the FEMA-designated "100-year flood.") Most of the System Evaluation levee reconstruction work in RD 784 was completed in 1998 at a cost of approximately $32 million. This work consisted of 5.2 miles of toe drains and stability berms, 6.2 miles of slurry cutoff walls, and 7.5 miles of levee height restoration. Yuba County Water Agency (YCWA) paid an additional $2.2 million to deepen levee reconstruction slurry cutoff walls from the System Evaluation design to the Yuba River Basin Project design (Yuba County et al. 2004). The 1997 flood resulted in the identification of additional seepage problems, however, leading to the Corps' $6 million System Evaluation Site 7 Extension project, which was completed in 2004.

The second effort was YCWA's initiation in 1988 of the Yuba River Basin Project, which led to a Corps project designed to achieve what was then considered to be a "200-year" level of protection for RD 784 levees. The Yuba River Basin Project was approved by Congress in 1998, and a construction start was authorized in 2002. In 2003, new Corps underseepage guidelines led to reevaluation of the project, which substantially increased the estimated cost. Because of this cost increase, the Yuba River Basin Project must be reauthorized by Congress. A General Reevaluation Report is currently being prepared by the Corps to obtain a new project authorization and to initiate construction.

In general, levee strength and stability remains a significant concern throughout the RD 784 service area.

3.2.2 YUBA-FEATHER SUPPLEMENTAL FLOOD CONTROL PROJECT

In response to the catastrophic flood of 1997, YCWA initiated a seven-phase program of flood control studies to identify methods to achieve a higher level of protection, particularly for the areas in RD 784 that had been subject to flooding several times in the past. The goal of this effort was to substantially improve the flood protection that would be provided by the System Evaluation Project and the Yuba River Basin Project. As part of this effort, YCWA identified and evaluated 33 potential elements representing a comprehensive range of available technology that could provide portions or all of the objective flood control protection. These ranged from relatively minor operational changes providing only a small increment of flood volume reduction to large single-purpose and multipurpose dams with substantial flood volume reductions. These elements are described in Chapters 3 and 8 of the Y-FSFCP draft EIR (DEIR) (Yuba County Water Agency 2003).

Following the passage of the Costa-Machado Water Act of 2000 (Water Act of 2000) by California voters, YCWA's flood control study team turned the focus of its seven-phase study to those measures that could be achieved within the budget provisions of the Water Act of 2000, which provided for a total of $90 million in bond funds targeted for the Yuba-Feather River basin. This ongoing effort, funded through Water Act of 2000 grant monies, is the Y-FSFCP. Of the $90 million, $70 million was targeted for planning, design, and construction work and $20 million was targeted for environmental mitigation and enhancement.

As part of the Y-FSFCP studies, YCWA prepared a feasibility study, including a DEIR released in October 2003 (Yuba County Water Agency 2003). This study evaluated combinations of three flood control elements:

- an outlet capacity increase at New Bullards Bar Reservoir,
- forecast-coordinated operations of New Bullards Bar Reservoir and Lake Oroville, and
- a setback of the left (east) bank levee of the Feather River between Shanghai Bend and the Bear River.

The Y-FSFCP levee setback was proposed for two segments, which were referred to as the Above Star Bend (ASB) and Below Star Bend (BSB) levee setbacks. The ASB levee setback was proposed to extend approximately 5.2 miles along the Feather River, from southwest of the Yuba County Airport to 1 mile downstream of Star Bend. The BSB levee setback was proposed to extend approximately 3.4 miles, from 1 mile downstream of the ASB levee setback to 2,000 feet upstream of the confluence with the Bear River. It was assumed that the levee setbacks evaluated in the Y-FSFCP would include a habitat restoration component in the expanded floodway area, combined with some continuing agricultural uses. The final EIR (FEIR) for the Y-FSFCP was certified and the program of elements approved by the YCWA Board in March 2004.

3.2.3 FLOOD RISKS ALONG THE BEAR RIVER AND WESTERN PACIFIC INTERCEPTOR CANAL

In May 2003, while YCWA was completing this first level of Y-FSFCP studies, the Corps, in a separate draft floodplain mapping study for DWR on the Feather River and its tributaries, identified several deficiencies in freeboard on the Bear River and WPIC levees that prevent these

levees from meeting the FEMA criteria for protecting RD 784 from a "100-year" flood event. (The top of the levee must be at least 3 feet higher than the 100-year event.) This information was unexpected by Yuba County officials because the 1998 Corps Yuba River Basin study did not recommend any work for the Bear River and WPIC levees to achieve a 200-year level of protection for the RD 784 area. In addition, it was found that a 2,800-foot stretch of the Yuba River levee on the upstream side of State Route (SR) 70 did not meet slope stability requirements. These issues were seen as a major setback to the long-term plan to increase the level of flood protection to a 200-year and eventually greater level of protection.

In 1993, following the initiation of the System Evaluation Project and the Yuba River Basin Project, and before the most recent devastating flood (in 1997), Yuba County had approved the Plumas Lake Specific Plan, which provides for a 12,000-home development on 5,200 acres in the southern portion of the RD 784 area. Development was initiated in the Plumas Lake Specific Plan area in 2002. The results of the 2003 Corps floodplain mapping study indicate that the people and property in the RD 784 area, including homes that had already been built in the Plumas Lake Specific Plan area before the release of the Corps study, are subject to a much higher flood risk than previously believed. Without levee improvements that meet FEMA criteria, FEMA may issue new Flood Insurance Rate Maps (FIRMs) for the RD 784 area. Once the FIRMs are issued, flood insurance rates for the area would increase and carrying flood insurance would become mandatory. The ongoing economic development of the county could be jeopardized.

To avoid having RD 784 mapped into the FEMA 100-year floodplain, the RD 784 levees will need to be certified as meeting current FEMA criteria. Consequently, YCWA, RD 784, and Yuba County, in consultation with many landowners and developers in the south county, elected to move aggressively on a program for evaluating options for achieving FEMA certification of the RD 784 levees. One step was the formation of the Three Rivers Levee Improvement Authority (TRLIA), a joint powers authority composed of Yuba County and RD 784 that was formed to address funding and implementation of levee repairs for the RD 784 area.

RD 784 first completed a Problem Identification Study to determine the magnitude of the repair effort necessary to achieve FEMA certification and a higher level of protection on the WPIC and Bear River levees. A geotechnical engineering report was prepared in November 2003 that identified significant geotechnical problems with the levee foundations along most of the Bear River levee and several reaches of the WPIC levee. Areas of concern with regard to erosion were also identified. Subsequently, a more in-depth engineering study was initiated to develop design alternatives to meet the study objectives and develop plans and specifications for some of the selected construction elements that compose the resulting FEMA certification program. These construction elements—which are in different stages of planning and implementation—have been addressed in ongoing studies completed by RD 784, TRLIA, and others. Priority was given to these construction elements, which are all part of the Y-FSFCP:

- repairs and improvements to the Yuba River levee above SR 70,
- repairs and improvements to the upper Bear River and WPIC levees (described below),
- repairs and modification to RD 784 Pump Station No. 6,

- construction of the Olivehurst detention basin, and
- construction of a setback levee along the lower Bear River to tie into the Feather River levee below RD 784 Pump Station No. 2 (described below).

TRLIA prepared a study of repairs and improvements to the upper Bear River and WPIC levees and the lower Bear River levee, and issued findings in May 2004 in the EIR for the Bear River and Western Pacific Interceptor Canal Levee Improvements Project (Bear River Project) (Three Rivers Levee Improvement Authority 2004). The Bear River Project proposed implementing flood control improvements along the Bear River and the WPIC, including raising and strengthening the Bear River right (north) bank levee in place and completing various related improvements to provide protection from a 200-year flood event, such as seepage and erosion protection measures.

In September 2004, TRLIA prepared another EIR that evaluated alternatives to address identified levee deficiencies in the right bank levee of the lower Bear River. The Feather-Bear Rivers Levee Setback Project (F-BRLSP) DEIR evaluated two setback levee alternatives that would involve either setting back the left bank levee of the lower Feather River and the right bank levee of the lower Bear River or setting back only the right bank levee of the lower Bear River. The EIR prepared for the F-BRLSP resulted in selection of the lower Bear River levee setback as the preferred alternative. The FEIR for the F-BRLSP was completed and certified by the TRLIA Board in November 2004. As approved, this setback levee project involves setting back the right bank levee of the lower Bear River from the confluence with the Feather River, where the alignment ties in with the existing Feather River levee below RD 784 Pump Station No. 2, to approximately 1,400 feet southwest of SR 70. The Bear River setback levee precludes the need to improve the Feather River levee below Pump Station No. 2. (Other elements of the setback project are habitat restoration in the levee setback area, the removal of the orchard in the lower Bear River floodway and replacement with riparian habitat, and the construction of a detention basin outside the levee setback area.) This project replaces particular elements of the Bear River Project, including raising and strengthening of the lower Bear River levee. In addition to addressing identified deficiencies in the lower Bear River levee, setting back the lower Bear River levee will remove channel constrictions, thereby improving the level of flood protection for the RD 784 area by lowering upstream water surface elevations.

3.3 DEVELOPMENT OF THE FEATHER RIVER LEVEE REPAIR PROJECT

As described above, the proposed FRLRP is an element of the Y-FSFCP that would address the identified deficiencies in the left bank levees of the Yuba and Feather Rivers, and consequently would improve flood protection for the RD 784 area of Yuba County. Flood control elements examined in the feasibility study and the EIR prepared for the Y-FSFCP included a setback of the left bank levee of the Feather River between Shanghai Bend and the Bear River. The levee setback was proposed for two segments, which were referred to as the ASB and BSB levee setback areas. YCWA subsequently altered the BSB setback levee concept described in the Y-FSFCP programmatic EIR to incorporate a setback of the right (north) bank levee of the lower Bear River, which is the major component of the F-BRLSP. The levee setback component of the project that is the subject of this DEIR, the FRLRP, is a modification of the ASB levee setback that was previously proposed and evaluated in the Y-FSFCP EIR.

Ongoing engineering and technical feasibility studies have resulted in development of three project alternatives to meet the project objectives discussed above and to correct levee deficiencies for the Feather and lower Yuba Rivers in Yuba County:

- *Alternative 1 – The Levee Strengthening Alternative.* Under this alternative, levee repair and strengthening activities would be completed along the entire length of FRLRP project Segments 1, 2, and 3 (Figure 2-3 in Chapter 2, "Introduction"). Establishment of soil borrow areas and construction of a detention basin would be required. Implementation of Alternative 1 would involve removing existing RD 784 Pump Station No. 3 and installing a new pump station east of the Feather River levee, which would correct seepage deficiencies related to the existing pump station.

- *Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative.* Under this alternative, levee repair and strengthening activities would be completed along project Segments 1 and 3. Repair and strengthening activities in these segments would be the same as for Alternative 1. In project Segment 2, a setback levee would be constructed roughly following the ASB setback levee alignment identified in the Y-FSFCP EIR. Establishment of soil borrow areas and construction of a detention basin would be required. Similar to Alternative 1, a pump station to replace Pump Station No. 3 would be installed.

- *Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative.* Under this alternative, the same levee repair and strengthening activities described for Alternatives 1 and 2 would be conducted in project Segments 1 and 3. In Segment 2 a modified setback levee would be constructed that would allow less land to be placed in the new floodway than under Alternative 2. The general design, construction, and operational characteristics of an intermediate setback levee under Alternative 3 would be same as for the ASB setback levee under Alternative 2.

The proposed FRLRP consists of implementation of one of these three potential alternatives, each evaluated at an equal level of detail in this DEIR. These alternatives are described in detail in Chapter 4, "Description of the Proposed Project."

CHAPTER 4 DESCRIPTION OF THE PROPOSED PROJECT

4.1 INTRODUCTION

4.1.1 OVERVIEW

Most of the levee system in Yuba County was constructed during the 1920s using construction practices of that era. Studies by the California Department of Water Resources (DWR), the U.S. Army Corps of Engineers (Corps), Reclamation District (RD) 784, and Three Rivers Levee Improvement Authority (TRLIA) have found that several reaches of the levee system protecting the RD 784 area do not satisfy geotechnical criteria for seepage at the water surface elevation for the 100-year flood event. In addition, constrictions in the Feather and Bear Rivers have created backwater effects that raise the flood stage at upstream locations.

An analysis of the Feather River levee was performed by Kleinfelder and is described in *Problem Identification Report, TRLIA Phase 4 Feather River and Yuba River Left Bank Levees, Reclamation District No. 784* (PIR) (Kleinfelder 2006). The PIR addresses the Feather River left (east) bank levee from approximately Project Levee Mile (PLM) 13.3 near RD 784 Pump Station No. 2 to the beginning of the Yuba River left (south) bank levee at approximately PLM 26.1, and the Yuba River left bank levee from PLM 0.0 to PLM 0.3 (Figure 4-1, "FRLRP Project Features"). The purpose of the analysis described in the PIR was to perform a feasibility-level evaluation of subsurface geotechnical conditions and levee conditions in accordance with Federal Emergency Management Agency (FEMA) requirements. The conclusions of the PIR indicate that portions of the subject levee do not currently meet FEMA geotechnical certification requirements for through-seepage or underseepage.

To correct the deficiencies identified along the levee segments analyzed in the PIR, three project alternatives for the Feather River Levee Improvement Project (FRLRP) are being considered and are analyzed in this environmental impact report (EIR):

- Alternative 1—Repair and strengthen the existing Feather River left bank levee from PLM 13.3 to PLM 26.1 (from approximately Pump Station No. 2 to the mouth of the Yuba River), and the Yuba River left bank levee from PLM 0.0 to PLM 0.3 (from the confluence with the Feather River to the Union Pacific Railroad crossing at the State Route [SR] 70 bridge) (Figure 4-1). This alternative is referred to in subsequent sections of this EIR as either "Alternative 1" or "the Levee Strengthening Alternative."

- Alternative 2—Strengthen the existing Feather River left bank levee from PLM 13.3 to PLM 17.1 (the area below Star Bend) and from PLM 23.6 to PLM 26.1 (from Shanghai Bend to the confluence with the Yuba River), and the Yuba River left bank levee from PLM 0.0 to PLM 0.3. Construct a new setback levee (the "ASB setback levee") between Feather River PLM 17.1 and PLM 23.6, approximately following the 2003 Above Star Bend (ASB) setback levee alignment identified in the EIR for the Yuba-Feather Supplemental Flood Control Project (Y-FSFCP) (Yuba County Water Agency 2003a). This alternative is referred to in subsequent sections as either "Alternative 2" or "the Levee Strengthening and ASB Setback Levee Alternative."

- Alternative 3—Strengthen the existing Feather River left bank levee from PLM 13.3 to PLM 17.1 and from PLM 23.6 to PLM 26.1, and the Yuba River left bank levee from PLM 0.0 to PLM 0.3. (This is the same levee strengthening activity proposed under Alternative 2.) Construct a new setback levee (the "intermediate setback levee") along an intermediate alignment between approximately Feather River PLM 17.1 and PLM 23.6. This alternative is referred to in subsequent sections as either "Alternative 3" or "the Levee Strengthening and Intermediate Setback Levee Alternative."

Each of these three alternatives is analyzed at an equal level of detail in this EIR, and the EIR can support the approval and implementation of any one of these alternatives by TRLIA.

The area considered for levee improvements is divided into three project segments as follows:

- Segment 1—The existing Feather River left bank levee from PLM 13.3 to PLM 17.1 (from approximately Pump Station No. 2 to Star Bend) (Figure 4-1). Proposed improvements to this levee segment are identical for each project alternative and consist of repairing and strengthening the existing levee in place to correct seepage and/or stability deficiencies.

- Segment 2—The existing Feather River left bank levee from approximately PLM 17.1 to PLM 23.6 (from Star Bend to immediately south of Shanghai Bend [west of the Yuba County Airport]). Improvements proposed for this levee segment are different for each project alternative and are briefly described below.

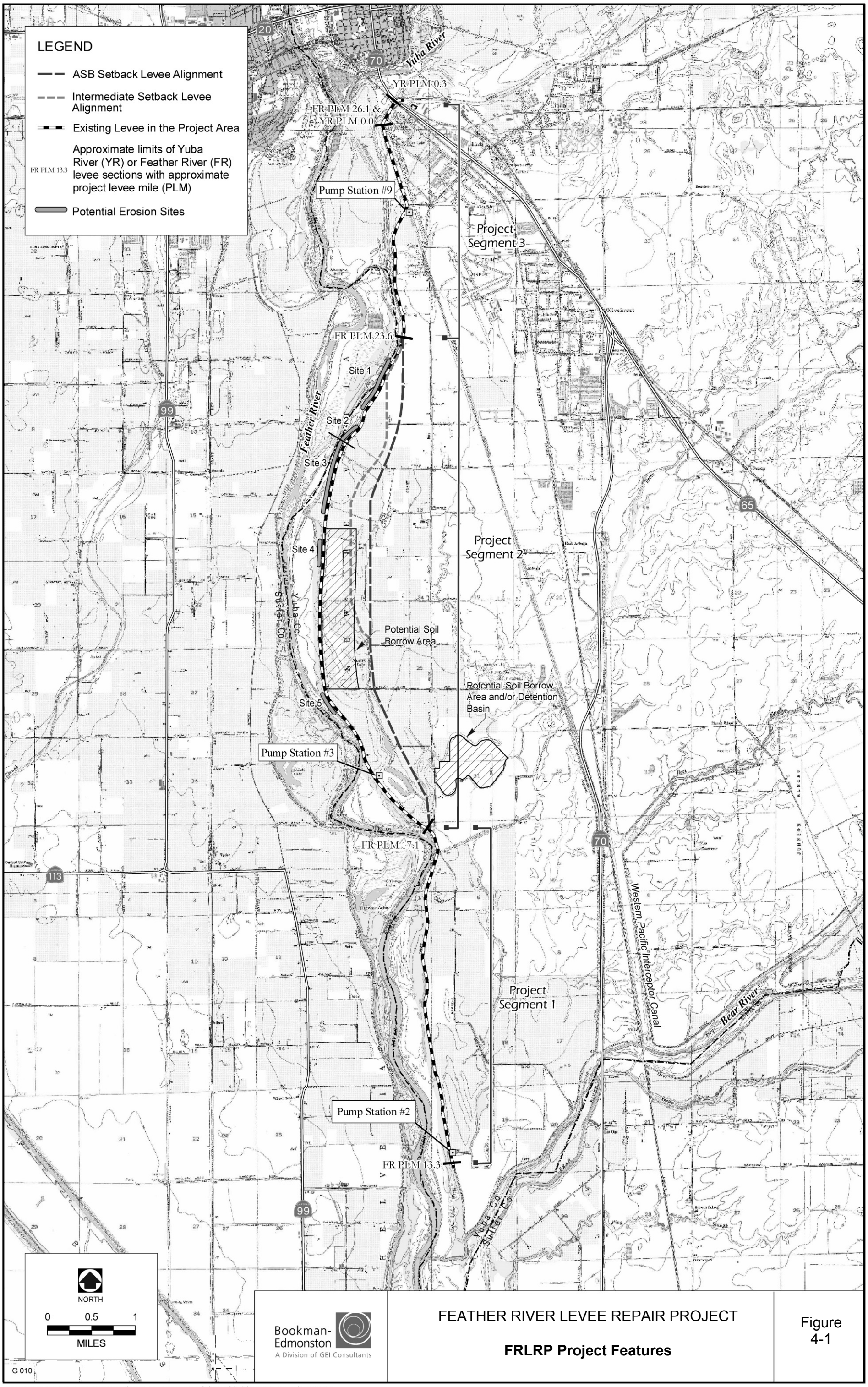
  - Alternative 1—Repair and strengthen the existing levee in place to correct seepage and/or stability deficiencies and address areas of the levee where erosion has been identified as a concern.

  - Alternative 2—Replace the existing levee with a new setback levee (the ASB setback levee) located approximately along the ASB setback levee alignment studied as part of the 2003 feasibility report.

  - Alternative 3—Replace the existing levee with a new setback levee (the intermediate setback levee), with the northern portion of this setback levee located mostly west of the 2003 ASB setback levee alignment.

  Relocation and replacement of the existing RD 784 Pump Station No. 3 is also included with Segment 2. The work would be similar for each alternative, although the location of the new pump station would depend on the alternative.

- Segment 3—The existing Feather River left bank levee from PLM 23.6 to PLM 26.1, and the Yuba River left bank levee from PLM 0.0 to PLM 0.3 (west of the Yuba County Airport to the railroad crossing at the SR 70 bridge). Improvements to this segment of the levee are identical for each alternative and would consist of repairing and strengthening the existing levee in place to correct seepage and/or stability deficiencies.



FEATHER RIVER LEVEE REPAIR PROJECT

FRLRP Project Features

Figure 4-1

Sources: EDAW 2004; GEI Consultants, Inc. 2004; Aerial provided by GEI Consultants, Inc.

Under Alternative 2 or Alternative 3, replacing the existing levee with a setback levee would allow for expansion of the floodway and associated benefits in the form of lowered water surface elevations during high-flow events. However, removal of the existing levee is subject to federal authorization through the Corps, and the timing of such authorization is uncertain. Until Corps authorization to remove the existing levee is received, it is possible that the existing levee in Segment 2 could be temporarily retained in its current condition in addition to a setback levee being constructed. In this case, the setback levee would more appropriately be described as a "backup levee," as it would provide a second level of flood protection behind the existing levee. In such a case, the area between the two levees would be inundated only if the existing levee were to breach. A backup levee would be constructed using the same methods and design as the setback levee, as described in this chapter.

It is anticipated that project design and construction will be phased as follows:

- Segments 1 and 3—Design 2006, construction 2007 (into 2008 for Alternatives 2 and 3)
- Segment 2—Design late 2006 and 2007, construction late 2007 through 2008

Under all alternatives, the construction period is considered to be 2 years (2007 and 2008). However, there would be little construction activity during the winter months due to restrictions associated with weather, soil conditions, and various agency regulations and guidelines. Therefore, the actual period of regular construction activity would be spring through late fall 2007 and spring through late fall 2008.

Section 4.1.3, "Level of Design Detail," below provides an overview of the level of design/planning detail for the three potential project alternatives evaluated in this EIR. Section 4.2, "Project Planning History," describes the background information taken into consideration in development of the three project alternatives. The three alternatives are described separately in Sections 4.3 (Alternative 1), 4.4 (Alternative 2), and 4.5 (Alternative 3). Section 4.6, "Implementation," provides additional details regarding the construction schedule and operations and maintenance activities for of the proposed project.

Please see Chapter 2, "Introduction," and Chapter 3, "Project Purpose, Need, and Development," for information related to all alternatives, such as regional setting, project objectives, a list of agencies expected to use the EIR, and a list of permits and other approvals required to implement the project.

4.1.2 GENERAL LEVEE DESIGN CRITERIA

The State of California Reclamation Board (The Reclamation Board) has primary jurisdiction for approval of levee design and construction. The standards of The Reclamation Board, found in Title 23, Sections 111–137 of the California Code of Regulations (CCR) (i.e., 23 CCR Sections 111–137), constitute the primary state standard. As stated in 23 CCR 120, levee design and construction must be in accordance with Corps Engineer Manual EM 1110-2-1913, *Engineering and Design—Design and Construction of Levees* (U.S. Army Corps of Engineers 2000). Additional criteria applicable to the Corps Sacramento District are contained in *Standard Operating Procedure Engineering Design Guidance 2003 (SOP EDG-03) for Geotechnical Levee Practice* (SOP), adopted by the Corps in August 2004. These documents are the primary

federal standards applicable to this project, as supplemented by additional prescriptive standards contained in 23 CCR Section 120. These additional standards prescribe minimum levee cross-sectional dimensions, construction material types, and compaction levels.

These requirements provide the basis for the design of the setback levee in FRLRP Segment 2 included in project Alternatives 2 and 3 (i.e., the ASB setback levee alignment and the intermediate setback levee alignment). Where these requirements can be applied to the existing Feather River and Yuba River levees in the project area, compliance or noncompliance with these requirements forms the basis for identifying needed repairs to levee segments to be improved in place under project Alternatives 1, 2, and 3.

Requirements for levee design and construction specified in 23 CCR Section 120 include the following:

- *Freeboard:* The levee must have a minimum of 3 feet of freeboard above the design floodplain.
- *Minimum cross section dimensions and slopes:* For a levee section on a main river channel, the following minimum dimensions are required:
  - crown width of 20 feet,
  - patrol road width of 12 feet,
  - waterside slope of 3:1 (horizontal:vertical) (H:V), and
  - landside slope of 2:1 H:V. (By comparison, the SOP, adopted by the Corps, specifies a landside slope of 3:1 H:V for new levees.)
- *Levee embankment materials:* "Impervious" material, as defined in 23 CCR Section 120, must be used for construction of new levees. Special construction details (e.g., 4:1 slopes, zoned embankments) may be substituted where these soil properties are not readily attainable. These requirements do not apply where the design of a new levee uses zones of various materials or soil types.
- *Foundation seepage control:* A cutoff trench must be excavated to an impervious stratum (where practical), where subsurface explorations disclose a pervious substratum underlying the location where a levee will be constructed.
- *Inspection trench:* An inspection trench, with a depth of 6 feet or greater and a bottom width of 12 feet or greater, must be excavated in the foundation along the length of a new or reconstructed levee.
- *Easements:* A 10-foot-wide easement must be provided adjacent to the landside levee toe, and the areas adjacent to the toe of the levee slopes must drain away from the levee for a minimum distance of 10 feet. (It should be noted, however, that the Corps's SOP specifies minimum waterside and landside easements of 15 feet and 20 feet, respectively. In addition,

permits recently issued by The Reclamation Board have included special conditions that require 50-foot-wide waterside and landside easements for new levee construction.)

Ditches, power poles, pipelines, and other structures must be situated a minimum distance of 10 feet beyond the levee toes. At locations where a drainage ditch or other seepage control facility is provided landward of the levee, the appropriate right-of-way for the feature must be included in the levee easement.

- *Additional geometric requirements:* The bottom of any nearby agricultural ditch must be located at an elevation above the projected downward extension of the landside levee slope.

4.1.3 LEVEL OF DESIGN DETAIL

Many of the project design details described in this EIR are the result of a preliminary project design process that has been completed for the three project alternatives. The general levee design criteria described above form the basis of the preliminary project design. The preliminary design effort also included collection and review of civil engineering, geological, and geotechnical data, as well as supplemental site exploration programs (see Section 4.1.4, "Preliminary Geotechnical Evaluation," below). The preliminary design concepts are based on limited subsurface investigations and data and include conservative assumptions, particularly regarding control of seepage underflow. Additional field data would be obtained during detailed design, which would include review by a Board of Senior Consultants (BOSC).

The structural features of the proposed levee repairs and of the setback levee included in Alternatives 2 and 3 have been developed to a level of detail sufficient for a complete "project-level" environmental analysis. As discussed above, detailed designs for levee repair activities in project Segments 1 and 3 are scheduled to occur in 2006. The detailed design process for these segments is taking place concurrently with the California Environmental Quality Act (CEQA) review process (i.e., with review of this EIR). Detailed designs for Segment 2 would occur in late 2006 and 2007, after the CEQA process is complete and a preferred project alternative has been selected.

4.1.4 PRELIMINARY GEOTECHNICAL EVALUATION

Preliminary geotechnical investigations were performed to provide a basis for the preliminary design of the proposed levee repairs/improvements and levee setback. The investigations included:

- a review of the available geological and geotechnical information,
- a geological reconnaissance of the existing and setback levee alignments,
- the drilling of test borings along the existing and setback levee alignments,
- laboratory index testing of selected soil samples, and
- the presentation of the preliminary geotechnical data and evaluations.

Geotechnical investigation data and results are presented in technical memoranda and reports on geotechnical conditions. These memoranda and reports are attached to or include *Report on Feasibility, Yuba-Feather Supplemental Flood Control Project* (Yuba County Water Agency 2003b) and the PIR (Kleinfelder 2006) described above in Section 4.1.1, "Overview." Based on

the results of the preliminary geotechnical evaluations, the levee repairs/improvements and setback levee alignments considered in the three proposed project alternatives are judged to be technically suitable, as long as appropriate measures are incorporated in the project design to minimize the potential for seepage-induced erosion problems and other issues that have plagued the existing levees in the past.

4.2 PROJECT PLANNING HISTORY

As discussed in Chapter 3, "Project Purpose, Need, and Development," the FRLRP is in part a modification and expansion of early work performed for TRLIA and Yuba County Water Agency (YCWA), as well as more recent analysis, described below. As part of the study and evaluation process, additional project alternatives beyond the three analyzed in the body of this EIR were considered but not analyzed further. These additional alternatives are discussed in Chapter 8, "Alternatives."

4.2.1 FEATHER RIVER LEVEE SETBACK

The preliminary design of the ASB Feather River setback levee was described previously in Appendix E, "Preliminary Design," of *Report on Feasibility, Yuba-Feather Supplemental Flood Control Project* (Yuba County Water Agency 2003b). The levee alignment was selected because it could achieve significant reductions in river stage along the Feather River while maintaining a Feather River floodway width that would be consistent with upstream and downstream reaches of the river. The location of the setback levee was aligned as much as possible along a topographically elevated area formed by older, more consolidated soils.

As described earlier, the ASB setback levee alignment for the FRLRP has been modified at the northern end from the alignment studied previously. The ASB setback levee alignment reflected in the FRLRP was developed, in part, through an alternatives identification process conducted in early 2006. Members of TRLIA's flood control study team participated in the identification, evaluation, and selection of alternatives to achieve desired flood protection results along the Feather River left bank levee and the lower Yuba River left bank levee (i.e., in the FRLRP project area). Through this process, the northern end of the previous ASB setback levee alignment was modified to replace a section of existing levee where seepage deficiencies had recently been discovered.

During the alternatives evaluation process, the intermediate setback levee concept was also identified. An intermediate setback levee was originally considered to allow a comparison between potential reductions in flood control benefits associated with providing a smaller levee setback area with the ability to reduce land acquisition costs and impacts in and adjacent to the setback area. Review of numerous intermediate setback levee options by the flood control study team resulted in the selection of the intermediate setback levee alignment included in this EIR analysis as a representation of the various alignment options available under the intermediate setback levee scenario.

The alternatives development and selection process is also discussed in Chapter 8 of this EIR.

4.2.2 FEATHER RIVER AND YUBA RIVER LEVEE REPAIR

An analysis of the Feather and Yuba River levees was performed by Kleinfelder and is described in the PIR (Kleinfelder 2006). The PIR addresses the Feather River left bank levee from approximately PLM 13.3 (near Pump Station No. 2) to the beginning of the Yuba River left bank levee at approximately PLM 26.1, and the Yuba River left bank levee from PLM 0.0 to PLM 0.3. The purpose of the analysis described in the PIR was to perform a feasibility-level evaluation of subsurface geotechnical conditions and levee conditions in accordance with FEMA requirements. The PIR indicates that portions of the subject levee do not currently meet FEMA geotechnical certification requirements for through-seepage or underseepage.

The results of the PIR precipitated the evaluation of levee repairs and strengthening because the Y-FSFCP and other past studies had not already identified a setback levee or other actions to correct the Feather River left bank levee segment north of PLM 23.6 and the Yuba River left bank levee segment from PLM 0.0 to PLM 0.3. In addition, because of the presence of numerous homes, businesses, and other facilities near or adjacent to the levee in these areas, these levee segments do not lend themselves to correction or repair via construction of setback levees. The approach of repairing existing levees in their current alignment was also applied to the levees in FRLRP project Segments 1 and 2 (Figure 4-1), as identified in the descriptions of each FRLRP project alternative below.

In early 2006, the *Three Rivers Levee Improvement Authority Phase IV Erosion Investigation* was completed (MBK Engineers 2006). The investigation identified several areas between Feather River PLM 17.1 and PLM 23.6 (all within FRLRP project Segment 2) where erosion of the left bank levee is a concern and where corrective action should be taken. Therefore, if this levee segment is repaired in place as part of the FRLRP rather than replaced with a setback levee, then the FRLRP includes repair of these erosion sites (see discussion of Alternative 1 below).

4.3 ALTERNATIVE 1—THE LEVEE STRENGTHENING ALTERNATIVE

4.3.1 PRELIMINARY DESIGN OF ALTERNATIVE 1

As described above, Alternative 1, The Levee Strengthening Alternative, would consist of repairing and strengthening each of the three levee segments under consideration:

- Segment 1—Feather River left bank levee from PLM 13.3 to PLM 17.1
- Segment 2—Feather River left bank levee from PLM 17.1 to PLM 23.6
- Segment 3—Feather River left bank levee from PLM 23.6 to PLM 26.1 and Yuba River left bank levee from PLM 0.0 to PLM 0.3

Repairs and strengthening would include seepage and stability mitigation measures identified in the PIR. Areas of erosion concern identified in the *Three Rivers Levee Improvement Authority Phase IV Erosion Investigation* (MBK Engineers 2006) would also be addressed. No setback levee is included in this alternative. The intended outcome of the repairs and strengthening is to ensure that all portions of the levee meet the engineering and design standards of The

7Reclamation Board and the Corps (described above) and that the levees meet FEMA geotechnical requirements for through-seepage and underseepage at the water surface elevation for the 200-year flood event.

In the following discussion, the preliminary designs of project Segments 1 and 3 are discussed together. This approach is taken because levee repair and strengthening activities would be the same across all three project alternatives in Segments 1 and 3. Therefore, the preliminary design characteristics for these segments discussed here for Alternative 1 would also apply to Alternatives 2 and 3. The preliminary design for Segment 2 is then discussed separately, as the approach to addressing flood control needs in this segment varies from alternative to alternative.

Segments 1 and 3—Seepage and Erosion Control

Seepage Control

Based on the performance history and the results of investigations at the existing Feather River and Yuba River levees, it is anticipated that seepage control measures would be required along significant portions of project Segments 1 and 3. Susceptibility of the existing levee embankments and foundation soils to seepage and internal erosion is the primary technical concern related to levee integrity and stability. Soils in the levee foundations, and also in the embankments themselves, include fine sands and fine silty sands. These permeable, cohesionless, and easily erodible soils have a high potential for undergoing internal erosion (a phenomenon referred to as “piping”) when subjected to moderately high hydraulic gradients that are sustained for more than several days. Animal burrows can exacerbate the situation by providing a shortened conduit for the initiation of seepage and internal erosion. Muddy seepage, boils, and sinkholes are external, landside manifestations of ongoing seepage and internal erosion processes that can occur when the levee is subjected to sustained high water levels. Internal erosion of levee embankment or foundation materials poses a threat to levee integrity during flood events. If unchecked, this progressive failure mechanism can eventually result in sudden, catastrophic failure of the levee.

The proposed preliminary designs for Segments 1 and 3 recognize these unfavorable soil conditions. They include the following seepage control measures to reduce the potential for seepage-induced erosion of the levee embankment and foundation soils:

- cutoff trenches/slurry cutoff walls,
- seepage/stability berms, and
- relief wells.

Information on the type, location, and extent of seepage control measures provided below is based primarily on recommendations included in the PIR (Kleinfelder 2006). Recommendations included in the PIR are considered preliminary. The maximum reaches in which seepage control measures may be required were identified for project budgeting purposes; however, definition of the reaches should be considered approximate at best. The seepage control system would be refined based on detailed field investigations and analyses, to be performed during detailed design.

Cutoff Trenches/Slurry Cutoff Walls

Because of the depths and thickness of pervious strata generally present along the Feather River and Yuba River levee alignments, the most practical method of constructing a cutoff trench is the slurry wall method. In the slurry wall method, a cutoff trench is excavated and filled with a bentonite slurry to keep the trench from caving during excavation; the trench is then backfilled with native soil mixed with cement-bentonite (for cutoff walls constructed through levees) or bentonite (for cutoff walls not installed through the levee) to provide a cutoff with reduced permeability.

An alternate method for constructing a deep cutoff wall is with the deep soil-mixing (DSM) method. In the DSM method, a cutoff wall is constructed by mixing in situ soils with bentonite or cement-bentonite using large-diameter augers. While the DSM method is more expensive than the slurry wall method for a given cutoff wall depth, it can be used to construct a cutoff wall in excess of the practical depth limit for the slurry wall method (about 80 feet). Therefore, the DSM method could be considered for cutoff walls deeper than about 80 feet.

A slurry cutoff wall would be provided along those portions of the levees where widespread strata of permeable sands and gravels exist in the foundations, and in locations where the levee embankments contain sand layers. Figure 4-2, “Preliminary Design for Levee Strengthening Measures,” shows a typical levee cross section with a slurry cutoff wall. Preliminary estimates of the locations, lengths, and depths of slurry cutoff walls based on the PIR (Kleinfelder 2006) are also shown in Figure 4-2. The purpose of the slurry cutoff wall is to dissipate the hydraulic gradients through the levee embankment and/or in the levee foundation and reduce seepage pressure and quantities. This would reduce the hydraulic gradient and seepage flows through the levee embankment and foundation soils adjacent to the slurry cutoff wall to safe levels. To achieve maximum effectiveness, the slurry cutoff wall must extend completely through the permeable strata and terminate some distance into an underlying, reasonably continuous layer with lower permeability.

Seepage/Stability Berms

Portions of the existing Feather River levee in project Segments 1 and 3 include stability berms constructed by the Corps during previous levee repair projects. For sections of levee with potential embankment through-seepage concerns, existing stability berms could be raised, or new stability berms provided, up to the 200-year water surface elevation. A stability berm of this height could be constructed in lieu of a slurry cutoff wall. However, stability berms would have limited application because they would not provide mitigation for foundation seepage. An evaluation of raising stability berms in lieu of providing a slurry cutoff wall in one or more locations will be conducted during detailed design. Figure 4-2 shows a typical levee cross section with a stability berm and also provides preliminary estimates for locations of stability berms based on the PIR (Kleinfelder 2006).

A seepage berm constructed along the landside toe of a levee can be an alternative to a slurry cutoff wall depending on soil conditions. A seepage berm does not reduce the hydraulic gradient through the foundation, nor does it reduce the seepage flows. However, it provides a weighted, filtered seepage path (i.e., the drainage blanket at the base of the berm) that allows seepage to occur but reduces the potential for boil formation and the associated erosion and loss of foundation material. Portions of the existing Feather River levee include seepage berms

constructed by the Corps during previous levee repair projects. An evaluation of thickening and/or lengthening the existing seepage berms, or adding new berms, in lieu of providing a slurry cutoff wall in one or more locations will be conducted during detailed design.

Relief Wells

Relief wells are another means of providing a filtered seepage path for reduction of water pressure in the foundation soils. Relief wells, however, can be prone to plugging and damage from vandalism, and they require operation (water removal) and periodic maintenance (flushing, cleaning, and replacement) to remain effective. Therefore, relief wells would be provided in locations where other measures are deemed to be insufficient or ineffective. Figure 4-2 shows the typical locations where a relief well might be installed relative to levees with and without seepage berms. The table in Figure 4-2 indicates possible locations where relief wells might be provided along the FRLRP alignment based on the PIR (Kleinfelder 2006).

Erosion Control

The *Three Rivers Levee Improvement Authority Phase IV Erosion Investigation* (MBK Engineers 2006) did not identify any erosion problems requiring action along the Feather River and Yuba River levees in project Segments 1 and 3. However, levee erosion will continue to be investigated during detailed design, and measures (e.g., placement of vegetation, buried cobble, or riprap on the waterside levee toe) will be developed if erosion deficiencies are discovered.

Segment 2—Seepage and Erosion Control

Seepage Control

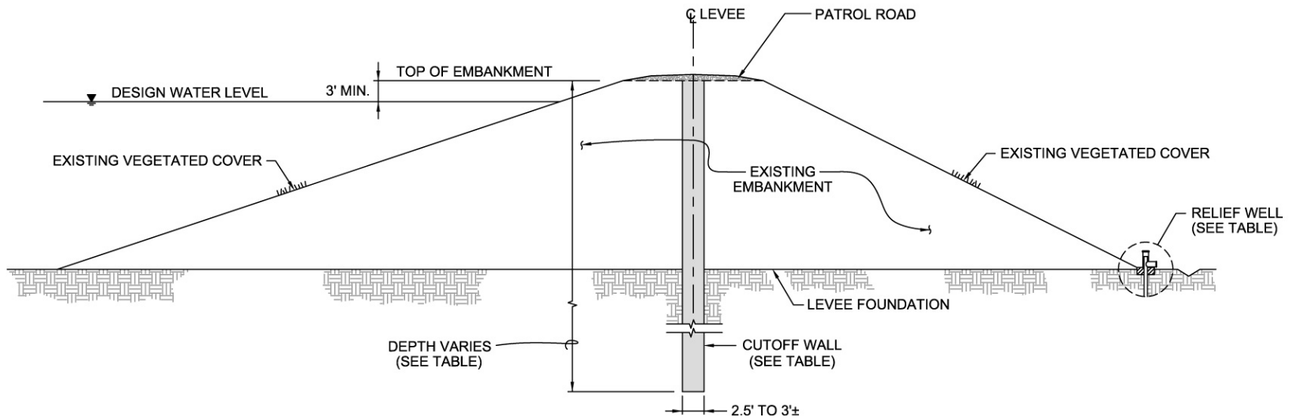
Seepage control measures for the Feather River levee in project Segment 2 would be similar to those described for the Feather River and Yuba River levees in Segments 1 and 3 above.

Seepage boils were identified in the vicinity of Pump Station No. 3 during high-water events in early 2006. The boils, located between PLM 17.1 and PLM 20.3 in a section of levee repaired by the Corps in 1997 with a deep slurry cutoff wall and waterside impermeable membrane, are in a location with a history of boils produced during high-water events. Although Kleinfelder's PIR did not identify mitigation requirements for this section of levee, the active seepage boils indicate that additional repairs are required.

Repairs to the levee in the vicinity of Pump Station No. 3 could include a deep cutoff wall, expansion of the existing seepage berm, relief wells, reconstruction of the existing levee, or a combination of these measures.

In addition, the existing Pump Station No. 3 would be removed and a replacement pump station would be constructed farther east (farther from the levee). The area between the old pump station and new pump station would be filled with material of low permeability to reduce seepage and increase levee stability. (Relocation of Pump Station No. 3 is discussed in more detail later in this section.)

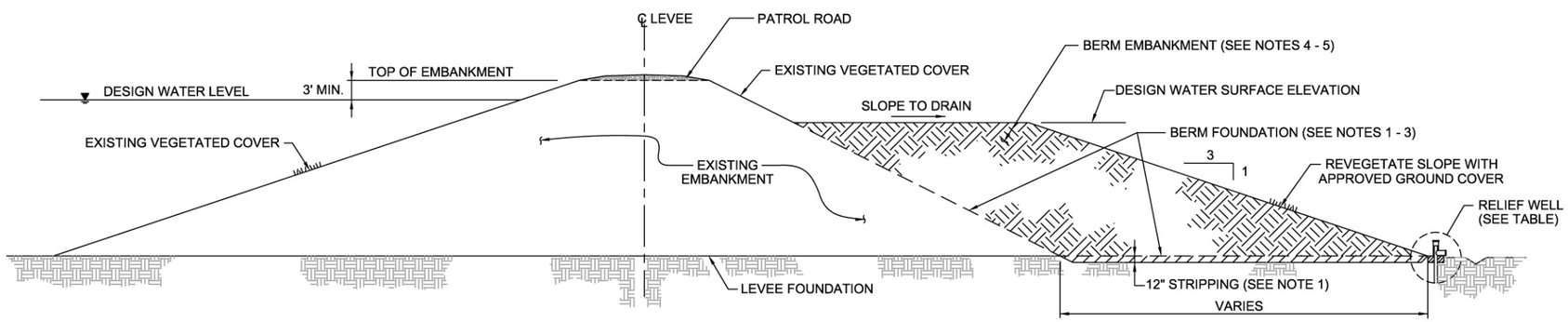
The table in Figure 4-2 presents a summary of preliminary design features proposed for repairing and strengthening the existing levee in the area encompassed by project Segment 2.



STRENGTHENING WITH
CUTOFF WALL OR RELIEF WELL

0 10 20
SCALE, FEET

PRELIMINARY LEVEE STRENGTHENING MEASURES (TO BE REFINED BASED ON DESIGN STUDIES)									
SEGMENT					STRENGTHENING OPTIONS				
LEVEE SEGMENT	PIR SECTION	BEGIN PLM	END PLM	LENGTH (ft)	CUTOFF WALL		BERM		RELIEF WELLS
1	1A	FR 13.3	FR 14.1	4,220	70 FT DEEP	OR	TO DESIGN WSE	_	–
	1B	FR 14.1	FR 15.1	5,280	70 FT DEEP	OR	TO DESIGN WSE	_	–
	2	FR 15.1	FR 16.0	4,750	60-70 FT DEEP	OR	TO DESIGN WSE	OR	@ 100-150 FT
	3	FR 16.0	FR 16.6	3,170	50-70 FT DEEP	OR	TO DESIGN WSE	_	–
	4A	FR 16.6	FR 17.1	2,640	–	–	–	–	–
2	4B	FR 17.1	FR 20.3	16,900	–	–	–	–	–
	5	FR 20.3	FR 23.6	17,420	70 FT DEEP	OR	TO DESIGN WSE	_	–
3	6	FR 23.6	FR 25.1	7,920	70 FT DEEP	OR	TO DESIGN WSE	_	–
	7	FR 25.1	YR 0.3	6,860	–	–	–	–	–
SOURCE: PROBLEM IDENTIFICATION REPORT, KLEINFELDER, FEB. 2006									



STRENGTHENING WITH
BERM AND/OR RELIEF WELL

0 10 20
SCALE, FEET

NOTES

FOUNDATION:

1. EXCAVATE BERM FOUNDATION AREA UP TO 12-IN BELOW EXISTING GROUND SURFACE. CLEAR AREA OF ROOTS, VEGETATION AND DELETERIOUS MATERIALS.
2. PREPARE FOUNDATION AREA BY REMOVING AND BACKFILLING SOFT SPOTS UP TO FOUNDATION GRADE LINES AND THEN COMPACT ENTIRE FOUNDATION WITH A SHEEPFOOT ROLLER.
3. WHEN CONNECTING BERM EMBANKMENT TO AN EXISTING EMBANKMENT PREPARE FOUNDATION AREA ON THE EXISTING EMBANKMENT AT A SLOPE NOT STEEPER THAN TWO (2) HORIZONTAL ON ONE (1) VERTICAL AND BENCH EXISTING EMBANKMENT.

EMBANKMENT:

4. EMBANKMENT MATERIAL: APPROVED LOW-PERMEABILITY MATERIAL.
5. PLACE AND COMPACT MATERIAL IN MAXIMUM 6-IN LIFTS AFTER COMPACTION.

NOTE:
LEVEE STRENGTHENING MEASURES ARE PRELIMINARY.

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FEATHER RIVER LEVEE REPAIR PROJECT

Preliminary Design for Levee Strengthening Measures

Figure 4-2

G 017

Erosion Control

Following extreme high-water conditions in 1997, deep scour areas were observed along the waterside toe of portions of the Feather River levee in project Segment 2. Some of these areas undermined the waterside slope enough to require minor slope repair. The sites where scour is a problem typically have noncohesive soils (loose sand) at the surface. Maintenance of an access path at the toe of the levee prevents any vegetation from establishing.

The *Three Rivers Levee Improvement Authority Phase IV Erosion Investigation* (MBK Engineers 2006) included a two-dimensional hydraulic model of the 1997 flood event. Typically, calculated flow velocities along the toe of the levee were in the range of 5–6 feet per second or lower. For these velocities, and pending more detailed analysis during detailed design, it is anticipated that revetting the noncohesive soils with cobble-size rock would be sufficient to stabilize the affected areas. The locations where erosion repairs are anticipated are shown in Figure 4-1.

4.3.2 HYDROLOGY AND FLOOD CONTROL BENEFITS

FRLRP Alternative 1 would not alter the location or configuration of the existing levees and therefore would not provide any increased flood storage or conveyance capacity. Because Alternative 1 would not alter the hydraulic conditions in the Feather and Yuba Rivers, the hydrology during both normal flows and flood flow conditions would not be changed. However, the repairs and strengthening of the existing levees that would occur under Alternative 1 would provide flood control benefits. The levee segments included in the FRLRP would be more resistant to underseepage, through-seepage, and erosion, and less susceptible to catastrophic breaches. All portions of the levee would meet the engineering and design standards of The Reclamation Board and the Corps, as well as FEMA geotechnical requirements for through-seepage and underseepage at the water surface elevation of the 100-year flood event.

4.3.3 ALTERNATIVE 1—CONSTRUCTION

General Construction Plan

Levee repair and strengthening under Alternative 1 would be primarily a large civil construction project and would need to be planned accordingly, consistent with standards of The Reclamation Board as stated in 23 CCR Sections 111–157. Because the levee repair and strengthening activities do not involve breaching the existing levee, work that would not adversely affect the flood control function of the existing levee could commence before the end of the “flood season” (i.e., before April 15). As stated previously, construction work is planned to begin in 2007 and be completed in 2008.

Slurry Cutoff Wall

Construction of the slurry cutoff wall to the depths required along the existing levee would be accomplished with large modified backhoes. This equipment and the associated sequence of excavation, backfill preparation, and placement of backfill back into the slurry cutoff wall trench would require a work platform near the trench. The work platform would be established adjacent to the trench by partially degrading (cutting down) the top of the existing levee to provide adequate working width. The width of the working platform could be minimized if excavated

soil were hauled to a nearby mixing area rather than being mixed adjacent to the slurry cutoff wall trench.

The slurry cutoff wall is expected to be as much as 80 feet deep. If the depth of the required slurry cutoff wall exceeds 80 feet, the levee could be degraded in those locations to allow the excavator to reach a deeper level, or the DSM method (described previously) could be used. After installation of the slurry cutoff wall, compacted embankment material would be placed to restore the levee height. However, some time would be allowed for the backfill in the slurry cutoff wall to settle before the placement of fill in the overlying embankment would occur. The connection between the slurry cutoff wall and the embankment fill is a key feature and would be refined during detailed design. After the levee is restored, aggregate base would be placed on the levee crown patrol road, similar to existing conditions.

Stability/Seepage Berm Construction

Stability and/or seepage berms may be used in lieu of a slurry cutoff wall in select locations. Berms would be constructed as an engineered fill, with the fill placed in horizontal lifts consistent with the requirements for lift thickness and compaction densities specified in 23 CCR Section 120. Each lift would be moisture conditioned and compacted to the specified density using a suitable compactor, such as a sheepsfoot, tamping-foot, or rubber-tired roller.

Erosion Protection

Based on the results of the *Three Rivers Levee Improvement Authority Phase IV Erosion Investigation* (MBK Engineers 2006), five locations have been identified as erosion problem areas requiring additional erosion protection. These locations, shown in Figure 4-1, all occur on the Feather River left bank levee in project Segment 2. Erosion protection activities in these locations are anticipated to consist of the following steps:

(1) Clear vegetation, and strip and salvage the surface soil from the work area.

(2) Backfill any existing scour features using adjacent native soils. Place and compact the soil in thin lifts to develop a good foundation for cobble fill.

(3) Lay a geotextile filter fabric over the area to be protected.

(4) Place gravel/cobble fill with an approximate thickness of 1.5–2 feet over the geotextile fabric.

(5) Place the salvaged original surface soil over the gravel/cobble fill. Also replace any segments of levee maintenance roads that were disturbed.

(6) Seed the disturbed area (other than maintenance road alignments) with a seed mix of native grasses that does not include woody vegetation.

Erosion protection in these five locations would occur only under Alternative 1, as the existing levee segment where these problem areas occur would be replaced by a setback levee under Alternatives 2 and 3. If, during detailed project design, additional areas in the existing levee are

found to have similar erosion conditions as the five areas identified in Segment 2, similar erosion protection measures could be implemented in these locations.

Where soil along the waterside or landside surface of the existing Feather River levee is disturbed during project implementation, an approved grass cover would be placed for erosion protection. The same grass cover would be placed on stability berms where they are installed. Historical experience with the existing left bank Feather River levee in this area indicates that grass cover provides acceptable erosion protection against high water levels during flood flows.

Pump Station No. 3 Relocation

As stated previously, the current location of Pump Station No. 3 experiences excessive seepage and boils during high-water events, making it desirable to relocate the pump station out of this area. As part of Alternative 1, the existing pump station would be removed and a new/replacement Pump Station No. 3 would be constructed farther to the east adjacent to the Plumas Lake Canal. The exact location would be determined during detailed project design**.** Equipment and material from the existing pump station would not be reused at the new location.

The new Pump Station No. 3 would be a reinforced-concrete structure similar to the recently constructed Pump Station No. 2 and the new Pump Station No. 6, which is currently under construction. The segment of existing canal between the current and new locations of Pump Station No. 3 would be backfilled with material of low permeability. Pipelines through the Feather River levee to allow drainage from the new pump station into the river would be designed in accordance with standards of The Reclamation Board and Corps guidelines.

If relief wells are installed as part of Alternative 1, flows from these wells would be conveyed to the new Pump Station No. 3. The capacity of the new pump station would be increased to accommodate the relief well discharge based on the estimated flow rates. The specific capacity of the new Pump Station No. 3 would be determined during detailed project design.

Detention Basin Construction

As stated above in the discussion of Pump Station No. 3, the capacity of the new pump station could be increased to accommodate discharges from relief wells. However, even with increased capacity, it is possible that during peak discharge periods water from relief wells could exceed the capacity of the new Pump Station No. 3. To accommodate this circumstance, Alternative 1 includes construction of a detention basin to temporarily hold relief well flows during peak discharge periods. An area currently being considered for a detention basin, northeast of Star Bend, is shown in Figure 4-1 as a potential borrow area and/or detention basin. The basin would cover approximately 150 acres. It would be excavated to a depth of about 8–10 feet, or deeper if a permanent water feature is desired for mitigation/restoration or local land development considerations. Suitable soils excavated during construction of the detention basin would be used as borrow material for levee repairs and strengthening.

Borrow Material Requirements and Development of Borrow Areas

Sources and Quantities of Borrow

Borrow areas are sites where native materials (i.e., soil and rock) are obtained for required construction activities. Borrow material would be obtained locally, with primary sources being excavations for the planned detention basin and from borrow areas developed in the project vicinity.

Objectives for local borrow areas include:

- reducing the impact on land resources,
- shortening borrow haul distances to reduce impacts on air quality and traffic, and
- promoting the use of large off-road earthmoving equipment such as scrapers rather than trucks to reduce construction costs.

Requirements for borrow material would be less under Alternative 1 than under other alternatives, because the existing levee would be retained and soil for a setback levee would not be necessary. In addition, material excavated from the slurry cutoff wall trenches would be used to the extent practicable, reducing the need for borrow material from off-site sources. However, it is still estimated that a total of approximately 1.6 million cubic yards (cy) of borrow material would be required for levee repair and strengthening activities under Alternative 1. Activities requiring borrow would include constructing slurry cutoff walls, correcting erosion problem areas, and construction of seepage/stability berms. It is estimated that approximately 1.4 million cy of borrow material would be needed for levee repairs and strengthening in project Segment 2, and the remaining approximately 200,000 cy would be used in Segments 1 and 3. As stated above, a primary source of borrow material would be excavations conducted for construction of the planned detention basin. Additional borrow areas might also be developed in this general location. Other potential borrow sources include the borrow area site to the east of existing levee shown in Figure 4-1, abandoned sections of the Bear and Feather River levees left remnant from construction of the Feather-Bear Rivers Levee Setback Project (F-BRLSP), and an existing borrow area near Ella Road.

Aggregate base needed to surface the patrol road on the levee crown, drain rock required for berm construction, and rock slope facing would be obtained from commercial sand and gravel operations in the Marysville–Yuba City area and would be hauled to the levee alignment by truck.

A preliminary estimate of borrow material requirements for construction under Alternative 1 is provided in Table 4-1, “Summary of Borrow Material Requirements for Alternative 1.” A detailed investigation of suitable borrow areas would be conducted as part of the field investigation program for detailed design. The limits of borrow areas would be refined during this effort.

Table 4-1
Summary of Borrow Material Requirements for Alternative 1

Description	Volume Required (cubic yards)
Embankment fill	1,600,000
Caltrans Class 2 aggregate base	18,000
Revetment	20,000

Note: Caltrans = California Department of Transportation
Source: Data provided by GEI Consultants in 2006

Design and Treatment of Borrow Areas

As discussed above, demand for borrow material would be less under Alternative 1 than under Alternatives 2 and 3; therefore, the level of disturbance associated with development of borrow areas would also be less. The potential borrow areas shown in Figure 4-1 are much larger than the area necessary to implement Alternative 1, and only a fraction of these areas would be disturbed if they were used as a source of borrow material. Any borrow areas used during implementation of Alternative 1 would be on the land side of the existing levees.

Any borrow areas that are developed would be constructed as wide, shallow excavations rather than as deep trenches. At the conclusion of the work, the borrow areas could be graded to blend with the topography, leaving slopes flat enough to reduce erosion and promote conditions conducive to vegetative growth (slopes of 3:1 [H:V] or flatter). Borrow areas could also be graded in a manner consistent with the continuation of past land uses (e.g., agriculture), or consistent with permitted future land uses based on the property owners' preferences. The borrow areas could be revegetated to conform to the surrounding landscape, or in a manner consistent with past or permitted future land uses, again based on the landowners' preferences.

Relocation of Utilities and Removal of Structures

Other than the pump station relocation discussed above, it is not anticipated that existing utilities would need to be permanently relocated under Alternative 1. Pacific Gas and Electric Company (PG&E) power lines may need to be deenergized or temporarily relocated for clearance during excavation operations for the slurry cutoff wall. Levee penetrations (i.e., pipelines, conduits, or similar structures passing through the levee) related to the Plumas Mutual Water District pump station, PG&E natural gas pipelines, the Linda County Water District Wastewater Treatment Plant, and Pump Station Nos. 2 and 9 will need to be evaluated and upgraded as necessary.

Staging Areas

It is anticipated that several staging areas would be developed along the existing Feather River and Yuba River levee alignments to allow for efficient use and distribution of materials and equipment. Staging areas would be located along the landside toes of the levees. Additional staging areas would be located at other suitable locations, such as RD 784 property near Pump Station No. 2 (project Segment 1), on existing seepage berms, and other locations along the levee alignments. Specific staging areas would not be identified until the detailed design phase. Final

selection of staging areas would be based on contractor preference and environmental and land use constraints.

Disposal of Excess Materials

Because of the nature of the work under Alternative 1, it is expected that only a limited amount of excess materials (e.g., soil, cleared vegetation) would be generated. Excess excavated materials (organic soils, excess material excavated from the slurry cutoff wall trench, and excess slurry) would be placed in a local disposal area on-site, or hauled off-site and placed in a suitable disposal area. Debris from structure demolition (e.g., the existing Pump Station No. 3), piping, and other materials requiring disposal would be hauled off-site to a suitable landfill.

Stormwater Pollution Prevention

Temporary erosion/runoff control measures would be implemented during construction to minimize stormwater pollution resulting from erosion and sediment migration from the construction, borrow, and staging areas. These temporary control measures may include implementing construction staging in a manner that minimizes the amount of area disturbed at any one time; secondary containment for storage of fuel and oil; and the management of stockpiles and disturbed areas by means of earth berms, diversion ditches, straw wattles, straw bales, silt fences, gravel filters, mulching, revegetation, and temporary covers as appropriate. Erosion and stormwater pollution control measures would be consistent with National Pollutant Discharge Elimination System (NPDES) permit requirements and would be included in a Stormwater Pollution Prevention Plan (SWPPP). (See Section 5.3, "Water Resources and River Geomorphology," for a detailed discussion of NPDES permit requirements and SWPPPs.)

After completion of construction activities, the temporary facilities would be demobilized and the site would be restored and reclaimed as appropriate. Site restoration activities for areas disturbed by construction activities, including borrow areas and laydown/staging areas, may include regrading, reseeding, construction of permanent diversion ditches, use of straw wattles and bales, application of straw mulch, and other measures deemed appropriate.

Construction Equipment

Contractor plant equipment would include construction office and equipment trailers; slurry batch plants, including bentonite storage facilities, mixing tanks, pumps, and piping; warehousing and equipment maintenance facilities; and fuel pumps and fuel storage tanks.

Mobile equipment for the levee repair, berm construction (if needed), and Pump Station No. 3 construction may include the following typical equipment:

- two hydraulic excavators,
- six scrapers,
- three bulldozers,
- three graders,
- three self-propelled sheepsfoot or tamping-foot rollers,
- two water wagons,
- 20 highway dump trucks,

- a lubricating truck,
- a front-end loader,
- a truck-mounted crane, and
- numerous pickup trucks.

Mobile equipment specifically for slurry cutoff wall construction for three simultaneous headings may include the following:

- three long-stick hydraulic excavators,
- three low-ground-pressure bulldozers,
- three utility excavators, and
- three integrated tool carriers.

Additional equipment would include drill rigs to install new relief wells (if required), utility equipment to install power lines, an air compressor, welding equipment, pumps and piping, communications and safety equipment, erosion control materials, miscellaneous equipment customary to the mechanical and electrical crafts, and vehicles used to deliver equipment and materials.

Construction-Related Traffic

Personnel, equipment, and imported materials would reach the site via SR 70 and Feather River Boulevard, which are paved, all-weather roads, and suitable for the anticipated loads. The construction labor force is estimated to average about 50–60 persons over the construction period of 2 years. Peak staffing could be close to 100 depending on the contractor's schedule.

It is expected that about 40 trailer ("low-boy") truck round trips would be required to transport the contractor's plant and equipment listed above to the site. A similar number of round trips would be needed to remove the equipment from the site as the work is completed.

Necessary aggregate base and rock revetment material would be obtained from a commercial sand and gravel operation, most likely in the Marysville–Yuba City area. The construction contractor would select the specific supplier based on suitability and pricing. About 4,000 highway truck trips would be needed to bring the aggregate base and rock revetment material to the site from the quarry of origin. About 300 truckloads would be needed to bring dry bentonite to the site. The bentonite would probably be processed in Wyoming or South Dakota and transported to the Marysville–Yuba City area by rail. About 300 truckloads would be needed to bring cement to the site. Another 25–30 trailer truckloads would be required to bring other permanent materials to the site, such as geotextile fabric, erosion control materials, structural steel, piping, well casings, and ancillary equipment. About 100 concrete loads, transported by transit mixer truck, are also likely. In addition, about 100 highway truckloads may be needed to carry demolition debris, construction debris, and waste dump materials to a suitable landfill.

At the project site, the primary construction corridor would include the crests of the existing Feather River and Yuba River levees, landside toes of the existing levees, and roads used for access to the work area, including Feather River Boulevard. Access roads would consist mainly of the existing east-west lateral roads between SR 70, Feather River Boulevard, and the existing levees.

Within the construction areas, the main sources of construction traffic would be the installation of the slurry cutoff wall, required transport of material for the slurry cutoff wall (including borrow from borrow sites), and required transport of borrow material for berm construction and restoration of levee heights (e.g., where the tops of levees were cut down to provide a work surface for installation of the slurry cutoff wall). Transport of an estimated 1.6 million cy of borrow material would require approximately 80,000 haul trips if a load of 20 cy per trip is assumed. Larger haul unit sizes would reduce the number of trips and impacts on air quality. Dust control measures would be applied to roads and work areas on a systematic basis. Under Alternative 1, installation of the slurry cutoff wall would take place during both years (2007 and 2008) of the 2-year construction period (see "Construction Sequence and Scheduling Constraints" in Section 4.6, "Implementation," below regarding the construction schedule).

4.4 ALTERNATIVE 2—THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE

4.4.1 PRELIMINARY DESIGN OF ALTERNATIVE 2

As described previously, Alternative 2, The Levee Strengthening and ASB Setback Levee Alternative, would consist of the following:

- Segment 1—Levee repairs and strengthening along the Feather River left bank levee from PLM 13.3 to PLM 17.1
- Segment 2—A setback levee along the left bank of the Feather River from PLM 17.1 to PLM 23.6, following an alignment similar to the ASB setback levee alignment described in 2003 for the Y-FSFCP
- Segment 3—Levee repairs and strengthening along the Feather River left bank levee from PLM 23.6 to PLM 26.1 and the Yuba River left bank levee from PLM 0.0 to PLM 0.3

Activities along project Segments 1 and 3 would be exactly the same as described for Alternative 1, consisting of the same levee repair and strengthening elements and seepage control and stability measures identified in the PIR. These activities generally are not described further below.

The primary difference between Alternatives 1 and 2 relates to project construction activities along Segment 2. Under Alternative 1, the existing Feather River levee in Segment 2 would be repaired and strengthened; by contrast, under Alternative 2 a setback levee would be constructed in this project segment generally following the alignment of the previously identified ASB setback levee.

A preliminary design of the original ASB setback levee was described in 2003 in Appendix E, "Preliminary Design," of *Report on Feasibility, Yuba-Feather Supplemental Flood Control Project* (Yuba County Water Agency 2003b). The levee alignment identified in 2003 was selected because it could achieve significant reductions in river stage along the Feather River while maintaining a Feather River floodway width that would be consistent with upstream and downstream reaches of the river. The ASB setback levee alignment included here in Alternative 2 has been modified at the northern end (north of Pearson Road) from the alignment previously

studied, but otherwise it matches the 2003 ASB setback levee alignment (Figure 4-1). The modification to the northern portion of the setback levee alignment is included in Alternative 2, in part, to allow full replacement of an existing levee segment with known deficiencies.

Segments 1 and 3—Levee Strengthening

The levee repairs and improvements to the Feather River and Yuba River levees in project Segments 1 and 3 under Alternative 2 are identical to those described previously for Alternative 1 in Section 4.3.

Segment 2—ASB Setback Levee

Levee modifications in project Segment 2 (the Feather River left bank levee from PLM 17.1 to PLM 23.6) would consist of construction of a new setback levee (the ASB setback levee) as described below.

Setback Levee Alignment

The general location of the proposed ASB setback levee is shown in Figure 4-1. This setback levee alignment was selected to achieve substantial reductions in river stage while maintaining a Feather River floodway width that is consistent with upstream and downstream reaches of the river. A second consideration was to take advantage of the existing configuration of the levee system to identify constructible locations where the ASB setback levee could be tied into the existing levee. After the approximate alignment of the selected setback levee segment was defined by hydraulic modeling, the alignment was refined based on topographic, geologic, and socioeconomic considerations. The location of the ASB setback levee was aligned as much as possible along a topographically elevated area formed by older, more consolidated soils, and consideration was given to reducing impacts on occupied residential units.

The ASB setback levee would be approximately 5.9 miles long. The new levee segment would generally be set back approximately 0.5 mile to the east of the existing Feather River levee, except near the northern and southern ends, where it would join the existing levee. The area between the existing levee and the setback levee (the levee setback area) and the footprint of the ASB setback levee would include approximately 1,600 acres. It should be noted that the final alignment of the ASB setback levee may be adjusted slightly during detailed design to meet site-specific project needs.

The Existing Segment 2 Levee

The material in the existing Feather River left bank levee in Segment 2 would be reused as borrow material for the new ASB setback levee to the maximum extent possible. However, as discussed previously in Section 2.3.2, “Alternative 2–The Levee Strengthening and ASB Setback Levee Alternative,” in Chapter 2, the decision to remove any of the existing levee is a federal decision that would be made by the Corps, and the timing of such an action is uncertain. Therefore, the existing levee material may not be available as a source of borrow/embankment material for the setback levee. In addition, based on the timing of Corps authorization to degrade/breach the existing levee, it is possible that for some period of time the existing levee and the new ASB setback levee would be in place concurrently. During this period, the ASB

setback levee would function as a "backup" levee, providing a second line of levee protection if the existing levee in Segment 2 were to breach during a flood event.

Whether authorization to degrade/breach the existing levee in Segment 2 is provided concurrently with the construction of the ASB setback levee, or at some time after the setback levee is complete, portions of the existing levee in Segment 2 would be removed to achieve the maximum hydraulic benefits of the levee setback by allowing water to flow into and out of the levee setback area during high river stages. The specific amount and location of existing levee requiring removal would be determined during detailed design.

Some sections of the existing levee may be left in place to provide refuge for animals during high flows. Specific sections to be retained would be determined in final project design and would be based on factors that include possible mitigation value for project impacts on sensitive species. Those sections of the existing levee that would be left in place would not be maintained.

Levee Embankment Material

23 CCR Section 120 states that "impervious" material must be used for construction of new levees. Impervious material is defined using various soil property parameters, including particle size and plasticity. Plasticity is the ability of a soil to deform under pressure without crumbling and acts as a general index to the clay content of a soil. Special construction details (e.g., 4:1 slopes rather than 3:1 slopes) may be substituted where appropriate soil properties are not readily attainable. CCR Section 120 includes the qualification that not all impervious-material requirements may apply where the design of a new levee uses zones of various materials or soil types. For example, soils on the interior of the levee embankment may not meet all characteristics of impervious materials if a sufficiently sized zone of impervious material makes up the exterior portion of the embankment.

Because of economic, environmental, and hydraulic considerations, it is desirable to use locally available earth materials for construction of the ASB setback levee. Local sources of borrow materials could include borrow areas developed in the levee setback area, soil removed during construction of a detention basin, and soil from abandoned sections of the Bear River and Feather River levees left remnant from F-BRLSP construction. However, it is anticipated that a large proportion of the soils in the levee setback area and at the detention basin site would fall outside the plasticity requirements described in CCR Section 120 because of the low plasticity associated with the silty soils prevalent in the project area. Accordingly, it would not be economically feasible for all soil used in the setback levee embankment to meet the soil property parameters of CCR Section 120. For purposes of preliminary design, it has been estimated that zoning the levee section, as allowed by CCR Section 120, would be more economical than flattening the slopes. Through conversations with Corps staff, it is understood that the reasons for the specified plasticity requirements in Section 120 are twofold:

- to avoid placement of nonplastic soils on slope surfaces to reduce the potential for slope erosion, and
- to avoid placement of highly plastic clays on slope surfaces to reduce the potential for formation of deep shrinkage cracks and the associated shallow soil creep and sloughing that can occur when exceptionally heavy rains fall on cracked sloping ground.

As allowed by CCR Section 120, the ASB setback levee section has been zoned to address these concerns while allowing use of silty soil. The silty soil would be placed in an interior zone within the embankment, completely encapsulated by material meeting the plasticity requirements. Soil that meets the plasticity requirements would be in the landside and waterside zones to promote resistance against erosion and shallow sloughing.

Figure 4-3, "Preliminary Plan View and Typical Cross Sections for the ASB Setback Levee," presents the cross sections used for the preliminary design of the setback levee. Cross sections are shown for levee segments both with and without a slurry cutoff wall.

Soils with excessively high plasticity and soils stripped from the ground surface (i.e., containing organic materials) cannot be placed in the setback levee embankment; these soils would need to be disposed of on-site. The proposed design of the ASB setback levee allows for the construction of a waterside berm as a location for the placement of excess soil from required excavations (the berm is not shown in Figure 4-3). This nonstructural berm would be placed as engineered fill (in thin lifts) on a prepared foundation, but would be constructed to a lower compaction standard than the levee embankment. In coordination with the Corps and the BOSC, the height of the berm has been specified not to exceed 1/4 the height of the levee, and the access corridor along the waterside toe would be established over the top of this berm. The berm would be up to 300 feet wide.

Setback Levee Dimensions

The preliminary design of the ASB setback levee is shown in Figure 4-3. The proposed design of the levee section incorporates the design criteria outlined above in Section 4.1.2, "General Levee Design Criteria."

For preliminary design purposes, it is assumed that the design crown elevation of the ASB setback levee would be the same as the crown elevation of the existing levee at each given latitude along the alignment. A review of the available topographic data for the project vicinity developed as part of the Sacramento and San Joaquin River Basins Comprehensive Study indicates that the height of the ASB setback levee would generally range from about 20 to 30 feet above the existing ground surface. The most common levee height above the adjacent land would be about 25 feet. This height has been depicted in the cross sections presented in Figure 4-3.

The existing levee has been reconstructed by the Corps to provide a minimum of 3 feet of freeboard above the 1957 design profile. This design profile is above the current objective flow profile for this stretch of the Feather River. Because the levee setback would lower most flow profiles by widening the flow channel, it follows that the ASB setback levee, if constructed to the elevations described above, would have freeboard in excess of 3 feet above the 1957 design profile and additional freeboard above the objective flow profile.

Other anticipated dimensions of the ASB setback levee are:

- crown width of 20 feet,
- patrol road width of 12 feet, and
- waterside and landside slope of 3:1 (H:V).

Setback Levee Inspection Trench

An inspection trench with a minimum depth and bottom width of 6 feet and 12 feet, respectively, would be excavated in the foundation along the length of the setback levee, with the trench centerline located approximately under the outer edge of the waterside shoulder of the levee crown. The purpose of the inspection trench is to expose or intercept any undesirable underground features such as old irrigation pipes, animal burrows, buried logs, layers of unsuitable material, or other debris. The trench would be backfilled with tight, compacted backfill to intercept shallow seepage paths that may exist directly under the base of the embankment. Based on discussions with the Corps during the design phase for the Bear River setback levee in the F-BRLSP, it is assumed that the depth of the inspection trench could be reduced to about 3–4 feet wherever a cutoff wall is provided for seepage control (see "Setback Levee Seepage Control" below). The upper cross section shown in Figure 4-3 represents a typical levee section with an inspection trench.

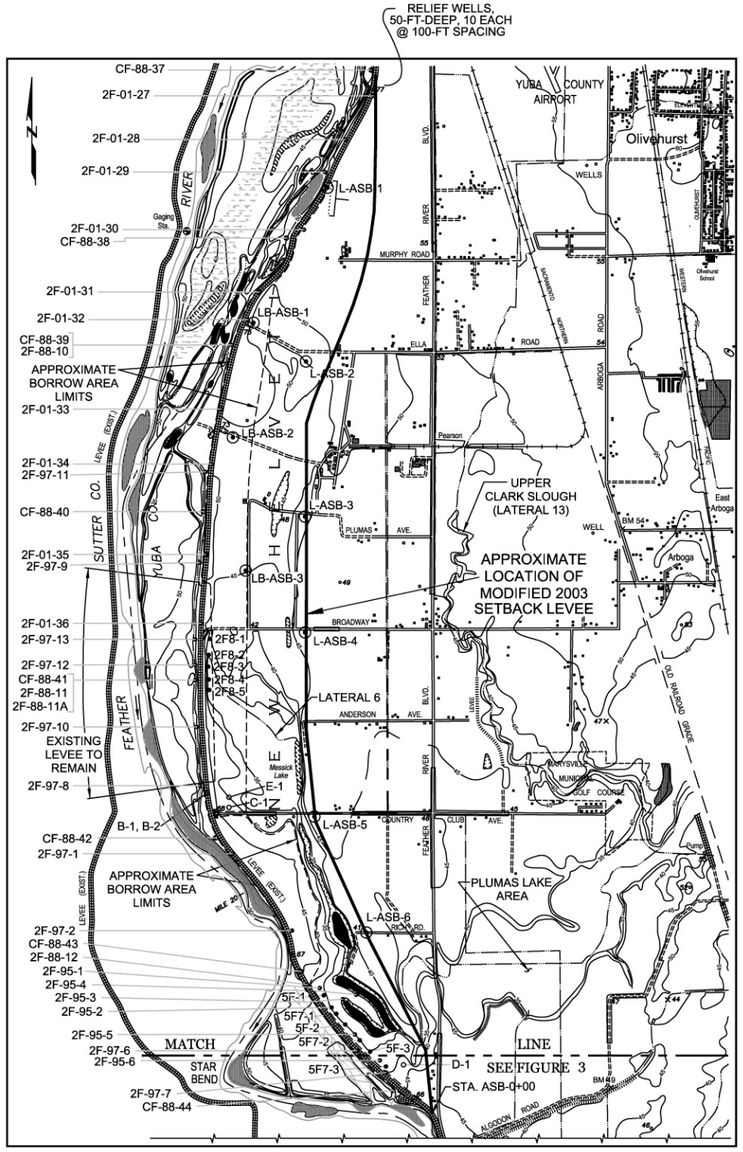
Setback Levee Easement

As illustrated in Figure 4-3, access easements would be provided adjacent to the landside and waterside toes of the ASB setback levee. These easements would be at least 50 feet wide. The areas adjacent to the setback levee would be graded to drain away from the levee toes for at least 10 feet. As required, the ASB setback levee easement would take into account the appropriate right-of-way for any drainage feature that lies landward of the levee. In addition, to meet the requirement in 23 CCR Section 120 that the bottom of any nearby agricultural ditch be located at an elevation above the projected downward extension of the landside levee slope, the toe of the ASB setback levee may need to be located farther than the required minimum of 10 feet from a deep ditch.

Setback Levee Seepage Control

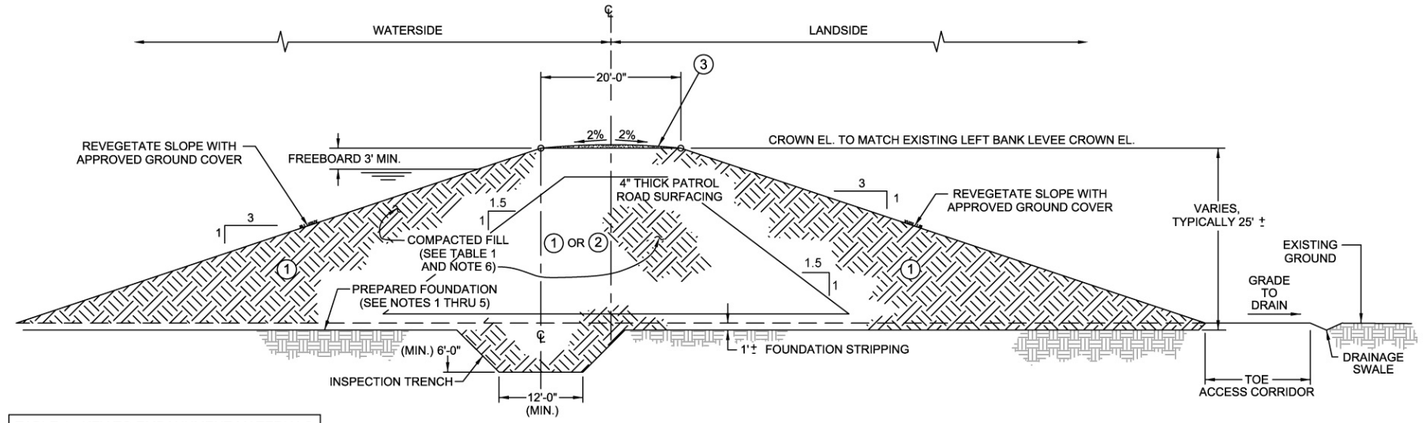
Based on the performance history of the existing levees and the results of investigations along the proposed ASB setback levee alignment, it is anticipated that seepage control measures would be required along significant portions of the setback levee. Susceptibility of the ASB setback levee embankment and foundation soils to seepage and internal erosion is the primary concern related to levee integrity and stability. Soils in the levee foundation would likely consist of fine sands and fine silty sands to a large extent. These permeable, cohesionless, and easily erodible soils have a high potential for undergoing internal erosion (a phenomenon referred to as "piping") when subjected to moderately high hydraulic gradients that are sustained for more than several days. Animal burrows can exacerbate the situation by providing a shortened conduit for the initiation of seepage and internal erosion. Muddy seepage, boils, and sinkholes are external landside manifestations of ongoing seepage and internal erosion processes that can occur when the levee is subjected to sustained high water levels. Internal erosion of levee embankment or foundation materials poses a threat to levee integrity during flood events. If unchecked, this progressive failure mechanism can eventually result in sudden, catastrophic failure of the levee.

The proposed preliminary design for the ASB setback levee recognizes these unfavorable soil conditions and includes appropriate provisions to reduce the potential for seepage-induced erosion of the levee embankment and foundation soils through the use of various seepage control measures, including cutoff trenches/slurry cutoff walls and relief wells.



PLAN VIEW

0 2,000 4,000
SCALE, FEET

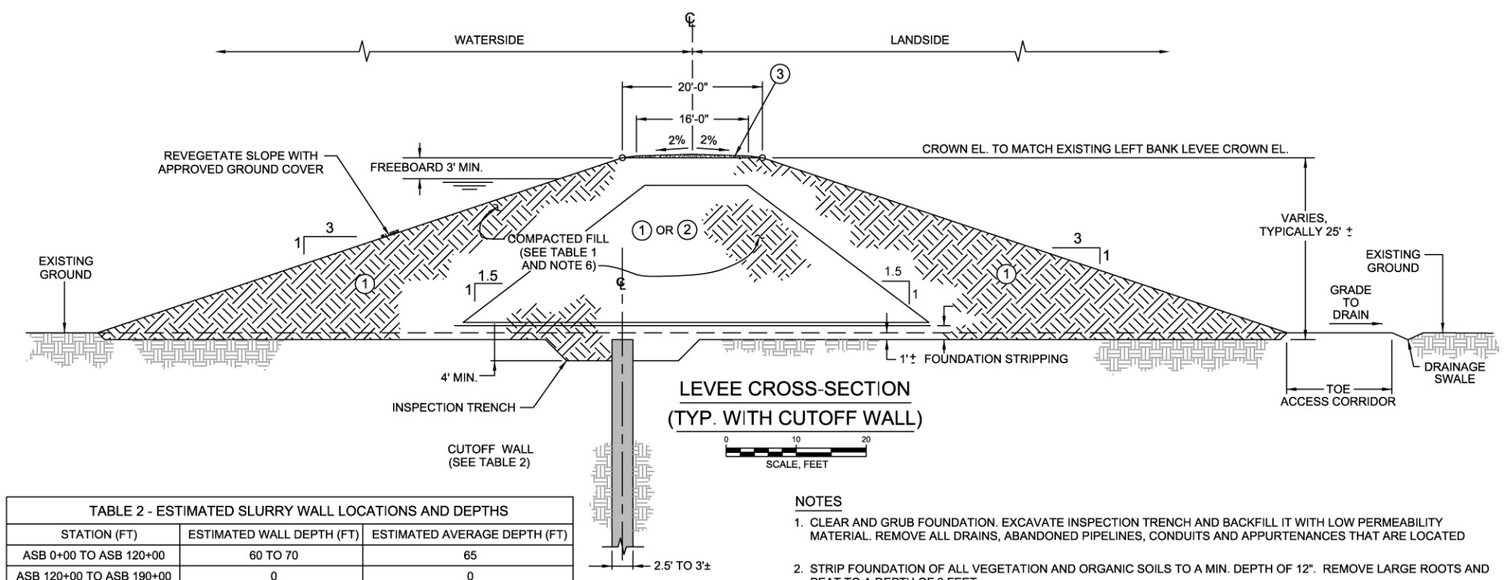


LEVEE CROSS-SECTION (TYP. WITHOUT CUTOFF WALL)

0 10 20
SCALE, FEET

TABLE 1 - KEY TO EMBANKMENT MATERIALS	
1	APPROVED LOW-PERMEABILITY MATERIAL
2	APPROVED LOW PERMEABILITY MATERIAL WITH REDUCED PLASTICITY
3	CALTRANS CLASS 2 AGGREGATE BASE

NOTE:
THE LEVEE SETBACK ALIGNMENT, CROSS-SECTION AND DETAILS ARE PRELIMINARY.



LEVEE CROSS-SECTION (TYP. WITH CUTOFF WALL)

0 10 20
SCALE, FEET

TABLE 2 - ESTIMATED SLURRY WALL LOCATIONS AND DEPTHS		
STATION (FT)	ESTIMATED WALL DEPTH (FT)	ESTIMATED AVERAGE DEPTH (FT)
ASB 0+00 TO ASB 120+00	60 TO 70	65
ASB 120+00 TO ASB 190+00	0	0
ASB 190+00 TO ASB 220+00	40 TO 70	50
ASB 220+00 TO ASB 310+00	0	0

NOTES

1. CLEAR AND GRUB FOUNDATION. EXCAVATE INSPECTION TRENCH AND BACKFILL IT WITH LOW PERMEABILITY MATERIAL. REMOVE ALL DRAINS, ABANDONED PIPELINES, CONDUITS AND APPURTENANCES THAT ARE LOCATED
2. STRIP FOUNDATION OF ALL VEGETATION AND ORGANIC SOILS TO A MIN. DEPTH OF 12". REMOVE LARGE ROOTS AND PEAT TO A DEPTH OF 3 FEET.
3. PROOF ROLL FOUNDATION TO ENSURE REMOVAL OF ALL SOFT SPOTS.
4. BACKFILL ALL HOLES, DEPRESSIONS AND DITCHES IN THE FOUNDATION WITH NATIVE MATERIAL AND COMPACT THE BACKFILL TO A DENSITY EQUAL TO THAT OF THE ADJACENT UNDISTURBED MATERIAL.
5. IMMEDIATELY PRIOR TO PLACING THE FIRST LIFT OF EMBANKMENT, SCARIFY AND MOISTURE CONDITION THE FOUNDATION SURFACE TO A DEPTH OF 4 INCHES.
6. PLACE THE FILL MATERIALS IN MAXIMUM 6" THICK LIFTS AFTER COMPACTION.

LEGEND

	EXISTING LEVEE
	MODIFIED 2003 SETBACK LEVEE
L-ASB-1	APPROX. GEI TEST BORING LOCATION (2002)
2F-97-7	APPROX. CORPS OF ENGINEERS TEST BORING LOCATION (1997)
CF-88-39	APPROX. CORPS OF ENGINEERS CONE PENETRATION TEST LOCATION (1988)
B-1, C-1, D-1	APPROX. WAHLER TEST BORING LOCATION (1986)
ASB	ABOVE STAR BEND

NOTE

Map is taken from U.S.G.S. Topographic 7.5 Minute Series Map of Olivehurst, California Quadrangle, Photorevised 1973. Datum is National Geodetic Vertical Datum of 1929 (NGVD).

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Preliminary Plan View and Typical Cross Sections for the ASB Setback Levee

Figure 4-3

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Because of the depths and thickness of pervious strata generally present along the setback levee alignment, the only practical method of constructing a cutoff trench is by the slurry wall method. As discussed above in the description of Alternative 1, in the slurry wall method a cutoff trench is excavated and filled with a bentonite slurry to keep the trench from caving during excavation; the trench is then backfilled with native soil mixed with bentonite to provide a cutoff with reduced permeability.

Construction of a slurry cutoff wall is proposed along those portions of the ASB setback levee where widespread strata of permeable sands and gravels exist in the foundation. The lower cross section in Figure 4-3 represents a typical levee cross section with a slurry cutoff wall. Information on the preliminary locations, lengths, and depths of slurry cutoff walls is also provided in Figure 4-3. The purpose of the slurry cutoff wall is to dissipate the hydraulic gradient in the levee foundation and reduce seepage quantities. This would reduce the hydraulic gradient and seepage flows through the foundation soils adjacent to the slurry cutoff wall to safe levels. To achieve maximum effectiveness, the slurry cutoff wall must extend completely through the permeable strata and terminate some distance into an underlying, reasonably continuous layer with lower permeability.

Relief wells are another means of providing a filtered seepage path for reducing water pressure in the foundation soils. Relief wells, however, can be prone to plugging and damage from vandalism, and they require operation (water removal) and periodic maintenance (flushing, cleaning, and replacement) to remain effective. Therefore, use of relief wells is typically proposed only for specific locations where other measures are deemed to be insufficient or ineffective. At this time the only location along the ASB setback levee alignment where relief wells are proposed is at the upstream tie-in point of the ASB setback levee with the existing levee. At this location relief wells would act as a supplemental seepage control method, to provide for relief of foundation seepage that may have a southerly flow component.

Although not included in the preliminary design for the ASB setback levee, a stability/seepage berm could be constructed along the landside levee toe along portions of the levee potentially susceptible to differential settlement, or where only relatively thin layers or lenses of permeable soils exist in the setback levee foundation. A seepage berm does not reduce the hydraulic gradient through the foundation, nor does it reduce the seepage flows. However, it provides a weighted, filtered seepage path (i.e., the drainage blanket at the base of the berm) that allows seepage to occur but reduces the potential for boil formation and the associated erosion and loss of foundation material.

Other potential seepage control measures were also given consideration as part of the design of the ASB setback levee. Impervious blankets on the river side of the levee were not pursued because of concerns about environmental impacts and effectiveness levels. In addition, the Corps apparently has not had good results from pervious (gravel-filled), trenched toe drains constructed in the project area because of the caving associated with excavation of trenches in very loose sandy soils. These soils have severely limited the depth to which toe trenches can be constructed and maintained economically. Toe drains in trenches have not been incorporated at any location along the ASB setback levee in the preliminary design.

Selection of the type and extent of seepage control measures for specific reaches of the ASB setback levee alignment is preliminary. For project budgeting purposes and for the evaluation of potential environmental effects, the maximum reaches over which seepage control measures may be required were identified; however, definition of the reaches should be considered approximate at best. If Alternative 2 is selected for implementation, the seepage control system for the ASB setback levee would be refined based on detailed field investigations and analyses, to be performed during detailed design.

4.4.2 HYDROLOGY AND FLOOD CONTROL BENEFITS

The ASB setback levee would work within the capacities of the current flood control system. The existing system design flow for the Feather River between the Yuba and Bear Rivers is 300,000 cubic feet per second (cfs). The upstream reservoirs operate to maintain flows in the Feather River at or below this design flow, insofar as possible. With the ASB setback levee in place along the Feather River, the reservoirs could continue to operate in the same manner as under current conditions. The levee setback would result in flood control benefits because it would lower water levels in the river during flood events and because the setback levee would be constructed in a more secure location than the existing levee, based on current engineering standards.

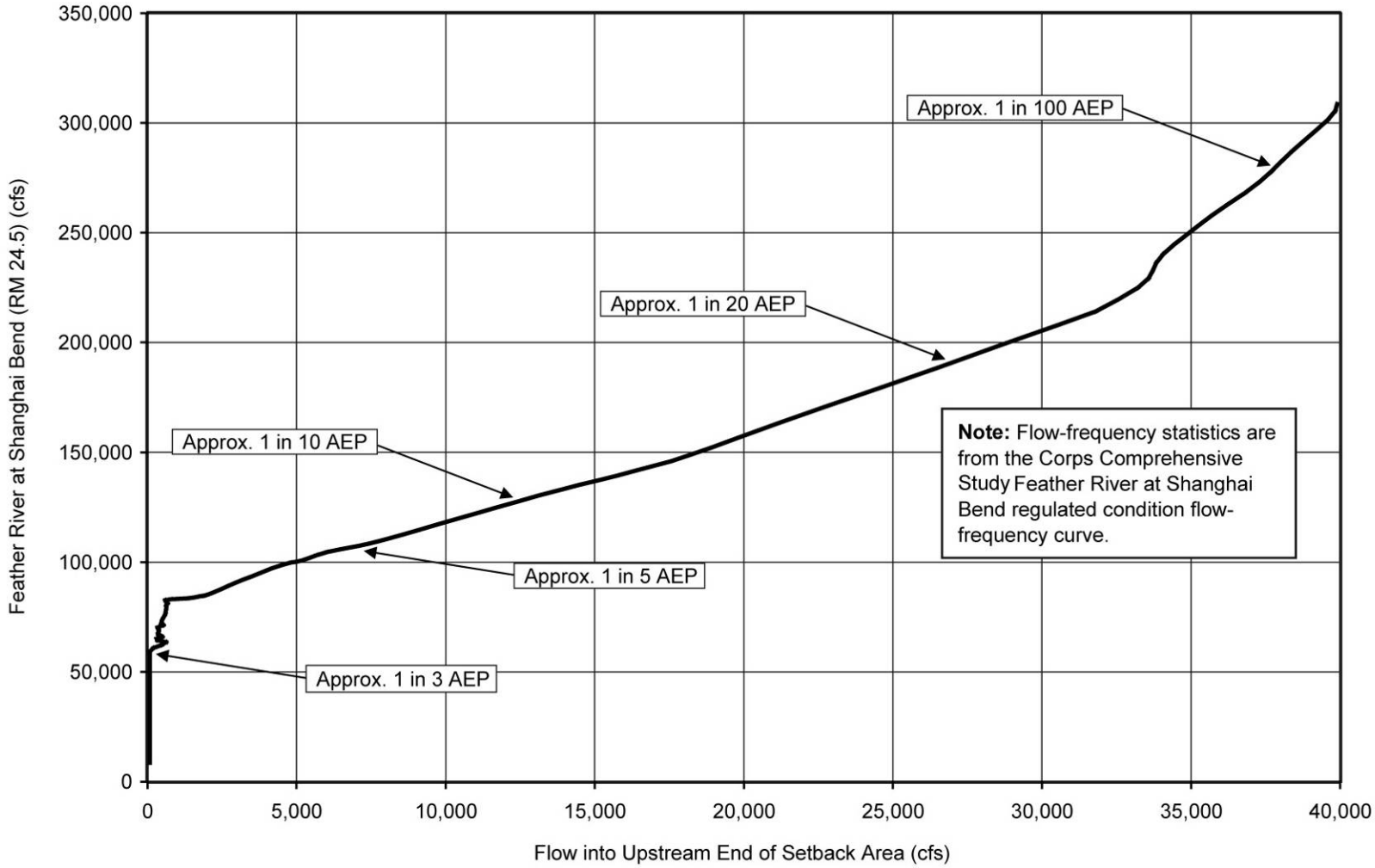
MBK Engineers performed hydraulic modeling of the proposed ASB levee setback. The following sections summarize the results of these modeling studies. Details regarding the modeling are provided in Appendix B.

Flooding of the ASB Levee Setback Area

Flows would enter the upstream end of the ASB levee setback area (i.e., the new floodway) when the river stage rises above the ground elevation at the current levee alignment, which is approximately 50 feet. Analysis performed by MBK Engineers indicates that flows passing downstream would enter the levee setback area approximately once in 3 years on average, when the rate of flow is somewhat higher than 50,000 cfs. Flooding would generally last for 3–5 days. This is similar to the frequency of flooding now experienced in areas that are within the currently leveed channel of the Feather River but are outside the low-flow channel. For the 1-in-100 annual exceedance probability (AEP) flood (i.e., the “100-year flood”) on the Feather River—a flow of approximately 300,000 cfs—the maximum depth of water in the levee setback area is expected to be about 20 feet, while the peak velocity is expected to fall in the range of 1–3 feet per second. For the 1-in-200 AEP flood on the Feather River (350,000 cfs), the maximum water depth in the levee setback area would be approximately 23 feet, and the peak velocity would fall in the range of 1–3 feet per second.

Table 4-2, “Feather River Flow Frequencies and Water Elevations in the ASB Levee Setback Area,” shows the approximate frequency of Feather River flood flows and corresponding water depths at the upstream end of the levee setback area.

Figure 4-4, “Expected Frequency and Magnitude of Flooding of the Levee Setback Areas from River Flows,” illustrates the expected frequency and magnitude of river flows through the ASB levee setback area.



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FEATHER RIVER LEVEE REPAIR PROJECT

Expected Frequency and Magnitude of Flooding of the Levee Setback Areas from River Flows

Figure 4-4

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Source: Countryman, pers. comm., 2002

Table 4-2
Feather River Flow Frequencies and Water Elevations in the ASB Levee Setback Area

AEP	Feather River Flow (cfs)	Water Elevation at Upper End of Levee Setback Area (feet—NGVD)	Height Above Ground at Upper End of Levee Setback Area (feet)
1 in 2.5	50,000	46.0	0
1 in 5	105,000	53.4	7
1 in 10	130,000	56.1	9
1 in 20	190,000	61.0	13
1 in 100	300,000	66.9	20
1 in 200	350,000	69.5	23

Notes: AEP = annual exceedance probability; ASB = Above Star Bend; cfs = cubic feet per second; NGVD = National Geodetic Vertical Datum
Source: Data provided by MBK Engineers in 2006

Reductions in River Stages

The hydraulic performance of the ASB setback levee was evaluated using an unsteady-flow model (HEC-RAS) originally developed by the Corps in support of the Lower Feather River Floodplain Mapping Study and subsequently modified and calibrated to the flow and high-water data from the 1997 flood by MBK Engineers. Simulations were performed for the 1-in-100 and 1-in-200 AEP events to assess the effect of the potential setback on river stages.

The results of the evaluation indicate that the ASB setback levee alignment would be effective in lowering water levels from Marysville–Yuba City to Country Club Lane, but would be ineffective in lowering water levels farther downstream at Star Bend because water levels at Star Bend are controlled by conditions downstream of this levee setback segment. The simulations show that the water levels would be lowered about 1.3 feet and 1.6 feet for the 1-in-100 and 1-in-200 AEP events, respectively, at the confluence of the Feather and Yuba Rivers in comparison with existing conditions. Within the ASB setback levee reach, the simulated maximum reductions in water surface elevations for the 1-in-100 and 1-in-200 AEP events are 2.6 feet and 3.0 feet, respectively, at river mile 23.5. The ASB setback levee would also lower water levels in the Yuba River above Marysville, but not by as much; for example, for the Yuba River 2.6 miles upstream of Marysville, MBK Engineers' evaluation showed that the ASB setback levee would lower the Yuba River stage by about 0.8 foot for the 1-in-100 AEP event and 1.2 feet for the 1-in-200 AEP event.

4.4.3 ALTERNATIVE 2—CONSTRUCTION

General Construction Plan—Segments 1 and 3

The construction plan for project Segments 1 and 3 under Alternative 2 would be similar to the construction plan for these same project segments under Alternative 1 presented in Section 4.3.3 above. Both alternatives include the same levee repair and strengthening activities in these two project segments.

General Construction Plan—Segment 2

Construction of the ASB setback levee under Alternative 2 would be primarily a large civil construction project and would need to be planned accordingly, consistent with standards of The Reclamation Board as stated in 23 CCR Sections 111–157. Section 112 stipulates that existing levees may not be excavated or left partially excavated during the flood season. The flood season for the Feather River, as defined in Section 112, extends from November 1 through April 15. This requirement sets milestone dates around which the project must be planned. Because the primary borrow sources would be borrow areas in the levee setback area and from excavation of a detention basin, embankment placement could begin before April 15, weather permitting. As described previously, the decision to remove the existing levee is a federal decision that would be made by the Corps, and the timing of such an action is uncertain. If the Corps were to permit degradation of the existing levee concurrently with construction of the ASB setback levee, any excavation of the existing levee would not occur until after a substantial portion of the setback levee is constructed. Levee excavation would need to occur after April 15, and the setback levee would need to be completed and approved by The Reclamation Board by November 1.

Key activities to be started ahead of construction of the setback levee embankment include construction of the slurry cutoff wall, excavation of the inspection trench, other work to prepare the levee foundation, and the removal or relocation of structures and utilities.

Slurry Cutoff Wall

Construction of the slurry cutoff wall to the depths required along the proposed ASB setback levee alignment would be accomplished with large modified backhoes. This equipment and the associated sequence of excavation, backfill preparation, and placement of backfill back into the slurry cutoff wall trench would require a 100-foot-wide work platform (20 feet along one side of the wall and 80 feet on the other side). The slurry cutoff wall is expected to be as much as 80 feet deep. Therefore, for each section of the ASB setback levee where a slurry cutoff wall is needed, the slurry cutoff wall would be installed before the levee embankment is constructed. In addition, the work platform would need to be at least 4–5 feet above the highest groundwater level to provide a stable base for the excavation equipment.

Before excavation for the slurry cutoff wall, a shallow (3-4 foot-deep) trench would be excavated and backfilled with material of low permeability to form a shallow cutoff. The slurry cutoff wall would be excavated through this shallow cutoff. Some time would be allowed for the backfill in the slurry cutoff wall to settle before the placement of fill in the overlying embankment would continue. The connection of the slurry cutoff wall to the embankment fill is a key feature and would be refined during detailed design.

Foundation Preparation

Preparation of the foundation of the ASB setback levee would involve a sequence of several activities. The setback levee footprint would be cleared and grubbed of all objectionable matter, such as trees, brush, vegetation, loose stone, abandoned structures, existing utilities, buried pipelines, and other deleterious buried materials that may exist within 10 feet of the levee toes. After clearing and grubbing, the setback levee foundation would be stripped to remove low-

growing vegetation and topsoil to a depth of at least 6 inches, although local areas with extensive tree roots or deep organic soils would require excavation to a depth of 3 feet or greater. The topsoil would be placed in a designated "unsuitable material" spoil area, consisting of a compacted waterside berm as described previously under "Levee Embankment Material." Overall, the depth of stripping is expected to average about 1–3 feet. After stripping, the inspection trench would be excavated, as described previously. The trench then would be backfilled and compacted.

Before placement of the embankment fill, the foundation surface would be proof-rolled, and any remaining soft materials would be removed and replaced with compacted fill, treated with lime stabilization, and strengthened with geogrid mesh. Just before the first lift of fill is placed, the foundation surface would be scarified to a depth of about 4 inches and moisture conditioned to help create a good bond between the foundation and the embankment fill.

Removal of the Existing Levee

Where the existing levee would be excavated for setback levee borrow and/or to allow flood waters to pass into and out of the levee setback area (assuming Corps authorization), the existing embankment would be excavated to the level of the adjoining ground surface. It is anticipated that vegetation would not be removed from the river side of the existing levee. However, some of this vegetation may need to be removed if drainage channels need to be constructed to allow borrow areas and other depressions to drain to the Feather River channel (see "Borrow Material Requirements and Development of Borrow Areas" below). If the construction of drainage channels is required, these channels would be located to minimize vegetation disturbance, fish stranding, and other environmental impacts. A site-specific drainage plan would be developed in final design.

Embankment Construction

Construction of the ASB setback levee embankment would begin in the spring as soon as weather conditions allow. The embankment would be constructed as an engineered fill, with the fill placed in horizontal lifts consistent with the requirements for lift thickness and compaction densities specified in 23 CCR Section 120. Each lift would be moisture conditioned and compacted to the specified density using a suitable compactor, such as a sheepsfoot, tamping-foot, or rubber-tired roller.

Erosion Protection

Once the setback levee embankment is completed, an approved grass cover would be placed on both the riverside and landside slopes of the levee for protection against erosion. Historical experience with the existing left bank Feather River levee in this area indicates that grass cover provides acceptable erosion protection against high water levels during flood flows.

Pump Station No. 3 Relocation and Replacement

The relocation and replacement requirements for Pump Station No. 3, and the characteristics of the new Pump Station No. 3, under Alternative 2 are similar to those described for Alternative 1

in Section 4.3 above. The only substantial difference is that the location of the new pump station would be farther to the east on the land side of the proposed ASB setback levee.

Detention Basin Construction

A portion of the stormwater runoff from the western portion of RD 784 passes into and through the ASB setback levee area. Drainage from this area is conveyed in the Plumas Lake Canal and pumped into the Feather River at Pump Station No. 3. When flows exceed the capacity of Pump Station No. 3, there are several areas where water may pond and be temporarily stored until flow rates decline. Construction of the ASB setback levee would cut off and remove some of the ponding area where excess drainage water is temporarily stored. Therefore, as part of Alternative 2, it may be necessary to create a detention basin to mitigate the lost storage capacity. An area currently being considered for a detention basin, northeast of Star Bend, is shown in Figure 4-1 as a potential borrow area and/or detention basin. The detention basin would be constructed adjacent to the Plumas Lake Canal to allow water to be diverted from the canal into the basin when needed. The basin would be excavated to a depth of about 8–10 feet, or deeper if a permanent water feature is desired for mitigation/restoration or local land development considerations. Suitable soils excavated during construction of the detention basin would be used as borrow material for construction of the setback levee**.**

Borrow Material Requirements and Development of Borrow Areas

Sources and Quantities of Borrow

Borrow areas are sites where native materials (i.e., soil and rock) are obtained for required construction activities. As noted previously, borrow material would be obtained locally from excavation of a detention basin and from borrow areas developed inside and outside the ASB levee setback area. The existing Feather River levee would also be used as a source of borrow to the maximum extent possible.

Objectives for local borrow areas include:

- reducing the impact on land resources,
- shortening borrow haul distances to reduce impacts on air quality and traffic, and
- promoting the use of large off-road earthmoving equipment such as scrapers rather than trucks to reduce construction costs.

A total of approximately 3.1 million cubic yards (cy) of borrow material would be required to construct the ASB setback levee in project Segment 2. An additional roughly 200,000 cy of material would be required for levee repair/strengthening in Segments 1 and 3. A preliminary estimate of borrow material requirements for construction under Alternative 2 is provided in Table 4-3, “Summary of Borrow Material Requirements for Alternative 2.”

Table 4-3
Summary of Borrow Material Requirements for Alternative 2

Material Type [a]	Description	Volume Required (cubic yards)
1 & 2	ASB setback levee embankment	3,100,000
1	Levee repairs in Segments 1 and 3	200,000
3	Levee crown surface	17,000
	TOTAL VOLUME	Approx. 3,317,000

[a] Material types are as shown in Figure 4-3; 1 = Approved low-permeability material; 2 = Approved low-permeability material with reduced plasticity; 3 = Caltrans Class 2 Aggregate Base.
Notes: ASB = Above Star Bend; Caltrans = California Department of Transportation
Source: Data provided by GEI Consultants in 2006

Figure 4-1 shows potential borrow areas for the ASB setback levee. The intent is that the borrow areas would be within the identified limits and would have a smaller footprint than the area shown in the figure. Additional potential borrow sources include the abandoned sections of the Bear and Feather River levees left remnant from construction of the F-BRLSP, the area between the setback levee and Feather River Boulevard, and an existing borrow area near Ella Road.

Two general objectives are important in the selection of borrow areas:

- To minimize haul distances to the ASB setback levee alignment and provide a continuous or nearly continuous borrow source. Minimizing haul distances is important to minimize project construction costs and air emissions.
- To reduce the potential for seepage impacts at the foundation of the ASB setback levee, maintain a distance of 500 feet or greater from the edge of the borrow area to the toe of the proposed levee unless there is an incised drainage channel between the setback levee alignment and the borrow area. If such an incised drainage exists, borrow excavation closer to the levee may be allowed, based on an evaluation of local site conditions. Borrow areas may also be developed closer than 500 feet from the toe of the setback levee if the borrow pit is to be subsequently backfilled.

In general, the borrow areas would be located such that the haul distance to the point of material placement would be minimized as much as possible.

A detailed investigation of suitable borrow areas for levee embankment materials would be conducted as part of the field investigation program for detailed design. The limits of borrow areas would be refined during this effort.

Design and Treatment of Borrow Areas

Standard practices for the design and treatment of borrow areas would be followed as described in guidance provided by the Corps in Engineer Manual EM 1110-2-1913, *Engineering and Design—Design and Construction of Levees* (U.S. Army Corps of Engineers 2000). This guidance recommends that riverside borrow areas be “wide and shallow” rather than “narrow and deep.” This configuration provides for improved underseepage, hydraulic, and

environmental conditions. To minimize subsequent scouring when pits are filled by flood flows, to promote the growth of vegetation, and to encourage silting where reclamation is possible, the Corps recommends that riverside borrow areas be located and excavated such that they will fill slowly on a rising river and drain fully on a falling river. The guidance therefore specifies that bottoms should be sloped to drain away from the levee, with culvert pipes provided through traverses, and foreshore areas ditched through to the river as needed for proper drainage. The guidance also recommends that minimum treatment of borrow areas after excavation (to satisfy aesthetic and environmental considerations) include topographic smoothing to remove any holes, trenches, and abrupt slopes and the promotion of conditions conducive to vegetative growth. The drainage of the borrow areas would also need to ensure fish movement out of the levee setback area into the main channel of the Feather River when flood flows recede following inundating flood events.

It is anticipated that borrow areas could be excavated to depths of 5–10 feet (i.e., above the groundwater table). (Groundwater levels along the existing Feather River levee were measured, in a limited number of exploration borings, to be 9–20 feet below ground surface above Star Bend.) Wide, shallow excavations (rather than deep trenches) are anticipated. At the conclusion of the work, the borrow areas would be graded to blend with the topography, leaving slopes flat enough to reduce erosion and promote conditions conducive to vegetative growth (slopes 3:1 [H:V] or flatter), or filled with material from removal of existing levees. If not filled, the bottom of the borrow areas would be regraded to drain away from the levee and toward the river or toward existing drainage ways. The borrow areas would be revegetated to conform to the surrounding landscape. The borrow sites would be reclaimed as appropriate. Some stockpiled topsoil, and other excess earth materials (organic soils, roots, and grass) from stripping of the existing levees, borrow areas, and ASB setback levee foundation, could be spread over borrow sites after excavation has been completed, or would be placed in spoil berms on the waterside toe of the setback levee. There may be opportunities for environmental enhancement if the development and reclamation of the borrow areas is coordinated with wetland mitigation efforts. These would need to be identified during further design of this element and would incorporate the findings of this EIR as appropriate.

Aggregate base needed to surface the patrol road on the levee crown would be obtained from commercial sand and gravel operations in the Marysville–Yuba City area and would be hauled to the setback levee alignment and levee repair areas by truck.

Relocation of Utilities and Removal of Structures

A preliminary survey of existing facilities and utilities in the ASB levee setback area was conducted in October 2002 associated with planning for the Y-FSFCP.

Implementation of Alternative 2 would necessitate the removal of all structures (houses, trailers, sheds, barns, other agricultural outbuildings) from the ASB levee setback area, which would be subject to periodic flooding following removal of the existing levee. The facilities surveys identified approximately 40 structures in the levee setback area. It is estimated that five to 10 of these are residences, including mobile homes. Appropriate compensation would be negotiated with landowners displaced by the project. In addition, all property acquisitions and relocations conducted as part of the project would be completed following both the Federal Uniform

Relocation Act and the California Relocation Assistance Law (see the discussion of these statutes in Section 5.1, "Land Use"). Eligible homeowners, renters/tenants, businesses, and farm operations would receive relocation assistance consistent with these federal and state statutes.

Three small waste dumps containing fruit waste and miscellaneous solid debris have been noted within the ASB levee setback area. If necessary, based on future study such as a Phase 1 Environmental Site Assessment (ESA), the dumps could be excavated and the materials placed in approved landfills, or other appropriate remediation could be implemented.

Some utilities and other facilities located in the ASB levee setback area would need to be relocated or reinforced with implementation of the levee setback. As discussed previously, RD 784 Pump Station No. 3 would be relocated to the land side of the proposed ASB setback levee. A PG&E 115-kilovolt (kV) transmission line called the Bogue Loop crosses the levee setback area on three towers. The foundations for these steel structures would probably need to be reinforced so that their integrity would be maintained during times of flood water inundation. Other steel towers along the same transmission line are located on the water side of the existing Feather River levee and are supported by elevated steel pile foundations.

Other existing facilities that may need to be abandoned, reinforced, or relocated include roads, power distribution lines, irrigation pipelines, drainage canals and structures, wells, fill stations, and communications lines. Several private irrigation lines would be cut off by the construction of the ASB setback levee, separating some lands on both sides of the setback levee that require irrigation from current water sources. During detailed design, and in coordination with landowners, appropriate water sources and irrigation infrastructure would be determined for lands where irrigation lines were cut off and that would continue to require irrigation water after project construction. Depending on site-specific conditions, wells and fill stations in the levee setback area could be removed or maintained. Private wells and fill stations in the levee setback area that would be abandoned would be removed and filled, and new wells would be dug and fill stations built outside the levee setback area to replace the abandoned facilities as appropriate. Wells and fill stations that would be retained in the levee setback area would be retrofitted to accommodate periodic flooding. New power lines and power poles would be required for any new wells and fill stations.

Individual utilities and conceptual plans for their abandonment, reinforcement, and relocation are described in more detail in Section 5.12, "Public Services, Utilities, and Service Systems."

Staging Areas

It is anticipated that several staging areas would be developed along the ASB setback levee alignment to allow for efficient use and distribution of materials and equipment. Staging areas would be located within the construction corridor (see "Construction-Related Traffic" below) and near active construction areas, so they may be relocated as construction progresses. Because the work area is essentially flat, suitable sites for construction staging are abundant. Specific staging areas would not be identified until the detailed design phase. Final selection of staging areas would be based on contractor preference and environmental and land use constraints.

Disposal of Excess Materials

Excess earth materials (organic soils, roots, and grass from stripping of the existing levees, borrow areas, and ASB setback levee foundation; excavated material that does not meet levee embankment criteria) would be used in the reclamation of borrow areas. Suitable excess material would also be placed in a compacted spoil berm along the waterside toe of the ASB setback levee as described previously. In addition, excess material could be used in the contouring of the setback area to facilitate drainage to the Feather River and prevent fish stranding. Cleared vegetation (i.e. trees, brush) would be hauled off-site. Debris from structure demolition, power poles, piping, and other materials requiring disposal would be hauled off-site to a suitable landfill.

Stormwater Pollution Prevention

Stormwater pollution prevention measures under Alternative 2 would be the same as those described previously for Alternative 1 (see Section 4.3.3, "Alternative 1—Construction"). These stormwater pollution prevention measures would need to be implemented over a larger area under Alternative 2 because of the increased level of ground disturbance associated with construction of the ASB setback levee, the increased need for borrow areas, and construction of the detention basin.

Construction Equipment

Contractor plant equipment would include construction office and equipment trailers; slurry batch plants, including bentonite storage facilities, mixing tanks, pumps, and piping; warehousing and equipment maintenance facilities; and fuel pumps and fuel storage tanks. Mobile construction equipment for levee repairs in project Segments 1 and 3, installation of a slurry cutoff wall in these segments, and berm construction (if needed) would be similar to the equipment listed previously for Alternative 1. However, the actual number of pieces of equipment may be somewhat smaller under Alternative 2 because of the reduced extent of levee repairs (i.e., two project segments rather than three segments).

Mobile equipment for construction of the ASB setback levee may include the following typical equipment:

- two hydraulic excavators,
- eight to 10 scrapers,
- four bulldozers,
- three to four graders,
- four self-propelled sheepsfoot or tamping-foot rollers,
- two water wagons,
- 20 highway dump trucks,
- a lubricating truck,
- a front-end loader,
- a truck-mounted crane, and
- numerous pickup trucks.

Mobile equipment for construction of a slurry cutoff wall for two simultaneous headings along the ASB setback levee alignment may include:

- two long-stick hydraulic excavators,
- two low-ground-pressure bulldozers,
- two utility excavators, and
- two integrated tool carriers.

Additional equipment would include drill rigs to abandon wells and install new wells, utility equipment to install power lines, an air compressor, welding equipment, pumps and piping, communications and safety equipment, erosion control materials, miscellaneous equipment customary to the mechanical and electrical crafts, and vehicles used to deliver equipment and materials.

Construction-Related Traffic

Personnel, equipment, and imported materials would reach the site via SR 70 and Feather River Boulevard, which are paved, all-weather roads suitable for the anticipated loads. The construction labor force is estimated to average about 60–70 persons over the 2-year construction period. Peak staffing could be close to 100 depending on the contractor's schedule.

It is expected that about 60–70 trailer ("low-boy") truck round trips would be required to transport the contractor's plant and equipment listed above to the site. A similar number of round trips would be needed to remove the equipment from the site as the work is completed.

Aggregate base, and similar aggregate and quarry materials as needed (e.g., drain rock, rock facing material) would be obtained from a commercial sand and gravel operation, most likely in the Marysville–Yuba City area. The construction contractor would select the specific supplier based on suitability and pricing. About 1,500 highway truck trips would be needed to bring the aggregate materials to the site from the quarry of origin. About 150 truckloads would be needed to bring dry bentonite to the site. The bentonite would probably be processed in Wyoming or South Dakota and transported to the Marysville–Yuba City area by rail. Another 40–50 trailer truckloads would be required to bring other permanent materials to the site, such as geotextile fabric, erosion control materials, structural steel, piping, utility poles, well casings, and ancillary equipment. About 30–40 concrete loads, transported by transit mixer truck, are also likely. In addition, about 750 highway truckloads may be needed to carry demolition debris, construction debris, and waste dump materials to a suitable landfill.

At the project site, the primary construction corridor for project Segments 1 and 3 would include the existing Feather River and Yuba River levee crests, the landside toes of the existing levees, and roads used for access to the work areas, including Feather River Boulevard. The primary construction corridor for Segment 2 would include the work area bounded by the waterside toe of the existing Feather River levee to the west and the landside toe of the ASB setback levee to the east, as well as roads used for access to the work area, including Feather River Boulevard. Access routes for construction of the ASB setback levee would consist mainly of the existing east-west lateral roads between SR 70, Feather River Boulevard, and the existing Feather River

levee. These access roads may need to be supplemented by new temporary access roads from the borrow areas and existing levee to the new setback levee.

Within the construction area, the main source of construction traffic would be the required transport of borrow material from the points of excavation at the borrow areas to the placement area at the ASB setback levee. A total volume of about 3.1 million cy would require about 155,000 haul unit trips if a load of 20 cy per trip is assumed. Larger haul unit sizes would reduce the number of trips and the impact on air quality. Dust control measures would be applied to roads and work areas on a systematic basis. This transport of material would take place over an approximately 8- to 9-month (spring through fall) construction season (see "Construction Sequence and Scheduling Constraints" in Section 4.6, "Implementation," below regarding the construction schedule). Borrow placement would need to average at least 11,500–15,000 cy per day for the work to be completed in approximately 210–230 work days.

4.5 ALTERNATIVE 3—THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE

4.5.1 PRELIMINARY DESIGN OF ALTERNATIVE 3

As described previously, Alternative 3, The Levee Strengthening and Intermediate Setback Levee Alternative, would consist of the following:

- Segment 1—Levee repairs and strengthening along the Feather River left bank levee from PLM 13.3 to PLM 17.1.
- Segment 2—A setback levee along the left bank of the Feather River from PLM 17.1 to PLM 23.6 following an alignment similar to the ASB setback levee alignment described for Alternative 2, but with a portion located farther to the west.
- Segment 3—Levee repairs and strengthening along the Feather River left bank levee from PLM 23.6 to PLM 26.1 and the Yuba River left bank levee from PLM 0.0 to PLM 0.3.

Activities along project Segments 1 and 3 would be exactly the same as described for Alternatives 1 and 2, consisting of the same levee repair and strengthening elements and seepage control and stability measures identified in the PIR. These activities generally are not described further below.

The primary difference between Alternative 3 and the other alternatives relates to project construction activities along Segment 2. Under Alternative 1 the existing Feather River levee in Segment 2 would be repaired and strengthened; by contrast, under Alternatives 2 and 3 a setback levee would be constructed in this project segment. The setback levee to be constructed under Alternative 3 would follow an alignment similar to that described for Alternative 2. However, a portion of the alignment would be moved farther to the west to minimize effects on existing properties and reduce the area placed on the water side of the levee.

For most parameters of the project description Alternative 3 is the same as or not substantially different from Alternative 2. The description below focuses on those areas where Alternative 3 differs.

Segments 1 and 3—Levee Strengthening

The levee repairs and improvements to the Feather River and Yuba River levees in project Segments 1 and 3 under Alternative 3 are identical to those described previously for Alternative 1 in Section 4.3.

Segment 2—Intermediate Setback Levee

Levee modifications in project Segment 2 (the Feather River left bank levee from PLM 17.1 to PLM 23.6) would consist of construction of a new setback levee (the intermediate setback levee) as described below.

Setback Levee Alignment

The general location of a potential intermediate setback levee is shown in Figure 4-1. However, for the portion of the intermediate setback levee that deviates from the ASB setback levee alignment, a specific route has not yet been confirmed and several options are being considered. The actual alignment could be located to the east or west of the alignment shown. Considerations for final route selection include the suitability of underlying soil conditions for levee construction and the extent of flood control benefits (i.e., moving the alignment westward and reducing the size of the Feather River high-water channel would result in fewer flood control benefits). The route shown in Figure 4-1 and described below is considered to be representative of the various alignment options available under the intermediate setback levee scenario.

The characteristics of the intermediate setback levee are similar to those of the ASB setback levee described in Section 4.4. However, the intermediate setback levee alignment was selected as a project alternative, in part, to minimize effects on existing land uses. Because a portion of the setback levee alignment would be farther west than the ASB setback levee alignment, less land area would be placed in the flood zone (i.e., between the setback levee and the river) if the intermediate setback levee were built. In addition, several structures that would be placed in the flood zone under Alternative 2, and hence would have to be removed, would remain on the land side of the levee under Alternative 3.

The intermediate setback levee alignment more closely follows some property parcel lines than the ASB setback levee alignment, reducing the splitting of parcels by the setback levee. Because existing parcel configurations would be more closely maintained, these parcels would remain large enough to cost effectively continue agricultural operations. Under the ASB setback levee alignment, by contrast, portions of these parcels would be separated or split by the setback levee, resulting in a smaller land area that may not be large enough to cost effectively continue agricultural operations.

The intermediate setback levee would be approximately 5.5 miles long. The new levee segment would generally be set back approximately 0.5 mile to the east of the existing Feather River levee in the southern portion of the alignment, and approximately 0.3 mile to the east of the existing levee in the northern portion. The exception is at the northern and southern ends of the alignment, where the setback levee would join the existing levee. The area between the existing levee and the setback levee (the levee setback area) and the footprint of the intermediate setback levee would include approximately 1,250–1,300 acres. It should be noted that the final alignment

of the intermediate setback levee may be adjusted slightly during detailed design to meet site-specific project needs.

The Existing Segment 2 Levee

Under Alternative 3 the existing Feather River left bank levee in project Segment 2 would be treated in the same manner as described previously for Alternative 2 (see Section 4.4.1, "Preliminary Design of Alternative 2").

Levee Embankment Material

Under Alternative 3, embankment materials used for the setback levee would have the same characteristics and would be used in the same manner as described previously for Alternative 2 (see Section 4.4.1, "Preliminary Design of Alternative 2"). Preliminary design cross sections for the intermediate setback levee are shown in Figure 4-5, "Preliminary Plan View and Typical Cross Sections for the Intermediate Setback Levee."

Setback Levee Dimensions

The preliminary cross sections for the intermediate setback levee are shown in Figure 4-5. The dimensions of the intermediate setback levee would be similar to the dimensions of the ASB setback levee described in Section 4.4.1, "Preliminary Design of Alternative 2."

Setback Levee Inspection Trench

The inspection trench for the intermediate setback levee would be similar to the inspection trench for the ASB setback levee described in Section 4.4.1. The upper cross section shown in Figure 4-5 represents a typical levee section with an inspection trench.

Setback Levee Easement

The easement requirements for the intermediate setback levee would be the same as those described for the ASB setback levee in Section 4.4.1.

Seepage Control

Seepage control measures for the intermediate setback levee would be very similar to measures for the ASB setback levee described in Section 4.4.1.

The lower cross section in Figure 4-5 represents a typical intermediate setback levee cross section with a slurry cutoff wall. Information regarding the preliminary locations, lengths, and depths of slurry cutoff walls for the intermediate setback levee alignment is also provided in Figure 4-5.

As with the ASB setback levee alignment, at this time the only location along the intermediate setback levee alignment where relief wells are proposed is at the upstream tie-in point of the setback levee with the existing levee. At this location relief wells would act as a supplemental

seepage control method, to provide for relief of foundation seepage that may have a southerly flow component.

Selection of the type and extent of seepage control measures for specific reaches of the intermediate setback levee alignment is preliminary. The maximum reaches over which seepage control measures may be required were identified for project budgeting purposes and for the evaluation of potential environmental effects; however, definition of the reaches should be considered approximate at best. The seepage control system would be refined based on detailed field investigations and analyses, to be performed during detailed design.

4.5.2 HYDROLOGY AND FLOOD CONTROL BENEFITS

The intermediate setback levee would work within the capacities of the current flood control system. The existing system design flow for the Feather River between the Yuba and Bear Rivers is 300,000 cfs. The upstream reservoirs operate to maintain flows in the Feather River at or below this design flow, insofar as possible. With the intermediate setback levee in place along the Feather River, the reservoirs could continue to operate in the same manner as under current conditions. The levee setback would result in flood control benefits because it would lower water levels in the river during flood events and because the setback levee would be constructed in a more secure location than the existing levee, based on current engineering standards.

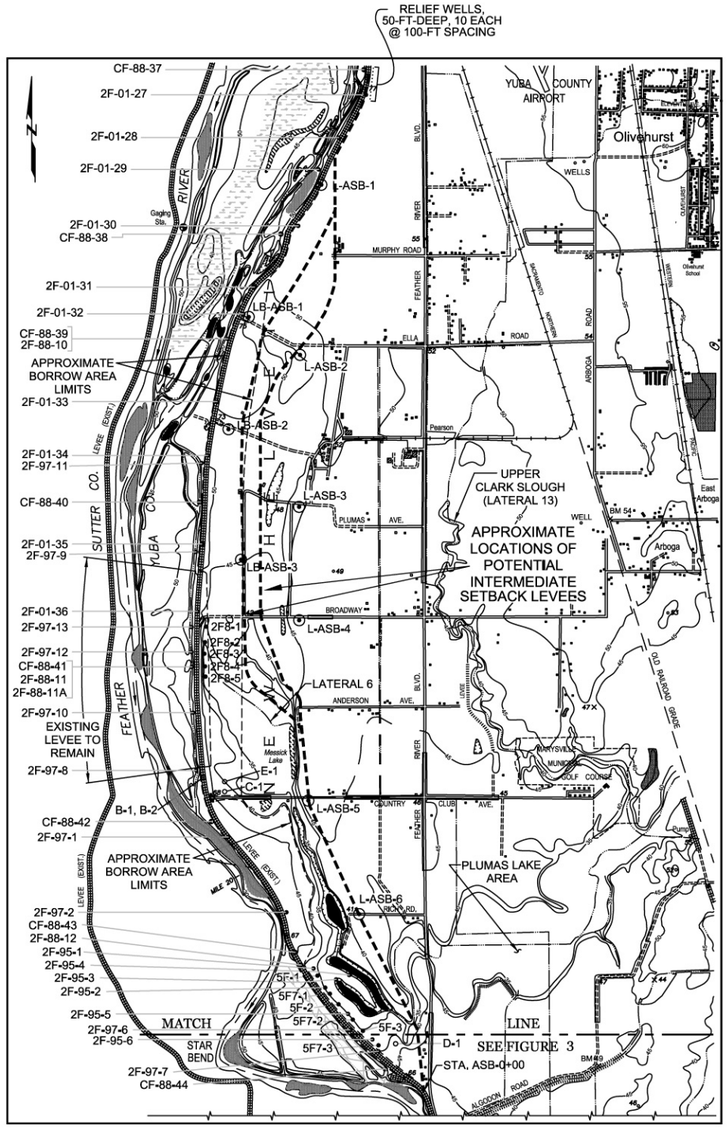
MBK Engineers performed hydraulic modeling of the proposed intermediate levee setback. The following sections summarize the results of these modeling studies. Details regarding the modeling are provided in Appendix B**.**

Flooding of the Intermediate Levee Setback Area

Flows would enter the upstream end of the intermediate levee setback area (i.e., the new floodway) when the river stage rises above the ground elevation at the current levee alignment, which is approximately 50 feet. Analysis performed by MBK Engineers indicates that flows passing downstream would enter the levee setback area approximately once in 3 years on average, when the rate of flow is somewhat higher than 50,000 cfs. Flooding would generally last for 3–5 days. This is similar to the frequency of flooding now experienced in areas that are within the currently leveed channel of the Feather River but are outside the low-flow channel. For the 1-in-100-AEP flood (i.e., the “100-year flood”) on the Feather River—a flow of approximately 300,000 cfs—the maximum depth of water in the levee setback area is expected to be about 20 feet, while the peak velocity is expected to fall in the range of 1–3 feet per second. For the 1-in-200 AEP flood on the Feather River (350,000 cfs), the maximum water depth in the setback area would be approximately 23 feet and the peak velocity is expected to fall in the range of 1–3 feet per second.

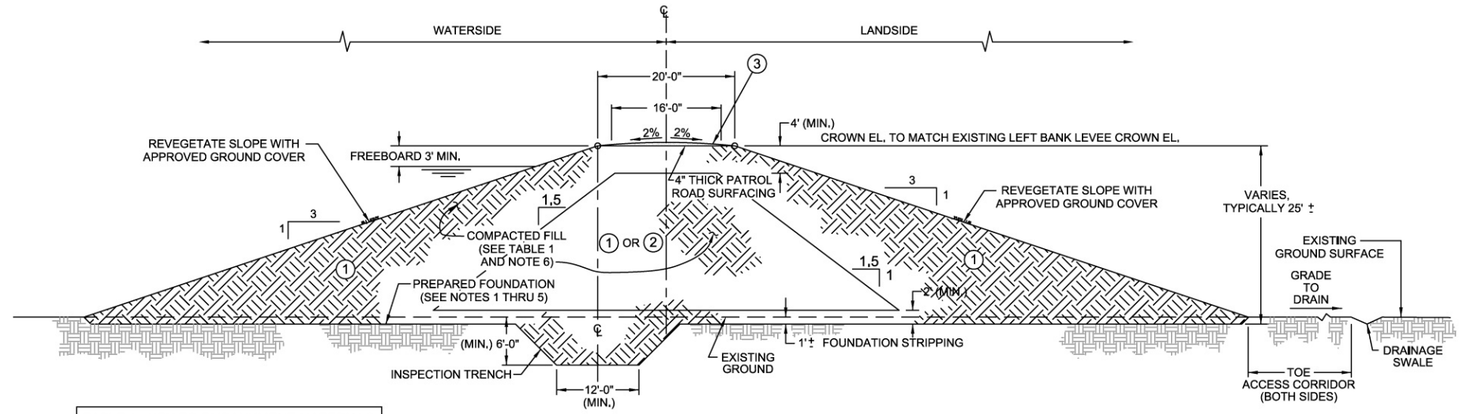
Table 4-4, “Feather River Flow Frequencies and Water Elevations in the Intermediate Levee Setback Area,” shows the approximate frequency of Feather River flood flows and corresponding water depths at the upstream end of the levee setback area.

Figure 4-4 illustrates the expected frequency and magnitude of river flows through the intermediate levee setback area.



PLAN VIEW

0 2,000 4,000
SCALE, FEET

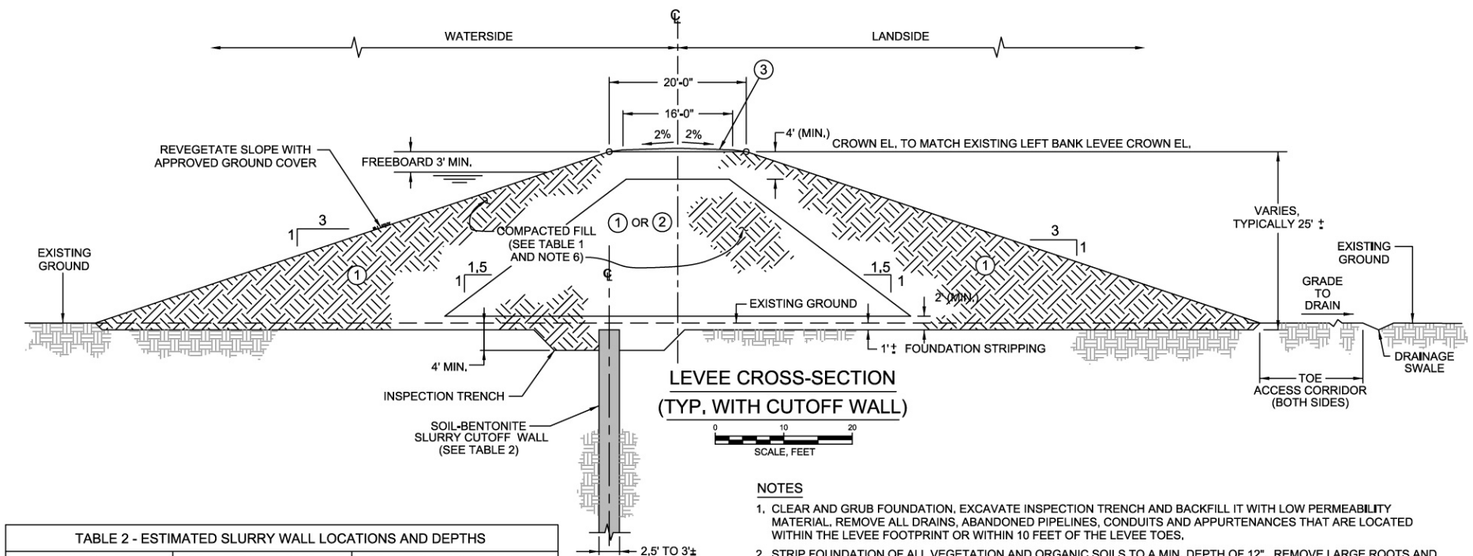


LEVEE CROSS-SECTION (TYP. WITHOUT CUTOFF WALL)

0 10 20
SCALE, FEET

TABLE 1 - KEY TO EMBANKMENT MATERIALS	
1	APPROVED LOW-PERMEABILITY MATERIAL
2	APPROVED LOW PERMEABILITY MATERIAL WITH REDUCED PLASTICITY
3	CALTRANS CLASS 2 AGGREGATE BASE

NOTE:
THE LEVEE SETBACK ALIGNMENT, CROSS-SECTION AND DETAILS ARE PRELIMINARY.



LEVEE CROSS-SECTION (TYP. WITH CUTOFF WALL)

0 10 20
SCALE, FEET

TABLE 2 - ESTIMATED SLURRY WALL LOCATIONS AND DEPTHS		
STATION (FT)	ESTIMATED WALL DEPTH (FT)	ESTIMATED AVERAGE DEPTH (FT)
ASB 0+00 TO ASB 310+00	40 TO 70	60

NOTES

1. CLEAR AND GRUB FOUNDATION. EXCAVATE INSPECTION TRENCH AND BACKFILL IT WITH LOW PERMEABILITY MATERIAL. REMOVE ALL DRAINS, ABANDONED PIPELINES, CONDUITS AND APPURTENANCES THAT ARE LOCATED WITHIN THE LEVEE FOOTPRINT OR WITHIN 10 FEET OF THE LEVEE TOES.
2. STRIP FOUNDATION OF ALL VEGETATION AND ORGANIC SOILS TO A MIN. DEPTH OF 12". REMOVE LARGE ROOTS AND PEAT TO A DEPTH OF 3 FEET.
3. PROOF ROLL FOUNDATION TO ENSURE REMOVAL OF ALL SOFT SPOTS.
4. BACKFILL ALL HOLES, DEPRESSIONS AND DITCHES IN THE FOUNDATION WITH NATIVE MATERIAL AND COMPACT THE BACKFILL TO A DENSITY EQUAL TO THAT OF THE ADJACENT UNDISTURBED MATERIAL.
5. IMMEDIATELY PRIOR TO PLACING THE FIRST LIFT OF EMBANKMENT, SCARIFY AND MOISTURE CONDITION THE FOUNDATION SURFACE TO A DEPTH OF 4 INCHES.
6. PLACE THE FILL MATERIALS IN MAXIMUM 6" THICK LIFTS AFTER COMPACTION.

LEGEND

▬▬▬	EXISTING LEVEE
- - - -	INTERMEDIATE SETBACK LEVEE
⊙ L-ASB-1	APPROX. GEI TEST BORING LOCATION (2002)
• 2F-97-7	APPROX. CORPS OF ENGINEERS TEST BORING LOCATION (1997)
• CF-88-39	APPROX. CORPS OF ENGINEERS CONE PENETRATION TEST LOCATION (1988)
○ B-1, C-1, D-1	APPROX. WAHLER TEST BORING LOCATION (1986)
ASB	ABOVE STAR BEND

NOTE

Map is taken from U.S.G.S. Topographic 7.5 Minute Series Map of Olivehurst, California Quadrangle, Photorevised 1973. Datum is National Geodetic Vertical Datum of 1929 (NGVD).

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FEATHER RIVER LEVEE REPAIR PROJECT

Preliminary Plan View and Typical Cross Sections for the Intermediate Setback Levee

Figure 4-5

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Table 4-4
Feather River Flow Frequencies and Water Elevations in the Intermediate Levee Setback Area

AEP	Feather River Flow (cfs)	Water Elevation at Upper End of Levee Setback Area (feet—NGVD)	Height Above Ground at Upper end of Levee Setback Area (feet)
1 in 2.5	50,000	46.0	0
1 in 5	105,000	53.6	7
1 in 10	130,000	56.4	9
1 in 20	190,000	61.5	13
1 in 100	300,000	67.4	20
1 in 200	350,000	69.8	23

Notes: AEP = annual exceedance probability; cfs = cubic feet per second; NGVD = National Geodetic Vertical Datum
Source: Data provided by MBK Engineers in 2006

Reductions in River Stages

The hydraulic performance of the intermediate setback levee was evaluated using an unsteady-flow model (HEC-RAS) originally developed by the Corps in support of the Lower Feather River Floodplain Mapping Study and subsequently modified and calibrated to the flow and high-water data from the 1997 flood by MBK Engineers. Simulations were performed for the 1-in-100 and 1-in-200 AEP events to assess the effect of the potential setback on river stages.

The results of the evaluation indicate that the intermediate setback levee alignment would be effective in lowering water levels from Marysville–Yuba City to Country Club Lane but would be ineffective in lowering water levels farther downstream at Star Bend because water levels at Star Bend are controlled by conditions downstream of this levee setback segment. The simulations show that the water levels would be lowered by about 1.0 feet and 1.2 feet for the 1-in-100 and 1-in-200 AEP events, respectively, at the confluence of the Feather and Yuba Rivers in comparison with existing conditions. Within the intermediate setback levee reach, the simulated maximum reductions in water surface elevations for the 1-in-100 and 1-in-200 AEP events are 2.1 feet and 2.4 feet, respectively, at river mile 23.5. The intermediate setback levee would also lower water levels in the Yuba River above Marysville, but not by as much; for example, for an index point 2.6 miles upstream of Marysville, MBK Engineers' evaluation showed that the intermediate setback levee would lower the Yuba River stage by about 0.6 foot for the 1-in-100 AEP event and 1.0 foot for the 1-in-200 AEP event.

4.5.3 ALTERNATIVE 3—CONSTRUCTION

General Construction Plan—Segments 1 and 3

The construction plan for project Segments 1 and 3 under Alternative 3 would be similar to the construction plan for these same project segments under Alternative 1 presented in Section 4.3.3 above. Both alternatives include the same levee repair and strengthening activities in these two project segments.

General Construction Plan—Segment 2

The general plan for construction of the intermediate setback levee under Alternative 3 would generally be the same as the plan for construction of the ASB setback levee under Alternative 2, described previously in Section 4.4.3, "Alternative 2—Construction." Locations of project elements would differ, but methods of constructing the slurry cutoff wall, foundation preparation, removal of the existing levee, embankment construction, erosion protection, relocation and replacement of Pump Station No. 3, and detention basin construction would be the same for the two alternatives.

Borrow Material Requirements and Development of Borrow Areas

Sources and Quantities of Borrow

Factors driving the need for borrow material and the selection of borrow areas are the same for Alternative 3 as described previously for Alternative 2 in Section 4.4.3, "Alternative 2—Construction." The two potential soil borrow areas shown in Figure 4-1, and other potential borrow sources identified for the ASB setback levee, if used, could provide borrow material for either the ASB or intermediate setback levee. It is estimated that a total of approximately 3.1 million cy of borrow material would be required to construct the intermediate setback levee in project Segment 2. An additional 200,000 cy of material would be required for levee repair/strengthening activities in Segments 1 and 3. A preliminary estimate of borrow material requirements for construction under Alternative 3 is provided in Table 4-5, "Summary of Borrow Material Requirements for Alternative 3."

Design and Treatment of Borrow Areas

The design and treatment of borrow areas under Alternative 3 would be the same as described previously for Alternative 2 in Section 4.4.3, "Alternative 2—Construction."

Table 4-5
Summary of Borrow Material Requirements for Alternative 3

Material Type [a]	Description	Volume Required (cubic yards)
1 & 2	Intermediate setback levee embankment	3,100,000
1	Levee repairs in Segments 1 and 3	200,000
3	Levee crown surface	17,000
	TOTAL VOLUME	Approx. 3,317,000

[a] Material types are as shown in Figure 4-5; 1 = Approved low-permeability material; 2 = Approved low permeability material with reduced plasticity; 3 = Caltrans Class 2 Aggregate Base.

Notes: ASB = Above Star Bend; Caltrans = California Department of Transportation

Source: Data provided by GEI Consultants in 2006

Relocation of Utilities and Removal of Structures

A preliminary survey of existing facilities and utilities in the intermediate levee setback area was conducted in October 2002.

Implementation of Alternative 3 would necessitate the removal of all structures (houses, trailers, sheds, barns, other agricultural outbuildings) from the intermediate levee setback area, which would be subject to periodic flooding following removal of the existing levee. The facilities surveys identified approximately 30 structures in the levee setback area. It is estimated that five to 10 of these are residences, including mobile homes. Appropriate compensation would be negotiated with landowners displaced by the project. In addition, all property acquisitions and relocations conducted as part of the project would be completed following both the Federal Uniform Relocation Act and the California Relocation Assistance Law (see the discussion of these statutes in Section 5.1, "Land Use"). Eligible homeowners, renters/tenants, businesses, and farm operations would receive relocation assistance consistent with these federal and state statutes.

Three small waste dumps containing fruit waste and miscellaneous solid debris have been noted within the intermediate levee setback area. If necessary, based on future study such as a Phase 1 ESA, the dumps could be excavated and the materials placed in approved landfills, or other appropriate remediation could be implemented.

Some utilities and other facilities located in the intermediate levee setback area would need to be relocated or reinforced with implementation of the levee setback. As discussed previously, RD 784 Pump Station No. 3 would be relocated to the land side of the proposed intermediate setback levee. A PG&E 115-kV transmission line called the Bogue Loop crosses the levee setback area on three towers. The foundations for these steel structures would probably need to be reinforced so their integrity would be maintained during times of flood water inundation. Other steel towers along the same transmission line are located on the water side of the existing Feather River levee and are supported by elevated steel pile foundations.

Other existing facilities that may need to be abandoned, reinforced, or relocated include roads, power distribution lines, irrigation pipelines, drainage canals and structures, wells, fill stations, and communications lines. Several private irrigation lines would be cut off by the construction of the intermediate setback levee, separating some lands on both sides of the setback levee that require irrigation from current water sources. During detailed design, and in coordination with landowners, appropriate water sources and irrigation infrastructure would be determined for lands where irrigation lines were cut off and that would continue to require irrigation water after project construction. Depending on site-specific conditions, wells and fill stations in the levee setback area could be removed or maintained. Private wells and fill stations in the levee setback area that would be abandoned would be removed and filled, and new wells would be dug and fill stations built outside the levee setback area to replace the abandoned facilities as appropriate. Wells and fill stations that would be retained in the levee setback area would be retrofitted to accommodate periodic flooding. New power lines and power poles would be required for any new wells and fill stations.

Individual utilities and conceptual plans for their abandonment, reinforcement, and relocation are described in more detail in Section 5.12, "Public Services, Utilities, and Service Systems."

Staging Areas

The use and treatment of staging areas under Alternative 3 would be the same as described previously for Alternative 2 in Section 4.4.3, "Alternative 2—Construction."

Disposal of Excess Material

The types of excess material generated during construction of the intermediate setback levee (e.g., organic soil, roots, cleared vegetation, excavated material that does not meet levee embankment criteria, debris from structure demolition) and the methods of disposing of this material would be the same as described previously for Alternative 2 in Section 4.4.3, "Alternative 2—Construction."

Stormwater Pollution Prevention

Stormwater pollution prevention measures under Alternative 3 would be the same as those described previously for Alternative 1 (see Section 4.3.3, "Alternative 1—Construction"). These stormwater pollution prevention measures would need to be implemented over a larger area under Alternative 3 than under Alternative 1 because of the increased level of ground disturbance associated with construction of the intermediate setback levee, the increased need for borrow areas, and construction of the detention basin.

Construction Equipment

The types and numbers of construction equipment used to implement Alternative 3 would be similar to those described previously for Alternative 2 in Section 4.4.3, "Alternative 2—Construction."

Construction-Related Traffic

The types and numbers of construction-generated vehicle trips under Alternative 3 would be similar to those described previously for Alternative 2 in Section 4.4.3, "Alternative 2—Construction."

4.6 IMPLEMENTATION

4.6.1 IMPLEMENTATION SCHEDULE

Completion of project-level environmental compliance, detailed engineering design, equipment procurement, permitting, design review and approval, and construction under both construction contracts are anticipated to take place over 3 years, ending in winter 2008. The anticipated activities and their durations are described below. The information provided below applies to all project alternatives unless otherwise noted.

Preconstruction Activities

Detailed engineering for project Segments 1 and 3 is expected to take approximately 12 months, while detailed engineering for Segment 2 is expected to take approximately 16 months. Main engineering activities would include:

- detailed surveying and topographic mapping of the existing Feather River and Yuba River levees and the potential ASB and intermediate levee setback corridors;
- additional geotechnical field investigations and laboratory testing of levee foundations and borrow areas;
- stability, settlement, and seepage evaluations and designs;
- preparation of construction drawings and specifications; and
- preparation of contract documents and issuance of the bid package.

It is assumed that federal, state, and local permitting and National Environmental Policy Act (NEPA) reviews would be completed concurrently with detailed design activities (see Chapter 2, "Introduction," for a list of the permits and authorizations that are likely to be required).

A BOSC would be convened to provide TRLIA with periodic independent reviews of design and construction progress. It is assumed that TRLIA and its engineering team would interact with the key reviewing agencies (DWR, The Reclamation Board, the Corps, and RD 784) throughout the design period, particularly at times of critical design milestones and construction review meetings. A 1-month period at the conclusion of the detailed design phase is anticipated for final reviews and approvals by the agencies, together with any final design modifications that may be required to satisfy agency requirements.

It is assumed that contractor selection would take place soon after the approval of the final detailed design. It is also expected that acquisition of right-of-way (e.g., temporary construction rights-of-way, right-of-way for a setback levee if Alternatives 2 or 3 are selected) would begin after certification of all CEQA documents for the project and could take up to approximately 15 months in some locations. Acquisition could proceed concurrent with the completion and approval of the final detailed design and contractor selection.

Completion of these preconstruction activities for all project segments is expected to take a total of approximately 20 months, although preconstruction activities for Segments 1 and 3 could be completed well before such activities for Segment 2.

Construction Sequence and Scheduling Constraints

Possible construction sequences applicable to the various project segments and alternatives are presented below.

Project Segments 1 and 3—Levee Repair and Strengthening (Alternatives 1, 2, and 3)

A construction period of about 6 months is assumed in project Segments 1 and 3, beginning in May 2007. Schedule highlights are as follows:

- *Mobilization:* Mobilization would include setting up construction offices and the slurry batch plant and transporting heavy earthmoving equipment to the site. These activities may take about 1 month.
- *Slurry cutoff wall installation:* This activity would begin soon after mobilization with construction of the work pad. Assuming two headings, construction would take approximately 5 months.
- *Construction of seepage/stability berms:* Seepage/stability berms would be constructed concurrently with installation of the slurry cutoff wall.
- *Utilities:* Any required utility relocation would be conducted concurrent with construction of the slurry cutoff wall.
- *Relief wells:* Relief wells would probably be installed toward the end of the construction period to reduce the likelihood of damage by construction traffic.

Project Segment 2—Levee Repair and Strengthening (Alternative 1)

A construction period of about 8 months, beginning in March 2008, is assumed for levee repair and strengthening in project Segment 2 if Alternative 1 is implemented. Schedule highlights are as follows:

- *Mobilization:* Mobilization would include setting up construction offices and the slurry batch plant and transporting heavy earthmoving equipment to the site. These activities may take about 1 month.
- *Installation of the slurry cutoff wall:* This activity would begin soon after mobilization with construction of the work pad. Assuming two headings, construction would take approximately 6 months.
- *Construction of seepage/stability berms:* Seepage/stability berms would be constructed concurrently with installation of the slurry cutoff wall.
- *Correction of erosion problem areas:* Correction of existing erosion problem areas would occur after construction of the slurry cutoff wall. This activity would take approximately 1 month.
- *Utilities:* Any required utility relocation would be conducted concurrent with construction of the slurry cutoff wall.
- *Relief wells:* Relief wells would probably be installed toward the end of the construction period to reduce the likelihood of damage by construction traffic.

Project Segment 2—Construction of ASB or Intermediate Setback Levee (Alternatives 2 and 3)

Construction of a setback levee in project Segment 2, if Alternative 2 or Alternative 3 is implemented, would occur over two seasons beginning in August 2007 and ending in winter 2008. Most construction activities would take place in the spring, summer, and fall months. During the winter months limitations on construction activities associated with weather, soil conditions, and agency guidelines would significantly reduce construction activity. Schedule highlights are as follows:

- *Mobilization:* Mobilization would include setting up construction offices and a slurry batch plant and transporting heavy earthmoving equipment to the site. These activities may take about 1 month.

- *Setback levee foundation*: Preparation of the foundation would begin soon after mobilization and could continue as weather and other factors permit through the winter of the first construction year (anticipated to be winter 2007/2008). Locations near environmentally sensitive areas (e.g., sensitive habitats, known cultural resources sites) would be given priority; preparation of the foundation at these sites could be initiated in summer/fall 2007.

- *Installation of the slurry cutoff wall:* This activity would follow preparation of the foundation and would precede construction of the embankment. Assuming two headings, installation of the slurry cutoff wall is anticipated to take about 3–4 months. Depending on weather conditions and other factors, this activity could occur through the winter of the first construction year (anticipated to be winter 2007/2008).

- *Construction of the setback levee embankment:* Setback levee embankment construction could begin as soon as weather conditions allow in 2008, and after the foundation has been prepared and construction of the slurry cutoff wall has been initiated. Seepage/stability berms, if required, would be constructed along with the levee embankment. The detention basin would be constructed at the same time as the setback levee embankment.

- *Utilities:* Construction of the new Pump Station No. 3 and removal and relocation of some utilities would likely be completed during the first construction season in 2007. Continued removal and relocation of utilities and reinforcement/retrofitting of utilities to be retained in the setback area (e.g., three 115-kV electrical towers) would continue through the second construction season in 2008. Utility work would be coordinated so as to not interrupt needed irrigation, drainage, or electrical service.

- *Relief wells:* Relief wells would probably be installed toward the end of the construction period to reduce the likelihood of damage by construction traffic.

4.6.3 OPERATION AND MAINTENANCE

The ASB setback levee under Alternative 2 or the intermediate setback levee under Alternative 3 would entirely replace the corresponding existing Feather River levee as a project levee in the Sacramento River Flood Control Project. The State of California, through the Sacramento–San Joaquin Drainage District, would obtain an easement that would allow the construction,

operation, and maintenance of the setback levee. Existing levee segments that would be repaired under the FRLRP would remain under the existing easements for operation and maintenance.

As is the current practice, landowners would be assessed fees for levee operation and maintenance, which would be performed by RD 784 under the supervision of DWR. The only substantial difference between the operation and maintenance of the repaired levee segments and/or the new setback levee and current practice would be that the proposed preliminary design for each alternative includes the use of relief wells. Relief wells can be prone to plugging and damage from vandalism, and they require operation (water removal) and periodic maintenance (flushing, cleaning, and replacement) to remain effective over the long term. It is assumed that seepage from the wells would be removed by the relocated Pump Station No. 3. RD 784 could contract out the well maintenance or perform it with its own forces.

If Alternative 2 or Alternative 3 is implemented, TRLIA may acquire land through fee-title or obtain flowage easements. Ownership of properties in the levee setback area that are acquired by TRLIA for project implementation and are not part of the setback levee footprint could be transferred to a resource agency or land conservancy for future management. Special operations and maintenance plans would need to be prepared and implemented to ensure the long-term maintenance of any habitat areas, and to ensure they do not conflict with the flood control function of the levee setback area. Similarly, if lands in the levee setback area are retained in agricultural production, agricultural operations plans would need to be developed and implemented to ensure that ongoing agricultural activities do not conflict with the flood control function of the levee setback area.

CHAPTER 5 ENVIRONMENTAL ANALYSIS

INTRODUCTION

This draft environmental impact report (DEIR) for the Feather River Levee Repair Project (FRLRP) evaluates three potential alternatives, each of which would correct identified deficiencies in the left (east) bank levee of the Feather River and the left (south) bank levee of the Yuba River. (References to the "left" or "right" bank levee indicate the left or right side of the river when facing downstream.) The alternatives evaluated are as follows:

- *Alternative 1 – The Levee Strengthening Alternative.* Under this alternative, levee repair and strengthening activities would be completed along the entire length of FRLRP project Segments 1, 2, and 3 (Figure 2-3, "FRLRP Project Area," in Chapter 2, "Introduction").

- *Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative.* Under this alternative, levee repair and strengthening activities would be completed along project Segments 1 and 3. Repair and strengthening activities in these segments would be the same as for Alternative 1. In project Segment 2, a setback levee would be constructed roughly following the Above Star Bend (ASB) setback levee alignment identified in the environmental impact report (EIR) for the Yuba-Feather Supplemental Flood Control Project (Y-FSFCP).

- *Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative.* Under this alternative, the same levee repair and strengthening activities described for Alternatives 1 and 2 would be conducted in project Segments 1 and 3. In Segment 2, a setback levee would be constructed along an alignment between the ASB setback levee and the existing levee, allowing less land to be placed in the new floodway than under Alternative 2. The general design, construction, and operational characteristics of an intermediate setback levee under Alternative 3 would be the same as for the ASB setback levee under Alternative 2.

The environmental impacts of the three alternatives are analyzed in this chapter at an equal level of detail. The impacts of Alternative 1 are discussed first, followed by the impacts of Alternatives 2 and 3. For each section in this chapter, where impacts of Alternatives 2 and/or 3 are similar to those described under an earlier impact discussion within the section, this is noted in the text.

As described in Chapter 2, "Introduction," this document is a "project" EIR. There is the potential to partially tier this FRLRP EIR from the Y-FSFCP EIR, which was certified by Yuba County Water Agency (YCWA) in March 2004. Partial tiering from the Y-FSFCP EIR (i.e., the first-tier document) is possible because the EIR evaluated the environmental effects of an ASB setback levee similar to that considered under Alternatives 2 and 3 in this FRLRP EIR (i.e., the second-tier document). However, because the FRLRP and Y-FSFCP EIRs have two different lead agencies under the California Environmental Quality Act (CEQA) (Three Rivers Levee Improvement Authority [TRLIA] and YCWA, respectively), and because the Y-FSFCP EIR does not evaluate many of the levee strengthening components included in the FRLRP, it was determined that preparation of an independent project EIR for the FRLRP, rather than a tiered

EIR, would be a clearer and more straightforward approach. However, much of the information in the Y-FSFCP EIR is still applicable to the FRLRP, and the Y-FSFCP EIR is incorporated by reference into the FRLRP EIR (see Section 2.8, "Documents Incorporated by Reference").

ORGANIZATION OF THIS CHAPTER

This chapter is divided into 13 sections, each evaluating a separate resource topic:

5.1 Land Use
5.2 Geology, Soils, and Mineral Resources
5.3 Water Resources and River Geomorphology
5.4 Fisheries
5.5 Terrestrial Biological Resources
5.6 Recreation
5.7 Aesthetic Resources
5.8 Cultural Resources
5.9 Air Quality
5.10 Noise
5.11 Transportation and Circulation
5.12 Public Services, Utilities, and Service Systems
5.13 Paleontological Resources

Each of these sections includes the following subsections:

- "Regulatory Setting" describes pertinent federal, state, and local laws and regulations that may apply to the FRLRP.
- "Environmental Setting" presents the existing regional and local environmental setting in accordance with Section 15125 of the State CEQA Guidelines. This information constitutes the baseline conditions with which the effects of the proposed levee strengthening and, for Alternatives 2 and 3, levee setback and associated features are compared.
- "Environmental Impacts" is organized as follows:
  - "Thresholds of Significance" identifies the significance thresholds used to determine the significance of potential impacts. While the thresholds are generally based on CEQA guidance, they also encompass the factors taken into account under the National Environmental Policy Act (NEPA) to determine the significance of an action in terms of its context and the intensity of its effects. Thus, this EIR can be used as the basis of NEPA documentation that may be required in association with federal authorizations for the project.
  - "Impact Analysis" describes the analysis method and discusses the potential effects of the three project alternatives, with emphasis on significant impacts, in accordance with Sections 15126.2(a) and 15143 of the State CEQA Guidelines. Project impacts are numbered sequentially for the three project alternatives in each resource section, with "LS" denoting an impact of The Levee Strengthening Alternative (Alternative 1), "ASB" denoting an impact of The Levee Strengthening and ASB Setback Levee Alternative

(Alternative 2), and "IS" denoting an impact of The Levee Strengthening and Intermediate Setback Levee Alternative (Alternative 3).

- "Mitigation Measures" describes mitigation measures recommended to reduce potentially significant effects to less-than-significant levels, in accordance with Sections 15002(a)(3), 15021(a)(2), and 15091(a)(1) of the State CEQA Guidelines. The number of each mitigation measure is identical to the number of the impact to which it applies. When the same mitigation measure would apply to more than one impact, the mitigation measure is repeated with the number of each impact to which it applies.

- "Impacts Remaining Significant after Mitigation" discusses whether any impacts identified as significant before mitigation would remain significant after the recommended mitigation is implemented.

SECTION 5.1 LAND USE

This section addresses the effects of the Feather River Levee Repair Project (FRLRP) as they relate to consistency with existing land uses in the project area and with policies intended to express the planning goals of applicable jurisdictions, including policies and goals related to agricultural land uses. This section also addresses the displacement of people and housing resulting from project implementation.

5.1.1 REGULATORY SETTING

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

Farmland Protection Policy Act

The Farmland Protection Program and the Land Evaluation and Site Assessment (LESA) system were established under the Farmland Protection Policy Act (U.S. Code [USC] Title 7, Section 4201 et seq.; Public Law 97-98). The Natural Resources Conservation Service (NRCS), a federal agency within the U.S. Department of Agriculture, administers the Farmland Protection Program, a voluntary program that provides matching funds to state, local, or tribal government entities and nongovernmental organizations with existing farmland protection programs to purchase conservation easements. The LESA system helps state and local officials make sound decisions about land use and rank lands for suitability and inclusion in the Farmland Protection Program. LESA evaluates several factors, including soil potential for agriculture, climate, location, market access, and adjacent land use. These factors are used to numerically rank land parcels based on local resource evaluation and site considerations.

Federal Uniform Relocation Act

The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (42 USC 4601 et seq.), is commonly referred to as the Federal Uniform Relocation Act. The overall intent of the act is to establish a uniform policy for the fair and equitable treatment of persons displaced as a direct result of programs or projects undertaken by a federal agency or with federal financial assistance. The primary purpose of the act is to ensure that such persons shall not suffer disproportionate injuries as a result of programs and projects designed for the benefit of the public as a whole and to minimize the hardship of displacement on such persons. Entities that may qualify for assistance under the Federal Uniform Relocation Act include homeowners, renters/tenants, businesses, and farm operations. Eligible displaced entities may receive various forms of assistance including reasonable moving expenses; compensation for actual direct losses of tangible property; reasonable expenses associated with searching for a replacement home, rental property, business, or farm; and reasonable expenses associated with reestablishing a displaced farm or business.

Section 103 of the Federal Uniform Relocation Act allows the head of a federal agency to delegate implementation of the act's requirements to a state agency if implementation of similar state laws will meet the requirements of the federal act. In California, the California Relocation Assistance Law (Government Code Section 7260 et seq.) mirrors the Federal Uniform

Relocation Act and allows state agencies to provide relocation assistance required under the federal act.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

Farmland Mapping and Monitoring Program

The Farmland Mapping and Monitoring Program (FMMP), administered by the Division of Land Resource Protection of the California Department of Conservation, produces maps and statistical data used to analyze farmland conversion impacts within the state. Agricultural land is rated according to soil quality and irrigation status. Agricultural land that meets the specified criteria is placed in one of the four following "Important Farmland" categories (California Department of Conservation 2006):

- *Prime Farmland.* Prime Farmland has the best combination of physical and chemical features able to sustain long-term agricultural production. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. The land must have been used for irrigated agricultural production at some time during the 4 years before the mapping date.

- *Farmland of Statewide Importance.* This farmland is similar to Prime Farmland but has minor shortcomings, such as greater slopes or less ability to store soil moisture. The land must have been used for irrigated agricultural production at some time during the 4 years before the mapping date.

- *Unique Farmland.* Unique Farmland has lesser quality soils used for the production of the state's leading agricultural crops. This land is usually irrigated, but may include nonirrigated orchards or vineyards as found in some climatic zones in California. Land must have been cropped at some time during the 4 years before the mapping date.

- *Farmland of Local Importance.* This is land of importance to the local agricultural economy as determined by each county's board of supervisors and a local advisory committee.

In addition, agricultural lands that do not meet the above definitions can be classified as Grazing Land. Grazing Land consists of lands on which the existing vegetation is suited to the grazing of livestock. The minimum mapping unit for Grazing Land is 40 acres.

Williamson Act

Application of the California Land Conservation Act of 1965, commonly referred to as the Williamson Act, is the principal method for encouraging the preservation of agricultural lands in California. The Williamson Act enables local governments to enter into contracts with private landowners who agree to maintain specified parcels of land in agricultural or related open space use in exchange for tax benefits. Yuba County (County) has chosen not to participate in the Williamson Act. Instead, farmland resource protection is addressed by policies in the Agriculture Element of the *Yuba County General Plan* and by the Yuba County Zoning Ordinance, as described below.

California Relocation Assistance Law

As described above in the discussion of the Federal Uniform Relocation Act, the California Relocation Assistance Law (Government Code Section 7260 et seq.) mirrors the federal act. Much of the language in the federal act is replicated in the California law. The California law not only allows state agencies to provide relocation assistance to qualifying entities affected by federal actions, but requires that qualifying entities affected by state actions (regardless of federal involvement) be provided the same forms of relocation assistance.

LOCAL PLANS, POLICIES, REGULATIONS, AND LAWS

Yuba County General Plan

Construction of the proposed project would occur in unincorporated Yuba County, with at least portions occurring on privately owned agricultural lands that are under the County's land use planning authority. Every county and city in California is required by state law (Government Code Section 65300 et seq.) to adopt a general plan, which is the policy basis for all land use decisions in the county. The *Yuba County General Plan*, adopted by the County in 1994 and 1996, is the comprehensive plan for growth and development in the unincorporated areas of the county.

The *Yuba County General Plan* includes goals, policies, and objectives that guide land use decisions in Yuba County. The following goals and objectives may be relevant to the FRLRP:

- 2–Land Use Goal. Retain the most productive agricultural lands in agricultural use, and clearly define areas suitable for urbanization and other forms of non-agricultural development.
- 16–Land Use Objective. Recognition of a farmer's right to farm.
- 9–Land Use Objective. Avoidance of Resource Conservation Service Capability Class I and II soils when establishing Community Boundaries or otherwise reviewing proposals for non-agricultural development projects.
- 16–Open Space and Conservation Goal. Protect productive agricultural land.

Class I soils are defined as "soils that have few limitations that restrict their use"; Class II soils are defined as "soils that have moderate limitations that reduce the choice of plants or that require moderate conservation practices" (Natural Resources Conservation Service 1998).

The land use diagram in the *Yuba County General Plan* assigns land use designations, which define appropriate land uses in the designated areas, for all parcels in the County's jurisdiction. The land use designations for the FRLRP project area are described below under "Land Use Designations and Zoning" in Section 5.1.2, "Environmental Setting."

In support of the general plan, the County uses a variety of land use controls, including the zoning ordinance, the subdivision ordinance, the building code, and improvement standards. These codes, ordinances, and standards are used to implement the policies and provisions of the general plan.

Yuba County Zoning Ordinance

State law (Government Code Section 65800 et seq.) authorizes counties and cities to adopt zoning ordinances that implement general plan goals, policies, and maps; to establish zoning districts; and to establish the basic regulations governing the use of land, buildings, or structures within the zoning districts. Zoning is required by state law to be consistent with the adopted general plan. The zoning maps show each land parcel and its designated zoning districts.

The Yuba County Zoning Ordinance was adopted for all unincorporated parcels in the county that are not owned by the federal or state government and are not designated tribal lands. The zoning ordinance consists of a zoning map and various designations that regulate land uses, permitted uses, and other standards. The zoning designations (i.e., districts) define the land uses that are allowed or not allowed on these lands. Some of the allowed land uses require conditional use permits, the approval of which requires a public hearing and other administrative procedures. A zoning variance, a zoning district boundary amendment, or zoning ordinance amendments are required before land uses prohibited within a particular zoning district can be approved. Additional administrative procedures, such as public hearings, a finding of special circumstances, approval from the Planning Commission, and/or approval from the County Board of Supervisors, are required before a variance or amendment can be granted.

The zoning designations for the FRLRP project area are described under "Land Use Designations and Zoning" below.

5.1.2 ENVIRONMENTAL SETTING

SOURCES OF INFORMATION

The information in this section is based primarily on review of the following documents:

- the *Yuba County General Plan* (Yuba County 1994, 1996);
- the Yuba County Zoning Ordinance;
- the *Draft Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project* (Yuba County Water Agency 2003); and
- the *Draft Environmental Impact Report for the Feather-Bear Rivers Levee Setback Project* (Three Rivers Levee Improvement Authority 2004).

Information included in this analysis is also based on field observations made in May 2006.

REGIONAL CONTEXT

Land use in Yuba County consists mainly of agriculture, forested land, open space/grazing lands, urban uses, and a military installation (Beale Air Force Base). Agriculture is the predominant land use in the county and the most important contributor to the local economy (Yuba County 1994). The major agricultural crops produced in the county are rice, plums, peaches, walnuts, kiwifruit, field crops, and almonds. Pastureland for grazing of beef and dairy cattle is also a

major agricultural land use. In the valley portion of the county, land use is dominated by agriculture (rice, field crops, and orchards), Beale Air Force Base, and urbanized areas.

Yuba County's urban centers are in the western portion of the county. The urbanized areas are the incorporated cities of Marysville and Wheatland and the unincorporated communities of Linda and Olivehurst. Substantial development is also ongoing in the Plumas Lake Specific Plan area, which occupies approximately 5,300 acres west of State Route 70 between Olivehurst and the Feather River. The specific plan allows for 12,000 dwelling units and approximately 600 acres of commercial and industrial uses. Residential development has already begun in the specific plan area.

FRLRP PROJECT AREA

Land Ownership and Jurisdiction

The existing Feather River and Yuba River levees in all three project segments are part of the federal-state Sacramento River Flood Control Project (SRFCP) within an easement obtained by the State of California through the Sacramento–San Joaquin Drainage District. The levees were constructed by the U.S. Army Corps of Engineers (Corps) and are maintained by Reclamation District 784 under the supervision of the State of California Reclamation Board (The Reclamation Board).

All lands in the project area are in unincorporated Yuba County. The County has land use planning jurisdiction over privately owned land in this area.

In addition to the County, several entities have authority over land uses in the project vicinity. The 698-acre Lake of the Woods Unit of the Feather River State Wildlife Area, owned by the State of California and managed by the California Department of Fish and Game (DFG), is located along the existing left (east) bank levee of the Feather River immediately adjacent to project Segment 1 (Figure 5.1-1, "Conservation Areas in the Project Vicinity"). The Star Bend Boat Launch and Fishing Access, owned by DFG and maintained by the County Public Works Department, is located north of the Lake of the Woods Unit at Star Bend in Segment 1. West of the left bank Feather River levee in project Segment 2, the 76-acre Marysville-Yuba City Mitigation Area, a mitigation site with seasonal wetlands and riparian vegetation, is maintained by the Corps. These land uses are described in further detail in Section 5.6, "Recreation."

Local Land Uses

Lands in the project area are particularly suited for agriculture, although parts of the area have suffered flood events that have resulted in crop damages. As of 2004, there were approximately 230,412 acres of agricultural land in Yuba County: 42,678 acres of Prime Farmland, 11,094 acres of Farmland of Statewide Importance, and 33,108 acres of Unique Farmland, and 143,533 acres of Grazing Land (California Department of Conservation 2004). (It is important to note that Grazing Land is considered agricultural land, but not Important Farmland.) FMMP mapping of Important Farmland in the project area is shown in Figure 5.1-2, "Important Farmland Map." The project area includes Important Farmland (Prime Farmland, Farmland of Statewide Importance, and Unique Farmland), as well as Grazing Land and Other Land as classified by the California Department of Conservation. The *Soil Survey of Yuba County, California* identifies

Class I and II soils in the vicinity of the existing Feather River levee in all three project segments, and in the proposed Above Star Bend (ASB) and intermediate levee setback areas in Segment 2 (Natural Resources Conservation Service 1998).

Most of the land in the project vicinity is currently under cultivation, with the majority of the acreage planted in orchards. Some row crops are also planted. Despite a major flood event in 1997 that destroyed some of the trees in the orchards, the current land use pattern is substantially similar to that of the recent past. Crops grown in orchards in the project vicinity consist of walnuts, peaches, prunes, apples, persimmons, and pears, with prunes and walnuts making up the greatest percentage. The trees are of various ages and are irrigated in a variety of fashions, including traditional flood, furrow, contour irrigation practices, and state-of-the art irrigation techniques such as drip and micro drip systems (Three Rivers Levee Improvement Authority 2004). Typical row crops planted in the area include cantaloupe, honeydew melon, and wheat. Several industrial facilities supporting agricultural operations are also located in the project vicinity, such as produce packing plants.

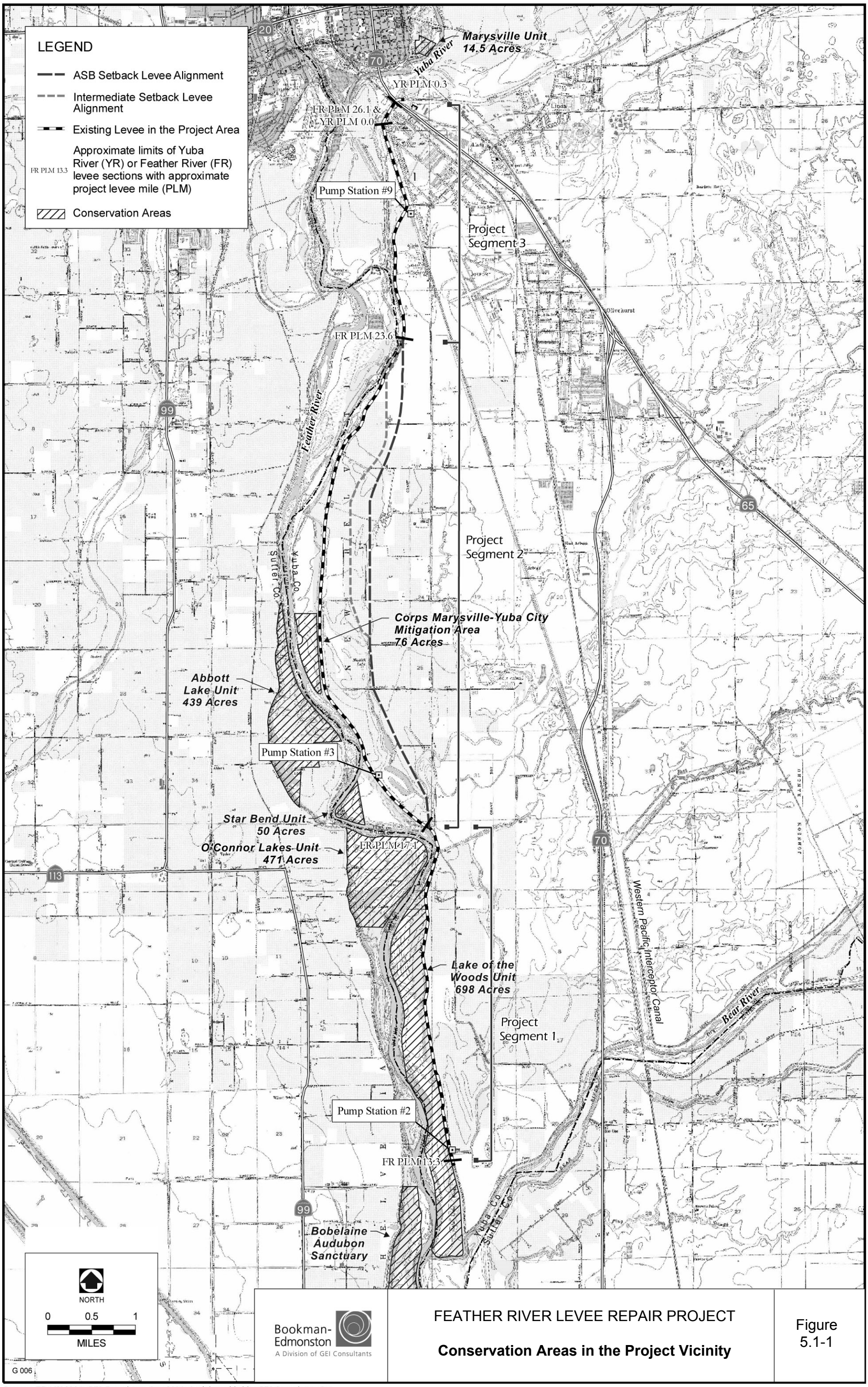
An initial facility survey found approximately 40 structures located along project Segment 2 between the ASB setback levee alignment and the existing levee. Approximately five to 10 of these structures are residences (including mobile homes). Between the intermediate setback levee alignment and the existing levee there are approximately 30 structures, with five to 10 being residences (including mobile homes). The density of residences in the project vicinity increases substantially as one moves north along the project alignment. Homes at densities typical of suburban or rural residential areas occur between Feather River Boulevard and the existing levee in Segment 3, mostly north of the Yuba County Airport. Many of these residences and structures are located near the levee toe. There are no structures along Segment 1.

Along the left bank Feather River levee adjacent to project Segment 1, the land between the low-flow channel and the existing levee contains a substantial riparian corridor in the DFG-managed Lake of the Woods area, where hunting and fishing are permitted (Figure 5.1-1). Several other DFG-managed units of the Feather River State Wildlife Area where hunting, fishing, and bird watching are permitted are also located along the river corridor west of Segment 1.

The Star Bend Boat Launch and Fishing Access, a public-access boat ramp and picnic area, is located on the east bank of the Feather River at Star Bend, near the intersection of Feather River Boulevard and Algodon Road in Segment 1. As stated previously, these recreation areas are discussed in more detail in Section 5.6, “Recreation.”

LAND USE DESIGNATIONS AND ZONING

The general plan land use designation for the project area and adjacent lands east of the Feather River and south of the Yuba River is Valley Agriculture. The Valley Agriculture designation is used to identify areas on the valley floor outside of community boundaries that are suitable for commercial agriculture and where it is desirable to retain agriculture as the primary land use; to protect the agricultural community from encroachment of unrelated uses that would injure the physical and economic well-being of the agricultural community; and to encourage the preservation of productive and potentially productive agricultural land, which is identified as state-designated Important Farmlands and/or lands having NRCS-classified Class I and II soils.

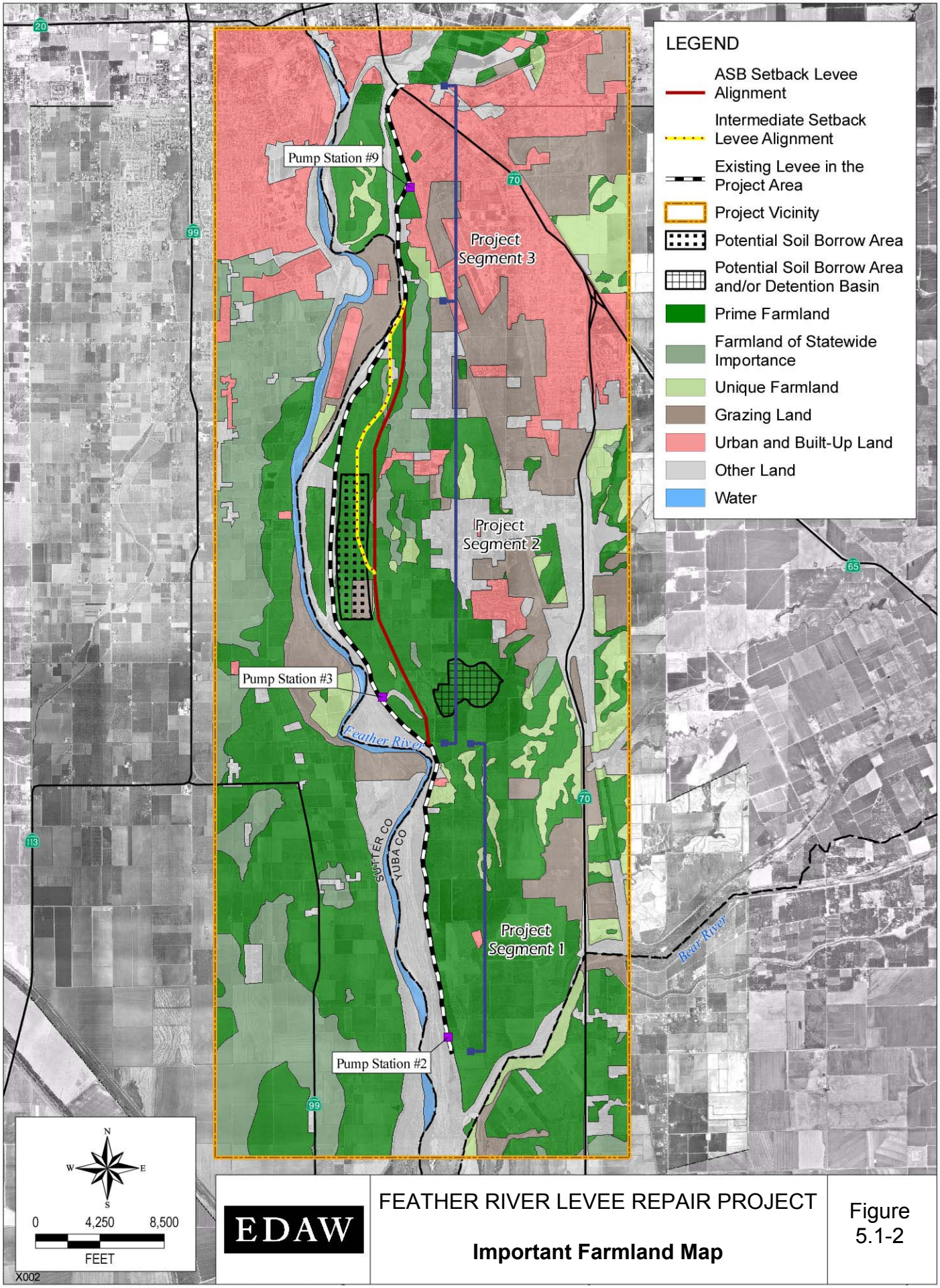


FEATHER RIVER LEVEE REPAIR PROJECT

Conservation Areas in the Project Vicinity

Figure 5.1-1

Sources: EDAW 2004; GEI Consultants, Inc. 2004; Aerial provided by GEI Consultants, Inc.



EDAW

FEATHER RIVER LEVEE REPAIR PROJECT

Important Farmland Map

Figure 5.1-2

Sources: EDAW 2004, GEI Consultants, Inc., 2004, FMMP 2004

The lands between the ASB and intermediate setback levee alignments are zoned Exclusive Agricultural (Yuba County 2005). The purpose of the Exclusive Agricultural zone is to eliminate the encroachment of land uses that are incompatible with the agricultural uses of the land and to prevent the unnecessary conversion of agricultural land to urban uses. In addition to agricultural uses such as crop cultivation and livestock raising, this zoning designation allows for low-density residential use, accessory buildings for residences, game preserves, family day-care homes, kennels, and farm produce stands, among other uses. Numerous other uses may be allowed with a conditional use permit.

5.1.3 ENVIRONMENTAL IMPACTS

THRESHOLDS OF SIGNIFICANCE

Thresholds for determining the significance of impacts related to land use and agricultural resources were based on the environmental checklist form in Appendix G of the California Environmental Quality Act Guidelines (State CEQA Guidelines). A project alternative would have a significant impact on land use (including displacement of housing) or agricultural resources if it would:

- physically divide an established community;
- conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect;
- conflict with any applicable habitat conservation plan or natural community conservation plan;
- conflict with existing zoning for agricultural use or a Williamson Act contract;
- convert or result in the conversion of Important Farmland (i.e., Prime Farmland, Unique Farmland, or Farmland of Statewide Importance) to nonagricultural uses; or
- displace substantial numbers of existing persons or housing, necessitating the construction of replacement housing elsewhere. (In assessing the displacement of people and housing, economic impacts of a project are not treated as significant impacts to the environment under CEQA; however, such information may be considered in determining the significance of impacts. Although the physical change in the environment from the displacement by itself may not be significant, the lead agency may consider whether the economic and social impacts that result in, or from such a physical change influence the significance conclusion.)

None of the three project alternatives would result in the physical division of a community. Repairing and strengthening the existing levee would not create a new barrier between various portions of the project area. In project Segment 2, where the ASB or intermediate setback levee could create a new barrier between lands to the east and west of the setback levee, the area is dominated by agricultural lands and residences are not clustered or located within an identified community. Therefore, no impacts related to the physical division of communities would result from implementation of a project alternative, and this issue is not discussed further in this section.

No habitat conservation or natural community conservation plans are in effect that would apply to the project area. In addition, the County does not participate in the Williamson Act, so no lands are under Williamson Act contract in the project area. Therefore, the third and fourth significance thresholds do not apply to this project.

The discussion below addresses the potential of the project alternatives to conflict with land use plans, policies, or regulations; to result in the conversion of Important Farmland to nonagricultural uses; and to displace substantial numbers of people or existing housing. Consistent with the direction provided in the State CEQA Guidelines, this impact analysis addresses the significance of direct and indirect physical changes in the environment that would be caused by the project (i.e., the conversion to nonagricultural use of land classified by the FMMP as Prime Farmland) and does not consider economic or social effects alone as significant effects on the environment (State CEQA Guidelines Sections 15064[d] and 15131[a]). It is recognized that the conversion of Important Farmland in the project area to nonagricultural uses could have economic effects that should be considered in the decision-making process along with environmental impacts and numerous other factors. Three Rivers Levee Improvement Authority (TRLIA) shall take economic effects into account when selecting a preferred alternative among the alternatives considered in this environmental impact report.

Alternative 1 – The Levee Strengthening Alternative

Impact LS-5.1-a

Conflicts with Land Use Planning and Policies Resulting from Levee Repairs and the Levee Setback. Levee repair and strengthening could result in the removal of up to approximately 30 acres of agricultural land from production through the placement of seepage/stability berms and other structures. Construction of a detention basin would be required to accommodate peak flows from relief wells. Construction of the detention basin could result in the removal of up to approximately 150 additional acres of agricultural land. These uses would conflict with County land use policies regarding the preservation of agricultural land. However, the proposed improvements to the flood control system would benefit thousands of acres of valuable agricultural lands in the adjacent floodplain by providing increased protection from future flood damages. Therefore, while the direct land use changes associated with Alternative 1 would conflict with policies related to protection of agricultural lands, in the long term this alternative would provide greater protection for agricultural lands and soils, consistent with these policies. Therefore, this impact would **be less than significant**.

The current land use designation for the project are in the *Yuba County General Plan* is Valley Agriculture, and the area is zoned Exclusive Agriculture. This land use designation and zoning are intended to support Land Use Goal 2, Land Use Objective 9, and Open Space and Conservation Goal 16 of the general plan, which promote protecting productive agricultural lands in Class I and II soils in productive agricultural use.

It is expected that levee repairs and strengthening under Alternative 1 would require construction of seepage/stability berms on the land side of the existing levee. Although exact locations for these berms have not been confirmed, it is known that a majority of the seepage/stability berms would be placed along the levee in project Segment 2. Current estimates indicate that all berms combined would cover approximately 30 acres of land area. Although it is unlikely that the entire 30 acres would cover agricultural land, for this analysis it is assumed that construction of seepage/stability berms under Alternative 1 would remove up to approximately 30 acres of agricultural land from production.

As part of Alternative 1 the existing Pump Station No. 3 would be removed and a new pump station would be constructed farther to the east on up to 1 acre of land. The specific location of the pump station would be determined based on the results of field investigations conducted during detailed design. For this analysis it is assumed that Pump Station No. 3 could be relocated on 1 acre of existing farmland, and that pump station relocation would remove this agricultural land from production.

Construction of a detention basin is included as part of Alternative 1 to accommodate flows from relief wells during peak discharge periods. It is estimated that the detention basin would cover up to approximately 150 acres. Although a location for the detention basin has not been confirmed, the primary area being considered at this time is some portion of the site identified in Figure 5.1-2 as a potential soil borrow area/detention basin. Whether constructed at this location or elsewhere, the detention basin would likely occur on agricultural land, resulting in the removal of this land from agricultural production.

Because these activities would result in the removal of land from agricultural production, implementation of Alternative 1 could conflict with the *Yuba County General Plan* and Yuba County Zoning Ordinance and with the goals and objectives identified previously. However, the proposed improvements to the flood control system would benefit thousands of acres of valuable agricultural lands in the adjacent floodplain by providing increased protection from future flood damages. Therefore, while the direct land use changes associated with Alternative 1 would conflict with the policies cited above, in the long term this alternative would provide greater protection for agricultural lands and soils, consistent with these policies. It should also be noted that agricultural operators would receive appropriate compensation for any temporary disturbance or permanent loss of agricultural lands associated with project implementation. In addition, all property acquisitions and relocations conducted as part of the project would be completed following both the Federal Uniform Relocation Act and the California Relocation Assistance Law (see the discussion of these statutes in Section 5.1.1, “Regulatory Setting”). Eligible farm operations would receive relocation assistance consistent with these federal and state statutes. This impact would be less than significant.

Impact LS-5.1-b

Conversion of Important Farmland to Nonagricultural Uses Resulting from Levee Repairs and Strengthening. Installation of seepage/stability berms and other structures associated with levee repairs and strengthening could permanently convert up to approximately 30 acres of Prime Farmland to nonagricultural uses. Construction of the detention basin under Alternative 1 could convert up to an additional approximately 150 acres of Prime Farmland to nonagricultural uses. This impact would be **significant**.

It is expected that levee repairs and strengthening under Alternative 1 would require construction of seepage/stability berms on the land side of the existing levee. Current estimates indicate that all berms combined would cover approximately 30 acres of land area, although a majority of the seepage/stability berms would be located in project Segment 2. The exact locations of the berms would be confirmed during detailed project design. However, because a majority of the lands adjacent to the existing levee alignment are identified as Prime Farmland (Figure 5.1-2), it is assumed for this analysis that construction of the seepage stability berms would result in the removal of up to approximately 30 acres of Prime Farmland from agricultural production.

As part of Alternative 1 the existing Pump Station No. 3 would be removed and a new pump station would be constructed farther to the east on up to 1 acre of land. The specific location of the pump station would be determined based on the results of field investigations conducted during detailed design. For this analysis it is assumed that Pump Station No. 3 could be relocated on 1 acre of Prime Farmland, and that pump station relocation would remove this agricultural land from production.

Construction of a detention basin is included as part of Alternative 1 to accommodate flows from relief wells during peak discharge periods. It is estimated that the detention basin would cover up to approximately 150 acres. Although a location for the detention basin has not been confirmed, the primary area being considered at this time is some portion of the site identified in Figure 5.1-2 as a potential soil borrow area/detention basin. This entire approximately 690-acre area is identified as Prime Farmland (Figure 5.1-2). Whether the detention basin is constructed at this location or elsewhere, it is assumed for this analysis that construction of the detention basin under Alternative 1 would remove up to 150 acres of Prime Farmland from agricultural production.

It is anticipated that several staging areas and temporary-access haul roads would be developed on agricultural lands in the project area during project construction. Land at construction staging areas and haul roads classified as Important Farmland could be temporarily converted for up to approximately 20 months to accommodate preconstruction and construction activities, although in most locations the time frame would be shorter. These areas would be returned to preproject conditions and agricultural uses could resume once construction is completed. Therefore, there would be no direct conversion of Important Farmland to nonagricultural uses.

Because implementation of Alternative 1 could convert up to approximately 180 acres of Important Farmland to nonagricultural uses, this impact would be significant.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impact ASB-5.1-a

Conflicts with Land Use Planning and Policies Resulting from Levee Repairs and the Levee Setback. Levee repair and strengthening of the existing levee in Segments 1 and 3 could result in removal of small areas of agricultural land from production associated with installation of seepage/stability berms and other structures. The setback levee footprint and levee easements in Segment 2 would cover approximately 240–250 acres of agricultural land, and setting back the levee could indirectly result in the removal of more land from agricultural production by dividing land parcels and allowing periodic flooding of agricultural land. Construction of a detention basin would be required to prevent adverse flooding effects on area properties, and this would likely occur on several hundred acres of existing agricultural land. These uses would conflict with County land use policies regarding the preservation of agricultural land and would be inconsistent with the current land use and zoning designations for the area. Because of these inconsistencies, this impact would be **significant**.

As discussed for Impact LS-5.1-a, described for Alternative 1 above, construction of seepage/stability berms and related structures under Alternative 1 could result in the removal of up to approximately 30 acres of agricultural land from production. However, most seepage/stability berms would be placed in project Segment 2, and these would be replaced by a setback levee under Alternative 2. A relatively small portion of seepage/stability berms would be placed adjacent to the existing levees in project Segments 1 and 3. The precise extent and

location of seepage/stability berms would be determined during detailed project design. For this analysis it is assumed that up to approximately 10 acres of seepage/stability berms could be placed adjacent to the existing levee in Segments 1 and 3 under Alternative 2, resulting in the removal of up to 10 acres of agricultural land from production. Under Alternative 2, the existing Pump Station No. 3 in project Segment 2 would be removed and a new pump station would be constructed east of the ASB setback levee alignment, converting up to 1 acre of land to nonagricultural use.

The ASB setback levee footprint and levee easements in project Segment 2 would cover approximately 240–250 acres of agricultural land, and setting back the levee could indirectly result in the removal of more land from agricultural production by dividing land parcels and allowing periodic flooding of agricultural land in the levee setback area. Construction of a detention basin is included as part of Alternative 2. Although a location for the detention basin has not been confirmed, the primary area being considered at this time is the site identified in Figure 5.1-2 as a potential soil borrow area/detention basin. The specific size and location of the detention basin would be determined during detailed project design. However, whether it is constructed at the location shown in Figure 5.1-2 or elsewhere, the detention basin under Alternative 2 would likely be located on agricultural land, resulting in the removal of several hundred acres of this land from agricultural production. Because the proposed levee is not a permitted use under the existing land use designation and zoning and would result in the removal of land from agricultural production, the levee setback could conflict with the *Yuba County General Plan* and Yuba County Zoning Ordinance and with the goals and objectives identified previously. However, the proposed improvements to the flood control system would benefit thousands of acres of valuable agricultural lands in the adjacent floodplain by providing increased protection from future flood damages. Therefore, while the direct land use changes associated with the proposed levee setback would conflict with the policies cited above, in the long term the setback levee would provide greater protection for agricultural lands and soils, consistent with these policies. It should also be noted that agricultural operators would receive appropriate compensation for any temporary disturbance or permanent lost of agricultural lands associated with project implementation. In addition, all property acquisitions and relocations conducted as part of the project would be completed following both the Federal Uniform Relocation Act and the California Relocation Assistance Law (see the discussion of these statutes in Section 5.1.1, “Regulatory Setting”). Eligible farm operations would receive relocation assistance consistent with these federal and state statutes.

The land use designation for the land in the project area is Valley Agriculture. The use of the ASB levee setback area in project Segment 2 as a floodway would be inconsistent with the Valley Agriculture designation and with various uses allowed under the Exclusive Agricultural zoning. For example, residential dwellings and accessory structures and agricultural buildings are allowed under the Exclusive Agricultural zoning; following the construction of the setback levee, however, buildings and various land uses within the levee setback area would be prohibited by regulations of The Reclamation Board, and existing structures would be removed. The proposed use of the lands in the levee setback area, therefore, conflicts with existing land use and zoning designations and with the associated allowed uses of these lands.

Because the proposed land uses in project Segment 2 would be inconsistent with County policies for the preservation of agricultural land and with the current permitted uses, this impact would be significant.

Impact ASB-5.1-b

Conversion of Important Farmland to Nonagricultural Uses Resulting from Levee Repairs and the Levee Setback. Levee repair and strengthening activities in project Segments 1 and 3 could permanently remove up to approximately 10 acres of Prime Farmland from production. Relocation of Pump Station No. 3 could potentially convert up to 1 acre of Prime Farmland in Segment 2 to nonagricultural use. The levee setback footprint and levee easements in Segment 2 would permanently convert approximately 210 acres of Prime Farmland, 35 acres of Farmland of Statewide Importance, and 2 acres of Unique Farmland to nonagricultural uses, and would potentially convert several hundred additional acres of Important Farmland for the proposed detention basin. The ASB levee setback could potentially result in the conversion of up to approximately 1,025 acres of Prime Farmland, 10 acres of Farmland of Statewide Importance, and 10 acres of Unique Farmland to nonagricultural uses. Implementation of the levee setback also may indirectly lead to the conversion of additional Important Farmland to nonagricultural uses because some properties would be divided by the setback levee, which could make continued farming of some crops, or on some parcels, impractical. This impact would be **significant**.

It is anticipated that several staging areas and temporary-access haul roads would be developed on agricultural lands in the project area during project construction. Additional land in the area generally identified for agricultural use could be needed for borrow material. (Potential borrow areas are shown in Figure 5.1-2. Details on development of borrow areas are included in Chapter 4, "Description of the Proposed Project.") At borrow sites, the proposed construction practice includes preserving the topsoil from the borrow sites and using it in the restoration of borrow areas. Land at construction staging areas, haul roads, and borrow sites classified as Important Farmland could be temporarily converted for up to approximately 20 months to accommodate preconstruction and construction activities, although in most locations the time frame would be shorter. These areas would be returned to preproject conditions and agricultural uses could resume once construction is completed. Therefore, there would be no direct conversion of Important Farmland to nonagricultural uses in these locations.

As discussed for Impact LS-5.1-b, described for Alternative 1 above, construction of seepage/stability berms and related structures under Alternative 1 could result in the removal of up to approximately 30 acres of Prime Farmland from production. However, most seepage/stability berms would be placed in project Segment 2, and these would be replaced by a setback levee under Alternative 2. A relatively small portion of seepage/stability berms would be placed adjacent to the existing levees in project Segments 1 and 3. The precise extent and location of seepage/stability berms would be determined during detailed project design. For this analysis it is assumed that up to approximately 10 acres of seepage/stability berms could be placed adjacent to the existing levee in Segments 1 and 3 under Alternative 2, resulting in the removal of up to 10 acres of Prime Farmland from production. Pump Station No. 3, currently located within project Segment 2, could be relocated on existing Prime Farmland, resulting in the conversion of up to 1 acre of Prime Farmland to a nonagricultural use.

The ASB levee footprint and levee easements in project Segment 2 would permanently convert a total of approximately 210 acres of Prime Farmland, 35 acres of Farmland of Statewide Importance, and 2 acres of Unique Farmland to nonagricultural uses. Construction of a detention basin is included as part of Alternative 2. Although a location for the detention basin has not

been confirmed, the primary area being considered at this time is some portion of the site identified in Figure 5.1-2 as a potential soil borrow area/detention basin. This entire approximately 690-acre area is identified as Prime Farmland (Figure 5.1-2). The specific size and location of the detention basin would be determined during detailed project design. However, whether it is constructed at the location shown in Figure 5.1-2 or elsewhere, the detention basin under Alternative 2 would likely be located on some category of Important Farmland, resulting in the removal of several hundred acres of this land from agricultural production.

Land uses in the levee setback area could consist of agricultural operations and/or habitat restoration activities that are compatible with flood control objectives. No specific plans for habitat restoration in the setback area are proposed at this time, although this is considered a potential future use. For purposes of this analysis, and to assess the highest level of impacts on agricultural lands, it is conservatively assumed that the entire levee setback area would be used for habitat restoration, and would therefore include the conversion of approximately 1,025 acres of Prime Farmland, 10 acres of Farmland of Statewide Importance, and 10 acres of Unique Farmland to nonagricultural uses.

Additionally, the new setback levee would transect several properties, and continued farming on the portions of those lands that remain outside of the levee setback area may be difficult or impractical, resulting in indirect temporary or long-term conversion of additional Important Farmland to nonagricultural land uses. The acreage of Important Farmland that may be indirectly converted as a result of the levee setback cannot be quantified at this time, but it would likely be much less than the acreage of the levee setback area.

Because it is expected that implementation of Alternative 2 would both directly and indirectly convert Important Farmland to nonagricultural uses, this impact would be significant. It should be noted, however, that any lands that might be converted to habitat may not be lost in perpetuity from agricultural use, as occurs with urban development. While the conversion from agriculture to habitat would be long term, it would not necessarily be permanent. This would not be the case if the conversion to habitat were tied to a permitting or mitigation requirement, or if there were some other legal mechanism in effect calling for the habitat to be retained in perpetuity.

Impact ASB-5.1-c

Displacement of Existing Housing in the Levee Setback Area. Implementation of the ASB levee setback would result in the removal of five to 10 residences from the levee setback area. There are sufficient available residences in the area to accommodate these households; therefore, project implementation would not necessitate the construction of replacement housing elsewhere. Although CEQA does not require that economic and social effects be evaluated or considered significant impacts, it is acknowledged that displacement of five to 10 residences would have both economic and social effects on the occupants of these residences (finding replacement housing, moving to a new residence). However, appropriate compensation would be negotiated with landowners displaced by the project. In addition, eligible homeowners, renters/tenants, businesses, and farm operations would receive relocation assistance consistent with the Federal Uniform Relocation Act and the California Relocation Assistance Law. This impact would be **less than significant**.

If the ASB setback levee were constructed, the area between the setback levee and the existing levee would become part of the Feather River floodplain and all existing buildings in this area would be removed as part of the project. Based on initial reviews of the project area,

implementation of the ASB levee setback under Alternative 2 would result in the removal of approximately 40 structures between the setback levee and the existing levee, with five to 10 of these structures being residences. Homeowners and tenants in these residences would need to be relocated. Removal of five to 10 existing residences and relocation of occupants would not necessarily be considered a substantial displacement of persons or housing. The displacement of persons and housing could be considered a significant impact if it resulted in the need to provide replacement housing, the construction of which would likely result in significant physical environmental effects. However, in this case, displacement of five to 10 residences in the project area would not necessitate the construction of replacement housing elsewhere. U.S. Census Bureau data from the 2000 Census identifies 2,101 vacant housing units in Yuba County, with 312 of these units in the Marysville area (U.S. Census Bureau 2006). Between 2000 and 2005, approximately 1,900 new housing units were added in Yuba County (Yuba County Economic Development Department 2006). These data indicate that there are sufficient existing housing units available in the project area to accommodate residents displaced by the proposed project, without necessitating the need to construct replacement housing elsewhere.

As noted previously in the description of thresholds of significance, economic and social impacts of a project in and of themselves are not treated as significant impacts on the environment under CEQA. However, such information may be considered in determining the significance of impacts. For example, if a freeway were constructed through the center of a community, the physical effect of building a freeway could result in a social effect of dividing a community, and the social effect can be used to help determine if the physical effect is significant. In the case of the FRLRP, although the physical change in the environment from the displacement of people and housing by itself may not be significant, the lead agency may consider whether the economic and social impacts that result in, or from such a physical change influence the significance conclusion. Given these considerations, it is acknowledged that displacement of five to 10 residences would have both economic and social effects on the occupants of these residences (finding replacement housing, moving to a new residence). If residents were displaced from their homes without appropriate compensation or means to find replacement housing, the economic and social effects on these individuals could be considered significant. However, all property acquisitions and relocations conducted as part of the project would be completed following both the Federal Uniform Relocation Act and the California Relocation Assistance Law (see the discussion of these statutes in Section 5.1.1, “Regulatory Setting”) and appropriate compensation would be negotiated with landowners displaced by the project. Eligible homeowners, renters/tenants, businesses, and farm operations would receive relocation assistance consistent with these federal and state statutes. Given these conditions, impacts related to the displacement of existing housing are considered less than significant. That said the displacement of five to 10 residences remains an important issue for consideration by TRLIA in the selection of a project alternative for implementation.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impact IS-5.1-a

Conflicts with Land Use Planning and Policies Resulting from Levee Repairs and the Levee Setback. Levee repair and strengthening of the existing levee in project Segments 1 and 3 could result in removal of small areas of agricultural land from production associated with the installation of seepage/stability berms and other structures. The setback levee footprint and levee easements in project Segment 2 would cover approximately 220–230 acres of agricultural land, and setting back the levee could indirectly result in the removal

of more land from agricultural production by dividing land parcels and allowing periodic flooding of agricultural land. Construction of a detention basin would be required to prevent adverse flooding effects on area properties, and this would likely occur on several hundred acres of existing agricultural land. These uses would conflict with County land use policies regarding the preservation of agricultural land and would be inconsistent with the current land use and zoning designations for the area. Because of these inconsistencies, this impact would be **significant**.

The potential removal of agricultural land in Segments 1 and 3 would be the same as in Impact ASB-5.1-a, described under Alternative 2 above. It is assumed for this analysis that up to approximately 10 acres of agricultural land could be removed by installation of seepage/stability berms and related structures. Under Alternative 3, the existing Pump Station No. 3 would be removed and a new pump station would be constructed east of the intermediate setback levee alignment, converting up to 1 acre of land to nonagricultural use.

The intermediate setback levee footprint and levee easements in project Segment 2 would cover approximately 220–230 acres of agricultural land, and setting back the levee could indirectly result in the removal of more land from agricultural production by dividing land parcels and allowing periodic flooding of agricultural land in the levee setback area. Construction of a detention basin is included as part of Alternative 3. Although a location for the detention basin has not been confirmed, the primary area being considered at this time is the site identified in Figure 5.1-2 as a potential soil borrow area/detention basin. The specific size and location of the detention basin would be determined during detailed project design. However, whether it is constructed at the location shown in Figure 5.1-2 or elsewhere, the detention basin under Alternative 2 would likely be located on agricultural land, resulting in the removal of several hundred acres of this land from agricultural production.

These proposed land uses are inconsistent with the goals and objectives for preservation of productive agricultural land and soils identified previously. However, the proposed improvements to the flood control system would benefit thousands of acres of valuable agricultural lands in the adjacent floodplain by providing increased protection from future flood damages. Therefore, while the direct land use changes associated with the proposed levee setback would conflict with the policies cited above, in the long term the setback levee would provide greater protection for agricultural lands and soils, consistent with these policies. It should be noted that agricultural operators would receive appropriate compensation for any temporary disturbance or permanent loss of agricultural lands associated with project implementation. In addition, all property acquisitions and relocations conducted as part of the project would be completed following both the Federal Uniform Relocation Act and the California Relocation Assistance Law (see the discussion of these statutes in Section 5.1.1, “Regulatory Setting”). Eligible farm operators would receive relocation assistance consistent with these federal and state statutes.

The land use designation for the land in the project area is Valley Agriculture. The use of the intermediate levee setback area as a floodway in project Segment 2 would be inconsistent with the Valley Agriculture designation and with various uses allowed under the Exclusive Agricultural zoning. For example, residential dwellings and accessory structures and agricultural buildings are allowed under the Exclusive Agricultural zoning; following the construction of the setback levee, however, buildings and various land uses within the levee setback area would be

prohibited by regulations of The Reclamation Board, and existing structures would be removed. The proposed use of the lands in the levee setback area, therefore, conflicts with existing land use and zoning designations and the associated allowed uses of these lands.

Because the proposed land uses in project Segment 2 would be inconsistent with County policies for the preservation of agricultural land and with the current permitted uses, this impact would be significant.

Impact IS-5.1-b

Conversion of Important Farmland to Nonagricultural Uses Resulting from Levee Repairs and the Levee Setback. Levee repair and strengthening activities in project Segments 1 and 3 could permanently remove up to approximately 10 acres of Prime Farmland from production. Relocation of Pump Station No. 3 could potentially convert up to 1 acre of Prime Farmland in Segment 2 to nonagricultural use. The levee setback footprint and levee easements in Segment 2 would permanently convert approximately 210 acres of Prime Farmland, 10 acres of Farmland of Statewide Importance, and 5 acres of Unique Farmland to nonagricultural uses, and would potentially convert several hundred additional acres of Important Farmland for the proposed detention basin. The intermediate levee setback area could potentially result in the conversion of approximately 700 acres of Prime Farmland, 10 acres of Farmland of Statewide Importance, and 10 acres of Unique Farmland to nonagricultural uses. Implementation of the levee setback also may indirectly lead to the conversion of additional Important Farmland to nonagricultural uses because some properties would be divided by the setback levee, which could make continued farming of some crops, or on some parcels, impractical. This impact would be **significant**.

Impacts on Important Farmland related to levee repairs in project Segments 1 and 3; relocation and replacement of Pump Station No. 3; and use of staging areas, temporary-access haul roads, and soil borrow areas would be the same as in Impact ASB-5.1-b, described under Alternative 2 above.

The intermediate levee setback footprint and levee easements in project Segment 2 would permanently convert approximately 210 acres of Prime Farmland, 10 acres of Farmland of Statewide Importance, and 5 acres of Unique Farmland to nonagricultural uses. Construction of a detention basin is included as part of Alternative 3. Although a location for the detention basin has not been confirmed, the primary area being considered at this time is some portion of the site identified as a potential soil borrow area/detention basin in Figure 5.1-2. This entire approximately 690-acre area is identified as Prime Farmland (Figure 5.1-2). The specific size and location of the detention basin will be determined during detailed project design. However, whether constructed at the location shown in Figure 5.1-2 or elsewhere, the detention basin under Alternative 2 would likely be located on some category of Important Farmland, resulting in the removal of several hundred acres of this land from agricultural production.

Land uses in the levee setback area could consist of agricultural operations and/or habitat restoration activities that are compatible with flood control objectives. No specific plans for habitat restoration in the levee setback area are proposed at this time, although this is considered a potential future use. For purposes of this analysis, and to assess the highest level of impacts on agricultural lands, it is conservatively assumed that the entire levee setback area would be used for habitat restoration, and would therefore include the conversion of approximately 700 acres of Prime Farmland, 10 acres of Farmland of Statewide Importance, and 10 acres of Unique Farmland to nonagricultural uses.

Additionally, the new setback levee would transect several properties, and continued farming on the portions of those lands that remain outside of the levee setback area may be difficult or impractical, resulting in indirect temporary or long-term conversion of additional Important Farmland to nonagricultural land uses. The acreage of Important Farmland that may be indirectly converted as a result of the levee setback cannot be quantified at this time, but it would likely be much less than the acreage of the levee setback area.

Because it is expected that implementation of Alternative 3 would both directly and indirectly convert Important Farmland in project Segment 2 to nonagricultural uses, this impact would be significant. It should be noted, however, that any lands that might be converted to habitat would not be lost in perpetuity from agricultural use, as occurs with urban development. While the conversion from agriculture to habitat would be long term, it would not necessarily be permanent. This would not be the case if the conversion to habitat were tied to a permitting or mitigation requirement, or if there were some other legal mechanism in effect calling for the habitat to be retained in perpetuity.

Impact IS-5.1-c

Displacement of Existing Housing in the Levee Setback Area. This impact would be the same as Impact ASB-5.1-c, described under Alternative 2 above. Both Alternative 2 and Alternative 3 would result in the removal of five to 10 residences in the levee setback area. For the same reasons as described above, this impact would be **less than significant**.

5.1.4 MITIGATION MEASURES

ALTERNATIVE 1 – THE LEVEE STRENGTHENING ALTERNATIVE

No mitigation is required for Impact LS-5.1-a (conflicts with land use planning and policies). Mitigation is provided below for Impact LS-5.1-b (conversion of Important Farmland to nonagricultural uses).

LS-5.1-b **Minimize Losses of Important Farmland to the Extent Feasible.** This mitigation would reduce the impact, but not to a less-than-significant level.

To minimize direct losses and indirect adverse effects on important farmland, TRLIA shall ensure that the following measures are implemented where feasible and practicable:

(a) Minimize the disturbance of Important Farmland and continuing agricultural operations during construction by locating construction laydown and staging areas on sites that are fallow, that are already developed or disturbed, or that are to be discontinued for use as agricultural land, and by using existing roads to access construction areas to the extent possible.

(b) When selecting the site and configuration of the detention basin, minimize the fragmentation of agricultural lands and retain contiguous parcels of agricultural land of sufficient size to support their efficient use for continued agricultural production.

Implementing this mitigation measure would reduce potential impacts of Alternative 1 on Important Farmland; however, it would not reduce the impact to a less-than-significant level because the conversion of Important Farmland would still occur.

ALTERNATIVE 2 – THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impact ASB-5.1-c (displacement of existing housing). Mitigation is provided below for Impact ASB-5.1-a (conflicts with land use planning and policies) and Impact ASB-5.1-b (conversion of Important Farmland to nonagricultural uses).

ASB-5.1-a **Resolve Inconsistencies between Proposed Uses of the Levee Setback Area and Yuba County Zoning.** This mitigation would reduce the impact, but not to a less-than-significant level.

TRLIA shall coordinate with the County Planning Department to appropriately address inconsistencies between proposed land uses and County-planned land uses and zoning designations. Before permanent changes in allowable land uses in the levee setback area need to be established (i.e., before degradation of the existing levee at the latest), TRLIA shall apply for a general plan amendment if necessary and for appropriate rezoning, a zoning amendment, or other measures determined by the Planning Department to be necessary to ensure the consistency of proposed land uses with zoning. Consistency is defined as land uses and activities permitted by the County in the levee setback area, as reflected by zoning and other land use guidelines, that do not conflict with the flood control function of the levee setback area. The approach to resolving any land use planning inconsistencies shall be determined by, and conducted in coordination with, the County Planning Department.

Any necessary modifications of general plan land use designations or of zoning, or placement of restrictions on existing zoning, will be determined by the Planning Department and approved by the County Planning Commission and Board of Supervisors as appropriate.

Implementing this mitigation measure could reduce the land use impact associated with conflicts with land use planning to a less-than-significant level. However, it is uncertain whether the County could complete the approval process for any necessary zoning or land use designation modifications before completion of the proposed project. Although not approving these modifications before completion of the project would not result in any physical effects on the environment, it would result in a period of time where identified land use conflicts would occur. In addition, even if the modification described above were approved, the project would still conflict with County policies for the preservation of agricultural land. Therefore, this impact would remain significant.

ASB-5.1-b **Preserve the Agricultural Productivity of Important Farmland to the Extent Feasible.** This mitigation would reduce the impact, but not to a less-than-significant level.

It is not known at this time whether lands in the levee setback area would be retained in agricultural production, converted to habitat, or a mixture of both land uses. If lands classified as Important Farmland in the levee setback area are to be retained in agricultural production, the following measures would apply to these lands.

To support the continued productive use of Important Farmland in the levee setback area in project Segment 2, TRLIA shall ensure that the following measures are implemented, to the extent feasible and practicable, in the design and implementation of the levee setback:

(a) When selecting sites for borrow excavation, minimize the fragmentation of lands that are to remain in agricultural use. Where practical, retain contiguous parcels of agricultural land of sufficient size to support their efficient use for continued agricultural production.

(b) Where the setback levee would transect agricultural properties and the continuation of agricultural use on the portions within the levee setback area would occur, ensure convenience of access to the levee setback properties sufficient to support ongoing agricultural operations.

(c) Make the most productive salvaged topsoil from the levee footprint available to landowners with less productive agricultural lands in the vicinity of, but outside the levee setback area that could benefit from the introduction of good-quality soil. By agreement between TRLIA or landowners of affected properties and the recipient(s) of the topsoil, the recipient(s) would be required to work the topsoil into the agricultural lands where it is delivered.

(d) Ensure that utilities currently in the levee setback area that are needed for ongoing agricultural uses, including wells, pipelines, and power lines, are appropriately relocated, replaced, or retrofitted to withstand flooding. Ensure that these systems and drainage systems are functioning as necessary after the project is in place so that agricultural uses are not unduly disrupted.

In addition, TRLIA shall ensure that the following measures are implemented, to the extent feasible and practicable, inside and/or outside the levee setback area:

(a) Minimize the disturbance of Important Farmland and continuing agricultural operations during construction by locating construction laydown and staging areas on sites that are fallow, that are already developed or disturbed, or that are to be discontinued for use as agricultural land, and by using existing roads to access construction areas to the extent possible.

(b) When selecting the site and configuration of the detention basin, minimize the fragmentation of agricultural lands and retain contiguous parcels of agricultural land of sufficient size to support their efficient use for continued agricultural production.

Implementing this mitigation measure would reduce potential impacts of the levee setback on Important Farmland, including indirect effects that may lead to the discontinuation of farming on some lands; however, it would not reduce the impact to a less-than-significant level because the conversion of a substantial amount of Important Farmland would still occur.

ALTERNATIVE 3 – THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impact IS-5.1-c (displacement of existing housing). Mitigation is provided below for Impact IS-5.1-a (conflicts with land use planning and policies) and Impact IS-5.1-b (conversion of Important Farmland to nonagricultural uses).

IS-5.1-a **Resolve Inconsistencies between Proposed Uses of the Levee Setback Area and Yuba County Zoning.** This measure is identical to Mitigation Measure ASB-5.1-a above. This mitigation would reduce the impact, but not to a less-than-significant level.

IS-5.1-b **Preserve the Agricultural Productivity of Important Farmland to the Extent Feasible.** This measure is identical to Mitigation Measure ASB-5.1-b above. This mitigation would reduce the impact of conversion of Important Farmland to nonagricultural uses, but not to a less-than-significant level.

5.1.5 IMPACTS REMAINING SIGNIFICANT AFTER MITIGATION

ALTERNATIVE 1 – THE LEVEE STRENGTHENING ALTERNATIVE

Impact LS-5.1-b (Conversion of Important Farmland to nonagricultural uses) would remain significant and unavoidable after mitigation. All impacts of Alternative 1 on land use would be less than significant.

ALTERNATIVE 2 – THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE

Impact ASB-5.1-a (conflicts with land use planning and policies) and Impact ASB-5.1-b (conversion of Important Farmland to nonagricultural uses) would remain significant and unavoidable after mitigation.

ALTERNATIVE 3 – THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE

Impact IS-5.1-a (conflicts with land use planning and policies) and Impact IS-5.1-b (conversion of Important Farmland to nonagricultural uses) would remain significant and unavoidable after mitigation.

SECTION 5.2 GEOLOGY, SOILS, AND MINERAL RESOURCES

This section addresses issues related to geologic hazards, including seismicity, soil erosion, and related levee safety issues, in addition to mineral resources. Flood hazards, geomorphology, and water quality effects of erosion are discussed in Section 5.3, "Water Resources and River Geomorphology."

5.2.1 REGULATORY SETTING

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

Levee Standards and Maintenance

The levees protecting the Reclamation District (RD) 784 area are part of the federal Sacramento River Flood Control Project (SRFCP), which was authorized by the Flood Control Act of 1917. The U.S. Army Corps of Engineers (Corps) began the SRFCP in 1918 and completed it in 1968. The SRFCP consists of a comprehensive system of levees, overflow weirs, outfall gates, pumping plants, levee bypass floodways, and overbank floodway areas. In the RD 784 area it includes levees along the left (east) bank of the Feather River, the right (north) bank of the Bear River, the left (south) bank of the Yuba River, and the right (west) bank of the Western Pacific Interceptor Canal, which collects water flowing toward RD 784 from the east and diverts the flows to the Bear River.

The Corps specifies in Engineering Manual 1110-2-1913 standards for the design and construction of federal "project" levees (U.S. Army Corps of Engineers 2000). "Project" levees in California are the levees, such as the SRFCP levees, that are built by the Corps and maintained by local agencies under the supervision of the State of California Reclamation Board (The Reclamation Board). The Reclamation Board is required to enforce appropriate standards for the construction, maintenance, and protection of adopted flood control plans. These regulations, set forth in Title 23 of the California Code of Regulations, are also intended to comply with The Reclamation Board's obligations to the Corps pursuant to numerous assurance agreements, Corps operation and maintenance manuals, and Title 33, Section 208.10 of the Code of Federal Regulations (33 CFR 208.10). RD 784 is the local entity that is responsible, under the supervision of The Reclamation Board, for maintaining the levees that protect the project area, including the left bank levee of the lower Feather River and the left bank levee of the lower Yuba River.

The Federal Emergency Management Agency (FEMA) also has oversight over flood control levees through the agency's levee certification program. For levees to be certified by FEMA as providing 100-year protection, evidence must be provided that adequate design and operation and maintenance systems are in place to provide reasonable assurance that protection exists from a base flood (1% or 100-year flood). Specific requirements pertaining to the amount of freeboard, closure devices, embankment protection from floods, embankment and foundation stability, settlement, interior drainage, operation plans, and maintenance plans are contained in 44 CFR 65.10.

Erosion Control

Erosion from construction activity under the Feather River Levee Repair Project (FRLRP) would be regulated under the federal Clean Water Act (CWA) and by FEMA. Erosion would also be regulated under the local grading ordinance (see "Local Plans, Policies, Regulations, and Laws" below).

The State Water Resources Control Board (SWRCB) and regional water quality control boards (RWQCBs) regulate discharges of waste to water through National Pollutant Discharge Elimination System (NPDES) permits, which are authorized under Section 402 of the CWA. The permits are issued for discharges to surface waters from such sources as stormwater runoff from general construction activities. The NPDES Construction Activities Storm Water General Permit applies to stormwater discharges associated with construction activity, including clearing, grading, excavation, and reconstruction of existing facilities, that could disturb at least 1 acre of land. The NPDES permitting process and other regulatory requirements for the protection of water quality are described in Section 5.3, "Water Resources and River Geomorphology."

For a levee to be recognized by FEMA as providing a "100-year" level of flood protection, the levee must be shown to satisfy several criteria, including embankment protection against erosion. Specific requirements are contained in 44 CFR 65.10. (Also see "Levee Standards and Maintenance" above.)

Federal Earthquake Hazards Reduction Act

In October 1997, the U.S. Congress passed the Earthquake Hazards Reduction Act to "reduce the risks to life and property from future earthquakes in the United States through the establishment and maintenance of an effective earthquake hazards and reduction program." To accomplish this, the act established the National Earthquake Hazards Reduction Program (NEHRP). This program was significantly amended in November 1990 by the National Earthquake Hazards Reduction Program Act (NEHRPA), by refining the description of agency responsibilities, program goals, and objectives.

The mission of the NEHRP includes:

- improved understanding, characterization, and prediction of hazards and vulnerabilities;
- improved building codes and land use practices;
- risk reduction through postearthquake investigations and education;
- development and improvement of design and construction techniques;
- improved mitigation capacity; and
- accelerated application of research results.

The NEHRPA designates FEMA as the lead agency of the program and assigns it several planning, coordinating, and reporting responsibilities. Other NEHRPA agencies include the National Institute of Standards and Technology, the National Science Foundation, and the U.S. Geological Survey (USGS).

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

California Seismic Hazards Mapping Act

The California Seismic Hazards Mapping Act of 1990 (Public Resources Code Sections 2690–2699.6) addresses seismic hazards other than surface rupture, such as liquefaction and induced landslides. The Seismic Hazards Mapping Act specifies that the lead agency for a project may withhold development permits until geologic or soils investigations are conducted for specific sites and mitigation measures are incorporated into plans to reduce hazards associated with seismicity and unstable soils.

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act (Public Resources Code Section 2621 et seq.) was passed by the California Legislature to mitigate the hazard of surface faulting to structures. The act's main purpose is to prevent the construction of buildings used for human occupancy on the surface trace of active faults. The act addresses only the hazard of surface fault rupture and is not directed toward other earthquake hazards. Local agencies must regulate most development in fault zones established by the State Geologist. Before a project can be permitted in a designated Alquist-Priolo Earthquake Fault Zone, cities and counties must require a geologic investigation to demonstrate that proposed buildings would not be constructed across active faults.

LOCAL PLANS, POLICIES, REGULATIONS, AND LAWS

Sections of the Yuba County Ordinance Code that regulate grading and borrow activities would apply to the FRLRP. Under Title XI (Planning), Chapter 11.25 of the ordinance code, a use permit from the Yuba County Planning Commission must be obtained before any grading, excavation, or fill activity commences. Conditions for issuance of a permit may be prescribed by the commission to avoid hazards of slides, caving, excessive settlement, erosion, or silting.

5.2.2 ENVIRONMENTAL SETTING

SOURCES OF INFORMATION

A stratigraphic inventory and literature review were completed to develop a baseline inventory of the geologic, soils, and seismic conditions of the project vicinity. Research methods included a review of published and unpublished literature and a cursory field survey.

Published geologic maps and reports covering the geology of the project vicinity were reviewed to determine the exposed rock units and to delineate their respective areal distributions. The *Problem Identification Report, TRLIA Phase 4 Feather River and Yuba River Left Bank Levees* (Kleinfelder 2006) was also reviewed. Analysis of geology and soils included in the environmental impact report (EIR) for the Yuba-Feather Supplemental Flood Control Project (Yuba County Water Agency 2003) and the EIR for the Feather-Bear Rivers Levee Setback Project (Three Rivers Levee Improvement Authority 2004) was also considered.

GEOLOGIC CONDITIONS

Regional Geology and Soils

The project area is located within the northern portion of the Sacramento Valley, which, together with the San Joaquin Valley, comprises the Great Valley geomorphic and geotectonic province. The Great Valley is a forearc basin composed of thousands of feet of sedimentary deposits that has undergone periods of subsidence and uplift over millions of years. The Great Valley basin began to form during the Jurassic period of the Mesozoic era as the Pacific oceanic plate was subducted underneath the adjacent North American continental plate. In the western portion of the Great Valley, Upper Jurassic to Upper Cretaceous rock sequences rest on Upper Jurassic oceanic crust sequences. In contrast, the eastern portion of the Great Valley is composed of shallow Pleistocene nonmarine deposits over a layer of Cretaceous marine/deltaic deposits only a few hundred feet thick, which rests on the metamorphic and igneous rocks of the Sierra Nevada—the western edge of the continental margin.

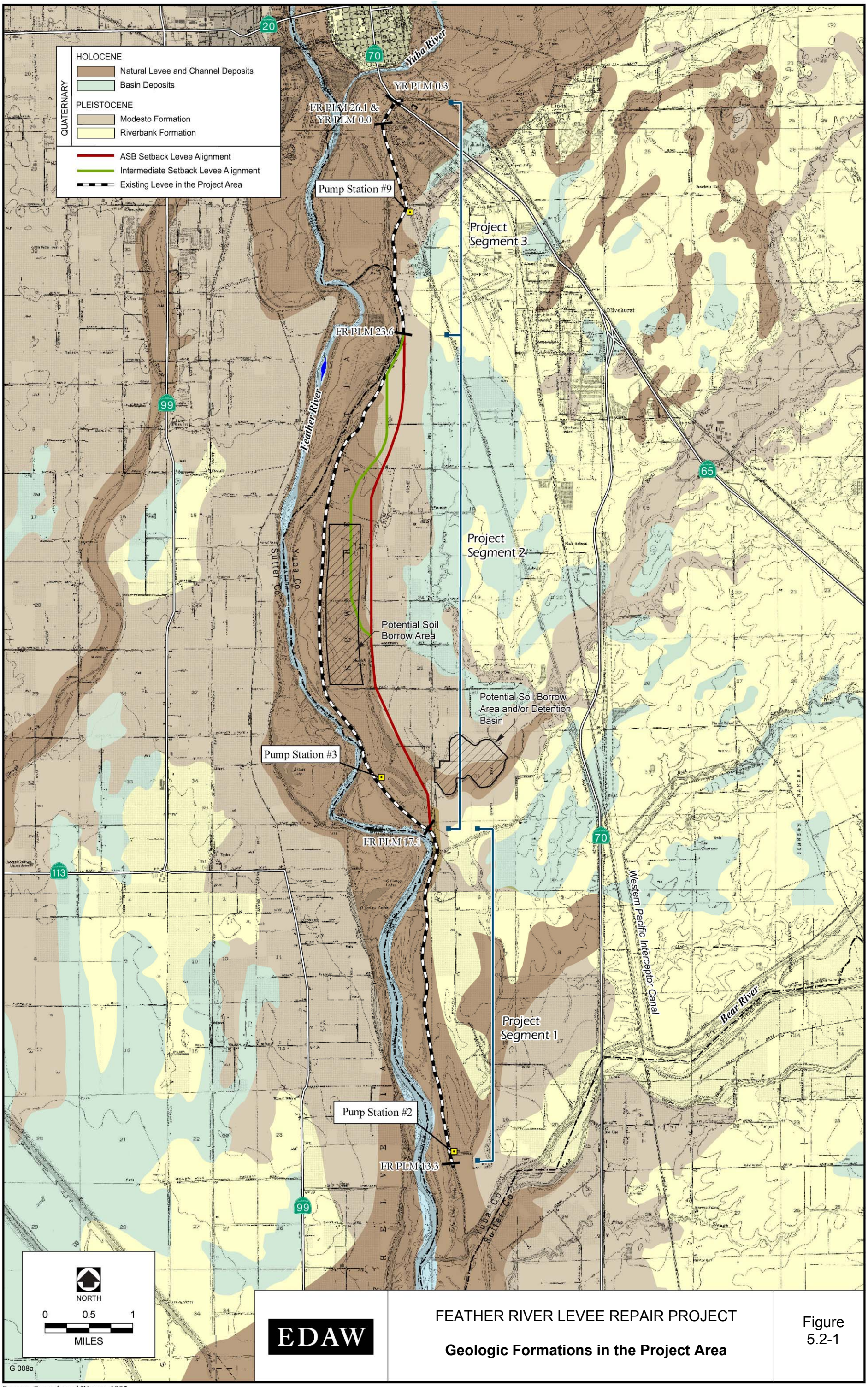
During the Jurassic and Cretaceous periods of the Mesozoic era, the Great Valley existed in the form of an ancient ocean. By the end of the Mesozoic, the northern portion of the Great Valley began to fill with sediment as tectonic forces caused uplift of the basin. Geologic evidence suggests that the Sacramento Valley and San Joaquin Valley gradually separated into two separate water bodies as uplift and sedimentation continued. By the time of the Miocene epoch (approximately 24 million years ago), sediments deposited in the Sacramento Valley were mostly of terrestrial origin. In contrast, the San Joaquin Valley continued to be inundated with water for another 20 million years, as indicated by marine sediments dated to the late Pliocene (approximately 5 million years ago).

Most of the surface of the Great Valley is covered with Recent (Holocene, i.e., 10,000 years Before Present [BP] to present day) and Pleistocene (i.e., 10,000–1,800,000 years BP) alluvium. This alluvium is composed of sediments from the Sierra Nevada to the east and the Coast Range to the west that were carried by water and deposited on the valley floor. Siltstone, claystone, and sandstone are the primary types of sedimentary deposits.

Most of the soils on the valley floor are shallow to moderately deep, sloping, well-drained soils with very slowly permeable subsoils underlain with hardpan. These soils have good natural drainage, slow subsoil permeability, and slow runoff (Natural Resources Conservation Service 1992). These soils are used primarily for pasture, range, and cultivation of grains and rice.

Project Area Geologic and Soil Conditions

Geologic formations within the FRLRP project segments and in the vicinity are depicted in Figure 5.2-1, “Geologic Formations in the Project Area.” The project area is in the eastern portion of the Sacramento Valley, and the project site lies within the floodplains of the Feather and Yuba Rivers. The natural floodplains of these rivers are wide in this area because the land is relatively flat. The floodplains are filled with Holocene-age alluvial deposits. These major drainage ways were originally confined within broad natural levees that sloped away from the rivers or streams. The natural levees formed through the deposition of alluvium during periods of flooding. As floodwaters lost energy, the coarser materials settled out nearest the rivers and



FEATHER RIVER LEVEE REPAIR PROJECT

Geologic Formations in the Project Area

Figure 5.2-1

Source: Saucedo and Wagner 1992

streams, forming the natural levees and sand bars in the vicinity of the river channel. The finer material was carried in suspension farther from the rivers or streams, and settled out in quiet water areas such as swales, abandoned meander channels, and lakes. However, because the streams have meandered and reworked the previously deposited sediments, extreme variations in material types may be found over a limited distance or depth. The most recent deposits in these floodplains are sediments generated by hydraulic mining operations in the Sierra Nevada during the mid-1800s. These sediments cover portions of the floodplain outside the existing levees, with thickness estimated to range from 10 to 15 feet.

Flanking the Recent alluvial deposits are late Pleistocene alluvial fan and terrace deposits of the Modesto and Riverbank Formations. Stream terrace deposits, mapped as the Modesto Formation, are higher in elevation and older than floodplain sediments. Before levees were built these stream terraces were flooded occasionally, but only small amounts of sediment were deposited during floods. The lower fan terraces of the Riverbank Formation are higher in elevation and older than stream terraces, and were flooded only rarely. (Additional information on these geologic formations is contained in Section 5.13, “Paleontological Resources.”)

Regional geologic mapping (Saucedo and Wagner 1992) shows that the existing Feather River levee within project Segment 1 overlies a mixture of the Pleistocene-age Riverbank and Modesto Formations. The levee in this project segment is also underlain in certain areas by younger Holocene channel deposits (Figure 5.2-1).

The existing Feather River levee and the proposed intermediate setback levee alignment in project Segment 2 overlie primarily Feather River channel deposits of Holocene age (Figure 5.2-1). River deposits crop out along the major rivers and streams of the Central Valley and include channel and floodplain deposits. River deposits are still accumulating, except where evidence of human activity (such as a levee) intervenes. Channel deposits, which consist chiefly of sand and gravel, range in width from a few feet to nearly 1,000 feet. Because soil development and topography are the criteria considered in mapping river deposits, subsurface contact with underlying deposits is poorly defined. River deposits in the Sacramento area have been described as predominantly coarse-grained at relatively shallow depths that appear to be hydraulically continuous with the present stream channels, floodplains, and natural levees. Within the northern portion of project Segment 2, the existing Feather River levee and the two proposed setback levee alignments overlie the older, Pleistocene-age Modesto Formation. Most of the proposed Above Star Bend (ASB) setback levee alignment overlies the contact border between the Modesto Formation and younger Holocene channel deposits (Figure 5.2-1).

The existing Feather River and Yuba River levees within project Segment 3 partially overlie the Modesto Formation (Feather River levee at the southern end of Segment 3) and partially overlie the Holocene channel deposits (Feather River and Yuba River levees at the northern end of the project segment) (Figure 5.2-1).

The Holocene channel deposits in the project area are anticipated to be poorly consolidated, well-sorted sands, silts, clays, and gravels. These deposits occur as gravelly sand, silt, and clay from flood events along the Feather River and its tributaries. This unit overlies the older Pleistocene alluvium and ranges in thickness from 5 to 15 feet. Soils within the Modesto and Riverbank Formations are expected to be composed of a similarly wide range of materials, but

slightly more consolidated, and these soils are expected to have higher shear strength and lower compressibility than the recent alluvial deposits (Yuba County Water Agency 2003).

Soils immediately adjacent to the Yuba and Feather Rivers are dominated by deep, nearly level, well-drained loamy and sandy soils. The natural drainage is good, and the soils have slow to moderate subsoil permeability. Runoff is slow, and inherent soil fertility is high. These soils are used for pasture, orchards, and row crops. The river terraces consist of very deep, well-drained alluvial soils (Natural Resources Conservation Service 1992) and are used for irrigated orchards and cultivated crops.

The *Yuba County Soil Survey* (Natural Resources Conservation Service 1992) identifies a variety of soil map units in the FRLRP project area. These units and their specific characteristics are described under "Soil Resources" below. The project area generally consists of deep soils derived from alluvial sources, which are classified by the Farmland Mapping and Monitoring Program as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. The soils have low to high permeability rates that, combined with the nearly level topography, result in low runoff rates and low risk of erosion.

SEISMICITY AND FAULT ZONES

The project area lies in east central California, an area that has experienced relatively low seismic activity in the past. The project area is not located in an Alquist-Priolo Earthquake Fault Zone (California Geological Survey 1999, Hart and Bryant 1999). The closest major faults in the vicinity are listed in Table 5.2-1.

Table 5.2-1
Faults in the Vicinity of the Project Area

Fault Name	Age of Fault Activity[1]	Distance from Project Area
Willows Fault Zone	Pre-Quaternary	5 miles
Dunnigan Hills	Holocene	20 miles
Prairie Creek	Historic	25 miles
Swain Ravine	Historic	30 miles
Cleveland Hills	Historic	40 miles
Melones	Pre-Quaternary	40 miles
Bear Mountain	Pre-Quaternary	40 miles
Coast Range Fault Zone	Historic	40 miles

[1] Historic = activity within the last 200 years; Holocene = activity within the last 10,000 years; Pre-Quaternary = no evidence of fault activity within the last 1,600,000 years.

Source: Jennings 1994

The nearest known active (Holocene or Historic) fault trace to the project area is the Dunnigan Hills fault, near the city of Woodland approximately 20 miles southwest of the project area (Jennings 1994). The Cleveland Hills fault, near Lake Oroville, is mapped approximately 40 miles north of the project area. The 1975 Oroville earthquake (5.7 Richter magnitude) caused surface rupture on portions of the Cleveland Hills fault.

Studies conducted after the Oroville earthquake concluded that the Swain Ravine fault was a continuation of the Cleveland Hills fault. The Prairie Creek fault joins with the Swain Ravine fault in southwestern Yuba County, and surface cracking was observed along this fault in Palermo following the 1975 Oroville earthquake. The Swain Ravine and Prairie Creek faults are considered capable of seismic activity, but the activity is estimated to have a long recurrence interval and a low slip rate (California Department of Water Resources 1979). Based on the California Seismic Hazard Map, a large-magnitude earthquake from either of these nearby seismic sources would produce an estimated maximum peak ground acceleration of 0.2 gravity (g) (equivalent to ±20% of the earth's normal gravitational strength) in the project area. Actual surface response may differ depending on local soil conditions.

A geotechnical field investigation was conducted in the local area for a setback of the lower Feather River levee that was proposed as part of the Yuba-Feather Supplemental Flood Control Project (Y-FSFCP). No evidence of faulting was interpreted from data recovered in this geotechnical field investigation (Yuba County Water Agency 2003).

Potential seismic hazards resulting from a nearby moderate to major earthquake can generally be classified as primary and secondary. The primary effect is fault ground rupture, also called surface faulting. Because there are no active faults mapped across the project site by the California Geological Survey or USGS and the project area is not located within an Alquist-Priolo Earthquake Fault Zone, fault ground rupture is unlikely. Common secondary seismic hazards include ground shaking, liquefaction, subsidence, and seiches. These hazards are discussed below.

Seismic Ground Shaking

Strong earthquakes generated along any fault in the region may affect the project area, depending on the characteristics of the earthquake and the location of the epicenter. Ground motions can be estimated by a probabilistic method at specified hazard levels. The intensity of ground shaking depends on the distance from the earthquake epicenter to the site, the magnitude of the earthquake, site soil conditions, and the characteristic of the source. *Probabilistic Seismic Hazard Assessment for the State of California* (Petersen et al. 1996), published by USGS and the California Division of Mines and Geology (CDMG), identifies the seismic hazard based on a review of these characteristics and historical seismicity throughout California. The results of these studies suggest that there is a 10% probability that the peak horizontal acceleration experienced at the site would exceed 0.2 g in 50 years. The California Building Standards Code sets 0.3 g as the threshold above which special structural design is necessary to accommodate potential ground movement.

Ground Failure/Liquefaction

Liquefaction is a process by which water-saturated materials (soil, sediment, and certain types of volcanic deposits) lose strength and may fail during strong ground shaking, when granular materials are transformed from a solid state into a liquefied state as a result of increased pore-water pressure. This behavior is most commonly induced by strong ground shaking associated with earthquakes. In some cases, a complete loss of strength occurs and catastrophic ground failure may result. However, liquefaction may happen where only limited strains develop, and ground surface deformations are much less serious.

Factors determining the liquefaction potential are soil type, the level and duration of seismic ground motions, the type and consistency of soils, and the depth to groundwater. Loose sands and peat deposits are susceptible to liquefaction, while clayey silts, silty clays, and clays deposited in freshwater environments are generally stable under the influence of seismic ground shaking.

The FRLRP project area has relatively shallow groundwater conditions. Unconsolidated sediments underlie the project area in layers of very loose or loose cohesionless soils (clean sand and silty sand). These materials, where saturated, may be susceptible to liquefaction immediately after strong earthquake shaking, which may induce damaging settlement and/or cracking of the levee. Such a situation is possible, but the probability that strong ground motion would coincide with or immediately precede high river levels is very low.

Three types of ground failure or collapse of soil structures commonly result from liquefaction: lateral spread, ground oscillation, and loss of bearing strength. Each type is briefly defined below.

Lateral Spread. This term defines the lateral displacement of surficial blocks of sediment as the result of liquefaction in a subsurface layer. Once liquefaction transforms the subsurface layer into a fluidized mass, gravity plus inertial forces that result from the earthquake may cause the mass to move downslope toward a cut slope or free face (such as a river channel or a canal). Lateral spreads most commonly occur on gentle slopes that range between 0.3° and 3°, and commonly displace the surface by several meters to tens of meters. Such movement typically damages pipelines, utilities, bridges, and other structures that have shallow foundations. Because topography in the project area is level and the potential for seismic activity is considered low, the potential for lateral spread is also considered low.

Ground Oscillation. When liquefaction occurs at depth and the slope is too gentle to permit lateral displacement, the soil blocks that are not liquefied may decouple from one another and oscillate on the liquefied zone. The resulting ground oscillation may be accompanied by opening and closing of fissures and sand boils, which may damage structures and underground utilities. Because of the low probability of strong seismic ground shaking in the project area, the probability of ground oscillation is also low.

Loss of Bearing Strength. When a soil loses strength and liquefies, loss of bearing strength may occur beneath a structure, possibly causing the structure to settle and tip. If the structure is buoyant, it may float upward. The only structure included in the FRLRP is the relocated Pump Station No. 3. The pump station would not be subject to human occupancy/habitation. Through proper site selection and implementation of various Uniform Building Code requirements, Pump Station No. 3 would not be subject to the effects of loss of bearing strength.

Subsidence and Settlement

Land surface subsidence can be induced by both natural phenomena and human activities. Natural phenomena include subsidence resulting from tectonic deformations and seismically induced settlements; soil subsidence caused by consolidation, hydrocompaction, or rapid sedimentation; subsidence resulting from oxidation or dewatering of organically rich soils; and

subsidence related to subsurface cavities. Human activities that can cause subsidence include withdrawal of subsurface fluids or sediments.

Pumping of water for residential, commercial, and agricultural uses from subsurface water tables can be a cause of subsidence in California. For example, subsidence has created serious problems for flood control in the Sacramento–San Joaquin River Delta (Delta). Estimates in 1993 indicated that the Delta was subsiding at a rate of more than 3 inches per year. However, according to the *Yuba County General Plan* (Yuba County 1994), excessive groundwater extraction occurred from 1950 through 1984 within the valley area of Yuba County, but no concomitant land subsidence was recorded. Thus, it appears that subsidence from groundwater extraction should not be an issue in the project area.

Soil settlement could occur at the proposed ASB and intermediate setback levee embankments in project Segment 2 because of an increase in overlying pressure from deposition and storage of a large volume of excavated soils. According to studies performed for the Y-FSFCP in support of preliminary design of a Feather River levee setback (Yuba County Water Agency 2003), levee foundations in loose sand will likely settle up to several inches; levee foundations in clayey soils would be expected to settle for several years after completion. Differential settlement could cause cracking in embankments. A similar potential exists at potential borrow sites in the levee setback area as a result of hydrocompaction (compaction of soil after an initial wetting event) when these sites are later flooded.

Seismic Seiches

Earthquakes may affect open bodies of water in two ways: by creating seismic sea waves and by creating seiches. Seismic sea waves (often called “tidal waves”) are caused by abrupt ground movements (usually vertical) on the ocean floor in connection with a major earthquake. Because of the distance of the project area from the ocean, seismic sea waves are not likely to be a factor.

A seiche is a sloshing of water in an enclosed or restricted water body such as a basin, river, or lake, caused by earthquake motion. The sloshing can occur for a few minutes or several hours. A seiche in the project vicinity could be damaging, but based on the anticipated short duration of seismic ground shaking in Yuba County, the risk from seiches can be considered low. In addition, under most circumstances, flows in the Yuba and Feather Rivers are in the normal drainage channel, fairly distant from the flood control levees. For a seiche to affect anything other than the normal river channel and associated floodplain, a large seismic event of relatively long duration would need to occur concurrently with high water levels in the Feather and/or Yuba Rivers.

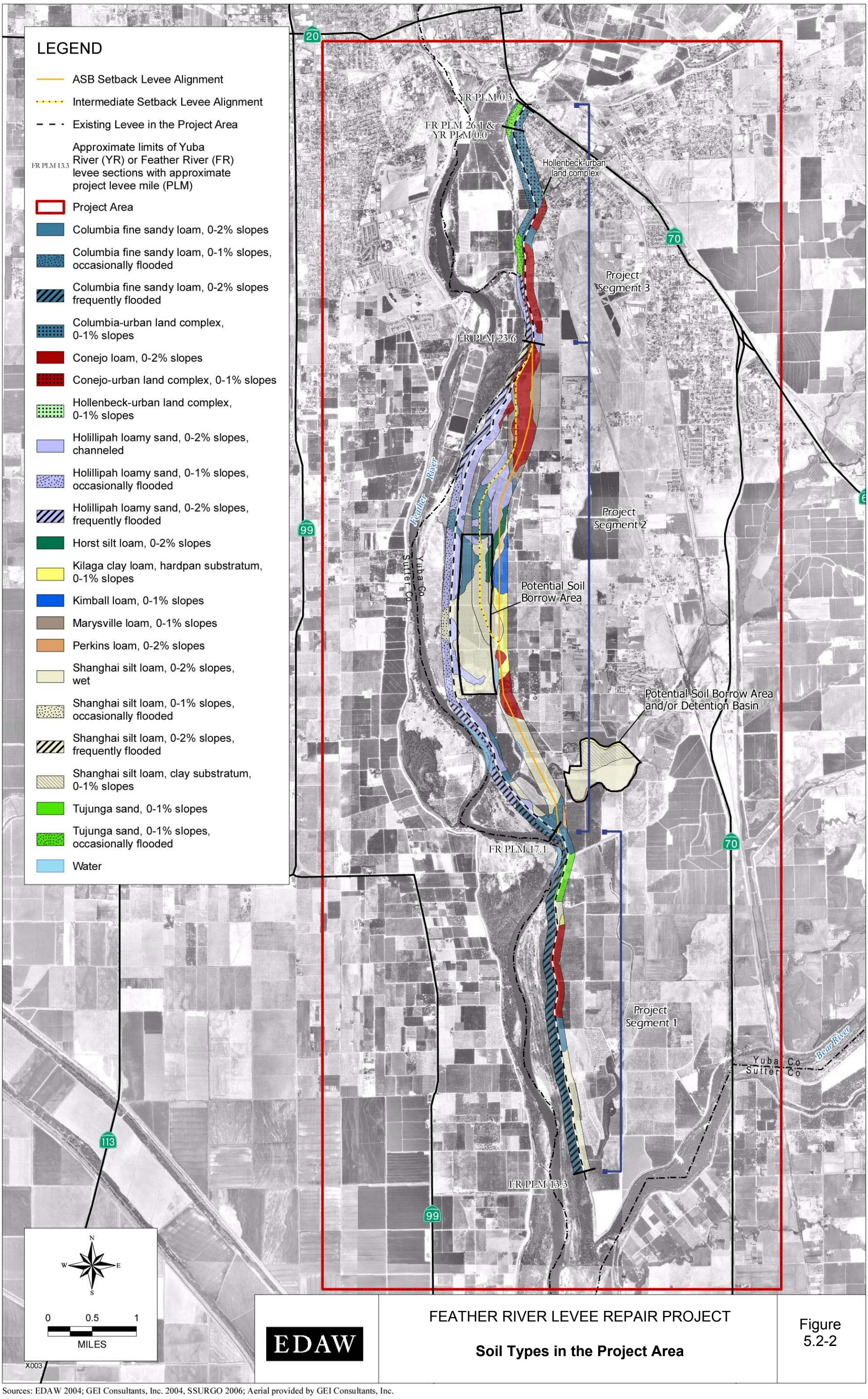
SOIL RESOURCES

Soil types and their distribution in the project area were identified through a review of maps provided by the U.S. Soil Conservation Service (now called the Natural Resources Conservation Service). The soil map units found within each project segment are listed below in Table 5.2-2. Figure 5.2-2, “Soil Types in the Project Area,” provides a detailed map of the surficial soils in the project area. Table 5.2-3 provides a detailed summary of the physical and chemical characteristics of each soil type identified from the project site.

Table 5.2-2
Soil Mapping Units Identified by Project Segment

Project Segment	Soil Mapping Unit
Segment 1	Columbia fine sandy loam, 0–2% slopes
	Columbia fine sandy loam, 0–2% slopes, frequently flooded
	Conejo loam, 0–2% slopes
	Horst silt loam, 0–2% slopes
	Kilaga clay loam, hardpan substratum, 0–1% slopes
	Shanghai silt loam, 0–2% slopes, wet
Segment 2 (Includes soils associated with the existing levee, ASB and intermediate levee setback alignments, the levee setback area, and potential soil borrow areas)	Columbia fine sandy loam, 0–2% slopes
	Columbia fine sandy loam, 0–1% slopes, occasionally flooded
	Columbia fine sandy loam, 0–2% slopes, frequently flooded
	Conejo loam, 0–2% slopes
	Holillipah loamy sand, 0–2% slopes, channeled
	Holillipah loamy sand, 0–1% slopes, occasionally flooded
	Holillipah loamy sand, 0–2% slopes, frequently flooded
	Horst silt loam, 0–2% slopes
	Kilaga clay loam, hardpan substratum, 0–1% slopes
	Kimball loam, 0–1% slopes
	Marysville loam, 0–1% slopes
	Perkins loam, 0–2% slopes
	Shanghai silt loam, 0–2% slopes, wet
	Shanghai silt loam, 0–1% slopes, occasionally flooded
	Shanghai silt loam, 0–2% slopes, frequently flooded
	Shanghai silt loam, clay substratum, 0–1% slopes
	Tujunga sand, 0–1% slopes
Segment 3	Columbia fine sandy loam, 0–1% slopes, occasionally flooded
	Columbia-urban land complex, 0–1% slopes
	Conejo loam, 0–2% slopes
	Conejo-urban land complex, 0–1% slopes
	Holillipah loamy sand, 0–2% slopes, channeled
	Holillipah loamy sand, 0–1% slopes, occasionally flooded
	Holillipah loamy sand, 0–2% slopes, frequently flooded
	Tujunga sand, 0–1% slopes, occasionally flooded

Source: Natural Resources Conservation Service 1992



EDAW

FEATHER RIVER LEVEE REPAIR PROJECT

Soil Types in the Project Area

Figure 5.2-2

Sources: EDAW 2004; GEI Consultants, Inc. 2004, SSURGO 2006; Aerial provided by GEI Consultants, Inc.

Table 5.2-3
Soil Mapping Unit Descriptions for Soil Types in the Project Area

Unit No.[1]	Soil Series Name	Depth (inches)	USDA texture	Shrink-Swell Potential	Permeability (in/hr)	Drainage	Water Erosion Hazard	Erosion Factors[2]		Land Capability[3]		pH
								K	T	N	I	
137 138 139 140	Columbia	0–9 9–18 18–68	Fine sandy loam Fine sandy loam, sandy loam Stratified sand to silt loam	Low	2.0–6.0	Poorly drained	Slight	0.32	5	IIIs IVw IIIs	IIs IVw IIs	6.1–7.8
141 143	Conejo	0–6 6–65	Loam Loam, clay loam	Low Moderate	0.6–2.0 0.2–0.6	Well drained	Slight	0.32	5	IIIc	I	6.1–7.8 6.1–8.4
161 162 163	Holillipah	0–6 6–66	Loamy sand Stratified silt loam to sand	Low Low	6.0–20 2.0–6.0	Excessively drained	Slight	0.17	5	IVs	IIIs	6.1–7.3
170	Horst	0–26 26–60 60–70	Silt loam Silt loam Loam	Low Moderate Low	0.6–2.0	Well drained	Slight	0.43 0.43 0.37	5	IIIc	Is	5.6–7.8 6.6–7.8 6.6–7.8
183	Kilaga	0–21 21–55 55–60 60–64	Clay loam Silty clay loam, silty clay, clay loam Indurated material Weathered bedrock	Moderate High — —	0.2–0.6 0.06–0.2 — —	Well drained	Slight	0.37 0.20 — —	3	IIIs	IIs	6.6–7.3 7.4–7.8 — —
185	Kimball	0–16 16–42 42–60	Loam Clay, clay loam, sandy clay loam, clay loam, loam Clay	Low High Moderate	0.6–2.0 0.01–0.06 0.06–0.2	Well drained	Slight	0.37 0.28 0.28	5	IIIs	IIIs	5.6–7.3 5.6–7.3 6.1–7.8

Table 5.2-3
Soil Mapping Unit Descriptions for Soil Types in the Project Area

Unit No.[1]	Soil Series Name	Depth (inches)	USDA texture	Shrink-Swell Potential	Permeability (in/hr)	Drainage	Water Erosion Hazard	Erosion Factors[2]		Land Capability[3]		pH
								K	T	N	I	
192	Marysville	0–6	Loam	Low	0.6–2.0	Well drainage	Slight	0.32	3	IIIs	IIIs	6.6–7.8
		6–36	Clay loam, siltyclay loam	Moderate	0.2–0.6			0.28				7.4–8.4
		36–40	Weathered bedrock	—	—			—				—
203	Perkins	0–5	Loam	Low	0.6–2.0	Well drained	Slight	0.32	5	IIIc	I	5.6–7.3
		5–58	Loam, clay loam	Moderate	0.2–0.6			0.32				5.6–7.3
		58–66	Stratified sandy loam to clay loam	Moderate	0.2–0.6			0.24				6.1–7.3
		66–72	Stratified very gravelly sandy loam to very cobbly clay loam	Low	0.6–2.0			0.15				6.1–7.3
218	Shanghai	0–20	Silt loam	Low	0.6–2.0	Poorly drained	Slight	0.43	5	IIIc	I	6.6–7.3
		20–69	Stratified silty clay loam to fine sandy loam	Moderate	0.6–2.0			0.43				6.6–7.8
219	Shanghai	0–20	Silt loam	Low	0.6–2.0	Poorly drained	Slight	0.49	5	IIIw	IIIw	6.6–8.4
		20–69	Stratified silty clay loam to fine sandy loam	Moderate	0.6–2.0			0.43				
220	Shanghai	0–8	Silt loam	Low	0.6–2.0	Poorly drained	Slight	0.49	5	IIIw	IIIw	6.6–8.4
		8–41	Stratified silty clay loam to fine sandy loam	Moderate	0.6–2.0			0.43				
		41–60	Clay	High	0.06–0.2			0.24				
249	Tujunga	0–6	Sand	Low	6.0–20	Excessively drained	Slight	0.17	5	VIe	IVs	6.1–7.3
		6–58	Loamy sand, fine sand, sand	Low	6.0–20			0.17				6.1–7.8

Table 5.2-3
Soil Mapping Unit Descriptions for Soil Types in the Project Area

Unit No.[1]	Soil Series Name	Depth (inches)	USDA texture	Shrink-Swell Potential	Permeability (in/hr)	Drainage	Water Erosion Hazard	Erosion Factors[2]		Land Capability[3]		pH
								K	T	N	I	
		58–62	Stratified gravelly sand to gravelly loamy sand	Low	6.0–20			0.15				6.1–7.8
251	Tujunga	0–6	Sand	Low	6.0–20	Excessively drained	Slight	0.17	5	VIw	IIIw	6.1–7.3
		6–58	Loamy sand, fine sand, sand	Low	6.0–20			0.17				6.1–7.8
		58–62	Stratified gravelly sand to gravelly loamy sand	Low	6.0–20			0.15				6.1–7.8

Notes: in/hr = inches per hour; USDA = U.S. Department of Agriculture

1 Soil unit number refer to numbers shown on soil maps in the *Yuba County Soil Survey* (National Resources Conservation Service 1992).

2 K is a measurement of relative susceptibility to sheet and rill erosion by water. It ranges from 0.10 to 0.64, with lower values representing a lower susceptibility to erosion. T represents soil loss tolerance, which is defined as the maximum rate of soil erosion (wind and water) without reducing crop production or environmental quality. Values ranges from 1 to 5 tons of soil loss per acre per year, with 5 representing soils less sensitive to erosion.

3 An indication of the suitability of soils for most kinds of field crops. Land capability classes are I through VIII, with VIII being unsuitable for most crop production. Subclasses denoting limiting factors are designated by letters e (erosion), w (water), s (shallow or stony), or c (climate). I=irrigated; N=nonirrigated.

— Either not measured or not applicable.

Source: Natural Resources Conservation Service 1992

LEVEE CONDITIONS

Historically, levees along both the Feather and Yuba Rivers have experienced recurring and serious seepage problems during high river stages. Boils have been reported in fields on the land side of the levees. The existing levees were constructed before 1940. Over the last 50 years, the Corps has implemented various modifications to improve levee protection, including installation of relief wells, berms, drains, and slurry walls.

Along the Feather River and Yuba River levee segments in the project area, levee heights range from 20 to 30 feet, and the levees are designed to pass the 1957 design profile with 3 feet of freeboard. Crown widths are approximately 20 feet or wider. Side slopes are generally 3:1 on the water side and 2:1 on the land side. Portions of the Feather River levee have berms of various heights and widths on the land side.

Existing drainage features on the land side of the Feather River levee include a number of irrigation ditches and wells throughout the proposed levee setback area in project Segment 2, and Clark Slough and Pump Stations No. 2, 3, and 9 along the Feather River. Clark Slough drains to the Feather River near the southern end of Segment 1. Flows from Clark Slough are pumped over the Feather River levee to the river via Pump Station No. 2.

The existing levees were constructed primarily of local soils, discussed previously. Foundation soils are similar. Groundwater levels have been measured at 6–16 feet below ground surface (Yuba County Water Agency 2003).

MINERAL RESOURCES

In compliance with the California Surface Mining and Reclamation Act (SMARA), CDMG has established the classification system shown in Table 5.2-4 to denote both the location and significance of key extractive resources.

Table 5.2-4
California Division of Mines and Geology Mineral Land Classification System

Classification	Description
MRZ-1	Areas where adequate information indicates that no significant mineral deposits are present or where it is judged that little likelihood exists for their presence
MRZ-2	Areas where adequate information indicates that significant mineral deposits are present or where it is judged that a high likelihood for their presence exists
MRZ-3	Areas containing mineral deposits, the significance of which cannot be evaluated from existing data
MRZ-4	Areas where available data are inadequate for placement in any other mineral resource zone

Note: MRZ = Mineral Resource Zone

Source: Habel and Campion 1988

Under SMARA, the State Mining and Geology Board may designate certain mineral deposits as being regionally significant to satisfy future needs. The board's decision to designate an area is

based on a classification report prepared by CDMG and on input from agencies and the public. The northern portion of the project area lies within the designated Yuba City–Marysville Production-Consumption Region for Portland cement and concrete-grade aggregate, which includes all designated lands within the marketing area of the active aggregate operations supplying the Yuba City–Marysville urban center.

The existing Feather River and Yuba River levees in project Segment 3, and the northern portion of the existing Feather River levee and the proposed setback levee alignments in Segment 2, are classified as MRZ-4, areas for which available information is lacking or where available data are inadequate for placement in any other mineral resource zone. According to Habel and Campion (1988), "Areas classified as MRZ-4 in the Yuba City–Marysville Production Consumption Region have thick overlying soil layers which offer few rock exposures or are inaccessible." Drill holes east of the northern portion of the existing Feather River levee within the area zoned MRZ-4, shown on Plate 7 of the Mineral Land Classification Map (Habel and Campion 1988), indicated that there is little likelihood of aggregate resources in this area.

The locations of the potential soil borrow area in the proposed levee setback area north of Country Club Avenue and the potential soil borrow area and/or detention basin east of Star Bend have not been zoned for mineral resources by CDMG. However, as with the northern portion of the proposed setback levee alignments, drill holes east of the project site, shown on Plate 7 of the Mineral Land Classification Map (Habel and Campion 1988), indicated that there is little likelihood of aggregate resources in this area. The project site does not contain any land zoned MRZ-2 within the Yuba City–Marysville Production-Consumption Region, and is not shown in the *Yuba County General Plan* as an area of mineral resources to be protected from further development.

5.2.3 ENVIRONMENTAL IMPACTS

Effects associated with geology and soils that could result from construction activities were evaluated qualitatively based on expected construction practices, materials, and locations, and the expected duration of project construction and related activities. Operations effects were also evaluated qualitatively based on anticipated flood operations as described in Chapter 4, "Description of the Proposed Project."

It was assumed that the design and construction of the proposed flood control facilities would meet or exceed applicable design standards for static and dynamic stability, secondary effects related to ground shaking, and seepage.

THRESHOLDS OF SIGNIFICANCE

Thresholds for determining the significance of impacts on geology, soils, and mineral resources were based on the environmental checklist form in Appendix G of the California Environmental Quality Act Guidelines (State CEQA Guidelines). A project alternative would have a significant impact on geology, soils, and mineral resources if it would:

- expose persons or property to geologic hazards, such as ground shaking, liquefaction, landslides, land subsidence, or erosion;

- be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project and potentially result in an on-site or off-site landslide, lateral spreading, subsidence, liquefaction, collapse, or other ground failure; or
- result in a loss of availability of a regionally or locally important mineral resource recovery site.

The existing Feather River and Yuba River levees in project Segment 3, and the northern portion of the existing Feather River levee and the proposed setback levee alignments in Segment 2, are classified as MRZ-4 (see discussion of "Mineral Resources" above); however, based on well log data east of the existing Feather River levee (Habel and Campion 1988, as well as data collected as part of planning for the Y-FSFCP and for the FRLRP), the project site does not contain a source of regionally or locally important mineral resources. Because the project would not result in a loss of mineral resources, no impact would occur, and this issue is not discussed further in this environmental impact report.

IMPACT ANALYSIS

Alternative 1 – The Levee Strengthening Alternative

Impact LS-5.2-a

Risk of Geologic Hazards to the Levees. Characteristics of the soils along the existing Feather River and Yuba River levees could lead to structural deficiencies or failure of the levees if not addressed in construction design. Although no active faults are in the immediate vicinity of the existing levee alignments, some ground shaking is possible from earthquakes at distant sites. The levees would be strengthened according to geotechnical engineering recommendations that incorporate seepage control features, making them more stable than the existing levee and less likely to fail. Therefore, this would be a **beneficial** effect.

The potential for water seepage problems to occur along the Feather River or Yuba River levees in the project area is created by discontinuous layers of clean sand found at varying depths. As discussed by Kleinfelder (2006), levee design would need to incorporate measures to alleviate potential seepage impacts. For example, slurry cutoff walls, relief wells, and/or seepage berms could be employed and are considered in the preliminary project design. Cutoff walls and relief wells intercept the shallow sand layers and form an underseepage barrier or relieve the internal seepage pressure. Seepage berms provide additional overburden at the landside levee toe while allowing the seepage pressures to dissipate at gradients below the project criteria.

In addition to seepage and settlement, the existing levees could be subject to ground shaking from earthquakes in the faults at Oroville and within the Coast Range. The unconsolidated sediments on which the levees are founded include layers of very loose or loose cohesionless soils (clean sand and silty sand). These materials, where saturated, may lose strength during and immediately after strong earthquake shaking (the phenomenon referred to as soil liquefaction). In the unlikely event of strong earthquake shaking, liquefaction of loose foundation soils may induce damaging settlement and/or cracking of the levees. Such a situation is possible, but the probability that strong ground motion would coincide with or immediately precede high river levels is very low.

However, the susceptibility of existing levees to seepage and seismic events is part of the existing condition. Levee repair and strengthening activities under Alternative 1 would not result in the construction of new levees or other structures potentially susceptible to seepage or seismic events, and would not alter the probability or potential intensity of seismic events in the project area.

Relative to existing conditions, implementation of levee repairs and strengthening under Alternative 1 would make the existing levees less susceptible to seepage, the levees would be more sound overall, and damage from a strong seismic event would be less likely. The use of up-to-date engineering methods during levee repair and strengthening activities would ensure that the stability of the Feather River and Yuba River levees would increase over existing conditions and that the risks of geology- and soils-related failure would be lower. This would be a beneficial effect.

Impact LS-5.2-b

Soil Erosion Hazards Associated with Levee Repair and Strengthening Activities. Although levee repair and strengthening activities would disturb earth, thereby potentially accelerating erosion, construction disturbance would be temporary, and soils in disturbed areas would be vegetated or otherwise stabilized after construction is complete. In addition, part of Alternative 1 includes correction of existing erosion problem areas on the water side of the Feather River left bank levee in project Segment 2. Levee repair and strengthening activities would not expose persons or property to erosion hazards. This impact would be **less than significant**.

Erosion impacts related to disturbed soil entering waterways and adversely affecting water quality are addressed in Section 5.3, "Water Resources and Geomorphology." The impact discussion below addresses the potential for the proposed project to expose persons or property to erosion hazards.

Construction activities associated with the proposed levee repair and strengthening would disturb earth, potentially resulting in accelerated erosion or an incidental release of sediment to adjacent lands or the Feather and Yuba Rivers. Ground-disturbing activities would include temporarily cutting down the top of the existing levee to provide a work platform, excavating for slurry cutoff walls, excavating for borrow material and constructing a detention basin, and removing soil during repairs to existing erosion problem areas. However, ground disturbance would be temporary. Soils in the proposed borrow material and detention basin sites are nearly level and are well drained, and the risk of erosion in these areas is slight. Consistent with standards of The Reclamation Board as stated in Title 23, Sections 111–157 of the California Code of Regulations, work on the levee and stabilization of exposed soils on the levee surface would need to be complete by November 1. In addition, temporary erosion/runoff control measures would be implemented during construction to minimize potential stormwater pollution from the construction areas (see the "Stormwater Pollution Prevention" discussion in Section 4.3.3, "Alternative 1 – Construction," in Chapter 4). Therefore, construction under Alternative 1 would not result in any erosion conditions that would be considered hazardous to persons or property. In addition, Alternative 1 includes measures to correct erosion problem areas identified on the Feather River left bank levee in project Segment 2, minimizing existing erosion hazards. This impact would be less than significant.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impact ASB-5.2-a

Risk of Geologic Hazards to the Levees. Characteristics of the soils along the proposed ASB setback levee alignment could lead to structural deficiencies or levee failure if not addressed in construction design. Although no active faults are in the vicinity of the existing levees or the setback levee alignment, some ground shaking is possible from distant sites. Effects on the stability of the proposed ASB setback levee would be no greater than effects on the existing levee. Construction according to design recommendations by the geotechnical engineers, independent reviews of the project design and construction by a Board of Senior Consultants (BOSC), and engineering review and approval by the Corps and The Reclamation Board would ensure the incorporation of appropriate features to address any potential structural instability of the levee. The setback levee would be engineered and constructed to modern standards with appropriate seepage control features and, therefore, would be more stable than the existing levee and unlikely to fail. This would be a **beneficial** effect.

The risk of geologic hazards to the existing Feather River and Yuba River levees in project Segments 1 and 3 under this alternative would be the same as those described above in Impact LS-5.2-a under Alternative 1.

The discussion below relies mainly on the preliminary geotechnical investigations performed for the preliminary setback-levee design prepared for the Y-FSFCP. However, the information is supplemented, where appropriate, with new geotechnical data collected in 2006 in support of the FRLRP. Reports discussing and analyzing the 2006 data are in preparation.

Past and current investigations include:

- a review of the available geological and geotechnical information,
- geological reconnaissance visits to the ASB setback levee alignment and the surrounding area,
- the drilling of exploratory test borings and cone penetration tests along the proposed levee alignment and in the vicinity,
- laboratory index testing of selected soil samples, and
- the presentation of the preliminary geotechnical data and evaluations in Volume 3, "Design Technical Memorandum on Geotechnical Conditions," of Appendix E of Yuba County Water Agency's (YCWA's) report on feasibility of the Y-FSFCP, for technical review by the California Department of Water Resources (DWR).

Based on the results of the preliminary geotechnical evaluations, the project design engineers have judged the proposed alignment of the ASB setback levee to be technically suitable, provided that appropriate measures are incorporated in the levee design to minimize the potential for static settlement and seepage-induced erosion problems, and to accommodate 200-year flood conditions.

Static settlement of the proposed levee embankments has been considered at a conceptual level in the preliminary design to address the presence of both unconsolidated recent sediments

(generally loose sands and fine-grained soils) and older, slightly more consolidated sediments (typically of medium density) in the foundation soils. Levee foundations in loose sand are likely to settle as much as several inches, but most of the settlement would occur as the levee is constructed (Yuba County Water Agency 2003). To address the likelihood that sand foundations would settle, the preliminary design anticipates that volumes of soil greater than the design estimates would be needed for the levee embankment. To address the potential for settlement of levee segments constructed on clayey foundation soils, overbuilding of the embankment (also called camber) is anticipated to be necessary to avoid loss of freeboard over the long term. The preliminary design also acknowledges that the potential for adjacent areas to settle at different rates or in different amounts under the embankment load needs to be addressed to prevent cracking and subsequent seepage or internal erosion during periods of high water levels.

The potential for water seepage problems to occur along the ASB setback levee alignment is created by discontinuous layers of clean sand found at varying depths. As discussed in Chapter 4, "Description of the Proposed Project," levee design would need to incorporate measures to alleviate potential seepage impacts. For example, seepage cutoff walls, closely spaced relief wells, and/or seepage berms could be employed and are considered in the preliminary project design. Cutoff walls and relief wells intercept the shallow sand layers and form an underseepage barrier or relieve the internal seepage pressure. Seepage berms provide additional overburden at the landside levee toe while allowing the seepage pressures to dissipate at gradients below the project criteria.

In addition to seepage and settlement, the ASB setback levee could be subject to ground shaking from earthquakes centered in the faults of both the Sierra Nevada and the Coast Range. The unconsolidated sediments on which the proposed setback levee would be founded include layers of very loose or loose cohesionless soils (clean sand and silty sand). These materials, where saturated, may lose strength during and immediately following strong earthquake shaking (the phenomenon referred to as soil liquefaction). In the unlikely event of strong earthquake shaking, liquefaction of loose foundation soils may induce damaging settlement and/or cracking of the levee. While this situation is possible, the combined probability of strong ground motion occurring during or just prior to high river levels is very low. Because of this low probability, the current standards of design do not specify that earthquake loadings must be included in stability analyses performed for levees that do not retain a permanent pool (Yuba County Water Agency 2003). The potential for earthquake damage of the setback levee would be no greater than the potential for such damage to the existing levee, and any associated hazards would be the same as or less than those associated with the existing levee because the setback levee would be more structurally sound overall. As under existing conditions, in the unlikely event that strong earthquake shaking were to result in liquefaction damage, such damage would need to be repaired as soon as practicable to restore the levee to an appropriate level of safety before the next flood event.

As of publication of this draft EIR (DEIR), no slope stability analyses associated with the preliminary project design have been completed and published. However, previous slope stability analyses of the existing levees have generally indicated that the levees are stable against shear strength failure under design flood conditions (Yuba County Water Agency 2003). It is anticipated that the same would be true for the proposed setback levee, which would be constructed using stricter construction quality control standards that require greater compaction

of embankment soils. Although reasonable levee side slopes have been adopted for the preliminary design of the cross sections, detailed confirmatory slope stability analyses would be performed during detailed design, using the selected cross section geometry and site-specific strength properties for foundation and embankment materials.

The preliminary design for the ASB setback levee is based on preliminary subsurface exploration and testing. If Alternative 2 was selected for implementation, further, more detailed investigations would be undertaken during final design to analyze the stability of the levee foundation and embankment, susceptibility to seepage and erosion damage, or other localized site-specific conditions of the proposed setback levee. Similarly, detailed investigations of potential borrow areas have not been possible and would be required as part of final design if this alternative were selected. As part of final design, additional field and laboratory investigations and detailed site-specific analyses and design studies would need to be undertaken to confirm the design levee cross section and finalize seepage control measures that are appropriate for the specific conditions encountered locally. Proposed additional field studies and analyses are described in Volume 3 of Appendix E, "Preliminary Design," of YCWA's feasibility report for the Y-FSFCP (Yuba County Water Agency 2003). The field explorations would be performed to:

- characterize soil profiles for the foundation of the setback levee,
- characterize permeable layers in the foundation,
- measure the undisturbed strength of foundation materials for slope stability analyses,
- assess the compressibility of foundation materials for settlement evaluations, and
- develop detailed information on borrow areas to establish the properties of borrow materials and define the limits of borrow excavations.

Final design would include:

- determining the density, strength, permeability, and consolidation properties of embankment and foundation soils as appropriate along the entire length of the proposed setback levee;
- finalizing levee sections and details required for special local conditions;
- analyzing levee sections for underseepage and through-seepage, and finalizing the design of seepage control measures;
- conducting slope stability analyses to confirm the stability of the setback levee embankment and foundation;
- performing settlement analysis and developing the design of camber, if required; and
- determining the final locations and depths of borrow areas.

Existing information indicates that all potential geological hazards that could be associated with the ASB setback levee (e.g., settlement, seepage, slope stability) can be successfully addressed

with appropriate design, engineering, and construction techniques. The final design of the ASB setback levee would incorporate the findings of the detailed geotechnical investigations and analyses as described above; the engineering design and construction progress would undergo independent reviews by a BOSC; the levee design and construction plans would meet Corps standards as specified in Engineering Manual 1110-2-1913 (U.S. Army Corps of Engineers 2000) and would require the approval of the Corps and The Reclamation Board; and project design would include interaction with other key reviewing agencies (DWR and RD 784). These detailed investigations, design and construction reviews, and approval processes would ensure the incorporation of appropriate features to address any potential structural instability of the proposed levee. In addition, the use of up-to-date engineering methods in the design and construction of the setback levee would ensure that its stability would exceed that of the existing levee, which has been subject to numerous seepage problems, and that the risks of geology- and soils-related failure would be lower. This would be a beneficial effect.

Impact ASB-5.2-b

Soil Erosion Hazards Associated with Construction of the ASB Setback Levee. Although construction activities associated with levee repair and strengthening and installation of the ASB setback levee would disturb earth, thereby potentially accelerating erosion, construction disturbance would be temporary and soils in disturbed areas would be vegetated or otherwise stabilized after construction is complete. In addition, the levee setback area is nearly level and is well drained, and the risk of erosion and associated hazards is slight. Levee repair and strengthening activities and construction of the ASB setback levee would not expose persons or property to erosion hazards. This impact would be **less than significant**.

Erosion impacts related to disturbed soil entering waterways and adversely affecting water quality are addressed in Section 5.3, “Water Resources and Geomorphology.” The potential for changes in river geomorphology resulting from hydraulic effects of the setback levee to contribute to erosion are also addressed in Section 5.3. The impact discussion below addresses the potential for construction of the proposed project to expose persons or property to erosion hazards.

Under Alternative 2, the risk of erosion hazards associated with levee repair and strengthening activities in project Segments 1 and 3 would be the same as those described above in Impact LS-5.2-a under Alternative 1.

Construction activities associated with the ASB levee setback would disturb earth and potentially result in accelerated erosion or an incidental release of sediment to adjacent lands, nearby drainages, or the Feather River. Ground-disturbing activities would include levee removal, site excavation for borrow materials, levee construction, removal of power poles and structures, and construction of a detention basin. However, soils within the levee setback area and proposed borrow material and detention basin sites are nearly level and are well drained, and the risk of erosion is slight. Temporary erosion/runoff control measures would be implemented during construction to minimize potential migration of sediments from the construction areas (see the “Stormwater Pollution Prevention” discussion in Section 4.4.3, “Alternative 2—Construction,” in Chapter 4). Therefore, construction under Alternative 2 would not result in any erosion conditions that would be considered hazardous to persons or property. This impact would be less than significant.

Impact ASB-5.2-c

Soil Erosion Hazards Associated with Flood Operations with the ASB Setback Levee. Floodwaters passing through the levee setback area could erode soil that is not currently subjected to flood flows on a frequent basis. However, levee construction would increase the width and decrease the depth and velocity of flood flows in the levee setback area, minimizing erosive forces. In addition, vegetative cover in the levee setback area (agriculture or habitat) would reduce the potential for erosion. This impact would be **less than significant.**

Lands within the ASB levee setback area are currently protected by the existing Feather River left bank levee and are only exposed to floodwaters if there is a catastrophic levee failure. After construction of the ASB setback levee and removal of portions of the existing levee in project Segment 2, floodwaters passing through the ASB levee setback area could erode soil that is not currently subjected to flood flows on a frequent basis. However, construction of the ASB setback levee would provide a broad floodplain area that would reduce the overall velocity of flood flows (Philip Williams & Associates 2006). This is expected to minimize erosive forces across the levee setback area. Furthermore, vegetative cover that would be present in the levee setback area (agriculture and/or habitat) would help stabilize the soil under flood conditions. The low velocity of flows within the levee setback area and the presence of vegetation would minimize the potential for soil erosion. Therefore, this impact would be less than significant.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impact IS-5.2-a

Risk of Geologic Hazards to the Levees. This impact would be the same as Impact ASB-5.2-a, described under Alternative 2 above. For the same reasons as described above, this impact would be **less than significant**.

Impact IS-5.2-b

Soil Erosion Hazards Associated with Construction of the Setback Levee. This impact would be the same as Impact ASB-5.2-b, described under Alternative 2 above. For the same reasons as described above, this impact would be **less than significant.**

Impact IS-5.2-c

Soil Erosion Hazards Associated with Flood Operations with the Intermediate Setback Levee. This impact would be the same as Impact ASB-5.2-c, described under Alternative 2 above. For the same reasons as described above, this impact would be **less than significant.**

5.2.4 MITIGATION MEASURES

ALTERNATIVE 1—THE LEVEE STRENGTHENING ALTERNATIVE

No mitigation is required for Impacts LS-5.2-a and LS-5.2-b.

ALTERNATIVE 2— THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impacts ASB-5.2-a, ASB-5.2-b, and ASB-5.2-c.

ALTERNATIVE 3—THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impacts IS-5.2-a, IS-5.2-b, and IS-5.2-c.

5.2.5 IMPACTS REMAINING SIGNIFICANT AFTER MITIGATION

All impacts of the three proposed project alternatives related to geology, soils, and mineral resources would be less than significant.

SECTION 5.3 WATER RESOURCES AND RIVER GEOMORPHOLOGY

This section addresses issues related to hydrology, water supply, water quality, and river geomorphology. Potential project effects on aquatic species are addressed in Section 5.4, "Fisheries."

5.3.1 REGULATORY SETTING

FLOOD SAFETY

Sacramento River Flood Control Project

The primary facilities for controlling flood damage in the Yuba-Feather River system are levees along the flood channels and reservoirs that provide flood storage. Also important in preventing flood damage are coordinated preparations for flood fighting and emergency planning, including evacuation. Several federal, state, and local agencies have responsibilities for different aspects of operations and maintenance of flood control facilities and for emergency response. These agencies include the U.S. Army Corps of Engineers (Corps); the National Weather Service; the California Department of Water Resources (DWR), including its Division of Safety of Dams; the State of California Reclamation Board (The Reclamation Board); the Governor's Office of Emergency Services (OES); Yuba County Water Agency (YCWA); Yuba County Office of Emergency Services; and local reclamation and levee districts. The roles of these entities are described in detail in Chapter 2 and Section 5.3 of the Yuba-Feather Supplemental Flood Control Project (Y-FSFCP) programmatic draft environmental impact report (DEIR) (Yuba County Water Agency 2003a), which is incorporated by reference into this DEIR.

The flood control facilities on the Feather and Yuba Rivers are part of the joint federal-state Sacramento River Flood Control Project (SRFCP). The Corps, in conjunction with the State of California, developed a flood control plan for the Feather and Yuba Rivers as part of the SRFCP. This plan included levee construction, channel improvements, and reservoir flood storage. The Corps developed specific design capacities for the river channels and flood control operation rules for Lake Oroville on the Feather River and New Bullards Bar Reservoir on the North Yuba River, both of which control flows in the Feather River below Marysville. These operating rules are in force for defined flood seasons. During flood operations, the Corps monitors the operation of the reservoirs to ensure compliance with the written regulations.

The levees on the left (east) bank of the Feather River and the left (south) bank of the Yuba River in the Feather River Levee Repair Project (FRLRP) project area were constructed by the Corps as part of the SRFCP. The Corps does not actively participate in the flood operation of the river and levee system, but has undertaken construction and repair of the existing levees along the Feather and Yuba Rivers over the years as part of its ongoing efforts to maintain the regional protections provided by the SRFCP. "Project" levees in California must meet the standards for design and construction specified by the Corps in Engineering Manual 1110-2-1913 (U.S. Army Corps of Engineers 2000).

The Reclamation Board enforces appropriate standards for the construction, maintenance, and protection of flood control facilities in the Central Valley. The Reclamation Board must approve any activity that may affect "project works," to ensure that the activity maintains the integrity and safety of flood control project levees and floodways and is consistent with the flood control plans adopted by the board and the California Legislature. "Project works" are the components of a flood control project within the jurisdiction of The Reclamation Board that the board or the legislature has approved or adopted. Project works include levees, bank protection projects, weirs, pumping plants, floodways, and any other related flood control works or rights-of-way that have been constructed using state or federal funds. Project works also include flood control plans. Rules in the California Code of Regulations (CCR) (23 CCR Sections 111–137]) regulate the modification and construction of levees to ensure public safety. The rules state that existing levees may not be excavated or left partially excavated during the flood season. The flood season for the Feather and Yuba Rivers is November 1 through April 15.

Levee operation and maintenance are overseen by DWR, which inspects the levees and issues a biannual report. The report covers the general condition of the levees, vegetation control, rodent control, and flood preparedness. The report contains maintenance recommendations that are subsequently implemented by the applicable levee district or reclamation district. Reclamation District (RD) 784 has jurisdiction over the levees in the FRLRP project area.

During floods, the levees must be continually patrolled so that the functioning of the levee system can be assessed and immediate emergency actions initiated if a defect is detected. Forecasts issued by the State-Federal Flood Operations Center, jointly operated by DWR and the National Weather Service, are the primary notification received by local levee districts and reclamation districts for the need to patrol the levees. If levee defects are found that are beyond the capability of the responsible levee or reclamation district to manage, the district will request assistance from the state and the Corps. Such requests are coordinated through the OES system.

See Section 5.3 of the Y-FSFCP DEIR (Yuba County Water Agency 2003a) for additional information on components of flood safety, including reservoir operations, flood forecasting, and emergency services.

Sacramento and San Joaquin River Basins California Comprehensive Study

The Sacramento and San Joaquin River Basins California Comprehensive Study (Comprehensive Study) is a joint effort by The Reclamation Board and the Corps, in coordination with federal, state, and local agencies, groups, and organizations in California's Central Valley. Responding to the flooding of 1997, the California Legislature and the U.S. Congress directed the Corps to develop a comprehensive plan for flood damage reduction and environmental restoration for the Sacramento and San Joaquin River basins. The Comprehensive Study is not a regulatory program per se, but consistency with its goals and objectives is important for any project that would affect flood control in the Sacramento and San Joaquin River basins.

In December 2002, an interim report was released by the Comprehensive Study team (U.S. Army Corps of Engineers and State of California Reclamation Board 2002). This is the most recent document released by the Comprehensive Study team. The report identified a comprehensive plan as an approach to developing future projects to reduce flood damage and restore the

ecosystem in the Sacramento and San Joaquin River basins. As described in the report, the comprehensive plan has three parts:

- a set of principles to guide future projects,
- an approach to develop projects with consideration for systemwide effects, and
- an organization to consistently apply the guiding principles in maintaining the flood management system and developing future projects.

The Comprehensive Study has proposed a set of guiding principles to govern implementation of projects that propose modifying the Sacramento or San Joaquin River flood control system. These principles have been developed to ensure that proposed projects are consistent with the objectives established by the Corps and The Reclamation Board. The Comprehensive Study's guiding principles are to:

- recognize that public safety is the primary purpose of the flood management system;
- promote effective floodplain management;
- promote agriculture and open-space protection;
- avoid hydraulic and hydrologic impacts;
- plan system conveyance capacity that is compatible with all intended uses;
- provide for sediment continuity;
- use an ecosystem approach to restore and sustain the health, productivity, and diversity of the floodplain corridors;
- optimize use of existing facilities;
- integrate with the CALFED Bay-Delta Program and other programs; and
- promote multipurpose projects to improve flood management and ecosystem restoration.

The FRLRP lies in the Feather River Region of the Comprehensive Study. The draft interim report notes in the discussion of this region that:

> [l]evees along the Feather, Yuba, and Bear Rivers that are already set back from the river offer greater flexibility in accommodating flood management and ecosystem restoration. There are opportunities to widen selected reaches of the floodways to reduce constrictions and increase flow capacity. Reducing floodway constrictions along the lower Feather River would improve levee reliability in the Marysville–Yuba City urban area by reducing flood stage.…There are opportunities to improve the effectiveness of existing reservoirs in managing floods on the Feather, Yuba, and Bear Rivers. The level of flood protection provided by Oroville and New Bullards Bar Reservoirs could be increased by reoperation or physical improvements to the dams. Operational criteria

> could be modified to coordinate releases from Oroville and New Bullards Bar or accommodate forecast-based operations…. Local stakeholder groups and ongoing studies have identified a number of measures that appear to have a high degree of local acceptability. These include a combination of measures such as reservoir reoperation, reservoir outlet modifications, other structural modifications to the dams or related facilities, localized levee setbacks, levee strengthening or rehabilitation, and riparian restoration within existing floodways.

WATER QUALITY

The quality of surface water and groundwater resources in California is protected under various federal and state laws, including the federal Clean Water Act (CWA) and the state Porter-Cologne Water Quality Control Act (Porter-Cologne Act). The U.S. Environmental Protection Agency (EPA) has generally authorized the State Water Resources Control Board (SWRCB) and the nine associated regional water quality control boards (RWQCBs) to administer all surface water and groundwater quality regulations in California. Both EPA and the SWRCB generally provide oversight, while the RWQCBs have primary responsibility for implementation and enforcement. The Central Valley RWQCB is responsible for enforcing these regulations in Yuba County.

Clean Water Act, Section 303(d)

The RWQCBs administer Section 303(d) of the CWA, which requires each state to maintain a list of water bodies in which physical and/or chemical aspects of water quality are limited or impaired by the presence of pollutants. Section 303(d) requires preparation of a total maximum daily load (TMDL) program for waters identified as impaired. The TMDL is a quantitative assessment of the pollutant sources, contaminant loads, assimilative capacity of the water body for the specific contaminants, and allocation of specific load reduction targets that are necessary to ensure compliance with the water quality standards.

Clean Water Act, Section 401

Section 401(a)(1) of the CWA requires applicants for a federal license or permit to conduct activities that may result in any discharge into navigable waters to provide the federal licensing or permitting agency a certification that any such discharge will not violate state water quality standards. The RWQCBs administer the Section 401 program with the intent of prescribing measures that are necessary to avoid, minimize, or mitigate adverse project impacts on water quality and ecosystems.

Water Quality Control Plan and Applicable Water Quality Criteria

Pursuant to the Porter-Cologne Act, each RWQCB prepares and updates a water quality control plan (Basin Plan) every 3 years that identifies water quality protection policies and procedures. The Basin Plan describes the officially designated beneficial uses for specific surface water and groundwater resources and the enforceable water quality objectives necessary to protect those beneficial uses.

The Basin Plan includes numerical and narrative water quality objectives for physical and chemical water quality constituents. Numerical objectives are set for temperature; dissolved oxygen (DO); turbidity; pH (i.e., acidity); total dissolved solids (TDS); electrical conductivity (EC); bacterial content; and various specific ions, trace metals, and synthetic organic compounds. Narrative objectives are set for parameters such as suspended solids, biostimulatory substances (e.g., nitrogen and phosphorus), oils and grease, color, taste, odor, and aquatic toxicity.

In addition, the California Toxics Rule (CTR) is a separate regulatory instrument that prescribes criteria for trace metals and organic compounds for the protection of aquatic life and human health. Federal and state drinking-water quality standards regulate the quality of treated municipal drinking-water supplies delivered to users.

National Pollutant Discharge Elimination System Permits and Waste Discharge Requirements

The SWRCB and RWQCBs regulate discharges of waste into waters of the state through National Pollutant Discharge Elimination System (NPDES) permits, authorized under Section 402 of the CWA for waste discharges to waters of the United States, and waste discharge requirements (WDRs), authorized under the Porter-Cologne Act. The RWQCBs issue NPDES permits and WDRs to ensure that projects that may discharge wastes to land or water conform with Basin Plan water quality objectives and policies and procedures (described above). The Porter-Cologne Act defines waters of the state as “any surface water or ground water, including saline waters, within the boundaries of the state.” Some waters that qualify as waters of the state, such as isolated wetlands, do not necessarily qualify as waters of the United States.

The RWQCBs issue NPDES permits for waste discharges to surface water from both point and nonpoint sources. The NPDES permit system includes an individual permit system for municipal wastewater treatment plants and several categories of stormwater discharges. General NPDES stormwater permits apply to industrial facilities and any general ground-disturbing construction activity greater than 1 acre.

Before construction of such projects, applicants must submit a Notice of Intent (NOI) to the RWQCB and prepare a Storm Water Pollution Prevention Plan (SWPPP). A SWPPP generally describes proposed construction activities, receiving waters, stormwater discharge locations, and best management practices (BMPs) that will be used to reduce project construction effects on receiving water quality. A number of “good housekeeping” BMPs are also generally included in a SWPPP to control waste discharges during the dry months. An appropriate selection of postconstruction permanent pollution control and treatment measures must also be considered for implementation where necessary to prevent long-term water quality impairment.

The NPDES permitting process for general construction activities requires the applicant to:

- file an NOI to discharge stormwater;
- prepare a SWPPP that identifies BMPs to prevent or minimize the discharge of sediments and other contaminants that have the potential to affect beneficial uses or to lead to violations of water quality objectives; and

- complete a self-implemented inspection, monitoring, and reporting program for BMP performance.

The RWQCBs issue WDRs to regulate activities of entities subject to the state's jurisdiction that would discharge waste that may affect groundwater quality or that may discharge waste in a diffused manner (e.g., through erosion from soil disturbance). WDRs specify terms and conditions that must be followed during the implementation and operation of a project.

The RWQCB administers a general WDR/NPDES permit process for low-threat discharges from construction dewatering activities that discharge to surface waters (i.e., removal of accumulated water during excavation). A NOI to discharge must be submitted to the RWQCB before commencement of the activity. The general order contains a set of standard terms and conditions for compliance with discharge prohibitions, specific effluent and receiving water limitations, required solids disposal activities, water quality monitoring protocols, and applicable water quality criteria. When numerous discharge locations are anticipated, the general order allows the applicant to submit a Pollution Prevention, Monitoring, and Reporting Plan that provides for consolidated identification of discharges, monitoring, and reporting procedures. The RWQCB can also issue a waiver to dewatering discharges if the discharge would not enter a water body.

Regulatory Guidance for Quality of Aquatic Sediment

There are no regulatory criteria pertaining to ambient concentrations of chemical constituents in aquatic sediments. However, if a project results in the removal of sediment, the material is subject to federal and state hazardous waste regulations, the RWQCB-designated waste classification program (Central Valley Regional Water Quality Control Board 1989), and applicable waste classification regulations described in CCR Title 22. The California Department of Health Services (DHS) administers the hazardous waste regulations pursuant to CCR Title 22. Title 22 (Division 4, Chapter 30) describes classification protocols, including lists of known compounds and waste testing requirements based on numerical concentration criteria.

For those sediments that are not classified as hazardous, the RWQCB method is used to classify material as "designated," "nonhazardous solid," or "inert." Designated allowable concentrations of total and soluble contaminants are established for the specific water bodies that may be affected through reuse of the material, beneficial uses of those water resources, potential of the waste to impair water quality, and environmental attenuation and leachability of the contaminants from the material. Wastes with contaminant concentrations exceeding the designated levels must be directed to waste management units (i.e., landfills) for disposal as "hazardous" wastes.

The RWQCB administers the reuse of contaminated "nonhazardous" sediment for creation, enhancement, and restoration of wetlands. The wetland reuse criteria were developed in part based on Effects Range–Low (ER-L) and Effects Range–Median (ER-M) criteria originally developed by the National Oceanic and Atmospheric Administration (California Department of Water Resources 1995). The ER-L and ER-M criteria reflect the concentrations below which adverse biological effects may be expected to occur less than 10% of the time and less than 50% of the time, respectively. The RWQCB also considers disposal options with respect to EPA's established preliminary remediation goals (PRGs). PRGs are concentration values that have been

established based on the risks to human health of wastes in soil material, using specific assumptions about receptor exposure. PRGs are guidance values only for acceptable constituent concentrations at industrial and residential sites; they are not legally binding enforcement criteria.

The RWQCB criteria specify allowable uses based on two categories:

- use for wetland noncover where exposure to the aquatic environment would be limited, and
- use for wetland cover or levee construction where sediments would be exposed to the water.

Over the last several years there has been a national effort to revise the criteria for freshwater aquatic sediment quality for general assessments of potential toxicity thresholds (MacDonald and Berger 2000).

Other Regulations for Water Quality Protection

The following other regulations related to water quality conditions are described in other sections of this EIR:

- Clean Water Act, Section 404. Under Section 404, the Corps regulates and issues permits for activities that involve the discharge of dredged or fill materials into "waters of the United States," including wetlands. See Section 5.5, "Terrestrial Biological Resources."
- SWRCB Water Right Decision 1644. Decision 1644 amends several water right permits and licenses and requires other actions to protect fish in the reach of the Yuba River downstream of Englebright Reservoir. See Section 5.4, "Fisheries."
- Section 1600 et seq. of the California Fish and Game Code. All diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake in California that supports wildlife resources is subject to regulation by the California Department of Fish and Game (DFG), pursuant to Sections 1600–1603 of the California Fish and Game Code. See Section 5.5, "Terrestrial Biological Resources."

These regulatory programs typically impose specific measures to reduce water quality impacts on wetlands and aquatic habitat. Local grading and erosion control ordinances may also apply to components of the FRLRP as they relate to soil disturbance in the area. Regulations associated with erosion control are described further in Section 5.2, "Geology and Soils."

HAZARDOUS MATERIALS AND WASTE MANAGEMENT

Inundation of lands in the FRLRP levee setback area under either Alternative 2 or Alternative 3 could result in the exposure of Feather River waters to preexisting hazardous materials or contaminated sites. While pollution or degradation of water quality is covered under the water quality laws and regulations described above, the handling and management of hazardous materials is governed under separate federal, state, and local plans, policies, regulations, and laws.

Federal Plans, Policies, Regulations, and Laws

At the federal level, the principal agency regulating the generation, transport, storage, and disposal of hazardous substances is EPA, under the authority of the Resource Conservation and Recovery Act (RCRA). EPA regulates hazardous substance sites under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA). Applicable federal regulations are outlined in Titles 29, 40, and 49 of the Code of Federal Regulations (CFR).

Hazardous materials and/or wastes potentially present at a site are identified in a Phase I Environmental Site Assessment. The designation of wastes is authorized under California statutes (see below). Phase I Environmental Site Assessments are typically performed before the beginning of any ground-disturbing construction activity to identify potential sources of surface and buried contaminants and provide a report of assessment findings. A variety of different protocols are offered by various technical and professional groups; in general, however, the method most commonly used is described in the American Society for Testing and Materials (ASTM) *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process* (ASTM E1527), last revised in 2005. This document provides clear guidance for use when undertaking a Phase I Environmental Site Assessment but also allows environmental professionals to exercise their judgment and discretion. ASTM has also developed standards to address the special considerations of large tracts (120 acres and greater) of undeveloped rural properties (including managed agriculture); these are described in ASTM *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process for Forestland or Rural Property* (ASTM E2247-02).

State Plans, Policies, Regulations, and Laws

Individual states may implement their own hazardous substance management programs as long as they are consistent with, and at least as strict as, RCRA (see above). EPA must approve state programs implementing the RCRA requirements. In California, the California Environmental Protection Agency (Cal/EPA) and OES establish rules governing the use of hazardous substances. Within Cal/EPA, the Department of Toxic Substances Control (DTSC) has primary responsibility for the generation, transport, and disposal of hazardous substances under the authority of the Hazardous Waste Control Law. DTSC delegates enforcement of this law to local jurisdictions. State regulations applicable to hazardous substances are outlined in CCR Title 26.

As described above, hazardous wastes are defined in California in policies and procedures outlined in CCR Title 22 (Division 4, Chapter 30). Criteria for classification of hazardous wastes include common names of known hazardous materials, and waste-testing protocols for identification for properties such as corrosivity, reactivity, ignitability, toxicity, and constituent concentration. Concentrations are identified through the testing of solid material and potential for leachate production with the Waste Extraction Test methodology (22 CCR Section 66700). Hazardous wastes must be managed appropriately and disposed of in Class 1 designated waste management units unless such containment is otherwise demonstrated to not be necessary.

Regulations implementing the Hazardous Waste Control Law list hazardous chemicals and common substances that may be hazardous; establish criteria for identifying, packaging, and labeling hazardous substances; prescribe management of hazardous substances; establish permit

requirements for treatment, storage, disposal, and transportation of hazardous substances; and identify hazardous substances that cannot be deposited in landfills.

Local Plans, Policies, Regulations, and Ordinances

The Yuba County Office of Emergency Services is the local agency responsible for enforcing a variety of requirements related to hazardous materials, waste, safety, noise, and other related concerns. It is the mission of the Office of Emergency Services to coordinate disaster activities before, during, and after catastrophic emergencies affecting the citizens of Yuba County. The Office of Emergency Services provides planning, training, and coordination to Yuba County departments and allied agencies throughout the county.

It is also the mission of the Office of Emergency Services to manage Yuba County's Hazardous Materials and Hazardous Waste programs. These state-mandated programs come under a single program identified by the State of California as the Certified Unified Program Agency. This program consists of six basic hazardous materials programs:

- Underground Storage Tanks,
- Hazardous Wastes,
- Hazardous Material Inventory and Reporting,
- Aboveground Storage Tanks,
- Risk Management Plans, and
- Article 80 of the Uniform Fire Code.

5.3.2 ENVIRONMENTAL SETTING

SOURCES OF INFORMATION

The following are the primary sources of information that were used to describe water resources and river geomorphology:

- *Draft Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project* (Yuba County Water Agency 2003a);
- *Land Acquisition and Management Plan for the Feather-Bear Rivers Levee Setback Project* (Yuba County Water Agency 2004);
- *Yuba County General Plan Background Report* (Yuba County 1994);
- Appendix I, "Hydraulic Analyses," of the *Report on Feasibility of RD 784 Supplemental Flood Control Improvements of the Yuba-Feather Supplemental Flood Control Project* (Yuba County Water Agency and Three Rivers Levee Improvement Authority 2004);
- Appendix A, "Hydrology," of YCWA's report on feasibility of the Y-FSFCP (Yuba County Water Agency 2002a);
- Appendix B, "Flood Operations," of YCWA's report on feasibility of the Y-FSFCP (Yuba County Water Agency 2002b);

- *Hydraulic and Hydrologic Analysis of the Three Rivers Levee Improvement Authority's Phase IV Project—Feather River Levee Repair Project* (MBK Engineers 2006) (Appendix B); and
- *Geomorphic Assessment of Project Alternatives for Feather River Levee Improvements Between the Bear and Yuba Rivers* (Philip Williams & Associates, Ltd. 2006) (Appendix C).

Water quality information was obtained primarily from available special study reports, including reports from the National Water Quality Assessment (NAWQA) program (U.S. Geological Survey 2000) and the Sacramento River Watershed Program (Larry Walker Associates 2001).

HYDROLOGY AND FLOOD CONTROL

Primary Drainages

The RD 784 area of Yuba County is bounded by the Yuba River on the north, the Feather River on the west, the Bear River on the south, and the Western Pacific Interceptor Canal (WPIC) on the east. The Yuba River is a tributary to the Feather River, and the WPIC connects with the Bear River upstream of the confluence with the Feather River. These drainages are briefly described below, followed by a summary of seasonal flows in the Yuba and Feather Rivers.

Yuba River

The Yuba River drains the western slope of the Sierra Nevada and flows generally southwesterly to its confluence with the Feather River at Marysville (see Figure 2-1, "Regional Setting," in Chapter 2, "Introduction"). The main stem of the Yuba River forms at the juncture of the Middle and North Yuba Rivers just south of New Bullards Bar Reservoir and is joined by the South Yuba River just a few miles downstream near Bridgeport in Nevada County, approximately 1 mile east of Yuba County. The North Yuba River above New Bullards Bar Dam drains approximately 489 square miles. Large portions of the Yuba River drainage (Middle and South Forks) are largely unregulated with respect to flood flows. The main stem of the Yuba River in the Marysville vicinity drains approximately 1,390 square miles.

Feather River

The Feather River and its main tributaries are shown in Figure 2-1 in Chapter 2. The Feather River drains an area of approximately 5,500 square miles at its confluence with the Bear River and 3,611 square miles above Oroville Dam in Butte and Plumas Counties. Between Oroville and Marysville, the Feather River drains an area of 369 square miles, flowing southerly through relatively flat or gently rolling terrain for 39 miles. North and South Honcut Creeks are principal tributaries to the Feather River between Marysville and Oroville and drain about 78 square miles of lower foothill and valley areas east of the Feather River. Jack and Simmerly Sloughs, also tributaries to the Feather River, are bordered by levees in places to confine them to their channels during flood events. The sloughs drain approximately 55 square miles north of Marysville between the left (east) bank levee of the Feather River and the right (north) bank levee of the Yuba River. Most of the area drained by the sloughs is rice-growing land that is seasonally flooded.

Bear River

The headwaters of the Bear River are in the vicinity of Emigrant Gap and Lake Spaulding. The Bear River flows generally southwesterly to a point approximately 8 miles north of Auburn, where it turns more westward to its confluence with the Feather River in the vicinity of Nicolaus. Elevations within the Bear River basin range from about 125 feet above mean sea level (msl) to more than 5,700 feet msl. Major tributaries to the Bear River are Greenhorn, Wolf, Rock, and Dry Creeks. The entire drainage of the Bear River is approximately 550 square miles (Yuba County Water Agency 2002a). Figure 2-1 in Chapter 2 shows the middle and lower reaches of the Bear River.

Major importation of water to the Bear River watershed occurs near its headwaters. Some irrigation spill and ditch seepage enters from the ridge between the South Yuba and Bear Rivers. Exports from the Bear River watershed are made through the conveyance facilities of Nevada Irrigation District and Pacific Gas and Electric Company. These diversions include nearly all the imported water and some of the natural flow. The diverted water is used for irrigation, power generation, and domestic supply in the Auburn area. The net effect of the upstream uses, exports, and imports in the Yuba and Bear River basins has been to deplete the streamflow at the base of the foothills. In recent years, the average amount diverted has been more than 44,000 acre-feet (af) seasonally. This amount primarily affects the Yuba River at Smartville; the average depletion of the Bear River above Wheatland is relatively minor because of the imports of water farther upstream from the Yuba River basin.

Western Pacific Interceptor Canal

The WPIC was constructed as part of the SRFCP. The WPIC runs north-south on the east side of State Route (SR) 70 from approximately 2 miles south of the SR 70/SR 65 interchange to the Bear River near Rio Oso. Flows in the WPIC are derived from Reeds and Hutchinson Creeks and Best Slough. Agricultural runoff presumably also contributes flows to the WPIC. The WPIC also receives backwater from the Bear River.

Feather and Yuba River Flows

The Feather and Yuba Rivers have similar seasonal distributions of flows. As shown in Table 5.3-1, “Average Mean, Maximum, and Minimum Monthly Flows (cfs) on the Feather and Yuba Rivers,” the mean monthly flows are greatest in winter and early spring (January through March) and are at a minimum in late summer and early fall (July through October). The effects of reservoir storage capacity on flows are noticeable in extreme water years. The Feather River has nearly uniform flows in different year types because of the very large storage capacity of Lake Oroville; however, Yuba River flows are greatly reduced in very dry years because of the more limited carryover storage capacity of Bullards Bar Reservoir. During wet periods, the maximum monthly flow in the Feather River is often less than the maximum flow on the Yuba River, even though the Feather River watershed is more than three times the size of the Yuba River watershed, because the large storage volume of Lake Oroville can more effectively attenuate high flows.

Table 5.3-1
Average Mean, Maximum, and Minimum Monthly Flows (cfs) on the Feather and Yuba Rivers

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Feather River at Oroville, USGS Gauge 11407000 (1969–2005)												
Mean	571	734	1,120	2,760	2,090	1,890	949	747	531	538	526	518
Maximum	1,580	3,310	7,730	26,750	25,180	18,870	7,060	7,920	1,000	770	800	660
Minimum	400	400	390	400	400	400	400	390	410	400	390	390
Yuba River near Marysville, USGS Gauge 11421000 (1970–2005)												
Mean	1,070	1,320	2,320	4,090	4,330	4,280	2,880	2,530	1,970	1,310	1,440	1,240
Maximum	2,370	4,480	11,430	26,180	20,970	15,100	14,280	9,720	8,630	3,740	2,830	2,900
Minimum	130	180	370	230	210	190	170	170	150	90	70	90

Notes: cfs = cubic feet per second; USGS = U.S. Geological Survey
Source: U.S. Geological Survey 2006

Major Reservoirs

The major reservoirs with a role in flood control operations for the project area are Lake Oroville on the Feather River and New Bullards Bar Reservoir on the North Yuba River (see Figure 2-1 in Chapter 2). Other reservoirs in the Yuba-Feather River watershed include Lake Almanor on the North Fork of the Feather River, Englebright Reservoir on the Yuba River, and Merle Collins and Slate Creek Reservoirs. Most of these reservoirs were created for the primary purpose of hydroelectric power generation, although they often fulfill several purposes, including flood control, water supply, and recreation.

Lake Oroville, owned and operated by the State Water Project, is the primary flood control feature on the Feather River. Lake Oroville captures runoff from a 3,611-square-mile watershed. At elevation 900 feet msl, the reservoir provides a full pool of 3,538,000 af of storage, up to 750,000 af of which is required for flood control. The reservoir inundates 15,800 acres at this elevation. Power is generated at the Hyatt Pumping-Generating Plant and Thermalito facilities downstream of Oroville Dam. Thermalito Afterbay has 45,000 af of storage space for water deliveries to local districts and for regulation of power releases from Oroville Dam and a maximum outflow of 17,000 cubic feet per second (cfs). Flood control operations for the reservoir are described in detail in the Y-FSFCP DEIR (Yuba County Water Agency 2003a).

New Bullards Bar Reservoir is owned and operated by YCWA and is the principal flood control reservoir on the Yuba River system. The reservoir is on the North Yuba River just above its confluence with the Middle Yuba River. New Bullards Bar Reservoir drains a watershed of 489 square miles, which is only 37% of the total Yuba River drainage area. At elevation 1,956 feet msl, the reservoir provides a full pool of 960,000 af of storage, up to 170,000 af of which is required for flood control. The reservoir inundates 4,790 acres at this elevation. Power is generated at the New Colgate Powerhouse, which has a maximum outflow of 3,500 cfs. Flood control operations for the reservoir are described in detail in the Y-FSFCP DEIR (Yuba County Water Agency 2003a).

Existing Flood Control Conditions for RD 784

Lake Oroville and New Bullards Bar Reservoir, as well as an extensive system of levees, provide flood control along the Feather and Yuba Rivers. Release volumes from Lake Oroville and New Bullards Bar Reservoir depend on the combined flows of the Feather and Yuba Rivers downstream of Marysville.

Design Flows

As described previously, the SRFCP includes Corps-specified design capacities for channels in the project area and flood control operation rules for Lake Oroville and New Bullards Bar Reservoir, including design target flows for the Feather and Yuba Rivers. The maximum design target flows for the levee system that protects RD 784 are shown in Table 5.3-2, along with the design-flow frequency, expressed in terms of the annual exceedance probability (AEP). The AEP is the probability that a given flow will be exceeded in any year; for example, an AEP of 1 in 125 has a 1-in-125, or 0.8%, probability of being exceeded in any year. Lake Oroville and New Bullards Bar Reservoir are operated to maintain flood flows at or below the flows shown in Table 5.3-2. The reservoirs fill and lose flood management capability at about the 1-in-150 AEP flood.

Table 5.3-2
Design Target Flows for Various Levees in the Project Vicinity

River	Design Flow	Design-Flow Frequency (AEP)
Yuba River	120,000–180,000 cfs depending on Feather River flow	Less frequent than 1 in 125
Feather River between Yuba River and Bear River	300,000 cfs	Less frequent than 1 in 125
Bear River at mouth	40,000 cfs	Less frequent than 1 in 50
WPIC	Backwater from Bear River	NA
Feather River below Bear River	320,000 cfs	Less frequent than 1 in 100

Notes: AEP = annual exceedance probability; cfs = cubic feet per second; NA = not applicable; WPIC = Western Pacific Interceptor Canal
Source: Trieu, pers. comm., 2006

Levee Conditions

Feather River Left (East) Bank Levee. The Feather River left bank levee from the confluence with the Yuba River to the confluence with the Bear River was initially constructed in the early 1900s. The levee failed frequently before the 1930s. To create a safer condition, the Corps set back a substantial portion of the levee and strengthened some reaches. This work was completed about 1940. Additional strengthening of the levee took place in the 1960s because significant seepage was evident during the 1955 flood. Additional weak areas in the levee were identified following the 1986 flood. In 1997, before these weak areas could be completely repaired, the levee failed across from Country Club Avenue to the north of Star Bend, in what is now FRLRP Segment 2.

The Corps has performed additional levee strengthening since the 1997 flood. The final contract for Corps levee strengthening along the Feather River levee at Site 7 just upstream of the Bear River (within what is now FRLRP Segment 1) was completed in 2004. Subsequent study has indicated underseepage, through-seepage, and erosion problems with this levee segment, resulting in the need for the FRLRP to achieve desired levels of flood protection (see Chapter 2, "Introduction," and Chapter 3, "Project Purpose, need, and Development," for more information). The levee downstream of Pump Station No. 2 (in and immediately south of project Segment 1) has also had underseepage problems that inhibit its flood protection capability. However, the setback levee at the confluence with the Bear River, being completed in 2006 under the Feather-Bear Rivers Levee Setback Project (F-BRLSP) (TRLIA's Phase 2 work), will improve hydrologic conditions in this reach such that desired flood protection levels are achieved.

Yuba River Left (South) Bank Levee. The left bank levee of the Yuba River was constructed and reconstructed from the early 1900s through 1964. The last levee segment strengthened by the Corps in 1964 was from Project Levee Mile (PLM) 1.0 to about PLM 3.0. In 1986, when the water surface was approximately 8 feet below the top of the levee, the Yuba River left bank levee failed in the reach between Simpson Lane Bridge and the SR 70 bridge approximately 1 mile upstream of the confluence with the Feather River. After the 1986 flood, the Corps strengthened the levee both in the vicinity of the levee break and upstream of the break area. A weak area in the levee was subsequently identified just upstream of the SR 70 bridge. A 2,200-foot-long, 50-foot-deep slurry wall was completed in this area in 2004, and a seepage berm was constructed in 2005 to address foundation and levee stability issues. Subsequent study has identified additional weak areas in the Yuba River left bank levee, precipitating the need for further levee strengthening projects that are currently under way, as well as for the levee strengthening element of the FRLRP from Yuba River PLM 0.0 to PLM 0.3.

Groundwater

General Conditions

The principal aquifers in the valley area of Yuba County are composed of continental sediments of Pleistocene and Recent age. These aquifers consist of as much as 100 feet of Pleistocene sands and gravels overlain by as much as 125 feet of Recent alluvial fan, floodplain, and stream channel deposits. The pre-Eocene formations in the valley area of Yuba County have relatively low permeability and are moderate water producers (Yuba County 1994). Natural groundwater levels can vary substantially from year to year and seasonally. Groundwater levels are generally higher in winter and spring.

A general assessment of the hydrogeology serves to characterize areas as either groundwater recharge or groundwater discharge areas. Groundwater discharge occurs in areas that are lower in elevation than the water surface in flowing streams. Groundwater recharge occurs as infiltration from precipitation and surface water in areas higher in elevation than streams. The valley areas along the Feather and Yuba Rivers generally serve as groundwater recharge areas.

Groundwater Conditions in the Project Area

The project area is in the southern portion of the Sacramento River hydrologic region and is located within the South Yuba subbasin (California Department of Water Resources 2003). In recent years, under relatively normal conditions, groundwater elevations in the South Yuba subbasin have ranged from about 150 feet in the northwest region of the basin to about 30 feet in the southwest corner near the confluence of the Feather and Bear Rivers (California Department of Water Resources 2003).

The proposed levee setback areas in project Segment 2, considered under Alternatives 2 and 3, are expected to have relatively shallow groundwater conditions (groundwater table generally less than 20 feet deep), as the nearby perennial flows of the Feather and Yuba Rivers provide ready recharge. Based on available topographic maps, the water surface elevation in the Feather River channel is estimated to range from approximately 34 feet at the north end of the project area to 20 feet at the south end (Yuba County Water Agency 2003b). However, flow levels in the channel can vary considerably depending on the volume of natural flow and releases from upstream dams.

Depending on local variations in the horizontal hydraulic continuity of the soil, groundwater levels near the river's edge and along the existing levees may be similar to river surface flow elevations, with a slight hydraulic gradient downward away from the rivers (and other sources of recharge, such as agricultural drainage). However, groundwater levels also vary seasonally with precipitation and runoff in this area and may rise closer to the ground surface during wet years. In addition, groundwater levels are influenced locally by pumping as the groundwater is withdrawn regularly during spring and summer for irrigation, and throughout the year for general use by most of the local growers. (Yuba County Water Agency 2003b.)

In a limited number of exploration borings performed in recent years in relation to the Feather River levee setback proposed under the Y-FSFCP, groundwater has been found to be 6–16 feet below the natural ground surface along the Feather River levee. Test borings along the proposed Above Star Bend (ASB) setback alignment in project Segment 2, performed previously as part of the effort evaluated in the Y-FSFCP DEIR, indicated that the elevation of the groundwater table varied from 19.9 feet to 30.8 feet along the length of the alignment. In general, groundwater elevations appeared to drop slightly from north to south (Yuba County Water Agency 2003b). Several agricultural irrigation wells were observed in the vicinity of the test borings; the use and influence of these wells on the local groundwater regime is unknown.

Local Drainage

Project Segment 1

Surface drainage in the vicinity of project Segment 1 is collected into ditches that ultimately drain into Clark Slough, an agricultural drainage canal maintained by RD 784 that meanders toward the south (Figure 5.3-1, "Drainage Features in the Vicinity of Project Segment 1)." Water in Clark Slough is directed toward a sump adjacent to the Feather River levee. Water collected in the sump can either flow by gravity into off-channel areas of the Feather River through two

culverts under the existing levee or be pumped over the levee through RD 784's Pump Station No. 2 (Yuba County Water Agency 2003a).

Water pumped from Pump Station No. 2 collects in Lake of the Woods, a topographic low on the river side of the existing levee, which empties into the channel of the Bear River (Yuba County Water Agency 2003a).

Project Segment 2

Drainage in the northern half of project Segment 2 is generally directed southwest, angling toward the existing Feather River levee. In much of the area west of the proposed setback levee alignments in Segment 2, drainage water is collected in Lateral 6 and conveyed to Messick Lake and several unnamed shallow water bodies, as shown in Figure 5.3-2, "Drainage Features in the Vicinity of Project Segment 2." Lateral 7/8 crosses the proposed setback levee alignment in a buried culvert at Anderson Avenue and empties from the east into Lateral 6 north of these water bodies. The Plumas Lake Canal, which collects drainage from several ditches east of the proposed setback levee alignments, crosses the alignments approximately 1,900 feet north of the southern end of the segment (in an area where the ASB and intermediate setback levee alignments coincide) and empties into a pond (Figure 5.3-2). Water from Messick Lake and the pond is pumped out over the existing levee into the Feather River floodway at RD 784's Pump Station No. 3.

Project Segment 3

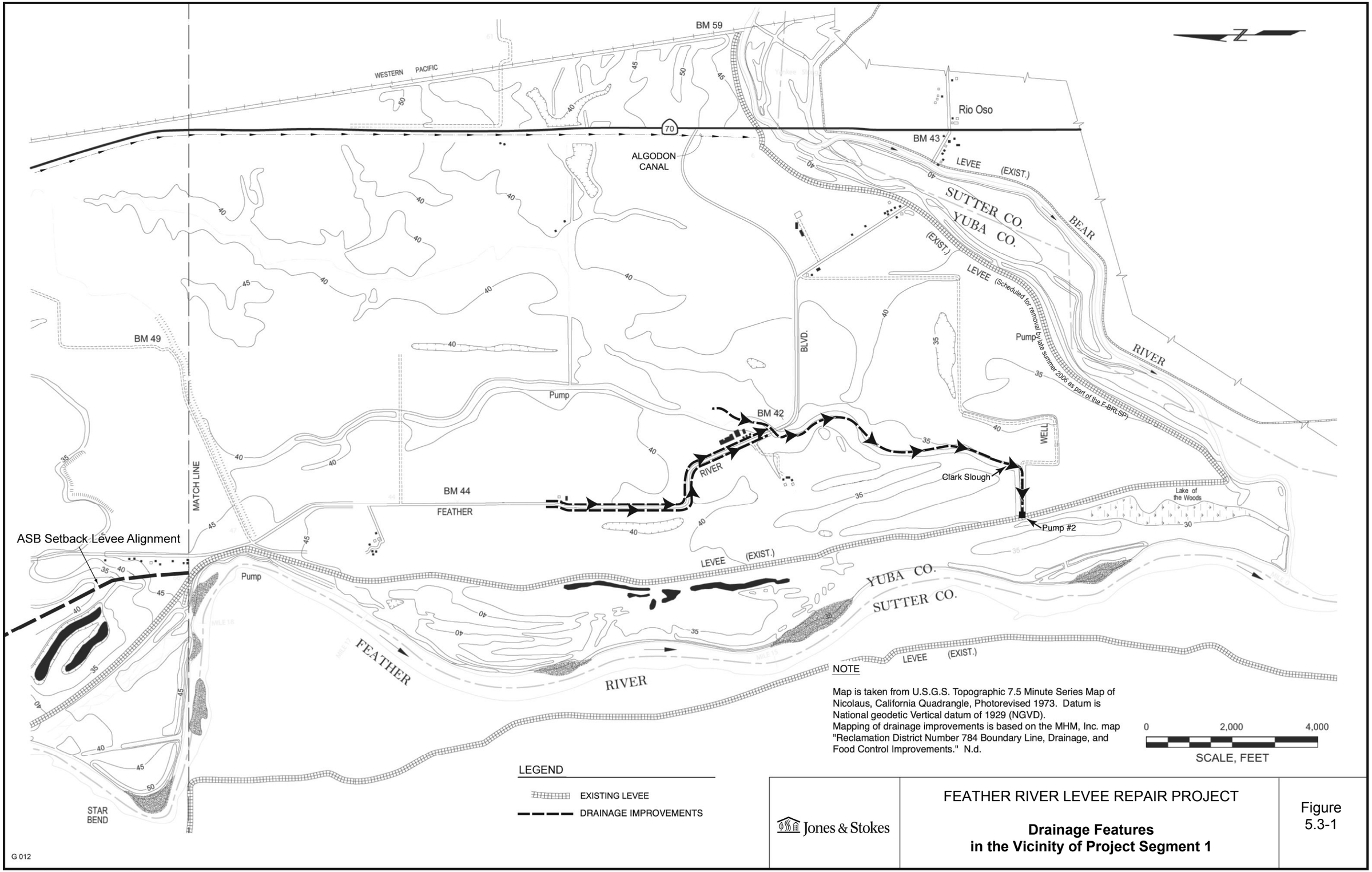
Surface runoff from the primarily urban northern reach of Segment 3 is conveyed by Lateral 15 to Pump Station No. 9, where it is pumped over the levee to the Feather River (Figure 5.3-3, "Drainage Features in the Vicinity of Project Segment 3"). Surface runoff from the primarily agricultural southern reach of Segment 3 is conveyed by the Algodon Canal to Pump Station No. 6 (in the southern portion of the RD 784 area), where it is discharged to the Bear River. RD 784 plans to construct a new pump station on Ella Road to divert the runoff from the area encompassing the southern portion of Segment 3, along with runoff from planned development to the east, directly to the Feather River. The schedule for construction of this pump station is not known at this time.

WATER QUALITY

Surface Water Quality

Designated beneficial uses of the Yuba River from Englebright Reservoir to the Feather River are:

- agricultural supply,
- contact and noncontact recreation,
- coldwater and warmwater fish habitat,
- fish migration and spawning,
- wildlife habitat, and
- power generation.

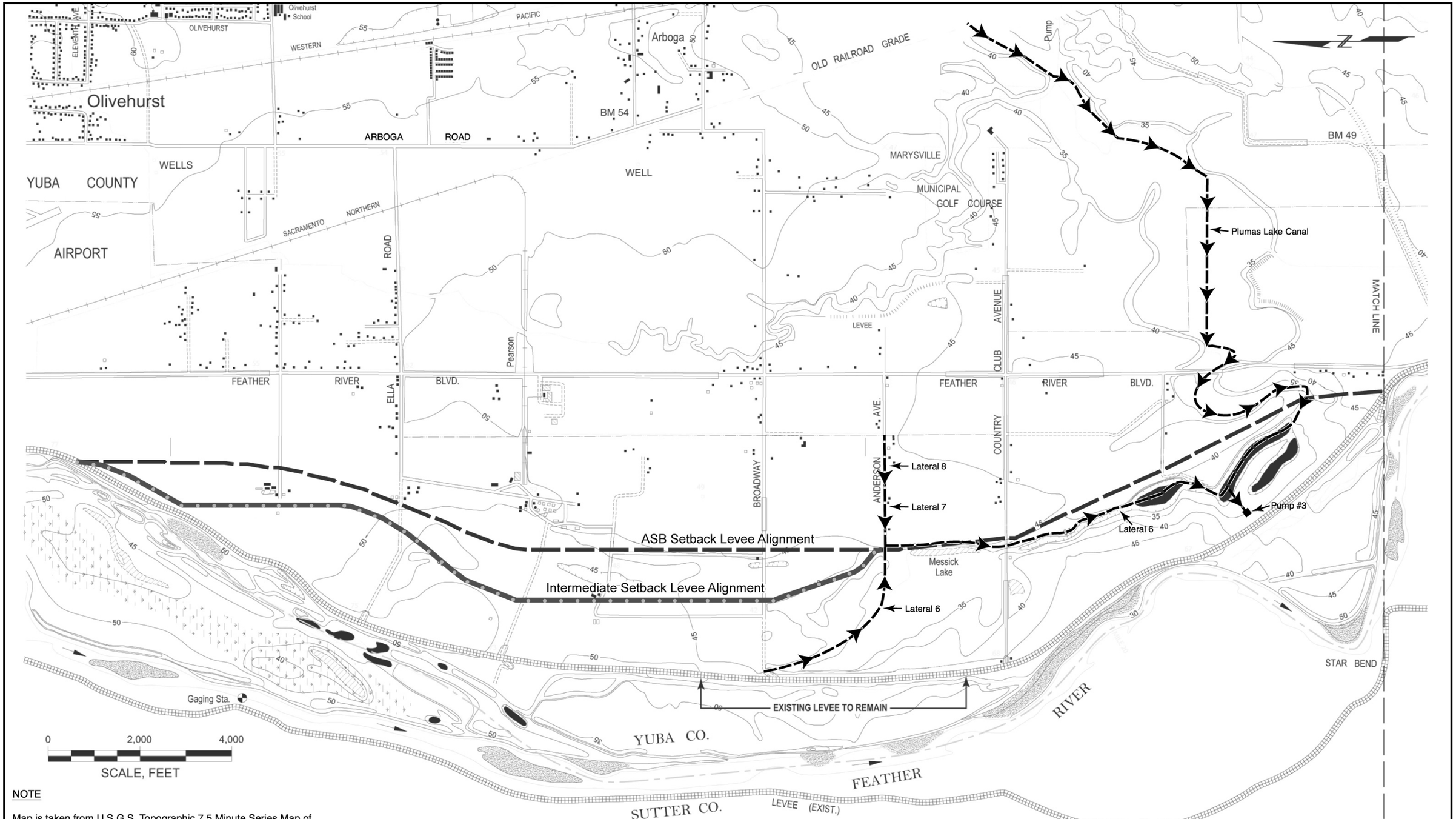


FEATHER RIVER LEVEE REPAIR PROJECT

Drainage Features in the Vicinity of Project Segment 1

Figure 5.3-1

Source: Adapted from Jones & Stokes 2002



NOTE

Map is taken from U.S.G.S. Topographic 7.5 Minute Series Map of Olivehurst, California Quadrangle, Photorevised 1973. Datum is National geodetic Vertical datum of 1929 (NGVD).
Mapping of drainage improvements is based on the MHM, Inc. map "Reclamation District Number 784 Boundary Line, Drainage, and Food Control Improvements." N.d.

LEGEND

EXISTING LEVEE
DRAINAGE IMPROVEMENTS

G 013

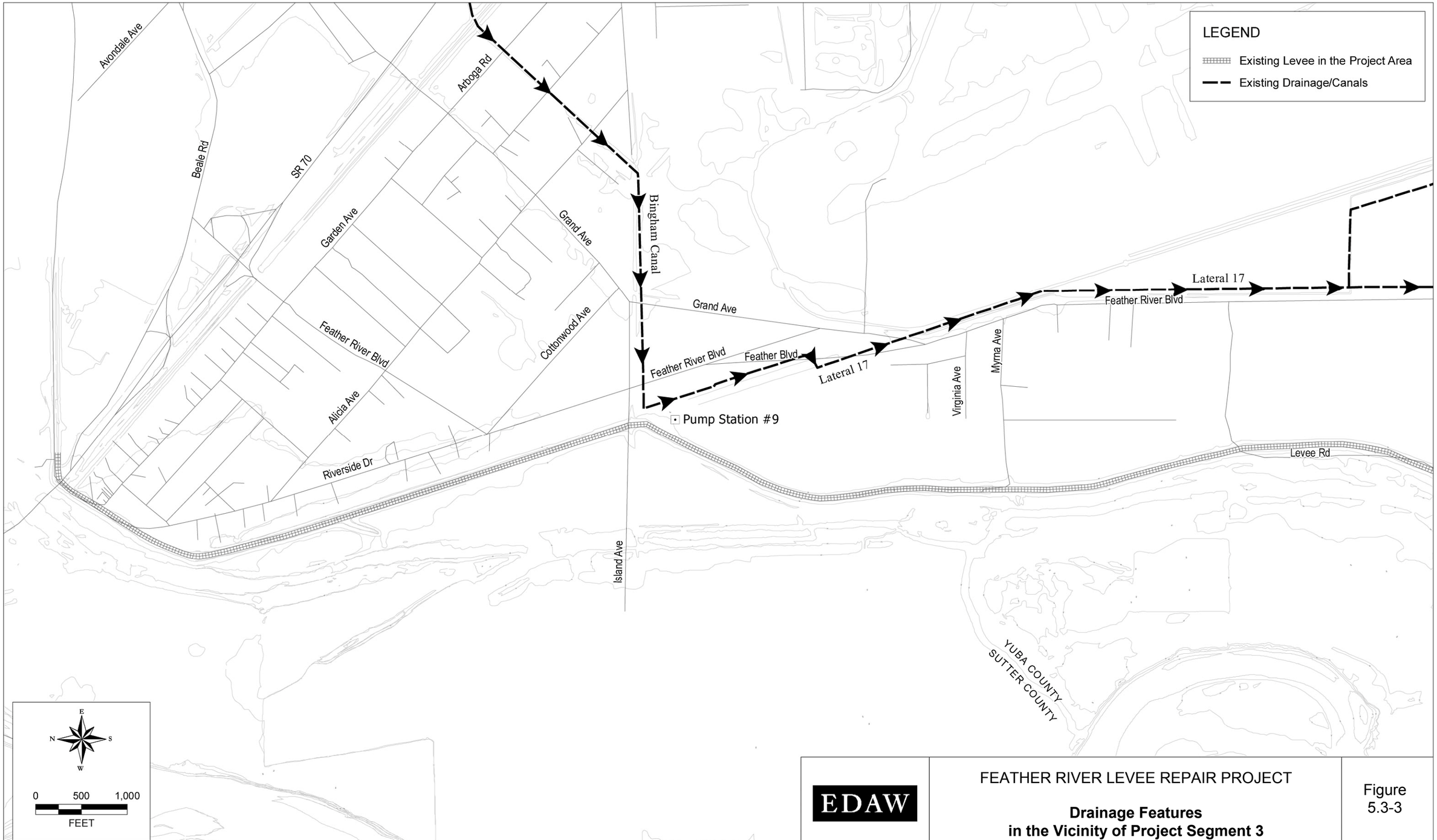
Jones & Stokes

FEATHER RIVER LEVEE REPAIR PROJECT

Drainage Features in the Vicinity of Project Segment 2

Figure 5.3-2

Source: Adapted from Jones & Stokes 2002



EDAW

FEATHER RIVER LEVEE REPAIR PROJECT

Drainage Features in the Vicinity of Project Segment 3

Figure 5.3-3

Sources: GEI Consultants, Inc. 2006; CaSIL 1998

Designated beneficial uses of the Feather River are:

- agricultural supply,
- municipal supply for Yuba City,
- contact and noncontact recreation,
- coldwater and warmwater fish habitat,
- fish migration and spawning, and
- wildlife habitat.

The Feather River is included on the 303(d) list of impaired waters for diazinon, Group A pesticides, mercury, and unknown toxicity. Agriculture and urban runoff are the main sources for diazinon and Group A pesticides, resource extraction is the main source for mercury, and the source is unknown for unknown toxicity. The Central Valley RWQCB has TMDL priorities of high, low, medium, and low for the respective stressors (State Water Resources Control Board 2002).

The U.S. Geological Survey (USGS) completed an evaluation of water quality conditions of the Feather and Yuba Rivers in the project area as a component of an overall analysis of conditions in the Sacramento River watershed (U.S. Geological Survey 2000). The evaluation indicated that the Yuba River generally has excellent water quality that is very low in contaminants. However, historical gold mining activities have left a legacy of mercury contamination (because mercury was used extensively for ore extraction), and the Yuba River is considered a major source of mercury loading in the Sacramento River watershed. Fish caught in Englebright Reservoir are known to have elevated tissue mercury levels (U.S. Geological Survey 2000).

Table 5.3-3, “Summary of Conventional Water Quality Constituents in the Feather and Yuba Rivers,” shows a summary of average concentrations from monthly water samples for conventional physical and inorganic chemical constituents measured in the Feather River at Nicolaus and the Yuba River at Marysville from February 1996 through April 1998 (U.S. Geological Survey 2000). In general, the data indicate that both rivers are low in TDS as indicated by measurements of EC, total hardness, and specific cations and anions. The water has neutral pH, moderate alkalinity, and adequate DO levels for aquatic organisms. The water from both rivers is also generally low in nutrients (nitrogen and phosphorus) that can cause growth of nuisance algae and aquatic vascular plants. Trace metal content is low in both rivers. Although mercury is routinely detected in both rivers, the concentrations have not exceeded ambient CTR criteria. Pesticides have been detected in the Feather River more frequently than in the Yuba River. With the exception of the drinking-water standard for carbofuran, there are no applicable regulatory criteria established for the pesticides that have been detected. DFG has established guidance values for aquatic-life chronic (i.e., 4-day-average) criteria applicable to the organophosphate pesticides diazinon and chlorpyrifos. The DFG guidance values and other reference dose values for aquatic life or human health hazards that have been established for many pesticides are generally indicative of the lowest concentrations at which toxic effects have been detected. The average concentration of diazinon in the Feather River exceeds the DFG guidance level of 50 nanograms per liter (ng/L) (California Department of Fish and Game 2000). Pesticide levels in the Feather River are presumably related to the influence of the extensive agricultural and urban activities (Oroville, Marysville, and Yuba City) occurring in the surrounding watershed.

Table 5.3-3
Summary of Conventional Water Quality Constituents in the Feather and Yuba Rivers

Constituent	Water Quality Objective	Feather River at Nicolaus	Yuba River at Marysville
Conventional Physical and Chemical Constituents			
Temperature	<2.5°F [a]	15.2°C	12.2°C
Flow (cfs)		359	125
EC (µS/cm)		84	72
DO (mg/L)	7.0 [b]	10.5	11.4
DO Saturation (%)	85 [b]	104	105
pH (standard units)	6.5 to 8.5 [c]	7.7	7.5
Alkalinity (mg/L $CaCO_3$)		34.2	28.4
Total Hardness (mg/L $CaCO_3$)		34.8	31.4
Suspended Sediment (mg/L)	narrative [d]	36.5	30.0
Calcium (mg/L)		8.2	7.9
Magnesium (mg/L)		3.5	2.8
Sodium (mg/L)		3.3	2.2
Potassium (mg/L)		0.9	0.5
Chloride (mg/L)	500 [e]	1.9	1.1
Sulfate (mg/L)	500 [e]	3.2	4.2
Silica (mg/L)		12.8	12.1
NO_2+NO_3 (mg/L N)	NO_3<10 [f]	0.17	0.08
Total Phosphorus (mg/L)		0.03	0.03
Trace Metals			
Arsenic (µg/L)	50 [g]	1.0	1.0
Chromium (µg/L)	180 [g]	<MRL	<MRL
Copper (µg/L)	5.1 [g]	1.3	1.5
Mercury (µg/L)	0.050 [h]	0.0085	0.0069
Nickel (µg/L)	52 [g]	1.0	1.2
Zinc (µg/L)	120 [g]	1.6	2.3
Organic Pesticides			
Molinate (ng/L)	13,000 [i]	373	<60
Simazine (ng/L)	3,400 [j]	88.9	<22
Carbofuran (ng/L)	40,000 [e], 500 [i]	38.5	<31
Diazinon (ng/L)	51 [k]	98	<28
Carbaryl (ng/L)	700 [j]	142	<41
Thiobencarb (ng/L)	1,000 [a]	167	<38
Chlorpyrifos (ng/L)	14 [k]	<25	<25
Methidathion (ng/L)		57	<38

Notes: $CaCo_3$ = calcium carbonate; µg/L = micrograms per liter; µS/cm = microsiemens per centimeter; mg/L = milligrams per liter; MRL = method reporting limit; ng/L = nanograms per liter; NO_2 = nitrogen dioxide; NO_3 = nitrogen trioxide

[a] RWQCB Basin Plan water quality objective for allowable change from controllable factors
[b] RWQCB Basin Plan water quality objective
[c] RWQCB Basin Plan water quality objective; <0.5 allowable change from controllable factors
[d] RWQCB Basin Plan narrative objective: water shall not contain constituent in concentrations that would cause nuisance or adversely affect beneficial uses
[e] Secondary drinking water maximum contaminant level (MCL)
[f] Primary drinking water maximum contaminant level (MCL)
[g] California Toxics Rule aquatic life criteria for 4-day average dissolved concentration
[h] California Toxics Rule human health maximum criteria total recoverable concentration
[i] California DFG hazard assessment value
[j] U.S. EPA Integrated Risk Information System reference dose for drinking water quality
[k] California DFG aquatic life guidance value for 4-day average concentration

Source: Constituent measurements from U.S. Geological Survey 2000

The Feather and Yuba Rivers have also been evaluated since 1998 as part of DWR's Sacramento River Watershed Program (Larry Walker Associates 2001). Water quality data have generally supported the earlier findings of the USGS NAWQA program data. In addition, toxicity data from the DWR program have indicated that Feather River water has occasionally been toxic to test organisms. Bulk sediment toxicity has been identified in one of four samples collected in the Feather River at Nicolaus since 1998. No toxicity has been detected from sediment toxicity tests conducted on Yuba River sediments.

Table 5.3-4, "Concentrations of Trace Metals Detected in Feather River and Yuba River Sediment," shows NAWQA sediment concentrations of trace metals from a single sample in 1997. The results indicate that concentrations of trace metals in both the Feather and Yuba Rivers are generally low relative to RWQCB criteria for reuse in wetlands. The concentrations of chromium and nickel in the Feather River were slightly higher than the RWQCB guidance values for wetland cover use; the Yuba River copper value was also higher than its respective wetland cover criterion. Concentrations of arsenic, chromium, copper, mercury, and zinc at both sites exceeded the most recent guidance criteria for general toxic effect thresholds (MacDonald and Berger 2000).

Table 5.3-4
Concentrations of Trace Metals Detected in Feather and Yuba River Sediment

Constituent	Feather River [a]	Yuba River [a]	Sediment Criteria for Wetlands Creation and Levee Restoration [b]	
			Wetlands Creation Noncover	Wetlands Creation Cover and Levee Restoration
Arsenic (mg/kg)	11	21	33–85	<33
Barium (mg/kg)	510	600		
Cadmium (mg/kg)	0.3	0.4	5–9	<5
Chromium (mg/kg)	280	210	220–300	<220
Copper (mg/kg)	70	95	90–390	<90
Lead (mg/kg)	19	16	50–110	<50
Mercury (mg/kg)	0.19	0.29	0.35–1.3	<0.35
Nickel (mg/kg)	160	98	140–200	<140
Selenium (mg/kg)	0.3	0.6	0.7–1.4	<0.7
Silver (mg/kg)	0.2	0.2	1.0–2.2	<1.0
Zinc (mg/kg)	110	98	160–270	<160

Note: mg/kg = milligrams per kilogram
[a] Source: U.S. Geological Survey 2000
[b] Source: San Francisco Bay RWQCB disposal option sediment screening criteria. Criteria specify the allowable use based on two categories: use for wetland noncover where exposure to the aquatic environment would be limited and wetland cover or levee construction where sediments would be exposed to the water.

Groundwater Quality

Groundwater resources in California are assumed to support drinking-water quality beneficial uses, unless proven otherwise. In general, the chemistry of groundwater in the Sacramento Valley is greatly influenced by the chemistry of recharge water. The volcanic and metamorphic

rock types are reflected in the magnesium bicarbonate and magnesium calcium-sodium bicarbonate water quality found in Yuba and Butte Counties (Boles, pers. comm., 2001). Concentrations show an increase in TDS resulting from dissolution of minerals that generally matches the predominant groundwater flow direction from northeast to southwest.

Groundwater provides most water supplies for the Marysville, Linda, and Olivehurst areas and for rural properties in the project vicinity. In general, the mineral content of the groundwater underlying south Yuba County is suitable for domestic and agricultural uses. The City of Olivehurst has 10 wells and Linda has five wells that draw water from 300–600 feet below ground surface (Foothill Associates 1999). Water quality samples routinely collected from these wells indicate that all regulated inorganic and organic pollutants are below the applicable drinking-water standards. However, groundwater in the area contains relatively high levels of iron, manganese, and gases (i.e., methane and hydrogen sulfide), which occasionally cause taste and odor problems but are not a threat to human health. The groundwater north of the Yuba River and in Butte County is generally of very good quality with a low TDS range of 250–300 milligrams per liter (Boles, pers. comm., 2001).

Hazardous Materials

No formal hazardous materials surveys have been conducted associated with the FRLRP. Phase I ESAs are currently in progress for Segments 1 and 3 and a screening-level assessment is being prepared for Segment 2. Preliminary surveys conducted in support of the Y-FSFCP EIR identified three small waste dump sites containing fruit waste and miscellaneous solid debris in the ASB levee setback area. Independent computer-generated database searches were conducted in support of the F-BRLSP EIR to identify any existing hazardous materials within the project area and immediate vicinity (Environmental Data Resources Inc. 2004a, 2004b). These searches encompassed a portion of the FRLRP Segment 1 area. The databases used are based on records kept by federal, state, and local agencies that are responsible for recording incidents of contamination and permitting transfer, storage, or disposal facilities that handle hazardous materials. The database searches revealed no hazardous materials within the sites considered in the F-BRLSP EIR. However, the searches did identify the presence of 24 hazardous materials sites that were located within a 1-mile radius from the boundaries of the project site. None of the sites identified during the database search are expected to require removal or cleanup.

Given historical and current land uses in the FRLRP project area, it would not be unusual for concentrated deposition of contaminants to be present in the form of organic litter (e.g., debris piles, orchard slash piles) or hazardous substances (e.g., abandoned vehicles and farm implements; aboveground and underground storage containers for, and residues of, fuel, oil, fertilizers, and pesticides; and material in illegal dumping areas).

GEOMORPHOLOGY

In its pristine condition, the Sacramento Valley was composed of perennial grasslands, riparian woodlands, and extensive marshes. The Sacramento River, Feather River, Bear River, and other primary waterways often would flood in winter and early spring, recharging wetlands and depositing fertile sediments on the floodplain that are now valued for agriculture. River channels

were somewhat migratory, shifting through time. In places along the rivers, natural levees would form to just above flood levels.

Hydraulic mining conducted during much of the latter half of the 19th century washed immense quantities of sediments into Sierra Nevada streams. The effects of hydraulic mining were, and remain, particularly significant for the valley portions of Yuba County, especially in the Marysville vicinity, where the Feather and Yuba Rivers converge. Both of these river basins received huge sediment loads from hydraulic mining at their upper reaches. At the mouth of the Yuba River at the south edge of Marysville (in what is now project Segment 3 of the FRLRP), 70 feet or more of sediment eventually filled the river channel. Upstream of Marysville, entire communities were buried under more than 40 feet of silt and gravel (Hoover et al. 1990).

Levees were constructed along the Feather and Yuba Rivers and their tributaries to prevent the flooding of Marysville and surrounding valley communities. The levees also prevented these communities from becoming buried under the sediments that were washed down from the mountains. To continue to protect Marysville and the surrounding communities, levees were built ever higher to confine the floodwaters to a relatively narrow channel that would promote sediment transport. The SRFCP levees on the Feather and Yuba Rivers were designed to confine flows to a relatively narrow channel that would efficiently convey sediment through the system, reducing the amount of dredging necessary to maintain navigation. As a result, Marysville, Olivehurst, and Linda are now many feet below the floodwater levels of the Feather and Yuba Rivers.

As part of the Corps' Yuba River Basin Investigation (U.S. Army Corps of Engineers and State of California Reclamation Board 1998), sediment transport was evaluated with a numerical model (HEC-6) for very large flood flows (the "400-year" flood). The following were the main conclusions of the study:

- The main phase of channel degradation (downcutting) on the Feather River through the hydraulic mining debris had occurred by the mid-1960s. Further large-scale degradation is unlikely within an engineering time frame (50 years) because the base elevation of the channel is controlled by sedimentation from the Yuba and Bear Rivers.

- The Feather River has cut through the mining debris, but there have not been mass bank failures that could lead to channel migration that could ultimately threaten the levee system.

- The channel is stable because of the sediment supply to the Feather River from the Yuba and Bear Rivers.

- Eventual reduction in sediment delivery from the Yuba and Bear Rivers is likely to promote lateral migration of the Feather River in the future.

In summary, while hydraulic mining debris stored in the Feather, Yuba, and Bear River channels continues to supply sediment to the river system, the channels are expected to remain relatively stable. As sediment supplies decline, the rivers again will adjust to a new equilibrium. Ultimately (hundreds to thousands of years in the future), it is likely that the river channels will cut down to their premining elevations and will begin migrating laterally.

5.3.3 ENVIRONMENTAL IMPACTS

THRESHOLDS OF SIGNIFICANCE

Thresholds for determining the significance of impacts on water resources and river geomorphology (including hazardous materials in relation to effects on water quality) were based on the environmental checklist form in Appendix G of the California Environmental Quality Act Guidelines (State CEQA Guidelines). A project alternative would have a significant impact on water resources and river geomorphology if its construction or operation would:

- violate any water quality standards or waste discharge requirements or otherwise substantially degrade water quality;
- substantially alter the existing drainage pattern of a site or area;
- substantially increase the rate or amount of surface runoff;
- result in increased exposure of persons or private property to flood hazards;
- substantially reduce water supply;
- alter regional or local hydrology, resulting in erosion of the levee system or substantial increases in the mobilization and/or deposition of sediments;
- create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment; or
- be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or environment.

IMPACT ANALYSIS

Modeling of Hydraulic Effects

Hydraulic effects of the ASB setback levee and intermediate setback levee alignments proposed for project Segment 2 (Alternative 2 and Alternative 3, respectively) were evaluated through modeling of a series of floods with different AEP levels in the project vicinity. The methods and results of the modeling are described in Appendix B**.**

For modeling purposes, the “Without Project” condition was the benchmark condition by which all hydraulic impacts were measured for the project alternatives. The “Without Project” condition was represented in the modeling by the existing condition (channel vegetation and geometry, top-of-levee elevations) of the flood control system, except in a few locations along the Bear River and Yankee Slough where data show that the levees are below the 1957 design criteria. At these locations, the “Without Project” condition was represented by the 1957 design profile levee elevation (1957 design water surface + 3 feet of freeboard). In other words, the top-

of-levee elevations that were found to be below design specifications were assumed to be restored to their original specified design elevations. The state and local districts have a requirement to maintain the project design levee grade, and once they become aware of a project deficiency, they must take action to correct that deficiency (see *Standard Operations and Maintenance Manual for the Sacramento River Flood Control Project*, dated May 1955, Section IV, paragraphs 4-02 and 4-04). The state and local districts are aware of these project deficiencies and are expected to restore levees to specified design elevations in the near future (Countryman, pers. comm., 2004).

FRLRP Alternatives 1, 2, and 3 and the "Without Project" condition were evaluated using state-of-the-art hydraulic models and hydrology data obtained from the Corps. The 1-in-100 and 1-in-200 AEP floods were routed through Lake Oroville and New Bullards Bar Reservoir for hypothetical storms centered over either the Feather River or Yuba River watershed. The resultant flows were routed through the flood system down to the location of Verona, on the Sacramento River immediately downstream of the confluence with the Feather River. Water surface profiles were calculated for each flood event and for each alternative. The Shanghai-Yuba centering (i.e., location in the hydrologic model where a storm is focused) provided the highest water surface elevations along the Feather and Yuba Rivers and also along the lower Bear River. The water surface profiles were calculated based on an assumption that levees would overtop but would not fail. This assumption ensures the worst-case (highest) water surface profile for any given flood. This is also the condition that the downstream levee system has a reasonable probability of experiencing during an extreme flood because levees are not designed to fail for a water surface elevation lower than the top of the levee.

Alternative 1 – The Levee Strengthening Alternative

Alternative 1 would not include a setback levee and associated floodway expansion, but rather results in a continuation of the existing levee configuration in the project area. As discussed below, this alternative could result in temporary effects on water quality associated with levee repair and strengthening activities, and installation of slurry cutoff walls could affect local groundwater conditions; however, this alternative would not result in any long-term changes to the existing drainage pattern of the project site, would not affect the rate or amount of surface runoff in the project area, would not increase exposure of persons or private property to flood hazards, and would not reduce water supply or alter regional or local hydrology. The project also would not affect the operation or risk of failure of upstream dams (i.e., Lake Oroville and New Bullards Bar Reservoir). Therefore, these impact mechanisms would not occur under Alternative 1 and are not discussed further.

Impact LS-5.3-a

Temporary Effects on Water Quality Associated with Levee Repair and Strengthening Activities. Ground-disturbing activities associated with repair and strengthening of the existing levees could cause soil erosion and sedimentation of local drainages and the Feather and Yuba River channels. Construction activities could also discharge waste petroleum products or other construction-related substances that could enter these waterways in runoff. Because the release of soil or other materials into these waterways could adversely affect river water quality, this impact would be **potentially significant**.

Among the construction activities associated with repairing and strengthening the existing Feather River left bank levee and the Yuba River left bank levee are the following:

- constructing slurry cutoff walls, stability/seepage berms, and relief wells;
- repairing levee segments susceptible to erosion.
- excavating borrow material from borrow sites and constructing a detention basin;
- relocating Pump Station No. 3; and
- relocating or modifying other existing facilities (e.g., wells, drainage channels, and irrigation systems).

These construction activities would disturb existing vegetation cover and soils on the existing levees and in nearby areas, would expose relatively large areas of disturbed ground that could be subject to rainfall and erosion, and could cause temporary discharges of sediment and other contaminants in stormwater runoff to drainage channels and the Feather and Yuba Rivers. Petroleum products or other construction-related substances (e.g., hydraulic fluids, concrete, solvents) also could be discharged inadvertently to waterways via stormwater runoff.

Although erosion and generation of contaminated runoff are possible during construction under Alternative 1, anything more than minor releases of sediment is unlikely because most land disturbance would occur during the dry months from late spring through fall. In addition, temporary erosion control measures would be implemented during construction to minimize stormwater pollution resulting from erosion and sediment migration from the construction areas, borrow areas, laydown/staging areas, and disposal areas. These temporary measures may include:

- the use of construction staging to minimize the amount of land disturbed at any one time;
- secondary containment for storage of fuel and oil; and
- the management of stockpiles and disturbed areas using earth berms, diversion ditches, straw wattles, straw bales, silt fences, gravel filters, mulching, revegetation, and temporary covers as appropriate.

Nevertheless, some soil erosion and sedimentation of waterways or discharge of contaminated runoff to waterways could occur. Because construction activities could affect water quality in nearby waterways by causing erosion and sedimentation or releasing construction materials into soil or water, this impact would be potentially significant.

Impact LS-5.3-b

Changes in Groundwater Levels Resulting from Seepage Control Measures. Slurry cutoff walls that would be installed in segments of the existing Feather River and Yuba River levees to control seepage could restrict groundwater flow and affect groundwater levels. Potential consequences are localized changes in well water levels and/or high groundwater levels east and south of the locations where slurry cutoff walls are installed. Such changes are not expected to substantially affect water supply or adversely affect land uses. This impact would be **less than significant**.

It is assumed that proposed repairs to the left bank levees of the Feather and Yuba Rivers would include installation of slurry cutoff walls in various portions of the levees to control seepage

during flood stages. The specific locations of slurry cutoff walls would be determined during detailed project design, scheduled to be conducted in late 2006 and through 2007. However, it is assumed that construction of slurry cutoff walls would focus on those portions of the levee alignments where widespread strata of permeable sands and gravels exist in the foundation.

The purpose of a slurry cutoff wall is to dissipate the hydraulic gradient in the levee foundation and reduce seepage quantities. This would reduce the hydraulic gradient and seepage flows through the foundation soils adjacent to the cutoff wall to safe levels. To achieve maximum effectiveness, the cutoff wall must extend completely through the permeable strata and terminate some distance into an underlying, reasonably continuous, less permeable layer. Under Alternative 1 slurry cutoff walls may extend to depths of 80 feet or more. The presence of slurry cutoff walls could restrict the movement of groundwater in either direction (away from the Feather River or Yuba River channel or toward the channel). Potential consequences are increases or decreases in the water levels in shallower wells and/or localized near-surface groundwater levels in areas immediately east and west of the slurry cutoff wall.

Groundwater levels in the area south of the Yuba River and east of the Feather River have generally risen since completion of the South Yuba Canal and delivery of irrigation water beginning in 1982. Water levels in the RD 784 area have been relatively stable since the mid-1990s on the order of 30 feet above sea level. (Bookman-Edmonston Engineering 2000.) This is above the elevation of water in the Feather River during nonflood periods. Water could move from the Feather and Yuba Rivers to nearby wells during periods of well pumping when the drawdown is below the level of water in the rivers. Although slurry cutoff walls could interfere with this movement, any effect on total water supply would not be substantial. RD 784 indicates that there have been no complaints to date about reductions in well yield in association with the Corps's 1997 installation of a 3-mile-long, 70-foot-deep slurry cutoff wall for seepage control along the Feather River levee from approximately Broadway to Star Bend, in what is now FRLRP Segment 2 (Goff, pers. comm., 2003).

The nearly uniform groundwater levels in RD 784 indicate that recharge from the east is nearly in balance with groundwater pumping and any losses to the Feather and Yuba Rivers. Water levels could rise on the east side (Feather River) or south side (Yuba River) of the existing levee where slurry cutoff walls are constructed if the pumping does not equal or exceed the recharge. Water could continue to move in either direction in the areas where slurry cutoff walls would not be constructed. Even with supplemental subsurface data to be obtained during design, it would be difficult to determine where, and to what extent, groundwater levels could change as a result of the presence of slurry cutoff walls. It can be expected, however, that any changes would be gradual. If local groundwater were to rise periodically to levels at which trees, crops, or structures could be damaged, excess groundwater could be pumped out using selected wells (as under current practices) or newly installed drains. TRLIA would coordinate with landowners as needed to resolve such circumstances. The excess groundwater could be delivered to irrigated lands or discharged to drains and then to the Feather River as part of RD 784's operations and maintenance.

Potential changes in groundwater levels associated with the installation of slurry cutoff walls are not expected to substantially affect water supply or local drainage. This impact would be less than significant.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impact ASB-5.3-a

Temporary Effects on Water Quality Associated with Levee Repair and Strengthening Activities and Setback Levee Construction. Ground-disturbing activities associated with repairs and strengthening of the existing levees and construction of the ASB setback levee could cause soil erosion and sedimentation of local drainages and the Feather and Yuba River channels. Construction activities could also discharge waste petroleum products or other construction-related substances that could enter these waterways in runoff. Because the release of soil or other materials into these waterways could adversely affect river water quality, this impact would be **potentially significant**.

Temporary water quality impacts associated with construction in project Segments 1 and 3 would be the same as in Impact LS-5.3-a, described under Alternative 1 above. However, because Alternative 2 includes the construction of the ASB setback levee in Segment 2, additional or more severe effects would result under this alternative, as described below.

Among the construction activities associated with the ASB levee setback are the following:

- removing portions of the existing levee in project Segment 2;
- excavating borrow material from proposed borrow sites;
- constructing the new setback levee and associated seepage control features (e.g., slurry cutoff walls, seepage berms, relief wells);
- constructing a detention basin;
- relocating Pump Station No. 3; and
- relocating or modifying other existing facilities (e.g., wells, drainage channels, and irrigation systems).

These construction activities would disturb existing vegetation cover and soils, would expose large areas of disturbed ground that could be subject to rainfall and erosion, and could cause temporary discharges of sediment and other contaminants in stormwater runoff to drainage channels and the Feather and Yuba Rivers. Petroleum products or other construction-related substances (e.g., concrete, hydraulic fluids, solvents) also could be discharged inadvertently to waterways via stormwater runoff.

There is the potential for the quantity and intensity of this impact to be large because of the areal extent of the construction activities. However, large-scale erosion and generation of contaminated runoff are unlikely because, although some slurry cutoff wall construction and other work would be conducted during the winter months (as weather, regulatory guidelines, and other factors allow), most land disturbance would occur during the dry months from late spring through fall. In addition, temporary erosion control measures would be implemented during construction to minimize stormwater pollution resulting from erosion and sediment migration from the construction areas, borrow areas, laydown/staging areas, and disposal areas. These temporary measures may include:

- the use of construction staging to minimize the amount of area disturbed at any one time;
- secondary containment for storage of fuel and oil; and
- the management of stockpiles and disturbed areas using earth berms, diversion ditches, straw wattles, straw bales, silt fences, gravel filters, mulching, revegetation, and temporary covers as appropriate.

Nevertheless, some soil erosion and sedimentation of waterways or discharge of contaminated runoff to waterways could occur. Because construction activities could affect water quality in nearby waterways by causing erosion and sedimentation or releasing construction materials into soil or water, this impact would be potentially significant.

Impact ASB-5.3-b

Disruption of Local Drainage Systems by the Levee Setback. The ASB setback levee would cross existing drainage infrastructure and sever parts of the drainage system for the local area. Drainage patterns within the levee setback area could be changed by project implementation as well. Because interruption of drainage patterns could cause or exacerbate local flooding, this impact would be **significant**.

On the lands outside the proposed ASB levee setback area, between the proposed levee setback alignment in project Segment 2 and the Western Pacific Interceptor Canal about 2 miles to the east, most of the surface runoff, including irrigation runoff, is collected in a series of RD 784 sloughs and canals that eventually drain to the Plumas Lake Canal (MHM n.d.). In addition, a small area east of the ASB levee setback area drains to Lateral 7/8. The proposed ASB setback levee alignment crosses Lateral 7/8 and the Plumas Lake Canal as they continue west into the levee setback area (Figure 5.3-2). As described under "Environmental Setting," the water conveyed into the levee setback area through Lateral 7/8 empties into Lateral 6, which drains a portion of the proposed ASB levee setback area. The water conveyed in Lateral 6 and the Plumas Lake Canal is pumped into the Feather River floodway at RD 784 Pump Station No. 3 (Figure 5.3-2). To ensure continued functioning of the drainage system east of the levee setback area, Pump Station 3 is proposed to be relocated to the land side of the ASB setback levee to drain the Plumas Lake Canal to the west of the levee.

The buried culvert from Lateral 7/8 that joins Lateral 6 above Star Bend would need to be removed where it crosses the setback levee alignment. The preliminary design for the levee setback suggests that Lateral 7/8 may be regraded to drain eastward along Anderson Avenue to Feather River Boulevard and that a new drainage ditch would need to be constructed to discharge the lateral to the most convenient point, which may be north along Feather River Boulevard to Lateral 10 or south along Feather River Boulevard to Lateral 9 (Yuba County Water Agency 2003a). Laterals 9 and 10 are part of the system that eventually discharges into the Plumas Lake Canal. The preliminary design also suggests that Lateral 6 may be abandoned and/or modified.

The proposed ASB levee setback would include the excavation of borrow sites that could also alter site drainage. The levee setback concept includes grading the borrow areas to slopes of 3:1 (horizontal:vertical) or flatter and regrading the bottom of the borrow areas to drain away from the setback levee and toward the river or toward existing drainage ways.

The modifications described above have been designed schematically. Although the preliminary levee setback design acknowledges the need to address local drainage, specific plans have not been developed to ensure that modified drainage features would adequately convey anticipated drainage volumes from the current and proposed land uses.

Because relocating drainage features and modifying the direction or volume of flows in parts of the drainage system could cause or exacerbate local flooding from normal surface runoff or stormwater runoff, this impact would be significant.

Inundation of the levee setback area during periods of high flow could cause some ponding of water that would remain in low spots, such as the footprint of the existing Feather River levee and possibly the borrow areas, when floodwaters recede. Until natural drainage or evaporation occurs, standing water could remain in these areas, which could provide breeding habitat for nuisance species such as mosquitoes and flies. However, irrigation practices that are a part of normal agricultural operations currently practiced in the ASB levee setback area sometimes lead to the formation of areas of standing shallow water that are favorable to the breeding of mosquitoes and other nuisance insects in drainage ponds, ditches, canals, and irrigated fields. It is unlikely that any additional areas of standing water that would result from occasional flooding of the levee setback area in winter months would appreciably increase the potential for breeding of these species compared with existing conditions. In addition, Mitigation Measure ASB-5.4-d, "Develop and Implement a Drainage and Grading Plan that Results in No Loss or Incidental Loss of Fish from Stranding," in Section 5.4, "Fisheries," calls for drainage improvements to the levee setback area and monitoring and necessary adjustments of these improvements. This measure is intended to prevent ponding of water after flood events to prevent/minimize the potential for stranding of special-status fish species in the setback area after floodwaters recede. Proper drainage would minimize any potential for increased mosquito production. Although detention basins constructed as part of the project would also generate areas of ponded water, the water would only be held for short periods until Pump Station No. 3 was able to discharge the accumulated stormwater flows. In addition, the detention basins would typically only fill during storm events in the winter and spring when mosquito activity is low. Detention basins included as part of this or any other project alternative are not expected to appreciably increase the potential for nuisance insect species to occur.

Impact ASB-5.3-c

Changes in Local Flood Hydrology Resulting from the Levee Setback. Setting back the left bank Feather River levee along the ASB setback levee alignment would decrease flood stages on the river. The levee setback would also provide a well-designed, well-constructed levee that would be more reliable and less subject to seepage than the existing levee. These changes would improve local flood protection. This effect would be **beneficial**.

The ASB levee setback proposed under Alternative 2 is designed to (1) decrease flood stages in the Feather River between Shanghai Bend and Star Bend (i.e., in project Segment 2) by increasing the channel width and, therefore, channel capacity; and (2) provide a well-designed, well-constructed levee using up-to-date technology. Lowering flood stages along this part of the Feather River channel would also reduce the backwater effects on flood stages upstream in both the Feather and Yuba Rivers.

Hydraulic simulations conducted for the FRLRP (MBK Engineers 2006**)** indicate that the ASB levee setback would lower water levels in the Feather River upstream of Star Bend (project Segments 2 and 3). For the 1-in-100 and 1-in-200 AEP events, it was determined that the ASB levee setback would lower the water level at the confluence of the Feather and Yuba Rivers by 1.3 feet and 1.6 feet, respectively. The presence of the ASB setback levee and related changes in upstream water levels would not affect the Lake Oroville or New Bullards Bar Reservoir dams.

Three Rivers Levee Improvement Authority (TRLIA) and DWR do not propose to increase the objective flow on the Feather River. Lowering flood stages and replacing the existing levee with a well-designed, well-constructed levee built using up-to-date construction standards would reduce the potential for levee failures in this channel segment that has historically been plagued by levee instability and failures. Effects of the levee setback on local flood protection would be beneficial.

Impact ASB-5.3-d

Changes in Flood Hydrology Downstream of the Setback Levee. The ASB levee setback would lower water levels upstream of the levee setback area, which could increase flows downstream of project Segment 2. This condition could lead to increased flooding downstream of Segment 2 if flood events should occur. However, the passage of floodwaters downstream to the Feather River would increase floodwater elevation within adequately sized levees, and the increased potential for levee failure and flooding downstream would be very slight. In addition, the implementation of Forecast-Coordinated Operations of Lake Oroville and New Bullards Bar Reservoir would reduce peak flows in the Feather-Yuba River system, and hence downstream of the levee setback area. Therefore, this impact would be **less than significant**.

As explained in Impact ASB-5.3-c above, the ASB levee setback proposed under Alternative 2 would increase flood storage capacity along the Feather River channel. Under most conditions, this would help attenuate downstream flows. However, because the levee setback would lower water levels upstream, flows in the Feather River just downstream of the ASB setback levee (project Segment 2) would increase slightly. The hydraulic simulations indicate that the Feather River peak flow just downstream of the setback levee under a 1-in-100 AEP event would increase from 271,938 cfs to 272,406 cfs, an increase of less than 1% (MBK Engineers 2006). The slight increase in flows would increase water surface elevation by 0.02 foot in the Feather River from the southern end of the setback levee alignment to the confluence with the Bear River. There would be no measurable increase in flood stage elevations downstream of the Bear River. For the 1-in-200 AEP event, the flows would increase from 347,031 cfs to 348,879 cfs, an increase of less than 1%. The water surface elevation in the Feather River from the southern end of the setback levee alignment to the confluence with the Bear River would increase by 0.08 foot as a result of the increased flow. Again, there would be no measurable increase in flood stage elevations downstream of the Bear River. The stage for the design flow remains below the project design stage (1957 profile) for the entire Feather River reach below the setback levee.

It should be noted that the hydraulic model used for this analysis does not take into account the planned Forecast-Coordinated Operations (F-CO) of Lake Oroville and New Bullards Bar Reservoir included as part of the Y-FSFCP. The F-CO element of the Y-FSFCP is a cooperative planning and model development process that is directed toward strengthening flood control operations for the Yuba and Feather Rivers by improving flood forecasts, closely coordinating the flood operations of Lake Oroville and New Bullards Bar Reservoir, improving operational procedures, and providing for improved communication and real-time forecast information to

reservoir operators and downstream emergency managers (Yuba County Water Agency 2003a). With implementation of the F-CO, any increases in downstream flood stage elevations associated with implementation of the ASB levee setback would be less than described above.

The simulated increases in downstream floodwater flows with the ASB levee setback are small (less than 1%), the increases in downstream flood stage elevation would be less than 1 inch for the 1-in-100 and 1-in-200 AEP events, and the stage for the design flow would remain below the project design stage even with these minor increases. Implementation of the F-CO would further reduce these minor increases. Therefore, this impact would be less than significant.

Impact ASB-5.3-e

Change in Water Demand and Available Water Supply Resulting from the ASB Levee Setback. Implementation of the ASB levee setback would remove approximately 240–1,300 acres of land from irrigated agricultural use along the proposed setback levee footprint and in the setback area. Alternative uses (e.g., levee, habitat restoration) are not expected to increase demand for water supply but, rather, are expected to decrease water use. This would be a **beneficial** effect.

The footprint of the ASB setback levee proposed under Alternative 2 would remove approximately 240–250 acres of land in project Segment 2 from agricultural use. It is unknown at this time how much, if any, of the levee setback area might be converted to riparian, wetland, or other habitat if the ASB setback levee is constructed. In the most extreme case, assuming that the entire levee setback area is converted to habitat, approximately 1,050 acres of land would be removed from agricultural use. Any irrigation associated with the establishment or maintenance of the setback levee or riparian, wetland, or other habitats would not surpass the current water use for agricultural crops and orchards. Any habitat restoration areas would be required to be self-sustaining, in that they would not need irrigation other than during the initial establishment of new vegetation.

It is expected that demand for water supply would not increase as a result of implementation of the ASB levee setback; in fact, demand is anticipated to decrease because 240–1,300 acres in the setback levee footprint and the levee setback area in project Segment 2 would be removed from irrigated agricultural use. Project effects on water demand and available water supply would be beneficial.

Impact ASB-5.3-f

Changes in Groundwater Levels Resulting from Installation of Slurry Cutoff Walls and the Levee Setback. Slurry cutoff walls that would be installed to control seepage in the existing Feather River and Yuba River levees in project Segments 1 and 3 and in the ASB setback levee in Segment 2 could restrict groundwater flow and affect groundwater levels. Potential consequences are localized changes in well water levels and/or high groundwater levels east of the setback levee and east and south of the locations where slurry cutoff walls are installed in Segments 1 and 3. Such changes are not expected to substantially affect water supply or adversely affect land uses. This impact would be **less than significant**.

This impact would be the similar to Impact LS-5.3-b, described above under Alternative 1. Installation of slurry cutoff walls in the existing levee in project Segments 1 and 3 would be the same under Alternative 2 as under Alternative 1, with the same less-than-significant effects on groundwater levels as described for Impact LS-5.3-b above. Installation of slurry cutoff walls in the ASB setback levee in project Segment 2 under Alternative 2 would alter the location of slurry cutoff walls in Segment 2 relative to Alternative 1; however, the mechanism by which

groundwater levels might be affected and the severity of the effect would be the same. Effects on groundwater levels would remain less than significant.

Impact ASB-5.3-g

Long-Term Effects on Water Quality Resulting from the Levee Setback. Potentially hazardous materials related to agricultural activities could be transported downstream when the levee setback area becomes inundated during flood events. These materials could contaminate floodwater and adversely affect river water quality. Because of the potential for adverse effects on water quality in the Feather River, this impact would be **potentially significant**.

The proposed ASB levee setback area has historically been used for intensive agriculture, primarily in the form of fruit and nut orchards. The inclusion of former agricultural lands in the Feather River floodway could result in the release of different types of contaminants into river water, such as pesticides and fertilizer, and organic litter and debris containing hazardous substances, during periodic flood events.

Pesticides, fertilizers, and other agricultural chemicals are applied on lands in the levee setback area, and pesticide residues in soil could be transported by periodic flood flows into the river. However, portions of the Feather River floodplain in the project area are currently used for agriculture. In addition, irrigation runoff from lands near the river but outside the floodplain area, including the ASB levee setback area, is currently conveyed to the Feather River via canals and ditches. The continued use of the ASB levee setback area for agricultural, whether the whole area or a portion, and occasional flooding of the area (i.e., approximately once in 3 years for a period of 3–5 days) is not expected to significantly increase the transport or concentrations of pesticides into the river in comparison with existing conditions.

Long-term uses in the proposed levee setback area may have resulted in the concentrated deposition of contaminants in the form of organic litter (e.g., debris piles, orchard slash piles) or hazardous substances (e.g., abandoned vehicles and farm implements; aboveground and underground storage containers for, and residues of, fuel, oil, fertilizers, or pesticides; and material in illegal dumping areas). Preliminary surveys of the levee setback area have identified three small waste dumps containing fruit waste and miscellaneous solid debris above Star Bend. Extensive surveys have not yet been completed, and additional dump or chemical spill sites may be present. Therefore, the full extent of potential problem areas is not known. If contaminants are present in soils in the levee setback area, they may become mobilized during flood conditions and be transported off-site by river flows, adversely affecting water quality.

In addition, portions of the Feather River levee, which may be used as borrow material for the ASB setback levee, were constructed before the existence of many of the regulations governing hazardous wastes and/or cleanup of contaminated soils and therefore may not have been tested for the presence of hazardous substances. Most likely, the fill material was uncontaminated because it probably would have originated in rural areas or riverine floodplain deposits and probably was not derived from sites containing hazardous wastes. However, some potential for contamination exists. There is also the potential that soils that would be exposed during excavation at borrow sites could be contaminated with elevated levels of pesticides and other hazardous substances or could be locations of abandoned dump sites. If contaminated soil exists in either of these sources and is used in construction of the setback levee, hazardous materials could be exposed to flood flows and subject to leaching and mobilization into river water.

Because periodic flooding of the ASB levee setback area could increase the release of hazardous materials into nearby water bodies and adversely affect water quality, this impact would be potentially significant.

Impact ASB-5.3-h

Changes in Floodplain Sediment Deposition Associated with the Levee Setback. Inundation of the ASB levee setback area would result in the transport and deposition of sediments in the setback area that may contain elevated concentrations of trace metals and/or organic constituents. Because it is unlikely that the sediment constituent concentrations resulting from inundation would be any higher than existing concentrations in the levee setback area, this impact would be **less than significant**.

As described in Impact 5.3-n of the Y-FSFCP programmatic EIR, sediments that may contain elevated concentrations of trace metals and/or organic constituents may be transported into the ASB levee setback area and deposited there during inundation with flood flows. It is unlikely that the concentrations of constituents deposited in the levee setback area in this way would be as high as those observed in the Feather River low-flow channel because the frequency of inundation would be less than that of the channel. It is also unlikely that sediment constituent concentrations resulting from inundation would be any higher than existing constituent concentrations in the levee setback area. The existing concentration patterns in river sediments are a result of continuous exposure to inputs of chemical contaminants. Conversely, the potential mass of contaminants transported into the proposed levee setback area would be less because of the relatively lower frequency of inundation.

Aquatic sediments in the Feather River currently exceed consensus-based guidelines for aquatic life concerns; however, concentrations are considerably less than EPA guidance PRGs for human health exposure in residential soils (PRGs are established only for industrial sites and residential sites). Consequently, the impact of potential changes in soil concentrations of trace metals and organic compounds would be less than significant.

Impact ASB-5.3-i

Changes in Geomorphic Processes Along the River Channels Resulting from the Levee Setback. Increasing the conveyance area of the Feather River floodway along the ASB setback levee alignment would alter water velocities and depths in the existing river channel and floodway in this area and upstream during flood events large enough to inundate the levee setback area (greater than an approximately a 3-year flow). These changes in velocities and depths could lead to decreased shear stresses from Star Bend to just below Shanghai Bend (project Segment 2) and slightly increased shear stresses at Shanghai Bend (Segment 3) and some distance upstream on both the Feather River and the Yuba River. Shear stresses would not change downstream of the levee setback area. Portions of the riverbanks and channel bed along the Feather and Yuba Rivers where shear stresses increase could experience minor increases in erosive forces. However, any increases would not be sufficient to result in a substantial increase in the mobilization and/or deposition of sediments. This impact would be **less than significant**.

The following discussion addresses the potential effects of increases in shear stresses along the Feather River and Yuba River channels, shorelines, and floodways. Potential effects of increased shear stresses on the levee system are addressed below in the discussion of Impact ASB-5.3-j, "Changes in Geomorphic Processes Along the Project Levees Resulting from the ASB Levee Setback."

The ASB levee setback would increase the capacity of the Feather River floodway to convey flood flows. Increasing the conveyance area by increasing the floodplain width would decrease the depth and velocity of flood flows in this portion of the Feather River floodway (along project Segment 2). This decrease in velocity would result in a decrease in shear stresses along this part of the Feather River (Philip Williams & Associates 2006). Shear stress is an expression of the lateral force of water against the adjacent shoreline. Higher shear stresses typically indicate greater erosion potential. Therefore, the presence of the setback levee would be expected to lessen the potential for channel bed and bank erosion on the Feather River along project Segment 2.

The presence of the setback levee would have little effect on flow velocities and no effect on shear stresses downstream of the levee setback area. However, the increase in flood flow conveyance capacity in the ASB levee setback area would increase flow velocities and erosion potential upstream of this area when flows are sufficient to inundate the levee setback area (greater than an approximately 3-year flow).

The degree of change in shear stress, and hence erosion potential, varies with the frequency and magnitude of flow events. To assess differences in shear stress between with- and without-project conditions, a shear-stress index was developed that reflects the change in boundary shear stress and the frequency with which different flow events are likely to occur over a 100-year period. For example, the change in shear stress for a 4-year event is multiplied by 25 (number of occurrences in a 100-year period) and the change in shear stress for a 100-year event is multiplied by 1. The sum of changes is divided by 100 (number of years in the evaluation period). The shear-stress index is a measure of the cumulative change in erosive energy at a location over a 100-year period. The analysis divided reaches into units based on geomorphic processes or sensitivity to increases in shear stress. The reaches are: Yuba River through Marysville (approximately PLM 0.0–1.5), Feather River through Yuba City (approximately PLM 26.5–34.0), Feather River right bank at Shanghai Bend (approximately PLM 22.25–23.75), Feather River left bank downstream of Shanghai Bend (approximately PLM 17.75–22.0), Feather River knickzone where incision on the river bottom has currently held up on a cohesive layer (approximately PLM 22.25–22.75), Feather River levee setback reach (approximately PLM 17.1–23.6), Feather River right bank at Star Bend (approximately PLM 15.5–19.0), and Feather River downstream of Star Bend (approximately PLM 12.0–15.25). Details of this analysis are provided in the draft report *Geomorphic Assessment of Project Alternatives for Feather River Levee Improvements Between the Bear and Yuba Rivers*, which is included in Appendix C of this EIR.

The analysis shows that along the levee setback area (including Star Bend), the ASB levee setback would reduce the shear-stress index by 3% relative to existing conditions (approximating a 3% reduction in erosive potential). In the reach around Shanghai Bend, the maximum shear-stress index is increased by 8% (west bank bend) and 5% (east bank downstream of Shanghai Bend). In the knickzone, the maximum increase in the shear-stress index is 7%. In the reaches through Yuba City and Marysville, the maximum increase in the shear-stress index is 3–8%.

Based on these results, portions of the riverbanks along the Feather and Yuba Rivers where the shear-stress index is predicted to increase could experience small amounts of new erosion or a slight acceleration of existing erosion. However, these increases in shear stresses could also

result in no effects in areas where shoreline sediments are sufficiently cohesive or if the banks are stabilized by vegetation, riprap, or other means and can resist the increase in erosive potential. Estimated increases in shear stresses would not be sufficient to result in substantial increases in the mobilization and/or deposition of sediment. Therefore, this impact would be less than significant.

Impact ASB-5.3-j

Changes in Geomorphic Processes Along the Project Levees Resulting from the ASB Levee Setback. Increasing the conveyance area of the Feather River floodway along the ASB setback levee alignment would alter water velocities and depths in the existing floodway in this area and upstream during flood events large enough to inundate the levee setback area (greater than an approximately a 3-year flow). These changes in velocities and depths would lead to decreased shear stresses along the right and left bank Feather River levees from Star Bend to just below Shanghai Bend (project Segment 2) and increased shear stresses along the levees at Shanghai Bend (Segment 3) and some distance upstream on both the Feather River and the Yuba River. Shear stresses along the levees would not change downstream of the levee setback area. Portions of the levee area along the Feather and Yuba Rivers where shear stresses increase could experience minor increases in erosive forces. Any increases in shear stresses would not be sufficient to result in a substantial increase in the mobilization and/or deposition of sediments or increase exposure of persons or private property to flood hazards (i.e., through damage to the levees). This impact would be **less than significant**.

The impact mechanism and analysis methodology for this impact is the same as described above for Impact ASB-5.3-i, "Geomorphic Processes Along the River Channels Resulting from the Levee Setback." However, the analysis below addresses the effects of changes in shear stresses and erosive potential on the levee system rather than the river channels, shorelines, and floodways.

The shear-stress index analysis for the levee system (see Appendix C) shows that in the levee setback area (including Star Bend), the ASB levee setback would reduce the shear-stress index along the levees by 14% (approximating to a 14% reduction in erosive potential). In the reach around Shanghai Bend, the maximum shear-stress index is increased by 8% along the levees (west bank bend), while on the east bank downstream of Shanghai Bend, there is a 1% increase in the shear-stress index along the levees. In the reaches through Yuba City and Marysville, the maximum increase in the shear-stress index along the levees is 3–6%.

Based on these results, various areas along the Feather River and Yuba River levees would experience small increases in shear stresses, and therefore erosive potential, resulting from the implementation of the ASB levee setback. However, even with these increases, the types of materials typically used to construct and protect levees (e.g., compacted soils, vegetative cover, riprap) would adequately resist the overall erosive potential. Estimated increases in shear stresses would not be sufficient to result in substantial increases in the mobilization and/or deposition of sediment or result in increased exposure of persons or private property to flood hazards (i.e., through damage to the levees). Therefore, this impact would be less than significant.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impact IS-5.3-a

Temporary Effects on Water Quality Associated with Levee Repair and Strengthening Activities and Setback Levee Construction. This impact would be the same as Impact ASB-5.3-a, described under Alternative 2 above. For the same reasons as described above, this impact would be **potentially significant**.

Impact IS-5.3-b

Disruption of Local Drainage Systems by the Levee Setback. The intermediate setback levee would cross existing drainage infrastructure and sever parts of the drainage system for the local area. Drainage patterns within the levee setback area could be changed by project implementation as well. Because interruption of drainage patterns could cause or exacerbate local flooding, this impact would be **significant**.

This impact would be similar to Impact ASB-5.3-b, described under Alternative 2 above. However, the severity of the impact would be somewhat less under Alternative 3 because the intermediate setback levee alignment is located farther to the west. Setting the Feather River levee back along this alignment would likely result in less disruption to drainage systems. However, the potential disruption of local drainage systems under Alternative 3 would remain a significant impact.

Impact IS-5.3-c

Changes in Local Flood Hydrology Resulting from the Levee Setback. Setting back the left bank Feather River levee along the intermediate setback levee alignment would decrease flood stages on the river. The levee setback would also provide a well-designed, well-constructed levee that would be more reliable and less subject to seepage than the existing levee. These changes would improve local flood protection. This effect would be **beneficial**.

This impact would be the same as Impact ASB-5.3-c, described under Alternative 2 above. Hydraulic simulations conducted for the FRLRP (MBK Engineers 2006) indicate that the intermediate levee setback would lower water levels in the Feather River upstream of Star Bend (project Segments 2 and 3) somewhat less than would the ASB levee setback levee—1.0 feet and 1.2 feet, respectively, for the 1-in-100 and 1-in-200 AEP events, rather than 1.3 feet and 1.6 feet with the ASB setback levee. The reductions in water levels would be less under this alternative because the intermediate setback levee would be located farther west than the ASB setback levee, creating a smaller setback area to hold floodwaters. However, the intermediate setback levee would decrease flood stage elevations and would provide a well-designed, well-constructed levee built using up-to-date construction standards, resulting in beneficial effects related to local flood protection.

Impact IS-5.3-d

Changes in Flood Hydrology Downstream of the Setback Levee. The intermediate levee setback would lower water levels upstream of the levee setback area, which could increase flows downstream of project Segment 2. This condition could lead to increased flooding downstream of Segment 2 if flood events should occur. However, the passage of floodwaters downstream to the Feather River would result in a increase in floodwater elevation within adequately sized levees, and the increased potential for levee failure and flooding downstream would be very slight. In addition, implementation of the F-CO for Lake Oroville and New Bullards Bar Reservoir would reduce peak flows in the Feather-Yuba River system, and hence downstream of the levee setback area. Therefore, this impact would be **less than significant**.

The effect of this impact would be the same as described above for Impact ASB-5.3-d under Alternative 2. However, the hydraulic simulations performed for Alternative 3 produce slightly different increases in flood stage elevations downstream of the setback levee. Hydraulic modeling indicates that the Feather River peak flow just downstream of the setback levee under a 1-in-100 AEP event would increase from 347,031 cfs to 348,624 cfs, an increase of less than 1% (MBK Engineers 2006). This slight increase in flow would result in a 0.02-foot increase in the water surface elevation in the Feather River from the southern end of the setback levee alignment to the confluence with the Bear River. There would be no measurable increase in flood stage elevations downstream of the Bear River. For the 1-in-200 AEP event, the flows would increase from 347,031 cfs to 348,624 cfs, an increase of less than 1%. The water surface elevation in the Feather River from the southern end of the setback levee alignment to the confluence with the Bear River would increase by 0.07 foot as a result of the increased flow. Again, there would be no measurable increase in flood stage elevations downstream of the Bear River. The stage for the design flow remains below the project design stage (1957 profile) for the Feather River reach below the setback levee.

As noted in the discussion of Impact ASB-5.3-d under Alternative 2, the hydraulic model used for this analysis does not take into account implementation of the F-CO for Lake Oroville and New Bullards Bar Reservoir. With implementation of the F-CO, any increases in downstream flood stage elevations associated with the intermediate levee setback would be less than described above.

The simulated increases in downstream floodwater flows with the intermediate levee setback are small (less than 1%), the increases in downstream flood stage elevation would be less than 1 inch for the 1-in-100 and 1-in-200 AEP events, and the stage for the design flow would remain below the project design stage even with these minor increases. Implementation of the F-CO would further reduce these minor increases. Therefore, this impact would be less than significant.

Impact IS-5.3-e

Change in Water Demand and Available Water Supply Resulting from the Intermediate Levee Setback. Implementation of the intermediate levee setback would remove approximately 220–950 acres of land from irrigated agricultural use along the proposed setback levee footprint and in the setback area. Alternative uses (e.g., levee, habitat restoration) are not expected to increase demand for water supply but, rather, are expected to decrease water use. This would be a **beneficial** effect.

The effect of this impact would be the same as described above for Impact ASB-5.3-e under Alternative 2. The footprint of the intermediate setback levee would remove approximately 220–230 acres of land from agricultural use. It is unknown at this time how much, if any, of the levee setback area might be converted to riparian, wetland, or other habitat if the intermediate setback levee is constructed. In the most extreme case, assuming the entire levee setback area is converted to habitat, approximately 720 acres of land would be removed from agricultural use. Any irrigation associated with the establishment or maintenance of the setback levee or riparian, wetland, or other habitats would not surpass the current water use for agricultural crops and orchards. Any habitat restoration areas would be required to be self-sustaining, in that they would not need irrigation other than during the initial establishment of new vegetation.

It is expected that demand for water supply would not increase as a result of implementation of the intermediate levee setback; in fact, demand is anticipated to decrease because approximately 220–950 acres in the setback levee footprint and the levee setback area in project Segment 2

would be removed from irrigated agricultural use. Project effects on water demand and available water supply would be beneficial.

Impact IS-5.3-f

Changes in Groundwater Levels Resulting from Installation of Slurry Cutoff Walls and the Levee Setback. This impact would be the same as Impact ASB-5.3-f, described under Alternative 2 above. For the same reasons as described above, this impact would be **less than significant**.

Impact IS-5.3-g

Long-Term Effects on Water Quality Resulting from the Levee Setback. Potentially hazardous materials related to agricultural activities could be transported downstream when the levee setback area becomes inundated during flood events. These materials could contaminate floodwater and adversely affect river water quality. Because of the potential for adverse effects on water quality in the Feather River, this impact would be **potentially significant**.

This impact would be similar to Impact ASB-5.3-g described above under Alternative 2. Although a smaller area of agricultural land would be placed in the Feather River floodway under Alternative 3 than under Alternative 2, the potential still exists for agricultural lands in the floodway to contain contaminants (e.g., pesticides and fertilizers) that could be released into the Feather River during periodic flood events. Long-term uses in the proposed levee setback area may also have resulted in the concentrated deposition of contaminants in the form of organic litter (e.g., debris piles, orchard slash piles) or hazardous substances (e.g., abandoned vehicles and farm implements; aboveground and underground storage containers for, and residues of, fuel, oil, fertilizers, or pesticides; and material in illegal dumping areas) that could be released into the Feather River during flood events.

In addition, portions of the Feather River levee, which may be used as borrow material for the intermediate setback levee, were constructed before the existence of many of the regulations governing hazardous wastes and/or cleanup of contaminated soils and therefore may not have been tested for the presence of hazardous substances. Soil taken from soil borrow areas may also contain contaminants. If contaminated soil exists in either of these sources and is used in construction of the setback levee, hazardous materials could be exposed to flood flows and subject to leaching and mobilization into river water.

Although there is not definitive evidence of soil contamination in any of these areas, further testing could indicate the presence of contaminants. Because periodic flooding of the intermediate levee setback area could increase the release of hazardous materials into nearby water bodies and adversely affect water quality, this impact would be potentially significant.

Impact IS-5.3-h

Changes in Floodplain Sediment Deposition Associated with the Levee Setback. Inundation of the levee setback area would result in the transport and deposition of sediments in the setback area that may contain elevated concentrations of trace metals and/or organic constituents. Because it is unlikely that the sediment constituent concentrations resulting from inundation would be any higher than existing concentrations in the levee setback area, this impact would be **less than significant**.

This impact would be the same as Impact ASB-5.3-h, described above under Alternative 2. Although the levee setback area would be smaller under Alternative 3 than under Alternative 2, the potential still exists for deposition of sediments in the intermediate levee setback area that

may contain elevated concentrations of trace metals and/or organic constituents. For the reasons described above, this impact would be less than significant.

Impact IS-5.3-i

Changes in Geomorphic Processes Along the River Channels Resulting from the Levee Setback. Increasing the conveyance area of the Feather River floodway along the intermediate setback levee alignment would alter water velocities and depths in the existing river channel and floodway in this area and upstream during flood events large enough to inundate the levee setback area (greater than an approximately 3-year flow). These changes in velocities and depths could lead to decreased shear stresses from Star Bend to just below Shanghai Bend (project Segment 2) and slightly increased shear stresses at Shanghai Bend (Segment 3) and some distance upstream on both the Feather River and the Yuba River. Shear stresses would not change downstream of the levee setback area. Portions of the riverbanks along the Feather and Yuba Rivers where shear stresses increase could experience minor increases in erosive forces. However, any increases would not be sufficient to result in a substantial increase in the mobilization and/or deposition of sediments. This impact would be **less than significant**.

This impact would be similar to Impact ASB-5.3-i, described above under Alternative 2. The impact mechanism and analysis methodology are the same under the two alternatives, although the effects on shear stresses are slightly different.

The geomorphic analysis (provided in Appendix C) shows that in the levee setback area (including Star Bend), the intermediate levee setback would reduce the shear-stress index by 3% relative to existing conditions (approximating a 3% reduction in erosive potential). In the reach around Shanghai Bend, the maximum shear-stress index is increased by 7% (west bank bend) and 5% (east bank downstream of Shanghai Bend). In the knickzone, the maximum increase in the shear-stress index is 7%. In the reaches through Yuba City and Marysville, the maximum increase in the shear-stress index is 3–4%.

Based on these results, portions of the riverbanks along the Feather and Yuba Rivers where the shear-stress index is predicted to increase could experience small amounts of new erosion or a slight acceleration of existing erosion. However, these increases in shear stresses could also result in no effects in areas where shoreline sediments are sufficiently cohesive or if the banks are stabilized by vegetation, riprap, or other means and can resist the increase in erosive potential. Estimated increases in shear stresses would not be sufficient to result in substantial increases in the mobilization and/or deposition of sediment. Therefore, this impact would be less than significant.

Impact IS-5.3-j

Changes in Geomorphic Processes Along the Project Levees Resulting from the Intermediate Levee Setback. Increasing the conveyance area of the Feather River floodway along the intermediate setback levee alignment would alter water velocities and depths in the existing floodway in this area and upstream during flood events large enough to inundate the levee setback area (greater than an approximately a 3-year flow). These changes in velocities and depths would lead to decreased shear stresses along the right and left bank Feather River levees from Star Bend to just below Shanghai Bend (project Segment 2) and increased shear stresses along the levees at Shanghai Bend (Segment 3) and some distance upstream on both the Feather River and the Yuba River. Shear stresses along the levees would not change downstream of the levee setback area. Any increases in shear stresses would not be sufficient to result in a substantial increase in the mobilization and/or deposition of sediments or increase exposure of persons or private property to flood hazards (i.e., through damage to the levees). This impact would be **less than significant**.

This impact would be similar to Impact ASB-5.3-j, described above under Alternative 2. The impact mechanism and analysis methodology are the same under the two alternatives, although the effects on shear stresses are slightly different.

The shear-stress index analysis for the levee system shows that in the levee setback area (including Star Bend), the intermediate levee setback would reduce the shear-stress index along the levees by 14% (approximating to a 14% reduction in erosive potential). In the reach around Shanghai Bend the maximum shear-stress index is increased by 7% along the levees (west bank bend), while on the east bank downstream of Shanghai Bend there is no increase in the shear-stress index along the levees. In the reaches through Yuba City and Marysville, the maximum increase in the shear-stress index along the levees is 2–3%.

Based on these results, various areas along the Feather River and Yuba River levees would experience small increases in shear stresses, and therefore erosive potential, resulting from the implementation of the intermediate levee setback. However, even with these increases, the types of materials typically used to construct and protect levees (e.g., compacted soils, vegetative cover, riprap) would adequately resist the overall erosive potential. Estimated increases in shear stresses would not be sufficient to result in substantial increases in the mobilization and/or deposition of sediment or result in increased exposure of persons or private property to flood hazards (i.e., through damage to the levees). Therefore, this impact would be less than significant.

5.3.4 MITIGATION MEASURES

ALTERNATIVE 1 – THE LEVEE STRENGTHENING ALTERNATIVE

No mitigation is required for Impact LS-5.3-b (effects on groundwater levels). Mitigation is provided below for Impact LS-5.3-a (temporary water quality effects).

LS-5.3-a(1) Prepare a SWPPP, File an NOI, and Comply with the NPDES Stormwater Permit for Project Construction Activities. This mitigation, together with Mitigation Measure LS-5.3-a(2), would reduce the potential impact to a less-than-significant level.

Before the start of any project construction work, site grading, or excavation, TRLIA or its primary construction contractor shall prepare a SWPPP detailing measures to control soil erosion and waste discharges from construction areas and shall submit an NOI to the Central Valley RWQCB for stormwater discharges associated with general construction activity. TRLIA shall require all contractors conducting construction-related work to implement the SWPPP to control soil erosion and waste discharges of other construction-related contaminants. The general contractor(s) and subcontractor(s) conducting the work shall be responsible for constructing or implementing, regularly inspecting, and maintaining the measures in good working order.

The SWPPP shall identify the grading and erosion control BMPs and specifications that are necessary to avoid and minimize water quality impacts to the extent practicable. Standard erosion control measures (e.g., management, structural, and vegetative controls) shall be implemented for all construction activities that expose soil. Grading operations shall be conducted to eliminate direct routes for conveying potentially contaminated runoff to drainage

channels. Erosion control barriers such as silt fences and mulching material shall be installed, and disturbed areas shall be reseeded with grass or other plants where necessary.

The SWPPP shall contain specific measures for stabilizing soils at construction-related sites before the onset of the winter rainfall season. These standard erosion control measures shall be designed to reduce the potential for soil erosion and sedimentation of drainage channels.

The following specific BMPs are recommended for implementation:

- Conduct all work according to site-specific construction plans that identify areas for clearing, grading, and revegetation so that ground disturbance is minimized.
- Avoid riparian and wetland vegetation wherever possible and identify vegetation to be retained for habitat maintenance (i.e., as identified through preconstruction biological surveys), cover cleared areas with mulches, install silt fences near riparian areas or streams to control erosion and trap sediment, and reseed cleared areas with native vegetation.
- Stabilize disturbed soils at all construction sites (e.g., levee repair areas, borrow areas) and staging areas before the onset of the winter rainfall season.
- Stabilize and protect stockpiles from exposure to erosion and flooding.

The SWPPP also shall specify appropriate hazardous materials handling, storage, and spill response practices to reduce the possibility of adverse impacts from use or accidental spills or releases of contaminants. Specific measures applicable to the project include, but are not limited to, the following:

- Develop and implement strict on-site handling rules to keep construction and maintenance materials out of drainages and waterways.
- Conduct all refueling and servicing of equipment with absorbent material or drip pans underneath to contain spilled fuel. Collect any fluid drained from machinery during servicing in leakproof containers and deliver to an appropriate disposal or recycling facility.
- Maintain controlled construction staging, site entrance, concrete washout, and fueling areas at least 100 feet away from stream channels or wetlands to minimize accidental spills and runoff of contaminants in stormwater.
- Prevent raw cement; concrete or concrete washings; asphalt, paint, or other coating material; oil or other petroleum products; or any other substances that could be hazardous to aquatic life from contaminating the soil or entering watercourses.
- Maintain spill cleanup equipment in proper working condition. Clean up all spills immediately according to the spill prevention and response plan, and immediately notify DFG and the RWQCB of any spills and cleanup procedures.

LS-5.3-a(2) Obtain a Use Permit from Yuba County and Comply with Permit Conditions for Erosion Control. This mitigation, together with Mitigation Measure LS-5.3-a(1), would reduce the potential impact to a less-than-significant level.

Before the start of any project-related grading, excavation, or fill activity, TRLIA or its primary construction contractor shall obtain a use permit from the Yuba County Planning Department in compliance with the Yuba County Ordinance Code. TRLIA shall require all contractors conducting construction-related work to implement the conditions of the permit. The general contractor(s) and subcontractor(s) conducting the work shall be responsible for constructing or implementing, regularly inspecting, and maintaining the required measures in good working order.

Implementing Mitigation Measures LS-5.3-a(1) and LS-5.3-a(2) together would reduce the potential temporary impact on water quality to a less-than-significant level.

ALTERNATIVE 2 – THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impact ASB-5.3-c (changes in local flood hydrology), Impact ASB-5.3-d (changes in downstream flood hydrology), Impact ASB-5.3-e (change in water demand and available water supply), Impact ASB-5.3-f (effects on groundwater levels), Impact ASB-5.3-h (changes in floodplain sediment deposition), Impact ASB-5.3-i (effects of increased shear stresses on river shorelines), or Impact ASB-5.3-j (effects of increase shear stresses on levees).

Mitigation is provided below for Impact ASB-5.3-a (temporary water quality effects), Impact ASB-5.3-b (disruption of local drainage systems by the levee setback), and Impact ASB-5.3-g (long-term water quality effects).

ASB-5.3-a(1) Prepare a SWPPP, File an NOI, and Comply with the NPDES Stormwater Permit for Project Construction Activities. This measure is identical to Mitigation Measure LS-5.3-a(1) above. Together with Mitigation Measure ASB-5.3-a(2), this mitigation would reduce the potential impact to a less-than-significant level.

ASB-5.3-a(2) Obtain a Use Permit from Yuba County and Comply with Permit Conditions for Erosion Control. This measure is identical to Mitigation Measure LS-5.3-a(2) above. Together with Mitigation Measure ASB-5.3-a(1), this mitigation would reduce the potential impact to a less-than-significant level.

ASB-5.3-b Coordinate with RD 784 to Modify Drainage Facilities that Would Be Affected by the Levee Setback and Ensure Appropriate Functioning of the Local Drainage System. This mitigation would reduce the impact to a less-than-significant level.

TRLIA or its primary construction contractor shall coordinate with RD 784 to evaluate local drainage needs before and after construction of the setback levee and shall prepare and implement a plan for modification of the portion of the drainage system that would be affected by the levee setback. A drainage study shall be prepared that evaluates the effects on local drainage that would result from the levee setback and any proposed changes in land uses in the

levee setback area. The study shall consider the design flows of the existing facilities that cross the proposed setback levee footprint (e.g., Lateral 7/8 and the Plumas Lake Canal). It shall develop appropriate plans for relocation or other modification of these facilities and construction of new facilities, as needed, to ensure equivalent functioning of the system during and after construction of the setback levee. Facility modification will include relocating Pump Station No. 3, and may include removing, filling, and/or rerouting drainage canals and culverts; regrading drainage alignments to redirect drainage; constructing new ditches and canals; and installing new culverts.

The plan shall also consider the continuing and proposed uses of the levee setback area and shall incorporate appropriate drainage requirements for those uses to prevent any unintended flooding from stormwater runoff. The plan shall integrate environmental mitigation requirements and drainage of restored borrow sites to the extent feasible and practical.

The final plan shall be approved by RD 784. TRLIA and its construction contractor(s) shall ensure that the necessary modifications are implemented without interruption of the adequate functioning of the drainage system. TRLIA shall also ensure that any necessary environmental review requirements have been met before the drainage modifications are implemented.

Implementing this mitigation measure would reduce the potential impact on existing drainage facilities to a less-than-significant level.

ASB-5.3-g(1) Conduct a Phase I Environmental Site Assessment for the Levee Setback Area and Implement Recommendations. This mitigation, together with Mitigation Measures ASB-5.3-g(2) and ASB-5.3-g(3), would reduce the potential impact to a less-than-significant level.

Before the start of any ground-disturbing construction activity, TRLIA or its primary construction contractor shall have a qualified hazardous waste specialist perform a Phase I Environmental Site Assessment of the levee setback area to identify potential sources of surface and buried contaminants, and provide a report of assessment findings.

The assessment shall include the following:

- review of available information on property history, including, as appropriate, historical and current topographic maps, aerial photographs, property title and permit information, interviews of environmental regulatory agency and Yuba County personnel, and interviews of current occupants and landowners regarding the current and past uses of the land;
- review of federal, state, and county governmental records and databases to determine whether any sites in the area are listed as hazardous waste sites; and
- reconnaissance-level surveys to observe visual evidence of hazardous materials use.

A written report on the findings of the assessment, including recommendations for the disposition of any identified hazardous waste sites or potential hazardous waste sites, shall be provided to TRLIA. TRLIA or its construction contractor(s) shall implement recommendations made in the Phase I report. If hazardous materials or wastes are identified, recommendations

could include, but would not be limited to, a Phase II assessment or cleanup of known identified hazardous waste sites. Presence of hazardous wastes would be determined using waste classification protocols described in CCR Title 22.

ASB-5.3-g(2) Evaluate Levee Borrow Material for Potential Contaminants in Coordination with the RWQCB. This mitigation, together with Mitigation Measures ASB-5.3-g(1) and ASB-5.3-g(3), would reduce the potential impact to a less-than-significant level.

Before the start of construction, TRLIA or its primary construction contractor shall have a qualified hazardous materials specialist collect and evaluate representative soil samples from the existing levee sections that would be used as sources of borrow, and from potential borrow sites. The soil samples shall be evaluated for contaminant residues (e.g., trace metals, organochlorine pesticides, polychlorinated biphenyls) that may be encountered in excavation and grading activities. This evaluation shall be conducted to address any requirements of the Central Valley RWQCB as part of the RWQCB's permitting and approval process for the project (e.g., Section 401 certification). Wastes that are encountered at hazardous levels shall be treated in accordance with CCR Title 22 procedures for hazardous materials reporting and disposal. Where the evaluation of soil samples detects the presence of wastes that are not present at hazardous levels, the results of the evaluation shall be reported to the RWQCB for classification in the RWQCB's designated waste classification program, and the RWQCB will determine the acceptability of the material for levee construction based on the potential of the waste to impair water quality and public health. Borrow material used for construction of the waterside levee face or other features with soil exposure to the aquatic environment (e.g., new drainage channels) that is deemed unacceptable by the RWQCB shall be properly disposed of in a landfill or made available for other approved uses.

ASB-5.3-g(3) Remove Nonhazardous Waste and Debris from the Levee Setback Area. This mitigation, together with Mitigation Measures ASB-5.3-g(1) and ASB-5.3-g(2), would reduce the potential impact to a less-than-significant level.

Before the beginning of the first season of potential flood operations with the setback levee in place, TRLIA or its primary construction contractor shall ensure the removal from the levee setback area of all large slash and wood piles, nonhazardous waste dumps, and other nonhazardous debris that could adversely affect water quality or create a hazard if carried downriver in flood flows. All removed materials shall be properly disposed of in approved off-site landfills.

Implementing Mitigation Measures ASB-5.3-g(1), ASB-5.3-g(2), and ASB-5.3-g(3) together would reduce potential impacts related to releases of hazardous materials from existing contaminated sites to a less-than-significant level.

ALTERNATIVE 3 – THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impact IS-5.3-c (changes in local flood hydrology), Impact IS-5.3-d (changes in downstream flood hydrology), Impact IS-5.3-e (change in water demand and

available water supply), Impact IS-5.3-f (effects on groundwater levels), Impact IS-5.3-h (changes in floodplain sediment deposition), Impact IS-5.3-i (effects of increased shear stresses on river shorelines), or Impact IS-5.3-j (effects of increased shear stresses on levees).

Mitigation is provided below for Impact IS-5.3-a (temporary water quality effects), Impact IS-5.3-b (disruption of local drainage systems by the levee setback), and Impact IS-5.3-g (long-term water quality effects).

IS-5.3-a(1) **Prepare a SWPPP, File an NOI, and Comply with the NPDES Stormwater Permit for Project Construction Activities.** This measure is identical to Mitigation Measure LS-5.3-a(1) above. Together with Mitigation Measure IS-5.3-a(2), this mitigation would reduce the potential impact to a less-than-significant level.

IS-5.3-a(2) **Obtain a Use Permit from Yuba County and Comply with Permit Conditions for Erosion Control.** This measure is identical to Mitigation Measure LS-5.3-a(2) above. Together with Mitigation Measure IS-5.3-a(1), this mitigation would reduce the potential impact to a less-than-significant level.

IS-5.3-b **Coordinate with RD 784 to Modify Drainage Facilities that Would Be Affected by the Levee Setback and Ensure Appropriate Functioning of the Local Drainage System.** This measure is identical to Mitigation Measure ASB-5.3-b above. This mitigation would reduce the potential impact to a less-than-significant level.

IS-5.3-g(1) **Conduct a Phase I Environmental Site Assessment for the Levee Setback Area and Implement Recommendations.** This measure is identical to Mitigation Measure ASB-5.3-g(1) above. Together with Mitigation Measures IS-5.3-g(2) and IS-5.3-g(3), this mitigation would reduce the potential impact to a less-than-significant level.

IS-5.3-g(2) **Evaluate Levee Borrow Material for Potential Contaminants in Coordination with the RWQCB.** This measure is identical to Mitigation Measure ASB-5.3-g(2) above. Together with Mitigation Measures IS-5.3-g(1) and IS-5.3-g(3), this mitigation would reduce the potential impact to a less-than-significant level.

IS-5.3-g(3) **Remove Nonhazardous Waste and Debris from the Levee Setback Area.** This measure is identical to Mitigation Measure ASB-5.3-g(3) above. Together with Mitigation Measures IS-5.3-g(1) and IS-5.3-g(2), this mitigation would reduce the potential impact to a less-than-significant level.

5.3.5 IMPACTS REMAINING SIGNIFICANT AFTER MITIGATION

With implementation of the mitigation described above, all impacts on water resources and river geomorphology would be reduced to a less-than-significant level.

SECTION 5.4 FISHERIES

This section addresses fish species found in the lower Feather River and lower Yuba River, including species that are listed or are candidates for listing under the federal Endangered Species Act (ESA) and the California Endangered Species Act (CESA). Water quality, hydrology, and geomorphology are discussed in Section 5.3, "Water Resources and River Geomorphology." Terrestrial biological resources (e.g., plants, wildlife) are discussed in Section 5.5, "Terrestrial Biological Resources."

5.4.1 REGULATORY SETTING

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

Federal Endangered Species Act

Pursuant to ESA, the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) have authority over projects that may result in take of a federally listed species. Under ESA, "take" means "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." USFWS has also interpreted the definition of "harm" to include significant habitat modification. If the project may affect a federally listed species, either an incidental take permit under ESA Section 10(a) or a federal interagency consultation under ESA Section 7 is required. USFWS has regulatory jurisdiction over freshwater and estuarine fishes (such as delta smelt), while NMFS has jurisdiction over anadromous and marine species (such as chinook salmon and steelhead).

Sustainable Fisheries Act

In response to growing concern about the status of U.S. fisheries, the Sustainable Fisheries Act of 1996 (Public Law [PL] 104-297) was passed by Congress to amend the Magnuson-Stevens Fishery Conservation and Management Act (PL 94-265), the primary law governing marine fisheries management in the federal waters of the United States. Under the Sustainable Fisheries Act, consultation is required by NMFS on any activity that might adversely affect essential fish habitat (EFH). EFH includes those habitats that fish rely on throughout their life cycles. It encompasses habitats necessary to allow sufficient production of commercially valuable aquatic species to support a long-term sustainable fishery and contribute to a healthy ecosystem.

Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (16 U.S. Code 661–666c), as amended, requires federal agencies to consult with USFWS, NMFS, and state fish and wildlife resource agencies before undertaking or approving projects that control or modify surface water. The recommendations made by these agencies must be fully considered in project plans by federal agencies.

Clean Water Act, Section 404

Section 404 of the Clean Water Act (CWA) establishes a requirement to obtain a permit from the U.S. Army Corps of Engineers (Corps) before undertaking any activity that involves any discharge of dredged or fill material into "waters of the United States," including wetlands. Waters of the United States include navigable waters of the United States, interstate waters, all other waters where the use or degradation or destruction of the waters could affect interstate or foreign commerce, tributaries to any of these waters, and wetlands that meet any of these criteria or that are adjacent to any of these waters or their tributaries. Many surface waters and wetlands in California, including the Feather and Yuba Rivers, meet the criteria for waters of the United States. Under Section 404, the Corps must consider impacts on listed species under ESA; it thereby incorporates USFWS and NMFS findings on impacts on federally listed fish species in its permit conditions.

Clean Water Act, Section 401

CWA Section 401(a)(1) specifies that any applicant for a federal license or permit to conduct any activity that may result in any discharge into navigable waters shall provide the federal licensing or permitting agency with a certification that any such discharge will not violate state water quality standards. In California, the nine regional water quality control boards (RWQCBs) administer the Section 401 program, prescribing measures for projects as necessary to avoid, minimize, and mitigate adverse impacts on water quality and ecosystems.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

California Endangered Species Act

Pursuant to CESA, a permit from the California Department of Fish and Game (DFG) is required for projects that could result in the take of a species that is state-listed as threatened or endangered. Under CESA, "take" is defined as an activity that would directly or indirectly kill an individual of a species; the CESA definition of take does not include "harming" or "harassing," as the ESA definition does. As a result, the threshold for take is higher under CESA than under ESA (i.e., habitat modification is not necessarily considered take under CESA).

Section 1600 et seq. of the California Fish and Game Code

All diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake in California that supports wildlife resources are subject to regulation by DFG, pursuant to Sections 1600–1603 of the California Fish and Game Code. Under Section 1603, it is unlawful for any person to substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake designated by DFG, or use any material from the streambeds, without first notifying DFG of such activity. A stream is defined as a body of water that flows at least periodically or intermittently through a bed or channel that has banks and supports fish or other aquatic life. This includes watercourses with a surface or subsurface flow that supports or has supported riparian vegetation. DFG's jurisdiction within altered or artificial waterways is based on the value of those waterways to fish and wildlife. A DFG streambed alteration agreement must be obtained for any project that would result in an impact on a river, stream, or lake.

Flow Requirements Affecting the Lower Feather River and Lower Yuba River

In addition to the regulations described above, two processes have resulted in the establishment of flow requirements upstream of the project area for the enhancement and protection of fish habitat. Both affect conditions for fish in the lower Feather River and lower Yuba River.

Revised Water Right Decision 1644

The State Water Resources Control Board (SWRCB) adopted Water Right Decision 1644 on March 1, 2001 (State Water Resources Control Board 2001). On July 16, 2003, the SWRCB adopted Revised Decision 1644 (State Water Resources Control Board 2003). Revised Decision 1644 amends several water rights permits and licenses and requires other actions to protect fish in the reach of the Yuba River downstream of Englebright Reservoir. Revised Decision 1644 established interim and long-term instream flow requirements for fall-run chinook salmon, spring-run chinook salmon, steelhead, and American shad. The interim instream flow requirements were developed for the Yuba River in part to protect fisheries resources as the full use of Yuba County Water Agency's (YCWA's) existing water rights and water supplies occurs over time. It also requires the preparation of plans to reduce fish losses at two diversion facilities and requires actions to promote release of water from Englebright Dam at temperatures that benefit anadromous fish. Finally, Revised Decision 1644 includes several requirements to ensure that water diversions from the lower Yuba River are made pursuant to valid water rights.

The long-term instream flow requirements included in Revised Decision 1644 are higher flows that were scheduled to take effect on April 21, 2006. On November 18, 2005, YCWA petitioned the SWRCB requesting an extension of instream flow requirements under Revised Decision 1644 from April 21, 2006 to March 1, 2007. On April 6, 2006, the SWRCB issued an order (WR 2006–0009) concluding that it was appropriate to change the effective date of the long-term requirements to March 1, 2007, subject to provisions of the order (State Water Resources Control Board 2006).

The interim instream flow requirements developed and adopted by the SWRCB in 2003 are the current minimum flow requirements for the lower Yuba River. These requirements are shown in Table 5.4-1, "Interim Instream Flow Requirements for the Lower Yuba River Included in Revised Decision 1644."

Agreement Concerning Operation of the Oroville Facilities

The August 1983 agreement between the California Department of Water Resources (DWR) and DFG titled *Concerning the Operation of the Oroville Division of the State Water Project for Management of Fish & Wildlife* sets criteria for flow and temperature for the low-flow section of the Feather River (between Thermalito Diversion Dam and the Thermalito Afterbay river outlet) and the reach of the Feather River below the river outlet to the confluence with the Sacramento River. The required minimum flows specified in the agreement for the Feather River between Thermalito Afterbay and Verona (i.e., the confluence) are listed in Table 5.4-2, "Minimum Flow Requirements for the Feather River."

Table 5.4-1
Interim Instream Flow Requirements for the Lower Yuba River Included in Revised Decision 1644

Period	Wet and Above-Normal Years (cfs)		Below-Normal Years (cfs)		Dry Years (cfs)		Critical Years (cfs)	
	Smartville Gauge	Marysville Gauge	Smartville Gauge	Marysville Gauge	Smartville Gauge	Marysville Gauge	Smartville Gauge	Marysville Gauge
September 15–October 1	700	250	550	250	500	250	400	150
October 1–14	700	250	550	250	500	250	400	250
October 15–April 20	700	500	700	500	600	400	600	400
April 21		1,000		900		400		280
April 22–April 30		1,000		900		400		270
May 1–31		1,500		1,500		500		270
June 1		1,050		1,050		400		245*
June 2–30		800		800		400		245*
July 1		560		560		280		245*
July 2		390		390		250		245*
July 3		280		280		250		100
July 4–September 14		250		250		250		100

Note: cfs = cubic feet per second
* The interim instream flow requirements for June 1–30 of critical years shall be 245 cfs, except if a lower flow is allowed pursuant to the provisions of the 1965 Yuba County Water Agency/California Department of Fish and Game agreement. The minimum flow on July 1 shall be 70% of the flow on June 30, and the minimum flow on July 2 shall be 70% of the flow on July 1.
Source: State Water Resources Control Board 2003

Table 5.4-2
Minimum Flow Requirements for the Feather River

Required Flow (cfs)	Months Affected	Criteria
1,700	October through March	Feather River unimpaired runoff for the preceding April through July >55% of normal (1,942,000 af)
1,000	April through September	
1,200	October through February	Runoff for the preceding April through July <55% of normal or Two or more consecutive years of April-through-July runoff <60% of normal
1,000	March through September	
900	October through February	Minimum allowable flows; additional deficiencies up to 25% can be imposed in the same proportion as those applied to agriculture if the Oroville storage would fall below 1.5 million af under projected operation
750	March through September	
2,500	October 15–November 30	Normal maximum flow for river channel spawning gravels; if this flow is exceeded except for flood control, failure, etc., the minimum flow through March 31 shall not be less than 500 cfs below the average maximum 1-hour flow
Variable	April through June	Release scheduled water in other than constant flows or release water in excess of minimum flows ahead of time

Notes: af = acre-feet; cfs = cubic feet per second
Source: California Department of Water Resources and California Department of Fish and Game 1983

Additional requirements that are specified in the agreement for the protection of fish govern flows at Thermalito Diversion Dam and the Feather River Fish Hatchery, water temperatures below the Thermalito Afterbay outlet and at the Feather River Fish Hatchery, and the rate of change in flows below Thermalito Afterbay.

CALFED Bay-Delta Program

The CALFED Bay-Delta Program (CALFED) is not a regulatory program but is arguably the largest water management and ecosystem restoration program in the nation. It is a comprehensive program established to solve the San Francisco Bay/Sacramento–San Joaquin Delta's (Bay-Delta's) water supply, water quality, ecosystem, and levee integrity problems. As such, CALFED deserves mention as part of the regulatory background for the Feather River Levee Repair Project (FRLRP) because implementation of CALFED projects is having a substantial effect on conditions and actions associated with the Bay-Delta system, including those affecting the Feather and Yuba Rivers.

CALFED was initiated in 1995 as a collaboration among state and federal agencies and the state's leading urban, agricultural, and environmental interests to address and resolve the environmental and water management problems associated with the Bay-Delta system. The mission of CALFED is to develop and implement a long-term comprehensive plan that would restore ecological health and improve water management for beneficial uses of the Bay-Delta.

CALFED addresses four interrelated, interdependent programs concurrently: water supply reliability, water quality, ecosystem restoration, and levee system integrity. These four major programs are implemented through 11 major program elements: Storage, Conveyance, Water Use Efficiency, Water Transfers, Ecosystem Restoration, Environmental Water Account, Water Management, Watersheds, Drinking Water Quality, Levee System Integrity, and the CALFED Science Program.

The Feather and Yuba Rivers are addressed in the CALFED Ecosystem Restoration Program (ERP). The ERP effort presents the visions for ecological management zones in the Bay-Delta system and their ecological management units. The Feather River/Sutter Basin Ecological Management Zone includes a Feather River Management Unit.

The visions for the unit include the following (CALFED Bay-Delta Program 2000):

- Improve natural spawning populations of spring- and fall-run chinook salmon and steelhead. This involves improving spring (March) flows below Oroville in dry and normal water years, improving spring-through-fall base flows, providing suitable water temperatures for summer rearing, and improving spawning and rearing habitat in the lower river below Oroville.

- Reactivate or maintain important ecological processes that create and sustain habitats for anadromous fish. The most important processes include floodplain and flood processes and a natural streamflow pattern in the river, to which most of the anadromous and resident native fishes are adapted.

LOCAL PLANS, POLICIES, REGULATIONS, AND LAWS

The *Yuba County General Plan* (Yuba County 1996) provides overall guidance for resource conservation in Yuba County and includes several resource conservation objectives that aim to protect significant biological resources. Specific habitats identified for special consideration for preservation and protection are the Yuba River and watershed within Yuba County. The general plan also states that the anadromous fishery occurring within the streams of Yuba County shall be afforded the same protection from the adverse effects of development as terrestrial species.

5.4.2 ENVIRONMENTAL SETTING

The FRLRP could potentially affect aquatic resources within the lower Feather and Yuba Rivers. The Feather and Yuba Rivers provide important habitat for native anadromous and resident Central Valley fishes, including species that are listed or species of concern for listing under ESA and CESA. Because the two rivers support many of the same fish species, the are discussed together in this section.

SOURCES OF INFORMATION

Information on existing conditions was derived from other environmental documents prepared for the project area and vicinity, including the following:

- previous environmental documents for the Yuba-Feather Supplemental Flood Control Project and the Feather-Bear Rivers Levee Setback Project;
- field data collected by DFG and DWR;
- status reviews of winter-run, spring-run, and fall-run chinook salmon, steelhead, green sturgeon, and Sacramento splittail; and
- reports describing historical conditions before construction of dams and other barriers.

Information was also derived from the California Natural Diversity Database (California Natural Diversity Database 2006) and a reconnaissance-level site visit conducted in July 2006.

FEATHER AND YUBA RIVER FISHERIES RESOURCES

The lower Feather and Yuba Rivers support a diverse assemblage of native and nonnative species (Table 5.4-3, “Fishes Present in the Lower Feather and Yuba Rivers”). Anadromous and other migratory species include Central Valley fall-run chinook salmon, Central Valley spring-run chinook salmon, Central Valley steelhead, white sturgeon, green sturgeon, Pacific lamprey, striped bass, and American shad. Juvenile winter-run chinook salmon may also periodically move into the lower Feather River during their downstream migrations in the Sacramento River.

Table 5.4-3
Fishes Present in the Lower Feather and Yuba Rivers

Common Name	Scientific Name	Native (N) or Introduced (I)
Green sturgeon	*Acipenser medirostris*	N
White sturgeon	*Acipenser transmontanus*	N
Sacramento sucker	*Catostomus occidentalis*	N
Riffle sculpin	*Cottus gulosus*	N
Tule perch	*Hysterocarpus traski*	N
Pacific lamprey	*Lampetra tridentata*	N
California roach	*Lavinia symmetricus*	N
Hardhead	*Mylopharodon conocephalus*	N
Central Valley steelhead	*Oncorhynchus mykiss*	N
Rainbow trout	*Oncorhynchus mykiss*	N
Sacramento River winter-run chinook salmon	*Oncorhynchus tshawytscha*	N
Central Valley spring-run chinook salmon	*Oncorhynchus tshawytscha*	N
Central Valley fall/late fall–run chinook salmon	*Oncorhynchus tshawytscha*	N
Sacramento splittail	*Pogonichthys macrolepidotus*	N
Sacramento pikeminnow	*Ptychocheilus grandis*	N
Speckled dace	*Rhinichthys osculus*	N
American shad	*Alosa sapidissima*	I
Mosquitofish	*Gambusia affinis*	I
Green sunfish	*Lepomis cyanellus*	I
Bluegill	*Lepomis macrochirus*	I
Redear sunfish	*Lepomis microlophus*	I
Smallmouth bass	*Micropterus dolomieui*	I
Striped bass	*Morone saxatilus*	I

Sources: California Department of Fish and Game 1991, Moyle 2002

Special-Status Species

Special-status fish species are legally protected or are otherwise considered sensitive by federal, state, or local resource conservation agencies and organizations. Special-status fish species addressed in this section include:

- species listed as threatened or endangered under ESA or CESA;
- species identified by USFWS, NMFS, or DFG as species of special concern; and
- species fully protected in California under the California Fish and Game Code.

A total of nine special-status fish species have the potential to occur in the lower Feather and Yuba Rivers, as described below. Of the nine species, green sturgeon, Central Valley steelhead

Evolutionarily Significant Unit (ESU), Sacramento River winter-run chinook salmon ESU, and Central Valley spring-run chinook salmon ESU are federally listed as endangered or threatened species. Sacramento River winter-run chinook salmon ESU and Central Valley spring-run chinook salmon ESU are also listed as endangered species under CESA. USFWS delisted Sacramento splittail from its threatened status on September 22, 2003. NMFS determined that listing is not warranted for Central Valley fall-/late fall–run chinook salmon. However, this species is still designated a species of concern by NMFS and species of special concern by DFG because of concerns about specific risk factors. The three remaining species (Pacific lamprey, California roach, and hardhead) are considered species of special concern by DFG and/or federal species of concern by NMFS or USFWS. Brief descriptions follow for the special-status species with potential to occur in the lower Feather and Yuba Rivers (Table 5.4-4).

Table 5.4-4
Special-Status Fish Species Potentially Occurring in the Lower Feather and Yuba Rivers

Species	Status [1]		Habitat	Potential to Occur in the Lower Feather River
	USFWS/ NMFS	DFG		
Green sturgeon *Acipenser medirostris*	T	--	Requires cold, freshwater streams with suitable gravel for spawning; rears seasonally inundated floodplains, rivers, tributaries, and Delta	Occurs in the lower Feather River; may occur in the lower Yuba River
Pacific lamprey *Lampetra tridentada*	SC	--	Requires cool, freshwater streams with suitable gravel for spawning	Occurs in the lower Feather and Yuba Rivers
California roach *Lavinia symmetricus* sp.	--	SSC	Spawning occurs in pools and side pools of rivers and creeks; juveniles rear in pools of rivers and creeks	Occurs in the lower Feather and Yuba Rivers
Hardhead *Mylopharodon conocephalus*	--	SSC	Spawning occurs in pools and side pools of rivers and creeks; juveniles rear in pools of rivers and creeks, and in shallow to deeper water of lakes and reservoirs	Occurs in the lower Feather and Yuba Rivers
Central Valley steelhead ESU *Oncorhynchus mykiss*	T	--	Requires cold, freshwater streams with suitable gravel for spawning; rears in seasonally inundated floodplains, rivers, and tributaries, and in the Delta	Occurs in the lower Feather and Yuba Rivers
Sacramento River winter-run chinook salmon ESU *Oncorhynchus tshawytscha*	E	E	Requires cold, freshwater streams with suitable gravel for spawning; rears in seasonally inundated floodplains, rivers, and tributaries, and in the Delta	Occurs in the Sacramento River and tributaries; adults and juveniles may stray into the Feather River; unlikely to occur adjacent to the project site

Table 5.4-4
Special-Status Fish Species Potentially Occurring in the Lower Feather and Yuba Rivers

Species	Status [1]		Habitat	Potential to Occur in the Lower Feather River
	USFWS/ NMFS	DFG		
Central Valley spring-run chinook salmon ESU *Oncorhynchus tshawytscha*	T	T	Requires cold, freshwater streams with suitable gravel for spawning; rears in seasonally inundated floodplains, rivers, and tributaries, and in the Delta	Occurs in the lower Feather and Yuba Rivers
Central Valley fall/late fall–run chinook salmon *Oncorhynchus tshawytscha*	--	SSC	Requires cold, freshwater streams with suitable gravel for spawning; rears in seasonally inundated floodplains, rivers, and tributaries, and in the Delta	Occurs in the lower Feather and Yuba Rivers
Sacramento splittail *Pogonichthys macrolepidotus*	DT	SSC	Spawning and juvenile rearing from winter to early summer in shallow weedy areas inundated during seasonal flooding in the lower reaches and flood bypasses of the Sacramento River, including the Yolo Bypass	Occurs in the lower Feather and Yuba Rivers

Notes: DFG = California Department of Fish and Game; ESU = Evolutionarily Significant Unit; NMFS = National Marine Fisheries Service; USFWS = U.S. Fish and Wildlife Service

[1] Legal Status Definitions

Federal Listing Categories (USFWS and NMFS)
- E Endangered (legally protected)
- T Threatened (legally protected)
- DT Recently delisted from threatened status
- SC Species of Concern

State Listing Categories (DFG)
- E Endangered (legally protected)
- T Threatened (legally protected)
- FP Fully Protected (legally protected, no take allowed)
- SSC Species of Special Concern (no formal protection)

Source: Data compiled by EDAW in 2006 from the California Natural Diversity Database (2006), past environmental impact reports addressing the project area, and sources cited in this section

Oroville Dam is the upstream limit of anadromous fish migration in the Feather River. Most of the water released from Oroville Reservoir is diverted at Thermalito Diversion Dam into the Thermalito Complex. During controlled releases, water is released at a constant rate of 600 cubic feet per second (cfs) through the Fish Barrier Dam to the Feather River Fish Hatchery and then into the low-flow section of the Feather River. This 8-mile reach, which extends downstream to the Thermalito Afterbay outlet, provides important spawning and rearing habitat for fall- and spring-run chinook salmon and steelhead. Fourteen miles of additional spawning and rearing habitat exists between the Thermalito Afterbay outlet and the mouth of Honcut Creek, which is located upstream of the FRLRP project area (see Figure 2-1, “Regional Setting,” in Chapter 2).

Englebright Dam is the upstream limit of anadromous fish migration in the Yuba River. The lower Yuba River supports natural production of fall-run chinook salmon, steelhead, Pacific lamprey, and American shad. Spring-run chinook salmon also occur in the lower Yuba River, but

the origin (natural versus hatchery) and population status of these fish are unclear. American shad and striped bass occur seasonally downstream of Daguerre Point Dam. Resident species include Sacramento sucker, Sacramento pikeminnow, hardhead, rainbow trout, and largemouth and smallmouth bass.

Descriptions of the special-status species and some of the other key species supported by the lower Feather and Yuba Rivers are provided below.

Special-Status Species

Green Sturgeon

Green sturgeon (*Acipenser medirostris*) has recently has been listed as threatened by NMFS (71 *Federal Register* [FR] 17757, April 7, 2006). Green sturgeon occur in the lower reaches of large rivers, including the Sacramento and San Joaquin River basins, and in the Eel, Mad, Klamath, and Smith Rivers. Green sturgeon is found primarily in the Sacramento River and occasionally in the lower Feather River. Green sturgeon adults and juveniles occur throughout the upper Sacramento River, based upon observations incidental to winter-run chinook monitoring at the Red Bluff Diversion Dam in Tehama County (National Marine Fisheries Service 2005). Green sturgeon spawn predominantly in the upper Sacramento River. They are thought to spawn every 3–5 years (Tracy 1990). Their spawning period is March to July, with a peak from mid-April to mid-June (Moyle et al. 1992). Juveniles inhabit the Bay-Delta estuary until they are approximately 4–6 years old, when they migrate to the ocean (Kohlhorst et al. 1991).

Pacific Lamprey

Similar to chinook salmon and steelhead (described below), Pacific lamprey (*Lampetra tridentata*) adults migrate upstream from the ocean during the winter and spring to spawn (Moyle 2002). Spawning occurs over gravel substrates. Larval lamprey rear in sand and mud substrates, gradually moving downstream over the rearing period. Little is known about their habitat needs or population trends. Pacific lamprey is a federal species of concern.

California Roach

California roach (*Lavinia symmetricus* sp.) are distributed throughout the state; however, there is a specific subspecies found in the Sacramento River drainage (excluding the Pit River). California roach occupy small, warm streams with intermittent flow in midelevation foothills. Dense populations often occur in isolated pools. They are tolerant of high temperatures (30 degrees Celsius [ºC] to 35ºC) and low oxygen levels, although they also can be found in cold, well-oxygenated systems; human-modified habitats; and the main channels of larger rivers (Moyle 2002). The subspecies found in the Sacramento River system, including the Feather and Yuba Rivers, is a California species of special concern.

Hardhead

Hardhead (*Mylopharodon conocephalus*) are widely distributed throughout the low- to mid-elevation streams in the main Sacramento–San Joaquin River drainage, including the Feather and Yuba Rivers. Undisturbed portions of larger streams at low to middle elevations are preferred by

hardhead. Hardhead are able to withstand summer water temperatures above 20ºC; however, they will select lower temperatures when they are available. Hardhead are fairly intolerant of low-oxygen waters, particularly at higher water temperatures. Pools with sand-gravel substrates and slow water velocity are the preferred habitat; adult fish inhabit the lower half of the water column, while the juvenile fish remain in the shallow water closer to the stream edges. Hardhead typically feed on small invertebrates and aquatic plants at the bottom of quiet water (Moyle 2002). Hardhead is a federal species of concern and a California species of special concern.

Central Valley Steelhead

Historically, Central Valley steelhead (*Oncorhynchus mykiss*) spawned and reared in most of the accessible upstream reaches of Central Valley rivers, including the Yuba, Feather, and Sacramento Rivers and their perennial tributaries. Steelhead generally migrated farther than chinook salmon (described below) into tributaries and headwater streams where cool, well-oxygenated water is available year round.

In the Central Valley, steelhead are now restricted to the upper Sacramento River downstream of Keswick Reservoir; the lower reaches of large tributaries downstream of impassable dams; small, perennial tributaries of the Sacramento River mainstem and large tributaries; and the Bay-Delta system.

Population estimates of steelhead on the Feather River have not been performed; however, since 1967 an average of approximately 900 steelhead have returned each year to the Feather River Fish Hatchery (California Department of Fish and Game 2006).

The upstream migration of adult steelhead in the mainstem Sacramento River historically started in July, peaked in September, and continued through February or March. Central Valley steelhead spawn mainly from January through March, but spawning has been reported from late December through April (McEwan and Jackson 1996). During spawning, the female digs a redd (gravel nest) in which she deposits her eggs, which are then fertilized by the male. Egg incubation time in the gravel is determined by water temperature, varying from approximately 19 days at an average water temperature of 15.5ºC to approximately 80 days at an average temperature of 14.5ºC (McEwan and Jackson 1996).

Steelhead fry usually emerge from the gravel 2–8 weeks after hatching (Barnhart 1986, Reynolds et al. 1993), between February and May, sometimes extending into June (California Department of Fish and Game 1991). Newly emerged steelhead fry move to shallow, protected areas along streambanks but move to faster, deeper areas of the river as they grow. Juvenile steelhead feed on a variety of aquatic and terrestrial insects and other small invertebrates.

Juvenile steelhead rear throughout the year and may spend 1–3 years in fresh water before emigrating to the ocean. Smoltification, the physiological adaptation that juvenile salmonids undergo to tolerate saline waters, occurs in juveniles as they begin their downstream migration. Smolting steelhead generally emigrate from March to June (California Department of Fish and Game 1991).

NMFS completed a status review of steelhead populations in Washington, Oregon, Idaho, and California, and identified 15 ESUs in this range. On August 9, 1996, NMFS issued a proposed

rule to list five of these ESUs (including the Central Valley steelhead) as endangered under ESA, and five as threatened (61 FR 155). The Central Valley steelhead ESU was later listed as threatened (downgraded from its proposed status of endangered) (63 FR 13347, March 19, 1998), and critical habitat (which included the lower Feather and Yuba Rivers) was designated for this ESU (65 FR 7764, February 16, 2000). However, following a lawsuit (*National Association of Home Builders et al. v. Donald L. Evans, Secretary of Commerce, et al.*) (see "Central Valley Spring-Run Chinook Salmon" below), NMFS rescinded the listing. After further review, critical habitat for the Central Valley steelhead ESU was designated on August 12, 2005. Critical habitat is designated to include select waters in the Sacramento and San Joaquin River basins, including the Feather and Yuba Rivers.

Sacramento River Winter-Run Chinook Salmon

Sacramento River winter-run chinook salmon (*Oncorhynchus tshawytscha*) do not spawn in the Feather or Yuba Rivers, but juveniles may periodically move into the lower portions of these systems during downstream migration.

Juvenile winter-run chinook salmon rear and emigrate in the Sacramento River from July through March (Hallock and Fisher 1985). Juveniles descending the Sacramento River above Red Bluff Diversion Dam (RBDD) from August through October, and possibly November, are mostly presmolts (smolts are juveniles that are physiologically ready to enter seawater) and probably rear in the Sacramento River below RBDD. Juveniles have been observed in the Delta from October through December, especially during high Sacramento River discharges caused by late fall and early winter storms.

Cover structures, space, and food are necessary components of rearing habitat for all races of chinook salmon. Suitable habitat includes areas with instream and overhead cover in the form of undercut banks; downed trees; and large, overhanging tree branches. The organic materials forming fish cover also help provide sources of food, in the form of both aquatic and terrestrial insects. Growth of juvenile chinook salmon in floodplain habitat is fast relative to growth in river habitat. Juvenile salmon have been found to have growth rates in excess of 1 millimeter (mm) per day when they rear in flooded habitat and as much as 20 mm in 2–3 weeks (Jones & Stokes 2001). The water temperature is typically higher in floodplain habitat than in main channel habitats. Although increased temperature increases metabolic requirements, the productivity in flooded habitat is also increased, resulting in higher growth rates (Sommer et al. 2001). The production of drift invertebrates in the Yolo Bypass has been found to be one to two times greater than in the river (Sommer et al. 2001). Also, grasses that are flooded support invertebrates that are also a substantial source of food for rearing juveniles. Increased areas resulting from flooded habitat can also reduce the competition for food and space and potentially decrease the possible encounters with predators (Sommer et al. 2001). Juvenile chinook salmon that grow faster are likely to migrate downstream sooner, which helps to reduce the risks of predation and competition in freshwater systems.

Juvenile chinook salmon in the Sacramento River move out of upstream spawning areas into downstream habitats in response to many factors, including inherited behavior, habitat availability, flow, competition for space and food, and water temperature. The number of juveniles that move and the timing of movement are highly variable. Storm events and the

resulting high flows appear to trigger movement of substantial numbers of juvenile chinook salmon to downstream habitats. In general, juvenile abundance in the Delta increases as flow increases (U.S. Fish and Wildlife Service 1993).

Winter-run salmon smolts may migrate through the Delta and bay to the ocean from December through as late as May (Stevens 1989). The Sacramento River channel is the main migration route through the Delta. Adult winter-run chinook salmon spend 1–3 years in the ocean. About 67% of the adult escapement that leaves the ocean to spawn in the Sacramento River consists of 3-year-olds, 25% consists of 2-year-olds, and 8% consists of 4-year-olds (Hallock and Fisher 1985).

Adult winter-run chinook salmon leave the ocean and migrate through the Delta into the Sacramento River from November through July. Salmon migrate upstream past RBDD from mid-December through July, and most of the spawning population has passed RBDD by late June.

Winter-run chinook salmon spawn from mid-April through August, and incubation continues through October. The primary spawning grounds in the Sacramento River are above RBDD. As mentioned above, adult winter-run chinook salmon do not enter the Feather or Yuba Rivers.

Central Valley Spring-Run Chinook Salmon

Central Valley spring-run chinook salmon (*Oncorhynchus tshawytscha*) historically were the second most abundant run of Central Valley chinook salmon (Fisher 1994). They occupied the headwaters of all major river systems in the Central Valley where there were no natural barriers. Adults returning to spawn ascended the tributaries to the upper Sacramento River, including the Pit, McCloud, and Little Sacramento Rivers. They also occupied Cottonwood, Battle, Antelope, Mill, Deer, Stony, Big Chico, and Butte Creeks, and the Feather, Yuba, American, Mokelumne, Stanislaus, Tuolumne, Merced, San Joaquin, and Kings Rivers. Spring-run chinook salmon migrated farther into headwater streams where cool, well-oxygenated water is available year round.

Current surveys indicate that remnant, nonsustaining spring-run chinook salmon populations may be found in Cottonwood, Battle, Antelope, and Big Chico Creeks (California Department of Water Resources 1997). More sizable, consistent runs of naturally produced fish are found only in Mill and Deer Creeks. The Feather River Fish Hatchery sustains the spring-run population on the Feather River, but the genetic integrity of that run is questionable (California Department of Water Resources 1997). Estimates since 1953 on the Feather River indicate that numbers of spring-run returning to the hatchery average around 2,115, although the estimates have increased dramatically since 1990 (California Department of Fish and Game 2006).

Juveniles display considerable variation in stream residence and migratory behavior. Juvenile spring-run chinook salmon may leave their natal streams as fry soon after emergence or rear for several months to a year before migrating as smolts or yearlings (Yoshiyama et al. 1998). Triggers for downstream movement are similar to those described above for winter-run chinook salmon.

Historical records indicate that adult spring-run chinook salmon enter the mainstem Sacramento River in February and March and continue to their spawning streams, where they then hold in deep, cold pools until they spawn. Spring-run are sexually immature during their spawning migration. Some adult spring-run chinook salmon start arriving in the Feather River below the Fish Barrier Dam in June. They remain there until the fish ladder is opened in early September. Spawning and rearing requirements for spring-run chinook salmon are similar to those identified above in the discussion for winter-run chinook salmon.

Spawning occurs in gravel beds in late August through October, and emergence takes place in March and April. Spring-run chinook salmon appear to emigrate at two different life stages: fry and yearlings. Fry move between February and June, while the yearling spring-run emigrate October to March, peaking in November (Cramer and Demko 1997).

On March 9, 1998 (63 FR 11481), NMFS issued a proposed rule to list spring-run chinook salmon as endangered. NMFS designated the Central Valley spring-run chinook as threatened on September 16, 1999 (64 FR 50393). On February 5, 1999, the California Fish and Game Commission listed spring-run chinook salmon as threatened under CESA. Critical habitat had originally been designated for Central Valley spring-run chinook salmon by NMFS (65 FR 7764, February 16, 2000). However, following a lawsuit (*National Association of Home Builders et al. v. Donald L. Evans, Secretary of Commerce, et al*.), NMFS rescinded the listing. After further review, critical habitat for the Central Valley spring-run chinook salmon ESU was designated on August 12, 2005. Critical habitat is designated to include select waters in the Sacramento and San Joaquin River basins, including the Feather and Yuba Rivers.

Central Valley Fall-/Late Fall–Run Chinook Salmon

Spawning escapement surveys on the Feather River are conducted between the Oroville Fish Barrier Dam and the Thermalito Afterbay outlet and between the afterbay outlet and the Gridley boat ramp above Honcut Creek. Annual estimates (since 1953) of the population of fall-/late fall–run chinook salmon (*Oncorhynchus tshawytscha*) based on spawning escapement survey counts and hatchery returns have averaged approximately 49,000 fish (California Department of Fish and Game 2006).

Spawning and rearing requirements for fall-/late fall–run chinook salmon are similar to those identified above in the discussion for winter-run chinook salmon. Juvenile fall-/late fall–run chinook salmon typically rear in fresh water (in their natal streams, the Sacramento River, and the Delta) for up to 5 months before entering the ocean. Juveniles migrate downstream during January through June. Juvenile chinook salmon prefer water depths of 0.5–3.3 feet and velocities of 0.26–1.64 feet per second (Raleigh et al. 1986). Important winter habitat for juvenile chinook salmon includes flooded bars, side channels, and overbank areas with relatively low water velocities. Juvenile chinook salmon have been found to successfully rear in floodplain habitat, which routinely floods but is dry at other times. Growth rates appear to be enhanced by the conditions found in floodplain habitat.

Fall-/late fall–run chinook salmon emigrate as fry and subyearlings and remain off the California coast during their ocean migration (63 FR 11481, March 9, 1998).

Adult fall-/late fall–run chinook salmon enter the Sacramento and San Joaquin River systems from July through April and spawn from October through February. During spawning, the female digs a redd (gravel nest) in which she deposits her eggs, which are then fertilized by the male. Optimal water temperatures for egg incubation are 6.7º–12.2ºC (Rich 1997). Newly emerged fry remain in shallow, lower-velocity edgewaters, particularly where debris congregates and makes the fish less visible to predators (California Department of Fish and Game 1998). The duration of egg incubation and time of fry emergence depends largely on water temperature. In general, eggs hatch after a 3- to 5-month incubation period, and alevins (yolk-sac fry) remain in the gravel until their yolk-sacs are absorbed (2–3 weeks).

Sacramento Splittail

Recent data indicate that Sacramento splittail (*Pogonichthys macrolepidotus*) occur in the Sacramento River as far upstream as RBDD (Sommer et al. 1997) and that some adults spend the summer in the mainstem Sacramento River rather than returning to the estuary (Baxter 1999). The distribution and extent of spawning and rearing along the mainstem Sacramento River is unknown.

Sacramento splittail spawn over flooded terrestrial or aquatic vegetation in lower reaches of the Sacramento River between early March and May (Wang 1986, Moyle et al. 1995, Moyle 2002). Spawning has been observed to occur as early as January and to continue through July (Wang 1986). Larval splittail are commonly found in the shallow, vegetated areas where spawning occurs. Larvae eventually move into deeper, open-water habitats as they grow and become juveniles. During late winter and spring, young-of-year juvenile splittail (i.e., those less than 1 year old) are found in floodplain habitat, sloughs, rivers, and Delta channels near spawning habitat. Juvenile splittail gradually move from shallow, nearshore habitats to the deeper, open-water habitats of Suisun and San Pablo Bays (Wang 1986). In areas upstream of the Delta, juvenile splittail can be expected to be present in the flood basins (i.e., Sutter and Yolo Bypasses and the Sacramento River) when these areas are flooded during the winter and spring.

In 1999, after 4 years of candidate status, the splittail was listed as threatened under ESA (64 FR 25, March 10, 1999). Fall midwater trawl surveys indicate that abundance of juvenile splittail has been highly variable from year to year, with peaks and declines coinciding with wet and dry periods, respectively, and correlated with the availability of flooded shallow-water habitat. After the listing, the State Water Contractors, the San Luis and Delta-Mendota Water Authority, and others challenged the listing, contending that it violated ESA and the Administrative Procedures Act. On June 23, 2000, the U.S. District Court in Fresno ruled in favor of the plaintiffs and found the listing unlawful. On September 22, 2003, USFWS delisted splittail as a threatened species, indicating that habitat restoration actions such as CALFED and the Central Valley Project Improvement Act are likely to keep the splittail from becoming endangered in the foreseeable future (68 FR 55139, September 22, 2003).

Other Key Species Supported by the Lower Feather and Yuba Rivers

American Shad

American shad (*Alosa sapidissima*) is an anadromous fish species that has been introduced into the Central Valley and has become established as a popular sport fish. American shad enter the Feather and Yuba Rivers to spawn during the spring (primarily May and June) and support a seasonal fishery downstream of the dams. Shad abundance increases at higher Yuba River flows relative to flows in the Feather and Sacramento Rivers (Painter et al. 1977).

Sacramento Sucker

Sacramento sucker (*Catostomus occidentalis*) is widely distributed throughout the Sacramento River system. Sacramento sucker occupy waters from cold, high-velocity streams to warm, nearly stagnant sloughs. They are common at moderate elevations (600–2,000 feet). Sacramento sucker feed on algae, detritus, and benthic invertebrates. They usually spawn for the first time in their fourth or fifth years. When they cannot move upstream and instead spawn in lake habitat, they typically orient themselves near areas where spring freshets flow into the lake. They typically spawn in stream habitat on gravel riffles from late February to early June. The eggs hatch in 3–4 weeks, and the young typically live in the natal stream for a couple of years before moving downstream to a reservoir or large river (Moyle 2002).

Striped Bass

Striped bass (*Morone saxatilus*) is an anadromous fish that has been an important part of the sport-fishing industry in the Delta. They were introduced into the Sacramento–San Joaquin estuary between 1879 and 1882 (Moyle 2002). Striped bass will not typically use fish ladders; therefore, their range in the lower Feather and Yuba Rivers is limited to the river reaches below dams. Striped bass may move into the lower reaches of the rivers year round but probably most often between April and June, when they spawn. The species tends to remain in deep, slow-moving water, where it has access to prey without having to expend a great deal of energy.

Sacramento Pikeminnow

Sacramento pikeminnow (*Ptychocheilus grandis*) occupy rivers and streams throughout the Sacramento–San Joaquin River system, mainly at elevations between 300 and 2,000 feet. The Yuba, Feather, and Sacramento Rivers support populations of Sacramento pikeminnow. Sacramento pikeminnow spawn in April and May, with eggs hatching in less than a week. Within a week of hatching, the fry are free-swimming and schooling.

Adult pikeminnow may feed on other fish, including juvenile pikeminnow, chinook salmon, and steelhead. According to Moyle (2002), they are overrated as predators on salmonid species in natural environments. They can, however, be major predators on juvenile salmon and steelhead in riverine environments modified by dams and fish ladders. Pikeminnow tend to remain in well-shaded, deep pools with sand or rock substrate and are less likely to be found in areas where there are higher numbers of introduced predator species, such as largemouth bass and other centrarchid species.

5.4.3 ENVIRONMENTAL IMPACTS

THRESHOLDS OF SIGNIFICANCE

Thresholds for determining the significance of impacts related to fisheries were based on the environmental checklist form in Appendix G of the California Environmental Quality Act Guidelines (State CEQA Guidelines). A project alternative would have a significant impact on aquatic resources if it would:

- substantially reduce or degrade the habitat of a state or federal special-status species, potentially resulting in a reduction in special-status species abundance;
- directly or indirectly reduce the growth, survival, or reproductive success of substantial numbers of federal candidate species; state-listed endangered, threatened, rare, or special-concern species; or regionally important commercial or game species;
- directly or indirectly reduce the growth, survival, or reproductive success of individuals of a species listed or proposed for listing as threatened or endangered under ESA;
- substantially interfere with, or prevent the movement or migration of, any fish species;
- substantially reduce any fish populations; or
- substantially reduce the quality and quantity of important habitat for any fish species or their prey species.

The term "substantial," in relation to a reduction in a fish population, its habitat, or its range, has not been quantitatively defined in CEQA. What is considered substantial varies with each species and with the circumstances pertinent to a particular geographic area. Impacts were considered less than significant if they did not meet at least one of the criteria listed above. The specific criteria regarding construction effects, water quality effects, habitat effects, and fish movement that were used to determine the significance of impacts on fish are described in the impact analysis. Effects on fish were considered for populations in the lower Feather and Yuba Rivers.

IMPACT ANALYSIS

Alternative 1 – The Levee Strengthening Alternative

Impact LS-5.4-a

Loss of Fish Habitat during Levee Repair and Strengthening Activities. Construction-related increases in sediments, turbidity, and contaminants could adversely affect fish habitats immediately adjacent to and downstream of project construction activities, possibly resulting in adverse effects on fish species listed or proposed for listing as threatened or endangered under ESA. This impact would be **potentially significant**.

Strengthening the existing left (east) bank Feather River levee and left (south) bank Yuba River levee would disturb soils along the top, and potentially the water side, of the existing levees. Any resulting erosion could temporarily increase turbidity and sedimentation downstream of the construction sites if soils are transported in river flows or stormwater runoff. (See Impact LS-5.3-

a in Section 5.3, "Water Resources and River Geomorphology," for additional discussion of this issue.)

Fish population levels and survival have been linked to levels of turbidity and siltation in a watershed. Prolonged exposure to high levels of suspended sediment could create a loss of visual capability in fish, leading to a reduction in feeding and growth rates; a thickening of the gill epithelia, potentially causing the loss of respiratory function; clogging and abrasion of gill filaments; and increases in stress levels, reducing the tolerance of fish to disease and toxicants (Waters 1995).

Also, high levels of suspended sediments would cause the movement and redistribution of fish populations, and could affect physical habitat. Once suspended sediment is deposited, it could reduce water depths in pools, decreasing the water's physical carrying capacity for juvenile and adult fish (Waters 1995). Increased sediment loading could degrade food-producing habitat downstream of the project area as well. Sediment loading could interfere with photosynthesis of aquatic flora and displace aquatic fauna. Many fish are sight feeders, and turbid waters reduce the ability of these fish to locate and feed on prey. Some fish, particularly juveniles, could become disoriented and leave areas where their main food sources are located, ultimately reducing their growth rates.

Avoidance is the most common result of increases in turbidity and sedimentation. Fish will not occupy areas unsuitable for survival unless they have no other option. Some fish, such as bluegill and bass species, will not spawn in excessively turbid water (Bell 1991). Therefore, FRLRP Alternative 1 could cause fish habitat to become limited if high turbidity resulting from construction-related erosion were to preclude a species from occupying habitat required for specific life stages.

In addition, the potential exists for contaminants such as fuels, oils, and other petroleum products used in construction activities to be introduced into the water system directly or through surface runoff. Contaminants may be toxic to fish or may alter oxygen diffusion rates and cause acute and chronic toxicity to aquatic organisms, thereby reducing growth and survival.

Any of the impact mechanisms listed above could directly or indirectly reduce the growth, survival, or reproduction success of individuals of a species listed or proposed for listing as threatened or endangered under ESA. Therefore, this impact would be potentially significant.

Impact LS-5.4-b

Loss of Overhead Cover and Instream Woody Material Associated with Levee Repair and Strengthening Activities. Small amounts of riparian vegetation (i.e., individual trees) may need to be removed or cleared at the waterside toe of the existing levee during repairs at erosion problem areas in project Segment 2. The loss of overhead cover for fish would be negligible and temporary, however, and revegetation would occur over time. Therefore, this impact would be **less than significant**.

No riparian habitat is located on the surface of the existing Feather and Yuba River levees in the project area and no losses of riparian habitat are anticipated during the repair and strengthening of these levees. However, small amounts of riparian vegetation (i.e., individual trees) that potentially provide overhead cover for fish or contribute instream woody material to the Feather River, may need to be removed or cleared from the waterside toe of the existing levee during the

correction of identified erosion problem areas in project Segment 2 (see Figure 4-1, "FRLRP Project Features," in Chapter 4). Removal of riparian vegetation adjacent to the existing levee or otherwise in the floodplain would be minor and temporary, and revegetation would occur over time. Effects on fish habitat would be negligible. Therefore, this impact would be less than significant.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impact ASB-5.4-a

Loss of Fish Habitat during Levee Repair and Strengthening Activities and Setback Levee Construction. Construction-related increases in sediments, turbidity, and contaminants could adversely affect fish habitats immediately adjacent to and downstream of project construction activities, possibly resulting in adverse effects on fish species listed or proposed for listing as threatened or endangered under ESA. This impact would be **potentially significant**.

This impact would be the same as Impact LS-5.4-a, described under Alternative 1 above, except that the areas of construction disturbance and potential contribution of sediments to fish habitat would be expanded with construction of the Above Star Bend (ASB) setback levee in project Segment 2. Under Alternative 2, removal of portions of the existing Feather River levee in Segment 2 and clearing and excavation at the potential borrow area would disturb soils in the floodplain or adjacent to drainage canals that discharge into the floodway. Any erosion resulting from project construction could temporarily increase turbidity and sedimentation downstream of the construction sites if soils are transported in high river flows or stormwater runoff. This impact would be potentially significant.

Impact ASB-5.4-b

Loss of Overhead Cover and Instream Woody Material Associated with Setback Levee Construction. In project Segment 2, vegetation may need to be removed to allow drainage from the levee setback area to the river channel, or it may be cleared at the waterside toe of the existing levee to accommodate levee removal. The loss in overhead cover for fish would be limited and temporary, however, and revegetation would occur over time. Therefore, this impact would be **less than significant**.

For project Segments 1 and 3 this impact would be the same as Impact LS-5.4-b, described under Alternative 1 above, with no effect on riparian vegetation associated with levee repairs. In Segment 2, small amounts of riparian vegetation that potentially provide overhead cover for fish or contribute instream woody material to the Feather River channel, could be cleared on the water side of the existing levee if drainage channels need to be constructed to allow drainage of the levee setback area to the Feather River channel. Removal of portions of the existing levee also could result in a minor loss of riparian vegetation along the waterside toe of the existing levee. Removal of any riparian vegetation or woody material in the floodplain would be minor and entirely offset by increased riparian habitat within the alignment of the existing levee over time. Effects on fish habitat would be negligible. Therefore, this impact would be less than significant.

Impact ASB-5.4-c

Effects on Habitat from Contaminants in Borrow Material. If contaminants are present in soil in the levee setback area or in borrow material used for the setback levee, they could be released when the area is inundated during flood events, resulting in harm to sensitive fish and habitat. This impact would be **potentially significant**.

Some of the borrow material for construction of the setback levee in project Segment 2 would be obtained from segments of the existing Feather River levee and some would be obtained from soil borrow area(s) between the setback levee alignment and the Feather River and/or east of Star Bend. Because of the age of the existing levee and the unknown condition of the proposed borrow areas, there is potential for soil material used in the setback levee to contain elevated levels of hazardous substances. Other disturbed soils in the proposed levee setback area could contain such substances as well. (See Impact ASB-5.3-g in Section 5.3, "Water Resources and River Geomorphology," for additional discussion of this issue.) If present, hazardous substances could be released into flowing water when it enters the levee setback area and could harm sensitive fish and habitat resources. This impact would be potentially significant.

Impact ASB-5.4-d

Fish Stranding Following Flooding of the Levee Setback Area. Following construction of the setback levee, the levee setback area may contain depressions where water could pond following inundation and fish could become trapped as floodwaters recede to the main river channel. Stranded fish, particularly juvenile chinook salmon and steelhead, would be exposed to predators and increasing water temperatures; with no means to return to the river, they would inevitably die. This impact would be **significant**.

Because it would increase the extent of floodplain habitat potentially available to native fishes for rearing, the proposed ASB levee setback would be expected to have long-term fisheries benefits. However, following periods when high flows pass through the levee setback area, receding floodwater could collect in existing ponds, channels and ditches, borrow areas, and other depressions there. Fish that enter the floodway during higher flows, particularly juvenile chinook salmon and steelhead, could become stranded in these areas. Fish that are trapped in such depressions for long periods of time would experience high mortality rates as a result of lethal water temperatures, poor water quality, predation, or desiccation of these areas. Because stranding could adversely affect populations of special-status fish species, this impact would be significant.

Impact ASB-5.4-e

Increased Aquatic and Riparian Habitat in the Levee Setback Area. Setting back the Feather River levee in project Segment 2 could allow the expansion of the available aquatic and riparian habitat corridor and could improve the success of fish species that use the area. This effect would be **potentially beneficial**.

The levee system along much of the lower Feather and Yuba Rivers limits aquatic and riparian habitats to relatively narrow corridors. Setting back the levee along the proposed ASB setback levee alignment would widen the lower Feather River floodway by as much as approximately 0.5 mile. This action would expand the available floodplain habitat for fish.

Floodplains provide important seasonal habitat for native fish species during the winter and spring flood periods. For this reason, a key restoration goal of CALFED is to improve the connectivity between rivers and floodplain habitat, as well as increase the amount of shallow-water habitat in the Central Valley (CALFED Bay-Delta Program 2001). Numerous studies have

shown that shallow water and dense vegetation in these areas provide highly productive rearing areas for numerous species, including chinook salmon and splittail. Seasonally flooded habitat provides rearing habitat for chinook salmon and spawning, rearing, and foraging habitat for splittail (Sommer et al. 1997, 2001, 2002; Baxter et al. 1996; Moyle et al. 2000; Jones & Stokes 1999). Floodplain habitat offers protection from large piscivorous fish such as striped bass. The temporary nature of the flooded habitat and the protection offered by relatively shallow water and dense vegetative cover serve to exclude predatory fish. The productivity of floodplains is generally related to the frequency, timing, water depths, velocities, vegetation, water quality, and duration of inundation relative to the life history and habitat requirements of fish species. Physical conditions (e.g., type and extent of vegetation, soil conditions, and drainage patterns) may also contribute to habitat quality.

Flooded vegetation provides an abundant source of food, including detrital material, insect larvae, crustaceans, and other invertebrates. Juvenile chinook salmon and splittail apparently forage among a variety of vegetation types, including trees, brush, and herbaceous vegetation, but their relative importance, alone or in combination, is unknown. As noted in Section 5.4.2, "Environmental Setting," juvenile chinook salmon that rear in seasonally flooded habitat have higher survival and growth rates than juveniles that remain in the main river channel to rear (Jones & Stokes 1999, Sommer et al. 2001). The increased rate of growth may be related to the higher temperatures in the shallow water in this habitat and the higher associated rate of production of invertebrates, which are a substantial source of food for rearing juveniles, and of the grasses that support the invertebrates. Increases in the area available to juveniles could also reduce the competition for food and space, and could reduce the likelihood of encounters with predators (Sommer et al. 2001). In addition, juvenile chinook salmon that grow faster are likely to migrate downstream sooner, which helps to reduce the risks of predation and competition in freshwater systems.

In summary, widening the floodway by setting back the levee would expand the available habitat for fish. The newly created floodplain could create refugia for fish during peak flows even if the habitat is only temporary. Many of these benefits would occur even if the levee setback area continued in agricultural operations. If habitat restoration were undertaken in all or part of the levee setback area, this could help reverse regional riparian habitat losses; increase the effective amount and quality of habitat available to fish; and improve the conveyance capacity of the floodplain to provide migration corridors for, and sustain, fish populations. Providing wider floodplains and larger habitat units is especially important for migratory fish species, such as salmon and steelhead. Because the proposed ASB levee setback could increase the extent of floodplain habitat potentially available to native fishes for rearing, this impact would be potentially beneficial.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impact IS-5.4-a

Loss of Fish Habitat during Levee Repair and Strengthening Activities and Setback Levee Construction. This impact would be the same as Impact ASB-5.4-a, described under Alternative 2 above. For the same reasons as described above, this impact would be **potentially significant**.

Impact IS-5.4-b

Loss of Overhead Cover and Instream Woody Material Associated with Setback Levee Construction. This impact would be the same as Impact ASB-5.4-b, described under Alternative 2 above. For the same reasons as described above, this impact would be **less than significant**.

Impact IS-5.4-c

Effects on Habitat from Contaminants in Borrow Material. If contaminants are present in soil in the levee setback area or in borrow material used for the setback levee, they could be released when the area is inundated during flood events, resulting in harm to sensitive fish and habitat. This impact would be **potentially significant**.

This impact would be the same as Impact ASB-5.4-c, described under Alternative 2 above, except that the areas of potential contamination (the levee setback area and the setback levee alignment) would be smaller under this alternative. This impact would be potentially significant.

Impact IS-5.4-d

Fish Stranding Following Flooding of the Levee Setback Area. Following construction of the setback levee, the levee setback area may contain depressions where water could pond following inundation and fish become trapped as floodwaters recede to the main river channel. Stranded fish, including chinook salmon and steelhead, would be exposed to predators and increasing water temperatures; with no means to return to the river, they would inevitably die. This impact would be **significant**.

This impact would be the same as Impact ASB-5.4-d, described under Alternative 2 above, except that there would be a smaller amount of land with potential stranding areas in the levee setback area with the intermediate setback levee alignment. This impact would be significant.

Impact IS-5.4-e

Increased Aquatic and Riparian Habitat in the Levee Setback Area. Setting back the Feather River levee in project Segment 2 could allow the expansion of the available aquatic and riparian habitat corridor and could improve the success of fish species that use the area. This effect would be **potentially beneficial**.

This impact would be the same as Impact ASB-5.4-e, described under Alternative 2 above, except that setting back the levee along the intermediate setback levee alignment would expand the Feather River floodway less than would a levee setback along the ASB setback levee alignment. Therefore, the potential for benefits to fish species would be reduced. However, this impact would remain potentially beneficial.

5.4.4 MITIGATION MEASURES

ALTERNATIVE 1 – THE LEVEE STRENGTHENING ALTERNATIVE

No mitigation is required for Impact LS-5.4-b (loss of overhead cover and instream woody material associated with construction). Mitigation is provided below for Impact LS-5.4-a (habitat loss during construction).

LS-5.4-a(1): Prepare a SWPPP, File an NOI, and Comply with the NPDES Stormwater Permit for Project Construction Activities. This measure is identical to Mitigation Measure LS-5.3-a(1) in Section 5.3, "Water Resources and River

Geomorphology." This mitigation, together with Mitigation Measure LS-5.4-a(2), would reduce the potential temporary impact to a less-than-significant level.

LS-5.4-a(2): Obtain a Use Permit from Yuba County and Comply with Permit Conditions for Erosion Control. This measure is identical to Mitigation Measure LS-5.3-a(2) in Section 5.3, "Water Resources and River Geomorphology." This mitigation, together with Mitigation Measure LS-5.4-a(1), would reduce the potential temporary impact to a less-than-significant level.

ALTERNATIVE 2 – THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impacts ASB-5.4-b (loss of overhead cover and instream woody material associated with construction) and ASB-5.4-e (changes in aquatic and riparian habitat in the levee setback area). Mitigation is provided below for Impacts ASB-5.4-a (habitat loss during construction), ASB-5.4-c (borrow material effects on habitat), and ASB-5.4-d (fish stranding).

ASB-5.4-a(1): Prepare a SWPPP, File an NOI, and Comply with the NPDES Stormwater Permit for Project Construction Activities. This measure is identical to Mitigation Measure LS-5.3-a(1) in Section 5.3, "Water Resources and River Geomorphology." This mitigation, together with Mitigation Measures ASB-5.4-a(2) and ASB-5.4-a(3), would reduce the potential temporary impact to a less-than-significant level.

ASB-5.4-a(2): Obtain a Use Permit from Yuba County and Comply with Permit Conditions for Erosion Control. This measure is identical to Mitigation Measure LS-5.3-a(2) in Section 5.3, "Water Resources and River Geomorphology." This mitigation, together with Mitigation Measures ASB-5.4-a(1) and ASB-5.4-a(3), would reduce the potential temporary impact to a less-than-significant level.

ASB-5.4-a(3): Obtain and Comply with Terms and Conditions of a Streambed Alteration Agreement for Construction Activities Associated with the Setback Levee. This mitigation, together with Mitigation Measures ASB-5.4-a(1) and ASB-5.4-a(2), would reduce the potential temporary impact to a less-than-significant level.

Three Rivers Levee Improvement Authority (TRLIA) or its representative shall consult with DFG regarding potential disturbance to fish habitat as part of the process for obtaining a streambed alteration agreement, pursuant to Section 1602 of the California Fish and Game Code, for construction work associated with the setback levee. TRLIA shall comply with conditions set forth in the streambed alteration agreement to protect fish habitat.

Implementing Mitigation Measures ASB-5.4-a(1), ASB-5.4-a(2), and ASB-5.4-a(3) together would reduce the potential temporary impact on fish habitat immediately adjacent to and downstream of project construction activities to a less-than-significant level.

ASB-5.4-c(1): Conduct a Phase I Environmental Site Assessment for the Levee Setback Area and Implement Recommendations. This measure is identical to Mitigation Measure ASB-5.3-g(1) in Section 5.3, "Water Resources and River Geomorphology." This mitigation, together with Mitigation Measures ASB-5.4-

c(2) and ASB-5.4-c(3), would reduce the potential impact to a less-than-significant level.

ASB-5.4-c(2): Evaluate Levee Borrow Material for Potential Contaminants in Coordination with the RWQCB. This measure is identical to Mitigation Measure ASB-5.3-g(2) in Section 5.3, "Water Resources and River Geomorphology." This mitigation, together with Mitigation Measures ASB-5.4-c(1) and ASB-5.4-c(3), would reduce the potential impact to a less-than-significant level.

ASB-5.4-c(3): Remove Nonhazardous Waste and Debris from the Levee Setback Area. This measure is identical to Mitigation Measure ASB-5.3-g(3) in Section 5.3, "Water Resources and River Geomorphology." This mitigation, together with Mitigation Measures ASB-5.4-c(1) and ASB-5.4-c(2), would reduce the potential impact to a less-than-significant level.

ASB-5.4-d: Develop and Implement a Drainage and Grading Plan that Minimizes Loss or Incidental Loss of Fish from Stranding. This mitigation would reduce the impact to a less-than-significant level.

TRLIA and its primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize the potential for fish stranding in the levee setback area:

(a) Plan and implement drainage improvements. TRLIA or its designated construction contractors, through a combination of grading and drainage improvements, shall minimize the potential for floodwater to pond in the levee setback area in such a way that substantial numbers of fish become stranded and consequently become exposed to hostile environments (warm water temperatures and increased predation).

As part of the development of the final design for the levee setback area, TRLIA or its representatives shall determine the specific topographic and hydrologic characteristics of the levee setback area and shall define the anticipated flooding regime (depth, duration, and extent of flooding), drainage patterns, and potential for fish stranding risks there. The final project design shall include recontouring as necessary to ensure complete drainage and provide fish passage back to the main river channel as floodflows recede from the levee setback area. Features with substantial stranding risk shall be identified for filling and/or grading.

Complete drainage is important to reduce the risk of stranding; however, maintaining some seasonal aquatic habitat in the levee setback area and/or hydrologic connectivity to the Feather River may also be important features if enhancement of fish habitat and production is selected as a management activity in the levee setback area.

Before the design of the setback levee and levee setback area is finalized, TRLIA or its representatives shall obtain the approval of DFG and NMFS indicating that the planned drainage and grading features are sufficient to address concerns about fish stranding potential, similar to the process used for the Feather-Bear Rivers Levee Setback Project

currently under construction downstream. The features of the setback levee and levee setback area shall be constructed in accordance with the approved final design.

(b) Monitor the success of the drainage features and adjust if necessary. A mitigation monitoring plan shall be developed by a qualified biologist on behalf of TRLIA and shall be approved by DFG and NMFS before implementation of the levee setback. This monitoring plan shall evaluate the effectiveness of the grading and drainage features in the levee setback area in reducing the risk of fish stranding and the stability of the drainage features and shall determine the need for maintenance or modification. The monitoring plan shall include provisions for remediation should the design of the levee setback area prove to be unsuccessful in preventing fish stranding. These measures shall include, as appropriate, such activities as regrading or filling depressions in the levee setback area.

The recommended monitoring scheme shall include annual monitoring for a period of 5 years following the removal of any part of the existing levee. Additional monitoring may be required for areas where remediation is necessary. Monitoring is recommended to include the following actions:

- Visual assessment of the levee setback area by a qualified biologist before the flood season (i.e., by October 31). This assessment should note any substantial changes in the overall structure since implementation of the final design for the area, including reestablishment of vegetation and the presence of “holes” or pits.

- A visual survey by a qualified biologist at the end of each event that floods the levee setback area (i.e., after the recession of waters that inundate the floodplain). This survey should identify whether there is any ponding that would result in fish stranding, or whether channels have formed that flow through completely to the low-flow channel of the Feather River.

Following each flood season (i.e., after April 16), a letter report shall be submitted to NMFS and DFG summarizing the overall condition of the floodplain area and any changes that have occurred from the previous year(s). If any remediation measures are required, they shall be outlined in the letter report, along with a schedule specifying when the remediation activities will occur. Appropriate remediation measures shall be implemented as soon as is practicable to minimize the potential for fish stranding while maintaining the desired habitat values (if habitat enhancement is included in the floodplain area) and hydraulic characteristics of the area.

The performance of the mitigation measure shall be considered successful if there is no isolated standing water and/or barriers to fish passage capable of resulting in substantial fish stranding following a flood event that inundates the levee setback area.

Implementing Mitigation Measure ASB-5.4-d would reduce the potential fish stranding impact to a less-than-significant level.

ALTERNATIVE 3 – THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impacts IS-5.4-b (loss of overhead cover and instream woody material associated with construction) and IS-5.4-e (increased aquatic and riparian habitat in the levee setback area). Mitigation is provided below for Impacts IS-5.4-b (habitat loss during construction), IS-5.4-c (borrow material effects on habitat), and IS-5.4-d (fish stranding).

IS-5.4-a(1): **Prepare a SWPPP, File an NOI, and Comply with the NPDES Stormwater Permit for Project Construction Activities.** This measure is identical to Mitigation Measure LS-5.3-a(1) in Section 5.3, "Water Resources and River Geomorphology." This mitigation, together with Mitigation Measures IS-5.4-a(2) and IS-5.4-a(3), would reduce the potential temporary impact to a less-than-significant level.

IS-5.4-a(2): **Obtain a Use Permit from Yuba County and Comply with Permit Conditions for Erosion Control.** This measure is identical to Mitigation Measure LS-5.3-a(2) in Section 5.3, "Water Resources and River Geomorphology." This mitigation, together with Mitigation Measures IS-5.4-a(1) and IS-5.4-a(3), would reduce the potential temporary impact to a less-than-significant level.

IS-5.4-a(3): **Obtain and Comply with Terms and Conditions of a Streambed Alteration Agreement for Construction Activities Associated with the Setback Levee.** This measure is identical to Mitigation Measure ASB-5.4-a(3) above. This mitigation, together with Mitigation Measures IS-5.4-a(1) and IS-5.4-a(2), would reduce the potential temporary impact to a less-than-significant level.

IS-5.4-c(1): **Conduct a Phase I Environmental Site Assessment for the Levee Setback Area and Implement Recommendations.** This measure is identical to Mitigation Measure ASB-5.3-g(1) in Section 5.3, "Water Resources and River Geomorphology." This mitigation, together with Mitigation Measures IS-5.4-c(2) and IS-5.4-c(3), would reduce the potential impact to a less-than-significant level.

IS-5.4-c(2): **Evaluate Levee Borrow Material for Potential Contaminants in Coordination with the RWQCB.** This measure is identical to Mitigation Measure ASB-5.3-g(2) in Section 5.3, "Water Resources and River Geomorphology." This mitigation, together with Mitigation Measures IS-5.4-c(1) and IS-5.4-c(3), would reduce the potential impact to a less-than-significant level.

IS-5.4-c(3): **Remove Nonhazardous Waste and Debris from the Levee Setback Area.** This measure is identical to Mitigation Measure ASB-5.3-g(3) in Section 5.3, "Water Resources and River Geomorphology." This mitigation, together with Mitigation Measures IS-5.4-c(1) and IS-5.4-c(2), would reduce the potential impact to a less-than-significant level.

IS-5.4-d: **Develop and Implement a Drainage and Grading Plan that Minimizes Loss or Incidental Loss of Fish from Stranding.** This measure is identical to

Mitigation Measure ASB-5.4-d above. This mitigation would reduce the impact to a less-than-significant level.

5.4.5 IMPACTS REMAINING SIGNIFICANT AFTER MITIGATION

With implementation of the mitigation described above, all impacts on fisheries would be reduced to a less-than-significant level.

SECTION 5.5 TERRESTRIAL BIOLOGICAL RESOURCES

Terrestrial wildlife, plants, and habitats are discussed in this section. Aquatic biological resources (e.g., fisheries) are addressed in Section 5.4, "Fisheries." The evaluation presented in this section is based on field survey results and a review of existing documentation. EDAW biologists conducted reconnaissance-level and focused biological field surveys of portions of the project area where access was permitted on March 22; May 8, 11, 18, 26, and 31; and July 27, 2006. The purpose of these surveys was to characterize general biological resources, evaluate the potential for sensitive biological resources to occur on the project site, and document locations of breeding raptors.

5.5.1 REGULATORY SETTING

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

Federal Endangered Species Act

The U.S. Fish and Wildlife Service (USFWS) has authority over projects that may affect the continued existence of a federally listed (threatened or endangered) terrestrial species. Section 9 of the federal Endangered Species Act (ESA) prohibits the take of federally listed species; take is defined under ESA, in part, as killing, harming, or harassment. Under federal regulations, take is further defined to include habitat modification or degradation where it actually results in death or injury to wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering.

Section 7 of ESA outlines procedures for federal interagency cooperation to conserve federally listed species and designated critical habitat. Section 7(a)(2) requires federal agencies to consult with USFWS to ensure that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species. The Feather River Levee Repair Project (FRLRP) is expected to require permitting and/or authorization by the U.S. Army Corps of Engineers (Corps); therefore, ESA compliance for the project is anticipated to be completed through Corps compliance with the procedures described in Section 7.

Section 404 of the Clean Water Act

In accordance with Section 404 of the Clean Water Act (CWA), the Corps regulates discharge of dredged or fill material into waters of the United States. Waters of the United States and their lateral limits are defined in Title 33, Part 328.3(a) of the Code of Federal Regulations to include:

- navigable waters of the United States,
- interstate waters,
- all other waters where the use or degradation or destruction of the waters could affect interstate or foreign commerce,
- tributaries to any of these waters, and

- wetlands that meet any of these criteria or that are adjacent to any of these waters or their tributaries.

Waters of the United States are often categorized as "jurisdictional wetlands" (i.e., wetlands over which the Corps exercises jurisdiction under Section 404) and "other waters of the United States" when habitat values and characteristics are being described. "Fill" is defined as any material that replaces any portion of a water of the United States with dry land or that changes the bottom elevation of any portion of a water of the United States. Any activity resulting in the placement of dredged or fill material within waters of the United States requires a permit from the Corps.

In accordance with Section 401 of the Clean Water Act, projects that apply for a Corps permit for discharge of dredged or fill material must obtain water quality certification from the appropriate regional water quality control board (RWQCB) indicating that the project will uphold state water quality standards.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA), first enacted in 1918, implements domestically a series of treaties between the United States and Great Britain (on behalf of Canada), Mexico, Japan, and the former Soviet Union that provide for international migratory bird protection. The MBTA authorizes the Secretary of the Interior to regulate the taking of migratory birds; the act provides that it shall be unlawful, except as permitted by regulations, "to pursue, take, or kill any migratory bird, or any part, nest or egg of any such bird…" (U.S. Code Title 16, Section 703). This prohibition includes both direct and indirect acts, although harassment and habitat modification are not included unless they result in direct loss of birds, nests, or eggs. The current list of species protected by the MBTA includes several hundred species and essentially includes all native birds. The act offers no statutory or regulatory mechanism for obtaining an incidental take permit for the loss of nongame migratory birds.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

California Endangered Species Act

Pursuant to the California Endangered Species Act (CESA), a permit from the California Department of Fish and Game (DFG) is required for projects that could result in the take of a plant or animal species that is state-listed as threatened or endangered. Under CESA, "take" is defined as an activity that would directly or indirectly kill an individual of a species, but the CESA definition of take does not include "harming" or "harassing," as the ESA definition does. As a result, the threshold for take is higher under CESA than under ESA (i.e., habitat modification is not necessarily considered take under CESA).

California Fish and Game Code Sections 3503 and 3503.5—Protection of Bird Nests and Raptors

Section 3503 of the California Fish and Game Code states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. Section 3503.5 specifically states that it is unlawful to take, possess, or destroy any raptors (i.e., species in the orders Falconiformes and Strigiformes), including their nests or eggs. Typical violations of these codes include destruction

of active nests resulting from removal of vegetation in which the nests are located. Violation of Section 3503.5 could also include failure of active raptor nests resulting from disturbance of nesting pairs by nearby project construction. This statute does not provide for the issuance of any type of incidental take permit.

California Fish and Game Code—Fully Protected Species

Protection of fully protected species is described in Sections 3511, 4700, 5050, and 5515 of the California Fish and Game Code. These statutes prohibit take or possession of fully protected species. DFG is unable to authorize incidental take of fully protected species when activities are proposed in areas inhabited by those species. DFG has informed nonfederal agencies and private parties that they must avoid take of any fully protected species in carrying out projects.

California Fish and Game Code Section 1602—Streambed Alteration

All diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake in California that supports wildlife resources are subject to regulation by DFG under Section 1602 of the California Fish and Game Code. Under Section 1602, it is unlawful for any person, governmental agency, or public utility to do the following without first notifying DFG:

> …substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of any river, stream, or lake, or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake.

A stream is defined as a body of water that flows at least periodically or intermittently through a bed or channel that has banks and supports fish or other aquatic life. This definition includes watercourses with a surface or subsurface flow that supports or has supported riparian vegetation. DFG's jurisdiction within altered or artificial waterways is based on the value of those waterways to fish and wildlife. A DFG streambed alteration agreement must be obtained for any project that would result in an impact on a river, stream, or lake.

Porter-Cologne Water Quality Control Act

Under the Porter-Cologne Water Quality Control Act, "waters of the state" fall under the jurisdiction of the appropriate RWQCB (which, for the FRLRP, would be the Central Valley RWQCB). Under the act, the RWQCB must prepare and periodically update water quality control basin plans. Each basin plan sets forth water quality standards for surface water and groundwater, as well as actions to control nonpoint and point sources of pollution to achieve and maintain these standards. Projects that affect wetlands or waters must meet waste discharge requirements of the RWQCB, which may be issued in addition to a water quality certification or waiver under Section 401 of the CWA.

California Native Plant Society Species Designations

The California Native Plant Society (CNPS) is a statewide nonprofit organization that seeks to increase understanding of California's native flora and to preserve this rich resource for future generations. CNPS has developed and maintains lists of vascular plants of special concern in

California as described below under "Special-Status Species." CNPS-listed species have no formal legal protection, but the values and importance of these lists are widely recognized. CNPS List 1 and 2 species are considered rare plants pursuant to Section 15380 of the California Environmental Quality Act (CEQA), and it is recommended that they be fully considered during preparation of environmental documents relating to CEQA.

LOCAL PLANS, POLICIES, REGULATIONS, AND LAWS

The *Yuba County General Plan* (Yuba County 1996) provides overall guidance for resource conservation in Yuba County and includes several resource conservation objectives that aim to protect significant biological resources. Specific habitats identified for special consideration for preservation and protection are the Yuba River, Yuba River watershed, wetlands, and valley oaks (*Quercus lobata*) and oak woodlands in foothill areas. Yuba County has also approved the *Yuba County Voluntary Individual Oak and Oak Woodland Management Plan*. The plan provides management techniques and guidelines for landowners who voluntarily choose to apply them in part or in full, to promote the general health of individual oaks and oak woodlands found upon their land. The plan encourages the retention of oaks of all sizes and species, including hollow or dead trees used for nesting, reforestation of oaks, planning for replacement of oaks, and the removal of trees which are fire or safety hazards.

5.5.2 ENVIRONMENTAL SETTING

SOURCES OF INFORMATION

Information provided in this section is based primarily on the results of field surveys conducted for the FRLRP, surveys conducted by EDAW in support of the Feather-Bear Rivers Levee Setback Project (F-BRLSP), and preparation of previous environmental documents for the Yuba-Feather Supplemental Flood Control Project (Y-FSFCP) and the F-BRLSP (Yuba County Water Agency 2003, 2004). Field surveys in the FRLRP project area could be conducted only in locations where access was permitted. Information on properties where access was not available was gathered by viewing the property from public areas and by analyzing aerial photographs. Additional information was compiled through review of databases of sensitive biological resources, including the California Natural Diversity Database (CNDDB) (California Natural Diversity Database 2006) and the online version of CNPS's *Inventory of Rare and Endangered Vascular Plants of California* (California Native Plant Society 2006).

HABITAT TYPES

Habitat types in the project area are characterized in this section. The descriptions of habitat types and species presence are based on observations made during the reconnaissance-level surveys and information previously presented in the Y-FSFCP programmatic environmental impact report (EIR) (Yuba County Water Agency 2003). Plant community classification is based primarily on *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986).

Six habitat types exist within the project area: riparian forest/scrub, elderberry savanna, wetlands, open-water drainages, ruderal areas, orchards/agricultural land, and development. Each of these habitat types is described briefly below. A Valley elderberry longhorn beetle mitigation area is also present within Segment 3. The location of these habitat types and the valley

elderberry longhorn beetle mitigation area are shown in Figures 5.5-1a, 5.5-1b, and 5.5-1c, "Habitat Types and Elderberry Shrub Locations within the Project Area."

Riparian Forest/Scrub

Riparian habitat in the project area includes Great Valley mixed riparian forest, Great Valley valley oak riparian forest, willow riparian scrub, and elderberry savanna (described separately below). Figures 5.5-1a through 5.5-1c show the extent of riparian habitat in and near the existing Feather River and lower Yuba River levees in all three FRLRP project segments and the proposed levee setback area in project Segment 2.

Riparian Forest

Riparian forest occurs as a broad to narrow band of vegetation within the floodplains of the Feather and Yuba Rivers. Relatively thin corridors of riparian habitat are present along Clark Slough, the Plumas Lake Canal, and irrigation/drainage ditches in the proposed levee setback area in Segment 2. Riparian habitat is characterized by a complex structure, and the dominance of its component species varies along the river.

Great Valley mixed riparian forest is found within the Feather River and Yuba River floodways and, to a lesser extent, along Clark Slough and the Plumas Lakes Canal. This is a deciduous broadleaved forest community with a moderately dense to dense tree canopy that typically includes several species as codominants.

Within the project area the upper canopy of Great Valley mixed riparian forest is typically dominated by valley oak, Fremont cottonwood (*Populus fremontii*), boxelder (*Acer negundo*), Goodding's willow (*Salix gooddingii*), shining willow (*S. lucida* spp. *lasiandra*), red willow (*S. laevigata*), and Oregon ash (*Fraxinus latifolia*). White alder *(Alnus rhombifolia*), northern California black walnut (*Juglans californica* var. *hindsii)*, and western sycamore (*Platanus racemosa*) may also exist in the upper canopy.

The lower shrub canopy is very dense and thicket-like. The dominant species are buttonbush (*Cephalanthus occidentalis*), California rose (*Rosa californica*), blue elderberry (*Sambucus mexicanus*), Himalayan blackberry (*Rubus discolor*), and shrub-like forms of the various willow species listed above. Lianas such as California grape (*Vitis californica*) and virgin's bower (*Clematis ligusticifolia)* are also found in the shrub layer. The herbaceous understory ranges from very developed to sparse depending on the amount of light filtering through the upper canopies, but typically includes various grasses, sedges, and rushes. The Great Valley mixed riparian forest along the existing Feather River levee is very dense and consists mostly of even-aged trees, with scattered, more established trees in some areas. A few mature valley oaks are apparent along the edge of the mixed riparian forest.

Great Valley valley oak riparian forest is generally found in the same areas as mixed riparian forest. Great Valley valley oak riparian forest is a deciduous broadleaved forest community with a closed to somewhat open canopy. This community type is similar to the Great Valley mixed riparian forest community described above but is clearly dominated by valley oak. The lower canopy includes scattered Oregon ash, Northern California black walnut, sycamore, and young valley oak. The sparse to dense shrub layer includes blue elderberry, California rose, coyote

brush (*Baccharis pilularis*), and Pacific blackberry (*Rubus ursinus*). Climbing vines are apparent in openings but may also be found scattered in the shady understory. Common vine species are California pipevine (*Aristolochia californica*), virgin's bower, and California grape. A variety of grasses, sedges, and forbs such as creeping wild-rye (*Leymus triticoides*), mugwort (*Artemesia douglasiana*), and barbara sedge (*Carex barbarae*) exist in the dense to sparse understory.

Riparian Scrub

Willow riparian scrub is a dense, shrub-dominated plant community that exists in patches along the Feather and Yuba Rivers and is also found along drainage/irrigation canals within the proposed levee setback area in project Segment 2. Characteristic willow species in the project area are Goodding's willow, Arroyo willow (*Salix lasiolepis*), and red willow. Blue elderberry shrubs can also be found frequently. This community typically creates dense, impenetrable thickets, but remains fairly short in stature.

Elderberry Savanna

Elderberry savanna is characterized by open stands of blue elderberry with an annual grassland understory. It occurs in project Segments 2 and 3, in areas along the Feather and Yuba River corridors where disturbances have created large gaps in the dense canopies of the mixed and valley oak riparian communities. Also found in this community are scattered coyote brush, rose, Himalayan blackberry, and willow shrubs.

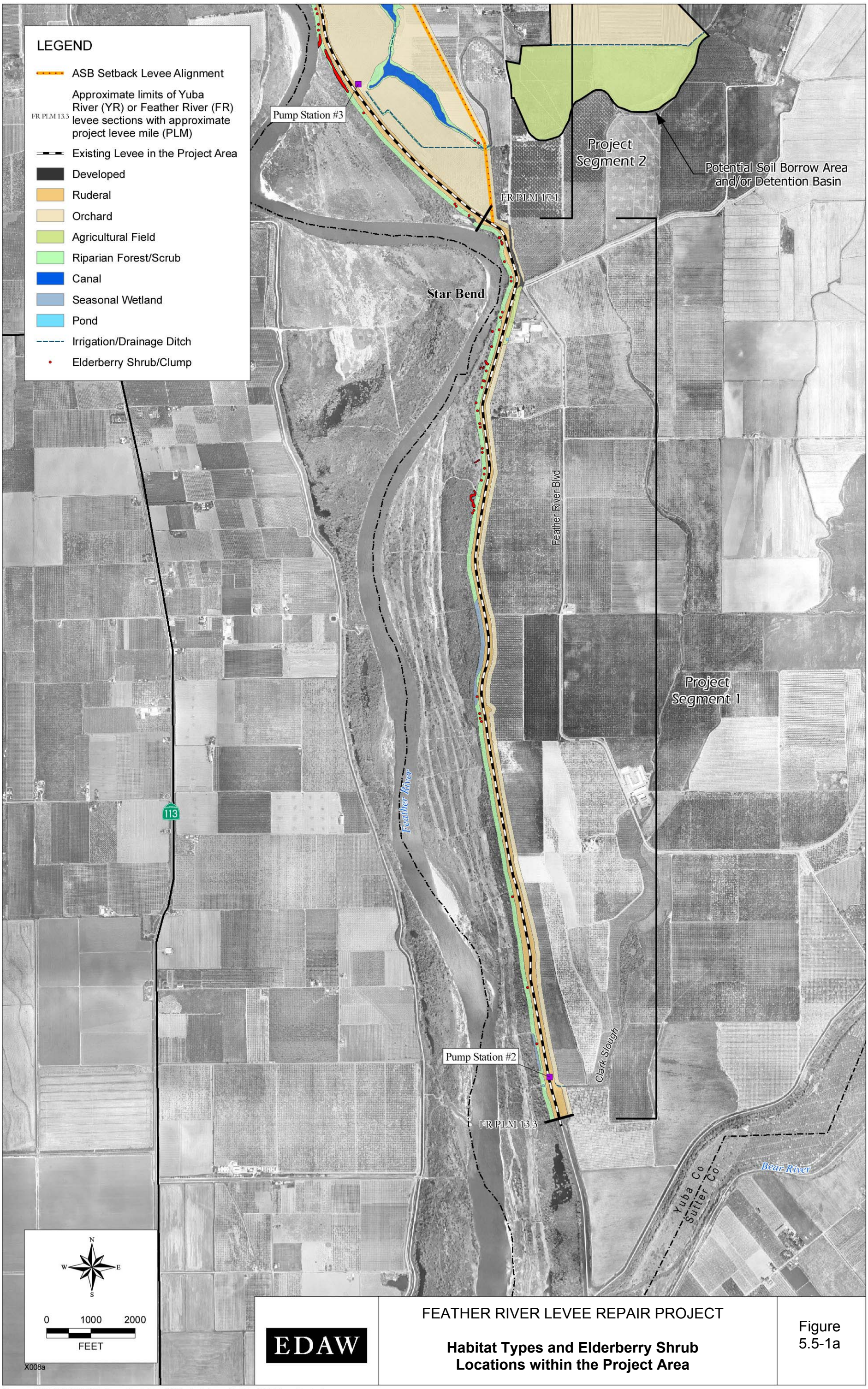
Wetlands

Freshwater marsh and seasonal wetland habitats can be found in project Segments 1 and 2. Wetland areas within the Feather River floodway, the Plumas Lake Canal, and additional drainage/irrigation ditches east of the existing Feather River levee support freshwater marsh vegetation (Figures 5.5-1a and 5.5-1b). Freshwater marshes are permanently flooded and are dominated by emergent perennial monocots, such as cattails (*Typha angustifolia*), sedges (*Carex* spp.), and tules (*Scirpus acutus*). Other characteristic herbaceous species are water primrose (*Ludwigia peploides*), smartweed (*Polygonum* sp.), South American vervain (*Verbena bonariensis*), and reed canarygrass (*Phalaris arundinacea*).

Potential seasonal wetlands exist within the riparian forest on the water side of the existing Feather River levee, primarily in project Segment 2. This area has many large linear depressions that may be a combination of remnant river channels and historical sources of borrow material. These low-lying areas temporarily pond water during the wet, winter season but become dry as the river levels and precipitation decrease in the spring and summer. Species observed in these seasonally wet areas included many of the species found in the riparian forest and willow scrub, but also include areas dominated by monocultures of herbaceous species.

Open-Water Drainages

The Feather and Yuba Rivers are large, perennially flowing drainages in the project area. They are generally open-water habitats lined with riparian forest and willow scrub. The Yuba River has a small side channel that carries high flows between the Feather River and the existing left bank



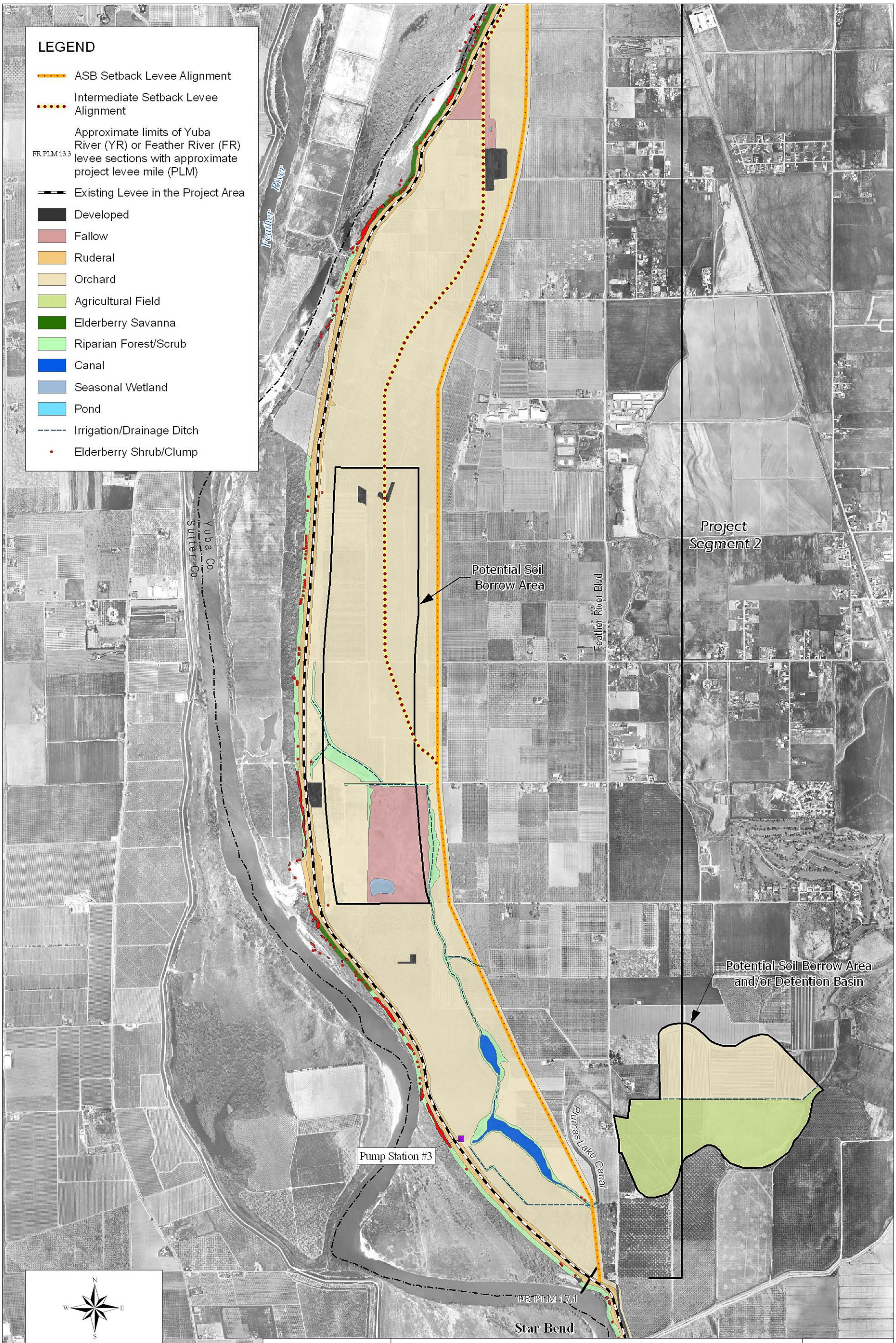
EDAW

FEATHER RIVER LEVEE REPAIR PROJECT

Habitat Types and Elderberry Shrub Locations within the Project Area

Figure 5.5-1a

Sources: EDAW 2006; GEI Consultants, Inc. 2004; Aerial provided by GEI Consultants, Inc.



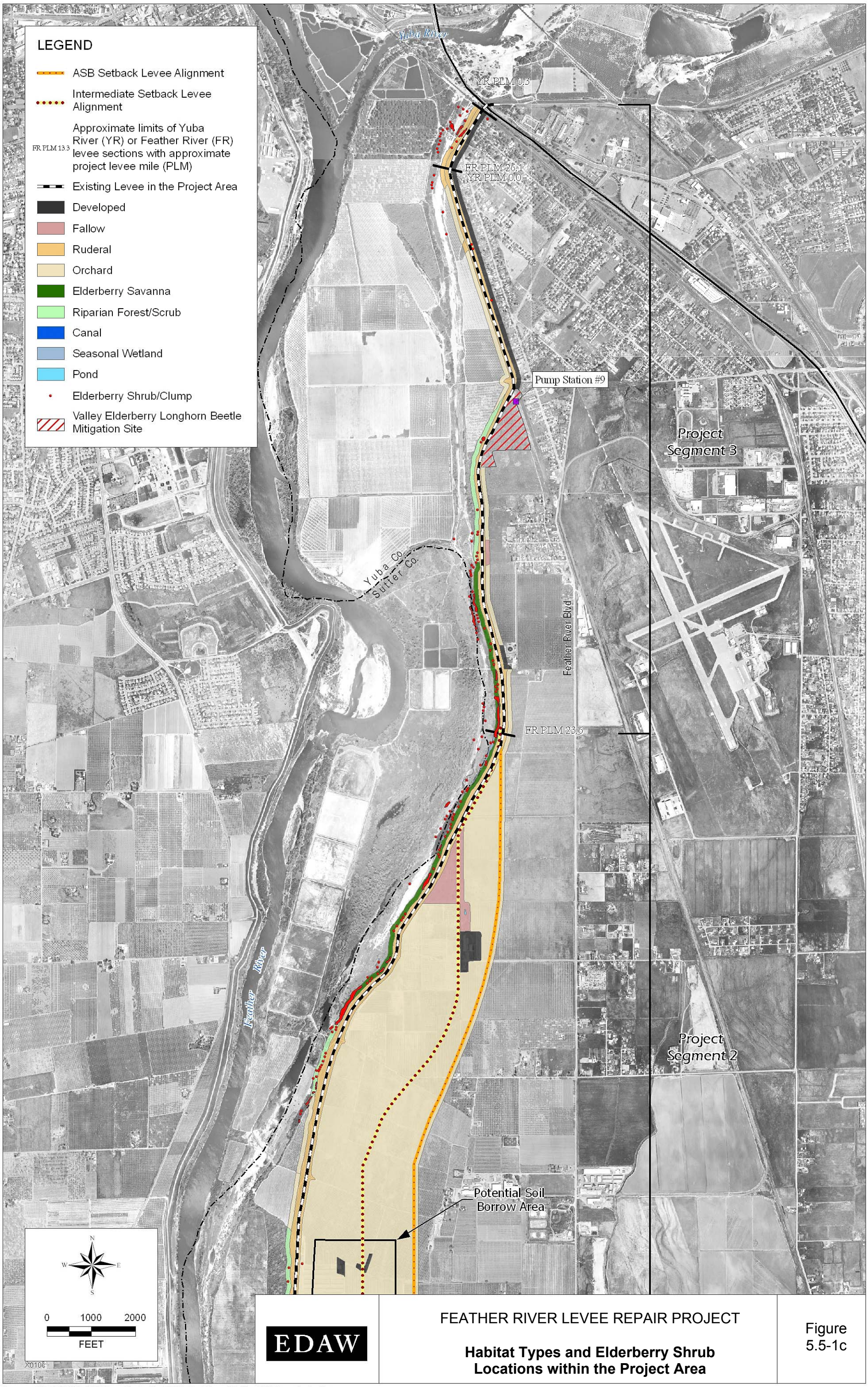
EDAW

FEATHER RIVER LEVEE REPAIR PROJECT

Habitat Types and Elderberry Shrub Locations within the Project Area

Figure 5.5-1b

Sources: EDAW 2006; GEI Consultants, Inc. 2004; Aerial provided by GEI Consultants, Inc.



EDAW

FEATHER RIVER LEVEE REPAIR PROJECT

Habitat Types and Elderberry Shrub Locations within the Project Area

Figure 5.5-1c

Sources: EDAW 2006; GEI Consultants, Inc. 2004; Aerial provided by GEI Consultants, Inc.

levee in project Segment 3. This side channel was not flowing at the time of the reconnaissance surveys, but some sections did contain standing water. Some portions of the channel bed were vegetated with riparian or wetland species and other areas were barren.

Many irrigation/drainage ditches serve to transport water to and from lands on both sides of the existing Feather River levee, including the proposed levee setback area in project Segment 2. Some of these irrigation ditches are maintained regularly and therefore lack vegetation; others are more established canals that are well vegetated. These ditches and canals convey water pumped from the river to orchards and fields of row crops on the land side of the Feather River levee and drain the area to three pump stations (Pump Stations No. 2, 3, and 9 in project Segments 1, 2, and 3, respectively) that lift stormwater and agricultural drainage water into the Feather River floodway.

Ruderal Areas

Ruderal areas are those that have been stripped of their native vegetative cover and that are either covered by gravel or dirt or dominated by weedy invasive species. Ruderal areas are common along the existing Feather River and Yuba River levees in all three project segments and in disturbed areas such as access roads. The levee slopes are generally dominated by nonnative grasses such as wild oats (*Avena fatua*); however, a few native species, including creeping wild rye (*Leymus triticoides*), blue elderberry, and valley oak saplings, have become established in isolated areas on the levee slopes and at the levee toe. The vegetation on the levee slopes is maintained periodically through prescribed fire and/or mowing. An approximately 35-foot-wide corridor along the water side of the existing levees is routinely mowed and/or disked to keep woody riparian vegetation from becoming established. Conspicuous weeds in these ruderal areas are medusahead (*Taeniatherum caput-medusae*), woolly mullein (*Verbascum thapsus*), Canada thistle (*Cirsium arvense*), and yellow star-thistle (*Centaurea solstitialis*).

Orchards/Agricultural Land

Many of the areas between the existing Feather River levee and Feather River Boulevard are dominated by agricultural land. These agricultural areas consist mostly of orchards where fruit and nut crops are grown, as well as some agricultural facilities. Orchards are also maintained in the Feather River floodway in project Segments 2 and 3, between the Feather River and the left (east) bank levee. A small percentage of the agricultural land in the proposed levee setback area in Segment 2 and Feather River floodway was fallow or planted with field crops at the time of the field surveys.

Fallow fields are areas that were previously cultivated, harvested, and plowed, but have not been in agricultural production recently. These lands are characterized primarily by annual grasses and weedy forbs, but they may also include seedlings of some native tree and shrub species, such as willows and cottonwoods. This community type differs from the ruderal classification in that it is not currently subject to ongoing disturbance and is used specifically to describe areas that were previously cultivated.

Developed Land

Developed areas in the project vicinity generally consist of residential structures and other buildings, yards, roads, and parking areas. Developed areas are scattered on the land side of the

existing Feather River and Yuba River levees. An area of relatively high-density commercial and residential development is located at the northern end of project Segment 3. There are several scattered residential properties and other structures within the proposed levee setback area in project Segment 2. Many of the developed areas are devoid of vegetation, but where vegetation exists, it ranges from sparse cover of weedy species to horticultural plantings.

WILDLIFE

The overall quality of wildlife habitat in the project vicinity is high, particularly in project Segment 1 and the southern portion of Segment 2. This is the case primarily because of the extensive corridor of riparian habitat within the existing Feather River floodway and riparian patches associated with the Plumas Lake Canal and other irrigation/drainage ditches within the potential levee setback area in Segment 2. Riparian habitat within the existing Feather River floodway supports a high diversity of terrestrial wildlife species, including a wide range of breeding, migrant, and wintering birds, common reptiles and amphibians, and a variety of mammals.

The large areas of agricultural lands east of the Feather River levee support a lower diversity of wildlife, but can provide valuable habitat for large numbers of common bird, reptile, and mammal species. Field crops, fallow fields, and ruderal areas provide important foraging and nesting habitat for a variety of species. Irrigation/drainage ditches and the aquatic habitats they support provide habitat for amphibians, reptiles, and birds that may not occur elsewhere in the project area.

EDAW surveys conducted in 2006 documented a wide diversity of breeding birds, including seven species of raptors within the project area: Swainson's hawk (*Buteo swainsoni*), northern harrier (*Circus cyaneus*), Cooper's hawk (*Accipiter cooperii*), white-tailed kite (*Elanus leucurus*), red-shouldered hawk (*Buteo lineatus*), red-tailed hawk (*Buteo jamaicensis*), and great horned owl (*Bubo virgineanus*). Mammals observed in the Feather River floodway and adjacent agricultural lands are mule deer (*Odocoileus hemionus*), bobcat (*Lynx rufus*), coyote (*Canis latrans*), black-tailed jackrabbit (*Lepus californicus*), and California ground squirrel (*Spermophilus beecheyii*). A variety of small mammals are also likely to occur and provide prey for the high numbers and diversity of breeding raptors.

SENSITIVE BIOLOGICAL RESOURCES

Sensitive biological resources addressed below are those that are afforded special protection through CEQA, the California Fish and Game Code (including but not limited to CESA), ESA, and the CWA.

Special-Status Species

Special-status species are plants and animals that are legally protected or that are otherwise considered sensitive by federal, state, or local resource conservation agencies and organizations, including:

- plant and wildlife species that are listed by ESA and/or CESA as rare, threatened, or endangered;
- plant and wildlife species considered candidates for listing or proposed for listing;

- wildlife species identified by DFG or USFWS as species of concern;
- wildlife species identified by DFG as fully protected; and
- taxa considered by CNPS to be "rare, threatened, or endangered in California." The CNPS Inventory of Rare and Endangered Vascular Plants of California (CNPS Inventory) (California Native Plant Society 2006) includes five lists for categorizing plant species of concern, which are summarized as follows:
    - List 1A—Plants presumed to be extinct in California
    - List 1B—Plants that are rare, threatened, or endangered in California and elsewhere
    - List 2—Plants that are rare, threatened, or endangered in California but more common elsewhere
    - List 3—Plants about which more information is needed (a review list)
    - List 4—Plants of limited distribution (a watch list)

The term "California Species of Special Concern" is applied by DFG to animals that are not listed under ESA or CESA but are nonetheless declining at a rate that could result in listing, or that historically occurred in low numbers and currently face known threats to their persistence. Plant inventories prepared by CNPS provide one source of substantial evidence that is used by lead agencies to determine what plants meet the definition of endangered, rare, or threatened species, as described in Section 15380 of the State CEQA Guidelines. For purposes of this document, the relevant inventories are List 1B (plants that are rare, threatened, or endangered in California and elsewhere) and List 2 (plants that are rare, threatened, or endangered in California but more common elsewhere). All plants listed in the CNPS Inventory (California Native Plant Society 2006) are considered "special plants" by DFG. The term "special plants" is a broad term used by DFG to refer to all of the plant taxa inventoried by the CNDDB, regardless of their legal or protection status. Notation as a List 1B or 2 plant species does not automatically qualify the species as endangered, rare, or threatened within the definition of State CEQA Guidelines Section 15380. Rather, CNPS designations are considered along with other available information about the status, threats, and population condition of plant species to determine whether a species warrants evaluation as an endangered, rare, or threatened species under CEQA. Other sources include consultation with biologists from federal, state responsible, and state trustee agencies with jurisdiction over natural resources of the project site and area; published and unpublished research; field survey records; local and regional plans adopted for the conservation of species (such as habitat conservation plans or natural community conservation plans), other CEQA or National Environmental Policy Act (NEPA) documents; or other relevant information. Plants on Lists 1A, 1B, and 2 of the CNPS Inventory may qualify for listing, and DFG recommends—and local governments may require—that these species be addressed in CEQA projects. However, a plant species need not be in the CNPS Inventory to be considered a rare, threatened, or endangered species under CEQA.

The CNDDB was used as the primary source to identify previously reported occurrences of special-status species in the project vicinity (California Natural Diversity Database 2006).

Although the CNDDB is the most current and reliable tool for tracking occurrences of special-status species, it contains only those records that have been reported to DFG. To identify additional special-status plant species with potential to occur in the project area, a search of the online edition of CNPS's *Inventory of Rare and Endangered Vascular Plants of California* (California Native Plant Society 2006) was also conducted. CNDDB and CNPS database searches were conducted for the Yuba City, Olivehurst, and Nicolaus U.S. Geological Survey (USGS) quadrangles, as well as the 12 immediately adjacent quadrangles. Other sources include both published and unpublished data and reports and observations made during reconnaissance surveys conducted for the FRLRP. The locations of the CNDDB-recorded occurrences of sensitive terrestrial biological resources in and near the project area are depicted in Figure 5.5-2, "CNDDB-Recorded Occurrences of Biological Resources in the Project Vicinity."

Special-Status Plant Species

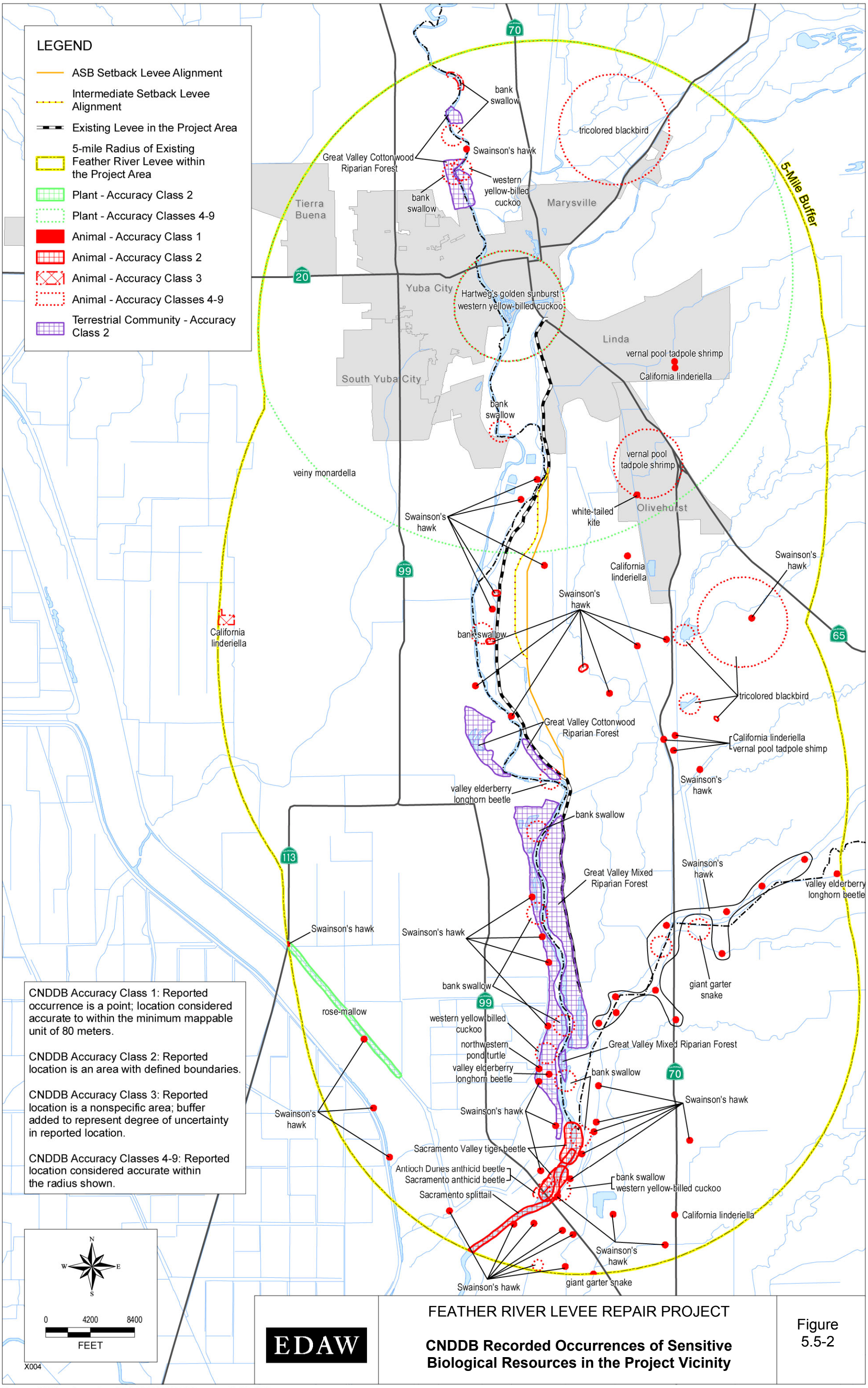
Seven special-status plant species are documented in the CNDDB and CNPS Inventory as occurring in the project vicinity. Each species is listed in Table 5.5-1, along with its status, habitat requirements, blooming periods, and potential for occurrence in the project area. Only two of these species, rose mallow and Wright's trichocoronis, have potential to occur in the project area and are discussed further below. The remaining species are not expected to occur because they are restricted to habitats that are not present in the project area, such as vernal pools, meadows, grasslands, and cismontane woodlands.

Rose mallow (*Hibiscus lasiocarpus*) is a CNPS List 2 plant (plants considered rare, threatened, or endangered in California but more common elsewhere). It is an emergent perennial herb in the mallow family that produces large pink flowers. It blooms from June to September and grows in freshwater marshes and swamps. Suitable habitat for rose mallow exists in the proposed levee setback area in project Segment 2 and includes areas of freshwater marsh within drainage/irrigation canals and ditches.

Wright's trichocoronis (*Trichocoronis wrightii* var. *wrightii*) is also a CNPS List 2 plant. It is an annual herb in the sunflower family. It produces small whitish flowers from May to September and grows in meadows, marshes and swamps, riparian forest, and vernal pools. Suitable habitat for Wright's trichocoronis is provided by freshwater marsh in the drainage/irrigation canals and ditches in the proposed levee setback area in Segment 2, in moist riparian habitats bordering drainage/irrigation canals and ditches, and within the Feather River floodway.

Special-Status Wildlife Species

Based on previously existing information and observations made during field surveys, a total of 15 special-status wildlife species have potential to occur in the project vicinity. The regulatory status, habitat associations, and potential for these species to occur in the project area are summarized in Table 5.5-2. Additional special-status animal species are known to occur in the region. However, based on the reconnaissance field survey and assessment of database records, these species are not expected to occur and were eliminated from further analysis because no suitable habitat occurs in the project area, the species have not been documented in the project vicinity despite numerous biological surveys, and/or the species have very restricted ranges that do not include the project area.



Sources: GEI Consultants, Inc. 2004, CNDDB 2006; Basemap: CaSIL 1998

Table 5.5-1
Special-Status Plant Species with Potential to Occur in the Project Vicinity

Species	Listing Status			Habitat	Distribution	Flowering Period	Potential for Occurrence in the Project Area
	Fed.	State	CNPS				
Ferris's milk-vetch *Astragalus tener* var. *ferrisiae*	—	—	1B	Meadows (vernally mesic), valley and foothill grassland (subalkaline flats); 5–75 meters elevation	Extant in Butte and Glenn counties; extirpated in Colusa, Solano, Sutter, and Yolo Counties	April–May	None; no suitable habitat
Dwarf downingia *Downingia pusilla*	—	—	2	Valley and foothill grassland (mesic), vernal pools; 1–445 meters elevation	Merced, Mariposa, Napa, Placer, Sacramento, Solano, Sonoma, Stanislaus, Tehama, and Yuba Counties; South America	March–May	None; no suitable habitat
Rose mallow *Hibiscus lasiocarpus*	—	—	2	Marshes and swamps (freshwater); 0–120 meters elevation	Butte, Contra Costa, Colusa, Glenn, Sacramento, San Joaquin, Solano, Sutter, and Yolo Counties; widespread outside of California	June–September	Moderate; suitable habitat present along rivers and ditches
Legenere *Legenere limosa*	—	—	1B	Vernal pools; 1–880 meters elevation	Extant in Lake, Napa, Placer, Sacramento, Shasta, San Mateo, Solano, Tehama, and Yuba Counties; extirpated in Sonoma and Stanislaus Counties	April–June	None; no suitable habitat
Veiny monardella *Monardella douglasii* ssp. *venosa*	—	—	1B	Cismontane woodland, valley and foothill grassland/heavy clay; 60–410 meters elevation	Extant in Butte and Tuolumne Counties; extirpated in Sutter County	May–July	None; no suitable habitat
Hartweg's golden sunburst *Pseudobahia bahiifolia*	E	E	1B	Cismontane woodland, valley and foothill grassland/clay; 15–150 meters elevation	Extant in Fresno, Madera, Merced, and Stanislaus Counties; extirpated in Sutter and Yuba Counties	March–April	None; no suitable habitat

Table 5.5-1
Special-Status Plant Species with Potential to Occur in the Project Vicinity

Species	Listing Status			Habitat	Distribution	Flowering Period	Potential for Occurrence in the Project Area
	Fed.	State	CNPS				
Wright's trichocoronis *Trichocoronis wrightii* var. *wrightii*	—	—	2	Meadows, marshes and swamps, riparian forest, vernal pools/alkaline; 5–435 meters elevation	Extant in Merced and Riverside Counties and in Texas, and widespread outside of California; extirpated in Colusa, San Joaquin, and Sutter Counties	May–September	Moderate; suitable habitat present along rivers and ditches

U.S. Fish and Wildlife Service (USFWS) Federal Listing Categories:
E Federally listed as endangered
California Department of Fish and Game (DFG) State Listing Categories:
E State listed as endangered
California Native Plant Society (CNPS) Listing Categories:
1B Plants considered rare, threatened, or endangered in California and elsewhere
2 Plants considered rare, threatened, or endangered in California but more common elsewhere
Sources: California Native Plant Society 2006, California Natural Diversity Database 2006

Table 5.5-2
Special-Status Wildlife Species with Potential to Occur in the Project Vicinity

Species	Listing Status		Habitat	Potential for Occurrence on the Project Site
	USFWS	DFG		
Invertebrates				
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	T	—	Elderberry shrubs, typically within riparian habitat.	May occur on-site. Valley elderberry longhorn beetles have been documented in the project vicinity (California Natural Diversity Database 2006). Elderberry shrubs grow in the Feather River and Yuba River floodways and in the proposed levee setback area in project Segment 2.
Reptiles				
Northwestern pond turtle *Emys marmorata marmorata*	FSC	CSC	Requires some slack- or slow-water aquatic habitat; prefers habitats with prevalence of basking sites.	Pond turtles are known to occur in the project vicinity (California Natural Diversity Database 2006). Suitable habitat is available in the Feather River floodway and in irrigation/drainage ditches and canals in the proposed levee setback area in project Segment 2.

Table 5.5-2
Special-Status Wildlife Species with Potential to Occur in the Project Vicinity

Species	Listing Status		Habitat	Potential for Occurrence on the Project Site
	USFWS	DFG		
Giant garter snake *Thamnophis gigas*	T	T	Open water associated with marshes, sloughs, and irrigation/drainage ditches within the Central Valley; requires developed wetland vegetation for cover.	Low potential but possible within the Plumas Lake Canal and other irrigation/drainage ditches in the proposed levee setback area in Segment 2.
Birds				
Swainson's hawk *Buteo swainsoni*	—	T	Forage in grasslands and agricultural fields; nest in open woodland or scattered trees.	Breeding pairs detected during 2002, 2005, and 2006 field surveys; known to nest in the Feather River floodway and could nest in woodland patches within the proposed levee setback area in project Segment 2.
Northern harrier *Circus cyaneus*	—	CSC	Nests and forages in open grassland, marsh, and agricultural fields.	May nest in ruderal areas and agricultural fields within the proposed levee setback area in Segment 2, and in the Feather River floodway.
Cooper's hawk *Accipiter cooperi*	—	CSC	Forages and breeds in oak woodland and deciduous riparian forest.	May nest in the riparian woodland within the Feather River floodway. Low potential to nest in woodland patches within the proposed levee setback area.
White-tailed kite *Elanus leucurus*	—	CSC FP	Prefers cultivated or marshy bottomlands with scattered tall trees, although will also use oak savannas. Occurs below 2,000 feet.	Known to nest in the Feather River floodway and could nest in woodland patches within the proposed levee setback area.
Western yellow-billed cuckoo *Coccyzus americanus occidentalis*	C	E	Generally occurs in dense riparian habitats.	May nest within the Feather River floodway.
Burrowing owl *Athene cunicularia*	—	CSC	Burrows in grasslands and agricultural areas, and along roads and canals; forages in areas of low-growth vegetation.	Limited potential to occur in the project area. No evidence of burrowing owls was detected during field surveys, and there are no CNDDB records in the vicinity of the project area.
Loggerhead shrike *Lanius ludovicianus*	FSC	CSC	Forages in grasslands and agricultural fields; nests in scattered shrubs and trees.	May nest in trees and shrubs in the proposed levee setback area, and in the Feather and Yuba River floodways. Suitable foraging habitat present throughout the project area.
Bank swallow *Riparia riparia*	—	T	Prefers open and partly open habitat, frequently near flowing water. Nests in steep sand, dirt, or gravel banks.	Documented locations within the Feather River floodway in all three project segments (California Natural Diversity Database 2006). May forage over the proposed levee setback area.

Table 5.5-2
Special-Status Wildlife Species with Potential to Occur in the Project Vicinity

Species	Listing Status		Habitat	Potential for Occurrence on the Project Site
	USFWS	DFG		
Yellow warbler *Dendroica petchia*	—	CSC	Generally occurs in riparian habitat characterized by small trees and shrubby understory.	May nest in the riparian woodland within the Feather River floodway. Low potential to nest in riparian areas within the proposed levee setback areas in project Segment 2.
Yellow-breasted chat *Icteria virens*	—	CSC	Generally occurs in willow riparian thickets and brushy tangles near watercourses.	May nest in the riparian woodland within the Feather River floodway. Low potential to nest in riparian areas within the proposed levee setback areas in project Segment 2.
Tricolored blackbird *Agelaius tricolor*	FSC	CSC	Forages in grasslands and agricultural fields; nests in freshwater marsh with dense cattails and tules, riparian scrub, and other dense shrubs and herbs.	Potential nesting habitat is of marginal quality; however, could nest in riparian scrub and freshwater marsh within the Feather River floodway and proposed levee setback areas in project Segment 2.
Mammals				
Pacific western big-eared bat *Corynorhinus townsendii townsendii*	FSC	CSC	Hibernates in caves, mines, and on old buildings. May roost at night in tree cavities. Forages in a variety of upland habitats.	May roost in snags in the riparian woodland within the Feather River floodway.

U.S. Fish and Wildlife Service (USFWS) Federal Listing Categories:
T Federally listed as threatened
C Candidate for listing
FSC Federal Species of Concern
California Department of Fish and Game (DFG) State Listing Categories:
T State listed as threatened
E State listed as endangered
FP Fully protected
CSC California Species of Special Concern
Source: California Natural Diversity Database 2006

Five of the special-status wildlife species with potential to occur in the project area are federally listed and/or state listed as endangered or threatened: valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), giant garter snake (*Thamnophis gigas*), Swainson's hawk, western yellow-billed cuckoo (*Coccyzus americanus occidentalis*), and bank swallow (*Riparia riparia*). These and other species listed in Table 5.5-2 are discussed further below.

The valley elderberry longhorn beetle is federally listed as threatened. This beetle is generally found in riparian habitats and requires blue elderberry shrubs for survival and reproduction. Valley elderberry longhorn beetle has been documented at the Bobelaine Audubon Sanctuary, located on the west (Sutter County) side of the Feather River, 12 miles south of Yuba City (California Natural Diversity Database 2006) (Figure 5.5-2). (The location of Bobelaine Audubon Sanctuary is shown in Figure 5.1-1, "Existing Conservation Areas in the Project Vicinity," in Section 5.1, "Land Use.")

Many elderberry shrubs occur throughout the Feather River and Yuba River floodways. Shrubs located near the existing Feather River and Yuba River levees are depicted in Figures 5.5-1a, 5.5-1b, and 5.5-1c. Shrubs are also likely to occur along canals and ditches in the proposed levee setback area in project Segment 2. All elderberry shrubs with stems 1 inch or greater in diameter within the range of the valley elderberry longhorn beetle are considered potential habitat for this threatened species.

The northwestern pond turtle is a federal Species of Concern and a California Species of Special Concern. The northwestern pond turtle has been documented along the Feather River in the Bobelaine Audubon Sanctuary (Figure 5.5-2). Suitable basking and nesting habitat for this species exists within portions of the Feather River floodway. Drainage and irrigation ditches and canals in the proposed levee setback area in project Segment 2 provide aquatic habitat suitable to support pond turtles.

Giant garter snake is federally and state listed as threatened. Giant garter snakes inhabit a variety of aquatic habitats, such as agricultural canals, marshes, sloughs, and ponds. Giant garter snakes also require adjacent upland habitat (for basking) and burrows (for overwintering) that provide sufficient cover and are at high enough elevations to function as refuges from floodwaters during the snakes' inactive season (early fall to early spring). A historical population was documented in the project region, east of State Route (SR) 70 near the Bear River approximately 3 miles upstream of the confluence with the Feather River (Figure 5.5-2). Despite the lack of recent records of giant garter snake in the project vicinity, aquatic habitats in the setback area could support giant garter snakes because they are hydrologically connected to areas capable of supporting the species. The rice fields and accompanying irrigation system that existed before extensive residential development west of SR 70 and north of Feather River Boulevard provided habitat and transit corridors for giant garter snakes that may have occupied the region historically. The Plumas Lake Canal is a historical feature capable of sustaining giant garter snakes, and it may support remnant populations of the species. Upland habitat in the proposed levee setback area in project Segment 2 is dominated by agricultural lands; these areas are incompatible with the biological needs of giant garter snake because routine maintenance eliminates belowground refuge. Therefore, undisturbed uplands and potential overwintering habitat is limited to bank margins of the aquatic habitat.

Swainson's hawk is state listed as threatened. This species prefers to nest in scattered riparian or woodland trees adjacent to grasslands and/or agricultural fields that provide suitable foraging habitat. Swainson's hawks are known to occur throughout the project area. At least two breeding pairs were documented in the project area during 2006 field surveys, including an active nest at the southern end of project Segment 1 and a pair just north of Star Bend at the southern end of Segment 2. Agricultural fields and ruderal vegetation in the project area provide suitable foraging habitat for this species.

Other special-status raptors known to occur in the project area are white-tailed kite, Cooper's hawk, and northern harrier. All of these raptors are California Species of Special Concern and protected under Section 3503.5 of the California Fish and Game Code. White-tailed kite is also fully protected under Section 3511 of the California Fish and Game Code. Suitable nesting habitat for white-tailed kite and Cooper's hawk is provided by riparian forest within the Feather River floodway and patches of large trees in the proposed levee setback area in project Segment

2. Cooper's hawks also forage in these forest and woodland habitats. Agricultural fields and ruderal vegetation in the project area provides suitable nesting and foraging habitat for northern harrier and foraging habitat for white-tailed kite. Breeding pairs of all three species were documented in project Segment 1 during 2006 field surveys.

Burrowing owl (*Athene cunicularia*) is a California Species of Special Concern and is protected under Section 3503.5 of the California Fish and Game Code. Burrowing owls prefer dry grasslands and other dry, open habitats. They typically nest and roost in burrow systems created by medium-sized mammals (e.g., ground squirrels), artificial sites (e.g., drain pipes and culverts), or self-excavated burrows, where soil conditions are appropriate. There are no documented records of burrowing owls in the project vicinity, and no individuals or evidence of their presence (e.g., burrows with pellets, whitewash) were observed during field surveys. However, the existing Feather River and Yuba River levees, agricultural field margins, and fallow fields could support burrowing owls if suitable burrows are present. These areas also provide suitable foraging habitat for burrowing owls.

Tricolored blackbird (*Agelaius tricolor*) is a federal Species of Concern and a California Species of Special Concern. Tricolored blackbirds nest colonially and prefer dense cattail patches, but they also utilize blackberry and other patches of dense vegetation. They forage in grasslands and agricultural fields. The nearest tricolored blackbird colonies documented during statewide surveys conducted in 2005 were at Beale Air Force Base, approximately 10 miles east of the project area (USFWS data). There are no records of historic colonies within approximately 2 miles of the project area (California Natural Diversity Database 2006). Despite the lack of known nearby colonies, freshwater marsh and riparian scrub habitats within the Feather River floodway and associated with irrigation/drainage ditches in the proposed levee setback area in project Segment 2 could support a nesting colony in the future. In addition, small flocks of tricolored blackbirds were observed flying over the project area during 2006 surveys and could forage in agricultural fields and other open habitats in the proposed levee setback area.

Western yellow-billed cuckoo is state listed as endangered and is a candidate for federal listing. This species requires relatively large wide patches of cottonwood-willow riparian forests. Potentially suitable habitat for yellow-billed cuckoo exists within the Feather River floodway, primarily in project Segment 1 and the southern portion of Segment 2. Western yellow-billed cuckoo has been documented at the Bobelaine Audubon Sanctuary and in project Segment 3 in the vicinity of the confluence of the Feather and Yuba Rivers (California Natural Diversity Database 2006) (Figure 5.5-2).

Bank swallow is state listed as threatened. This species prefers open and partly open habitat, frequently near flowing water. Individuals nest in steep sand, dirt, or gravel banks. Figure 5.5-2 depicts the locations of four historical colonies that have been documented along the banks of the Feather River in the project vicinity (California Natural Diversity Database 2006). Bank swallows could forage in the project area, but no suitable nesting habitat exists.

Loggerhead shrike (*Lanius ludovicianus*) is a federal Species of Concern and a California Species of Special Concern. Shrikes inhabit lowland and foothill areas with scattered shrubs and trees. Loggerhead shrikes nest in shrubs and small trees and typically forage in grasslands and agricultural fields. Suitable nesting and foraging habitat exists throughout the project area.

Yellow warbler (*Dendroica petechia*) and yellow-breasted chat (*Icteria virens*) are both California Species of Special Concern. Yellow warblers typically nest in riparian habitats with small trees and shrubs typical of low, open-canopy riparian woodland. Yellow-breasted chats typically nest in riparian habitats with a dense shrub layer. No evidence of either species nesting within the project area was documented during 2006 field surveys, although riparian habitats in the project area, primarily within the Feather River floodway, provide suitable foraging habitat and potential nesting habitat.

Pacific western big-eared bat (*Corynorhinus townsendii townsendii*) is a federal Species of Concern and a California Species of Special Concern. This species generally hibernates in caves, mines, or old buildings but may roost in tree cavities. There are no natural and very few potential artificial roosting locations in the project area on the land side of the existing levees. However, snags in the riparian woodland in the Feather River or Yuba River floodway could provide roosting habitat for small numbers of individuals. There are no CNDDB records of past colonies in or near the project area.

Sensitive Habitats

Sensitive habitats are those that are of special concern to resource agencies, or that are afforded specific consideration through CEQA, Section 1602 of the California Fish and Game Code, and/or Section 404 of the CWA, as discussed above in Section 5.5.1, "Regulatory Setting."

Irrigation/drainage canals and ditches with associated freshwater marsh vegetation, seasonal wetlands, and open-water channels would be considered waters of the United States, subject to regulation under CWA Section 404. All riparian habitats are subject to regulation under Section 1600 et seq. of the California Fish and Game Code. Other habitats considered sensitive by DFG are those identified as "rare and worthy of consideration" in natural communities recognized by the CNDDB. These sensitive communities provide essential habitat to special-status species that are often restricted in distribution or decreasing throughout their range. Natural communities within the project vicinity that qualify as sensitive include Great Valley mixed riparian forest, Great Valley valley oak riparian forest, and elderberry savanna.

5.5.3 ENVIRONMENTAL IMPACTS

THRESHOLDS OF SIGNIFICANCE

Thresholds for determining the significance of impacts on biological resources were based on the environmental checklist form in Appendix G of the State CEQA Guidelines. A project alternative would have a significant impact on biological resources if it would:

- have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by DFG or USFWS;
- have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in any local or regional plans, policies, or regulations, or by DFG or USFWS;

- have a substantial adverse effect on federally protected waters of the United States, including wetlands, as defined by Section 404 of the CWA (including but not limited to marshes, vernal pools, rivers, etc.) through direct removal, filling, hydrological interruption, or other means;
- interfere substantially with the movement of any native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;
- conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance;
- conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan; or
- substantially reduce the habitat of a fish and wildlife species, cause a fish or wildlife species to drop below self-sustaining levels, threaten to eliminate a plant or animal community, or reduce the number or restrict the range of an endangered, rare, or threatened species.

The term "substantial" in relation to adverse effects on plant and wildlife resources has not been quantitatively defined in CEQA. What is considered substantial can vary with each species or habitat and with the circumstances pertinent to a particular geographic area. Impacts were considered less than significant if they did not meet at least one of the criteria listed above.

IMPACT ANALYSIS

Alternative 1 – The Levee Strengthening Alternative

Impact LS-5.5-a

Effects on General Biological Resources. Levee repair and strengthening and related activities would result in disturbance and/or loss of vegetation along the Feather and Yuba River levees and at staging areas and detention basin and borrow sites. These areas provide habitat for many common plant and wildlife species. Although local populations of common species could be affected, these species are locally and regionally abundant. This impact would be **less than significant**.

Common plant and wildlife species found along and adjacent to the existing Feather and Yuba River levees and staging, borrow, and detention basin areas would be affected by activities associated with levee repair and strengthening. Such activities would affect primarily ruderal vegetation and agricultural crops. These habitats are locally and regionally abundant and are not considered sensitive natural plant communities. Common plant and wildlife species associated with these habitats are also locally and regionally abundant and would not be substantially affected by levee repair and strengthening activities under Alternative 1 (i.e., such activities would not substantially reduce the habitat for a wildlife species, cause a wildlife species to drop below self-sustaining levels, or threaten to eliminate a plant or animal community). Potential effects on sensitive habitats and species are addressed in separate discussions below. Because this alternative would not substantially adversely affect common plant and wildlife species, this impact would be less than significant.

Impact LS-5.5-b

Effects on Sensitive Habitats. Levee repair and strengthening and related activities could result in disturbance and/or loss of sensitive habitats, including jurisdictional wetlands, other waters of the United States, and riparian habitats. This impact would be **significant**.

Sensitive habitats within the project area include wetland, riparian, and open-water habitats that are likely under Corps jurisdiction and protected under Section 404 of the CWA. These areas are also subject to DFG jurisdiction under Section 1600 of the California Fish and Game Code, and Great Valley mixed riparian forest, Great Valley valley oak riparian forest, and elderberry savanna are considered sensitive natural communities by DFG. Much of the habitat on the water side of the existing Feather River and Yuba River levees is considered sensitive. Although levee strengthening and waterside erosion repair activities would primarily be restricted to the existing levees, there is potential for small amounts (i.e., from 5 acres to as little as a fraction of an acre) of sensitive habitats within the Feather River and Yuba River floodways to be affected.

Effects on sensitive habitats could also occur on the land side of the Feather River levee where the Plumas Lake Canal intersects the levee at Pump Station No. 3 and the detention basin site (project Segment 2) and at the potential borrow sites. Replacement of the pump station would result in disturbance of the canal and adjacent habitat and could result in the permanent loss of small amounts of habitat; detention basin construction and borrow excavation could also result in the permanent loss of small amounts of habitat.

Loss of sensitive habitat associated with levee strengthening and erosion repair and related activities would be a significant impact.

Impact LS-5.5-c

Loss of Special-Status Plants. Levee repair and strengthening and related activities could result in the loss of rose mallow and Wright's trichocoronis if they exist in areas that would be disturbed during these activities. This impact would be **potentially significant**.

Suitable habitat for two special-status plants, rose mallow and Wright's trichocoronis, exists in the irrigation/drainage canals and ditches on the land side of the Feather River levee, in moist riparian habitat adjacent to these ditches, and within the Feather River floodway in project Segment 2. Although levee strengthening and waterside erosion repair would primarily be restricted to the existing levee, there is potential for adjacent riparian habitat on the water side of the levee to be affected.

Effects on potential habitat could also occur on the land side of the Feather River levee where the Plumas Lake Canal intersects the Feather River levee at Pump Station No. 3 (project Segment 2 and the proposed detention basin site). Disturbance of the canal and adjacent habitat could result in permanent habitat loss.

Disturbance and/or loss of wetland and riparian habitat could result in loss of special-status plants, if present in the affected areas. No special-status plants have been observed in the project area, but focused botanical surveys have not been conducted. Because there is potential for these species to be present in the project area and suitable habitat for them could be disturbed or removed, this impact would be potentially significant.

Impact LS-5.5-d

Effects on Valley Elderberry Longhorn Beetle. Levee repair and strengthening and related activities could result in the loss of blue elderberry shrubs that are occupied by valley elderberry longhorn beetle. This impact would be **potentially significant**.

Valley elderberry longhorn beetles have been documented as recently as 2002 at the Bobelaine Audubon Sanctuary, on the west (Sutter County) side of the Feather River (California Natural Diversity Database 2006) (Figure 5.5-2). Blue elderberry shrubs, the host plant for valley elderberry longhorn beetle larvae, are found throughout riparian habitat along much of the Feather River and Yuba River floodways. Shrubs grow along the edge of the riparian corridor, immediately adjacent to the existing levees. Focused surveys for elderberry shrubs (i.e., counting individual shrubs and stems 1 inch or greater in diameter) have not been conducted, but shrubs have been observed in all three project segments (Figures 5.5-1a, 5.5-1b, and 5.5-1c). Although levee strengthening and waterside erosion repair activities would primarily be restricted to the existing levee, there is potential for elderberry shrubs in immediately adjacent riparian habitat on the water side of the levee to be affected. Shrubs could also be affected by replacement of Pump Station No. 3, construction of the detention basin, and use of potential borrow sites. Because project activities could result in the damage, death, or removal of elderberry shrubs, the impact on valley elderberry longhorn beetle would be potentially significant.

Impact LS-5.5-e

Effects on Northwestern Pond Turtle. Levee repair and strengthening and related activities could result in disturbance and/or loss of suitable aquatic habitat for northwestern pond turtle and could result in direct loss of individuals. This impact would be **potentially significant**.

The northwestern pond turtle has been documented along the Feather River in Bobelaine Audubon Sanctuary, and suitable aquatic habitat for the species is provided by irrigation/drainage canals with the project area, including the Plumas Lake Canal. Project activities at Pump Station No. 3 would result in disturbance of suitable aquatic habitat for northwestern pond turtle. Habitat could be permanently lost as a result of pump station replacement. Habitat in the Plumas Lake Canal could also be disturbed or lost as a result of activities associated with construction of the detention basin. Dewatering of and/or construction in areas of suitable aquatic habitat could result in stranding and direct mortality of turtles, if any are present in the affected areas. This impact would be potentially significant.

Impact LS-5.5-f

Effects on Giant Garter Snake. Levee repair and strengthening and related activities would result in disturbance and/or loss of suitable aquatic and upland habitat for giant garter snake. Construction activities also have the potential to result in direct take of individuals. This impact would be **significant**.

Giant garter snakes were documented in the project vicinity (south of the Bear River) before, but not during, surveys conducted in that area in 1987 (California Natural Diversity Database 2006). Irrigation/drainage canals and ditches east of the Feather River levee provide potentially suitable aquatic habitat for giant garter snake, although suitability may vary from time to time depending on maintenance regimes and current hydrologic characteristics. The banks of these canals and the adjacent upland areas may provide suitable habitat, depending on vegetation characteristics and

maintenance regimes. Project activities at Pump Station No. 3 would result in disturbance of a small amount of suitable aquatic habitat (less than an acre), and replacement of the pump station could result in the permanent loss of a similarly small amount of habitat. Uplands adjacent to this area would also be disturbed. Excavation of borrow areas or the proposed detention basin could result in disturbance or the permanent loss of upland habitat for giant garter snake if fallow or ruderal areas are affected. Construction activities could result in direct take of giant garter snake, particularly during the snake's inactive season (October through April). Because project construction activities under Alternative 1 could result in the loss of aquatic and/or upland habitat for giant garter snake and direct loss of individuals, this impact would be significant.

Impact LS-5.5-g

Effects on Swainson's Hawk and Other Nesting Raptors. Levee repair and strengthening and related activities would result in disturbance and/or loss of suitable nesting and/or foraging habitat for Swainson's hawk and other raptors and could result in loss of active nests. This impact would be **potentially significant**.

The project area provides suitable nesting and foraging habitat for Swainson's hawks and other special-status raptor species, including Cooper's hawk, northern harrier, white-tailed kite, and burrowing owl. Breeding pairs of all of these species except burrowing owl were observed in the project area during surveys conducted in 2006. Swainson's hawk and other tree-nesting species could nest in riparian habitat along the Feather River and in riparian and other nonorchard trees on the landside levee. Northern harriers could nest in agricultural fields and ruderal and fallow areas adjacent to the levee. Potential burrowing owl habitat is limited to the Feather River and Yuba River levees and nearby fallow and ruderal areas. Construction activities associated with Alternative 1 could result in disturbance of raptors nesting nearby, potentially resulting in nest abandonment and loss of active nests. There is also limited potential for borrow excavation, waterside erosion repair on the Feather River levee, and replacement of Pump Station No. 3 to require removal of suitable nesting habitat for tree-nesting species. If burrowing owls are present along the Feather River or Yuba River levees, occupied burrows could be directly destroyed by project construction.

Construction would result in disturbance and temporary loss of suitable raptor foraging habitat adjacent to the existing levee and in a small portion of the nearby potential soil borrow area, but such effects would be limited to a relatively small area. Temporary and permanent loss of low-quality foraging habitat could result from use of the potential detention basin/soil borrow site. The southern portion of this area currently supports a squash crop. Some row crops can provide suitable raptor foraging habitat, but those typically grown in the project vicinity (e.g., safflower, squash, melons) have limited suitability because they are too tall and dense to provide foraging access or too heavily maintained to support high prey densities. Therefore, disturbance or loss of raptor foraging habitat is not anticipated to have a substantial effect on special-status raptors.

Although they are not considered special-status species, common raptors such as red-shouldered hawk, red-tailed hawk, and great horned owl are protected under California Fish and Game Code Section 3503.5. Loss of an active raptor nest and/or occupied burrowing owl burrow would be a significant impact. Because project construction could potentially cause the loss of an active nest if nesting raptors are present, this impact would be potentially significant.

Impact LS-5.5-h

Effects on Other Special-Status Birds. Levee repair and strengthening and related activities would result in disturbance and/or loss of potential nesting and/or foraging habitat for several special-status bird species. Special-status species are unlikely to nest in areas that would be affected, and large areas of nesting and foraging habitat of equal or higher quality are available elsewhere in the project area. Therefore, this impact would be **less than significant**.

The Feather River and Yuba River floodways provide potential nesting habitat for western yellow-billed cuckoo, loggerhead shrike, bank swallow, yellow warbler, yellow-breasted chat, and tricolored blackbird. Wetland and riparian habitats on the land side of the existing levees may also be suitable for loggerhead shrike and tricolored blackbird. Habitat in the vicinity of areas that would be disturbed during project construction is of relatively low quality, in comparison to less disturbed and more contiguous habitat closer to the main channels of the Feather and Yuba Rivers. Loggerhead shrike has the greatest potential to nest in habitat nearby construction areas. However, few nesting individuals are anticipated. Because higher-quality habitat is available elsewhere, none of the special-status birds listed above would be substantially affected by implementation of Alternative 1. Therefore, this impact would be less than significant.

Impact LS-5.5-i

Effects on Pacific Western Big-Eared Bat. Levee repair and strengthening and related activities would not affect the suitability of foraging habitat or result in loss of important roost or maternity sites. This impact would be **less than significant**.

Pacific western big-eared bats could forage in the project area. Trees in and near the Alternative 1 project sites could provide roost sites for a small number of bats, but the project area does not provide roosting habitat capable of supporting large numbers of individuals. Implementation of Alternative 1 would not affect the suitability of foraging habitat in the project area. Because no important bat roost sites or maternity sites are anticipated to exist in the project area, none would be affected by implementation of Alternative 1. This impact would be less than significant.

Impact LS-5.5-j

Effects on Wildlife Corridors. Levee repair and strengthening and related activities would result in limited temporary disturbance of the Feather River and Yuba River habitat corridors but are not expected to affect overall use of these corridors by wildlife. This impact would be **less than significant**.

Riparian habitat along the Feather and Yuba Rivers supports valuable botanical and wildlife diversity and serves as a corridor for wildlife movement. The project area is within the Pacific Flyway and contains important habitat for birds, as well as reptiles and mammals. Construction activities associated with Alternative 1 would result in temporary disturbance of these wildlife corridors. However, disturbance would be limited to the edges of the corridors and is unlikely to disrupt migratory movements or use of nursery sites. This impact would be less than significant.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impact ASB-5.5-a

Effects on General Biological Resources. Levee repair and strengthening activities in project Segments 1 and 3 would temporarily disturb ruderal habitat on the levee slopes and adjacent riparian and agricultural land. Construction of the ASB setback levee in Segment 2 would result in loss of primarily agricultural land. Agricultural lands could also be lost at potential borrow and detention basin sites. These temporary impacts and potential permanent land use changes would affect habitat for many common plant and wildlife species. Although local populations would be reduced by these activities, these species are locally and regionally abundant. This impact would be **less than significant**.

Common plant and wildlife species found along and adjacent to the existing Feather River and Yuba River levees in project Segments 1 and 3 and within the potential levee setback and borrow areas in and near Segment 2 would be affected by activities associated with Alternative 2. Effects along portions of the existing levees to be repaired in Segments 1 and 3 would be temporary (see previous discussion of Impact LS-5.5-a); permanent habitat conversion would result from construction of the ASB setback levee and removal of portions of the existing levee in project Segment 2. In addition, use of the levee setback area to convey flood flows would result in occasional short-term inundation of habitat for some common species. Although habitat types within the levee setback area and at the areas considered for borrow sites and/or a detention basin could change, such changes are unlikely to result in any overall effects on common species, because these areas would continue to provide habitat values for such species. The primary areas that would be affected support ruderal vegetation and agricultural crops. These habitats are locally and regionally abundant and are not considered sensitive natural plant communities. Common plant and wildlife species associated with these habitats are also locally and regionally abundant and would not be substantially affected by the proposed project (i.e., the project would not substantially reduce the habitat for a wildlife species, cause a wildlife species to drop below self-sustaining levels, or threaten to eliminate a plant or animal community). Potential effects on sensitive habitats and species are addressed in separate discussions below. Because common plant and wildlife species would not be substantially adversely affected, this impact would be less than significant.

Impact ASB-5.5-b

Effects on Sensitive Habitats. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities would result in disturbance and/or loss of sensitive habitats, including jurisdictional wetlands, other waters of the United States, and riparian habitats. This impact would be **significant**.

Under Alternative 2, effects on sensitive habitats associated with levee repair and strengthening activities in project Segments 1 and 3 would be the same as those described above in Impact LS-5.5-b under Alternative 1.

Sensitive habitats within the project area include wetland, riparian, and open-water habitats that are likely under Corps jurisdiction and protected under Section 404 of the CWA, subject to DFG jurisdiction under Section 1600 of the California Fish and Game Code, and/or considered sensitive natural communities by DFG. Construction activities in areas considered for borrow sites and/or a detention basin could affect sensitive habitats. Construction of the ASB setback levee in Segment 2 would require fill of portions of the Plumas Lake Canal and other canals and ditches within the setback levee footprint. This would result in permanent fill of a relatively small amount of sensitive

habitat, but could result in additional permanent effects on the hydrology of the portions of the ditches within the levee setback area if they do not continue to serve irrigation and drainage purposes. Aquatic habitat within the levee setback area could be permanently affected if grading is required to allow floodwaters to drain to the Feather River and alleviate fish stranding. There are no specific plans for habitat restoration within the levee setback area at this time; however, if such restoration is compatible with flood control objectives, restoration of agricultural habitats to riparian and other sensitive habitats could occur in portions of the setback area, which could result in an overall increase in sensitive habitat within the project area. Because it is not known at this time whether such restoration would occur, this impact would be significant.

Impact ASB-5.5-c

Loss of Special-Status Plants. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities could result in the loss of rose mallow and Wright's trichocoronis if they are present in areas that would be disturbed during these activities. This impact would be **potentially significant**.

Under Alternative 2, potential effects on special-status plants associated with levee repair and strengthening activities in project Segments 1 and 3 would be the same as those described above in Impact LS-5.5-c under Alternative 1.

Suitable habitat for two special-status plants, rose mallow and Wright's trichocoronis, is present in the irrigation/drainage canals and ditches in the potential ASB levee setback area in project Segment 2 and in moist riparian habitat adjacent to these ditches and within the Feather River floodway. As discussed above under Impact ASB-5.5-b, construction of the ASB setback levee would require fill of small portions of canals and ditches within the setback levee footprint, and aquatic habitat within the levee setback area could be hydrologically altered by setback levee construction and/or graded to allow floodwaters to drain to the Feather River and alleviate fish stranding. Construction activities in areas considered for soil borrow sites and/or detention basins could also result in the loss of wetland habitats. Disturbance and/or loss of wetland and riparian habitats could result in loss of rose mallow and/or Wright's trichocoronis individuals or populations, if present in the affected areas. If restoration of wetlands and riparian habitat occurs in portions of the levee setback area, there could be an overall increase in available habitat for special-status plants within the project area. Because it is not known whether such restoration would occur and special-status plants could be lost as a result of levee repair and strengthening activities and/or construction of the ASB setback levee, this impact would be potentially significant.

Impact ASB-5.5-d

Effects on Valley Elderberry Longhorn Beetle. Levee repair and strengthening activities and construction of the ASB setback levee, and related activities could result in loss of blue elderberry shrubs that are occupied by valley elderberry longhorn beetles. This impact would be **potentially significant**.

Under Alternative 2, potential effects on valley elderberry longhorn beetle associated with levee repair and strengthening activities in project Segments 1 and 3 would be the same as those described above in Impact LS-5.5-d under Alternative 1.

Blue elderberry shrubs, the host plant for valley elderberry longhorn beetle larvae, are found throughout riparian habitat along much of the Feather River and Yuba River floodways and have

been observed near the levees in all three project segments (Figures 5.5-1a, 5.5-1b, and 5.5-1c). Shrubs are also anticipated to exist in riparian habitat within the potential ASB levee setback area. Unlike under Alternative 1, shrubs on the land side of the existing Feather River levee in Segment 2 could be affected by setback levee construction, greater use of potential borrow sites, and potential grading to allow floodwaters to drain to the Feather River and alleviate fish stranding. Shrubs could also potentially be affected by the area considered for a detention basin/borrow site.

Flooding of the ASB levee setback area in Segment 2 is not expected to adversely affect elderberry shrubs currently located in this area. The rate and duration of flooding of the levee setback area is expected to be similar to the rate and duration of flooding of most, if not all, of the existing Feather River floodway. Because elderberry shrubs within the floodway appear to thrive in spite of normal periodic flooding of the Feather River, the similar flooding regime within the proposed levee setback area is not expected to result in loss of elderberry shrubs or impacts on valley elderberry longhorn beetle. If restoration of wetlands and riparian areas occurs in portions of the setback area, there could be an overall increase in available habitat for the beetle.

It is not known whether restoration would occur, and levee repair and strengthening activities, construction of the ASB setback levee, and related activities could result in the damage, death, or removal of elderberry shrubs that could support valley elderberry longhorn beetle; therefore, this impact would be potentially significant.

Impact ASB-5.5-e

Effects on Northwestern Pond Turtle. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities would result in disturbance and/or loss of suitable aquatic habitat for northwestern pond turtle and could result in direct loss of individuals. This impact would be **potentially significant**.

Under Alternative 2, potential effects on northwestern pond turtle associated with levee repair and strengthening activities in project Segments 1 and 3 would be the same as those described above in Impact LS-5.5-e under Alternative 1.

Suitable habitat for northwestern pond turtle exists in the irrigation/drainage canals and ditches in the potential ASB levee setback area in project Segment 2 and the potential detention basin/soil borrow site. As discussed above, construction of the ASB setback levee would require fill of small portions of canals and ditches within the setback levee footprint, and aquatic habitat within the levee setback area could be hydrologically altered by setback levee construction and/or graded to allow floodwaters to drain to the Feather River and alleviate fish stranding. Construction of the detention basin could also result in the disturbance or removal of suitable habitat in the Plumas Lake Canal. Dewatering of and/or construction in areas of aquatic habitat could result in stranding and direct mortality of turtles, if any are present in the affected areas. If restoration of wetlands and riparian habitat occurs in portions of the levee setback area, there could be an overall increase in available habitat for pond turtles within the project area. Because it is not known whether such restoration would occur and there is potential for pond turtle mortality to result from setback levee construction, this impact would be potentially significant.

Impact ASB-5.5-f

Effects on Giant Garter Snake. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities would result in disturbance and/or loss of suitable aquatic and upland habitat for giant garter snake. Construction activities also have potential to result in direct take of individuals. This impact would be **significant**.

Under Alternative 2, effects on giant garter snake associated with levee repair and strengthening activities in project Segments 1 and 3 would be the same as those described above in Impact LS-5.5-f under Alternative 1.

Irrigation/drainage canals and ditches and adjacent uplands east of the Feather River levee provide potentially suitable habitat for giant garter snake. Borrow excavation and detention basin construction could result in impacts on upland habitat for giant garter snake in areas adjacent to suitable aquatic habitat. Construction of the ASB setback levee in project Segment 2 would result in fill of small portions of aquatic habitat within the setback levee footprint. The hydrology of the aquatic habitat within the levee setback area would be altered if it no longer serves irrigation and drainage purposes, and this habitat could require grading to allow floodwaters to drain to the Feather River and alleviate fish stranding. Perhaps most importantly, the levee setback area would become part of the Feather River floodway and could be inundated for multiple continuous days during each flood event. If giant garter snakes are present within the setback area, inundation would displace wintering individuals from their burrows and could result in mortality. Leaving remnants of the existing levee in place after the setback levee is constructed could preserve upland habitat for giant garter snake, but the suitability of habitat within the setback area would be uncertain. Construction activities could also result in direct take of giant garter snake, particularly during the snake's inactive season (October through April). Because construction activities under Alternative 2 and exposure to floodwaters could result in the loss of aquatic and/or upland habitat for giant garter snake and loss of individuals, this impact would be significant.

Impact ASB-5.5-g

Effects on Swainson's Hawk and Other Nesting Raptors. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities would result in disturbance and/or loss of suitable nesting and/or foraging habitat for Swainson's hawk and other raptors and could result in loss of active nests. This impact would be **potentially significant**.

Under Alternative 2, potential effects on Swainson's hawk and other nesting raptors associated with levee repair and strengthening activities in project Segments 1 and 3 would be the same as those described above in Impact LS-5.5-g under Alternative 1.

Swainson's hawk and other tree-nesting raptor species could nest in riparian habitat along the Feather River and in riparian and other patches of nonorchard trees on the landside levee. Northern harriers could nest in agricultural fields and ruderal and fallow areas adjacent to the levee and in the potential borrow site in the ASB levee setback area. Potential burrowing owl habitat exists along the Feather River and Yuba River levees and in other fallow and ruderal areas. Construction activities associated with Alternative 2 could result in disturbance of raptors nesting nearby, potentially resulting in nest abandonment and loss of active nests. There is also potential for setback levee construction and borrow excavation to require removal of suitable nesting habitat.

If burrowing owls are present along the Feather River or Yuba River levees or in suitable habitat within the ASB levee setback area, including the potential borrow site within the setback area or the potential detention basin/soil borrow site, occupied burrows could be directly destroyed by project construction. Construction would also result in disturbance and potential loss of suitable raptor foraging habitat, but such effects would be limited to relatively small areas of suitable habitat or to low-quality foraging habitat and are not anticipated to have a substantial effect on special-status raptors. Active nests of common raptors protected under California Fish and Game Code Section 3503.5 could also be affected. Loss of an active raptor nest and/or occupied burrowing owl burrow would be a significant impact. Conversion of orchards within the levee setback area could result in an overall increase in foraging habitat for special-status and common raptors. Because project construction could potentially cause the loss of an active nest if nesting raptors are present, this impact would be potentially significant.

Impact ASB-5.5-h

Effects on Other Special-Status Birds. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities would result in disturbance and/or loss of potential nesting and/or foraging habitat for several special-status bird species. Special-status species are unlikely to nest in areas that would be affected, and large areas of nesting and foraging habitat of equal or higher quality are available elsewhere in the project area. Therefore, this impact would be **less than significant**.

Under Alternative 2, potential effects on special-status birds other than raptors associated with levee repair and strengthening activities in project Segments 1 and 3 would be the same as those described above in Impact LS-5.5-h under Alternative 1.

The Feather River and Yuba River floodways provide potential nesting habitat for western yellow-billed cuckoo, loggerhead shrike, bank swallow, yellow warbler, yellow-breasted chat, and tricolored blackbird. Wetland and riparian habitats within the ASB levee setback area in project Segment 2 and the potential detention basin/soil borrow site would also be suitable for loggerhead shrike and tricolored blackbird. Habitat in the vicinity of areas that would be disturbed during project construction is of relatively low quality, in comparison to less disturbed and more contiguous habitat closer to the main channels of the Feather and Yuba Rivers. Although additional areas of potential nesting habitat would be affected by construction of the detention basin and the setback levee and potential grading of aquatic habitats to allow them to drain to the Feather River, the potential for special-status birds to nest in these areas is relatively low. Loggerhead shrike has the greatest potential to nest in habitat near construction areas. However, few nesting individuals are anticipated. Because habitat of higher quality is available elsewhere, none of the special-status birds listed above would be substantially affected by implementation of Alternative 2. This impact would be less than significant.

Impact ASB-5.5-i

Effects on Pacific Western Big-Eared Bat. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities would not affect suitability of foraging habitat or result in loss of important roost or maternity sites. This impact would be **less than significant**.

Under Alternative 2, potential effects on Pacific western big-eared bats associated with levee repair and strengthening activities in project Segments 1 and 3 would be the same as those described above in Impact LS-5.5-i under Alternative 1.

Pacific western big-eared bats could forage in the project area, including in the vicinity of the existing Feather River and Yuba River levees, the potential ASB setback levee in project Segment 2, potential borrow sites, and sites considered for a detention basin. Trees in and near these areas could provide roost sites for a small number of bats, but the project area does not provide roosting habitat capable of supporting large numbers of individuals. Implementation of this alternative would not affect the suitability of foraging habitat in the project area. Because no important bat roost sites or maternity sites are anticipated to exist in the project area, none would be affected by implementation of Alternative 2. This impact would be less than significant.

Impact ASB-5.5-j

Effects on Wildlife Corridors. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities would result in limited temporary disturbance of the Feather River and Yuba River habitat corridors and minor corridors associated with canals and ditches in the levee setback area. However, such disturbance is not expected to affect overall use of these corridors by wildlife. This impact would be **less than significant**.

Under Alternative 2, potential effects on wildlife corridors associated with levee repair and strengthening activities in project Segments 1 and 3 would be the same as those described above in Impact LS-5.5-j under Alternative 1.

Riparian habitat along the Feather and Yuba Rivers supports valuable botanical and wildlife diversity and serves as a corridor for wildlife movement. Irrigation/drainage canals and ditches within the ASB levee setback area (including the Plumas Lake Canal, which also passes through the proposed detention basin/soil borrow site) serve as wildlife corridors on a smaller scale. Construction activities associated with Alternative 2 would result primarily in temporary disturbance of these wildlife corridors. Disturbance of the Feather and Yuba River corridors would be limited to the edges of the corridors and is unlikely to disrupt migratory movements or use of nursery sites. Construction of the setback levee would create an obstacle along the Plumas Lake Canal but is not anticipated to serve as a barrier to wildlife movement. Similarly, the presence of detention basins along the canal would not serve as a barrier to wildlife movement. If portions of the levee setback area are ultimately restored to natural habitats, the Feather River riparian corridor would be expanded, ultimately resulting in a beneficial effect on its function as a corridor for movement of terrestrial wildlife. This impact would be less than significant.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impact IS-5.5-a

Effects on General Biological Resources. This impact would be the same as Impact ASB-5.5-a, described under Alternative 2 above, although the extent of the impact would be slightly less because of the reduced setback area associated with the intermediate setback levee alignment. For the same reasons as described above, this impact would be **less than significant**.

Impact IS-5.5-b

Effects on Sensitive Habitats. This impact would be the same as Impact ASB-5.5-b, described under Alternative 2 above, although the extent of the impact would be slightly less because of the reduced setback area associated with the intermediate setback levee alignment. For the same reasons as described above, this impact would be **significant**.

Impact IS-5.5-c

Loss of Special-Status Plants. This impact would be the same as Impact ASB-5.5-c, described under Alternative 2 above, although the extent of the impact would be slightly less because of the reduced setback area associated with the intermediate setback levee alignment. For the same reasons as described above, this impact would be **potentially significant**.

Impact IS-5.5-d

Effects on Valley Elderberry Longhorn Beetle. This impact would be the same as Impact ASB-5.5-d, described under Alternative 2 above, although the extent of the impact could be slightly less because of the reduced setback area associated with the intermediate setback levee alignment. For the same reasons as described above, this impact would be **potentially significant**.

Impact IS-5.5-e

Effects on Northwestern Pond Turtle. This impact would be the same as Impact ASB-5.5-e, described under Alternative 2 above, although the extent of the impact would be slightly less because of the reduced setback area associated with the intermediate setback levee alignment. For the same reasons as described above, this impact would be **potentially significant**.

Impact IS-5.5-f

Effects on Giant Garter Snake. This impact would be the same as Impact ASB-5.5-f, described under Alternative 2 above, although the extent of the impact would be slightly less because of the reduced setback area associated with the intermediate setback levee alignment. For the same reasons as described above, this impact would be **significant**.

Impact IS-5.5-g

Effects on Swainson's Hawk and Other Nesting Raptors. This impact would be the same as Impact ASB-5.5-g, described under Alternative 2 above, although the extent of the impact would be slightly less because of the reduced setback area associated with the intermediate setback levee alignment. For the same reasons as described above, this impact would be **potentially significant**.

Impact IS-5.5-h

Effects on Other Special-Status Birds. This impact would be the same as Impact ASB-5.5-h, described under Alternative 2 above, although the extent of the impact would be slightly less because of the reduced setback area associated with the intermediate setback levee alignment. For the same reasons as described above, this impact would be **less than significant**.

Impact IS-5.5-i

Effects on Pacific Western Big-Eared Bat. This impact would be the same as Impact ASB-5.5-i, described under Alternative 2 above, although the extent of the impact would be slightly less because of the reduced setback area associated with the intermediate setback levee alignment. For the same reasons as described above, this impact would be **less than significant**.

Impact IS-5.5-j

Effects on Wildlife Corridors. This impact would be the same as Impact ASB-5.5-j, described under Alternative 2 above. For the same reasons as described above, this impact would be **less than significant**.

5.5.4 MITIGATION MEASURES

ALTERNATIVE 1 – THE LEVEE STRENGTHENING ALTERNATIVE

No mitigation is required for Impact LS-5.5-a (general biological resources), Impact LS-5.5-h (other special-status birds), Impact LS-5.5-i (Pacific western big-eared bat), or Impact LS-5.5-j (wildlife corridors).

Mitigation is provided below for Impact LS-5.5-b (sensitive habitats), Impact LS-5.5-c (special-status plants), Impact LS-5.5-d (valley elderberry longhorn beetle), Impact LS-5.5-e (northwestern pond turtle), Impact LS-5.5-f (giant garter snake), and Impact LS-5.5-g (Swainson's hawk and other nesting raptors).

LS-5.5-b **Avoid Disturbance of Sensitive Habitats to the Extent Feasible and Comply with Corps and DFG Processes to Mitigate Unavoidable Effects.** This mitigation would reduce the impact to a less-than-significant level.

Three Rivers Levee Improvement Authority (TRLIA) and its primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize potential project effects on sensitive habitats. As noted in the setting and impact discussions above, for purposes of this EIR the potential presence of sensitive habitats was assessed through reconnaissance surveys (where access was allowed) and literature review. The mapping and surveys identified below are intended to supplement and clarify these initial surveys and reviews by providing timely, detailed, and finely tuned biological information within the specific geographical areas subject to impact under the alternative selected for implementation. Each measure is accompanied by one or more performance standards to control the ultimate level of impact:

(a) <u>Map potential waters of the United States and riparian habitat in the project area and, to the extent feasible and practicable, plan project features and construction activity to avoid direct effects on these areas.</u> Before the beginning of any ground-disturbing project activities, a qualified biologist shall delineate potential waters of the United States and shall formally map all riparian habitat that could be affected by the proposed project.

This activity will be performed following the requirements of a formal delineation of waters of the United States for CWA Section 404 permitting as described below. The primary engineering and construction contractors shall ensure, through coordination with the biologist, that the footprints of construction zones, borrow areas, staging areas, and access routes are designed to prevent any disturbance of waters of the United States and riparian habitat to the extent feasible and practicable.

All avoidable jurisdictional habitats that could potentially be affected by ground-disturbing project activity shall be protected during construction by temporary fencing and/or flagging, as appropriate. Qualified biological monitors shall be present during all construction activities that could potentially affect these protected habitats to ensure that project activity is excluded from these areas.

(b) Complete the Section 404 permitting process, and mitigate the acreage of affected jurisdictional wetland on a "no-net-loss" basis. Before the initiation of any ground-disturbing project activities in areas that contain potentially jurisdictional wetlands, qualified biologists shall complete a delineation of wetlands and other waters of the United States that would be affected by the proposed project. The findings shall be documented in a detailed report and submitted to the Corps for verification as part of the formal Section 404 wetland delineation process. For all jurisdictional areas that cannot be avoided as described above, TRLIA shall secure authorization for fill of wetlands and alteration of waters of the United States from the Corps through the Section 404 permitting process before project implementation. The acreage of jurisdictional wetland affected shall be mitigated (e.g., through restoration, rehabilitation, enhancement, and/or replacement) on a "no-net-loss" basis in accordance with Corps regulations. Habitat restoration, rehabilitation, and/or replacement shall be at a location and by feasible methods agreeable to the Corps. TRLIA shall implement the feasible mitigation measures adopted through the permitting process.

(c) Obtain a streambed alteration agreement from DFG and mitigate affected riparian habitat on a "no-net-loss" basis. Because project implementation would result in changes to the natural flow and bed and bank of a waterway (e.g., vegetated drainage canal, the Feather River), the project would likely require a Section 1602 streambed alteration agreement from DFG. If complete avoidance of identified riparian habitat is not feasible, the acreage of riparian habitat that would be removed shall be mitigated on a "no-net-loss" basis in accordance with DFG regulations and as specified in the streambed alteration agreement, if needed. Habitat mitigation (e.g., restoration, rehabilitation, and/or replacement) shall be at a location and by methods agreeable to DFG.

Implementing this mitigation measure would reduce the impact on sensitive habitats to a less-than-significant level.

LS-5.5-c **Conduct Detailed Special-Status Plant Surveys and Establish Construction Buffers as Necessary to Minimize Effects on Special-Status Plants.** This mitigation would reduce the potential impact to a less-than-significant level.

TRLIA and its primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize potential project effects on special-status plants:

(a) Conduct detailed special-status plant surveys and document the results. Before the initiation of any ground-disturbing project activities, a qualified botanist shall conduct detailed/focused surveys for rose mallow and Wright's trichocoronis in appropriate habitat within the project area, in accordance with USFWS and DFG guidelines and at the appropriate time of year when the target species would be in flower or otherwise clearly identifiable (June to September for rose mallow and May to September for Wright's trichocoronis). The findings shall be documented in a letter report that is retained by TRLIA. If rose mallow and Wright's trichocoronis are not found during focused surveys, no further action shall be required.

(b) Establish buffers wherever possible to protect identified special-status plants from construction activity. If special-status plants are found during focused surveys, the primary

engineering and construction contractors shall ensure, through coordination with a qualified biologist, that the footprint of project features and construction zones, staging areas, and access routes are designed such that any disturbance of the plants is prevented to the extent feasible and practicable. The botanist shall clearly identify the locations of special-status plant populations in the field by staking or flagging before construction. No project activities shall be allowed within the marked areas.

(c) Compensate for losses of special-status plants. If populations or individuals of rose mallow and Wright's trichocoronis are found during implementation of item (a) above, and the individuals or populations cannot be avoided during implementation of item (b), a mitigation and monitoring plan for the affected species shall be developed and implemented. The plan shall be prepared by a qualified biologist. Before disturbance of the individuals or populations of the effected species, the mitigation and monitoring plan shall be submitted to TRLIA for review and approval. The plan shall be submitted concurrently to DFG for review and comment, and TRLIA may consult with DFG before approval of the plan. Possible mitigation for individuals or populations removed during construction includes:

- removing and stockpiling topsoil with intact roots, rhizomes, and seed bank in the disturbance area, and either replacing the soil in the same location after construction is complete or placing it in a new area with suitable habitat; or
- collecting plants, seeds, or other propogules in the area to be disturbed, and placing propogules or cultivating nursery stock in the disturbed area after construction is complete or in a new area with suitable habitat.

Mitigation will be considered successful if populations of affected species in mitigation areas are sustained for a minimum of 3 years and are of similar size and quality as the affected populations.

Implementing this mitigation measure would reduce the potential impact on special-status plants to a less-than-significant level.

LS-5.5-d **Conduct Protocol-level Surveys, Establish Buffers, and Implement a Mitigation Plan as Necessary to Minimize Effects on Valley Elderberry Longhorn Beetle.** This mitigation would reduce the potential impact to a less-than-significant level.

TRLIA and its primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize potential project effects on valley elderberry longhorn beetles:

(a) Conduct protocol-level elderberry shrub surveys in the project area. Before the beginning of ground disturbance within 100 feet of any area that may support elderberry shrubs, a qualified biologist shall conduct an elderberry shrub survey consistent with USFWS protocols for conservation of valley elderberry longhorn beetle (U.S. Fish and Wildlife Service 1999). All elderberry shrubs with potential to be affected by project activities shall be mapped and the number of stems greater than 1 inch in diameter on each shrub that may require removal shall be counted. (Elderberry plants with no stems measuring 1 inch or

greater in diameter at ground level are considered unlikely to be habitat for the beetle because of their small size and/or immaturity [U.S. Fish and Wildlife Service 1999].)

(b) Protect elderberry shrubs from disturbance. The primary engineering and construction contractors, through coordination with the biologist, shall ensure to the extent feasible and practicable that the footprint of project features and construction zones, staging areas, and access routes are designed to ensure that no project activities would affect an elderberry shrub with stems measuring 1 inch in diameter at ground level. Buffers of at least 100 feet shall be established around all elderberry shrubs with stems greater than 1 inch in diameter at ground level that can be retained undisturbed on-site. The buffer shall be clearly identified in the field by staking or flagging. All project activity shall be prohibited within the buffer areas. If maintenance of these buffers is not feasible, consultation with USFWS shall be conducted as described below.

(c) If effects on shrubs cannot be avoided, develop and implement a mitigation plan approved by USFWS. If maintaining 100-foot protection buffers or otherwise avoiding construction-related effects on elderberry shrubs with a stem greater than 1 inch in diameter at ground level is not feasible, consultation with USFWS will be required, and an incidental take permit may be required. During this consultation, an appropriate and feasible mitigation plan shall be developed and provided to USFWS for approval. The plan may include, but would not necessarily be limited to, reducing buffers around shrubs that would not be removed; transplanting shrubs to a conservation area; and planting additional seedling or cuttings at a ratio ranging from 1:1 or 1:6, depending on the number of stems greater than or equal to 1 inch in diameter and whether beetle exit holes are found on the shrubs on-site (U.S. Fish and Wildlife Service 1999).

Implementing this mitigation measure would reduce the potential impact on valley elderberry longhorn beetle to a less-than-significant level.

LS-5.5-e **Conduct Surveys as Part of Dewatering Activities and Minimize Effects on Northwestern Pond Turtle.** This mitigation would reduce the potential impact to a less-than-significant level.

TRLIA and its primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize potential project effects on northwestern pond turtles:

(a) Conduct surveys after dewatering. A qualified biologist shall conduct surveys for northwestern pond turtles in aquatic habitats to be dewatered and/or filled during project construction and grading of aquatic habitat within the setback area. Surveys shall be conducted immediately after any dewatering and before any fill of aquatic habitat. If no pond turtles are found, no further mitigation will be required.

(b) Capture and move turtles. If any pond turtles are found, the biologist shall capture them and move them to suitable habitat in the vicinity of the project site.

Implementing this mitigation measure would reduce the potential impact on northwestern pond turtle to a less-than-significant level.

LS-5.5-f **Implement Applicable Take Minimization Measures and a Mitigation Plan as Necessary for Giant Garter Snake.** This mitigation would reduce the potential impact to a less-than-significant level.

TRLIA and its primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize potential project effects on giant garter snakes:

(a) Verify potential habitat in the project area and, to the extent feasible and practicable, plan project features and construction activity to avoid direct effects on these areas. Before the initiation of any ground-disturbing project activities, a qualified biologist approved by USFWS's Sacramento Fish and Wildlife Office shall verify where suitable habitat conditions for giant garter snake occur in areas that could be affected by the proposed project. The primary engineering and construction contractors shall ensure, through coordination with the biologist, that the footprint of project features and construction zones, staging areas, and access routes are designed to prevent any disturbance of potential giant garter snake habitat to the extent feasible and practicable.

(b) Designate areas to be avoided during construction. The primary engineering and construction contractors, through coordination with the biologist, shall designate giant garter snake habitat to be avoided during project construction as Environmentally Sensitive Areas. These areas shall be flagged by the biologist and avoided by all construction personnel.

(c) Limit the timing of construction activity within potential habitat. All construction activities that must take place within potential giant garter snake habitat (aquatic habitat and adjacent upland habitat within 200 feet) shall be limited to the period of May 1 to October 1 to the extent feasible.

(d) Follow guidelines for habitat dewatering. Dewatering of aquatic habitat shall not occur between October 1 and April 15. Any dewatered habitat must remain dry for at least 15 consecutive days after April 15 and before the excavation or filling of the dewatered habitat.

(e) Inspect suitable habitat within 24 hours of beginning construction. Within 24 hours before the initiation of construction activities within suitable habitat, a qualified biologist who is approved by USFWS's Sacramento Fish and Wildlife Office shall conduct preconstruction surveys for giant garter snakes. These areas shall be reinspected whenever a lapse of construction activity within suitable habitat occurs for a period greater than 2 weeks. If a giant garter snake is found, all activity that could result in death or injury of giant garter snake shall be delayed until consultation with USFWS and DFG has been completed and authorization to proceed has been received from those agencies.

(f) Minimize clearing of wetland vegetation. Clearing of wetland vegetation shall be confined to the minimum area necessary. Excavation of channel banks shall be accomplished by using equipment located on and operated from the top of the bank, with the least interference practical for emergent vegetation that would not be affected by the project.

(g) Restrict movement of equipment. Movement of heavy equipment to and from the project site shall be restricted to areas outside the identified suitable habitat, unless the equipment is

being moved on established roadways or in areas that have been inspected by a qualified biologist.

(h) Participate in environmental awareness program. Construction personnel shall participate in a USFWS-approved worker environmental awareness program. Under this program, workers shall be informed about the presence of giant garter snakes and habitat associated with the species and that unlawful take of the animal or destruction of its habitat is a violation of ESA.

(i) Restore disturbed areas. After completion of construction activities, any construction debris shall be removed and disturbed areas within potential giant garter snake habitat shall be restored to preproject conditions.

(j) If impacts cannot be avoided, develop and implement a feasible mitigation plan approved by USFWS. Consultation with USFWS and DFG shall be required for impacts that cannot be avoided, and an incidental take permit may be required. During this consultation, an appropriate and feasible mitigation plan shall be developed and provided to USFWS and DFG for approval. The mitigation plan may include, but would not necessarily be limited to, applicable take minimization measures outlined above, or modifications of those measures, and compensation for unavoidable impacts through replacement of habitat. Compensation ratios may range from 1:1 to 3:1 (replaced aquatic habitat to affected habitat), depending on the amount of habitat lost and the duration of the impact. Replacement habitat shall include both upland and aquatic habitat components at a ratio of 2:1 upland habitat to aquatic habitat.

Implementing this mitigation measure would reduce the potential impact on giant garter snake to a less-than-significant level.

LS-5.5-g(1) Conduct Preconstruction Surveys and Protect Active Nests to Minimize Effects on Swainson's Hawk. This mitigation, together with Mitigation Measures LS-5.5-g(2) and LS-5.5-g(3), would reduce the potential impact to a less-than-significant level.

TRLIA and its primary construction contractor shall ensure that the following measures are implemented to minimize potential project effects on Swainson's hawk:

(a) Conduct preconstruction surveys. Because project construction activity would occur during the Swainson's hawk breeding season (March 1 to September 15), a qualified biologist shall conduct preconstruction surveys to identify active nests in the nonorchard trees within 1/2 mile of construction areas (including staging and borrow areas). Because of the mostly linear nature of project construction, preconstruction surveys may be phased to accommodate construction activities; suitable nesting habitat shall be surveyed only when construction activities would encroach within 1/2 mile of unsurveyed areas. Surveys shall be conducted no less than 14 days and no more than 30 days before construction activities may encroach within 1/2 mile of unsurveyed areas. To the extent feasible, guidelines provided in *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (Swainson's Hawk Technical Advisory Committee 2000) shall be followed.

(b) Establish protective buffers around active nests. If an active nest is found, an appropriate buffer to avoid impacts shall be determined by a qualified biologist. No project activities shall commence within the buffer area until a qualified biologist confirms that the nest is no longer active. The size of the buffer may vary, depending on the nest location, nest stage, and construction activity. Monitoring of the nest by a qualified biologist may be required if the activity could adversely affect the nest.

LS-5.5-g(2) Conduct Preconstruction Surveys, Protect Occupied Burrows, and Relocate Individuals as Necessary to Minimize Effects on Burrowing Owl. This mitigation, together with Mitigation Measures LS-5.5-g(1) and LS-5.5-g(3), would reduce the potential impact to a less-than-significant level.

TRLIA and its primary construction contractor shall ensure that the following measures are implemented to minimize potential project effects on burrowing owl:

(a) Conduct preconstruction surveys. Before project-related activities in the project area, a qualified biologist shall conduct focused surveys for burrowing owls within 250 feet of construction areas (including staging and borrow areas). Surveys shall be conducted no less than 14 days and no more than 30 days prior to initiation of project activities, and surveys shall be conducted in accordance with DFG protocol (California Department of Fish and Game 1995).

(b) Establish protective buffers around occupied burrows. If occupied burrows are found, an appropriate buffer shall be established to avoid impacts on the burrows. A buffer of 165 feet would be required during the nonbreeding season (September 1 through January 31), and a buffer of 250 feet would be required during the breeding season (February 1 through August 31). To the extent feasible, project activity shall be excluded from within the buffer areas.

(c) Relocate owls if necessary. If impacts on occupied burrows are unavoidable, on-site passive relocation techniques approved by DFG shall be used to encourage owls to move to alternative burrows outside the impact area. However, no occupied burrows shall be disturbed during the nesting season unless a qualified biologist verifies through noninvasive methods that the burrow is no longer occupied.

LS-5.5-g(3) Conduct Preconstruction Surveys and Protect Active Nests to Minimize Effects on Other Nesting Raptors. This mitigation, together with Mitigation Measures LS-5.5-g(1) and LS-5.5-g(2), would reduce the potential impact to a less-than-significant level.

TRLIA and its primary construction contractor shall ensure that the following measures are implemented to minimize potential project effects on other nesting raptors:

(a) Conduct preconstruction surveys. Because project construction activity would occur during the raptor breeding season (February 15 to September 15), a qualified biologist shall conduct preconstruction surveys to identify active nests in the nonorchard trees within 500 feet of potential construction areas (including staging and borrow areas). Because of the linear nature of project construction, preconstruction surveys may be phased to accommodate construction activities; suitable nesting habitat shall be surveyed only when construction

activities would encroach within 500 feet of unsurveyed areas. Surveys shall be conducted no less than 14 days and no more than 30 days before construction encroaches within 500 feet of unsurveyed areas. If no active nests are found, no further mitigation shall be required.

(b) Establish protective buffers around active nests. If an active nest is found, an appropriate buffer to avoid impacts shall be determined by a qualified biologist. No project activities shall commence within the buffer area until a qualified biologist confirms that the nest is no longer active. The size of the buffer may vary, depending on the nest location, nest stage, and construction activity. Monitoring of the nest by a qualified biologist may be required if an activity could adversely affect the nest.

Implementing Mitigation Measures LS-5.5-g(1), LS-5.5-g(2), and LS-5.5-g(3) together would reduce the potential impact on Swainson's hawk and other nesting raptors to a less-than-significant level.

ALTERNATIVE 2 – THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impact ASB-5.5-a (general biological resources), Impact ASB-5.5-h (other special-status birds), Impact ASB-5.5-i (Pacific western big-eared bat), or Impact ASB-5.5-j (wildlife corridors).

Mitigation is provided below for Impact ASB-5.5-b (sensitive habitats), Impact ASB-5.5-c (special-status plants), Impact ASB-5.5-d (valley elderberry longhorn beetle), Impact ASB-5.5-e (northwestern pond turtle), Impact ASB-5.5-f (giant garter snake), and Impact ASB-5.5-g (Swainson's hawk and other nesting raptors).

ASB-5.5-b **Avoid Disturbance of Sensitive Habitat to the Extent Feasible and Comply with Corps and DFG Processes to Mitigate Unavoidable Effects.** This measure is identical to Mitigation Measure LS-5.5-b above. This mitigation would reduce the impact to a less-than-significant level.

ASB-5.5-c **Conduct Detailed Special-Status Plant Surveys and Establish Construction Buffers as Necessary to Minimize Effects on Special-Status Plants.** This measure is identical to Mitigation Measure LS-5.5-c above. This mitigation would reduce the potential impact to a less-than-significant level.

ASB-5.5-d **Conduct Protocol-level Surveys, Establish Buffers, and Implement a Mitigation Plan as Necessary to Minimize Effects on Valley Elderberry Longhorn Beetle.** This measure is identical to Mitigation Measure LS-5.5-d above. This mitigation would reduce the potential impact to a less-than-significant level.

ASB-5.5-e **Conduct Surveys as Part of Dewatering Activities and Minimize Effects on Northwestern Pond Turtle.** This measure is identical to Mitigation Measure LS-5.5-e above. This mitigation would reduce the potential impact to a less-than-significant level.

ASB-5.5-f **Implement Applicable Take Minimization Measures and a Mitigation Plan as Necessary for Giant Garter Snake.** This measure is identical to Mitigation Measure LS-5.5-f above. This mitigation would reduce the potential impact to a less-than-significant level.

ASB-5.5-g(1) **Conduct Preconstruction Surveys and Protect Active Nests to Minimize Effects on Swainson's Hawk.** This measure is identical to Mitigation Measure LS-5.5-g(1) above. Together with Mitigation Measures ASB-5.5-g(2) and ASB-5.5-g(3), this mitigation would reduce the potential impact to a less-than-significant level.

ASB-5.5-g(2) **Conduct Preconstruction Surveys, Protect Occupied Burrows, and Relocate Individuals as Necessary to Minimize Effects on Burrowing Owl.** This measure is identical to Mitigation Measure LS-5.5-g(2) above. Together with Mitigation Measures ASB-5.5-g(1) and ASB-5.5-g(3), this mitigation would reduce the potential impact to a less-than-significant level.

ASB-5.5-g(3) **Conduct Preconstruction Surveys and Protect Active Nests to Minimize Effects on Other Nesting Raptors.** This measure is identical to Mitigation Measure LS-5.5-g(3) above. Together with Mitigation Measures ASB-5.5-g(1) and ASB-5.5-g(2), this mitigation would reduce the potential impact to a less-than-significant level.

ALTERNATIVE 3 – THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impact IS-5.5-a (general biological resources), Impact IS-5.5-h (other special-status birds), Impact IS-5.5-i (Pacific western big-eared bat), or Impact IS-5.5-j (wildlife corridors).

Mitigation is provided below for Impact IS-5.5-b (sensitive habitats), Impact IS-5.5-c (special-status plants), Impact IS-5.5-d (valley elderberry longhorn beetle), Impact IS-5.5-e (northwestern pond turtle), Impact IS-5.5-f (giant garter snake), and Impact IS-5.5-g (Swainson's hawk and other nesting raptors).

IS-5.5-b **Avoid Disturbance of Sensitive Habitat to the Extent Feasible and Comply with Corps and DFG Processes to Mitigate Unavoidable Effects.** This measure is identical to Mitigation Measure LS-5.5-b above. This mitigation would reduce the impact to a less-than-significant level.

IS-5.5-c **Conduct Detailed Special-Status Plant Surveys and Establish Construction Buffers as Necessary to Minimize Effects on Special-Status Plants.** This measure is identical to Mitigation Measure LS-5.5-c above. This mitigation would reduce the potential impact to a less-than-significant level.

IS-5.5-d **Conduct Protocol-level Surveys, Establish Buffers, and Implement a Mitigation Plan as Necessary to Minimize Effects on Valley Elderberry Longhorn Beetle.** This measure is identical to Mitigation Measure LS-5.5-d

above. This mitigation would reduce the potential impact to a less-than-significant level.

IS-5.5-e **Conduct Surveys as Part of Dewatering Activities and Minimize Effects on Northwestern Pond Turtle.** This measure is identical to Mitigation Measure LS-5.5-e above. This mitigation would reduce the potential impact to a less-than-significant level.

IS-5.5-f **Implement Applicable Take Minimization Measures and a Mitigation Plan as Necessary for Giant Garter Snake.** This measure is identical to Mitigation Measure LS-5.5-f above. This mitigation would reduce the potential impact to a less-than-significant level.

IS-5.5-g(1) **Conduct Preconstruction Surveys and Protect Active Nests to Minimize Effects on Swainson's Hawk.** This measure is identical to Mitigation Measure LS-5.5-g(1) above. Together with Mitigation Measures IS-5.5-g(2) and IS-5.5-g(3), this mitigation would reduce the potential impact to a less-than-significant level.

IS-5.5-g(2) **Conduct Preconstruction Surveys, Protect Occupied Burrows, and Relocate Individuals as Necessary to Minimize Effects on Burrowing Owl.** This measure is identical to Mitigation Measure LS-5.5-g(2) above. Together with Mitigation Measures IS-5.5-g(1) and IS-5.5-g(3), this mitigation would reduce the potential impact to a less-than-significant level.

IS-5.5-g(3) **Conduct Preconstruction Surveys and Protect Active Nests to Minimize Effects on Other Nesting Raptors.** This measure is identical to Mitigation Measure LS-5.5-g(3) above. Together with Mitigation Measures LS-5.5-g(1) and IS-5.5-g(2), this mitigation would reduce the potential impact to a less-than-significant level.

5.5.5 IMPACTS REMAINING SIGNIFICANT AFTER MITIGATION

With implementation of the mitigation described above, all impacts on terrestrial biological resources would be reduced to a less-than-significant level.

SECTION 5.6 RECREATION

This section describes existing recreational facilities in the project vicinity and presents an analysis of recreation-related impacts that could result from implementation of any of the three proposed project alternatives.

5.6.1 REGULATORY SETTING

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

No federal plans, policies, regulations, or laws related to recreation resources are applicable to the proposed project.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

California Department of Fish and Game

The California Department of Fish and Game (DFG) manages the Feather River State Wildlife Area, which comprises several management "units" on both the left (east) and right (west) banks of the Feather River (see Figure 5.1-1, "Conservation Areas in the Project Vicinity"). As shown in Figure 5.1-1, the Lake of the Woods Unit (described below under "Recreational Opportunities along the Feather River") is located between the Feather River and the left bank levee, immediately adjacent to a portion of the Feather River Levee Repair Project (FRLRP) project area. DFG administers these units for multiple recreational uses, the most important of which are hunting and fishing. DFG regulates the types and levels of recreational use of these areas to ensure public safety and the protection of fish, wildlife, and plant resources. DFG may limit use within the units or portions of the units for safety reasons or to provide for the limited take of a species.

LOCAL PLANS, POLICIES, REGULATIONS, AND LAWS

Yuba County

The Yuba County (County) system of parks and recreational facilities is limited. The County does not have a parks and recreation department, nor does it have any regulations or general plan policies that would apply to the FRLRP.

City of Marysville

The City of Marysville maintains various recreation amenities in the floodplains of the Feather and Yuba Rivers. In particular, the City of Marysville's Riverfront Park consists of a large complex of facilities, many of which (e.g., an off-highway vehicle [OHV] motocross course, sports fields, a nature area, a BMX track) are located in the river floodplain. The northern edge of the FRLRP project area is in the vicinity of some of the motocross/BMX facilities. One of the policies of the Open Space, Conservation and Recreation Element of the *City of Marysville General Plan* (City of Marysville 1985) is "To encourage compatible recreational uses in floodplains of the Feather and Yuba rivers." This policy, among others, supports the broader goal

"To designate, protect, and conserve the natural resources, open space, and recreation lands in the city; and provide opportunities for recreation activities to meet citizens' needs."

5.6.2 ENVIRONMENTAL SETTING

SOURCES OF INFORMATION

Information for this section was obtained from individuals familiar with recreation resources in the project area and from various online and print documents, including Volumes I and II of the *Yuba County General Plan* (Yuba County 1994, 1996); the *City of Marysville General Plan* (City of Marysville 1985); the *Draft Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project* (Yuba County Water Agency 2003); the *Land Acquisition and Management Plan for the Feather-Bear Rivers Levee Setback Project* (Yuba County Water Agency 2004); the *Bear River and Western Pacific Interceptor Canal Levee Improvements Project Draft Environmental Impact Report* (Three Rivers Levee Improvement Authority 2004a); and the *Draft Environmental Impact Report for the Feather-Bear Rivers Levee Setback Project* (Three Rivers Levee Improvement Authority 2004b).

REGIONAL RECREATIONAL OPPORTUNITIES

Yuba County contains approximately 580 acres of neighborhood and community park and recreation facilities that are accessible to the public. Of these approximately 580 acres, roughly 270 acres are within the jurisdiction of the City of Marysville, including Riverfront Park, Ellis Lake, and scattered neighborhood parks. Olivehurst Public Utility District oversees approximately 13 acres of neighborhood parkland, the City of Wheatland maintains roughly 6 acres of parkland, and Brownsville has approximately 40 acres of parks. The remaining approximately 250 acres of park and recreation facilities are administered by the County Public Works Department (Yuba County 1994). Some of this acreage is located in the project vicinity and is discussed below under "Recreational Opportunities along the Feather River" and "Recreational Opportunities along the Yuba River."

In addition, numerous rivers, creeks, and reservoirs are used for recreation in Yuba County. Where access is available, fishing, hunting, picnicking, rafting, tubing, and swimming are the dominant recreational uses on the Feather, Yuba, and Bear Rivers. Developed day use and overnight facilities for camping, picnicking, and boating are available at upstream sites, including Camp Far West, Lake Mildred, Lake Francis, Merle Collins Reservoir, Englebright Reservoir, and New Bullards Bar Reservoir. Tahoe and Plumas National Forests occupy more than 56,000 acres of land in northeastern Yuba County and offer a wide variety of recreational opportunities (Yuba County 1994).

RECREATIONAL OPPORTUNITIES ALONG THE FEATHER RIVER

The lower Feather River flows from Oroville Dam to its confluence with the Sacramento River, largely past private land. Common activities along the Feather River include boat and shore fishing, pleasure boating, hunting, swimming, sightseeing, picnicking, and camping. Boat access between Oroville and Marysville is provided at Riverfront Park and near Live Oak, Gridley, and Biggs. Undeveloped access points downstream of Marysville are located along Garden Highway (State Water Resources Control Board 1997).

The primary recreation site in the FRLRP project vicinity is the Feather River State Wildlife Area, most of which is located south of Marysville and Yuba City near the confluence of the Feather and Bear Rivers in both Yuba and Sutter Counties. This wildlife area, which is managed by DFG, comprises several management units (California Department of Fish and Game 2006). The following management units are located along the Feather River and in the FRLRP project vicinity:

- The Abbott Lake Unit is a 439-acre site east of Garden Highway and north of Star Bend Road in Sutter County. This unit is adjacent to the right (west) bank levee of the Feather River and across the river from project Segment 2.
- The Star Bend Unit is a 50-acre site located along the left bank of the Feather River at Star Bend in Yuba County. This unit is near Segment 2.
- The O'Connor Lakes Unit is a 471-acre site east of Garden Highway and south of Star Bend Road in Sutter County. This unit is adjacent to the right bank levee of the Feather River and across the river from project Segment 1.
- The Lake of the Woods Unit is a 698-acre site along the left bank levee of the Feather River in Yuba County. It is immediately adjacent to Segment 1. The unit is accessible only by boat.

The four units in the project vicinity—Abbott Lake, Star Bend, O'Connor Lakes, and Lake of the Woods—are shown in Figure 5.1-1. This figure also shows the location of Bobelaine Audubon Sanctuary, which is discussed below and in Section 5.5, "Terrestrial Biological Resources," and the location of the Corps Marysville–Yuba City mitigation area.

Use of the public lands in the Feather River State Wildlife Area for all forms of recreation (e.g., hunting, fishing, hiking, motor biking) is currently estimated at about 5,000 user days annually. A user day is equivalent to a single person visiting a site for a day. One person may be responsible for multiple user days if he or she visits a site more than once during a year. Hunting (using shotguns only) is available within the management units from July through January, as well as during spring turkey season (late March through early May); usage of the area for this purpose is moderate. For example, estimated usage of the Lake of the Woods Unit by hunters and anglers from July through January is 1,500 user days; in the Star Bend Unit, this figure is about 500 user days, and the lands north of Star Bend, including the Abbott Lake Unit, are used at about the same rate (Three Rivers Levee Improvement Authority 2004b, Whitmore, pers. comm., 2006). Estimated annual usage of the O'Connor Lakes Unit by hunters and anglers is approximately 1,000 user days (Whitmore, pers. comm., 2006). Game animals in the wildlife area include quail, pheasant, rabbit, turkey, and deer.

Annual usage of the Lake of the Woods Unit by nonhunters (e.g., hikers, bird-watchers) outside the July-through-January hunting season is estimated at 500 user days; at Star Bend and points north, usage is estimated at 150 user days in each location. The level of annual recreation use at the O'Connor Lakes Unit by hikers and other nonhunters is estimated at 300 recreation user days (Whitmore, pers. comm., 2006). Access to the existing levees within these wildlife management units is currently very limited; vehicles are prohibited from driving on the levee except on ramps, and parking is limited to an area at the Star Bend Boat Ramp. The existing levee is used for

walk-in access only, and unauthorized vehicles can be cited (Three Rivers Levee Improvement Authority 2004b).

In addition to the lands managed by DFG as part of the Feather River State Wildlife Area, the Bobelaine Audubon Sanctuary, a registered state ecological reserve, is located on more than 430 acres on the west (Sutter County) side of the Feather River, 12 miles south of Yuba City (Figure 5.1-1). Managed by the Sacramento Audubon Society, the reserve is a remnant of the 2- to 5-mile-wide river forests that historically bordered the rivers in California's Central Valley. The Bobelaine reserve offers a variety of recreational activities, including picnicking, hiking along more than 5 miles of trails, and viewing numerous species of mammals and more than 190 species of birds, and it is a destination for field trips. Hunting and fishing are prohibited (Yuba Sutter Tourism Board 2004, Sacramento Audubon Society 2006).

Beyond the activities associated with the wildlife and habitat areas described above, recreationists currently use the Feather River channel and floodway adjacent to the project area for rafting, tubing, and swimming where access allows these uses. The tops of the levees are also used for bicycle riding, walking, and jogging. The City of Yuba City maintains the Feather River Levee Bike Trail along the right bank of the Feather River from Northgate Drive on the north to Shanghai Bend Road on the south. However, most levee areas in the project vicinity are not considered formal recreation facilities.

The Star Bend Boat Launch and Fishing Access, located 0.5 mile north of the Lake of the Woods Unit, is the only developed public recreation facility that intersects the project area. The 9-acre facility, owned by DFG and maintained by the County Public Works Department, provides a one-lane boat launch ramp, a picnic table, and parking for approximately 20 boat trailers; no camping or recreational vehicle access is provided (Whitmore, pers. comm., 2006).

Near the confluence of the Feather and Yuba Rivers, the City of Marysville maintains various recreation amenities in the floodplains of both rivers as part of its Riverfront Park. Riverfront Park consists of a large complex of facilities, several of which (e.g., an OHV motocross course, sports fields, a nature area, a BMX track, a boat ramp) are located in the river floodplain. The northern edge of the FRLRP project area is in the vicinity of some of the motocross/BMX facilities.

RECREATIONAL OPPORTUNITIES ALONG THE YUBA RIVER

Few public recreation facilities exist along the Yuba River below New Bullards Bar Dam (U.S. Bureau of Reclamation 1997). From Englebright Lake to the Feather River at Marysville, the river flows past mostly private lands, restricting public access; however, limited public access is available at the SR 20 crossing 5 miles downstream of Englebright Lake, at the end of Hallwood Boulevard and approximately 8 miles upstream of the confluence of the Yuba and Feather Rivers. Access is also provided through Riverfront Park in Marysville. Although powerboat access is available from launches on the Feather River near the confluence with the Yuba River, boats traveling up the river are constrained by flows and cannot pass Daguerre Point Dam approximately 12 miles upstream of the confluence. Despite the lack of public recreation facilities, fishing is common along the Yuba River. Anglers can fish from shore at access points available to the public, from boats that travel upstream of the Feather River, and from drift boats

launched near the SR 20 crossing (State Water Resources Control Board 1997). Prime fishing season is March through May and August through November, and winter fishing is popular in December through February.

A portion of the Marysville Unit of the Feather River State Wildlife Area is located along the Yuba River (Figure 5.1-1). The Marysville Unit totals approximately 85 acres and is located on separate sites adjacent to the city of Marysville. A 14.5-acre site associated with the Marysville Unit is located along the right (north) bank levee of the Yuba River in Marysville, several thousand feet upstream of the north end of the project area. Access is provided via Sampson Street or 14th Street.

5.6.3 ENVIRONMENTAL IMPACTS

THRESHOLDS OF SIGNIFICANCE

Thresholds for determining the significance of impacts related to recreation are based on the environmental checklist form in Appendix G of the California Environmental Quality Act Guidelines (State CEQA Guidelines) and professional standards and practices. A project alternative would have a significant impact on recreation if it would:

- increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated;
- include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment;
- substantially restrict or reduce the availability or quality of existing recreational opportunities in the project vicinity; or
- implement operational or construction-related activities related to the placement of project facilities that would cause a substantial long-term disruption of any institutionally recognized recreational activities. Institutionally recognized recreational activities are those associated with an established publicly or privately operated recreational facility, or those actively administered or promoted by a public or private entity.

None of the three project alternatives would involve the construction of additional recreational facilities or expansion of existing facilities. Therefore, the second significance threshold does not apply to the FRLRP.

IMPACT ANALYSIS

Alternative 1 – The Levee Strengthening Alternative

Impact LS-5.6-a

Temporary Changes in Recreational Opportunities during Levee Repairs. Construction noise could disrupt recreational uses in the project area, particularly in areas adjacent to the existing levee alignment. Some wildlife species present in or inhabiting natural areas are likely to be disturbed by noise and by the presence of project construction crews and equipment. Portions of the Feather River State Wildlife Area in project Segment 1 may need to be closed temporarily to hunting and other recreational activities for safety reasons

while adjacent sections of the existing Feather River levee are being repaired. There would be no public access to the Star Bend Boat Launch and Fishing Access for several days while levee repairs were conducted in this area. Although these temporary disturbances may affect the recreation experience for bird-watchers, hunters, boaters, and other recreational users, displaced recreational uses could be accommodated by other nearby facilities (Whitmore, pers. comm., 2006). For this reason, and because of the temporary nature of this effect, this impact would be **less than significant**.

Several recreation areas are in the project vicinity, and recreational uses in these areas and along the Feather River channel could be temporarily affected by noise and visual disturbance from construction activities associated with levee repairs. The recreation areas nearest to the project site are the Star Bend Boat Launch and Fishing Access; the Bobelaine Ecological Reserve; and four units of the DFG-managed Feather River State Wildlife Area—the Abbott Lake, Star Bend, O'Connor Lakes, and Lake of the Woods Management Units. Except for the Star Bend facilities and the Lake of the Woods Management Unit, these areas are on the west side of the Feather River and not on the project site (i.e., outside the levee repair and strengthening area) (Figure 5.1-1). The Lake of the Woods Unit stretches along the entire length of project Segment 1 below Star Bend, adjacent to the existing left bank levee of the Feather River. The Star Bend Unit lies between the river channel and the existing left bank levee, within Segment 2. The existing levee is approximately 1,000–3,000 feet east of the unit boundary (Figure 5.1-1). The Star Bend Boat Launch and Fishing Access is accessible from Feather River Boulevard near the Algodon Road intersection and is within project Segment 1.

In addition to the prescribed recreational activities in these designated areas, recreationists also use the Feather River channel in the project vicinity for rafting, tubing, and swimming where access allows these uses, and the top of the existing levee is used for bicycle riding, walking, and jogging. The northern edge of the FRLRP project area is in the vicinity of some Marysville Riverfront Park facilities (i.e., MotoCross/BMX facilities) and portions of project construction could be visible or audible from these locations.

Because the levee repair and strengthening activities do not involve breaching the existing levee, some limited work on or adjacent to the levee could commence before the end of the "flood season" (i.e., before April 15). The entire construction period is expected to occur over 2 years. Therefore, project construction could coincide with a portion of the spring turkey-hunting season in the Feather River State Wildlife Area, which begins in late March and continues until early May, and with a portion of the July-through-January hunting season for other game. The construction period would also coincide with the period of summer recreation along the channel and floodway. Therefore, it can be assumed that hunters, anglers, and other recreationists could be present during the construction period for each levee segment, and that recreational activities could be disturbed by construction activity.

Effects of construction activity on recreationists in areas along the right bank levee of the Feather River are expected to be minor because of the distance between these areas and construction sites across the river. Remnant riparian vegetation along the river would provide a partial buffer between public use areas along the right bank levee and construction sites on the east side of the river, providing some visual screening and noise attenuation. Construction activity is not expected to substantially disrupt recreational opportunities near the left bank levee (i.e., Lake of the Woods, Star Bend facilities, and recreation in unmanaged areas) because use of these areas is

only moderate, construction would proceed linearly, and disturbance would not affect individual sites for long periods. Furthermore, overall disturbance would be temporary, and recreationists could adapt to disturbance by using other nearby areas that provide similar recreational opportunities. Construction activity along the northern portion of Segment 3 is not expected to disrupt activities at Marysville Riverfront Park facilities for the same reasons described above (distance from construction activities, temporary nature of construction activities). In addition, park facilities nearest the project site consist of MotoCross/BMX tracks, which are uses that would not be adversely affected by construction noise.

Annual use of all the public lands in the Feather River State Wildlife Area is estimated at about 5,000 user days (Three Rivers Levee Improvement Authority 2004b). Hunter and angler use of the Lake of the Woods and Star Bend Management Units, the units closest to the proposed construction activity, is estimated at 1,500 and 350 user days, respectively, from July through January. Annual usage of these areas by nonhunters outside the July-through-January hunting season is estimated at 500 and 150 user days, respectively (Three Rivers Levee Improvement Authority 2004b). Because none of the wildlife management units experiences heavy use, each can be assumed to be able to accommodate additional visitors who may be temporarily displaced from a unit closer to the construction areas.

In the Lake of the Woods Management Unit (which is generally within project Segment 1), some wildlife is likely to be disturbed by nearby construction, but no boundaries or obstacles would prevent their movement to quieter areas nearby. Portions of the Feather River State Wildlife Area may need to be closed to hunting temporarily for safety reasons while sections of the existing levee are being repaired. However, hunters in this unit could move to other areas not subject to disturbance. Similarly, recreationists along the river channel or the levee top could move to other areas where there is less disturbance.

The Star Bend Boat Launch and Fishing Access in project Segment 1 is one of only a limited number of boat launch facilities in the project vicinity. The boat launch area is also used for parking by recreationists using the Feather River State Wildlife Area, as vehicle access to the levees is prohibited. Levee repairs in Segment 1 would cross the Star Bend Boat Launch and Fishing Access and would temporarily prevent access to the boat launch and associated parking area as the repairs intersect the existing access road over the top of the levee. However, construction efforts would proceed along each project segment in a linear fashion, only disturbing a particular area for a relatively short period. In addition, a temporary access road could be provided to the Star Bend Boat Launch and Fishing Access during a portion of the time that levee repairs intersect the existing access road. Overall, project construction is expected to prevent public access to the Star Bend Boat Launch and Fishing Access for no more than 2–3 days (Wanket, pers. comm., 2006). Loss of public access to the Star Bend Boat Launch and Fishing Access for 2–3 days would not substantially restrict or reduce the availability or quality of existing recreational opportunities in the project vicinity or cause a substantial long-term disruption of any institutionally recognized recreational activities.

Any temporary disruption of recreational opportunities near the project area resulting from construction disturbance is likely to be accommodated by other existing facilities in the area. Levee repairs are likely to result in a shift of recreational activity to different wildlife management units and other recreational facilities; however, numerous other recreational

opportunities are available in the project vicinity and the region, and a temporary shift in use of facilities affected by construction activities to other facilities would not be expected to accelerate the physical deterioration of any one facility. Disturbance of recreational opportunities near the project area would not substantially restrict or reduce the availability or quality of existing recreational opportunities in the project vicinity and would not cause a substantial long-term disruption of institutionally recognized recreational activities. Therefore, this impact would be less than significant.

Impact LS-5.6-b

Long-Term Changes in Recreational Opportunities Resulting from Levee Repairs. In the long term, recreational opportunities along the left bank levee of the Feather River would not be adversely affected by levee repairs. Levee repair and strengthening of the existing levee would not change Feather River flood stage elevations, and hence would not alter the duration or frequency of inundation of recreational facilities relative to existing conditions. After completion of construction activities, the project site would be restored and reclaimed as appropriate to preexisting conditions. Recreational opportunities after project construction are expected to be available to the extent that these opportunities are available under preproject conditions. No substantial changes in recreational opportunities would be associated with levee repair and strengthening of the existing levee. This impact would be **less than significant**.

Short-term effects of project construction on recreational opportunities are addressed above in the discussion of Impact LS-5.6-a. Long-term recreational opportunities along the left bank levee of the Feather River (i.e., Lake of the Woods, Star Bend facilities, and recreation in unmanaged areas) would not be adversely affected by levee repairs. Levee repair and strengthening of the existing levee would occur in place and would not involve levee setbacks; therefore, no changes in Feather River flood stage elevations would occur after completion of construction activities. Therefore, no existing recreational facilities would be inundated more frequently or for longer periods than under existing conditions. In addition, after project construction, the project site would be restored and reclaimed as appropriate to preexisting conditions.

Recreational opportunities in the Feather River State Wildlife Area, at the Star Bend Boat Launch, along the levee top, and in the Feather River channel are expected to be available after project construction to the extent that these opportunities are available under preproject conditions. No substantial changes in recreational opportunities would be associated with levee repair and strengthening of the existing levee. This impact would be less than significant.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impact ASB-5.6-a

Temporary Changes in Recreational Opportunities during Levee Repairs and Setback Levee Construction. Construction noise could disrupt recreational uses in the project area, particularly in areas adjacent to the existing levee. Some wildlife species present in or inhabiting natural areas are likely to be disturbed by noise and by the presence of project construction crews and equipment. Portions of the Feather River State Wildlife Area in project Segment 1 may need to be closed temporarily to hunting and other recreational activities for safety reasons while adjacent sections of the existing Feather River levee are being repaired. There would be no public access to the Star Bend Boat Launch and Fishing Access for several days while levee repairs were conducted in this area. Although these temporary disturbances may affect the recreation experience for bird-watchers, hunters, boaters, and other recreational users, displaced recreational uses could be accommodated by other nearby facilities (Whitmore, pers. comm., 2006). For this reason, and because of the temporary nature of this effect, this impact would be **less than significant**.

This impact would be the same as Impact LS-5.6-a, described under Alternative 1 above. The Lake of the Woods Unit stretches along the entire length of project Segment 1 below Star Bend, and the existing left bank levee is approximately 1,000–3,000 feet east of the Star Bend Unit, which is within Segment 2. Recreational uses in these areas and others along the Feather River channel could be temporarily affected by noise and visual disturbance from construction activities associated with levee repairs in Segments 1 and 3 and by the removal of the existing levee in Segment 2. However, effects of construction activity on recreationists in public use areas along the right bank levee of the Feather River channel are expected to be minor because of the distance between these areas and construction sites across the river. Riparian vegetation would partially buffer the noise and screen views of the project construction sites.

As described in Impact LS-5.6-a, any temporary disruption of recreational opportunities near the project area resulting from construction disturbance is likely to be accommodated by other existing facilities in the area. There would be no public access to the Star Bend Boat Launch and Fishing Access for a short period during completion of Segment 1 levee repairs in this area. However, access would be restricted for only 2–3 days. Disturbance of recreational opportunities near the project area would not substantially restrict or reduce the availability or quality of existing recreational opportunities in the project vicinity and would not cause a substantial long-term disruption of institutionally recognized recreational activities. Therefore, this impact would be less than significant.

Impact ASB-5.6-b

Long-Term Changes in Recreational Opportunities Resulting from Levee Repairs and Setback Levee Construction. Implementing levee repairs along project Segments 1 and 3 would have little or no effect on recreational uses in the Lake of the Woods Management Unit or along the Feather River channel in these project segments. Implementing the levee setback in Segment 2 would slightly modify Feather River flood stage elevations in the project vicinity during high flows, possibly affecting recreational uses, and could affect survival rates of wildlife following high-flow periods, which could temporarily affect associated wildlife-related recreation. The changes in Feather River flood stage elevations that would result from expansion of the Feather River floodway in Segment 2, however, would be infrequent, of short duration, and during periods when river stage is already high; therefore, no new effects on recreational uses are expected. Sections of the existing Feather River levee would be left in place as part of the proposed project, which would minimize losses of wildlife that could adversely affect long-term recreational activities. This impact would be **less than significant**.

Long-term changes in recreational opportunities in project Segments 1 and 3 would be exactly the same as described for Impact LS-5.6-b under Alternative 1 above. As described for Impact LS-5.6-b, implementing levee repairs along Segments 1 and 3 would not affect recreational uses in the Lake of the Woods Management Unit or along the Feather River channel in these project segments.

Some aspects of flood operations with implementation of the levee setback in Segment 2 have the potential to adversely affect recreational opportunities; these include changes in Feather River flood stage elevations and effects on the survival of wildlife that take refuge on the existing levee during high river flows.

Under Alternative 2, much of the existing Feather River levee along the setback levee alignment in project Segment 2 would be removed to allow water to flow into the setback area during high river stage. Setting back the levee in Segment 2 would widen the floodway and lower the flood

stage in this river reach (see Section 5.3, "Water Resources and River Geomorphology"). However, the change in the river's flood stage would not be substantial enough, frequent enough, or of long enough duration to have a noticeable effect on river-based recreational opportunities.

Removing the existing levee has the potential to lower the chance of survival of wildlife that take refuge on this high ground during inundation of the floodway, possibly resulting in reduced populations and slower repopulation of flooded areas after the water level declines, causing recreational opportunities to temporarily decrease. Recreational activities (e.g., walking, jogging, and cycling) that take place on the existing levee would be displaced by removal of the levee. However, portions of the existing levee would be retained in Segment 2 after the setback levee is complete. The levee sections that would remain in place are expected to provide sufficient high ground to prevent substantial losses of wildlife that could adversely affect recreational activities such as bird-watching. In addition, any habitat restoration or creation that may occur in the levee setback area would likely increase wildlife populations in the vicinity and improve wildlife-related recreational activities. Other recreational opportunities, such as hiking and jogging, are expected to be available on the new levee in project Segment 2 and on the current levee in Segments 1 and 3 to the extent that these opportunities are available on the existing levee. No substantial changes in recreational opportunities would be associated with removal of the existing levee in Segment 2. This impact would be less than significant.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impact IS-5.6-a

Temporary Changes in Recreational Opportunities during Levee Repairs and Setback Levee Construction. Construction noise could disrupt recreational uses in the project area, particularly in areas adjacent to the existing levee. Some wildlife species present in or inhabiting natural areas are likely to be disturbed by noise and by the presence of project construction crews and equipment. Portions of the Feather River State Wildlife Area in project Segment 1 may need to be closed temporarily to hunting and other recreational activities for safety reasons while adjacent sections of the existing Feather River levee are being repaired. There would be no public access to the Star Bend Boat Launch and Fishing Access for several days while levee repairs were conducted in this area. Although these temporary disturbances may affect the recreation experience for bird-watchers, hunters, boaters, and other recreational users, displaced recreational uses could be accommodated by other nearby facilities (Whitmore, pers. comm., 2006). For this reason, and because of the temporary nature of this effect, this impact would be **less than significant**.

This impact would be the same as Impact ASB-5.6-a, described under Alternative 2 above. Although portions of the intermediate setback levee alignment are located to the west of the ASB setback levee alignment, the potential short-term effects on recreational opportunities during construction would be the same for the two alternatives.

As described in Impact ASB-5.6-a under Alternative 2 above, any disruption of recreational opportunities resulting from construction disturbance near the project area would be short term and temporary. For most recreational activities, individuals diverted from using locations near the construction area could be accommodated by other existing facilities in the area. Disturbance of recreational opportunities near the project area would not substantially restrict or reduce the availability or quality of existing recreational opportunities in the project vicinity and would not cause a substantial long-term disruption of institutionally recognized recreational activities. Therefore, this impact would be less than significant.

Impact IS-5.6-b

Long-Term Changes in Recreational Opportunities Resulting from Levee Repairs and Setback Levee Construction. Implementing levee repairs along project Segments 1 and 3 would have little or no effect on recreational uses in the Lake of the Woods Management Unit or along the Feather River channel in these project segments. Implementing the levee setback in Segment 2 would slightly modify Feather River flood stage elevations in the project vicinity during high flows, possibly affecting recreational uses, and could affect survival rates of wildlife following high-flow periods, which could temporarily affect associated wildlife-related recreation. The changes in Feather River flood stage elevations that would result from expansion of the Feather River floodway in Segment 2, however, would be infrequent, of short duration, and during periods when river stage is already high; therefore, no new effects on recreational uses are expected. Sections of the existing Feather River levee would be left in place as part of the proposed project, which would minimize losses of wildlife that could adversely affect long-term recreational activities. This impact would be **less than significant**.

This impact would be the same as Impact ASB-5.6-b, described under Alternative 2 above. Long-term changes in recreational opportunities in project Segments 1 and 3 would be exactly the same as described previously, resulting in less-than-significant effects. Some aspects of flood operations with implementation of the levee setback in Segment 2 have the potential to adversely affect recreational opportunities; these include changes in Feather River flood stage elevations and effects on the survival of wildlife that take refuge on the existing Feather River levee during high river flows. The change in river stage that would result from expansion of the floodway, however, would be infrequent, of short duration, and during periods when river stage is already high, and no new effects on recreational uses are expected. Under Alternative 3, much of the existing Feather River levee along the setback levee alignment in Segment 2 would be removed to allow water to flow into the setback area during high river stage. However, portions of the existing levee would be retained in Segment 2 after the setback levee is complete. The levee sections that would remain in place are expected to provide sufficient high ground to prevent substantial losses of wildlife that could adversely affect long-term recreational activities. In addition, any habitat restoration or creation that may occur in the levee setback area would likely increase wildlife populations in the vicinity and improve wildlife-related recreational activities. Other recreational opportunities, such as hiking and jogging, are expected to be available on the new levee in project Segment 2 and on the current levee in Segments 1 and 3 to the extent that these opportunities are available on the existing levee. No substantial changes in recreational opportunities would be associated with removal of the existing levee in Segment 2. This impact would be less than significant.

5.6.4 MITIGATION MEASURES

ALTERNATIVE 1 – THE LEVEE STRENGTHENING ALTERNATIVE

No mitigation is required for Impact LS-5.6-a or Impact LS-5.6-b.

ALTERNATIVE 2 – THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impact ASB-5.6-a or Impact ASB-5.6-b.

ALTERNATIVE 3 – THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impact IS-5.6-a or Impact IS-5.6-b.

5.6.5 EFFECTS REMAINING SIGNIFICANT AFTER MITIGATION

All impacts of the three proposed project alternatives on recreation would be less than significant.

SECTION 5.7 AESTHETIC RESOURCES

This section focuses on visual components of aesthetic resources that may be affected by elements of the Feather River Levee Repair Project (FRLRP).

5.7.1 CRITERIA USED IN VISUAL ASSESSMENT

The aesthetic quality of an area is determined through the variety and contrasts of the area's visual features, the character of those features, and the scope and scale of the scene. The aesthetic quality of an area depends on the relationships between its features and their importance in the overall view. Visual images dominate observers' impressions of the aesthetic qualities of an area. Therefore, evaluating scenic resources requires a method that objectively characterizes visual features, assesses their quality in relation to the visual character of the surrounding area, and identifies their importance to the individuals viewing them. This process is derived from established federal procedures for visual assessment and is commonly used for a variety of project types.

Both natural and created features in a landscape contribute to its perceived visual quality. Landscape characteristics influencing visual quality include geologic, hydrologic, botanical, wildlife, recreation, and urban features. Several sets of criteria have been developed for defining and evaluating visual quality. A commonly used set of criteria includes the concepts of vividness, intactness, and unity. None of these is itself equivalent to visual quality; all three must be high to indicate high quality. These terms are defined as follows (Federal Highway Administration 1983):

- "Vividness" is the visual power or memorability of landscape components as they combine in striking and distinctive visual patterns.
- "Intactness" is the visual integrity of the natural and human-built landscape and its freedom from encroaching elements.
- "Unity" is the visual coherence and compositional harmony of the landscape considered as a whole.

This study uses a qualitative descriptive method for characterizing and evaluating the visual resources of the areas that could be affected by the project. The quality of views of areas that could be affected by the FRLRP is evaluated based on the relative degree of vividness, intactness, and unity apparent in views and also on viewer sensitivity. Viewer sensitivity is a function of several factors, including the following:

- visibility of the landscape,
- proximity of viewers to the visual resources,
- frequency and duration of views,
- number of viewers,
- types of individuals and groups of viewers, and
- viewers' expectations.

The sensitivity of a view of the landscape is also determined by the extent of the public's concern for a particular view. Areas of high visual sensitivity are typically highly visible to the general public. Scenic highways, tourist routes, and recreation areas are considered more visually sensitive than more urbanized locations. A determination finding that a potential visual impact has significance would be based on a change in visual character as determined by the obstruction of a public view, creation of an aesthetically offensive public view, or adverse changes to objects having aesthetic significance. A viewer's distance from landscape elements plays an important role in the determination of an area's visual quality. Landscape elements are considered higher or lower in visual importance based on their position relative to the viewer. Generally, the closer a resource is to the viewer, the more dominant, and therefore visually important, it is to the viewer.

5.7.2 REGULATORY SETTING

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

No federal plans, policies, regulations, or laws related to aesthetic resources are applicable to the proposed project.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

California's Scenic Highway Program was created by the California Legislature in 1963. Its purpose is to preserve and protect scenic highway corridors from change that would diminish the aesthetic value of lands adjacent to highways. A highway may be designated "scenic" depending on how much of the natural landscape travelers can see, the scenic quality of the landscape, and the extent to which development intrudes on travelers' enjoyment of the view. There are no designated state scenic highways in the project area (California Department of Transportation 2003).

LOCAL PLANS, POLICIES, REGULATIONS, AND LAWS

The project area is located in Yuba County. There are no regulations that pertain specifically to visual resources in the project area. The general goal of the Open Space and Conservation Element of the *Yuba County General Plan* (Yuba County 1994) is "To maintain and enhance the natural resources, open space land uses and scenic beauty of Yuba County in order to protect the quality of the environment, the County's economy, and the health and well-being of present and future residents." Supporting this goal is a policy to "encourage the preservation and enhancement of the natural features of the County, including rivers and streams and their banks, mountain peaks, bluffs, areas of scenic beauty, and native vegetation."

5.7.3 ENVIRONMENTAL SETTING

SOURCES OF INFORMATION

Information for this section was obtained from Volume I of the *Yuba County General Plan* (Yuba County 1994), the *Three Rivers Levee Improvement Authority Phase IV Erosion Investigation* (Three Rivers Levee Improvement Authority 2006), discussions with individuals with knowledge of the area, and field observations during site visits in June 2004 and May 2006.

PROJECT SEGMENT 1

As described in Section 4.1, "Introduction," in Chapter 4, "Description of the Proposed Project," the Feather River levee in the project area is divided into three segments. The southernmost segment, project Segment 1, extends from Project Levee Mile (PLM) 13.3 to PLM 17.1, between Reclamation District (RD) 784 Pump Station No. 2 and Star Bend. At its northern end, Segment 1 is adjacent to the west side of Feather River Boulevard for nearly a mile, until Feather River Boulevard turns east toward SR 70. SR 70 is about 2 miles east of the project area. Figure 5.11-1, "Roads in the Vicinity of the Proposed Feather River Levee Repair Project Area," shows local roads and highways in relation to the three project segments.

The area between Feather River Boulevard and the existing Feather River levee in project Segment 1 is rural, with few residences (Figure 5.7-1, "Views in and near Project Segment 1"). Views west toward the levee and east, from the levee, are typical of local rural areas, consisting mainly of orchards of various ages dominated by crops of walnuts, peaches, prunes, pears, and apples; scattered agricultural outbuildings and residences along Feather River Boulevard and connecting roads; disturbed areas of ruderal vegetation bordering roadways; utility poles and overhead utility lines; and the existing levee (Figure 5.7-1, Photo A). The area has little topographic variation. From Feather River Boulevard, the existing levee is visible in the middle distance where the road parallels the levee alignment and is a less evident feature of the viewshed farther south where the road runs east-west. SR 70 extends approximately parallel to the existing levee, which is located about 2 miles west of the roadway; where SR 70 approaches the Bear River, there are long-distance views across open agricultural land to the existing levee. A wide riparian corridor extends the length of project Segment 1 on the water side of the levee, and vegetation from this area is visible above the top of the levee to observers on the land side of the levee (Figure 5.7-1, Photo B). Because fewer nonagricultural elements, such as utility lines, encroach on the undeveloped rural character of views from the east below Star Bend than above Star Bend, views in Segment 1 have a higher degree of intactness and unity than those described for Segment 2 below. However, Segment 1 is visible to fewer individuals because of the sparse population within approximately 0.5 to 1 mile of this project segment and because of the orientation of Feather River Boulevard in relation to the existing levee. Therefore, these views are of low to moderate aesthetic value.

The right (west) bank Feather River levee obstructs most views of project Segment 1 from rural Sutter County to the west. Therefore, most individuals viewing Segment 1 from the west are boaters and other recreationists along the Feather River, including the Lake of the Woods unit of the Feather River State Wildlife Area (shown in Figure 5.1-1, "Conservation Areas in the Project Vicinity," in Section 5.1, "Land Use"). From the Feather River channel, views to the east are dominated by the river channel; the corridor of mixed riparian woodland and scrub of varying width that extends the length of the levee in the project area; and the existing left (east) bank Feather River levee, which blocks ground-level views of the agricultural land on the land side of the levee. The riparian corridor is dominated by Fremont cottonwood, valley oak, ash, box elder, and sycamore trees with a shrub layer dominated by willow, buttonbush, elderberry, and coyote bush. Many trees rise above the top of the levee, and views of the levee are screened by the natural vegetation in many locations.

A. Orchards adjacent to the Feather River levee with housing development visible on the horizon. View east from the existing levee.

B. Riparian vegetation along the Feather River levee in the project area. View northwest from the existing levee.

Views In and Near Project Segment 1 **Figure 5.7-1**

Views of the river corridor are distinctive and moderately vivid, with the meandering river channel and riparian areas forming striking and harmonious visual elements. The channel is free from urban encroachment in project Segment 1. However, the levees on both sides of the Feather River floodway, including areas of recent repairs, abruptly limit the lateral extent of the riparian growth and detract from the natural appearance of the corridor, reminding viewers of the presence of nearby urban and agricultural areas. The views have a moderate degree of both intactness and unity. Recreationists are generally considered a sensitive viewer group, but because the number of recreationists in this area is only moderate, the sensitivity of views is moderate. Overall, the views along the existing Feather River floodway in Segment 1 are of moderate aesthetic value.

PROJECT SEGMENT 2

Project Segment 2 extends approximately 6.2 miles from PLM 17.1 to PLM 23.6, from Star Bend to immediately south of Shanghai Bend (west of the Yuba County Airport). This project segment is about ⅔ mile west of Feather River Boulevard and 2.5 miles west of State Route (SR) 70 (Figure 5.11-1). Travelers on Feather River Boulevard and residents of the area between Feather River Boulevard and the existing levee would be the main viewers of the project area.

The aesthetic resources in this area are similar to those in Segment 1, except that several east-west lateral roadways connect to Feather River Boulevard in this project segment, there are more residences and other structures between Feather River Boulevard and the existing levee, and there are more utility lines. As in Segment 1, the landscape is dominated by orchards (Figure 5.7-2, "Views in and near Project Segment 2," Photo A). A few agricultural processing facilities are located in the area. Drainage canals and ponds can be found in the southern half of Segment 2. The existing levee, which is approximately 25 feet high on average, blocks views of the Feather River from the east. The tops of trees in the riparian area west of the levee are visible from some areas east of the levee (Figure 5.7-2, Photo B).

Views toward the levee from Feather River Boulevard and lands west of this roadway are neither striking nor distinctive. Because the elements of the landscape are a mixture of agricultural, agricultural industrial, residential, and utility features, the intactness and unity of the views are low to moderate. Views from the east, therefore, are generally of low to moderate aesthetic value. The existing levee is a familiar, integral part of the visual setting to the majority of regular viewers, consisting of occupants of residences in the area and commuters and other travelers on Feather River Boulevard. Views from some parts of Feather River Boulevard and the surrounding area include the levee as a background element, although in other areas, the dense growth of orchards obscures views toward the levee.

Parts of the existing levee are visible in long-distance views across open agricultural land from some areas east of Feather River Boulevard, including part of SR 70; the Yuba County Airport west of Olivehurst; rural roadways and scattered residences; and the Marysville Municipal Golf Course, approximately 1 mile east of the levee on Country Club Avenue. In many nonelevated locations east of Feather River Boulevard, long-distance views toward the levee are limited by earth berms where railroad tracks cross the area. A majority of the homes and businesses in the area are located east of the railroad tracks and have only partial views of the project area. Long-

A. Orchards and a view along Country Club Avenue near the project area. View to the east from the existing Feather River levee.

B. Riparian area and utility lines in the project area. View to the west, toward the Feather River, from the existing Feather River levee.

Views In and Near Project Segment 2 **Figure 5.7-2**

distance views from parts of SR 70 are also blocked by the Algodon Canal levee in addition to railroad berms.

As described for project Segment 1, the right bank Feather River levee obstructs most views of Segment 2 from rural Sutter County to the west. Most individuals viewing Segment 2 from the west would be boaters and other recreationists along the Feather River channel, including several units of the Feather River State Wildlife Area (see Figure 5.1-1). Views east from the river channel are as described above for Segment 1 and have moderate aesthetic value.

PROJECT SEGMENT 3

Project Segment 3 extends approximately 2.5 miles from Feather River PLM 23.6 to PLM 26.1, between Shanghai Bend and the confluence with the Yuba River, and also includes the Yuba River left (east) bank levee from PLM 0.0 to PLM 0.3 (west of the Yuba County Airport to the railroad crossing at the SR 70 bridge). This segment is about ⅓ mile west of Feather River Boulevard and is adjacent to a railroad bridge and SR 70 at its northern terminus (Figure 5.11-1).

Travelers on Feather River Boulevard and residents of the area between Feather River Boulevard and the existing Feather River levee would be the main viewers of Segment 3.

The aesthetic resources in this project segment are somewhat similar to those in Segments 1 and 2, although the area is generally more developed. There are substantially more residences in Segment 3 (Figure 5.7-3, "Views in and near Project Segment 3," Photo A) and other structures between Feather River Boulevard and the existing levee (mostly north of the Yuba County Airport). Many of the homes and structures are adjacent to the existing levee. In addition, SR 70 and the railroad tracks cross at the northern terminus of Segment 3. Additionally, roughly ½ mile of agricultural land lies to the west of the existing levee in the river floodway. The Yuba County Airport is east of Feather River Boulevard in the southern portion of Segment 3. As in Segment 1, undeveloped areas are dominated by orchards. RD 784 Pump Station No. 9 is located approximately in the middle of Segment 3. The existing Feather River levee, which is approximately 25 feet high on average, blocks views of the river from the east. The tops of trees in the riparian area west of the levee are visible from some areas east of the levee.

Views of project Segment 3 from Feather River Boulevard and residences east of the levee are neither vivid nor distinctive, especially at the northern end of the segment where SR 70 and the railroad tracks cross the area (Figure 5.7-3, Photo B). The elements of the landscape are a mixture of agricultural, agricultural industrial, residential, and utility features; therefore, the intactness and unity of the views and aesthetic value are low to moderate. The existing levee is a familiar, integral part of the visual setting to the majority of regular viewers, consisting of occupants of residences in the area and the commuters and other travelers on SR 70 and Feather River Boulevard. Views from some parts of Feather River Boulevard and the surrounding area include the levee as a background element, although in other areas, the dense growth of orchards obscures views of the levee and the surrounding area.

A. Residences north of the Yuba County Airport adjacent to the project area. View to the east from the existing Feather River levee.

B. SR 70 and railroad bridge adjacent to the project area. View to the north from the existing Feather River levee at the northern end of Segment 3.

Views in and Near Project Segment 3 **Figure 5.7-3**

Because of its proximity to south Yuba City, the section of Sutter County across the Feather River from project Segment 3 contains more residences than the sections of the county opposite Segments 1 and 2; however, as with the other segments, the right bank Feather River levee obstructs most views of Segment 3 from Sutter County. Most individuals viewing Segment 3 from the west are boaters and other recreationists along the Feather River, and from the Feather River channel, views toward this project segment to the east are dominated by the river channel and riparian woodland. Views of the river corridor are distinctive and moderately vivid, with the meandering river channel and riparian areas forming striking and harmonious visual elements. The channel is generally free from urban encroachment along Segment 3, except for the northern portion near SR 70 and the railroad tracks. The views have a moderate degree of both intactness and unity. Recreationists are generally considered a sensitive viewer group, but because the number of recreationists in this area is only moderate, the sensitivity of views is moderate. (Refer to Section 5.6, "Recreation," for a discussion of the level of recreational uses within the project area.) Overall, the views along the existing Feather River floodway are of moderate aesthetic value.

5.7.4 ENVIRONMENTAL IMPACTS

THRESHOLDS OF SIGNIFICANCE

Thresholds for determining the significance of impacts related to aesthetic resources were based on the environmental checklist form in Appendix G of the California Environmental Quality Act Guidelines (State CEQA Guidelines). A project alternative would have a significant impact on aesthetic resources if it would:

- have a substantial adverse effect on a scenic vista;
- substantially damage scenic resources, including but not limited to trees, rock outcrops, and historic buildings, within a state scenic highway;
- substantially degrade the existing visual character or quality of the site and its surroundings; or
- create a new source of substantial light or glare that would adversely affect day or nighttime views in the area.

There are no designated state scenic highways in the project area (California Department of Transportation 2003); therefore, the second significance threshold does not apply to the FRLRP.

IMPACT ANALYSIS

Alternative 1 – The Levee Strengthening Alternative

Impact LS-5.7-a

Temporary Changes in Visual Resources Associated with Levee Repairs. Levee repair and strengthening activities would temporarily reduce the aesthetic qualities of views by introducing earthmoving equipment and other construction equipment, materials, and work crews into the viewshed of recreationists, motorists on SR 70 and Feather River Boulevard, workers in nearby farming areas, and residents of the area. However, the construction areas would typically be distant from and/or screened from most viewers. Where

residents would be near the construction area (e.g., in project Segment 3), construction would pass by these areas relatively quickly and changes in aesthetic conditions would be short term and temporary. For these reasons, this impact would be **less than significant**.

Primary construction activities under FRLRP Alternative 1 would be repairing the existing levee in place to improve seepage and stability issues, constructing a detention basin in the detention basin/soil borrow area east of Star Bend, transporting borrow material from this area to the levee repair areas, and relocating Pump Station No. 3. These activities would require the use of various types of equipment and a crew generally of 50–60 persons, with as many as 100 at the peak of construction. A total volume of about 1.6 million cubic yards of borrow would be moved to the levee repair areas in about 80,000 haul unit trips (fewer if loads larger than about 20 cubic yards are possible). This transport of material would take place over two 6- to 9-month levee construction seasons (approximately April through November). The relocation of Pump Station No. 3 in project Segment 2 would entail the use of similar equipment over a relatively short period.

The presence and movement of heavy construction equipment and construction-related generation of dust would have the potential to temporarily degrade the existing visual character and/or quality of the area. Most viewers of the construction corridor, particularly in project Segments 1 and 2, would be recreationists on the west side of the existing Feather River levee, travelers along SR 70 and Feather River Boulevard, workers in nearby farming areas, and occupants of scattered residences between Feather River Boulevard and the existing levee. In Segment 3 many of those viewing the construction area would be residents in nearby homes. Of these groups, recreationists and residents are considered the most sensitive to aesthetic qualities. Recreationists' views of the construction corridor from the western end of the Feather River floodway would be screened or partially screened by the riparian corridor in all three project segments. Recreational use areas also extend along the Feather River to the north and south of this area, so recreationists could move away from areas close to visual disturbance to areas where construction activities would not encroach on the viewshed.

Many views from the land side of the construction corridor, including those from residences, would be largely screened by orchard trees, other vegetation, and structures. However, in project Segment 3 there are several locations where residences are adjacent to the eastern (landside) toe of the levee, and construction activities would be clearly visible from these vantage points. The total duration of construction activity in Segments 1 and 3 would be approximately 6–7 months. Construction activity in Segment 2 would also last approximately 8–9 months, but would take place in the year following the completion of activities in Segments 1 and 3. Levee repair work would typically move linearly down levee segments, with construction activities in any one location lasting from several days to no more than several weeks. Therefore, where construction activities would be clearly visible from nearby residences, the activity would be short term and temporary.

For the reasons listed above, project construction would not have a substantial adverse effect on a scenic vista or substantially degrade the existing visual character or quality of the site and its surroundings. This impact would be less than significant.

Impact LS-5.7-b

Changes in Light and Glare. There would be no substantial long-term sources of light or glare associated with levee repairs. However, equipment staging areas may be temporarily lit at night during construction, and portions of the construction areas may also need to be lit at night. Although such nighttime lighting may be visible from various residences, particularly in project Segment 3, in most locations views of the construction areas would be largely shielded by orchards, other vegetation, and structures. Where lit construction areas are visible, lighting would be short term and temporary. For these reasons, this impact would be **less than significant**.

There would be no substantial long-term sources of light or glare associated with levee repairs. However, equipment staging areas may be temporarily lit for security reasons during construction, and portions of the levee repair areas may need to be lit if levee construction needs to take place at night. In most of the project area, particularly in Segments 1 and 2, construction-related lighting would not be visible from any residences or other potentially sensitive vantage points. There are no residences in some parts of the project area, and where residences do exist, construction areas would be screened by orchards, other vegetation, or structures. However, in Segment 3 there are several locations where residences are adjacent to the eastern (landside) toe of the levee; if construction were to take place at night, construction lighting would be clearly visible from these vantage points. The total duration of construction activity in Segment 3 would be approximately 6–7 months. Levee repair work would typically move linearly down the levee segment, with construction activities in any one location lasting from several days to no more than several weeks. Therefore, where nighttime construction lighting (if needed) would be clearly visible from nearby residences, the activity would be short term and temporary.

For the reasons listed above, nighttime lighting related to project construction would not create a new source of substantial light or glare that would adversely affect day or nighttime views in the area. This impact would be less than significant.

Impact LS-5.7-c

Long-Term Modifications of Views from Levee Repairs. Levee repair and strengthening activities would not dramatically change the appearance of the project area, which is of low to moderate aesthetic value. There would be no substantial adverse effect on any scenic vista, and these repairs would not substantially alter the general character of views of the area. This impact would be **less than significant**.

Levee repair and strengthening activities would not substantially alter the visual character of the project area and its surroundings. The area would remain rural, and the project components—levees, wells, and drainage features—are common elements of views of the area. Existing views of the project area from the east (i.e., Feather River Boulevard and residences) generally lack vividness, given the flatness of the terrain and lack of distinctive features. Overall views have moderate unity and intactness, given their consistently rural agricultural character and the occasional presence of overhead utility lines and scattered industrial facilities mixed with crops and rural residences in the viewshed. The riparian growth along the floodway adds to the quality of these views. Repairing the levee would not alter the composition or character of elements in this viewshed, nor would it substantially alter the general landscape, which itself is not of high aesthetic value. Levee repairs could include use of stabilization elements such as soil cement, cobbles, and buried riprap and would include the construction of seepage/stability berms. These repairs would add new elements to the existing levee; however, the aesthetic impact of the repairs would be minimal because the construction specifications of the existing levee would remain similar and because the overall structure represents a homogenous visual landscape. The

levee would still be a background element in views from most vantage points and would still be screened from many views by orchard and riparian growth.

The soil borrow site/detention basin could occupy as much as approximately 150 acres of land east of Feather River Boulevard that is currently in agricultural use. The exact size and location would be determined in final design. Because of the flat terrain in the project area, the basin would not be highly visible from the roadway, although a long edge parallel to the roadway could present a noticeable discontinuity in the otherwise agricultural appearance of the area. The sides and bottom of the basin would be vegetated with grasses, lessening any adverse effect on the viewshed.

The proposed levee repair and strengthening and related activities associated with Alternative 1 would not adversely affect a scenic vista and would not have a substantial adverse effect on the character or quality of views of the area. This impact would be less than significant.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impact ASB-5.7-a

Temporary Changes in Visual Resources Associated with Levee Repairs and Setback Levee Construction. Levee repair and strengthening activities and construction of the ASB setback levee would temporarily reduce the aesthetic qualities of views by introducing earthmoving equipment and other construction equipment, materials, and work crews into the viewshed of recreationists, motorists on SR 70 and Feather River Boulevard, workers in nearby farming areas, and residents of the area. However, the construction areas would typically be distant from and/or screened from most viewers. Where residents would be near the construction area (e.g., in project Segment 3), construction would pass by these areas relatively quickly and changes in aesthetic conditions would be short term and temporary. For these reasons, this impact would be **less than significant**.

Temporary aesthetic impacts on project Segments 1 and 3 would be the same as in Impact LS-5.7-a, described under Alternative 1 above. However, because Segment 2 includes the construction of the ASB setback levee, additional aesthetic effects would result under Alternative 2, as described below.

The major components of ASB setback levee construction in project Segment 2 would be the removal of most of the existing levee, excavation of borrow areas between the setback levee alignment and the Feather River and/or east of Star Bend, transport of material from these sources to the setback levee alignment, construction of a detention basin in the area east of Star Bend, preparation of the setback levee foundation, and construction of the setback levee. New temporary-access haul roads would be needed to transport borrow across orchard land. The construction activities would require the use of various types of equipment such as scrapers, graders, and hydraulic excavators and a crew generally of 60–70 persons, with as many as 100 at the peak of construction. A total volume of about 3.1 million cubic yards of borrow would be moved across the levee setback area to the ASB setback levee alignment in about 155,000 haul unit trips (fewer if loads larger than about 20 cubic yards are possible). This transport of material would take place during an approximately 7- to 9-month (April through November) construction season for project Segment 2 (see Section 4.4.3, “Alternative 2—Construction,” and Section 4.6.1, “Implementation Schedule,” in Chapter 4, “Description of the Proposed Project,” regarding the construction schedule).

The presence and movement of heavy construction equipment and construction-related generation of dust could temporarily degrade the existing visual character and/or quality of the area. Most viewers of the construction area associated with project Segment 2 would be recreationists on the west side of the existing Feather River levee, travelers along SR 70 and Feather River Boulevard, workers in nearby farming areas, and occupants of scattered residences between Feather River Boulevard and the proposed ASB setback levee alignment. Of these groups, recreationists and residents are considered the most sensitive to aesthetic qualities. Recreationists' views of the construction activities would consist primarily of the removal of segments of the existing Feather River levee. Views from the western end of the Feather River floodway would be screened or partially screened by the riparian corridor there. Recreational use areas also extend along the Feather River to the north and south of this area, so recreationists could move away from areas close to visual disturbance to areas where construction activities would not encroach on the viewshed. Many views from the land side of the construction corridor would be largely screened by orchard trees.

The total duration of construction activity (construction of the levee foundation, the levee embankment, and the detention basin) in project Segment 2 would be about 17 months. Construction activity would be less during the winter months based on weather, regulatory guidelines, and other factors. Construction activity would not be continuous in any particular area during the 17-month construction period. The levee foundation may be constructed along a segment for several weeks, then construction could cease in that area for several months until the beginning of embankment construction or another activity. As the levee embankment is built, activity would occur at various times up and down the approximately 5.9-mile-long alignment. Therefore, close-up views of major construction activity in any given area along the ASB setback levee alignment in Segment 2 would be short term and temporary.

For the reasons listed above, project construction would not have a substantial adverse effect on a scenic vista or substantially degrade the existing visual character or quality of the site and its surroundings. This impact would be less than significant.

Impact ASB-5.7-b

Changes in Light and Glare. There would be no substantial sources of light or glare associated with levee repairs or with the long-term presence of the ASB setback levee and detention basin. However, equipment staging areas may be temporarily lit at night during construction, and portions of the construction areas may also need to be lit at night. Although such nighttime lighting may be visible from various residences, particularly in project Segment 3, in most locations views of the construction areas would be largely shielded by orchards, other vegetation, and structures. Where lit construction areas are visible, lighting would be short term and temporary. For these reasons, this impact would be **less than significant**.

Aesthetic effects on project Segments 1 and 3 associated with the temporary use of construction lighting would be the same as in Impact LS-5.7-b, described under Alternative 1 above. However, because Alternative 2 includes the construction of the ASB setback levee and a detention basin in project Segment 2, potential aesthetic impacts associated with light and glare in Segment 2 are described below.

There would be no substantial sources of light or glare associated with the long-term presence of the ASB setback levee and detention basin in project Segment 2. However, equipment staging areas may be temporarily lit for security reasons during construction, and portions of the

construction areas may need to be lit if activities need to take place at night. However, views of staging areas and the construction areas associated with Segment 2 would be largely shielded by orchards, other vegetation, and structures. Homes and other sensitive viewpoints are few and dispersed in the Segment 2 area; therefore, few individuals would be able to see nighttime construction lighting. If nighttime lighting were required, its use would be short term and temporary as construction proceeds along various portions of the construction area.

For the reasons listed above, nighttime lighting related to project construction would not create a new source of substantial light or glare that would adversely affect day or nighttime views in the area. This impact would be less than significant.

Impact ASB-5.7-c

Long-Term Modifications of Views from Levee Repairs and Installation of the Setback Levee. Levee repair and strengthening activities would not dramatically change the appearance of project Segments 1 and 3. Construction of the ASB setback levee would change the appearance of Segment 2. However, all three project segments are of low to moderate aesthetic value, there would be no substantial adverse effect on any scenic vista, and these changes would not substantially alter the general character of views of the area. This impact would be **less than significant**.

Long-term modifications of views of project Segments 1 and 3 resulting from levee repair and strengthening activities would be the same as in Impact LS-5.7-c, described under Alternative 1 above. However, because Alternative 2 includes the construction of the ASB setback levee and an associated detention basin in project Segment 2, additional effects on aesthetic resources would result under this alternative, as described below.

Construction of the ASB setback levee and the associated detention basin would change the long-term appearance of project Segment 2, which is rural/rural residential. As noted in Impact LS-5.7-c, the proposed detention basin would occupy land east of Feather River Boulevard and north of Algodon Road that is currently in agricultural use. Because of the flat terrain, the basin would not be highly visible from most vantage points. Its side and bottom surfaces would be vegetated with grasses, lessening any adverse effect on the viewshed.

The levee setback and the associated changes in land use would alter both the area's scenic vistas and its scenic resources; however, these effects would not be substantial. There are no historic buildings or state or local scenic highways located near the setback levee alignment. The largest viewing populations of the ASB setback levee would be travelers along SR 70 and Feather River Boulevard just west of SR 70. These viewers would have transitory and primarily obstructed views of the setback levee and levee setback area and are not considered a sensitive viewer group. Orchards obscure much of the view of the existing and proposed levee alignments; therefore, implementation of the levee setback would have only a minor effect on views.

In general, the proposed levee repair and strengthening activities, levee setback, and detention basin construction would not adversely affect a scenic vista and would not have a substantial adverse effect on the character or quality of views of the area. This impact would be less than significant.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impact IS-5.7-a

Temporary Changes in Visual Resources Associated with Levee Repairs and Setback Levee Construction. Levee repair and strengthening activities and construction of the intermediate setback levee would temporarily reduce the aesthetic qualities of views by introducing earthmoving equipment and other construction equipment, materials, and work crews into the viewshed of recreationists, motorists on SR 70 and Feather River Boulevard, workers in nearby farming areas, and residents of the area. However, the construction areas would typically be distant from and/or screened from most viewers. Where residents would be near the construction area (e.g., in project Segment 3), construction would pass by these areas relatively quickly and changes in aesthetic conditions would be short term and temporary. For these reasons, this impact would be **less than significant**.

The intermediate setback levee alignment under this alternative would be west of the ASB setback levee alignment under Alternative 2 (Figure 4-1, "Project Features," in Chapter 4, "Description of the Proposed Project"). Temporary changes to visual resources would be essentially the same for either setback levee alignment; therefore, this impact would be the same as Impact ASB-5.7-a, described under Alternative 2 above. For the same reasons as described above, this impact would be less than significant.

Impact IS-5.7-b

Changes in Light and Glare. There would be no substantial long-term sources of light or glare associated with levee repairs or with the long-term presence of the intermediate setback levee and detention basin. However, equipment staging areas may be temporarily lit at night during construction, and portions of the construction areas may also need to be lit at night. Although such nighttime lighting may be visible from various residences, particularly in project Segment 3, in most locations views of the construction areas would be largely shielded by orchards, other vegetation, and structures. Where lit construction areas are visible, lighting would be short-term and temporary. For these reasons, this impact would be **less than significant**.

The intermediate setback levee alignment under this alternative would be west of the ASB setback levee alignment under Alternative 2 (Figure 4-1). Temporary short-term increases in light and glare during project construction would be essentially the same for either setback levee alignment; therefore, this impact would be the same as Impact ASB-5.7-b, described under Alternative 2 above. For the same reasons as described above, this impact would be less than significant.

Impact IS-5.7-c

Long-Term Modifications of Views from Levee Repairs and Installation of the Setback Levee. Levee repair and strengthening activities would not dramatically change the appearance of project Segments 1 and 3. Construction of the intermediate setback levee would change the appearance of Segment 2. However, all three project segments are of low to moderate aesthetic value, there would be no substantial adverse effect on any scenic vista, and these changes would not substantially alter the general character of views of the area. This impact would be **less than significant**.

The intermediate setback levee alignment under this alternative would be west of the ASB setback levee alignment under Alternative 2 (Figure 4-1). Moderate changes to views within the project area where levees would be strengthened or set back would be essentially the same for either setback levee alignment; therefore, this impact would be the same as Impact ASB-5.7-c, described under Alternative 2 above. For the same reasons as described above, this impact would be less than significant.

5.7.5 MITIGATION MEASURES

ALTERNATIVE 1 – THE LEVEE STRENGTHENING ALTERNATIVE

No mitigation is required for Impacts LS-5.7-a, LS-5.7-b, and LS-5.7-c.

ALTERNATIVE 2 – THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impacts ASB-5.7-a, ASB-5.7-b, and ASB-5.7-c.

ALTERNATIVE 3 – THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impacts IS-5.7-a, IS-5.7-b, and IS-5.7-c.

5.7.6 IMPACTS REMAINING SIGNIFICANT AFTER MITIGATION

All impacts of the three proposed project alternatives on aesthetic resources would be less than significant.

SECTION 5.8 CULTURAL RESOURCES

This section includes an evaluation of the potential impacts on cultural resources that could result from implementation of the proposed levee improvements. Cultural resources include buildings, sites, structures, objects, or districts that may have historical, architectural, archaeological, cultural, or scientific significance. Cultural resources may include archaeological traces such as early Native American occupation sites and artifacts, or historic-era resources. These materials can be found at many locations on the landscape and, along with prehistoric and historic human remains and associated grave goods, are protected under various federal and state statutes. The most inclusive of these are Section 106 of the National Historic Preservation Act and the California Environmental Quality Act (CEQA), which are described below. Fossils (the remains of prehistoric animals and plants) are addressed in Section 5.13, "Paleontological Resources."

5.8.1 REGULATORY SETTING

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

Section 106 of the National Historic Preservation Act of 1966 and its implementing regulations (36 Code of Federal Regulations [CFR] Part 800, as amended in 1999) requires federal agencies to consider the effects of their actions, or those they fund or permit, on properties that may be eligible for listing or are listed in the National Register of Historic Places (NRHP).

The NRHP is a register of districts, sites, buildings, structures, and objects of significance in American history, architecture, archaeology, engineering, and culture. The regulations provided in 36 CFR Part 60.4 describe the criteria to evaluate cultural resources for inclusion in the NRHP. Cultural resources can be significant on the national, state, or local level. Properties may be listed in the NRHP if they possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

(A) are associated with events that have made a significant contribution to the broad patterns of our history;

(B) are associated with the lives of persons significant in our past;

(C) embody the distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction; or

(D) have yielded, or may be likely to yield, information important in prehistory or history.

To determine whether an undertaking could affect historic properties, cultural resources (including archaeological, historical, and architectural properties) must be identified, inventoried, and evaluated for listing in the NRHP. Although compliance with Section 106 is the responsibility of the lead federal agency, the work necessary to comply can be undertaken by others. The Section 106 process would need to be completed by any federal agency issuing a

permit for the Feather River Levee Repair Project (FRLRP), but it is not specifically required for CEQA compliance.

The Section 106 review process involves a four-step procedure:

- Initiate the Section 106 process by establishing the undertaking, developing a plan for public involvement, and identifying other consulting parties.
- Identify historic properties by determining the scope of efforts, identifying cultural resources, and evaluating their eligibility for inclusion in the NRHP.
- Assess adverse effects by applying the criteria of adverse effect on historic properties (resources that are eligible for inclusion in the NRHP).
- Resolve adverse effects by consulting with the State Historic Preservation Officer and other consulting agencies, including the Advisory Council on Historic Preservation if necessary, to develop an agreement that addresses the treatment of historic properties.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

CEQA includes cultural resources as an important component of its oversight and management policies. CEQA states that if a proposed project would result in an effect that may cause a substantial adverse change in the significance of a significant cultural resource (termed a "historical resource"), alternative plans or mitigation measures must be considered. Because only significant cultural resources need to be addressed, the significance of cultural resources must be determined before mitigation measures need to be developed.

CEQA Section 5024.1 (California Public Resources Code Section 5024.1) and Section 15064.5 of the State CEQA Guidelines (14 California Code of Regulations [CCR] Section 15064.5) define a historical resource as "a resource listed or eligible for listing on the California Register of Historical Resources." A historical resource may be eligible for inclusion in the California Register of Historical Resources (CRHR) if it:

(1) is associated with events that have made a significant contribution to the broad patterns of local or regional history or the cultural heritage of California or the United States;

(2) is associated with the lives of persons important to local, California, or national history;

(3) embodies the distinctive characteristics of a type, period, region, or method of construction, represents the work of a master, or possesses high artistic values; or

(4) has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California, or the nation.

CEQA also distinguishes between two classes of archaeological resources: archaeological sites that meet the definition of a historical resource as above, and "unique archaeological resources." An archaeological resource is considered "unique" if it:

- is associated with an event or person of recognized significance in California or American history or of recognized scientific importance in prehistory;
- can provide information that is of demonstrable public interest and is useful in addressing scientifically consequential and reasonable research questions;
- has a special or particular quality such as being the oldest, best example, largest, or last surviving example of its kind;
- is at least 100 years old and possesses substantial stratigraphic integrity; or
- involves important research questions that historical research has shown can be answered only with archaeological methods (Public Resources Code Section 21083.2).

The State CEQA Guidelines (14 CCR Section 15064.5[c]) also provide specific guidance on the treatment of archaeological resources, depending on whether they meet the definition of a historical resource or a unique resource.

The State CEQA Guidelines (14 CCR Section 15064.5[e]) also require that excavation be stopped whenever human remains are uncovered, and that the county coroner be called in to assess the remains. If the county coroner determines that the remains are those of a Native American, the Native American Heritage Commission (NAHC) must be contacted within 24 hours, and the provisions for treating or disposing of the remains and any associated grave goods as described in CCR Section 15064.5 must be followed.

The steps normally taken in a cultural resources investigation for CEQA compliance are as follows:

- Identify cultural resources.
- Evaluate the significance of the resources.
- Evaluate the effects of a project on all cultural resources.
- Develop and implement measures to mitigate the effects of the project on significant resources.

LOCAL PLANS, POLICIES, REGULATIONS, AND LAWS

No local plans, policies, regulations, or laws related to cultural resources are applicable to the proposed project.

5.8.2 ENVIRONMENTAL SETTING

SOURCES OF INFORMATION

To identify cultural resources that may be affected as a result of project implementation, EDAW cultural resource specialists reviewed pertinent information about previous surveys and known cultural resources in the project area, consulted with appropriate Native American

representatives, and conducted a pedestrian cultural resources inventory of portions of the project area. Relevant portions of the research and survey information prepared in 2003 for the Feather River Levee Setback element of the Yuba-Feather Supplemental Flood Control Project (Y-FSFCP) and reported in the Y-FSFCP programmatic environmental impact report (EIR) (Yuba County Water Agency 2003) and accompanying cultural resources survey report (Jones & Stokes 2003) were used as appropriate.

Records Search and Literature Review

Records searches were conducted at the North Central Information Center (NCIC) of the California Historical Resources Information System. The NCIC administers the cultural resources records for a six-county area, including Yuba County. The searches included reviewing the NCIC's database of previous surveys and known cultural resources in the areas of potential project disturbance in the project area. Sources consulted during the records searches include the NRHP, the CRHR, secondary historical sources, historical maps, and inventories of historic resources in Yuba County.

Native American Consultation

Before conducting fieldwork, EDAW consulted with the NAHC and local Maidu Native American groups, consisting of the Butte Tribal Council and Enterprise Rancheria of Maidu Indians of Oroville, Maidu Elders Organization of Dobbins, and Maidu Nation of Susanville. The NAHC responded that the Sacred Lands File does not have records of Native American cultural resources in the project area. No response has been received to date from the local Maidu groups. Correspondence with these groups is presented in Appendix D.

Field Inventory

Previous archaeological surveys covered most of the existing Feather River and Yuba River levees in the FRLRP project area—specifically, project Segments 1 and 2 and a portion of Segment 3. For the present study, an archaeological inventory was conducted along the proposed Above Star Bend (ASB) and intermediate setback levee alignments and the portion of the existing Feather River levee in Segment 3 that was not covered in the previous survey efforts. As described below in "Results of Current Investigations within the Project Area," portions of the setback levee alignments could not be surveyed because access to these areas was not available. Survey methods were consistent with the *Secretary of the Interior's Standards and Guidelines for Identification of Cultural Resources* (48 CFR 44720–44723). The presence of resources was recorded following the guidelines outlined in *Instructions for Recording Historical Resources* (California Office of Historic Preservation 1995).

The current inventory involved walking four parallel transects spaced at 25-meter (82-foot) intervals, resulting in the investigation of a 100-meter (328-foot)-wide footprint. A detailed sketch map was produced using a global positioning system (GPS) unit with accuracy to less than 3 meters (10 feet). Appropriate California Department of Parks and Recreation Series 523 forms were prepared as necessary. All sites and structures were photographed in their natural setting. Grass was removed periodically from areas with moderate cover to provide an adequate

sample of the ground surface. All areas of rodent disturbance, irrigation ditches, and other cut banks were inspected for the presence of subsurface cultural deposits.

Figures 5.8-1a and 5.8-1b, "Cultural Resources Surveys Conducted in the Project Area," show survey coverage in the project area.

REGIONAL SETTING

Prehistoric Context

Generally speaking, the archaeology of Yuba County is included within the broad framework established by archaeologists for the Sacramento Valley. Although human occupation of the northern Sacramento Valley may extend back 10,000 years or more, reliable evidence of the presence of such an early human presence is lacking. Early archaeological sites bearing evidence of these Paleo-Indian populations may be present in the valley but deeply buried under alluvium (Moratto 1984). The following summary of the prehistoric cultural sequence is drawn primarily from Moratto (1984).

Reliable evidence of early occupation in the northern Sacramento Valley dates after 8,000 years before present (B.P.) (Johnson et al. 1984). The Borax Lake Pattern of the Lower Archaic Period (8000–5000 B.P.) is defined by certain material items such as wide-stemmed projectile points, hand-stones, milling stones, and bowl mortars. The Late Borax Lake Pattern, which archaeologists date to the Middle Archaic Period (5000–2500 B.P.), represents a continuation of the earlier Borax Lake Pattern. Late Borax Lake is distinguished from the earlier manifestation by a greater diversity of projectile point types and use of the spear thrower (atl-atl).

During the Upper Archaic Period (2500–1500 B.P.), early cultures of the Sacramento Valley exhibited a shift to predominant use of mortars and pestles instead of hand-stones and milling stones. This change may reflect an increased reliance on acorns as a staple food by the valley's indigenous population.

The Emergent Period (1500–200 B.P.) in Sacramento Valley prehistory is represented by the Shasta Aspect of the Augustine Pattern. Shasta Aspect archaeological sites are typically located near watercourses, contain semi-subterranean dwellings and new artifact types, and reflect a hunting and gathering economy focused on acorn procurement. Moratto (1984) proposed that the Shasta Aspect represents the influence and intrusion of peoples from farther north in California. Toward the end of this period, extensive Euroamerican influences began to adversely affect native cultures throughout California.

Ethnographic Context

According to archaeological traces, documentary evidence, and oral history, the project area is located within the lands traditionally occupied by the Nisenan, or Southern Maidu. The language of the Nisenan, which includes several dialects, is classified within the Maiduan family of the Penutian linguistic stock (Kroeber 1925, Shipley 1978). The western boundary of Nisenan territory was the western bank of the Sacramento River. The eastern boundary was "the line in the Sierra Nevada mountains where the snow lay on the ground all winter" (Littlejohn 1928).

Nisenan settlement locations depended primarily on elevation, exposure, and proximity to water and other resources. Permanent villages were usually located on low rises along major watercourses. Village size ranged from three living structures to up to 40 or 50. Dwellings consisted of domed structures covered with earth and tule reeds or grass and usually measured 10–15 feet in diameter. Simple brush shelters were used in the summer and at temporary camps during food gathering rounds. Larger villages often had semi-subterranean dance houses that were covered in earth and tule reeds or brush and had a central smoke hole at the top and an east-facing entrance. Another common village structure was a granary, which was used for storing acorns (Wilson and Towne 1978). Two Nisenan villages were located at or near the southern end of what is now the FRLRP project area (project Segment 1) (Wilson and Towne 1978).

The Nisenan occupied permanent settlements from which specific task groups set out to harvest the seasonal bounty of flora and fauna that the rich valley environment provided. The Valley Nisenan economy was focused on riparian resources, in contrast to that of the Hill Nisenan, whose resource base consisted primarily of acorn and game procurement. The only domestic plant used by the Nisenan was native tobacco (*Nicotiana* sp.), but many wild species were closely husbanded. The acorn crop from the blue oak (*Quercus douglasii*) and black oak (*Q. kelloggii*) was managed so carefully that its management served as the equivalent of agriculture. Acorns could be stored in anticipation of winter shortfalls. Deer, rabbit, and salmon were the chief sources of animal protein in the Nisenan diet, but many other insect and animal species were taken when available. In large part, Nisenan lifeways remained unchanged for many generations before significant Euroamerican incursions starting in the early decades of the 19th century.

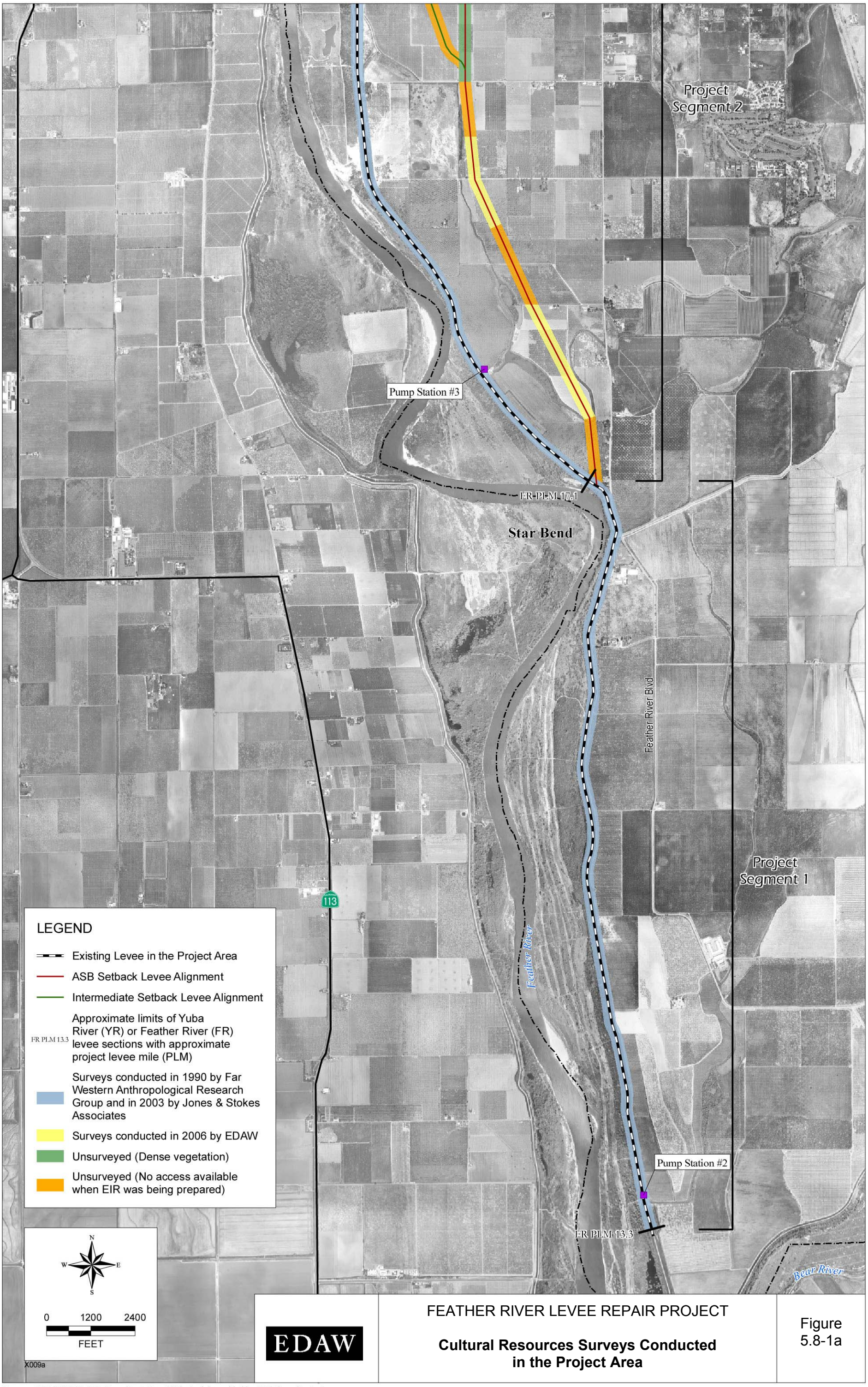
Historical Context

Exploration and Settlement

Europeans first explored the area that is now Yuba County in 1808, when Spanish explorer Gabriel Moraga led an expedition from Mission San Jose to the northern Sacramento Valley (Abeloe 1966, Gordon 1988). The earliest Euroamerican settlement in what is now Yuba County coincided with the establishment of land grants by the Mexican government. John A. Sutter obtained the first such grant in the region in 1841. Sutter's New Helvetia Rancho encompassed lands on the left (east) bank of the Feather River, including what is now the FRLRP project area (General Land Office 1859).

Mining

Beginning in 1849, prospectors and entrepreneurs overran the streams of the Sierra Nevada in search of riches. Miners initially established their claims and workings on watercourses and then gradually worked back from the flats adjacent to streams, ridges, and hillsides. By 1857, hydraulic mining began to replace the smaller-scale placer methods and extracting placer gold was no longer restricted to the immediate stream channel and bars. Debris from hydraulic operations destroyed or buried many of the older mining camps (Hoover et al. 1966).

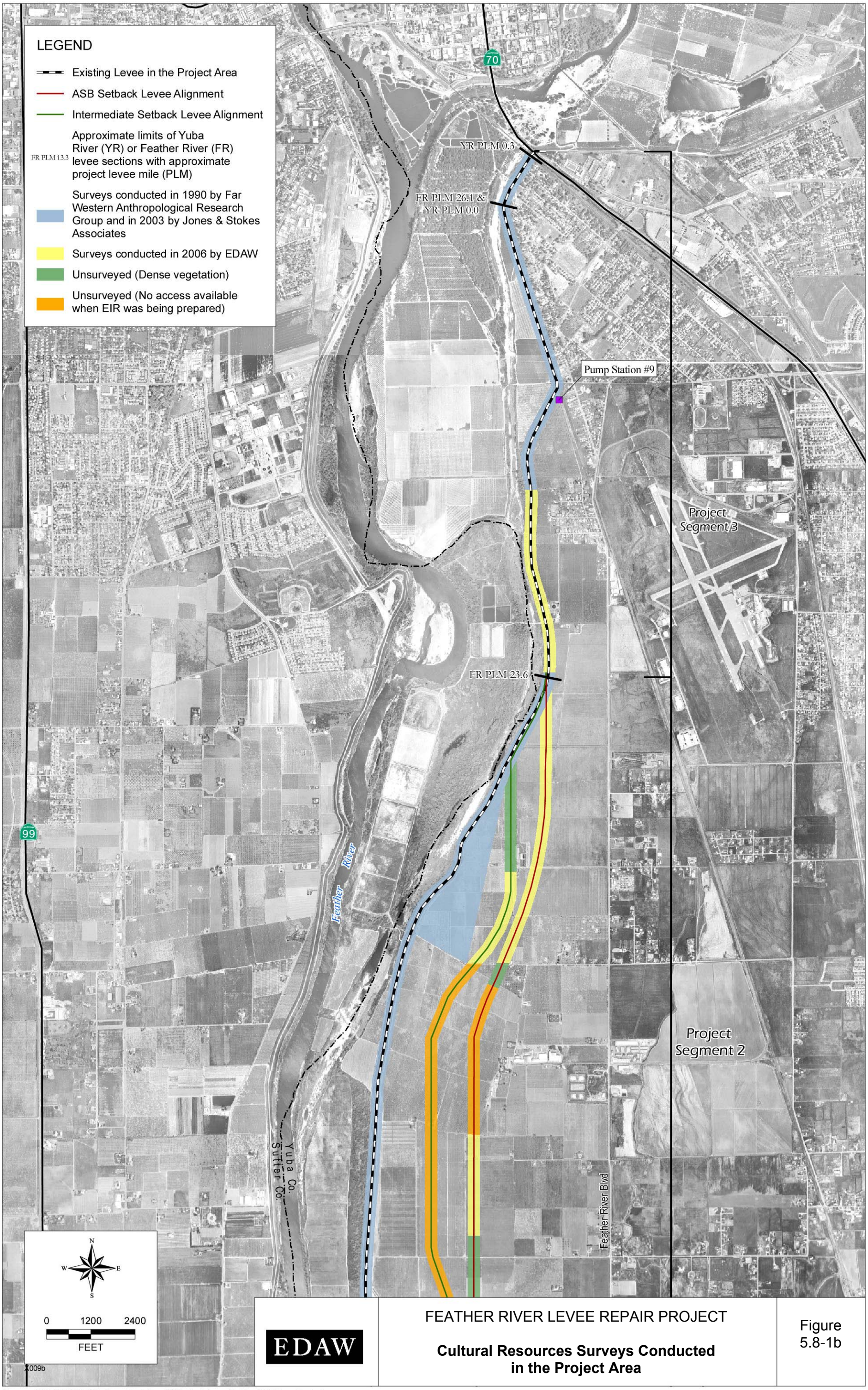


FEATHER RIVER LEVEE REPAIR PROJECT

Cultural Resources Surveys Conducted in the Project Area

Figure 5.8-1a

Sources: EDAW 2006; GEI Consultants, Inc. 2004; Aerial provided by GEI Consultants, Inc.



FEATHER RIVER LEVEE REPAIR PROJECT

Cultural Resources Surveys Conducted in the Project Area

Figure 5.8-1b

Sources: EDAW 2006; GEI Consultants, Inc. 2004; Aerial provided by GEI Consultants, Inc.

Although there are no records of large-scale mining in the project vicinity, the industry had considerable indirect effects on historical developments in the region. The diggings and mines in the nearby foothills dramatically increased economic activity in the region, leading to increased prosperity and the rise of larger and more numerous support industries such as cattle ranches and farms.

Meanwhile, the deposition of silt in Central Valley watercourses, including the Yuba and Feather Rivers, resulted in the raising of the riverbeds and increased flooding. Although the city of Marysville (immediately upstream of the FRLRP project area) experienced high waters every few years, there were no disastrous floods until December 1861 (Thompson & West 1879). As the waters receded, they left a deposit of 30–183 centimeters (11–72 inches) of sand on the bottomlands adjacent to the rivers. After 1861, catastrophic floods became more common, prompting the development of a levee system and beginning the process of land reclamation for agricultural purposes. In later years, other flood-control efforts were initiated as described below to further alleviate negative impacts on water quality and on the scale and frequency of seasonal flooding.

Agriculture and Flood Control

Initial efforts at flood control in the Central Valley were usually uncoordinated and consisted of small levees and drains constructed by individual landowners. These features proved insufficient to protect cultivated land, and much of the acreage east of the Feather River in the FRLRP project area remained marshland that was unsuited for agriculture (U.S. Geological Survey 1910, 1911). In 1861, the California Legislature created the State Board of Swampland Commissioners to effect reclamation of swamp and overflow lands. However, in 1866 the legislature terminated this board, and responsibility for swamp and overflow land fell to the individual counties. If a landowner could certify that he or she had spent at least $2 per acre in reclamation, the county would refund the purchase price of the property to the owner. Speculators took advantage of this program and a period of opportunistic and often-irrational levee building followed. (Thompson 1958, McGowan 1961.)

In response to the flood of 1907, citizens of Yuba County formed Reclamation District (RD) 784, which includes the land in the FRLRP project area. In 1908, at the time of its formation, RD 784 encompassed 22,762 acres of land, much of which was owned by the Farm Land Investment Company. RD 784 built substantial levee and drainage systems to restrain floodwaters from the Yuba, Feather, and Bear Rivers and the Western Pacific Interceptor Canal and incorporated levees built by the Farm Land Investment Company and other landowners.

In 1911, the California Legislature established the State of California Reclamation Board (The Reclamation Board) to exercise jurisdiction over reclamation districts and levee plans. That year, the state approved and began implementation of the Sacramento River Flood Control Project (SRFCP). The ambitious project included the construction of levees, weirs, and bypasses along the Sacramento River and its tributaries to channel floodwaters away from population centers. Under the SRFCP, new reclamation districts were created and existing districts, such as RD 784, were placed under the jurisdiction of The Reclamation Board (JRP Historical Consulting Services 1994).

LOCAL SETTING

A review of historic maps indicates the potential for the presence of archaeological deposits associated with several historic structures within the FRLRP project area. The 1859 General Land Office Plat Map for Township 15 North, Range 3 East, depicts a house in Elizatown just below Eliza Bend along the east side of the old Feather River channel in the vicinity of the current left (east) bank levee of the Feather River (project Segment 3) and another house just to the south in Township 14 North, Range 3 East. Farther south on the same map, fields and a fence are depicted along the east side of the Feather River in project Segment 2 in the vicinity of the northern end of the ASB and intermediate setback levees proposed under Alternatives 2 and 3, respectively. Three houses (designated as "Beach's," "Wessenharer's," and "Mesick's") appear to have been located in the vicinity of the intermediate setback levee alignment proposed under Alternative 3, and another house was located adjacent to the Feather River, near the west end of the contemporary Broadway. Directly across from this later structure, on the west side of the Feather River in Sutter County, are structures labeled "Indian Rancheria," "Hot House," "Iron House," and "Sutter's House." "Butterfield's House" is identified along the east side of the river oxbow in the vicinity of the pump where Feather River Boulevard is adjacent to the levee, west of Star Bend. A north-south road extending from the Feather River north toward Marysville appears to be at least partially located within the project area and is depicted on a 1849 map of the Sacramento Valley (Derby 1849), and the Indian rancheria mentioned above is labeled simply "Indians and Sutter's Hook Farm."

CULTURAL RESOURCES IN THE PROJECT AREA

Previous Archaeological Investigations

The files maintained at the NCIC contain information on previously conducted archaeological investigations that occurred within 1/4 mile of the project area. A summary of the records of past investigations directly related to the project area is presented in Table 5.8-1, "Summary of Previous Investigations within ¼ Mile of the Project Area." The findings of these past investigations are described briefly below.

Resources Previously Identified within the Project Area

Cultural resources previously identified within FRLRP project Segments 1 and 2 are described below. The records search did not reveal records of any cultural resources in Segment 3.

In 1953, archaeologists from the University of California, Berkeley (UC Berkeley) conducted salvage excavations at the request of a landowner who was proposing to build a dehydrator on a prehistoric village site identified as CA-Yub-5 (located in what is now project Segment 2), as documented by Elsasser and Baumhoff (1953). The UC Berkeley archaeologists removed the remains of several individuals and associated grave goods from the eastern portion of the site. The records of the burials themselves were minimal; however, grave goods included banjo ornaments, spire-lopped Olivella (olive snail) shell beads, square-cut Olivella shell beads, Haliotis (abalone) shell ornaments, obsidian projectile points, and bone awls. No data recovery excavations were completed. Based upon recovered shell beads, the investigators indicated that the site appears to date from the Middle Archaic to the Upper Archaic Period. While not

Table 5.8-1
Summary of Previous Investigations within 1/4 Mile of the Project Area

Report Title	NCIC File No.	Author and Date	Resources Identified
Studies Within the Project Area			
Archaeological Site Survey Record for CA-Yub-5	——	Elsasser and Baumhoff 1953	CA-Yub-5
Sacramento River Flood Control System Evaluation, Marysville–Yuba City Area Cultural Resources Survey	——	Bouey 1990	CA-Yub-13 within the project area and other sites outside the project area
Historic Resource Evaluation Report: Reclamation Facilities, RD 1001 and RD 784	——	JRP Historical Consulting Services 1994	Facilities associated with RD 784 and with RD 1001 to the south
Cultural Resources Survey for the Level (3) Communications Long Haul Fiber Optics Project—Segment WS04: Sacramento to Bakersfield	3853	Nelson et al. 2000	None in the project vicinity
Cultural Resources Inventory and Evaluation Report for the Yuba-Feather Supplemental Flood Control Project, Yuba County, California	——	Jones & Stokes 2003	Prehistoric site CA-Yub-5 and historic resources C-YCWA-1 and YCWA-3 through C-YCWA-8 in the project area
Class I Archaeological Survey, Reclamation District 784 Master Plan Update, Yuba County, California	6724	Jensen 2005	None
Studies Near the Project Area			
Archaeological Site Survey Record	——	Elsasser 1953, Riddell 1960	CA-Yub-6
Report on the Archeological Survey of the Bear River	——	Stoll and Thompson 1961	CA-Yub-1312 and CA-Yub-1313, both 1/4 mile to 2 miles east of the project area
Archaeological Site Survey Record	——	Olsen 1957	CA-Yub-14
Salvage of the Rio Oso Site, Yuba County, California	444	Olsen and Riddell 1962	CA-Yub-14
Cultural Resource Assessment of the Proposed Wastewater Treatment Plant Modification Along the Southern Bank of the Yuba River, Yuba County, California	——	Peak & Associates Inc. 1988	None
Negative Archaeological Survey Report, California Department of Transportation, Expenditure Authorization 297300	2755	Offerman 1992	None
Cultural Resources Survey and Investigation, Sacramento River Flood Control Project, Marysville–Yuba City Mitigation Area, Yuba County, California	939	U.S. Army Corps of Engineers 1993	Historic refuse west of the project area
Negative Archaeological Survey Report, California Department of Transportation, Expenditure Authorization OA2900 and 4A8900	2755	Offerman 2001	None
Cultural Resources Inventory and Evaluation Report for the Yuba-Feather Supplemental Flood Control Project, Yuba County, California	——	Jones & Stokes 2003	In addition to sites in the project area (see above), CA-Yub-1312
Archaeological Testing and Evaluation Report for the Feather-Bear River Setback Levee Project, Yuba County, California	——	Jones & Stokes 2005	CA-Yub-1312 and CA-Yub-1313
National Register of Historic Places Evaluation for CA-Yub-1312 and CA-Yub-1313, Feather-Bear Rivers Levee Setback Project, Yuba and Sutter Counties, California	——	EDAW 2006	CA-Yub-1312 and CA-Yub-1313
Cultural Resources Statement, West Linda Drainage Project	2497	Storm n.d.	CA-Yub-164 to the east of the project area

Notes: NCIC = North Central Information Center; RD = Reclamation District
Source: Data compiled by EDAW in 2006

providing evidence to substantiate their claim, the investigators remarked that more than half of the 6,000-square-foot site had been destroyed before the salvage excavation by pothunters, who reportedly had excavated some 30 burials before 1953. In 2002, Jones & Stokes archaeologists performing surveys in the area for the Y-FSFCP confirmed the recorded location of site CA-Yub-5 and made additional observations, as described below (Jones & Stokes 2003).

Far Western Anthropological Research Group (Far Western Anthropological) conducted surveys along several sections of levee in the Marysville–Yuba City area, including the major portion of the existing levee within the FRLRP project area, in 1990 (Bouey 1990). One site, CA-Yub-13, was suspected to be directly adjacent to (west of) the left (east) bank levee, just south of Star Bend in project Segment 1. According to Bouey (1990), CA-Yub-13 was initially documented by Olsen (1957) and Olsen and Riddell (1960). Initial observations had described a 50- by 100-foot area with dark compacted midden (habitation soil) containing a bone awl. A mano and stone bowl mortar fragment had been documented in 1960. Records indicate that the site was extensively vandalized and eroded by the Feather River. A lack of surface evidence and negative results of auger probes led the Far Western Anthropological investigators to conclude that the cultural material no longer exists. No new resources were observed (Bouey 1990).

Evaluation of RD 784 and neighboring RD 1001 was conducted by JRP Historical Consulting Services in 1994 (JRP Historical Consulting Services 1994). While RD 784 is historic, none of the reclamation-related features were recommended as eligible for listing in the NRHP, individually or as a system, because of a lack of integrity to the period of significance.

Nelson et al. (2000) surveyed a narrow utility corridor along the Western Pacific Railroad line that crosses project Segment 3 immediately south of Marysville. This linear survey did not identify any prehistoric or historic-era sites, features, or artifacts.

In 2002, archaeologists with Jones & Stokes inventoried a large portion of what is now the FRLRP project area at a reconnaissance level (50-meter [164-foot] parallel transects) as part of the Y-FSFCP effort. More intense (25-meter [82-foot]) parallel transects were used for a small portion of the project area consisting of approximately 1 mile of the Feather River levee north of Ella Road (project Segment 2) and adjacent orchards to the east. Site CA-Yub-5 was relocated. The archaeologists noted that a 4-foot-high mound is present on the site. No artifacts were observed on the surface, but a foot-thick midden layer and fire-cracked rock were observed in a cut bank on the western edge of the site, overlain by 1–3 feet of sand. Disturbances consisted of a dirt road along the western edge of the site, a barn, and a walnut orchard currently located on-site. An additional seven historic resources were identified within project Segments 1 and 2 during this investigation:

- RD 784 Pump Station No. 2 (C-YCWA-8) (Segment 1): A structure built as early as 1952 supporting a pumping facility that has been subsequently and recently modified.
- Clark Slough (C-YCWA-1) (Segment 1): An earthen ditch in the RD 784 irrigation and drainage system that extends approximately 2.5 miles between Pump Station No. 2 and Lateral 5.

- Feather River levee (C-YCWA-3) (Segments 1 and 2): A 25-foot-high earthen berm along the east side of the Feather River with a 14- to 16-foot-wide road along the 20-foot-wide crown.
- Barn (C-YCWA-4) (Segment 2): A wood frame structure built sometime in the early 1920s. In 1997, floodwaters lifted the barn off its foundation and twisted the structure into its current dilapidated condition.
- House and barn (C-YCWA-5) (Segment 2): A single-story house with a concrete slab foundation and concrete masonry unit walls and a carport at the south end of the building, and a two/three-story rectangular structure located north of the house.
- Migrant worker camp (C-YCWA-6) (Segment 2): The remains of a migrant worker camp that apparently consisted of two large bunkhouses, a bathhouse, and a fourth building that may have been a mess hall.
- Messick Lake Ditch/Lateral 6 (C-YCWA-7) (Segment 2): An earthen ditch that extends northwest and south from Messick Lake, crossing Anderson Avenue via corrugated steel pipe.

Jones & Stokes (2003) noted that the RD 784 irrigation features and the Feather River levee do not represent unique examples of reclamation technology and do not retain integrity to the period in which they achieved significance, having been modified over time. The other features were found to lack distinctive characteristics that would potentially qualify them for NRHP or CRHR listing. Therefore, these resources were considered not to be eligible for NRHP or CRHR listing.

Jensen (2005) surveyed an area immediately southwest of the southwest corner of the Yuba County Airport, bordered on the east by the abandoned Sacramento Northern Railroad line and on the west by the river side of the left (east) bank levee of the Feather River in project Segments 2 and 3. This survey encompassed the northernmost portion of project Segment 2. This survey did not identify any prehistoric or historic-era sites, features, or artifacts.

Resources Previously Identified at Sites Near the Project Area

First documented in 1953 (Elsasser 1953) and later updated in 1960 by Riddell, site CA-Yub-6 was recorded approximately 1/2 mile east of project Segment 2 near Feather River Boulevard. In 1953, the site was described as a low rise covered with darker soil than the surrounding area. Several burials were removed from this locale when they were exposed during excavations for a fuel storage tank. Riddell (1960) indicated that this is the location of a large village and cemetery measuring approximately 100 meters (328 feet) in diameter.

A study by Stoll and Thompson (1961) within the Bear River drainage identified two sites, CA-Yub-1312 and CA-Yub-1313, southeast of what is now the FRLRP project area:

- *Site CA-Yub-1312.* Located near the confluence of the Feather and Bear Rivers, this site was described as a leveled habitation site consisting of a midden covering an area of 200 meters by 125 meters (656 feet by 410 feet) within a sugar beet field. Associated constituents

included a pestle, a projectile point, a bone fragment, and a hammerstone. Fragments of human bone were also found at the site.

- *Site CA-Yub-1313.* Located just north of the Bear River near State Route 70 (approximately 2 miles east of the present project area), this site was described as consisting of scattered midden material, an obsidian projectile point, shell, bone, basalt and obsidian flakes, and what appeared to be a pestle fragment.

CA-Yub-14, also known as the Rio Oso Site, is situated west of the left bank Feather River levee near project Segment 1. It was first documented in 1957 when a subsurface archaeological deposit with human remains was discovered by construction workers during borrow excavations for construction along the levee. Olsen (1957) observed a 200-foot by 300-foot area with dark sandy midden, and reported the discovery of projectile points, shell ornaments, Olivella beads, a bone awl and a fish hook. “Many” burials were discovered, although no further details were offered. Vandals further damaged the site before salvage excavations could take place. Olsen and Riddell (1962) conducted salvage excavation at the site and identified a midden deposit approximately 14–16 inches below the surface and extending to a depth of 48–60 inches. A total of 42 burials were removed from this site. The investigators noted that the vast majority of the burials located at the site had been disturbed either by construction or by subsequent vandalism. Despite these site disturbances, burial positions and placement and the wealth of culturally and temporally diagnostic materials indicate that the site was heavily utilized during the Late Archaic Period.

Peak & Associates (1988) conducted an intensive survey for three effluent disposal ponds on a 30-acre parcel located approximately 100–200 feet south of the Yuba River and immediately adjacent to the Southern Pacific railroad line. No prehistoric or historic-era resources were documented within the project area, but an abandoned spur (NCIC site number PA-88-75) associated with the railroad was recorded in the immediate vicinity.

Offerman (1992) surveyed a 13.8-acre site at the location of the present-day Caltrans maintenance area located at 981 North Beale Road in Marysville, immediately east of SR 70. This site is approximately 0.25 mile south of the portion of the left (south) bank Yuba River levee that is located in project Segment 3. Another survey of this site was conducted by Offerman (2001). Neither of these intensive surveys identified any prehistoric or historic-era sites, features, or artifacts.

NCIC File No. 939 (U.S. Army Corps of Engineers 1993) is a record of a survey that was conducted for a levee project in the U.S. Army Corps of Engineers’ Marysville–Yuba City Mitigation Area, west of the left bank Feather River levee at Country Club Avenue, near project Segment 2. Historic glass and ceramics discovered adjacent to the levee near Segment 2 were determined to lack integrity and were therefore determined to be ineligible for listing in the NRHP or the CRHR.

As part of the archaeological inventory performed for the Y-FSFCP, Jones & Stokes (2003) surveyed the left (east) bank Feather River levee and adjacent land within approximately 2,000 feet to the east. The survey extended south of FRLRP Segment 1. Jones & Stokes archaeologists

confirmed the location of CA-Yub-1312 and noted the presence of an obsidian flake, a cobble tool, a faunal bone fragment, fire-affected rock, and freshwater mussel shell.

Subsurface testing was subsequently conducted by Jones & Stokes (2005) at this site and the suspected site of CA-Yub-1313 as part of the Feather-Bear Rivers Levee Setback Project (F-BRLSP). Archaeological deposits and human remains were found to be present at CA-Yub-1312; however, the deposits were highly disturbed, lacking both horizontal and vertical integrity, and the resources were determined to be not eligible for listing in the NRHP. Test excavations at CA-Yub-1313 concentrated on areas suspected to contain the remains of the site, based upon the site documents and information supplied by local residents. No evidence of the site was discovered during test excavations.

In 2005, during setback levee construction along the lower Bear River as part of the F-BRLSP, additional archaeological deposits were uncovered at site CA-Yub-1312, and previously undocumented human remains and archaeological materials were uncovered at the site of CA-Yub-1313. Subsequent investigations concluded that those related to CA-Yub-1312 represent redeposited midden soils graded by agricultural activities, probably in the mid to late 20th century. Test excavations at CA-Yub-1313 revealed the presence of a highly disturbed deposit. Because of the redeposited and highly disturbed nature of the archaeological deposits, neither site was recommended as eligible for inclusion in the NRHP (EDAW 2006).

Storm (n.d.) conducted an inventory for a drainage project in West Linda, directly east of the left bank Feather River levee near project Segment 3. While not noting any resources within the project area, Storm did note the presence of CA-Yub-164, a prehistoric occupation site, approximately 1 mile east of the project area.

Results of Current Investigations within the Project Area

On May 11, 15, 18, and 25, 2006, EDAW archaeologist Richard Deis conducted a pedestrian survey of corridors along the proposed ASB and intermediate setback levee alignments and the portion of the existing Feather River levee in project Segment 3 that was not covered in the previous survey efforts (EDAW 2006b). Approximately 2.0 miles of the proposed ASB setback levee alignment (Alternative 2) and 1.0 mile of the proposed intermediate setback levee alignment (Alternative 3) could not be inventoried because access to these areas was not available. In addition, approximately 1/2 mile of the ASB setback levee alignment and 3/4 mile of the intermediate setback levee alignment could not be inventoried because of dense grass that obscured 100% of the ground surface. For those areas that could be adequately inventoried, surface visibility averaged more than 30% and was limited by grasses. The 2006 survey did not include areas between the existing Feather River levee and the setback levees proposed under Alternatives 2 and 3 or areas that may be used for borrow materials and equipment staging. Figures 5.8-1a and 5.8-1b depict the areas surveyed. (Although the coverage area of the 2006 survey was limited, additional areas with the potential to be affected by project construction activities or flood control operations would be surveyed for cultural resources before initiation of project construction, as described in mitigation measures below.)

As described above, a total of nine previously identified resources have been identified within or directly adjacent to the project area (CA-Yub-13, C-YCWA-1, and C-YCWA-8 in or adjacent to

project Segment 1, and CA-Yub-5, C-YCWA-3, C-YCWA-4, C-YCWA-5, C-YCWA-6, and C-YCWA-7 in project Segment 2). In addition, CA-Yub-14 is near Segment 1 to the west. With the exception of CA-Yub-14, C-YCWA-5, and C-YCWA-6, to which access was not available, the EDAW archaeologist located all of the previously identified resources. Surface observations at the previously identified locale for CA-Yub-13, however, did not identify any cultural resource remains at this site. A detail map of CA-Yub-5 was completed; no further disturbances of this site, beyond those noted by Jones & Stokes (2003), were observed.

A single isolated find in Segment 2 and a new site, FR1 in Segment 3, were documented during this field investigation. The isolated find, consisting of a fragmented piece of sun-colored amethyst glass, was observed within the proposed intermediate setback levee alignment. This fragment is chipped along all of the margins and is eroded, indicating that it has been transported by fluvial processes, possibly during one or more of the historic flooding episodes. While this type of glass was in use from ca. 1880 to the late 1910s, it lacks association and further data potential.

Site FR1 consists of the remains of an irrigation/pump location situated along the west side of the left bank levee of the Feather River. Constituents consist of a head gate, concrete foundations/footings, an excavated pit, and a section of riveted steel pipe. Most likely these are the remains of a component of RD 784. The remains have been completely dismantled and scattered, which has compromised the integrity of the features.

A residential complex was also observed at 716 Murphy Road, southwest of the Yuba County Airport in the northern part of project Segment 2. This property contains various buildings and structures, none of which are more than 45 years of age.

Summary of Cultural Resources in the Project Area

Table 5.8-2, “Summary of Cultural Resources in the Project Area,” presents a list of previously identified and newly identified resources in and adjacent to the FRLRP project area, along with the NRHP and CRHR eligibility status of each resource.

5.8.3 ENVIRONMENTAL IMPACTS

THRESHOLDS OF SIGNIFICANCE

Thresholds for determining the significance of impacts on cultural resources were based on the environmental checklist form in Appendix G of the State CEQA Guidelines. A project alternative would have a significant impact on cultural resources if it would:

- cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5 of the State CEQA Guidelines;
- cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5 of the State CEQA Guidelines; or
- disturb any human remains, including those interred outside formal cemeteries.

Table 5.8-2
Summary of Cultural Resources in the Project Area

Project Segment	Site	Association	Description	Reference	Location – USGS Olivehurst Quad.			NRHP/CRHR Status
					T.	R.	Sec.	
Previously Identified Resources								
1	CA-Yub-13	Prehistoric	Village? (immediately west of Feather River levee)	Bouey 1990	13N	4E	6	Unevaluated
1	CA-Yub-14	Prehistoric	Village/burials outside (just west of) project area	Olsen 1957	13N	3E	6	Unevaluated
1	C-YCWA-1	Historic	Canal	Jones & Stokes 2003	13N	4E	13	Not eligible
1	C-YCWA-8	Historic	Pump station	Jones & Stokes 2003	13N	4E	25	Not eligible
2	CA-Yub-5	Prehistoric	Village/burials	Elsasser and Baumhoff 1953	13N	4E	25	Potentially eligible
1 and 2	C-YCWA-3	Historic	Levee	Jones & Stokes 2003	13N	4E	13	Not eligible
2	C-YCWA-4	Historic	Barn	Jones & Stokes 2003	13N	4E	25	Not eligible
2	C-YCWA-5	Historic	House and barn	Jones & Stokes 2003	13N	4E	24	Not eligible
2	C-YCWA-6	Historic	Work camp	Jones & Stokes 2003	13N	4E	24	Not eligible
2	C-YCWA-7	Historic	Canal	Jones & Stokes 2003	13N	4E	25	Not eligible
Newly Identified Resources								
2	Isolate 1	Historic	Glass fragment	EDAW 2006b	13N	4E	NA	Not eligible
3	FR1	Historic	Flood control features	EDAW 2006b	13N	4E	NA	Not eligible

Note: CRHR = California Register of Historical Resources; E = East; N = North; NA = Not available; NRHP = National Register of Historic Places; R = Range; Sec. = Section; T = Township; USGS = U.S. Geological Survey
Source: Data compiled by EDAW in 2006

A substantial adverse change in the significance of a resource means the physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of a historical resource would be materially impaired. Actions that would materially impair the significance of a historical resource are any actions that would demolish or adversely alter those physical characteristics of a historical resource that convey its significance and qualify it for inclusion in the CRHR or in a local register or survey that meets the requirements of Public Resources Code Sections 5020.1(k) and 5024.1(g).

IMPACT ANALYSIS

Analysis Method

The impacts of the project alternatives were considered with regard to the thresholds listed above. For each alternative, the analysis considered impacts on cultural resources that could result from ground-disturbing construction activities, such as the preparation and use of staging areas and access roads; excavation operations; and levee repairs and strengthening or setback levee construction. The analysis for Alternatives 2 and 3 also considered indirect impacts such as erosion or flood damage that could be caused by intermittent inundation associated with flood operations with the proposed setback levee.

Alternative 1 – The Levee Strengthening Alternative

Impact LS-5.8-a

Damage to or Destruction of Resources Associated with Prehistoric Archaeological Sites CA-Yub-13 and CA-Yub-14. Prehistoric site CA-Yub-13 was previously documented adjacent to the water side of the levee in project Segment 1, and prehistoric site CA-Yub-14 was documented just west of Segment 1. The eligibility of these resources for CRHR and NRHP listing has not been determined. Prehistoric remains that may be considered significant resources under CEQA may still be present near the documented locations of these sites and could be damaged or destroyed by proposed levee repair and strengthening activities. This impact would be **potentially significant.**

Prehistoric archaeological site CA-Yub-13 was previously documented at the northern end of project Segment 1, just south of Star Bend and adjacent to the water side of the levee. Compacted midden and artifact fragments were documented in 1957 and 1960 (Bouey 1990). Records indicate that the site was extensively vandalized, has been eroded by the Feather River, and had been affected by pump station construction. Bouey (1990) suggested that the site may no longer contain cultural resource materials. EDAW did not find any archaeological traces at the site during surveys conducted for the current effort. Nevertheless, it is possible that the project area may contain subsurface archaeological remains associated with CA-Yub-13 that could be considered significant resources under CEQA and that ground-disturbing project activities in the vicinity of the recorded location of CA-Yub-13 may damage or destroy such resources.

Site CA-Yub-14 was documented west of the left bank Feather River levee near project Segment 1 (in what is now the Lake of the Woods Unit of the Feather River State Wildlife Area). Numerous artifacts and “many” burials were reported by Olsen (1957). The site was subsequently vandalized. Salvage excavations (Olsen and Riddell 1962) recovered numerous burials and culturally and temporally diagnostic materials from this site, which provided evidence of prehistoric use. During the 2006 EDAW survey, the property where CA-Yub-14 was recorded could not be accessed. Consequently, the present-day condition and location of this site could not be assessed or confirmed. It is unknown whether any significant archaeological remains are still present at the site, and the recorded location of the site indicates that it may be sufficiently distant from the project area to preclude disturbance of any remaining cultural materials there by FRLRP activities. Nevertheless, it is possible that the project area may contain subsurface archaeological remains associated with CA-Yub-14 that could be considered significant resources and that ground-disturbing project activities in the vicinity of the recorded location of CA-Yub-14 may damage or destroy such resources.

Because it is possible that these sites, or elements of the sites, are eligible for NRHP or CRHR listing and may be considered significant resources under CEQA, any disturbance or destruction of resources associated with the sites may constitute a significant impact. Levee repair and strengthening activities could damage or destroy prehistoric remains that might be present at either of these locations. Therefore, this impact would be potentially significant.

Impact LS-5.8-b

Damage to or Destruction of Cultural Resources in Unsurveyed Areas. Potential borrow or staging areas have not been definitively identified and therefore have not been surveyed for cultural resources. Significant cultural resources could be present in these areas, and could be damaged by project-related ground-disturbing activities. This impact would be **potentially significant.**

The cultural resources survey did not include areas that may be used for borrow materials and equipment staging, which will be defined during area project design. Undocumented and potentially significant cultural resources may be present in these areas and could be damaged by project-related ground-disturbing activities. Therefore, this impact would be potentially significant.

Impact LS-5.8-c

Damage to or Destruction of Undocumented Buried Archaeological Resources during Construction. Project construction and related activities could damage or destroy previously unknown significant or potentially significant buried archaeological resources. This impact would be **potentially significant.**

Previously unidentified buried archaeological resources could be encountered during ground-disturbing activities, such as site preparation, grading, and excavation, in any of the project segments or at a soil borrow/detention basin site. Archaeological resources so encountered during construction could be damaged or destroyed. If any such resources are considered significant cultural resources, their damage or destruction would be considered significant. This impact would be potentially significant.

Impact LS-5.8-d

Damage to or Destruction of Undocumented Human Remains during Construction. It is possible that buried human remains could be unearthed during project-related ground-disturbing activities, causing damage to or destruction of such remains. This impact would be **potentially significant.**

It is possible that undiscovered buried human remains could be unearthed and damaged or destroyed during ground-disturbing activities, such as access road preparation, grading, excavation, and preparation and use of construction staging areas. Damage to or destruction of human remains during project construction or other project-related activities would be a significant impact. Because there is the potential for such damage to occur, this impact would be potentially significant.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impact ASB-5.8-a

Damage to or Destruction of Prehistoric Archaeological Site CA-Yub-5. Prehistoric archaeological site CA-Yub-5, which may be eligible for listing in the CRHR and NRHP, could be damaged or destroyed by construction activities or by inundation or scouring when flood flows pass through the levee setback area. Because this site may be a significant cultural resource, this impact would be **potentially significant.**

Archaeological site CA-Yub-5, a prehistoric village site, is located within the proposed setback levee alignment in project Segment 2, in an area where the alignments for the proposed ASB setback levee (Alternative 2) and the intermediate setback levee (Alternative 3) coincide. Native American burials and associated grave goods were removed from a portion of the site in the 1950s. A 4-foot-tall mound still exists at the site, and a thick midden layer is visible in a cut bank on one side of the site (Jones & Stokes 2003). Because little documentation of the previous excavations exists and the site retains the appearance of a prehistoric burial mound, it is considered possible that unrecovered prehistoric Native American burials or associated artifacts remain at the site. There is a lack of published information on the prehistory of Yuba County, particularly in the floodplain of the Feather River. CA-Yub-5 has previously yielded artifacts of importance to the understanding of regional prehistory, and has a high potential to yield more scientifically consequential information to supplement the little that is known. Therefore, it appears that CA-Yub-5 may be eligible for listing in the CRHR and the NRHP and therefore may be considered a historical resource (i.e., a significant cultural resource) for purposes of CEQA.

Because the site is within the proposed setback levee alignment, it could be damaged or destroyed by construction activities, such as grading, excavation, and transport of materials using heavy equipment. Flooding of the levee setback area by high Feather River flows following construction of the setback levee could also result in inundation or scouring that could damage or destroy site CA-Yub-5. Damage to or destruction of an archaeological site that is a historical resource would be a significant impact. Because the site represents a potentially significant resource that could be damaged by construction or operation of the project, this impact would be potentially significant.

Impact ASB-5.8-b

Damage to or Destruction of Resources Associated with Prehistoric Archaeological Sites CA-Yub-I3 and CA-Yub-I4. This impact would be the same as Impact LS-5.8-a, described under Alternative I above. For the same reasons as described above, this impact would be **potentially significant.**

Impact ASB-5.8-c

Damage to or Destruction of Cultural Resources in Unsurveyed Areas. Portions of the project area could not be surveyed for cultural resources because of ground conditions and lack of site access, and potential borrow or staging areas also have not been surveyed. Significant cultural resources could be present in these areas, and could be damaged by project-related ground-disturbing activities. This impact would be **potentially significant.**

Approximately 2.0 miles of the ASB setback levee alignment could not be inventoried because access to this area was not available. In addition, approximately 1/2 mile of the ASB setback levee alignment could not be inventoried because of dense grass that obscured 100% of the ground surface. For those areas that could be adequately inventoried, surface visibility averaged more than 30% and was limited by grasses. The survey also did not include areas between the

existing Feather River levee and the proposed ASB setback levee alignment or areas that may be used for borrow materials and equipment staging. Undocumented and potentially significant cultural resources may be present in these areas and could be damaged by project-related ground-disturbing activities. Therefore, this impact would be potentially significant.

Impact ASB-5.8-d

Damage to or Destruction of Undocumented Buried Archaeological Resources during Construction. This impact would be similar to Impact LS-5.8-c, described under Alternative 1 above. In addition, ground-disturbing activities associated with the proposed levee setback in project Segment 2, such as construction of the slurry cutoff wall and the setback levee foundation, have the potential to damage or destroy previously unidentified archaeological resources in the setback levee construction area. For the same reasons as described for Alternative 1, this impact would be **potentially significant.**

Impact ASB-5.8-e

Damage to or Destruction of Undocumented Human Remains during Construction. This impact would be similar to Impact LS-5.8-d, described under Alternative 1 above. In addition, ground-disturbing activities associated with the proposed levee setback in project Segment 2, such as construction of the slurry cutoff wall and the setback levee foundation, have the potential to damage or destroy undocumented human remains in the setback levee construction area. For the same reasons as described for Alternative 1, this impact would be **potentially significant.**

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impact IS-5.8-a

Damage to or Destruction of Prehistoric Archaeological Site CA-Yub-5. This impact would be the same as Impact ASB-5.8-a, described under Alternative 2 above. For the same reasons as described above, this impact would be **potentially significant.**

Impact IS-5.8-b

Damage to or Destruction of Resources Associated with Prehistoric Archaeological Sites CA-Yub-I3 and CA-Yub-I4. This impact would be the same as Impact LS-5.8-a, described under Alternative 1 above. For the same reasons as described above, this impact would be **potentially significant.**

Impact IS-5.8-c

Damage to or Destruction of Cultural Resources in Unsurveyed Areas. Portions of the project area could not be surveyed for cultural resources because of ground conditions and lack of access, and potential borrow or staging areas also have not been surveyed. Significant cultural resources could be present in these areas, and could be damaged by project-related ground-disturbing activities. This impact would be **potentially significant.**

Approximately 1.0 mile of the intermediate setback levee alignment could not be inventoried because access to this area was not available. In addition, approximately 3/4 mile of the intermediate setback levee alignment could not be inventoried because of dense grass that obscured 100% of the ground surface. For those areas that could be adequately inventoried, surface visibility averaged more than 30% and was limited by grasses. The survey also did not include areas between the existing levee and the proposed intermediate setback levee alignment or areas that may be used for borrow materials and equipment staging. Undocumented and potentially significant cultural resources may be present in these areas and could be damaged by project-related ground-disturbing activities. Therefore, this impact would be potentially significant.

Impact IS-5.8-d

Damage to or Destruction of Undocumented Buried Archaeological Resources during Construction. This impact would be the same as Impact ASB-5.8-d, described under Alternative 2 above. For the same reasons as described above, this impact would be **potentially significant.**

Impact IS-5.8-e

Damage to or Destruction of Undocumented Human Remains during Construction. This impact would be the same as Impact ASB-5.8-e, described under Alternative 2 above. For the same reasons as described above, this impact would be **potentially significant.**

5.8.4 MITIGATION MEASURES

Alternative 1 – The Levee Strengthening Alternative

Mitigation is provided below for Impact LS-5.8-a (damage to or destruction of resources associated with sites CA-Yub-13 and CA-Yub-14), Impact LS-5.8-b (damage to or destruction of cultural resources in unsurveyed areas), Impact LS-5.8-c (damage to or destruction of undocumented buried archaeological resources), and Impact LS-5.8-d (damage to or destruction of undocumented human remains).

LS-5.8-a(1) Conduct Further Evaluation and Subsurface Testing to Determine Whether Proposed Levee Improvements Could Damage Significant Resources Associated with Prehistoric Archaeological Sites CA-Yub-13 and CA-Yub-14. This mitigation, together with Mitigation Measure LS-5.8-a(2), would reduce the potential impact to a less-than-significant level.

If levee improvements would include activities that could disturb subsurface soils in the vicinity (within 1,000 feet) of the recorded location of either CA-Yub-13 or CA-Yub-14, TRLIA shall have a qualified archaeologist conduct an evaluation designed to assess the potential for damage to resources associated with the site(s) before initiation of project-related ground-disturbing activities in these areas. The evaluation may require assessment of the condition and data potential of specific areas of anticipated construction disturbance and/or determination of whether one or both of the sites are eligible for inclusion in the CRHR and/or NRHP. This evaluation shall include additional surveys, subsurface test excavations, analyses of any discovered archaeological materials, and (if necessary) data recovery.

If the testing indicates the presence of cultural resources, a qualified archaeologist shall evaluate the significance of the finds and shall recommend further mitigation measures. Because of the critical need to remedy weaknesses in the existing levee in Segment 1, it is unlikely that avoidance of any resources directly within the construction footprint would be possible, and data recovery would likely be required. Efforts involving testing, excavation, and monitoring shall be conducted in consultation with appropriate Native American representatives identified by the NAHC.

LS-5.8-a(2) Monitor Ground-Disturbing Activities in the Vicinity of Prehistoric Archaeological Sites CA-Yub-13 and CA-Yub-14. This mitigation, together

with Mitigation Measure LS-5.8-a(1), would reduce the potential impact to a less-than-significant level.

A qualified professional archaeologist and a Native American representative shall monitor all project-related ground-disturbing activities at and near the locations of prehistoric archaeological sites CA-Yub-13 and CA-Yub-14. If intact archaeological materials or human burials not recovered during the subsurface testing and excavation programs described in Mitigation Measure LS-5.8-a(1) are uncovered during project-related ground-disturbing activities, the archaeologist shall determine their possible significance and shall formulate appropriate mitigation measures. Appropriate mitigation may include no action, avoidance of the resource, and potential additional data and burial recovery.

Implementing Mitigation Measures LS-5.8-a(1) and LS-5.8-a(2) together would ensure that any significant cultural remains associated with sites CA-Yub-13 and CA-Yub-14 are appropriately addressed, and would reduce the potential impact to a less-than-significant level.

LS-5.8-b **Survey Unexamined Areas before Project Ground-Disturbing Activities and Implement Further Mitigation As Necessary.** This mitigation would reduce the potential impact to a less-than-significant level.

A qualified professional archaeologist shall conduct focused surveys of all portions of the project area that were not adequately surveyed during past efforts or during surveys for the current effort. The survey shall be conducted before activities associated with project preparation or construction are initiated, and during a fallow period, if possible, in the case of areas currently covered in agricultural crops or grasses. If cultural resources are identified as a result of the survey, the archaeologist shall evaluate the significance of the finds and recommend appropriate mitigation measures for significant resources. TRLIA and its construction contractors shall implement these mitigation measures.

Mitigation may include, but shall not necessarily be limited to, the avoidance of significant and potentially significant resources through changes in project design and/or subsurface testing and data recovery. Such efforts, particularly those involving testing and excavation, shall be conducted in consultation with appropriate Native American representatives identified by the NAHC.

Implementing this mitigation measure would ensure that impacts on unknown cultural resources in previously unsurveyed portions of the project area are prevented or mitigated, and would reduce the potential impact to a less-than-significant level.

LS-5.8-c **Stop Work and Implement Measures to Protect Archaeological Resources If Discovered during Ground-Disturbing Activities.** This mitigation would reduce the potential impact to a less-than-significant level.

If previously undocumented archaeological materials such as historic building or structure remains; historic artifact deposits or scatters; or prehistoric artifacts such as stone tool flaking debitage, mortars, pestles, shell, or bone are encountered during project construction, all ground-disturbing activity shall be suspended temporarily within a 100-foot radius of the find or a distance determined by a qualified professional archaeologist to be appropriate based on the

potential for disturbance of additional resource-bearing soils. A qualified professional archaeologist shall identify the materials, determine their possible significance, and formulate appropriate mitigation measures. Appropriate mitigation may include no action, avoidance of the resource, and potential data recovery. Ground disturbance in the zone of suspended activity shall not recommence without authorization from the archaeologist.

Implementing this mitigation measure would ensure proper identification and treatment of any significant cultural resources uncovered as a result of project-related ground disturbance and would reduce the potential impact on unknown buried archaeological resources to a less-than-significant level.

LS-5.8-d **If Human Remains Are Discovered during Ground-Disturbing Activities, Stop Work and Comply with State Laws Pertaining to the Discovery of Human Remains.** This mitigation would reduce the potential impact to a less-than-significant level.

If human remains are uncovered during project construction, all ground-disturbing activities shall immediately be suspended within a 100-foot radius of the find or a distance determined by a qualified professional archaeologist to be appropriate based on the potential for disturbance of additional remains, and TRLIA or its designated representative shall be notified. TRLIA shall immediately notify the Yuba County Coroner and a qualified professional archaeologist, if one is not already on-site. The coroner shall examine the discovery within 48 hours. If the coroner determines that the remains are those of a Native American, he or she shall contact the NAHC by phone within 24 hours. The NAHC shall contact the Most Likely Descendant (MLD) of the remains. TRLIA or its appointed representative and the archaeologist shall consult with the MLD regarding the removal or preservation and avoidance of the remains, and the parties shall rebury or preserve the remains as appropriate. Ground disturbance in the zone of suspended activity shall not recommence without authorization from the archaeologist.

Implementing this mitigation measure would reduce impacts on discovered human remains to a less-than-significant level.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Mitigation is provided below for Impact ASB-5.8-a (damage to or destruction of site CA-Yub-5), Impact ASB-5.8-b (damage to or destruction of resources associated with sites CA-Yub-13 and CA-Yub-14), Impact ASB-5.8-c (damage to or destruction of cultural resources in unsurveyed areas), Impact ASB-5.8-d (damage to or destruction of undocumented buried archaeological resources), and Impact ASB-5.8-e (damage to or destruction of undocumented human remains).

ASB-5.8-a **Evaluate the Significance of Archaeological Site CA-Yub-5 and, If Determined to Be Significant, Protect the Site from Damage and/or Conduct Data Recovery Excavation.** This mitigation would reduce the impact to a less-than-significant level.

TRLIA shall have a qualified archaeologist evaluate the extent and significance/eligibility for NRHP and CRHR listing of site CA-Yub-5 through test excavations and analysis of the site's stratigraphy and artifactual constituents. If the site is determined to lack eligibility for NRHP and

CRHR listing and is not found to be a significant cultural resource under CEQA, the archaeologist shall report these findings in a site investigation report and ensure that all remains discovered at the site are recorded and reported in accordance with professional practices, and no further protective measures will be necessary.

If intact stratigraphy, features, additional human remains, or artifacts indicate that the site may be eligible for NRHP or CRHR listing and therefore a significant historical resource according to CEQA criteria, TRLIA shall implement one or both of the measures described below in consultation with a professional archaeologist familiar with CA-Yub-5 to ensure that no significant cultural resources are damaged there. Two basic approaches are described: protecting the site from damage and conducting data recovery at the site. All site testing shall be conducted in consultation with appropriate Native American representatives designated by the NAHC, and a Native American monitor shall be present for monitoring during any excavation.

Option 1: Protect CA-Yub-5 from Damage

CA-Yub-5 can be protected from direct construction damage if the setback levee is realigned such that the site is beyond the footprint of ground-disturbing levee construction activity. This would require moving the levee alignment to the east of the site boundaries, thus placing the entire site within the levee setback area. It would be highly impractical to move the alignment to the west to place the site outside the project site and thereby avoid damaging it. Based on characteristics observed during archaeological field surveys, it is estimated that the setback levee would need to be constructed approximately 500 feet west of the proposed alignment in the area of CA-Yub-5 to ensure complete avoidance of the site. Geotechnical considerations render such a western shift of the alignment unrealistic because it would place this portion of the levee on a far less stable foundation (old riverbed) than under the proposed alignment.

Once situated within the levee setback area (i.e., the expanded floodway), the site should be protected from future erosion and scour from surface flows, as well as human disturbance, through the use of engineered features and/or strategic plantings. In addition, sufficient site data should be collected and analyzed to establish the important archaeological characteristics of the site. One of the most potentially significant characteristics of CA-Yub-5 is the presence of at least 12 inches of midden soil, which can be a source of information regarding the age of the site (through radiocarbon dating) and prehistoric diets and paleoenvironmental reconstruction (through microconstituent and chemical analyses). Because floodwaters passing through the levee setback area could alter the soil properties that permit accurate radiometric dating or hasten the degradation of macrobotanical and microbotanical remains, scientific data would need to be collected, recorded, and reported before the site is subjected to inundation.

It has been previously suggested that the site may be protected from future damage by use of a protective covering that is impermeable to water, which is also termed “capping.” However, “capping” CA-Yub-5 to protect it from water damage would be very impractical, if not impossible. It would be necessary to have a clear definition of the horizontal and vertical boundaries of CA-Yub-5, and the site would need to be completely encased in the covering so that it would be protected from saturation from all sides, including rising groundwater from below.

Option 2: Conduct Data Recovery at CA-Yub-5

Data recovery through destructive excavation is considered an acceptable mitigation measure for damage to archaeological sites if other mitigation measures are less feasible or wholly infeasible. The purpose of data recovery is to obtain scientifically consequential information from an archaeological site that would be partially or completely destroyed. Although much of the work required for data recovery is similar to that conducted during test excavations, the requirements for data recovery call for more extensive manual and perhaps mechanical excavation. Recovered materials shall be subjected to laboratory analysis (e.g., stone tool analysis, faunal analysis, radiocarbon assays, and obsidian hydration studies), and a report and interpretive material shall be prepared that documents the site investigation and findings.

Implementing one or both of the mitigation options described above would ensure that project effects on any significant cultural resources at CA-Yub-5 would be reduced to a less-than-significant level.

ASB-5.8-b(1) **Conduct Further Evaluation and Subsurface Testing to Determine Whether Proposed Levee Improvements Could Damage Significant Resources Associated with Prehistoric Archaeological Sites CA-Yub-13 and CA-Yub-14.** This measure is identical to Mitigation Measure LS-5.8-a(1) above. Together with Mitigation Measure ASB-5.8-b(2), this mitigation would reduce the potential impact to a less-than-significant level.

ASB-5.8-b(2) **Monitor Ground-Disturbing Activities in the Vicinity of Prehistoric Archaeological Sites CA-Yub-13 and CA-Yub-14.** This measure is identical to Mitigation Measure LS-5.8-a(2) above. Together with Mitigation Measure ASB-5.8-b(1), this mitigation would reduce the potential impact to a less-than-significant level.

ASB-5.8-c **Survey Unexamined Areas before Project Ground-Disturbing Activities and Implement Further Mitigation As Necessary.** This measure is identical to Mitigation Measure LS-5.8-b above. This mitigation would reduce the potential impact to a less-than-significant level.

ASB-5.8-d **Stop Work and Implement Measures to Protect Archaeological Resources If Discovered during Ground-Disturbing Activities.** This measure is identical to Mitigation Measure LS-5.8-c above. This mitigation would reduce the potential impact to a less-than-significant level.

ASB-5.8-e **If Human Remains are Discovered during Ground-Disturbing Activities, Stop Work and Comply with State Laws Pertaining to the Discovery of Human Remains.** This measure is identical to Mitigation Measure LS-5.8-d above. This mitigation would reduce the potential impact to a less-than-significant level.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Mitigation is provided below for Impact IS-5.8-a (damage to or destruction of site CA-Yub-5), Impact IS-5.8-b (damage to or destruction of resources associated with sites CA-Yub-13 and CA-Yub-14), Impact IS-5.8-c (damage to or destruction of cultural resources in unsurveyed areas), Impact IS-5.8-d (damage to or destruction of undocumented buried archaeological resources), and Impact IS-5.8-e (damage to or destruction of undocumented human remains).

IS-5.8-a **Evaluate the Significance of Archaeological Site CA-Yub-5 and, If Determined to Be Significant, Protect the Site from Damage and/or Conduct Data Recovery Excavation.** This measure is identical to Mitigation Measure ASB-5.8-a above. This mitigation would reduce the impact to a less-than-significant level.

IS-5.8-b(1) **Conduct Further Evaluation and Subsurface Testing to Determine Whether Proposed Levee Improvements Could Damage Significant Resources Associated with Prehistoric Archaeological Sites CA-Yub-13 and CA-Yub-14.** This measure is identical to Mitigation Measure LS-5.8-a(1) above. Together with Mitigation Measure IS-5.8-b(2), this mitigation would reduce the potential impact to a less-than-significant level.

IS-5.8-b(2) **Monitor Ground-Disturbing Activities in the Vicinity of Archaeological Sites CA-Yub-13 and CA-Yub-14.** This measure is identical to Mitigation Measure LS-5.8-a(2) above. Together with Mitigation Measure IS-5.8-b(1), this mitigation would reduce the potential impact to a less-than-significant level.

IS-5.8-c **Survey Unexamined Areas before Project Ground-Disturbing Activities and Implement Further Mitigation As Necessary.** This measure is identical to Mitigation Measure LS-5.8-b above. This mitigation would reduce the potential impact to a less-than-significant level.

IS-5.8-d **Stop Work and Implement Measures to Protect Archaeological Resources If Discovered during Ground-Disturbing Activities.** This measure is identical to Mitigation Measure LS-5.8-c above. This mitigation would reduce the potential impact to a less-than-significant level.

IS-5.8-e **If Human Remains Are Discovered during Ground-Disturbing Activities, Stop Work and Comply with State Laws Pertaining to the Discovery of Human Remains.** This measure is identical to Mitigation Measure LS-5.8-d above. This mitigation would reduce the potential impact to a less-than-significant level.

5.8.5 IMPACTS REMAINING SIGNIFICANT AFTER MITIGATION

With implementation of the mitigation described above, all impacts on cultural resources would be reduced to a less-than-significant level.

SECTION 5.9 AIR QUALITY

This section includes a summary of applicable regulations, existing air quality conditions, and an analysis of potential short-term and long-term air quality impacts of the Feather River Levee Repair Project (FRLRP). The method of analysis for short-term construction-related, long-term regional (operational), local mobile-source, odorous, and toxic air emissions is consistent with the recommendations of the Feather River Air Quality Management District (FRAQMD). In addition, mitigation measures are recommended as necessary to reduce significant air quality impacts.

5.9.1 REGULATORY SETTING

The project site is in Yuba County, which is in the Northern Sacramento Valley Air Basin (NSVAB). The NSVAB consists of Butte, Colusa, Glenn, Shasta, Sutter, Tehama, and Yuba Counties. Air quality in Yuba County is regulated by the U.S. Environmental Protection Agency (EPA), California Air Resources Board (ARB), and FRAQMD. Although EPA regulations may not be superseded, both state and local regulations may be more stringent. The following air quality regulations focus primarily on ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (PM), and lead. Because these are the most prevalent air pollutants known to be deleterious to human health and extensive health-effects criteria documents are available, these pollutants are commonly referred to as "criteria air pollutants."

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

At the federal level, EPA has been charged with implementing national air quality programs. EPA's air quality mandates are drawn primarily from the federal Clean Air Act (CAA), which was enacted in 1970. The most recent major amendments made by Congress were in 1990.

The CAA required EPA to establish national ambient air quality standards (NAAQS). As shown in Table 5.9-1, "Ambient Air Quality Standards and Attainment Designations," EPA has established primary and secondary NAAQS for the following criteria air pollutants: ozone, respirable particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), CO, NO_2, SO_2, and lead. The primary standards protect the public health and the secondary standards protect public welfare. The CAA also required each state to prepare an air quality control plan referred to as a State Implementation Plan (SIP). The federal Clean Air Act Amendments of 1990 (CAAA) added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is modified periodically to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies. EPA reviews all state SIPs to determine conformation to the mandates of the CAA and its amendments and to determine whether implementation will achieve air quality goals. If EPA determines that a SIP is inadequate, a Federal Implementation Plan (FIP) that imposes additional control measures may be prepared for the nonattainment area. Failure to submit an approvable SIP or to implement the plan within the mandated time frame may result in application of sanctions to transportation funding and stationary air pollution sources in the air basin.

Table 5.9-1
Ambient Air Quality Standards and Attainment Designations

Pollutant	Averaging Time	California Standards		National Standards [a]		
		Standards [b,c]	Attainment Status [d]	Primary [c,e]	Secondary [c,f]	Attainment Status [g]
Ozone	1-hour	0.09 ppm (180 μg/m^3)	N (Moderate)	– [h]	Same as Primary Standard	– [h]
	8-hour	0.07 ppm (137 μg/m^3)	U	0.08 ppm (157 μg/m^3)		U/A
Respirable Particulate Matter (PM_{10})	Annual Arithmetic Mean	20 μg/m^3	N	50 μg/m^3 [f]	Same as Primary Standard	U
	24-hour	50 μg/m^3		150 μg/m^3		
Fine Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean	12 μg/m^3	U	15 μg/m^3	Same as Primary Standard	–
	24-hour	–	–	65 μg/m^3		
Carbon Monoxide (CO)	1-hour	20 ppm (23 mg/m^3)	U	35 ppm (40 mg/m^3)	–	U
	8-hour	9 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)		
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	–	–	0.053 ppm (100 μg/m^3)	Same as Primary Standard	U/A
	1-hour	0.25 ppm (470 μg/m^3)	A	–		–
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	–	–	0.030 ppm (80 μg/m^3)	–	U
	24-hour	0.04 ppm (105 μg/m^3)	A	0.14 ppm (365 μg/m^3)	–	
	3-hour	–	–	–	0.5 ppm (1300 μg/m^3)	
	1-hour	0.25 ppm (655 μg/m^3)	A	–	–	–
Lead [i]	30-day Average	1.5 μg/m^3	A	–	–	–
	Calendar Quarter	–	–	1.5 μg/m^3	Same as Primary Standard	

Table 5.9-1
Ambient Air Quality Standards and Attainment Designations

Pollutant	Averaging Time	California Standards		National Standards [a]		
		Standards [b,c]	Attainment Status [d]	Primary [c,e]	Secondary [c,f]	Attainment Status [g]
Sulfates	24-hour	25 μg/m^3	A	No National Standards		
Hydrogen Sulfide	1-hour	0.03 ppm (42 μg/m^3)	U			
Vinyl Chloride [i]	24-hour	0.01 ppm (26 μg/m^3)	U/A			
Visibility-Reducing Particle Matter	8-hour	Extinction coefficient of 0.23 per kilometer —visibility of 10 miles or more (0.07—30 miles or more for Lake Tahoe) because of particles when the relative humidity is less than 70%.	U			

Notes: μg/m^3 = micrograms per cubic meter; mg/m^3 = milligrams per cubic meter; ppm = parts per million

[a] National standards (other than ozone, PM, and those based on annual averages or annual arithmetic means) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. The PM_{10} 24-hour standard is attained when 99% of the daily concentrations, averaged over 3 years, are equal to or less than the standard. The $PM_{2.5}$ 24-hour standard is attained when 98% of the daily concentrations, averaged over 3 years, are equal to or less than the standard.

[b] California standards for ozone, CO (except Lake Tahoe), SO_2(1- and 24-hour), NO_2, PM, and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[c] Concentration expressed first in units in which it was promulgated [i.e., parts per million (ppm) or micrograms per cubic meter (μg/m^3)]. Equivalent units given in parentheses are based upon a reference temperature of 25 degrees Celsius (°C) and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[d] Unclassified (U): A pollutant is designated unclassified if the data are incomplete and do not support a designation of attainment or nonattainment.

Attainment (A): A pollutant is designated attainment if the state standard for that pollutant was not violated at any site in the area during a 3-year period.

Nonattainment (N): A pollutant is designated nonattainment if there was at least one violation of a state standard for that pollutant in the area.

Nonattainment/Transitional (NT): A subcategory of the nonattainment designation. An area is designated nonattainment/transitional to signify that the area is close to attaining the standard for that pollutant.

[e] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.

[f] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[g] Nonattainment (N): Any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for the pollutant.

Attainment (A): Any area that meets the national primary or secondary ambient air quality standard for the pollutant.

Unclassifiable (U): Any area that cannot be classified on the basis of available information as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant.

[h] The national 1-hour ozone standard was revoked on June 15, 2005.

[i] ARB has identified lead and vinyl chloride as toxic air contaminants with no threshold of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

Sources: California Air Resources Board 2006a; U.S. Environmental Protection Agency 2006a, 2006b

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

ARB is the agency responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the California Clean Air Act (CCAA). The CCAA, which was adopted in 1988, required ARB to establish California ambient air quality standards (CAAQS) (Table 5.9-1). ARB has established CAAQS for sulfates, hydrogen sulfide, vinyl chloride, visibility-reducing particulate matter, and the above-mentioned criteria air pollutants. In most cases the CAAQS are more stringent than the NAAQS. Differences in the standards are generally explained by the health effects studies considered during the standard-setting process and the interpretation of the studies. In addition, the CAAQS incorporate a margin of safety to protect sensitive individuals.

The CCAA requires that all local air districts in the state endeavor to achieve and maintain the CAAQS by the earliest practical date. The act specifies that local air districts should focus particular attention on reducing the emissions from transportation and areawide emission sources, and provides districts with the authority to regulate indirect sources.

Other ARB responsibilities include overseeing local air district compliance with California and federal laws; approving local air quality attainment plans (AQAPs); submitting SIPs to EPA; monitoring air quality; determining and updating area designations and maps; and setting emissions standards for new mobile sources, consumer products, small utility engines, off-road vehicles, and fuels.

LOCAL PLANS, POLICIES, REGULATIONS, AND LAWS

FRAQMD attains and maintains air quality conditions in Yuba and Sutter Counties through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. The clean-air strategy of FRAQMD includes the preparation of plans and programs for the attainment of ambient-air-quality standards, adoption and enforcement of rules and regulations, and issuance of permits for stationary sources. FRAQMD also inspects stationary sources, responds to citizen complaints, monitors ambient air quality and meteorological conditions, and implements other programs and regulations required by the CAA, CAAA, and CCAA.

In an attempt to achieve the NAAQS and CAAQS and maintain healthful air quality throughout the NSVAB, FRAQMD and the other air districts in the NSVAB have jointly prepared and adopted AQAPs and reports. The most recent AQAP, completed in 2003, addresses all of the following:

- air quality modeling to identify the reductions needed and design effective emissions reduction strategies,
- comprehensive emission reduction programs that take advantage of zero- and near-zero-emission technologies, and
- the impacts of pollutant transport in the attainment demonstration.

In 1998 FRAQMD published the *Indirect Source Review Guidelines* (Feather River Air Quality Management District 1998). More recently FRAQMD has provided California Environmental Quality Act (CEQA) planning guidance online (Feather River Air Quality Management District 2006) to assist with identification of significant adverse air quality impacts and suggest amenities that will reduce potential project emissions early in the planning process. Because stationary sources such as industrial facilities are largely regulated, the guidelines focus on transportation and land-use control measures to reduce emissions to achieve and maintain federal and state health-based air quality standards.

All projects are subject to FRAQMD rules and regulations in effect at the time of construction. Specific rules applicable to the construction of the proposed project may include the following:

- Rule 3.0—Visible Emissions. A person shall not discharge into the atmosphere from any single source of emission whatsoever any air contaminant for a period or periods aggregating more than 3 minutes in any 1 hour which is as dark or darker in shade as that designated as No. 2 on the Ringelmann Chart, as published by the United States Bureau of Mines.

- Rule 3.2—Particulate Matter Concentration. A person shall not discharge into the atmosphere from any source particulate matter in excess of 0.3 grains per cubic foot of gas at standard conditions.

- Rule 3.15—Architectural Coatings. No person shall: (i) manufacture, blend, or repackage for sale within the District [FRAQMD]; (ii) supply, sell, or offer for sale within FRAQMD; or (iii) solicit for application or apply within FRAQMD, any architectural coating with VOC [volatile organic carbon] content in excess of the corresponding specified manufacturer's maximum recommendation.

- Rule 3.16—Fugitive Dust Emissions. A person shall take every reasonable precaution not to cause or allow the emissions of fugitive dust from being airborne beyond the property line, from which the emission originates, from any construction, handling or storage activity, or any wrecking, excavation, grading, clearing of land or solid waste disposal operation.

- Rule 4.1—Permit Requirements. Any person operating an article, machine, equipment, or other contrivance, the use of which may cause, eliminate, reduce, or control the issuance of air contaminants, shall first obtain a written permit from the Air Pollution Control Officer (APCO). Stationary sources subject to the requirements of Rule 10.3, Federal Operating Permit Program, must also obtain a Title V permit pursuant to the requirements and procedures of that rule.

TOXIC AIR CONTAMINANTS

Air quality regulations also focus on toxic air contaminants (TACs), or in federal parlance, hazardous air pollutants (HAPs). A TAC is defined as an air pollutant that may cause or contribute to an increase in levels of mortality or serious illness, or that may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air; however, their high toxicity or health risk may pose a threat to public health even at low concentrations. In general, for those TACs that may cause cancer, there is no concentration that does not present some risk. In other words, there is no threshold level below which adverse health impacts may

not be expected to occur. This contrasts with the criteria air pollutants, for which acceptable levels of exposure can be determined and for which the ambient standards have been established (Table 5.9-1). EPA and ARB regulate HAPs and TACs, respectively, through statutes and regulations that generally require the use of the maximum or best available control technology for toxics (MACT and BACT) to limit emissions. These statutes and regulations, in conjunction with additional rules set forth by FRAQMD, establish the regulatory framework for TACs.

Federal Hazardous Air Pollutant Programs

EPA has programs for identifying and regulating HAPs. Title III of the CAAA directed EPA to promulgate national emissions standards for HAPs (NESHAP). The NESHAP for major sources of HAPs may differ from the standards for area sources. Major sources are defined as stationary sources with potential to emit more than 10 tons per year (TPY) of any HAP or more than 25 TPY of any combination of HAPs; all other sources are considered area sources. The emissions standards are to be promulgated in two phases. In the first phase (1992–2000), EPA developed technology-based emission standards designed to produce the maximum emission reduction achievable. These standards are generally referred to as requiring MACT. For area sources, the standards may be different, based on generally available control technology. In the second phase (2001–2008), EPA is required to promulgate health risk–based emissions standards where deemed necessary to address risks remaining after implementation of the technology-based NESHAP standards.

The CAAA also required EPA to promulgate vehicle or fuel standards containing reasonable requirements that control toxic emissions, at a minimum emissions of benzene and formaldehyde. Performance criteria were established to limit mobile-source emissions of toxics, including benzene, formaldehyde, and 1,3-butadiene. In addition, Section 219 of the CAAA required the use of reformulated gasoline in selected areas with the most severe ozone nonattainment conditions to further reduce mobile-source emissions.

State and Local Toxic Air Contaminant Programs

The State of California regulates TACs primarily through the Tanner Air Toxics Act (Assembly Bill [AB] 1807 [1983]) and the Air Toxics Hot Spots Information and Assessment Act (AB 2588 [1987]). The Tanner Act sets forth a formal procedure for ARB to designate substances as TACs. Research, public participation, and scientific peer review must occur before ARB can designate a substance as a TAC. To date, ARB has identified more than 21 TACs and has adopted EPA's list of HAPs as TACs. Most recently, diesel PM was added to the ARB list of TACs.

Once a TAC is identified, ARB adopts an Airborne Toxics Control Measure (ATCM) for sources that emit that particular TAC. If there is a safe threshold for a substance at which there is no toxic effect, the control measure must reduce exposure below that threshold. If there is no safe threshold, the measure must incorporate BACT to minimize emissions.

The Hot Spots Act requires that existing facilities that emit toxic substances above a specified level prepare a toxic-emission inventory, prepare a risk assessment if emissions are significant, notify the public of significant risk levels, and prepare and implement risk reduction measures.

ARB has adopted diesel exhaust control measures and more stringent emission standards for various on-road mobile sources of emissions, including transit buses, and off-road diesel equipment (e.g., tractors, generators). In February 2000, ARB adopted a new public-transit bus fleet rule and emission standards for new urban buses. These new rules and standards provide for:

- more stringent emission standards for some new urban bus engines, beginning with 2002 model year engines;
- zero-emission bus demonstration and purchase requirements applicable to transit agencies; and
- reporting requirements with which transit agencies must demonstrate compliance with the urban-transit bus-fleet rule.

Upcoming milestones include the low-sulfur diesel-fuel requirement, and tighter emission standards for heavy-duty diesel trucks (2007) and off-road diesel equipment (2011) nationwide.

Over time, the replacement of older vehicles will result in a vehicle fleet that produces substantially fewer TACs than under current conditions. Mobile-source emissions of TACs (e.g., benzene, 1-3-butadiene, diesel PM) have been reduced significantly over the last decade, and will be reduced further in California through a progression of regulatory measures (e.g., Low-Emission Vehicle [LEV]/Clean Fuels and Phase II reformulated gasoline regulations) and control technologies. With implementation of ARB's Risk Reduction Plan, it is expected that diesel PM concentrations will be reduced by 75% in 2010 and 85% in 2020 from the estimated year 2000 level. Adopted regulations are also expected to continue to reduce emissions of formaldehyde from cars and light-duty trucks. As emissions are reduced, it is expected that risks associated with exposure to the emissions will also be reduced.

ARB recently published *Air Quality and Land Use Handbook: A Community Health Perspective* (California Air Resources Board 2005), which provides guidance concerning land use compatibility with sources of TAC emissions. While not a law or adopted policy, the handbook offers recommendations for the siting of sensitive receptors near uses associated with TACs, such as freeways and high-traffic roads, commercial distribution centers, rail yards, ports, refineries, dry cleaners, gasoline stations, and industrial facilities to help keep children and other sensitive populations out of harm's way.

At the local level, air pollution control or management districts may adopt and enforce ARB control measures. Under FRAQMD Regulation 4.0 ("General Requirements"), Regulation 4.1 ("Permits Required"), Regulation 10.1 ("New Source Review"), and Regulation 10.3 ("Federal Operating Permits"), all sources that possess the potential to emit TACs are required to obtain permits from FRAQMD. Permits may be granted to these operations if they are constructed and operated in accordance with applicable regulations, including new-source review standards and air-toxics control measures. FRAQMD limits emissions and public exposure to TACs through a number of programs. FRAQMD prioritizes TAC-emitting stationary sources based on the quantity and toxicity of the TAC emissions and the proximity of the facilities to sensitive receptors.

Sources that require a permit are analyzed by FRAQMD (e.g., in a health risk assessment) based on their potential to emit toxics. If it is determined that the project would emit toxics in excess of FRAQMD's threshold of significance for TACs, as identified below, sources must implement the best available control technology for TACs (T-BACT) to reduce emissions. If a source cannot reduce the risk below the threshold of significance even after T-BACT has been implemented, FRAQMD will deny the permit required by the source. This helps to prevent new problems and reduces emissions from existing older sources by requiring them to apply new technology when retrofitting with respect to TACs.

5.9.2 ENVIRONMENTAL SETTING

SOURCES OF INFORMATION

The information in this section is based primarily on review of the following documents:

- FRAQMD's *Indirect Source Review Guidelines* (Feather River Air Quality Management District 1998),
- FRAQMD CEQA planning information (Feather River Air Quality Management District 2006),
- *Draft Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project* (Yuba County Water Agency 2003), and
- *Draft Environmental Impact Report for the Feather-Bear Rivers Levee Setback Project* (Three Rivers Levee Improvement Authority 2004).

FACTORS AFFECTING POLLUTANT CONCENTRATIONS

The ambient concentrations of air pollutant emissions are determined by the amount of emissions released by pollutant sources and the ability of the atmosphere to transport and dilute such emissions. Natural factors that affect transport and dilution include terrain, wind, atmospheric stability, and the presence of sunlight. Therefore, existing air quality conditions in the project area are determined by such natural factors as topography, meteorology, and climate, in addition to the amount of emissions released by existing air pollutant sources, as discussed separately below.

Topography

The dimensions of the NSVAB are approximately 216 miles north to south and 95 miles east to west at the widest part. The NSVAB is bounded on the west and north by the Coast Range and on the east by the southern portion of the Cascade Range and the northern portion of the Sierra Nevada. The surrounding mountain ranges reach heights of 3,500 feet in the southwest, 8,500 feet in the northwest, 1,700 feet in the southeast, and 10,500 feet in the northeast. These mountain ranges provide a substantial physical barrier to locally created pollution as well as that transported northward on prevailing winds from the Sacramento metropolitan area.

Meteorology and Climate

The annual temperature, humidity, precipitation, and wind patterns of the NSVAB reflect the regional topography and the strength and location of a semipermanent, subtropical high-pressure cell. Summer temperatures that often exceed 100 degrees Fahrenheit (°F) coupled with clear sky conditions are favorable for ozone formation. Most precipitation in the valley occurs during winter storms. The coastal mountain ranges induce winter storms from the Pacific Ocean to release precipitation on the western slopes, producing a partial rain shadow over the valley. The winds and unstable atmospheric conditions associated with the passage of winter storms result in periods of low air pollution and excellent visibility. However, between winter storms, high pressure and light winds lead to the creation of low-level temperature inversions and stable atmospheric conditions that can result in high concentrations of CO and particulate matter (PM).

Summer conditions in the NSVAB are typically characterized by high temperatures and low humidity, with prevailing winds from the south. Summer temperatures average approximately 90°F during the day and 50°F at night (Feather River Air Quality Management District 1998).

Winter conditions in the NSVAB are characterized by occasional rainstorms interspersed with stagnant and foggy weather. Winter temperatures average in the low 50s (°F), and nighttime temperatures average in the upper 30s. Rainfall occurs mainly from late October to early May, averaging 17.2 inches per year, but varies significantly from year to year. During winter, north winds are frequent, but winds from the south predominate (Feather River Air Quality Management District 1998). The predominant wind direction and speed is from the south at 8.0 miles per hour (mph) (California Air Resources Board 1994).

Atmospheric Stability and Inversions

Stability describes the resistance of the atmosphere to vertical motion. The stability of the atmosphere depends on the vertical distribution of temperature. When the temperature decreases vertically at 10 degrees Celsius (°C) per 1,000 meters, the atmosphere is considered “neutral.” When the change in temperature is greater than 10°C per 1,000 meters, the atmosphere is considered “unstable.” When the change is less than 10°C per 1,000 meters, the atmosphere is termed “stable.” In the NSVAB, categories range from extremely unstable conditions, which are present in spring and summer, through neutral to stable conditions, which are both present in fall and winter. Unstable conditions occur primarily during the daytime, when solar heating warms the lower atmospheric layers sufficiently. Under extremely unstable conditions, large fluctuations in horizontal wind direction are coupled with large mixing depths, which are the vertical depths available for diluting air pollution near the ground. As solar heating decreases, fluctuations in wind direction and the vertical mixing depth become less pronounced, resulting in neutral to stable conditions. Under the most stable conditions, which are present in the NSVAB in fall and winter, air pollution emitted into the atmosphere will travel downwind with poor dispersion. The dispersive power of the atmosphere decreases with progression through the categories from extremely unstable to stable.

An inversion is a layer of warmer air over a layer of cooler air. Inversions influence the mixing depth of the atmosphere, thus significantly affecting air quality conditions. The NSVAB experiences two types of inversions that affect air quality. The first type of inversion layer contributes to photochemical smog problems by confining pollution to a shallow layer near the

ground. This type occurs in summer, when sinking air near the ground forms a "lid" over the region. The second type of inversion occurs when the air near the ground cools while the air aloft remains warm. This type of inversion occurs during winter nights and can cause localized air pollution "hot spots" near emission sources because of poor dispersion. The shallow surface-based inversions are present in the morning, but are often broken by daytime heating of the air layers near the ground.

AMBIENT AIR QUALITY IN THE PROJECT AREA

Concentrations of criteria air pollutants (ozone, PM_{10}, $PM_{2.5}$, CO, NO_2, SO_2, and lead) are used as indicators of ambient air quality conditions. A brief description of each criteria air pollutant, including source types, health effects, and future trends, is provided below along with the most current attainment area designations and monitoring data for the project area.

Ozone

Ozone is a photochemical oxidant and the primary component of smog. Ozone, typically associated with poor air quality, is not emitted directly into the air, but is formed through a series of chemical reactions between reactive organic gases (ROG) and oxides of nitrogen (NO_X) in the presence of sunlight. Motor vehicles and stationary (industrial) sources are major sources of emission of both ROG and NO_X, which are also referred to as ozone precursors.

Ozone located in the upper atmosphere (stratosphere) acts in a beneficial manner by shielding the earth from harmful ultraviolet radiation that is emitted by the sun. However, ozone in the lower atmosphere (troposphere) is a major health and environmental concern. Because sunlight and heat serve as catalysts for the reactions between ozone precursors, peak ozone concentrations typically occur during summer in the Northern Hemisphere (U.S. Environmental Protection Agency 2006a). In general, ozone concentrations over or near urban and rural areas reflect an interplay of emissions of ozone precursors, transport meteorology, and atmospheric chemistry (Godish 1991).

The adverse health effects associated with exposure to ozone pertain primarily to the respiratory system. Scientific evidence indicates that ambient levels of ozone can affect not only sensitive receptors, such as asthmatics and children, but healthy adults as well. Exposure to ambient levels of ozone ranging from 0.10 to 0.40 part per million (ppm) for 1–2 hours has been found to significantly alter lung functions by increasing respiratory rates and pulmonary resistance, decreasing tidal volumes, and impairing respiratory mechanics. Ambient levels of ozone above 0.12 ppm are linked to such symptoms as throat dryness, chest tightness, shortness of breath, headache, and nausea. In addition to these adverse health effects, some evidence also relates ozone exposure to an increase in susceptibility to respiratory infections (Godish 1991). Ozone causes substantial damage to leaf tissues of crops and natural vegetation and damages many materials by acting as a chemical oxidizing agent (Feather River Air Quality Management District 1998).

Emissions of ozone precursors in the project area have decreased in recent years and are projected to continue to decline in the future. On-road motor vehicles and other mobile sources are by far the largest contributors. More stringent mobile-source emission standards, cleaner burning fuels, and new rules for industrial operations have largely contributed to the decline in

emissions trends. However, peak ozone values have not declined as quickly over the last several years as they have in other urban areas. This is because the urbanized areas of the Central Valley are identified as both transport contributors and receptors for these pollutants. Regardless, ozone concentrations have been declining in the project area because of the decrease in precursor emissions.

Particulate Matter

Health concerns associated with suspended particles focus on those particles small enough to reach the lungs when inhaled. Few particles larger than 10 micrometers in diameter reach the lungs. Therefore, respirable particulate matter is considered to consist of particles with an aerodynamic diameter of 10 micrometers or less, referred to as PM_{10}. PM_{10} consists of particulates directly emitted into the air, such as fugitive dust, soot, and smoke from mobile and stationary sources, construction operations, fires, and natural windblown dust, and particulates formed in the atmosphere by condensation and/or transformation of SO_2 and ROG (U.S. Environmental Protection Agency 2006a). Major sources of PM_{10} are the combustion of wood, diesel, and other fuels; industrial processes; and ground-disturbing activities such as construction and agricultural operations. In Yuba and Sutter Counties, the primary sources of PM_{10} are entrained road dust, farming operations, and agricultural burning (Feather River Air Quality Management District 1998).

Ambient PM_{10} standards are designed to prevent respiratory disease and protect visibility. The adverse health effects associated with PM_{10} depend on the specific composition of the particulate matter. For example, health effects may be associated with metals, polycyclic aromatic hydrocarbons, and other toxic substances adsorbed onto fine particulates (the piggybacking effect), or with fine dust particles of silica or asbestos. Generally, adverse health effects associated with PM_{10} may result from both short-term and long-term exposure to elevated PM_{10} concentrations and may include breathing and respiratory symptoms, aggravation of existing respiratory and cardiovascular diseases, alterations in the body's immune system, carcinogenesis, and premature death (U.S. Environmental Protection Agency 2006a).

Finer particles having an aerodynamic diameter of 2.5 micrometers or less are referred to as $PM_{2.5}$. $PM_{2.5}$ poses an increased health risk because these particles can deposit deep in the lungs and contain substances that are particularly harmful to human health.

Direct emissions of PM_{10} and $PM_{2.5}$ have increased in recent years and are projected to continue increasing in the near future. Emissions are dominated by contributions from areawide sources, primarily fugitive dust from paved and unpaved roads, fugitive dust from construction and demolition, and particulates from residential fuel combustion. Emissions of PM_{10} and $PM_{2.5}$ from mobile sources in the project area have remained relatively steady.

Carbon Monoxide

Carbon monoxide is a colorless, odorless, and poisonous gas produced by incomplete burning of carbon in fuels, primarily from mobile (transportation) sources of pollution. Approximately three-fourths of the nationwide CO emissions are estimated to be from mobile (transportation) sources; the remaining CO emissions are associated with wood-burning stoves, incinerators, and

industrial sources. Peak CO levels are generally found near areas with high concentrations of mobile (transportation) sources and occur typically during calm conditions in the winter months.

CO enters the bloodstream through the lungs by combining with hemoglobin, which normally supplies oxygen to the cells. However, CO combines with hemoglobin much more readily than oxygen does, resulting in a drastic reduction in the amount of oxygen available to the cells. Adverse health effects associated with exposure to CO concentrations include such symptoms as dizziness, headaches, slow reflexes, and fatigue. CO exposure is especially harmful to individuals who suffer from cardiovascular and respiratory diseases (U.S. Environmental Protection Agency 2006a).

Nitrogen Dioxide

Nitrogen dioxide is a brownish, highly reactive gas that is present in all urban environments. The major human-made sources of NO_2 are combustion devices, such as boilers, gas turbines, and mobile and stationary reciprocating internal-combustion engines. Combustion devices emit primarily nitric oxide (NO), which reacts through oxidation in the atmosphere to form NO_2 (U.S. Environmental Protection Agency 2006a). The combined emissions of NO and NO_2 are referred to as NO_X, which are reported as equivalent NO_2. Because NO_2 is formed and depleted by reactions associated with photochemical smog (ozone), the NO_2 concentration in a particular geographical area may not be representative of the local NO_X emission sources.

Inhalation is the most common route of exposure to NO_2. Because NO_2 has relatively low solubility in water, the principal site of toxicity is in the lower respiratory tract. The severity of the adverse health effects depends primarily on the concentration inhaled rather than the duration of exposure. An individual may experience a variety of acute symptoms, including coughing, difficulty with breathing, vomiting, headache, and eye irritation, during or shortly after exposure. After approximately 4–12 hours an exposed individual may experience chemical pneumonitis or pulmonary edema with breathing abnormalities, cough, cyanosis, chest pain, and rapid heartbeat. Severe, symptomatic NO_2 intoxication after acute exposure has been linked on occasion with prolonged respiratory impairment with such symptoms as chronic bronchitis and decreased lung functions.

Sulfur Dioxide

Sulfur dioxide is produced by such stationary sources as coal and oil combustion, steel mills, refineries, and pulp and paper mills. The major adverse health effects associated with SO_2 exposure pertain to the upper respiratory tract. SO_2 is a respiratory irritant with constriction of the bronchioles occurring with inhalation of SO_2 at 5 ppm or more. On contact with the moist mucous membranes, SO_2 produces sulfurous acid, which is a direct irritant. Concentration rather than duration of the exposure is an important determinant of respiratory effects. Exposure to high SO_2 concentrations may result in edema of the lungs or glottis and respiratory paralysis.

Lead

Lead is a metal found naturally in the environment as well as in manufactured products. The major sources of lead emissions have historically been mobile and industrial sources. As a result of the phase-out of leaded gasoline (discussed in detail below), metal processing is currently the

primary source of lead emissions. The highest levels of lead in air are generally found near lead smelters. Other stationary sources are waste incinerators, utilities, and lead-acid battery manufacturers.

Twenty years ago, mobile sources were the main contributor to ambient lead concentrations in the air. In the early 1970s, EPA set national regulations to gradually reduce the lead content in gasoline. In 1975, unleaded gasoline was introduced for motor vehicles equipped with catalytic converters. EPA banned the use of leaded gasoline in highway vehicles in December 1995 (U.S. Environmental Protection Agency 2006a).

As a result of EPA's regulatory efforts to remove lead from gasoline, emissions of lead from the transportation sector have declined dramatically (by 95% between 1980 and 1999), and levels of lead in the air decreased by 94% between 1980 and 1999. Transportation sources, primarily airplanes, now contribute only 13% of lead emissions. A recent National Health and Nutrition Examination Survey reported a 78% decrease in the levels of lead in people's blood between 1976 and 1991. This dramatic decline can be attributed to the move from leaded to unleaded gasoline (U.S. Environmental Protection Agency 2006a).

The decrease in lead emissions and ambient lead concentrations over the past 25 years is California's most dramatic success story with regard to air quality management. The rapid decrease in lead concentrations can be attributed primarily to phasing out the lead in gasoline. This phase-out began during the 1970s, and subsequent ARB regulations have virtually eliminated all lead from gasoline now sold in California. All areas of the state are currently designated as attainment for the state lead standard (EPA does not designate areas for the national lead standard). Although the ambient lead standards are no longer violated, lead emissions from stationary sources still pose "hot spot" problems in some areas. As a result, ARB identified lead as a TAC.

Air Pollutant Sources and Concentrations

Approximately 60–70% of the air pollution in the FRAQMD area comes from mobile sources, which includes on-road and off-road motor vehicles (including cars, trucks, planes, trains, tractors, combines, buses, motorcycles, and boats). The remaining 30–40% of the air pollution in the FRAQMD area is a result of stationary sources that include agricultural operations, open burning of vegetative wastes, wood burning for residential heating, manufacturing industries, electric generation industries, diesel backup generators, retail gasoline and local bulk distribution facilities, auto body shops, dry cleaners, landfills, other human-made sources that emit air contaminants, and naturally occurring sources (including biological and geological sources, wildfires, and windblown dust) (Feather River Air Quality Management District 2006).

Air pollutant concentrations are measured at several monitoring stations in the NSVAB. The Yuba City air quality monitoring station on Almond Street is the closest monitoring station to the FRLRP project area with sufficient data to meet EPA and ARB criteria for quality assurance. In general, the ambient air quality measurements from this monitoring station are representative of the air quality in the project area.

Table 5.9-2, "Summary of Annual Air Quality Data from the Yuba City–Almond Street Air Quality Monitoring Station," summarizes the air quality data from this monitoring station for the years 2003–2005.

Table 5.9-2
Summary of Annual Air Quality Data from the Yuba City–Almond Street Monitoring Station

	2003	2004	2005
Ozone			
State standard (1-hour/8-hour avg., 0.09/0.07 ppm)			
National standard (8-hour avg., 0.08 ppm)			
Maximum concentration (1-hour/8-hour avg., ppm)	0.090/0.079	0.098/0.081	0.092/0.073
Number of days state standard exceeded	0	2	0
Number of days national 8-hour standard exceeded	0	0	0
Respirable particulate matter (PM_{10})			
State standard (24-hour avg., 50 $\mu g/m^3$)			
National standard (24-hour avg., 150 $\mu g/m^3$)			
Maximum concentration ($\mu g/m^3$)	83.0	53.0	60.0
Number of days state standard exceeded (measured/calculated [a])	5/30.7	1/NA	5/31.1
Number of days national standard exceeded (measured/calculated [a])	0/0	0/0	0/0
Fine particulate matter ($PM_{2.5}$)			
No separate state standard			
National standard (24-hour avg., 65 $\mu g/m^3$)			
Maximum concentration ($\mu g/m^3$)	32.0	39.0	45.0
Number of days national standard exceeded (measured [b])	0	0	0
Carbon monoxide (CO)			
State standard (1-hour/8-hour avg., 20/9.1 ppm)			
National standard (1-hour/8-hour avg., 35/9.5 ppm)			
Maximum concentration (1-hour/8-hour avg., ppm)	4.30/2.36	5.80/2.54	4.40/3.39
Number of days state standard exceeded	0	0	0
Number of days national 1-hour/8-hour standard exceeded	0/0	0/0	0/0
Nitrogen dioxide (NO_2)			
State standard (1-hour avg., 0.25 ppm)			
National standard (annual, 0.053 ppm)			
Maximum concentration (1-hour avg., ppm)	0.080	0.066	0.062
Annual average (ppm)	0.014	0.012	0.012
Number of days state standard exceeded	0	0	0

Notes: $\mu g/m^3$ = micrograms per cubic meter; NA = not available; ppm = parts per million by volume

[a] Measured days are those days when an actual measurement was greater than the level of the state daily standard or the national daily standard. Measurements are typically collected every 6 days. Calculated days are the estimated number of days that a measurement would have been greater than the level of the standard had measurements been collected every day. The number of days above the standard is not necessarily the number of violations of the standard for the year.

[b] The number of days a measurement was greater than the level of the national daily standard. Measurements are collected every day, every 3 days, or every 6 days, depending on the time of year and the site's monitoring schedule. The number of days above the standards is not directly related to the number of violations of the standard for the year.

Sources: California Air Resources Board 2006b, U.S. Environmental Protection Agency 2006c

Attainment Status

Both ARB and EPA use the type of monitoring data provided in Table 5.9-2 to designate areas according to attainment status for criteria air pollutants established by the agencies. The purpose of these designations is to identify those areas with air quality problems and thereby initiate planning efforts for improvement. The three basic designation categories are "nonattainment," "attainment," and "unclassified." The "unclassified" designation is used in an area that cannot be classified on the basis of available information as meeting or not meeting the standards. In addition, the California designations include a subcategory of the nonattainment designation, called "nonattainment-transitional." The nonattainment-transitional designation is given to nonattainment areas that are progressing and nearing attainment.

The state and national attainment status designations for Yuba County are presented in Table 5.9-1. Yuba County is designated as a nonattainment area with respect to the state standards for ozone (1-hour) and PM_{10}, and is either in attainment or unclassified for the remaining state standards. Yuba County is either in attainment or unclassified for federal standards (Feather River Air Quality Management District 2006).

ARB does not establish attainment status designations for vinyl chloride because ARB has classified it as a TAC for which ARB has established an ACTM that reduces exposure below the safe threshold.

5.9.3 ENVIRONMENTAL IMPACTS

THRESHOLDS OF SIGNIFICANCE

Significance thresholds for total maximum daily emissions are used by air quality management districts as a guide to identify the level of significance that a project may have on the formation of ozone and a project's contribution to the district's overall PM_{10} load. The FRAQMD *Indirect Source Review Guidelines* and CEQA planning guidance (Feather River Air Quality Management District 1998, 2006) provide recommended thresholds of significance for project-generated emissions of ozone precursors and PM_{10}.

In accordance with these recommended thresholds, a project alternative would have a significant impact on air quality if any of the following would occur:

- project implementation would substantially conflict with or substantially obstruct implementation of the applicable air quality plan;
- project construction would result in emissions that exceed:
  - 25 pounds per day (lb/day) of ROG,
  - 25 lb/day of NO_X, or
  - 80 lb/day of PM_{10};
- operation of the project would result in regional emissions that exceed:
  - 25 lb/day of ROG,
  - 25 lb/day of NO_X, or
  - 80 lb/day of PM_{10};

- operation of the project would result in or contribute to local CO concentrations that exceed the California 1-hour or 8-hour CO ambient air quality standards of 20 ppm or 9 ppm, respectively; or
- project implementation would result in exposure of sensitive receptors to excessive concentrations of toxic air emissions, criteria air pollutants, or odorous emissions.

Implementation of any of the project alternatives considered would not result in any major sources of odor, and the project does not involve operation of any of the common types of facilities that are known to produce odors (e.g., landfill, coffee roaster, wastewater treatment facility). In addition, the diesel exhaust from the use of on-site construction equipment would be intermittent and temporary, and it would dissipate rapidly from the source with an increase in distance. Thus, implementation of the proposed project would not expose sensitive receptors to odorous emissions, and this issue is not discussed further in this environmental impact report (EIR).

IMPACT ANALYSIS

Analysis Method

Almost all increased pollutant emissions that would be associated with the proposed project would be generated by construction activities. Construction emissions are described as short term or temporary in duration. These short-term emissions, especially PM_{10}, have the potential to represent a significant air quality impact.

Fugitive dust emissions are associated primarily with site preparation and excavation and vary as a function of such parameters as soil silt content, soil moisture, wind speed, acreage of disturbance area, and vehicle miles traveled on-site and off-site. ROG and NO_X emissions are associated primarily with gas and diesel equipment exhaust and the application of architectural coatings. CO emissions are a direct function of vehicle idling time and, thus, traffic flow conditions.

The methodology used for estimating construction emissions associated with the levee repairs and potential levee setback was based on emission factors and assumptions obtained from the following sources:

- FRAQMD's *Indirect Source Review Guidelines* (Feather River Air Quality Management District 1998),
- FRAQMD CEQA planning guidance (Feather River Air Quality Management District 2006),
- the Sacramento Metropolitan Air Quality Management District's air quality thresholds of significance (Sacramento Metropolitan Air Quality Management District 2004),
- EPA's *Compilation of Air Pollutant Emission Factors* (U.S. Environmental Protection Agency 1985),

- the South Coast Air Quality Management District's *CEQA Air Quality Handbook* (South Coast Air Quality Management District 1993), and
- EMFAC 2002 (California Air Resources Board 2003).

Assumptions regarding construction equipment and personnel, haul distances, areas of disturbance, and durations and timing of different construction activities were developed based on the information provided in Chapter 4, "Description of the Proposed Project," and coordination with project engineers.

The conclusions regarding construction emissions are based on the maximum daily emissions calculated for the entire 20-month construction period (scheduled to start in 2007 and last through 2008). The potential overlap of activities (e.g., construction of the slurry cutoff wall, setback levee, and detention basin) was considered.

For purposes of the calculations of maximum potential daily emissions, unmitigated conditions were assumed for fugitive dust emissions (i.e., no dust-control measures were assumed to be applied). This standard method of calculating potential emissions is very conservative, given that modern construction practices include very active dust-control measures, such as watering of roadways and wetting of excavation areas and stockpiles.

Alternative 1 – The Levee Strengthening Alternative

Impact LS-5.9-a

Temporary Emissions of ROG, NO_X, and PM_{10} during Construction. Maximum daily emissions of ROG, NO_X, and PM_{10} associated with levee repair and strengthening activities would exceed FRAQMD's recommended significance thresholds and contribute to existing nonattainment conditions for ozone and PM_{10} in the NSVAB. This impact would be **significant.**

The total length of the existing Feather River and Yuba River levees in project Segments 1, 2, and 3 is approximately 13.1 miles, or roughly 69,000 feet. Repair and strengthening activities along 13.1 miles of levee would result in the temporary generation of construction-related emissions for approximately 2 years. In each year of the project most emissions would be generated between April 15 and November 1, which is considered outside of the "flood season." Fugitive dust and mobile-source emissions (such as motor vehicle exhaust) would be generated by various construction activities, including:

- the operation of equipment at the construction sites, employee commute trips, and the delivery of equipment and materials to the construction areas;
- ground disturbance associated with preparing work surfaces on and near the existing levee; installing seepage control measures such as slurry cutoff walls, relief wells, and seepage/stability berms; and excavation of material from borrow areas and the proposed detention basin site;
- construction of the replacement for Pump Station No. 3 and demolition of the existing pump station.

The anticipated equipment types, borrow quantities and sources, and truck trips required for construction of the setback levee are described under Section 4.3.3, "Alternative 1—Construction," in Chapter 4, "Description of the Proposed Project." Detailed calculations are shown in Appendix E of this EIR, "Calculations of Construction-Related Emissions." The following discussions describe the main assumptions used in the calculations and summarize the results.

Assumptions

It was assumed for purposes of emissions calculations that the following mobile heavy-construction equipment could be used for general levee repair, construction of slurry cutoff walls, berm construction, borrow/detention basin excavation, and construction of Pump Station No. 3:

- eight excavators,
- six scrapers,
- six bulldozers,
- three graders,
- three rollers,
- two water trucks,
- 20 highway dump trucks,
- one crane,
- one loader, and
- four additional pieces of mobile equipment (e.g., tool carrier trucks, lubricating trucks).

Please note that the air quality model used for this analysis requires entries for specific types of construction equipment included in the model. The model does not provide entries for all types of construction equipment listed in Section 4.3.3, "Alternative 1—Construction." Therefore, the equipment listed above is intended to represent an approximation of the equipment described in Section 4.3.3.

The amount and types of equipment used during construction activities would vary from day to day depending on the specific activities being conducted. The number of off-site vehicle trips is also anticipated to vary from day to day. For purposes of calculating the maximum potential daily emissions, it was assumed that the equipment listed above would operate simultaneously for 16 hours on a day of maximum construction activity. This is a very conservative assumption used to calculate potential maximum daily emissions.

A peak construction labor force of 100 employees and an average travel distance of 10 miles to the construction site were assumed.

The daily average area of ground disturbance was estimated by calculating an estimated footprint for the levee repair work area, including additional acreage to account for staging areas, detention basin construction, potential soil borrow sites, and other activities, and dividing the total by the expected number of work days. As mentioned above, the total length of the existing Feather River and Yuba River levees in the three project segments is about 13.1 miles, or 69,000 feet. For purposes of this analysis, the average width of the levee repair work area was assumed

to be 100 feet (the actual average width is likely to be less). The area of land disturbance would therefore be approximately 6.9 million square feet, or 158 acres. The detention basin/borrow area is expected to cover approximately 150 acres, and seepage/stability berms are expected to cover approximately 30 acres. To account for ground disturbance associated with staging areas and other activities, an additional 50 acres was added to the disturbance area, although the actual acreage of additional disturbance is expected to be less. The total estimated acreage of ground disturbance was therefore assumed to be approximately 388 acres. Based on the assumption that the period of active ground disturbance would total 440 days (22 active construction days per month over 20 months), the average daily disturbance area was calculated to be approximately 0.88 acre.

The emissions calculations also included 4,910 truck trips to haul aggregate base, concrete, demolition debris, bentonite, and other materials to and within the site. These materials were assumed to be transported an average of 5.5 miles on paved roads. This estimate of haul trips exceeds estimates elsewhere in this DEIR (e.g., Section 4.3.3, "Alternative 1—Construction"; and Section 5.11, "Transportation and Circulation") to provide a margin of error and to ensure that emissions are not underrepresented. In addition, the emission calculations include sufficient haul trips to move 1.6 million cy of borrow material.

Results

Average daily construction emissions were calculated for completion of Alternative 1. It was assumed that there would be 440 active construction work days during the 2-year construction period. Detailed calculations of the maximum daily temporary emissions are shown in Appendix E. Table 5.9-3, "Summary of Maximum Daily Average Construction Emissions for Alternative 1," summarizes the results for this alternative. As indicated in the table, the maximum unmitigated daily emissions associated with Alternative 1 were estimated at 166 lb/day of ROG, 816 lb/day of NO_X, and 692 lb/day of PM_{10}.

Table 5.9-3
Summary of Maximum Daily Average Construction Emissions for Alternative 1

Emission Source	Pollutant (lb/day)		
	ROG	**NO_X**	**PM_{10}**
Mobile-Source Equipment	165	814	43
Employee Trips	1	2	0
Fugitive Dust			649
Total Unmitigated	**166**	**816**	**692**
FRAQMD Threshold	**25**	**25**	**80**

Notes: FRAQMD = Feather River Air Quality Management District; lb/day = pounds per day; NO_X = oxides of nitrogen; PM_{10} = particles with an aerodynamic diameter of 10 micrometers or less; ROG = reactive organic gases
See Appendix E for assumptions and modeling results.
Source: Data compiled by EDAW in 2006

Based on the conservative assumptions described above, the maximum daily emissions under Alternative 1 would exceed FRAQMD's recommended significance thresholds of 25 lb/day for

ROG, 25 lb/day for NO_X, and 80 lb/day for PM_{10}. In addition, Yuba County is designated as a nonattainment area for the national and state ozone (1-hour) standards and as a nonattainment area for the state PM_{10} standard. Because maximum construction emissions of ROG, NO_X, and PM_{10} would exceed FRAQMD thresholds and would contribute to existing nonattainment conditions in the NSVAB, this impact would be significant.

Impact LS-5.9-b

Long-Term Changes in Emissions of ROG, NO_X, and PM_{10} Associated with Levee Repairs and Strengthening. The proposed levee repairs and strengthening are expected to contribute only minimally, if at all, to long-term emissions of pollutants through potential vehicle trips related to occasional maintenance activities. The resulting increase in long-term emissions would be small; therefore, this impact would be **less than significant.**

The only operational activities associated with Alternative 1 would be the continuation of maintenance activities that are currently performed along the existing Feather River and Yuba River levees. The only potential mechanism for changes in operation or maintenance activities under Alternative 1 are the possible installation of relief wells and the relocation and possible increase in capacity at Pump Station No. 3. Relief wells are being considered in the preliminary project design as a method to address levee underseepage. However, a final determination as to the usage, number, and location of relief wells would be made as part of the detailed design process. Relief wells can be prone to plugging and damage from vandalism, and require operation (water removal) and periodic maintenance (flushing, cleaning, and replacement) to remain effective over the long term. If relief wells are installed, these maintenance activities could generate vehicle trips to the levees; however, such trips would be infrequent, and they are not expected to contribute measurably to long-term regional or local vehicle emissions.

If relief wells are included in Alternative 1, the capacity at the new/relocated Pump Station No. 3 would need to be greater than the capacity at the existing pump station to accommodate water generated by the relief wells. However, such an increase in capacity would not result in a significant increase in maintenance requirements. Replacement of Pump Station No. 3 could potentially reduce the need for maintenance activities because the existing exposed pump facility would be replaced by new pump equipment enclosed in a structure. Under any scenario associated with the relocation of Pump Station No. 3, if additional vehicle trips for maintenance are necessary, such additional trips would be infrequent and are not expected to contribute measurably to long-term regional or local vehicle emissions.

Replacement of Pump Station No. 3 could result in the use of an emergency backup generator at the new facility. If installed, such a backup generator would be subject to FRAQMD permitting and BACT requirements and thus would not be considered to have significant air-quality impacts. In fact, air districts typically do not even require the inclusion of such emissions in CEQA analyses unless the operation of a stationary source would result in surplus emissions in excess of BACT and offsets.

Therefore, the overall long-term effect of Alternative 1 on local and regional pollutant emissions is expected to be a negligible increase, if any, in emissions of ROG, NO_X, and PM_{10}. In addition, because Alternative 1 would not generate substantial vehicle trips and associated vehicle miles traveled, the project would be in compliance with the NSVAB AQAP. Thus, implementation of

Alternative 1 would not conflict with or obstruct implementation of the applicable air quality plan. This impact would be less than significant.

Impact LS-5.9-c

Exposure of Sensitive Receptors to Toxic Air Emissions. Emissions of TACs associated with construction or operations under Alternative 1 would not result in exposure of receptors to concentrations of TACs in excess of applicable thresholds. This impact would be **less than significant**.

Short-Term Construction Sources

Levee repair and strengthening activities would result in short-term emissions of diesel exhaust from on-site heavy-duty equipment. ARB identified particulate exhaust emissions from diesel-fueled engines (diesel PM) as a TAC in 1998. Construction under Alternative 1 would result in the generation of diesel PM emissions from the use of off-road diesel equipment required for site grading and excavation, and other construction activities. According to ARB, the potential cancer risk from the inhalation of diesel PM, as discussed below, outweighs the potential noncancer health impacts.

The dose to which receptors are exposed (a function of concentration and duration of exposure) is the primary factor used to determine the health risk (i.e., potential exposure to TAC emission levels that exceed applicable standards). Dose is positively correlated with time, meaning that a longer exposure period would result in a higher exposure level for the maximally exposed individual. Thus, the risks estimated for a maximally exposed individual are higher if a fixed exposure occurs over a longer period of time. According to the California Environmental Protection Agency's Office of Environmental Health Hazard Assessment (OEHHA), health risk assessments, which determine the exposure of sensitive receptors to TAC emissions, should be based on a 70-year exposure period; however, such assessments should be limited to the period/duration of activities associated with the project (Salinas, pers. comm., 2004).

Thus, short-term construction activities would not expose sensitive receptors to substantial pollutant concentrations for the following reasons:

- the overall use of mobilized equipment would be temporary (approximately 1% of the 70-year exposure period);
- equipment would move regularly down the linear construction corridor, further limiting the exposure period at any one location because diesel PM dissipates rapidly with an increase in distance from the source (Zhu et al. 2002);
- there are no sensitive receptors located in the immediate vicinity of a majority of the project site; and
- where there are sensitive receptors nearby (only in project Segment 3), they would be located at least 75 feet from the construction area.

As a result, this impact would be less than significant.

Long-term Operational Sources

Alternative 1 would not result in a net increase of long-term emissions of TACs from mobile sources. Long-term operations under this alternative would not require any additional employees and thus would not result in any emissions of TACs associated with employee commute trips. Also with respect to mobile-source emissions, as stated previously under Impact LS-5.9-b, maintenance-related trips would be negligible.

Furthermore, implementation of Alternative 1 would not result in the operation of any new major stationary emission sources of TACs. Specifically, long-term operations would include the use of an emergency backup generator at the new Pump Station No. 3, which would serve as a replacement for the existing Pump Station No. 3; however, such a stationary source would be subject to FRAQMD permitting and toxic (T)-BACT requirements. Before granting a permit for sources, FRAQMD would perform or refer to a formal health-risk assessment to ensure that operations would not result in the exposure of sensitive receptors to levels of TAC emissions that exceed the recommended threshold. Thus, long-term operational sources would not expose sensitive receptors to substantial pollutant concentrations. As a result, this impact would be less than significant.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impact ASB-5.9-a

Temporary Emissions of ROG, NO_X, and PM_{10} during Construction. Maximum daily emissions of ROG, NO_X, and PM_{10} associated with levee repair and strengthening activities in project Segments 1 and 3 and construction of the Above Star Bend (ASB) setback levee in Segment 2 would exceed FRAQMD's recommended significance thresholds and contribute to existing nonattainment conditions for ozone and PM10 in the NSVAB. This impact would be **significant.**

See the discussion of Impact LS-5.9-a for Alternative 1 above. Levee repair and strengthening activities and construction of the ASB setback levee would result in the temporary generation of construction-related emissions for approximately the same length of time and during the same periods as construction activities assumed under Alternative 1. Construction activities in project Segments 1 and 3 would be the same as under Alternative 1, but fugitive dust and mobile-source emissions would be expected to be greater under Alternative 2 because a new setback levee would be constructed in Segment 2 and the existing Feather River levee removed in this project segment, resulting in a larger construction area and disturbed surface and hauling of greater volumes of soil.

The anticipated equipment types, borrow quantities and sources, and truck trips required for construction of the ASB setback levee are described under Section 4.4.3, "Alternative 2—Construction," in Chapter 4. Detailed calculations are shown in Appendix E of this EIR. The following discussions describe the main assumptions used in the calculations and summarize the results.

Assumptions

It was assumed for purposes of emissions calculations that the following mobile heavy-construction equipment could be used for general levee repair, construction of slurry cutoff

walls, berm construction (if needed), construction of Pump Station No. 3, and construction of the ASB setback levee foundation and embankment:

- six excavators,
- 10 scrapers,
- six bulldozers,
- four graders,
- four rollers,
- two water trucks,
- 20 highway dump trucks,
- one crane,
- one loader, and
- three additional pieces of mobile equipment (e.g., tool carrier trucks, lubricating trucks).

Please note that the air quality model used for this analysis requires entries for specific types of construction equipment included in the model. The model does not provide entries for all types of construction equipment listed in Section 4.4.3, "Alternative 2—Construction." Therefore, the equipment listed above is intended to represent an approximation of the equipment described in Section 4.4.3.

The amount and types of equipment used during construction activities would vary from day to day depending on the specific activities being conducted. The number of off-site vehicle trips is also anticipated to vary from day to day. For purposes of calculating the maximum potential daily emissions, it was assumed that the equipment listed above would operate simultaneously for 16 hours on a day of maximum construction activity. This is a very conservative assumption used to calculate potential maximum daily emissions.

A peak construction labor force of 100 employees and an average travel distance of 10 miles to the construction site were assumed.

The daily average area of ground disturbance was estimated by adding the approximate areas of the existing levee segments to be repaired and strengthened (project Segments 1 and 3) or removed (Segment 2), the footprint of the ASB setback levee, and the proposed borrow sites, then dividing the total by the expected number of work days. The existing Feather River levee segment along Segment 2 that would be removed is a total of approximately 6.5 miles long. The area cleared would be approximately 6.86 million square feet (34,320 feet long x 200 feet wide), or 158 acres. The new setback levee would be approximately 5.9 miles long. The maximum area of ground disturbance would be approximately 10.9 million square feet (31,152 feet long x 350 feet wide), or 250 acres. The total length of the existing Feather River and Yuba River levees in project Segments 1 and 3 is about 6.6 miles, or 34,850 feet. For purposes of this analysis, the average width of the levee repair work area was assumed to be 100 feet (the actual average width is likely to be less). The area of land disturbance would therefore be approximately 3.5 million square feet, or 80 acres. The soil borrow area and detention basin/borrow area currently being considered covers approximately 689 acres. Although it is unlikely that this entire area would be disturbed, it is assumed for the emission calculations that construction would affect the entire 689 acres. To account for ground disturbance associated with staging areas and other activities, an additional 50 acres was added to the disturbance area, although the actual acreage of

additional disturbance is expected to be less. The total estimated acreage of ground disturbance was therefore assumed to be approximately 1,230 acres. Based on the assumption that the period of active ground disturbance would total 440 days (22 active construction days per month over 20 months), the average daily disturbance area under Alternative 2 was calculated to be about 2.8 acres.

The emissions calculations also included 2,700 truck trips to haul aggregate base and drain rock, concrete, demolition debris, bentonite, and other materials to and within the site. These materials were assumed to be transported an average of 5.5 miles on paved roads. This estimate of haul trips exceeds estimates elsewhere in this DEIR (e.g., Section 4.4.3, "Alternative 2—Construction"; and Section 5.11, "Transportation and Circulation") to provide a margin of error and to ensure that emissions are not underrepresented. In addition, the emissions calculations include sufficient haul trips to move 3.3 million cy of borrow material for construction of the ASB setback levee.

Results

Average daily construction emissions were calculated for completion of Alternative 2. It was assumed that there would be 440 active construction work days during the 2-year construction period. Detailed calculations of the maximum daily temporary emissions are shown in Appendix E. Table 5.9-4, "Summary of Maximum Daily Average Construction Emissions for Alternative 2," summarizes the results for this alternative. As indicated in the table, the maximum unmitigated daily emissions associated with Alternative 2 were estimated at 188 lb/day of ROG, 938 lb/day of NO_X, and 1,447 lb/day of PM_{10}.

Table 5.9-4
Summary of Maximum Daily Average Construction Emissions for Alternative 2

Emission Source	Pollutant (lb/day)		
	ROG	**NO_X**	**PM_{10}**
Mobile-Source Equipment	187	936	49
Employee Trips	1	2	0
Fugitive Dust			1,398
Total Unmitigated (Levee)	**188**	**938**	**1,447**
FRAQMD Threshold	**25**	**25**	**80**

Notes: FRAQMD = Feather River Air Quality Management District; lb/day = pounds per day; NO_X = oxides of nitrogen; PM_{10} = particles with an aerodynamic diameter of 10 micrometers or less; ROG = reactive organic gases. Results are rounded to the nearest whole number.
See Appendix E for assumptions and modeling results.
Source: Data compiled by EDAW in 2006

Based on the conservative assumptions described above, maximum emissions under Alternative 2 would exceed FRAQMD's recommended significance thresholds of 25 lb/day for ROG, 25 lb/day for NO_X, and 80 lb/day for PM_{10}. In addition, Yuba County is designated as a nonattainment area for the national and state ozone (1-hour) standards and as a nonattainment area for the state PM_{10} standard. Because construction emissions of ROG, NO_X, and PM_{10} would

exceed the FRAQMD thresholds and would contribute to existing nonattainment conditions in the NSVAB, this impact would be significant.

Impact ASB-5.9-b

Long-Term Changes in Emissions of ROG, NO_X, and PM_{10} Associated with Levee Repairs and Strengthening and the Levee Setback. The proposed levee repairs and strengthening in project Segments 1 and 3 and the ASB levee setback in Segment 2 would be expected to contribute only minimally, if at all, to long-term emissions of pollutants through vehicle trips related to occasional maintenance activities. The potential cessation of agricultural uses on some lands in the levee setback area could result in a decrease in long-term pollutant emissions in this area, particularly PM_{10} emissions associated with agricultural land disturbance and burning operations. Such a reduction would be a small **potentially beneficial** effect on air quality.

For project Segments 1 and 3 and for the relocation of Pump Station No. 3, this impact would be the same as described above for Impact LS-5.9-b under Alternative 1. Changes to operations and maintenance activities in these areas, if any, would not result in significant increases in emissions.

Along the ASB setback levee in project Segment 2, levee maintenance activities would be the same as for the existing levee in almost all respects. The only potential difference between the operation and maintenance of the new setback levee and current practice would be the possible use of relief wells along the setback levee. Relief wells are being considered in the preliminary project design as a method to address levee underseepage. However, a final determination as to the usage, number, and location of relief wells would be made as part of the detailed design process. Relief wells can be prone to plugging and damage from vandalism, and require operation (water removal) and periodic maintenance (flushing, cleaning, and replacement) to remain effective over the long term. If relief wells are installed, these maintenance activities could generate vehicle trips to the levees; however, such trips would be infrequent, and they are not expected to contribute measurably to long-term regional or local vehicle emissions.

Land use changes that are possible as part of implementation of the levee setback could have small but measurable beneficial effects on long-term pollutant emissions affecting regional and local air quality. Setting back the levee could allow for the conversion of some land from agricultural uses to riparian and wetland areas. If habitat restoration is implemented in any locations in the setback area, the restored areas would be removed from agricultural production. As noted previously, the primary sources of PM_{10} in Yuba and Sutter Counties are entrained road dust, farming operations, and agricultural burning (Feather River Air Quality Management District 1998). Agricultural emissions are typically unmitigated, although burning is regulated by FRAQMD such that it is prohibited on days of decreased air quality.

The cessation of agricultural uses on some of the lands in the ASB levee setback area would result in reductions in land disturbance such as plowing and disking; the use of tractors, bulldozers, and other heavy mobile farm equipment on unpaved ground; and agricultural burning. There is not sufficient information to quantify the amount of the potential decrease in pollutants associated with any long-term land use changes. However, examination of some of the standard emission factors used in calculating fugitive dust emissions provides some indication of the potential size of PM_{10} emissions that may be associated with typical farming activities. As indicated in Table 5.9-5, "Standard Factors Used in Evaluating Fugitive Dust Emissions,"

plowing 20 acres in a day could release more than 1,700 lb/day (20 x 85.6) of fugitive dust, and the equivalent of one truck (or other heavy equipment, such as a harvester) traveling 10 miles on an unpaved road could cause the emission of 230 lb/day (1 x 10 x 23).

In addition to decreases in fugitive dust emissions, any reduced agricultural use of lands in the levee setback area would also likely result in a decrease in the emission of ozone (ROG and NO_X) because of the reduction in the regular, long-term use of heavy mobile farm equipment.

Table 5.9-5
Standard Factors Used in Evaluating Fugitive Dust Emissions

Activity	Unit of Measure	Emission Factor (lb/day)
Dirt/debris/grading	Number of pieces of equipment operating during 1 hour	21.8
Exposed graded surfaces	Acres per day	85.6
Truck travel on unpaved roads	Miles traveled per day	23

Note: lb/day = pounds per day
Source: South Coast Air Quality Management District 1993

In contrast, the long-term use of lands as riparian/wetland habitat would not be expected to generate pollutant emissions, except for possible increases in emissions from vehicle trips to the levee setback area associated with recreational uses. If substantially increased recreational uses are envisioned as a result of subsequent design of land uses in the levee setback area, long-term air quality effects may need to be considered in more detail in additional environmental review. However, substantial increases in vehicle trips associated with recreational use of the levee setback area are not anticipated, and any increases in emissions associated with recreational uses are not currently expected to offset the decrease in emissions that would be associated with decreased agricultural uses. Therefore, the overall long-term effect of the levee setback on local and regional pollutant emissions could potentially be a reduction in emissions of ROG, NO_X, and PM_{10}. A decrease in operational emissions would be a beneficial effect on long-term air quality conditions.

Impact ASB-5.9-c

Exposure of Sensitive Receptors to Toxic Air Emissions. Emissions of TACs associated with construction or operations under Alternative 2 would not result in exposure of receptors to concentrations of TACs in excess of applicable thresholds. This impact would be **less than significant**.

This impact would be similar to Impact LS-5.9-c, described under Alternative 1 above. Although construction equipment would operate in different locations with construction of the ASB setback levee than under Alternative 1 (e.g., along the ASB setback alignment, in soil borrow areas, in the levee setback area), the same mechanisms and potential for exposure to TACs would occur. Because construction would occur in different locations, there is the potential for different or additional sensitive receptors to be nearby. However, no sensitive receptors would be closer than the distance identified for Alternative 1 (no closer than 75 feet). For the same reasons as described above, this impact would be less than significant.

Alternative 3 – The Levee Strengthening and Intermediate Setback Alternative

Impact IS-5.9-a

Temporary Emissions of ROG, NO_X, and PM_{10} during Construction. This impact would be the same as Impact ASB-5.9-a, described under Alternative 2 above. For the same reasons as described above, this impact would be **significant**.

Impact IS-5.9-b

Long-Term Changes in Emissions of ROG, NO_X, and PM_{10} Associated with Levee Repairs and Strengthening and the Levee Setback. This impact would be the same as Impact ASB-5.9-b, described under Alternative 2 above. Potential beneficial effects on air quality could be slightly less because the levee setback area would be smaller, and, thus, slightly less agricultural land has the potential to be converted to nonagricultural use. However, operational emissions would still be negligible under Alternative 3. As a result, for the same reasons as described above, this impact would be **potentially beneficial**.

Impact IS-5.9-c

Exposure of Sensitive Receptors to Toxic Air Emissions. This impact would be the same as Impact ASB-5.9-c, described under Alternative 2 above. For the same reasons as described above, this impact would be **less than significant**.

5.9.4 MITIGATION MEASURES

ALTERNATIVE 1—THE LEVEE STRENGTHENING ALTERNATIVE

No mitigation is required for Impact LS-5.9-b (long-term changes in ROG, NO_X, and PM_{10} emissions) or Impact LS-5.9-c (exposure to toxic air emissions).

Mitigation is provided below for Impact LS-5.9-a (construction-related emissions of ROG, NO_X, and PM_{10}).

LS-5.9-a **Implement FRAQMD Pollution-Control Measures to Minimize Temporary Emissions of ROG, NO_X, and PM_{10} during Construction.** This mitigation would reduce the impact, but not to a less-than-significant level.

FRAQMD's *Indirect Source Review Guidelines* and online CEQA guidance provide mitigation measures for reducing short-term air quality impacts. As recommended by FRAQMD, Three Rivers Levee Improvement Authority shall ensure that the following mitigation measures (summarized from FRAQMD guidance) are implemented during all project construction activities to the extent practicable. In addition, construction of the proposed project is required to comply with all applicable FRAQMD rules and regulations, in particular Rule 3.0 (Visible Emissions), Rule 3.16 (Fugitive Dust Emissions), and Rule 3.15 (Architectural Coatings).

1. Implement a Fugitive Dust Control Plan that includes the following measures (see Appendix E):

- All grading operations on a project should be suspended when winds carry dust beyond the property line despite implementation of all feasible dust control measures. Consideration should be given to suspending all project grading when winds exceed 20 mph to minimize the risk of dust being carried beyond the property line.

- Construction sites shall be watered as directed by the [Yuba County] Department of Public Works or FRAQMD and as necessary to prevent fugitive dust violations.

- An operational water truck should be on-site at all times. Apply water to control dust as needed to prevent visible emissions violations and offsite dust impacts.

- On-site dirt piles or other stockpiled particulate matter should be covered, wind breaks installed, and water and/or soil stabilizers employed to reduce windblown dust emissions. Incorporate the use of approved nontoxic soil stabilizers according to manufacturer's specifications to all inactive construction areas.

- All transfer processes involving a free fall of soil or other particulate matter shall be operated in such a manner as to minimize the free fall distance and fugitive dust emissions.

- Apply approved chemical soil stabilizers according to the manufacturers' specifications, to all inactive construction areas (previously graded areas that remain inactive for 96 hours) including unpaved roads and employee/equipment parking areas.

- To prevent track-out, wheel washers should be installed where project vehicles and/or equipment exit onto paved streets from unpaved roads. Vehicles and/or equipment shall be washed prior to each trip. Alternatively, a gravel bed may be installed as appropriate at vehicle/equipment site exit points to effectively remove soil buildup on tires and tracks to prevent/diminish track-out.

- Paved streets shall be swept frequently (water sweeper with reclaimed water recommended; wet broom) if soil material has been carried onto adjacent paved, public thoroughfares from the project site.

- Provide temporary traffic control as needed during all phases of construction to improve traffic flow, as deemed appropriate by the Department of Public Works and/or Caltrans [California Department of Transportation] and to reduce vehicle dust emissions.

- Reduce traffic speeds on all unpaved surfaces to 15 mph or less and reduce unnecessary vehicle traffic by restricting access. Provide appropriate training, on-site enforcement, and signage.

- Reestablish ground cover on the construction site as soon as possible and prior to final occupancy, through seeding and watering.

- No open burning of vegetative waste (natural plant growth wastes) or other materials (trash, demolition debris et al.) may be conducted at the project site. Materials also may not be hauled off-site for disposal by open burning Vegetative wastes should be chipped or delivered to waste to energy facilities (permitted biomass facilities), mulched, composted, or used for firewood.

2. Construction equipment exhaust emissions shall not exceed FRAQMD Regulation III, Rule 3.0 ("Visible Emissions") limitations (40% opacity or Ringelmann 2.0). Operators of vehicles and equipment found to exceed opacity limits shall take action to repair the equipment within 72 hours or remove the equipment from service. Failure to comply may result in a Notice of Violation.

3. The primary contractor shall be responsible to ensure that all construction equipment is properly tuned and maintained prior to and for the duration of onsite operation.

4. Limit vehicle and equipment idling times to 10 minutes—saves fuel and reduces emissions.

5. Use existing power sources (e.g., power poles) or clean fuel generators rather than temporary power generators.

6. Develop and implement a traffic plan to minimize traffic flow interference from construction activities. The plan may include advance public notice of routing, use of public transportation, and satellite parking areas with a shuttle service. Schedule operations affecting traffic for off-peak hours. Minimize obstruction of through-traffic lanes. Provide a flag person to guide traffic properly and ensure safety at construction sites.

7. Portable engines and portable engine-driven equipment units used at the project work site, with the exception of on-road and off-road motor vehicles, may require ARB Portable Equipment Registration with the state or a local district permit. The owner/operator shall be responsible for arranging appropriate consultations with ARB or the District [FRAQMD] to determine registration and permitting requirements prior to equipment operation at the site.

8. The proponent shall assemble a comprehensive inventory list (i.e. make, model, engine year, horsepower, and emission rates) of all heavy-duty off-road (portable and mobile) equipment (50 horsepower and greater) that will be used an aggregate of 40 or more hours for the construction project and apply the following mitigation measure:

Reducing NO_X emissions from off-road diesel powered equipment

The project shall provide a plan for approval by FRAQMD demonstrating that the heavy-duty (equal to or greater than 50 horsepower) off-road equipment to be used in the construction project, including owned, leased and subcontractor vehicles, will achieve a projectwide fleet-average 20% NO_X reduction and 45% particulate reduction[1] compared to the most recent ARB fleet average at time of construction.

The FRAQMD Fugitive Dust Control Plan is included in Appendix E.

Implementing the FRAQMD measures is expected to achieve a 5% reduction in ROG emissions from construction equipment, 20% reduction in NO_X emissions from construction equipment, 45% reduction in PM_{10} emissions from construction equipment, and 75% reduction in fugitive dust emissions (Sacramento Metropolitan Air Quality Management District 2004). The resulting maximum average daily emissions with implementation of Alternative 1, as shown in Table 5.9-6, "Summary of Maximum Daily Average Construction Emissions with Mitigation Incorporated," are calculated to be 158 lb/day of ROG, 653 lb/day of NO_X, and 186 lb/day of PM_{10}.

Table 5.9-6
Summary of Maximum Daily Average Construction Emissions with Mitigation Incorporated

Total Emissions	Pollutant (lb/day)		
	ROG	NO_X	PM_{10}
Alternative 1			
Total Unmitigated	166	816	692
Total Mitigated [1]	158	653	186
FRAQMD Threshold	25	25	80
Alternatives 2 and 3			
Total Unmitigated	188	938	1,447
Total Mitigated [1]	179	751	377
FRAQMD Threshold	25	25	80

Notes: FRAQMD = Feather River Air Quality Management District; lb/day = pounds per day; NO_X = oxides of nitrogen; PM_{10} = particles with an aerodynamic diameter of 10 micrometers or less; ROG = reactive organic gases

[1] Based on a 5% reduction in ROG emissions from construction equipment, 20% reduction in NO_X emissions from construction equipment, 45% reduction in PM_{10} emissions from construction equipment, and 75% reduction in fugitive dust emissions (Sacramento Metropolitan Air Quality Management District 2004).

See Appendix E for assumptions and modeling results.

Source: Data compiled by EDAW in 2006

These mitigated emissions would exceed the FRAQMD thresholds of 25 lb/day for ROG, 25 lb/day for NO_X, and 80 lb/day for PM_{10}. Therefore, although the impact would be reduced, implementing Mitigation Measure LS-5.9-a would not reduce the impact related to construction-related emissions to a less-than-significant level.

[1] Acceptable options for reducing emissions may include use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology (Carl Moyer Guidelines), after-treatment products, voluntary offsite mitigation projects, provide funds for air district off-site mitigation projects, and/or other options as they become available. The District should be contacted to discuss alternative measures.

ALTERNATIVE 2—THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impact ASB-5.9-b (long-term changes in ROG, NO_X, and PM_{10} emissions) or Impact ASB-5.9-c (exposure to toxic air emissions).

Mitigation is provided below for Impact ASB-5.9-a (construction-related emissions of ROG, NO_X, and PM_{10}).

ASB-5.9-a **Implement FRAQMD Pollution-Control Measures to Minimize Temporary Emissions of ROG, NO_X, and PM_{10} during Construction.** This measure is identical to Mitigation Measure LS-5.9-a above. This mitigation would reduce the impact (see Table 5.9-6), but not to a less-than-significant level.

ALTERNATIVE 3—THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impact IS-5.9-b (long-term changes in ROG, NO_X, and PM_{10} emissions) or Impact IS-5.9-c (exposure to toxic air emissions).

Mitigation is provided below for Impact IS-5.9-a (construction-related emissions of ROG, NO_X, and PM_{10}).

IS-5.9-a **Implement FRAQMD Pollution-Control Measures to Minimize Temporary Emissions of ROG, NO_X, and PM_{10} during Construction.** This measure is identical to Mitigation Measure LS-5.9-a above. This mitigation would reduce the impact (see Table 5.9-6), but not to a less-than-significant level.

5.9.5 IMPACTS REMAINING SIGNIFICANT AFTER MITIGATION

ALTERNATIVE 1—THE LEVEE STRENGTHENING ALTERNATIVE

Impact LS-5.9-a (Temporary emissions of ROG, NO_X, and PM_{10} during construction) would remain significant and unavoidable after mitigation.

ALTERNATIVE 2—THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE

Impact ASB-5.9-a (Temporary emissions of ROG, NO_X, and PM_{10} during construction) would remain significant and unavoidable after mitigation.

ALTERNATIVE 3—THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE

Impact IS-5.9-a (Temporary emissions of ROG, NO_X, and PM_{10} during construction) would remain significant and unavoidable after mitigation.

SECTION 5.10 NOISE

This section includes background information concerning noise fundamentals, a summary of applicable regulations, a description of existing noise conditions, and an analysis of potential short-term and long-term noise impacts of the Feather River Levee Repair Project (FRLRP). In addition, mitigation measures are recommended, as necessary, to reduce significant noise impacts.

5.10.1 NOISE FUNDAMENTALS

SOUND AND THE HUMAN EAR

Sound is energy that is transmitted through the air as the result of a disturbance or vibration, and that may evoke an auditory sensation. Noise is generally defined as sound that is loud, unpleasant, unexpected, or disagreeable.

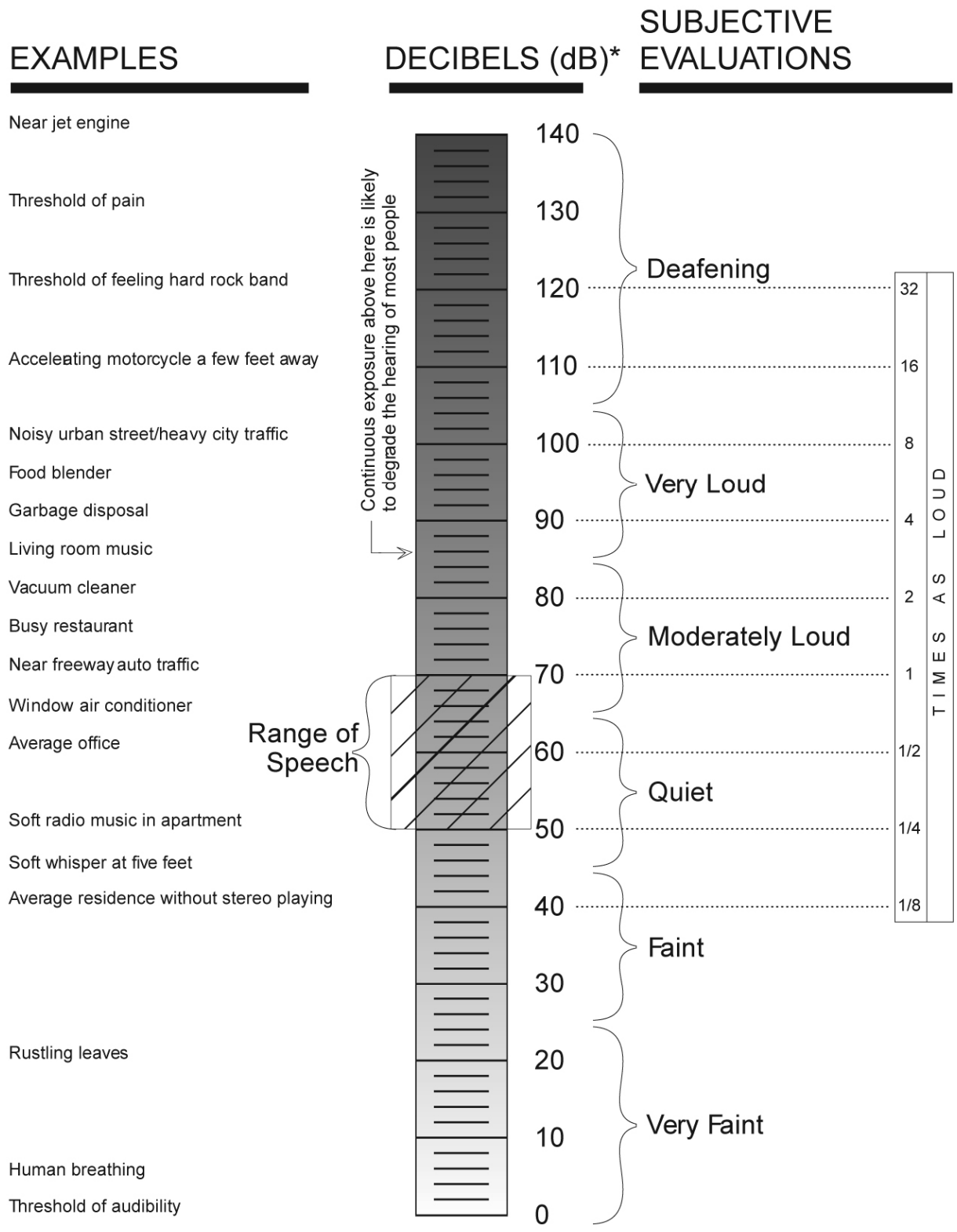
Because of the ability of the human ear to detect a wide range of sound-pressure fluctuations, sound-pressure levels are expressed in logarithmic units called decibels (dB). In addition, because the human ear is not equally sensitive to sound at all frequencies, a specific frequency-dependent rating scale was devised to relate noise to human sensitivity. An A-weighted dB (dBA) scale performs this compensation by discriminating against frequencies in a manner approximating the sensitivity of the human ear. The basis for compensation is the faintest sound audible to the average ear at the frequency of maximum sensitivity. This A-weighted dB scale has been chosen by most authorities for purposes of environmental noise regulation.

Typical indoor and outdoor noise levels are presented in Figure 5.10-1, "Typical Indoor and Outdoor Noise Levels." As indicated, typical sounds range from 10 dBA (very quiet) to 100 dBA (very loud). Conversation is roughly 60 dBA at 3–5 feet. As background noise levels exceed 60 dBA, speech intelligibility becomes increasingly difficult. Noise becomes physically discomforting at 110 dBA.

SOUND PROPAGATION

As sound (noise) propagates from the source to the receptor, the attenuation, or manner of noise reduction in relation to distance, depends on such factors as the inverse square law, surface characteristics, atmospheric conditions, and presence of physical barriers. The inverse square law describes the attenuation resulting from the pattern in which sound travels from the source to the receptor. Sound travels uniformly outward from a point source in a spherical pattern with an attenuation rate of 6 dBA per doubling of distance (dBA/DD). However, from a line source, sound travels uniformly outward in a cylindrical pattern with an attenuation rate of 3 dBA/DD.

The surface characteristics between the source and receptor may result in additional sound absorption and/or reflection. In addition, atmospheric conditions such as wind speed, temperature, and humidity may affect noise levels. Furthermore, the presence of a barrier between the source and receptor may also attenuate noise levels. The actual amount of attenuation depends on the barrier size and noise frequency. A noise barrier may be any natural



*dB are "average" values as measured on the A-scale of a sound-level meter
(From Concepts in Architectural Acoustics: M. David Egan, McGrawHill, 1972 and U.S. Department of Housing and Urban Development, Office of Community Planning and Development "The Noise Guidebook").

EDAW

FEATHER RIVER LEVEE REPAIR PROJECT

Typical Indoor and Outdoor Noise Levels

Figure 5.10-1

G 015

or human-made feature, such as a hill, tree, building, wall, or berm (California Department of Transportation 1998).

NEGATIVE EFFECTS OF NOISE ON HUMANS

Negative effects of noise exposure include physical damage to the human auditory system, interference, and disease. Exposure to noise may result in physical damage to the auditory system, which may lead to gradual or traumatic hearing loss. Gradual hearing loss is caused by sustained exposure to moderately high noise levels over a period of time. By contrast, traumatic hearing loss is caused by sudden exposure to extremely high noise levels over a short period of time. However, gradual and traumatic hearing loss both may result in permanent hearing damage. In addition, noise may interfere with or interrupt sleep, relaxation, recreation, and communication. Although most interference may be classified as annoying, the inability to hear a warning signal may be considered dangerous. Noise may also be a contributor to diseases associated with stress, such as hypertension, anxiety, and heart disease. The degree to which noise contributes to such diseases is dependent upon the noise frequency, bandwidth, level, and exposure time (California Department of Transportation 1998).

NOISE DESCRIPTORS

The selection of a proper noise descriptor for a specific source depends on the spatial and temporal distribution, duration, and fluctuation of the noise. The noise descriptors most often used to describe traffic, community, and environmental noise are defined below (California Department of Transportation 1998):

- L_{max} (maximum noise level): The maximum instantaneous noise level during a specific period of time. The L_{max} may also be referred to as the "peak (noise) level."
- L_X (statistical descriptor): The noise level exceeded X% of a specific period of time.
- L_{eq} (equivalent noise level): The energy mean noise level. The instantaneous noise levels during a specific period of time in dBA are converted to relative energy values. From the sum of the relative energy values, an average energy value is calculated; this is then converted back to dBA to determine the L_{eq}.
- L_{dn} (day-night noise level): The 24-hour L_{eq} with a 10-dBA "penalty" for the noise-sensitive hours between 10 p.m. and 7 a.m. The L_{dn} is used to account for the fact that noise during this specific period of time, considered normal sleeping hours, is a potential source of disturbance to sleepers.
- CNEL (community noise equivalent level): A noise level similar to the L_{dn} described above, but with an additional 5-dBA "penalty" for the noise-sensitive hours between 7 p.m. and 10 p.m., which are typically reserved for relaxation, conversation, reading, and television. When the same 24-hour noise data are used, the CNEL value is typically about 0.5 dBA higher than the L_{dn} value.

5.10.2 REGULATORY SETTING

FEDERAL PLANS, POLICIES, REGULATIONS AND LAWS

No federal plans, policies, regulations, or ordinances related to noise are applicable to the proposed project. However, to address the human response to groundborne vibration, the Federal Transit Administration (FTA) has set forth the following maximum acceptable vibration criteria for different types of land uses (Federal Transit Administration 1995):

- 65 vibration decibels (VdB) for land uses where low ambient vibration is essential for interior operations (such as hospitals and high-tech manufacturing or laboratory facilities),
- 80 VdB for residential uses and buildings where people normally sleep, and
- 83 VdB for institutional land uses with primarily daytime operations (such as schools, churches, clinics, and offices).

Standards have also been established to address the potential for groundborne vibration to cause structural damage to buildings. These standards were developed by the Committee of Hearing, Bio Acoustics, and Bio Mechanics (CHABA) at the request of the U.S. Environmental Protection Agency (Federal Transit Administration 1995). For fragile structures, CHABA recommends a maximum of 0.25 inch per second (in/sec) peak particle velocity (PPV) (Federal Transit Administration 1995).

STATE PLANS, POLICIES, REGULATIONS AND LAWS

The *State of California General Plan Guidelines*, published by the Governor's Office of Planning and Research (2003), provide guidance for the acceptability of different land uses within specific L_{dn}/CNEL contours to assist local agencies in their preparation of general plan noise elements. It would be the responsibility of Yuba County to incorporate these standards as appropriate into the *Yuba County General Plan* (see below). These state standards are not directly relevant to the evaluation of the FRLRP.

With respect to groundborne vibration, for the protection of fragile, historic, and residential structures, the California Department of Transportation (Caltrans) recommends a threshold of 0.2 in/sec PPV for normal residential buildings and 0.08 in/sec PPV for old or historically significant structures (California Department of Transportation 2002). These standards are more stringent than the federal standard established by CHABA, presented above.

LOCAL PLANS, POLICIES, REGULATIONS AND LAWS

Yuba County General Plan Noise Element

The *Yuba County General Plan* Noise Element, adopted in August 1980 (Yuba County 1980), contains objectives for acceptable noise exposure with respect to land use designations. The recommended noise-level criteria in the general plan are summarized in Table 5.10-1, "Recommended Objectives for Ambient Allowable Noise Levels in Yuba County." These designations are established for land use planning purposes and are intended to apply to long-term exposure to noise, as opposed to temporary noise sources, such as from construction.

Table 5.10-1
Recommended Objectives for Ambient Allowable Noise Levels in Yuba County

Land Use Category	7 a.m.–10 p.m.	10 p.m.–7 a.m.
Low-density residential	50 dBA	50 dBA
Multifamily residential	55 dBA	50 dBA
Schools	45 dBA	45 dBA
Retail/commercial	60 dBA	55 dBA
Passive recreation	45 dBA	45 dBA
Active recreation	70 dBA	70 dBA
Hospitals/mental health facilities	45 dBA	40 dBA
Agriculture	50 dBA	50 dBA
Neighborhood commercial	55 dBA	55 dBA
Professional office	55 dBA	55 dBA
Light manufacturing	70 dBA	65 dBA
Heavy manufacturing	75 dBA	70 dBA

Note: dBA = A-weighted decibels
Source: Yuba County 1994

Yuba County Noise Ordinance

Yuba County has adopted a noise ordinance, codified as Chapter 8.20 of the Yuba County Ordinance Code, to protect the citizens of Yuba County from unnecessary, excessive, and annoying noise and vibration and maintain quiet in areas that exhibit low noise levels. The maximum permissible noise levels for different land uses, as specified in Section 8.20.140 of the Yuba County Ordinance Code, are shown in Table 5.10-2, "Yuba County Noise Regulations." As specified in Section 8.20.140, where the ambient noise level is less than designated in this listing, the governing permissible noise level is the respective maximum noise level shown.

Table 5.10-2
Yuba County Noise Regulations

Zone	Time Period	Ambient Level	Maximum Permissible Noise Levels (dBA)
Single-family residential	10 p.m.–7 a.m. 7–10 p.m. 7 a.m.–7 p.m.	45 50 55	55 60 65
Multifamily residential	10 p.m.–7 a.m. 7 a.m.–10 p.m.	50 55	60 65
Commercial—Business and Professional (BP) subzone	10 p.m.–7 a.m.	55	65
Commercial	7 a.m.–10 p.m.	60	70
M-1 (General Industrial)	Any time	65	75
M-2 (Extractive Industrial)	Any time	70	80

Note: dBA = A-weighted decibels
Source: Yuba County Noise Regulations, Chapter 8.20 of the Yuba County Ordinance Code

The Yuba County noise ordinance also contains the following regulation that is applicable to the FRLRP:

> 8.20.310. Construction of Buildings and Projects. It shall be unlawful for any person within a residential zone, or within a radius of 500 feet therefrom, to operate equipment or perform any outside construction or repair work on buildings, structures, or projects or to operate any pile driver, power shovel, pneumatic hammer, derrick, power hoist, or any other construction type device between the hours of 10:00 p.m. of one day and 7:00 a.m. of the following day in such a manner that a reasonable person of normal sensitiveness residing in the area is caused discomfort or annoyance unless a permit has been duly obtained beforehand from the Director of the Planning and Building Services Department as set forth in Section 8.20.710 of the Noise Ordinance.

COMMUNITY AMBIENT NOISE DEGRADATION

In addition to the criteria discussed above, another consideration in defining impact criteria is based on the degradation of the existing noise environment. A variety of reactions result from the exposure to noise, ranging from serious annoyance to no awareness. About 10% of the population is so sensitive to noise that they object to any noise not of their own making. Thus, some complaints occur in even the quietest environments. Another sizable portion of the population (about 25%) does not react or complain even in very severe noise exposure. People can be expected to respond to changes in sound level as follows:

- Except in carefully controlled laboratory experiments, an increase or decrease of only 1 dBA is difficult to perceive.
- Outside of the laboratory, a 3-dBA increase or decrease is considered a noticeable difference.
- A 10-dBA increase is generally perceived as a doubling of loudness and would likely cause an adverse community reaction.

A noise impact is considered “generally not significant” if no noise-sensitive sites are located in the project area, or if increases in community noise level with implementation of the project are expected to be 3 dBA or less at noise-sensitive locations, and the project would not result in violations of local ordinances or standards. Noise-sensitive sites include residences, motels, hotels, public meeting rooms, auditoriums, schools, churches, libraries, hospitals, amphitheaters, parks, and other areas where low noise levels are essential.

The “significance” of a change in noise levels is somewhat subjective. However, both the Federal Highway Administration (FHWA) and Caltrans have published general criteria, applicable to roadway noise, that can also be used to define noise impacts associated with other community noise increases. In general, if the increase in noise exposure level would be greater than 3 dBA, the significance of the impact will depend on the ambient noise level and the presence of noise-sensitive uses. Noise impacts can be considered “possibly significant” if increases in noise exposure levels are expected to be no greater than 5 dBA with implementation of the project. Noise impacts can be considered “generally significant” if a project would cause noise standards or ordinances to be exceeded, would increase community noise levels by 6–10 dBA in urban areas, or would increase noise levels by 10 dBA in more rural areas.

5.10.3 ENVIRONMENTAL SETTING

SOURCES OF INFORMATION

Information for this section was obtained primarily from the following sources:

- Volume I, "Environmental Setting and Background," of the *Yuba County General Plan* (Yuba County 1994);
- *Draft Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project* (Yuba County Water Agency 2003);
- *Draft Environmental Impact Report for the Feather-Bear Rivers Levee Setback Project* (Three Rivers Levee Improvement Authority 2004b); and
- observations of noise-sensitive receptors during various field visits by project team members.

EXISTING NOISE-SENSITIVE RECEPTORS

Noise-sensitive land uses generally include those uses where exposure would result in adverse effects (e.g., sleep disturbance, annoyance), as well as uses where quiet is an essential element of their intended purpose. Residences are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. Other sensitive land uses include hospitals, convalescent facilities, parks, auditoriums, amphitheaters, public meeting rooms, motels, hotels, churches, schools, libraries, and other uses where low interior noise levels are essential.

The noise-sensitive receptors in the FRLRP project vicinity are single-family residences, a school (Cedar Lane Elementary School, located several hundred feet east of the existing Feather River levee in project Segment 3), and a nursing home located just east of the Above Star Bend (ASB) setback levee alignment on Ella Avenue. There are few residences in project Segment 1 (see Section 5.7, "Aesthetic Resources"). In Segment 2, as described in Chapter 4, "Description of the Proposed Project," preliminary surveys of existing facilities identified approximately five to 10 residences in the ASB levee setback area (Alternative 2). In addition, as stated above, a small nursing home is located just to the east (land side) of the ASB setback levee alignment. In the intermediate levee setback area (Alternative 3) there are also five to 10 residences, although this alignment is several hundred feet west of the nursing home. Project Segment 3 is generally more developed than the other two project segments, with substantially more residences, and many of the homes in this segment are adjacent to the existing Feather River levee (see Section 5.7). Multiple residences in the project area (primarily in Segment 3) are located within 500 feet of the existing levee or one of the proposed setback levee alignments. At least one residence in Segment 1 and several residences in Segment 3 are located within 150 feet of the existing levee or one of the proposed setback levee alignments. The evaluation of effects of construction noise on sensitive uses focuses on these residences.

EXISTING NOISE ENVIRONMENT

Vehicle traffic is the primary noise source in the project vicinity. The major roadways in the area are State Route (SR) 70 and Feather River Boulevard (see Figure 5.11-1, "Roads in the Vicinity

of the FRLRP," in Section 5.11, "Transportation and Circulation"). Traffic on these roadways includes agricultural equipment; truck traffic from food processing plants, industrial sites, and logging; recreational vehicles; and vehicle traffic associated with the Plumas Lake area, Olivehurst, Linda, Marysville, and Yuba City, including commuters traveling to places of employment in the Sacramento region. Additional sources of noise in this area include agricultural operations, boats, pets, and occasional train pass-bys and/or aircraft flights overhead.

Existing roadway traffic noise levels were calculated for SR 70 and Feather River Boulevard using the FHWA Traffic Noise Prediction Model (Federal Highway Administration 1988) with traffic data for segments of SR 70 and Feather River Boulevard in the project area (California Department of Transportation 2006, Yuba County 1994). Assumptions regarding the distribution of vehicle types (i.e., percentage of automobiles, light trucks, heavy trucks, and other vehicles) were based on default model settings for the project area as contained in URBEMIS 2002 (California Air Resources Board 2002), which are interpolated from California Department of Motor Vehicles data. Additional input assumptions included day/night percentages of autos and medium and heavy trucks, vehicle speeds, ground attenuation factors, and roadway widths. The inputs and calculations are shown in Table 5.10-3, "Modeled Existing Vehicular Traffic-Noise Levels on State Route 70 and Feather River Boulevard," and in Appendix F.

Table 5.10-3
Modeled Existing Vehicular Traffic-Noise Levels on State Route 70 and Feather River Boulevard [1]

Roadway Segment	Distance (ft) from Roadway Centerline to CNEL/L_{dn} (dBA)				CNEL/L_{dn} (dBA) 50 Feet from Centerline of Near Travel Lane
	70 CNEL	65 CNEL	60 CNEL	55 CNEL	
State Route 70					
Between Yuba County line and Feather River Boulevard	104.8	221.1	473.9	1019.9	72.46
Between Feather River Boulevard and McGowan Road	92.3	193.4	414.0	890.6	71.57
Between McGowan Road and SR 65	133.5	283.8	609.7	1312.4	741.0
Between SR 65 and Olivehurst Avenue	185.6	397.2	854.3	1839.6	76.30
Between Olivehurst Avenue and Erle Road	202.2	433.1	931.8	2006.6	76.87
Between Erle Road and Feather River Boulevard	203.7	436.3	938.7	2021.4	76.91
Between Feather River Boulevard and North Beale Road	244.4	524.4	1128.7	2430.7	78.11
Feather River Boulevard					
North of Broadway	NA	NA	105	225	64
South of Grand Avenue	NA	101	217	468	69

Notes CNEL = community noise equivalent level; dBA = A-weighted decibels; ft = feet; Ldn = day-night noise level; NA = not available; SR = State Route

[1] Modeled noise levels do not consider any shielding or reflection of noise by existing structures or terrain features or noise contribution from other sources and where:

- dBA is a measure on a logarithmic scale that indicates the squared ratio of sound pressure to a reference sound pressure. A-weighted (A) refers to the specific frequency-dependent rating scale that is used to approximate human response.
- CNEL is the energy average of the A-weighted noise levels during a 24-hour period with 5 dBA added to the evening (7–10 p.m.) hours and 10 dBA to the night (10 p.m.–7 a.m.) hours.
- Ldn is the energy average of the A-weighted noise levels during a 24-hour period with 10 dBA added to the night (10 p.m.–7 a.m.) hours.

Sources: Yuba County 1994, Yuba County Water Agency 2003, California Department of Transportation 2006, data provided by EDAW in 2006

5.10.4 ENVIRONMENTAL IMPACTS

This impact analysis addresses impacts of project-related noise on humans. Potential noise effects on wildlife are discussed in Section 5.5, "Terrestrial Biological Resources."

THRESHOLDS OF SIGNIFICANCE

Thresholds for determining the significance of noise impacts were based on general standards for community ambient noise degradation and the Yuba County standards identified above. A project alternative would have a significant noise impact if:

- construction equipment would be operated or construction work would be performed within 500 feet of a residential zone during the noise-sensitive hours between 10 p.m. and 7 a.m. (Yuba County Ordinance Code Section 8.20.310),
- construction operations would result in a noticeable increase (3 dBA) in ambient noise levels at the closest occupied (interior) or regularly used (exterior) portion of a noise-sensitive receptor,
- operation of the project would result in long-term noise levels that exceed Yuba County's applicable exterior noise standards, or
- operation of the project would result in an increase of 3 dBA in the ambient noise level at the property line of a noise-sensitive receptor.

A project alternative would have a significant impact related to vibration if:

- construction-generated vibration levels would exceed 80 VdB (FTA's maximum acceptable vibration standard with respect to human response at residential uses) (Federal Transit Administration 1995) or 0.2 in/sec PPV (Caltrans's recommended standard with respect to the prevention of structural building damage for normal residential buildings [California Department of Transportation 2002]) at nearby existing noise-sensitive land uses.

IMPACT ANALYSIS

Analysis Method

Almost all noise that would be associated with the FRLRP would be generated by construction activities and, therefore, would be short term. The estimates of construction-related noise levels are based on anticipated equipment use and noise-generation factors developed by the U.S. Environmental Protection Agency (1971) and the Federal Transit Administration (1995). Construction-generated groundborne vibration impacts were assessed based on existing documentation (e.g., vibration levels produced by specific construction equipment) and the distance of structures and sensitive receptors from the given source.

No long-term sources of noise would be associated with levee repairs and strengthening or with setting back the Feather River levee. The only operational activities that would be associated with the ASB setback levee (proposed under Alternative 2) or the intermediate setback levee

(proposed under Alternative 3) would be the continuation at the setback levee of maintenance activities currently performed at the existing Feather River levee. These activities would be performed only periodically and would not increase ambient noise levels noticeably. Further, no new stationary sources of noise would be introduced to the project area. Although an existing source of operational noise would be relocated, that is, Pump Station No. 3, it would not be moved near any sensitive receptors. In addition, the current pump equipment at Pump Station No. 3 is exposed. The replacement pump station would enclose the pump equipment in a structure, likely resulting in decreased noise generation during pump operation. For these reasons, only construction-generated noise is addressed in this section.

Alternative 1 – The Levee Strengthening Alternative

Impact LS-5.10-a

Temporary Increase in Noise Levels during Construction. Noise levels associated with construction activities could exceed the maximum permissible noise limits at residences. Construction equipment may operate between the hours of 10 p.m. and 7 a.m., and could operate within 500 feet of a residential zone during these hours. Therefore, construction activities occurring between 10 p.m. and 7 a.m. could result in annoyance and/or sleep disruption of certain receptors within the project area. In addition, construction operations may result in a noticeable temporary increase (3 dBA or more) in ambient noise levels at these residences. Therefore, this impact would be **significant.**

Construction activities under Alternative 1 would include grading, clearing, and excavation associated with site preparation; borrow excavation and detention basin construction; transport of materials; and other activities. The on-site equipment required for levee repairs and strengthening is anticipated to include two hydraulic excavators, six scrapers, three bulldozers, three graders, three rollers, two water wagons, 20 highway dump trucks, one lubricating truck, one loader, a truck-mounted crane, and numerous pickup trucks. Mobile equipment for construction of the slurry cutoff wall may include three hydraulic excavators, three bulldozers, three utility excavators, and three integrated tool carriers. Depending on the operations conducted, individual equipment noise levels can range from 77 to 98 dBA at 50 feet, as indicated in Table 5.10-4, "Typical Equipment Noise Levels."

The simultaneous operation of the on-site construction equipment associated with levee repair and strengthening activities, as identified above (including construction of the slurry cutoff wall), could result in combined intermittent noise levels of approximately 102 dBA 50 feet from the alignment of the existing levee (Appendix F). This estimate is calculated based on the very conservative assumption that multiple pieces of equipment that generate the highest noise levels would be operating at the same site along the levee alignment at the same time. However, this scenario would be very unlikely to occur, particularly with the narrow linear nature of the construction area. Also, the construction effort would consist of three main activities: construction of a slurry cutoff wall, other levee repair and strengthening activities, and excavation and transport of borrow materials. The three main activities would take place at different locations. Nevertheless, it is assumed for this analysis that noise from these sources may have cumulative effects on nearby sensitive receptors, and that noise levels 50 feet from any part of the construction area where heavy equipment is operating could be in the range of 74–102 dBA.

Table 5.10-4
Typical Equipment Noise Levels

Type of Equipment	Noise Level in dBA at 50 Feet	
	Without Feasible Noise Control	With Feasible Noise Control *
Dozer or tractor	80	75
Scraper	88	80
Excavator	88	80
Compactor	82	75
Roller	74	–
Backhoe or loader	85	75
Grader	85	75
Crane	83	75
Generator	78	75
Drill	98	80
Compressor	81	75
Pump	76	75
Truck	91	75
Chain saw	77	77

Note: dBA = A-weighted decibels

* Feasible noise control includes the use of intake mufflers, exhaust mufflers, and engine shrouds in accordance with manufacturers' specifications.

Sources: U.S. Environmental Protection Agency 1971, Federal Transit Administration 1995

At least one residence is within about 150 feet of the existing levee along project Segment 1 and multiple residences are within 150 feet of the existing levee in Segment 3. Based on the equipment noise levels described above and assuming a noise attenuation rate of 6 dBA/DD, exterior noise levels approximately 100 feet from the part of the levee alignment where repairs are occurring could be as high as 96 dBA without the use of feasible noise control, and noise levels 200 feet from the construction area could be as high as 90 dBA. Noise levels in areas within about 6,500 feet of the levee alignment could exceed 60 dBA, without feasible noise control, as a result of construction activity. Some noise-sensitive receptors in these areas are already within areas of higher noise contours associated with SR 70 and Feather River Boulevard, and the Yuba County Airport, but would likely experience more elevated noise levels during levee construction for up to several weeks.

In addition to equipment operation, additional noise would also be generated by off-site construction-related traffic. As described in Section 5.11, "Transportation and Circulation," there would be approximately 84,910 construction-related truck trips over two construction seasons, averaging approximately 4,250 truck round trips per month or about 190–200 per work day. These trips would occur throughout the work day and would be spread geographically, as work would occur simultaneously in several locations along the levee alignment. Employee travel to and from the work sites could increase traffic on local roadways during peak morning and evening periods. For Alternative 1 the maximum workforce during peak construction periods is

estimated to be 100 employees, resulting in up to 100 employee-generated commute trips in the mornings and evenings, assuming that no ridesharing occurs. Typically, a doubling of traffic volumes is required before a noticeable increase (3 dBA) in traffic noise levels occurs. The annual average daily traffic (AADT) volume on SR 70 has been estimated to range from 13,300 to 60,000 trips between the Yuba-Sutter County line and the Yuba River. The increase in vehicle traffic associated with project construction would not substantially increase traffic volume during peak hours on SR 70, but it could substantially increase traffic on local roadways between SR 70 and the construction area, causing a temporary noticeable increase (3 dBA) in off-site ambient noise levels.

The exact hours of equipment operation at the construction sites are not known and have not been specifically limited to the hours between 7 a.m. and 10 p.m. According to the Yuba County Ordinance Code, construction operations may occur during the noise-sensitive hours between 10 p.m. and 7 a.m., but not within 500 feet of residences. Because residences are located closer than 500 feet to the construction area in several locations (particularly in Segment 3), if the proposed construction activities were to take place during the more noise-sensitive evening and nighttime hours, this could violate Section 8.20.310 of the Yuba County Ordinance Code and/or may result in a noticeable temporary increase (3 dBA or more) in ambient noise levels and cause annoyance or sleep disruption to occupants of these residences closest to construction areas. For the reasons discussed above, this impact would be significant.

Impact LS-5.10-b

Exposure of Sensitive Receptors to Excessive Groundborne Vibration During Construction. Construction-generated vibration levels would not result in levels above 0.2 in/sec PPV (Caltrans's recommended standard with respect to the prevention of structural building damage) or 80 VdB (FTA's maximum acceptable vibration standard with respect to human response at residential uses) at the nearest land uses. Thus, this impact would be **less than significant.**

Construction activities have the potential to result in varying degrees of temporary ground vibration, depending on the specific construction equipment used and operations involved. Ground-vibration levels associated with various types of construction equipment are summarized in Table 5.10-5, "Typical Construction Equipment Vibration Levels." Vibration generated by construction equipment typically spreads through the ground and diminishes in magnitude with increases in distance. While effects of ground vibration may be imperceptible at low levels, they may result in detectable vibrations and slight damage to nearby structures at moderate and high levels, respectively. At the highest levels of vibration, damage to structures is primarily architectural (e.g., loosening and cracking of plaster or stucco coatings) and rarely results in structural damage.

Construction operations associated with Alternative 1 would be anticipated to include excavators, bulldozers, graders, and trucks, among other miscellaneous pieces of equipment. Groundborne noise and vibration resulting from levee repair and strengthening activities would be associated primarily with the use of bulldozers and movement of other tracked vehicles (i.e., excavators), which typically result in levels of groundborne vibration at 25 feet from the process that can exceed the applicable threshold of annoyance (80 VdB), as shown in Table 5.10-5. However, because the nearest residential structures would be located approximately 100–150 feet from the construction site at the nearest point, and groundborne vibration dissipates rapidly with distance, vibration levels would not surpass the 80-VdB threshold at these nearby

residential structures. Note that none of the pieces of construction equipment shown in Table 5.10-5 exceed the vibration threshold of 0.2 in/sec for structural damage. Pile drivers are the primary piece of construction equipment capable of exceeding this threshold, and there are no proposals to use impact pile drivers as part of FRLRP construction. Thus, the temporary construction vibration associated with on-site equipment would not be anticipated to expose sensitive receptors to or generate excessive groundborne vibration or groundborne noise levels. Therefore, this impact would be less than significant.

Table 5.10-5
Typical Construction Equipment Vibration Levels

Equipment	PPV at 25 feet (in/sec)	Approximate L_v at 25 feet
Large bulldozer	0.089	87
Caisson drilling	0.089	87
Trucks	0.076	86
Jackhammer	0.035	79
Small bulldozer	0.003	58

Notes: in/sec = inches per second; L_v = velocity level in decibels (VdB) and based on the root mean square (RMS) velocity amplitude; PPV = peak particle velocity

Source: Federal Transit Administration 1995

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impact ASB-5.10-a

Temporary Increase in Noise Levels during Construction. Noise levels associated with construction activities could exceed the maximum permissible noise limits at residences. Construction equipment may operate between the hours of 10 p.m. and 7 a.m. and could operate within 500 feet of a residential zone during these hours. Therefore, construction activities occurring between 10 p.m. and 7 a.m. could result in annoyance and/or sleep disruption of certain receptors within the project area. In addition, construction operations may result in a noticeable temporary increase (3 dBA or more) in ambient noise levels at these residences. This impact would be **significant.**

This impact is similar to Impact LS-5.10-a, described under Alternative 1 above. The on-site equipment required for levee repairs and strengthening and construction of the ASB setback levee is anticipated to include two hydraulic excavators, eight to 10 scrapers, four bulldozers, three to four graders, four rollers, two water wagons, 20 highway dump trucks, one lubricating truck, one loader, a truck-mounted crane, and numerous pickup trucks. Mobile equipment for construction of the slurry cutoff wall may include two hydraulic excavators, two bulldozers, two utility excavators, and two integrated tool carriers. Depending on the operations conducted, individual equipment noise levels can range from 77 to 98 dBA at 50 feet, as indicated in Table 5.10-4.

The simultaneous operation of the on-site construction equipment associated with levee repair and strengthening activities and the ASB levee setback, as identified above (including construction of the slurry cutoff wall), could result in combined intermittent noise levels of

approximately 104 dBA 50 feet from the alignment of the existing levee (Appendix F). This estimate is calculated based on the very conservative assumption that multiple pieces of equipment that generate the highest noise levels would be operating at the same site along the project alignment at the same time. However, this scenario is very unlikely to occur, particularly with the linear nature of the construction area. Also, the construction effort would consist of several activities: construction of a slurry cutoff wall, other levee repair and strengthening activities, construction of the ASB setback levee, and excavation and transport of borrow material from borrow sites. These activities would take place at different locations, and in some cases, during different construction seasons. Nevertheless, it is assumed for this analysis that noise from these sources may have cumulative effects on nearby sensitive receptors, and that noise levels 50 feet from any part of the construction area where heavy equipment is operating could be in the range of 74–104 dBA.

At least one residence is within approximately 150 feet of the existing levee along project Segment 1. The ASB setback levee alignment is within several hundred feet of some residences and a nursing home along Segment 2. Multiple residences are within 150 feet of the existing levee in Segment 3. Therefore, based on the equipment noise levels described above and assuming a noise attenuation rate of 6 dBA/DD, exterior noise levels approximately 100 feet from the part of the existing or setback levee alignment where construction is occurring could be as high as 98 dBA without the use of feasible noise control, and noise levels 200 feet from the construction area could be as high as 92 dBA. Noise levels in areas within about 6,500 feet of the existing or setback levee alignment could exceed 60 dBA, without feasible noise control, as a result of construction activity.

Construction-generated traffic under Alternative 2 would be greater than under Alternative 1, primarily because of the need to transport a greater volume of material from borrow sites to the setback levee alignment. During the second construction season, when the setback levee is being constructed, truck round trips are estimated to average approximately 8,400 trips per month or roughly 380–390 trips per work day. During peak construction periods up to approximately 100 employee commute trips would occur in the mornings and evenings, assuming that no ridesharing occurs. Construction-related traffic would be much less during the first construction season when repairs of the existing levee in Segments 1 and 3 would take place. Typically, a doubling of traffic volumes is required before a noticeable increase (3 dBA) in traffic noise levels occurs. The AADT volume on SR 70 has been estimated at greater than 16,000 trips. The increase in vehicle traffic associated with project construction would not substantially increase traffic volume during peak hours on SR 70, but it could substantially increase traffic on local roadways between SR 70 and the construction area, causing a temporary noticeable increase (3 dBA) in off-site ambient noise levels.

As described under Impact LS-5.10-a, the exact hours of equipment operation at the construction sites are not known and have not been specifically limited to the hours between 7 a.m. and 10 p.m. Because construction operations may occur during the noise-sensitive hours between 10 p.m. and 7 a.m. within 500 feet of residences, the proposed activities could violate Section 8.20.310 of the Yuba County Ordinance Code. For this reason, construction activities could result in a potentially significant noise impact. In addition, the occurrence of construction operations, particularly during the noise-sensitive hours, may result in a noticeable temporary increase (3 dBA or more) in ambient noise levels and cause annoyance or sleep disruption to

occupants of residences closest to construction areas. For the reasons discussed above, this impact would be significant.

Impact ASB-5.10-b

Exposure of Sensitive Receptors to Excessive Groundborne Vibration during Construction. This impact would be the same as Impact LS-5.10-b, described under Alternative 1 above. Construction processes under Alternative 2 would not occur any closer to sensitive land uses than discussed under Alternative 1, and no new construction equipment or processes that would generate additional groundborne vibration would be used. For the same reasons as described above, this impact would be **less than significant.**

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impact IS-5.10-a

Temporary Increase in Noise Levels during Construction. This impact would be similar to Impact ASB-5.10-a, described under Alternative 2 above. Although the intermediate setback levee alignment is in a different location than the ASB alignment relative to some sensitive receptors, and traffic generation may be somewhat different based on needs for borrow material, the extent and nature of the impact would not be appreciably different. For the same reasons as described above, this impact would be **significant.**

Impact IS-5.10-b

Exposure of Sensitive Receptors to Excessive Groundborne Vibration During Construction. This impact would be the same as Impact LS-5.10-b, described under Alternative 1 above. Construction processes under Alternative 2 would not occur any closer to sensitive land uses than those discussed under Alternative 1, and no new construction equipment or processes that would generate additional groundborne vibration would be used. For the same reasons as described above, this impact would be **less than significant.**

5.10.4 MITIGATION MEASURES

ALTERNATIVE 1 – THE LEVEE STRENGTHENING ALTERNATIVE

No mitigation is required for Impact LS-5.10-b (exposure to excessive groundborne vibration during construction). Mitigation is provided below for Impact LS-5.10-a (temporary increase in noise levels during construction).

LS-5.10-a **Limit Generation of Noise by Equipment during Project Construction.** This mitigation would reduce the potential impact, but not to a less-than-significant level.

Three Rivers Levee Improvement Authority (TRLIA) shall ensure that the primary construction contractor implements the following mitigation measures during construction activities:

(a) To the extent practicable, construction activities shall be limited to the hours of 7 a.m. to 10 p.m. when operations occur within 500 feet of a residential or other noise-sensitive land use. Decisions as to whether nighttime construction is needed within 500 feet of residential or other noise-sensitive land uses shall only consider the need to complete project activities before the beginning of

the flood season and the associated need to maintain human safety and the integrity of the flood control system.

(b) All construction equipment shall be properly maintained and equipped with noise control, such as mufflers, in accordance with manufacturers' specifications.

(c) To the extent feasible, the simultaneous operation of construction equipment within 50 feet of the project boundary shall be limited.

In addition, TRLIA shall implement the following measure:

(d) Before construction at each site near noise-sensitive receptors, TRLIA shall provide written notification to potentially affected receptors, identifying the type, duration, and frequency of construction operations. Notification materials will also identify a mechanism for residents to register complaints with TRLIA and Yuba County (the agency responsible for enforcement of the Yuba County noise ordinance) if construction noise levels are overly intrusive or construction occurs outside the permitted hours. TRLIA and/or Yuba County would then take corrective action.

Implementation of measure (a) would encourage compliance with Section 8.20.310 of the Yuba County Ordinance Code, but it would not ensure compliance, as schedule constraints and the need to maintain the integrity of the flood control system may require nighttime construction. Implementation of measures (b) and (c) would reduce construction-generated noise levels at the nearest noise-sensitive receptors by approximately 10 dBA. In addition, measure (d) would be consistent with International Standards Organization recommendation R-1996 by providing a mechanism for affected individuals to provide input or to seek corrective action if construction levels are overly intrusive. However, even with implementation of the proposed measures, noticeable increases (3 dBA) in the ambient noise environment would be anticipated to occur temporarily at some nearby residences. Therefore, implementing this mitigation would reduce the potential temporary noise impact, but not to a less-than-significant level.

ALTERNATIVE 2 – THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impact ASB-5.10-b (exposure to excessive groundborne vibration during construction). Mitigation is provided below for Impact ASB-5.10-a (temporary increase in noise levels during construction).

ASB-5.10-a **Limit Generation of Noise by Equipment during Project Construction.** This measure is identical to Mitigation Measure LS-5.10-a above. This mitigation would reduce the impact, but not to a less-than-significant level.

ALTERNATIVE 3 – THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impact IS-5.10-b (exposure to excessive groundborne vibration during construction). Mitigation is provided below for Impact IS-5.10-a (temporary increase in noise levels during construction).

IS-5.10-a **Limit Generation of Noise by Equipment during Project Construction.** This measure is identical to Mitigation Measure LS-5.10-a above. This mitigation would reduce the impact, but not to a less-than-significant level.

5.10.5 IMPACTS REMAINING SIGNIFICANT AFTER MITIGATION

ALTERNATIVE 1 – THE LEVEE STRENGTHENING ALTERNATIVE

Impact LS-5.10-a (temporary noise increase during construction of the setback levee) would remain significant and unavoidable after mitigation.

ALTERNATIVE 2 – THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE

Impact ASB-5.10-a (temporary noise increase during construction of the setback levee) would remain significant and unavoidable after mitigation.

ALTERNATIVE 3 – THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE

Impact IS-5.10-a (temporary noise increase during construction of the setback levee) would remain significant and unavoidable after mitigation.

SECTION 5.11 TRANSPORTATION AND CIRCULATION

This section describes the traffic and circulation characteristics of the existing roadways in the project vicinity and analyzes the potential impacts of the project alternatives on normal traffic circulation and transportation systems. Potential project effects on emergency vehicle access and response are discussed in Section 5.12, "Public Services, Utilities, and Service Systems."

5.11.1 REGULATORY SETTING

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

No federal plans, policies, regulations, or laws related to transportation and circulation are applicable to the proposed project.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

The California Department of Transportation (Caltrans) is responsible for planning, designing, constructing, operating, and maintaining all state-owned roadways in Yuba County. Caltrans enforces various policies and regulations related to the modification of, or encroachment on state-owned roadways.

LOCAL PLANS, POLICIES, REGULATIONS, AND LAWS

The Yuba County (County) Department of Public Works is responsible for planning, designing, constructing, operating, and maintaining all County-owned roadways. The *Yuba County General Plan* classifies County-maintained roads according to their function and linkage to land use. Among these classifications are major roads and collector roads. Major roads are defined as the primary carriers of intercity and intracounty travel in Yuba County, linking primary employment and population centers. Collector roads are defined as roadways intended to provide subregional access and circulation by linking major roads with residential streets.

The general plan assesses level of service (LOS) for County-maintained major roads and collector roads. LOS is a qualitative measure of traffic operating conditions whereby letter grades of A through F are assigned to roadway segments, with the letter grade A denoting best conditions and letter grade F the worst. LOS rankings are additionally categorized by physical characteristics of the surrounding area, either urban (U) or rural (R), with rural roadways further classified as rolling (RR), or mountainous (RM).

The *Yuba County General Plan* establishes goals that pertain to transportation on County-maintained roads. The general plan contains a circulation goal of maintaining roadway LOS that recognizes differences between urban and rural environments and minimizes congestion. This goal is intended for long-term planning. The general plan does not address temporary changes in LOS related to construction activities.

5.11.2 ENVIRONMENTAL SETTING

SOURCES OF INFORMATION

Information used to prepare this section was obtained from the *Yuba County General Plan*, Volumes I and II (Yuba County 1994, 1996); Caltrans traffic volume data (California Department of Transportation 2006); conversations with County staff members; and observations during site visits in 2006.

PROJECT AREA

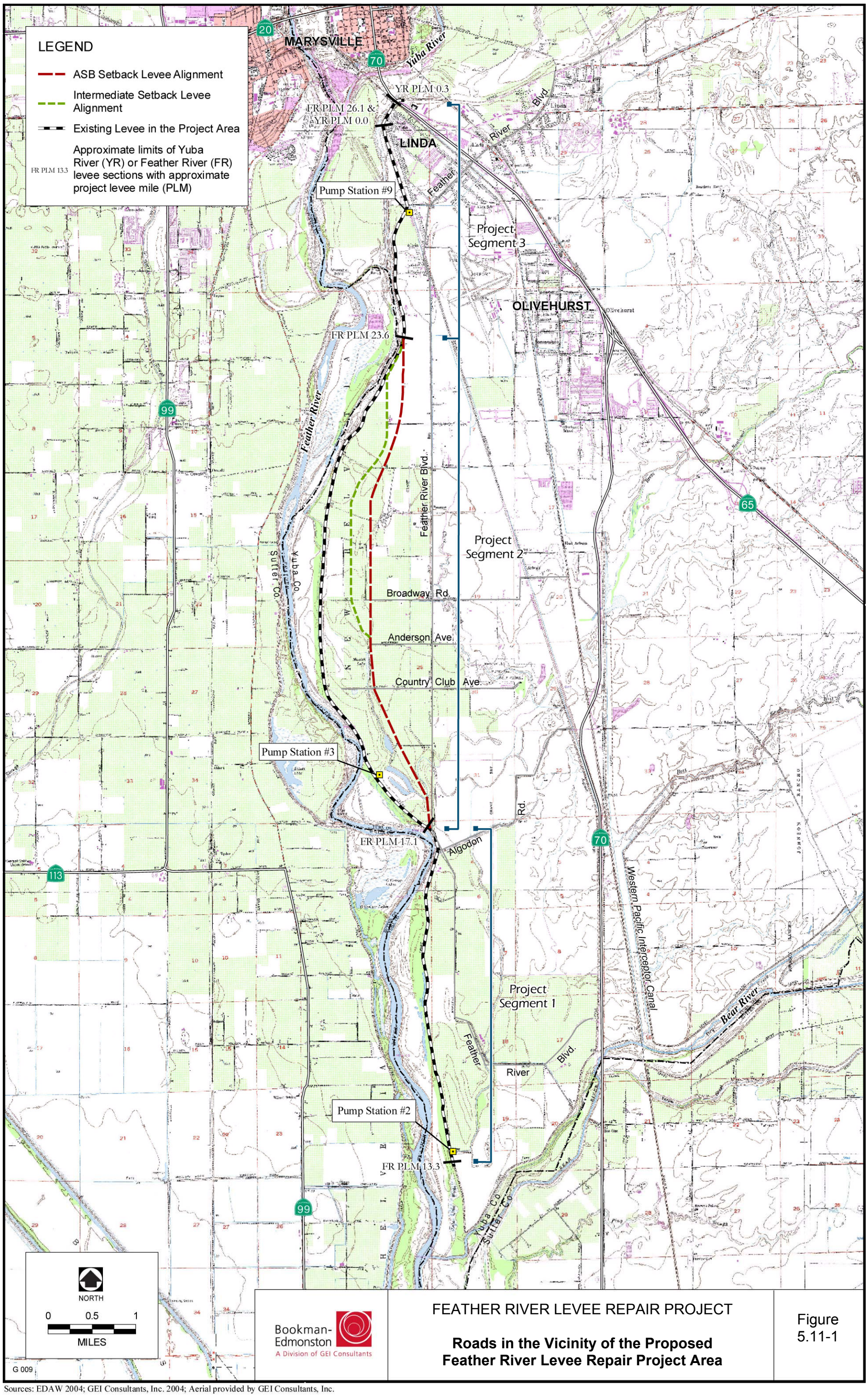
The primary roadways that would be used to access project construction areas are State Route (SR) 70, Feather River Boulevard, and local east-west roadways that connect SR 70 and Feather River Boulevard to the existing levee alignment and potential setback levee alignments. Under Alternatives 2 and 3, construction personnel would also likely use newly constructed temporary-access haul roads that would cross the levee setback alignments in what is currently orchard and other agricultural land. The major roadways that would be used by construction-related traffic are shown in Figure 5.11-1, "Roads in the Vicinity of the Proposed Feather River Levee Repair Project Area."

State Route 70

SR 70 provides north-south circulation between Marysville and the Sacramento metropolitan area. SR 70 is a two- and four-lane highway that extends north-south east of the project area. The *Yuba County General Plan* characterizes the topography traversed by SR 70 in Yuba County as "flat," and classifies different parts of the roadway as conventional highway, expressway, and freeway (Yuba County 1996). Annual average daily traffic (AADT) volumes for SR 70 include approximately 16,300 trips at the Yuba-Sutter County line east of project Segment 1 and 45,000 trips at the Feather River Boulevard interchange east of project Segment 3 (California Department of Transportation 2006). The general plan circulation element includes a forecast for AADT of 34,100 in year 2015 on SR 70 at the county line (Yuba County 1996).

Feather River Boulevard

Feather River Boulevard extends mostly north and south from Marysville to near the Sutter County line, passing just to the east of all three project segments. The road serves the community of West Linda and the industrial and agricultural areas of southwest Yuba County. Feather River Boulevard is 22 feet wide and terminates in the south at an at-grade intersection with SR 70, just north of the SR 70 overcrossing of the Bear River east of project Segment 1. Traffic that typically uses Feather River Boulevard includes agricultural equipment, truck traffic from food processing plants and industrial sites located on Feather River Boulevard, and traffic from residents of the Plumas Lake Specific Plan area. With the addition of traffic from development in the Plumas Lake Specific Plan area, the AADT varies along the various segments of Feather River Boulevard, with a majority of traffic in the Plumas Lake area. The 1994 general plan reports an AADT of 1,600 on Feather River Boulevard north of Broadway (in project Segment 2) (Yuba County 1994). The general plan circulation element includes a forecast for AADT of 8,100 in the project vicinity in year 2015.



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FEATHER RIVER LEVEE REPAIR PROJECT

Roads in the Vicinity of the Proposed Feather River Levee Repair Project Area

Figure 5.11-1

Sources: EDAW 2004; GEI Consultants, Inc. 2004; Aerial provided by GEI Consultants, Inc.

Feather River Boulevard is an emergency access route, especially important for emergency response to southwest Yuba County and to the Feather River via the Star Bend Boat Launch and Fishing Access in project Segment 1 (Cucci, pers. comm., 2006).

Associated Roads

County roads extending west from Feather River Boulevard that may be used by construction personnel and for hauling of construction materials to the project area include Broadway Road, Anderson Avenue, Country Club Avenue, and Algodon Road (Figure 5.11-1). In general, these roads are paved, narrow, nonstriped, two-lane roads that become unpaved roads as they near the Feather River levee access gates within the project area. Near the northern terminus of the project area, some roads that serve residential development in the community of Linda may also be used during project construction, including Riverside Drive, Garden Avenue, and Alicia Avenue.

5.11.3 ENVIRONMENTAL IMPACTS

THRESHOLDS OF SIGNIFICANCE

Thresholds for determining the significance of impacts on transportation and circulation were based on the environmental checklist form in Appendix G of the California Environmental Quality Act Guidelines (State CEQA Guidelines) and guidance developed by the Institute of Transportation Engineers (ITE). For the initial screening of temporary project effects on traffic, ITE recommends that an impact be examined further when it involves an increase of 50 or more trucks, 100 passenger vehicles, or an equivalent combination of vehicles per hour in the peak direction during the peak hour at any roadway intersection (Institute of Transportation Engineers 1989).

A project alternative would have a significant impact on transportation and circulation if it would:

- cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system;
- cause an increase of 50 or more trucks, 100 passenger vehicles, or an equivalent combination of vehicles per hour in the peak direction during the peak hour at any roadway intersection (ITE recommended threshold);
- exceed, either individually or cumulatively, an LOS standard established by the county congestion management agency for designated roads or highways;
- result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks;
- substantially increase hazards due to a design feature or incompatible uses;

- result in inadequate parking capacity; or
- conflict with adopted policies, plans, or programs supporting alternative transportation.

None of the project alternatives would entail the construction of towers or other impediments to air traffic. Therefore, the project alternatives would have no effect on air traffic, and these issues are not discussed further below.

All construction-related vehicles (i.e., equipment and worker vehicles) would be parked away from any public roadways at construction staging areas. No public parking facilities would be affected by the parking of construction-related equipment and worker vehicles.

None of the project alternatives would affect alternative transportation methods or routes, nor would they conflict with any local plans or policies regarding alternative transportation.

In addition, as noted above, effects of the project alternatives on emergency access are addressed in Section 5.12, "Public Services, Utilities, and Service Systems," and are not evaluated in this section.

IMPACT ANALYSIS

The project alternatives have the potential to affect transportation and circulation during construction. However, any effect of operation of the project alternatives on transportation and circulation issues would be negligible. Few, if any, additional vehicle trips would be associated with long-term maintenance under any of the project alternatives. Construction under Alternative 1 would not affect roadway or transportation system features in the long term. Construction under Alternatives 2 and 3 would cut off the western ends of some roads where they cross the proposed setback levee alignments along project Segment 2, but these roads are used for access to residences and agricultural operations in the proposed levee setback area that would be removed with implementation of the levee setback, and routine access to these areas would no longer be needed. The project alternatives do not include any permanent design features that would present hazards to transportation systems. Therefore, the impact discussions in this section are limited to construction-related effects.

Alternative 1 – The Levee Strengthening Alternative

Impact LS-5.11-a

Increase in Traffic on Local Roadways near the Project Site during Construction. During the anticipated 20-month construction period, commute trips and haul truck trips associated with levee repair and strengthening activities would increase traffic on Feather River Boulevard, SR 70, and local roadways that provide access to the project alignment (e.g., Anderson Avenue, Country Club Avenue, Riverside Drive). However, construction-related trips would not exceed the thresholds established by ITE for temporary traffic increases and would not represent a substantial increase in traffic levels on these roadways or other local roads. This impact would be **less than significant**.

The proposed levee repair and strengthening activities would have only a temporary effect on traffic. LOS standards established for roads by county congestion management agencies are intended to regulate long-term traffic increases or changes in traffic patterns that result from the development of facilities such as businesses and residences. Because the levee repair and

strengthening activities would not generate traffic or change traffic patterns over the long term, LOS standards are not considered in this evaluation of traffic effects. For the initial screening of temporary project effects on traffic, ITE recommends that an impact be examined further when it involves an increase of 50 or more trucks, 100 passenger vehicles, or an equivalent combination of vehicles per hour in the peak direction during the peak hour at any roadway intersection (Institute of Transportation Engineers 1989). For purposes of this analysis, impacts of project-generated traffic may be considered substantial if the amount of project-generated vehicle trips would exceed any of these thresholds.

Construction-related traffic would consist of daily commute trips of construction workers and truck trips to haul materials and supplies, such as drain rock, borrow materials, cement, and aggregate surfacing within and from outside the project vicinity. Construction personnel, equipment, and imported materials would reach the project area via SR 70 and Feather River Boulevard, which are currently used by trucks and other heavy agricultural equipment. Between Feather River Boulevard and the existing levee, local roads would be used to provide access to specific levee segments. Roads likely to be used include Broadway Road, Anderson Avenue, Country Club Avenue, Algodon Road, Riverside Drive, Garden Avenue, and Alicia Avenue. These roads are used primarily by nearby residents and agricultural operations and receive little traffic. Short temporary-access haul roads would likely be constructed between these existing local roadways, which typically end before reaching the existing levee, and the levee work area.

The construction labor force is estimated to average about 50–60 persons over the 2-year construction period (i.e., roughly 20 months of active work from approximately May 2007 into December 2008). Peak staffing could be close to 100 depending on the contractor's schedule. Construction staff traffic, therefore, could reach a total of 100 trips during the peak morning and evening commute hours at times of peak construction activity. This is a conservative assumption that does not consider the likelihood that some of the construction crew would rideshare. However, members of the construction crew are expected to travel to the project area from different directions, with overall traffic spread among various roadways and intersections, and it is also likely that some ridesharing would take place. Therefore, commute traffic is not expected to exceed the ITE threshold of an increase in traffic volume of 100 vehicles in the peak direction during the peak hour at any intersection.

About 40 trailer ("low-boy") truck round trips would be required to transport the contractor's plant and equipment to the site over a period of approximately 1 month. A similar number of round trips would occur as the work is completed to remove the equipment from the site. The number of truck trips and employee trips associated with mobilization is expected to fall well below the ITE thresholds of 50 trucks, 100 passenger vehicles, or an equivalent combination of vehicles per peak hour in the peak direction at an intersection.

About 4,000 highway truck trips would be needed to bring the drain rock, aggregate surfacing, and rock facing material to the site from the quarry of origin. About 300 truckloads would be needed to bring dry bentonite to the site. About 300 truckloads would also be needed to bring cement to the site. Another 25–30 trailer truckloads would be required to bring other permanent materials to the site, such as geotextile fabric, erosion control materials, structural steel, piping, utility poles, well casings, and ancillary equipment. About 100 concrete loads, transported by transit mixer truck, are also likely. In addition, about 100 highway truckloads may be needed to

carry construction debris and waste dump materials to a suitable landfill. Transport of an estimated 1.6 million cubic yards (cy) of borrow material between borrow sites and the levee alignment would also be required. This would result in approximately 80,000 haul trips if a load of 20 cy per trip is assumed. Larger haul unit sizes would reduce the number of trips and impacts on air quality.

The total of approximately 84,910 truck trips would take place over roughly 20 months encompassing two construction seasons, resulting in an average of approximately 4,250 truck round trips per month or about 190–200 per work day (assuming 22 work days per month). These trips would be spread out over the work day and would also be spread geographically, as work would occur simultaneously in several locations along the levee alignment. Also, truck trips would seldom occur at the same time as employee commute trips, as employees must be at the project site to operate haul trucks and receive deliveries of materials. It is unlikely that truck traffic would exceed the ITE threshold of 50 trucks per hour in the peak direction during the peak hour at any individual roadway intersection, or that commute traffic and truck haul traffic combined would exceed the equivalent threshold for a mix of passenger vehicles and trucks during a peak hour in a peak direction at a single intersection.

During the 20-month construction period under Alternative 1, commute trips and truck haul trips would increase traffic on SR 70, Feather River Boulevard, and local roadways. However, the construction-related trips would not exceed the thresholds established by ITE at any time or substantially increase overall traffic levels on the local road system. Therefore, this impact would be less than significant.

Impact LS-5.11-b

Increase in Traffic Hazards on Local Roadways near the Project Site during Construction. Construction-related traffic could track mud and gravel onto local roadways, and haul truck traffic could interfere with the flow of traffic on these roads. These conditions could pose hazards for travelers on local roadways. This impact would be **potentially significant.**

During the anticipated 20-month construction period under Alternative 1, trucks delivering materials and removing debris, as well as commute traffic, would be entering and exiting unpaved construction areas periodically and using local roadways. As described in Impact LS-5.11-a, truck traffic associated with levee repair and strengthening activities is expected to average 190–200 round trips per work day. Because similar activities would be performed during much of the construction period (with some limitations acknowledged during the winter months because of weather, soil conditions, agency guidelines, and other factors), the amount of daily truck traffic associated with delivery of materials or hauling of debris is not expected to vary widely, and the addition of construction-related truck traffic to traffic volumes on local roadways is not expected to noticeably alter traffic flow in most circumstances. However, trucks and workers exiting the construction area at the end of the work day are likely to move directly between Feather River Boulevard and entrances to the construction area or the existing levee road. Many of these vehicles would also enter SR 70. At times, the presence of slow-moving trucks entering or exiting construction areas could pose hazards to other vehicles on Feather River Boulevard and SR 70. In addition, trucks and other vehicles could track mud and gravel onto the local roadways, potentially posing a driving hazard. This impact would be potentially significant.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impact ASB-5.11-a

Increase in Traffic on Local Roadways near the Existing Levee and Setback Levee Alignment during Construction. During the anticipated 20-month construction period, commute trips and haul truck trips associated with levee repair and strengthening activities and setback levee construction would increase traffic on Feather River Boulevard, SR 70, and local roadways that provide access to the project alignment (e.g., Anderson Avenue, Country Club Avenue, Riverside Drive). However, construction-related trips would not exceed the thresholds established by ITE for temporary traffic increases and would not represent a substantial increase in traffic levels on these roadways or other local roads. This impact would be **less than significant.**

See Impact LS-5.11-a, described under Alternative 1 above. As under Alternative 1, project construction under Alternative 2 would have only a temporary effect on traffic. Construction-related traffic would consist of daily commute trips of construction workers and truck trips to haul materials and supplies, such as drain rock, cement, and aggregate surfacing from outside the project vicinity via SR 70 and Feather River Boulevard, and truck trips to haul soil between borrow sites and the ASB setback levee alignment.

The construction labor force is estimated to average about 60–70 persons over the 2-year construction period. Peak staffing could be close to 100 depending on the contractor's schedule. Construction staff traffic, therefore, could reach a total of 100 trips during the peak morning and evening commute hours at times of peak construction activity. This is a conservative assumption that does not consider the likelihood that some of the construction crew would rideshare. Members of the construction crew are expected to travel to the project area from different directions, with overall traffic spread among various roadways and intersections, and it is also likely that some ridesharing would take place. Therefore, although construction staff traffic could potentially generate 100 commute trips during peak construction periods, commute traffic is not expected to exceed the ITE threshold of an increase in traffic volume of 100 vehicles in the peak direction during the peak hour at any individual intersection.

It is expected that about 60–70 trailer ("low-boy") truck round trips would be required to transport the contractor's plant and equipment listed above to the site. A similar number of round trips would be needed to remove the equipment from the site as the work is completed.

Approximately 1,500 highway truck trips would be needed to bring the aggregate surfacing and similar aggregate and quarry materials to the site from the quarry of origin. About 150 truckloads would be needed to bring dry bentonite to the site. Another 40–50 trailer truckloads would be required to bring other permanent materials to the site, mainly including geotextile fabric, erosion control materials, structural steel, piping, utility poles, well casings, and ancillary equipment. About 30–40 concrete loads, transported by transit mixer truck, are also likely. In addition, about 750 highway truckloads may be needed to carry demolition debris, construction debris, and waste dump materials to a suitable landfill.

The activities listed above would generate up to approximately 2,560 truck trips. However, the main source of construction traffic would be the required transport of borrow material from the points of excavation at the existing Feather River levee or borrow areas to the placement areas at the ASB setback levee alignment in project Segment 2 and levee repair areas in Segments 1 and 3. A total volume of approximately 3.3 million cubic yards (cy) would require about 165,000

haul unit trips if a load of 20 cy per trip is assumed. For the purposes of this analysis, it is assumed that no material would be removed from the existing levee, thereby maximizing the number of haul trips. It is also assumed that borrow would be extracted in approximately equal proportions from the potential borrow areas east and west of the ASB setback levee alignment (although the site west of the alignment is closer to the work area and would be the preferred borrow source). Using these assumptions, approximately 82,500 haul trips would originate from the potential borrow area west of the ASB setback levee alignment and approximately 82,500 trips would originate from the potential detention basin/borrow area site east of the alignment. Only trips associated with the potential detention basin/borrow area or other sources east of the setback levee alignment would interact with traffic on local roadways, as local traffic would be excluded from sites west of the ASB setback levee alignment during construction.

Using the above assumptions, implementation of Alternative 2 would generate up to approximately 85,060 vehicle trips on local roadways. These 85,060 trips would take place over two construction seasons, although a vast majority of trips would take place during the second construction season, when the embankment for the ASB setback levee would be built. Assuming that all trips associated with the hauling of borrow material and half of the remaining trips would occur during the last 10 months of project construction, approximately 83,780 trips would take place during this period. This would result in an average of approximately 8,400 truck round trips per month or about 380–390 round trips per work day (assuming 22 work days per month).

These trips would be spread out over the work day and would also be spread geographically, as work would occur simultaneously in several locations along the project alignment. For example, the construction area for the ASB setback levee is linear and extends over 5.9 miles. Therefore, construction trips would be spread geographically over different roadways and intersections. Also, truck trips would seldom occur at the same time as employee commute trips, as employees must be at the project site to operate haul trucks and receive deliveries of materials.

It is unlikely that truck traffic would exceed the ITE threshold of 50 trucks per hour in a peak hour in a peak direction at a single intersection, or that commute traffic and truck haul traffic combined would exceed the equivalent threshold for a mix of passenger vehicles and trucks during a peak hour in a peak direction at a single intersection. Construction trips would be far fewer during the first construction season, and the same conclusions would apply.

During the approximately 20-month construction period under Alternative 2, commute trips and truck haul trips would increase traffic on Feather River Boulevard, SR 70, and local roadways. However, the construction-related trips would not exceed the thresholds established by ITE at any time or substantially increase overall traffic levels on the local road system. Therefore, this impact would be less than significant.

Impact ASB-5.11-b

Increase in Traffic Hazards on Local Roadways near the Existing Levee and Setback Levee Alignment during Construction. Construction-related traffic could track mud and gravel onto local roadways, and haul truck traffic could interfere with the flow of traffic on these roads. These conditions could pose hazards for travelers on local roadways. This impact would be **potentially significant.**

During the anticipated 20-month construction period, trucks delivering materials and equipment, hauling borrow material, removing debris, as well as commute traffic, would be entering and

exiting unpaved construction areas periodically and using local roadways. As described in Impact ASB-5.11-a, truck traffic associated with Alternative 2 is expected to average approximately 380–390 round trips per work day during the 2008 construction season, with far fewer trips during the 2007 construction season. Although the amount of vehicle traffic associated with project construction would vary considerably between the two construction seasons, similar activities would typically be performed from month to month within each construction season (with some limitations acknowledged during the winter months because of weather, soil conditions, agency guidelines, and other factors). Therefore, within each construction season the amount of daily truck traffic associated with delivery of materials or hauling of debris or borrow is not expected to vary widely, and the addition of construction-related truck traffic to traffic volumes on local roadways is not expected to noticeably alter traffic flow in most circumstances. However, trucks and workers exiting the construction area at the end of the work day are likely to move directly between Feather River Boulevard and entrances to the construction area or the existing levee road. Many of these vehicles would also enter SR 70. At times, the presence of slow-moving trucks entering or exiting construction areas could pose hazards to other vehicles on Feather River Boulevard and SR 70. In addition, trucks and other vehicles could track mud and gravel onto the local roadways, potentially posing a driving hazard. This impact would be potentially significant.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impact IS-5.11-a

Increase in Traffic on Local Roadways near the Existing Levee and Setback Levee Alignment during Construction. During the anticipated 20-month construction period, commute trips and truck haul trips associated with levee repair and strengthening activities and setback levee construction would increase traffic on Feather River Boulevard, SR 70, and local roadways that provide access to the project alignment (e.g., Anderson Avenue, Country Club Avenue, Riverside Drive). However, construction-related trips would not exceed the thresholds established by ITE for temporary traffic increases and would not represent a substantial increase in traffic levels on these roadways or other local roads. This impact would be **less than significant.**

See Impact ASB-5.11-a, described under Alternative 2 above. As under Alternatives 1 and 2, project construction under Alternative 3 would have only a temporary effect on traffic. Construction-related traffic would consist of daily commute trips of construction workers and truck trips to haul materials and supplies, such as aggregate surfacing and cement from outside the project vicinity via SR 70 and Feather River Boulevard and haul trips to move borrow material between soil borrow areas and the Intermediate setback alignment.

Trip generation from all sources under Alternative 3 is expected to be approximately the same as described above for Alternative 2. Therefore, this impact would be the same as Impact ASB-5.11-a, described under Alternative 2. For the same reasons as described above, this impact would be less than significant.

Impact IS-5.11-b

Increase in Traffic Hazards on Local Roadways near the Existing Levee and Setback Levee Alignment during Construction. Construction-related traffic could track mud and gravel onto local roadways, and haul truck traffic could interfere with the flow of traffic on these roads. These conditions could pose hazards for travelers on local roadways. This impact would be **potentially significant.**

Construction-related traffic under Alternative 3 would not be substantially different than described previously for Alternative 2. Therefore, this impact would the same as Impact ASB-5.11-b, described under Alternative 2 above. For the same reasons as described above, this impact would be potentially significant.

5.12.4 MITIGATION MEASURES

ALTERNATIVE 1 – THE LEVEE STRENGTHENING ALTERNATIVE

No mitigation is required for Impact LS-5.11-a (increase in traffic on local roadways during construction). Mitigation is provided below for Impact LS-5.11-b (increase in traffic hazards during construction).

LS-5.11-b **Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways.** This mitigation measure would reduce the potential impact to a less-than-significant level.

To reduce hazards to vehicles on local roadways, Three Rivers Levee Improvement Authority (TRLIA) shall ensure that its primary construction contractor implements the following measures:

(a) Develop and implement a traffic safety plan in coordination with the County and Caltrans. The construction contractor shall develop a plan for traffic safety assurance for the county roadways in the project vicinity. The contractor shall submit the plan to the County Public Works Department for approval before the initiation of construction-related activity that could adversely affect traffic on county roadways. A similar plan shall be prepared for SR 70 and submitted to Caltrans for review before initiation of construction-related activity that could adversely affect traffic on the highway. If both the County and Caltrans will accept the same traffic safety plan, then only one plan need be prepared. The plan(s) may call for the following elements, based on the requirements of each agency:

- posting warnings about the potential presence of slow-moving vehicles;
- using traffic control personnel when appropriate;
- scheduling truck trips outside of peak morning and evening traffic periods to the extent feasible;
- placing and maintaining barriers and installing traffic control devices necessary for safety, as specified in Caltrans's *Manual of Traffic Controls for Construction and Maintenance Works Zones* and in accordance with County requirements; and
- maintaining routes for passage of emergency response vehicles through roadways affected by construction activities.

The contractor shall train construction personnel in appropriate safety measures as described in the plan(s), and shall implement the adopted plan(s).

(b) Minimize the accumulation of mud and dirt on local roadways. All operations shall limit or expeditiously remove the accumulation of project-generated mud or dirt from adjacent public streets at least once every 24 hours when operations are occurring. The construction contractor shall sweep the paved roadways (water sweeper with reclaimed water recommended) at the end of each day if substantial volumes of soil material have been carried onto adjacent paved, public roads from the project sites. Also see a similar requirement under Mitigation Measure LS-5.9-a, "Implement FRAQMD Pollution-Control Measures to Minimize Temporary Emissions of ROG, NO_X, and PM_{10} during Construction."

Implementing Mitigation Measure LS-5.11-b would reduce the potential impact related to traffic hazards to a less-than-significant level.

ALTERNATIVE 2 – THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impact ASB-5.11-a (increase in traffic on local roadways during construction). Mitigation is provided below for Impact ASB-5.11-b (increase in traffic hazards during construction).

ASB-5.11-b **Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways.** This measure is identical to Mitigation Measure LS-5.11-b above. This mitigation would reduce the potential impact to a less-than-significant level.

ALTERNATIVE 3 – THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impact IS-5.11-a (increase in traffic on local roadways during construction). Mitigation is provided below for Impact IS-5.11-b (increase in traffic hazards during construction).

IS-5.11-b **Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways.** This measure is identical to Mitigation Measure LS-5.11-b above. This mitigation would reduce the potential impact to a less-than-significant level.

5.11.5 IMPACTS REMAINING SIGNIFICANT AFTER MITIGATION

With implementation of the mitigation described above, all impacts on transportation and circulation would be reduced to a less-than-significant level.

SECTION 5.12 PUBLIC SERVICES, UTILITIES, AND SERVICE SYSTEMS

Public services addressed in this section are limited to emergency services (fire, police, and emergency medical services). Schools, parks, and other public facilities are not discussed because the project alternatives would neither affect these facilities nor result in a need for new or physically altered schools, parks, or other public facilities. This section also addresses several public utilities and service systems: gas, electrical, water, sewer, cable, telephone, and drainage systems. Wastewater and solid-waste systems are not discussed because none of the project alternatives would result in the production of wastewater or the long-term production of solid waste.

5.12.1 REGULATORY SETTING

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

No federal plans, policies, regulations, or laws related to public services, utilities, and service systems are applicable to the proposed project.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

No state plans, policies, regulations, or laws related to public services, utilities, and service systems are applicable to the proposed project.

LOCAL PLANS, POLICIES, REGULATIONS, AND LAWS

Approval of an encroachment permit by the County Public Works Department may be required for placement of utilities in easements and rights-of-way in Yuba County when related earthmoving operations exceed 50 cubic yards. The *Yuba County General Plan* also contains policies related to the aesthetic character of new utilities and public service infrastructure (Cucci, pers. comm., 2006).

The County Public Works Department is responsible for operating and maintaining County roads, and it has jurisdiction over the removal of utilities from within County road rights-of-way. However, the County does not have jurisdiction over the simple removal of utilities from areas not located within such rights-of-way. County roads are used as emergency-vehicle routes, and Feather River Boulevard is an emergency-vehicle route in southwestern Yuba County (Lee, pers. comm., 2006). Feather River Boulevard provides emergency vehicles with access to areas of southwestern Yuba County and to the Feather River (via the Star Bend Boat Launch and Fishing Access) (Cucci, pers. comm., 2006).

5.12.2 ENVIRONMENTAL SETTING

SOURCES OF INFORMATION

Some information concerning public services, utilities, and service systems in the project area was obtained previously during preparation of the Feather-Bear Rivers Levee Setback Project (F-BRLSP) draft environmental impact report (DEIR) (September 2004) and the Yuba-Feather Supplemental Flood Control Program (Y-FSFCP) programmatic DEIR (October 2003). For these DEIRs, information was collected during a site visit; in conversations with project engineers; from Appendix E, "Preliminary Design," of the report on feasibility of the Y-FSFCP (Yuba County Water Agency 2003); in interviews with County Planning Department staff members; correspondence and conversations with various service providers; and maps showing the locations of existing utilities. That information has been supplemented for the Feather River Levee Repair Project (FRLRP) by information from the County Community Development Department, County Public Works Department, Olivehurst Public Utility District (OPUD), the Linda County Water District, and project engineers. Detailed utility information has not yet been collected for the area northeast of Star Bend being considered for a detention basin and soil borrow site (see Figure 4-1, "FRLRP Project Features," in Chapter 4). If this site is ultimately selected for a detention basin/soil borrow area, further utility information will be collected during the detailed design phase.

SERVICE PROVIDERS

Most of the project area is in the OPUD water and sewer sphere of influence. For a majority of this area, particularly in project Segments 1 and 2, there are no OPUD water or sewer lines, and local residents and businesses rely on wells and septic systems. OPUD does provide water and sewer service in the vicinity of Segment 3 east of Feather River Boulevard near Olivehurst (Tillotson, pers. comm., 2006). In the northern portion of Segment 3, Linda County Water District provides water and sewer service to areas north and west of the Yuba County Airport between the levee and State Route (SR) 70, near Linda.

Reclamation District (RD) 784 manages a majority of the storm drainage systems in the project area. (Shaw, pers. comm., 2006.) However, Yuba County (County) manages some of the storm drainage facilities in the more heavily developed areas near Segment 3.

Pacific Gas and Electric Company (PG&E) maintains the electrical and gas lines in the project area, and AT&T (formerly SBC Communications) maintains the telephone infrastructure. Comcast is the local cable television provider.

The Linda Fire Protection District provides fire protection for all of project Segments 1 and 3 and the majority of Segment 2. OPUD provides fire protection for a small portion of Segments 2 and 3 from Ella Avenue north to the Yuba County Airport (Shaw, pers. comm., 2006). The nearest staffed Linda Fire Protection District station is on Scales Road in Linda; there is also an unstaffed volunteer station at the intersection of Broadway and Arboga Road, east of project Segment 2 approximately 2 miles south of Olivehurst (Cucci, pers. comm., 2006). The County Sheriff's Department provides police protection for the project area.

EXISTING PUBLIC SERVICES, UTILITIES, AND SERVICE SYSTEMS

Project Segment 1

Public utilities and associated structures in project Segment 1 consist primarily of infrastructure related to agricultural operations (electrical lines and drainage improvements). Figure 5.12-1, "Public Utilities, Service Systems, and Structures in the Vicinity of Project Segment 1," shows the approximate locations of existing public utilities and service systems near the left (east) bank levee of the Feather River in Segment 1.

Aboveground PG&E 12-kilovolt (kV) electrical transmission lines on wooden poles parallel County Road 512 and an unnamed road that zigzags to the southwest from its intersection with Feather River Boulevard and County Road 512. A segment of electrical transmission line connects to RD 784 Pump Station No. 2, which consists of two large pumps, a 7-foot-wide by 5-foot-high concrete box culvert through the levee to allow gravity flow of drainage water to the Feather River, and two 36-inch diameter discharge pipes connected to the pumps to discharge water to the river when the river level is too high for gravity flow (MHM Inc. n.d., GEI 2006). Segments of the transmission lines connect to two privately owned irrigation wells near the project area (Pacific Gas and Electric Company 2001; Chambers, pers. comm., 2004). Other segments of the electrical transmission lines connect with privately owned irrigation wells that serve land and facilities near the levee, as well as with several privately owned irrigation lines (Yuba County Water Agency 2003).

An underground electrical cable also crosses the Feather River left bank levee near Algodon Road to feed the Plumas Mutual pump station. The Plumas Mutual pump station is an irrigation pump station located on the water side of the Feather River left levee near PLM 16.9. The pump station consists of two pumps that supply irrigation water from the Feather River to an irrigation canal that runs parallel to Algodon Road. Two 36-inch diameter pipes cross under the levee to connect the pump station to the canal.

Aboveground telephone poles and lines and some buried lines extend east from the telephone lines that run along Feather River Boulevard east of project Segment 1 (Klein, pers. comm., 2002; Freeman, pers. comm., 2002). Many of the aboveground telephone lines are attached to electrical power poles. In addition, an underground phone line runs along the west side of Feather River Boulevard south of Algodon Road.

Clark Slough is an agricultural drainage canal maintained by RD 784 that is located east of project Segment 1. The canal runs south, then west for approximately 3,500 feet before ending at Pump Station No. 2 (described above). No modifications to Pump Station No. 2 are proposed as part of the FRLRP (Wanket, pers. comm., 2006). Buried irrigation pipelines adjacent to the left bank levee of the Feather River connect with several irrigation risers and standpipes (Figure 5.12-1).

Project Segment 2

Public utilities and associated structures in project Segment 2 (including the existing levee, the levee footprint, and the proposed levee setback area) consist primarily of infrastructure related to agricultural operations (electrical lines and drainage improvements), telephone lines, and a

PG&E high-voltage electrical transmission line. Figure 5.12-2, "Public Utilities, Service Systems, and Structures in the vicinity of Project Segment 2," shows the approximate locations of existing public utilities and service systems near the left bank levee of the Feather River in Segment 2.

The PG&E 115-kV high-voltage transmission line referred to as the Bogue Loop line crosses the northern end of project Segment 2 between Ella Road and Murphy Road and is supported by steel transmission towers. Several PG&E overhead electrical lines on wooden poles also extend into the area. Lines and tributaries run from the east into the project area at Ella Road, West Ella Avenue, Broadway, and Country Club Avenue on approximately 120 poles. These lines provide electricity to residences and agricultural operations. The two lines that are parallel to Ella Avenue and Country Club Avenue pass through the proposed levee setback area and continue west of the existing levee (Pacific Gas and Electric Company 2001). These distribution lines service existing river diversion pumps across the Feather River. An overhead line on wooden poles also passes across the northern edge of the area being considered for a detention basin/soil borrow site.

Aboveground telephone poles and lines, as well as some buried lines, lead from the telephone lines that run along Feather River Boulevard into the proposed levee setback area to serve individual homes (Klein, pers. comm., 2002; Freeman, pers. comm., 2002). Aboveground telephone lines are typically attached to the wooden poles supporting electrical lines described above. A PG&E natural gas pipeline runs along the east side of Feather River Boulevard in the Star Bend area.

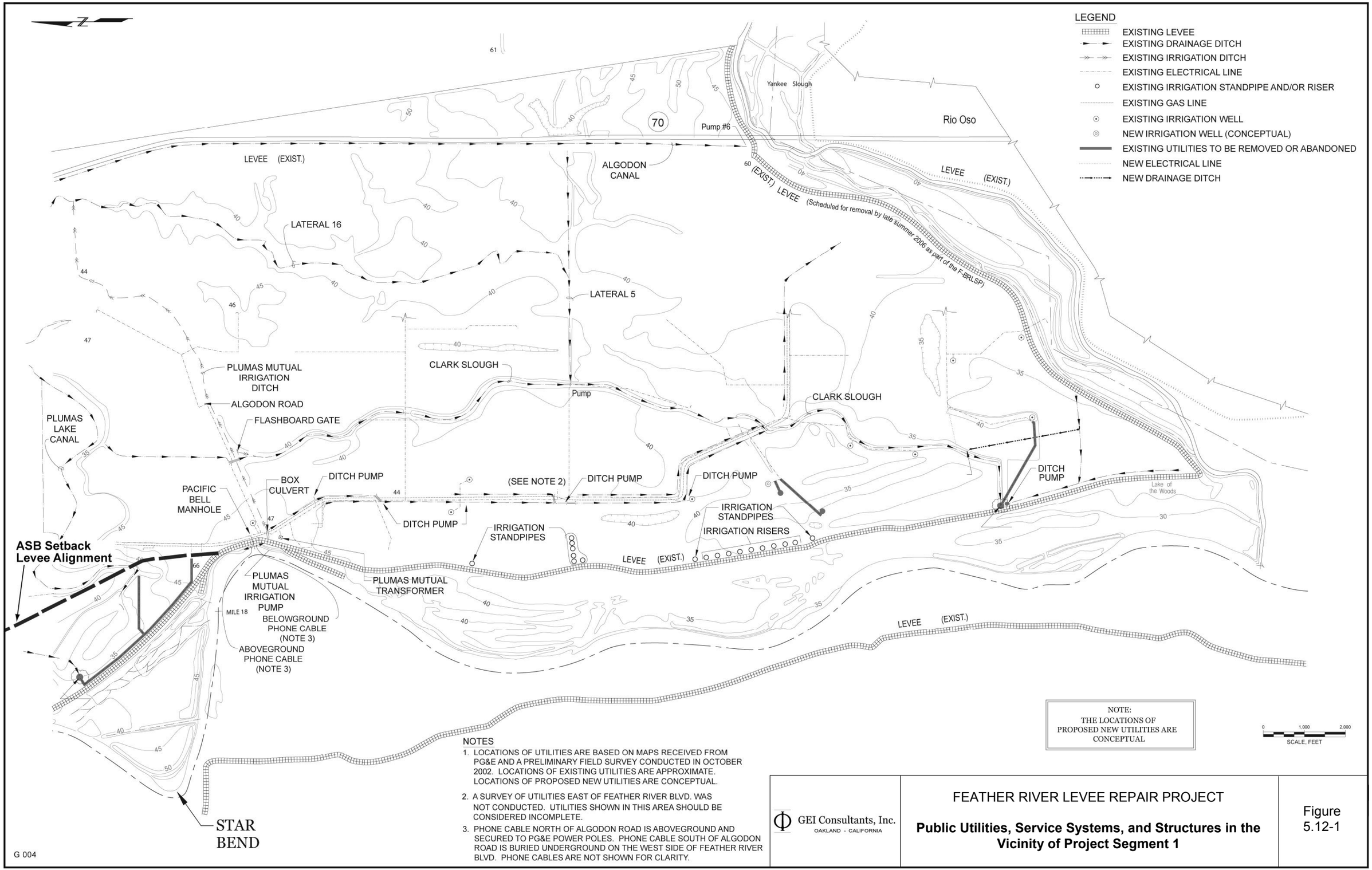
RD 784 maintains the Lateral 6 Canal, which lies entirely within and drains portions of the proposed levee setback area; the Lateral 7/8 Canal, which crosses the proposed Above Star Bend (ASB) setback levee alignment in a buried culvert and empties from the east into Lateral 6; and the Plumas Lake Canal, which drains out of Algodon Canal and crosses the proposed detention basin/soil borrow area site and the proposed setback levee alignment near its south end, running west approximately 1,500 feet into the proposed ASB levee setback area. Both the Lateral 6 Canal and the Plumas Lake Canal drain into a pond. The water in this pond is pumped over the levee into the Feather River floodway by RD 784 Pump Station No. 3 (MHM Inc. n.d.).

In addition to these public utilities and service systems, approximately 20 privately owned wells and several private irrigation lines serve land and facilities along project Segment 2 and possibly some land uses east of the proposed levee setback area (Yuba County Water Agency 2003).

Project Segment 3

Public utilities and associated structures in project Segment 3 consist of both infrastructure related to agricultural operations and infrastructure supporting residential and other urban uses in the area. Figure 5.12-3, "Public Utilities, Service Systems, and Structures in the Vicinity of Project Segment 3," shows the approximate locations of existing public utilities and service systems near the left bank levee of the Feather River in Segment 3.

Several 12-kV overhead power distribution lines cross the Feather and Yuba River left bank levees in project Segment 3. Starting in the southern portion of Segment 3, a line crosses the



NOTES

1. LOCATIONS OF UTILITIES ARE BASED ON MAPS RECEIVED FROM PG&E AND A PRELIMINARY FIELD SURVEY CONDUCTED IN OCTOBER 2002. LOCATIONS OF EXISTING UTILITIES ARE APPROXIMATE. LOCATIONS OF PROPOSED NEW UTILITIES ARE CONCEPTUAL.
2. A SURVEY OF UTILITIES EAST OF FEATHER RIVER BLVD. WAS NOT CONDUCTED. UTILITIES SHOWN IN THIS AREA SHOULD BE CONSIDERED INCOMPLETE.
3. PHONE CABLE NORTH OF ALGODON ROAD IS ABOVEGROUND AND SECURED TO PG&E POWER POLES. PHONE CABLE SOUTH OF ALGODON ROAD IS BURIED UNDERGROUND ON THE WEST SIDE OF FEATHER RIVER BLVD. PHONE CABLES ARE NOT SHOWN FOR CLARITY.

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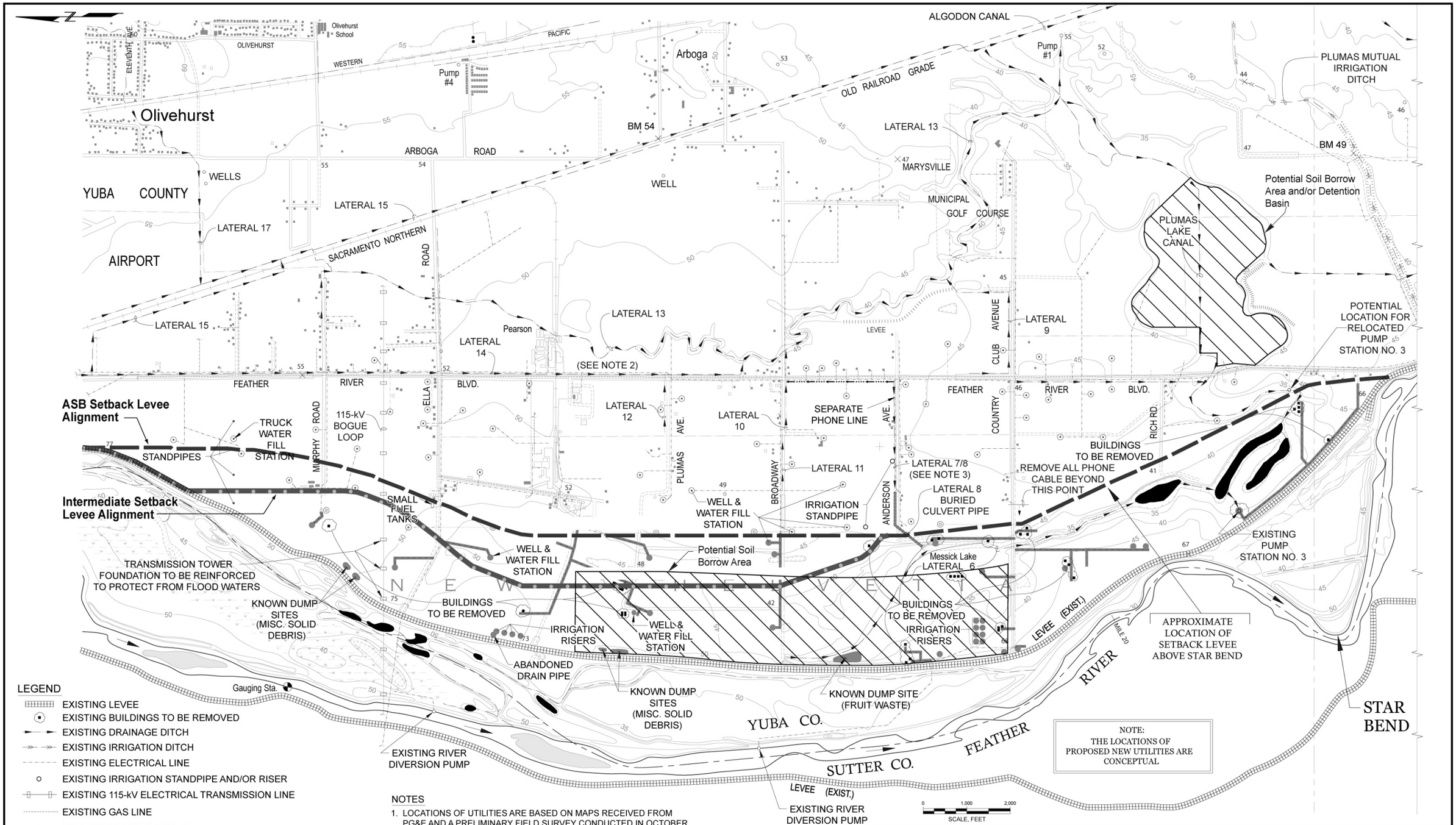
FEATHER RIVER LEVEE REPAIR PROJECT

Public Utilities, Service Systems, and Structures in the Vicinity of Project Segment 1

Figure 5.12-1

Source: Yuba County Water Agency 2003



NOTES

1. LOCATIONS OF UTILITIES ARE BASED ON MAPS RECEIVED FROM PG&E AND A PRELIMINARY FIELD SURVEY CONDUCTED IN OCTOBER 2002. LOCATIONS OF EXISTING UTILITIES ARE APPROXIMATE. LOCATIONS OF PROPOSED NEW UTILITIES ARE CONCEPTUAL.
2. A SURVEY OF UTILITIES EAST OF FEATHER RIVER BLVD. WAS NOT CONDUCTED. UTILITIES SHOWN IN THIS AREA SHOULD BE CONSIDERED INCOMPLETE.
3. LATERAL 7/8 WILL BE REGRADED TO DRAIN EAST TOWARD FEATHER RIVER BOULEVARD.

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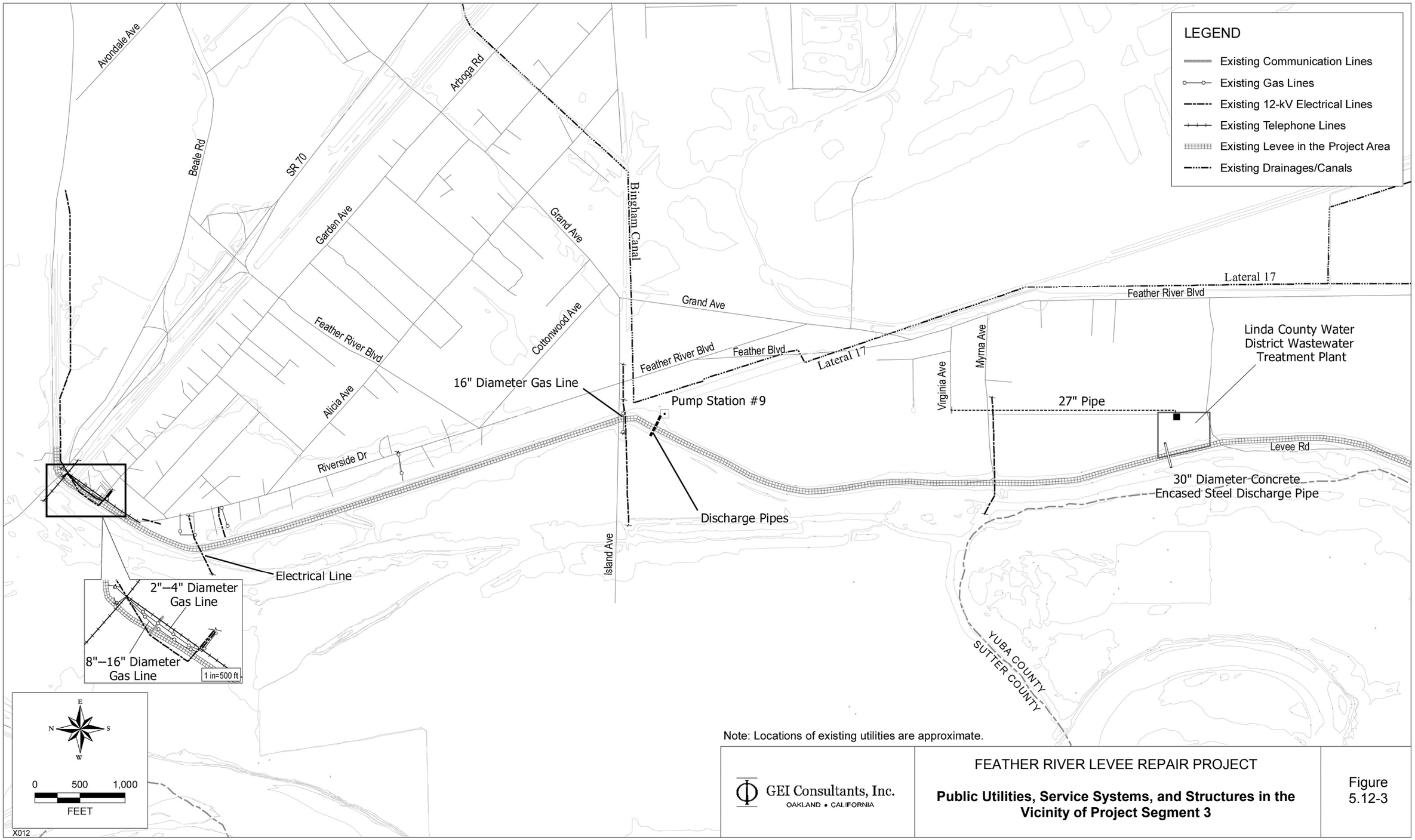
FEATHER RIVER LEVEE REPAIR PROJECT

Public Utilities, Service Systems, and Structures in the Vicinity of Project Segment 2

Figure 5.12-2

Source: Yuba County Water Agency 2003



Note: Locations of existing utilities are approximate.

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FEATHER RIVER LEVEE REPAIR PROJECT

Public Utilities, Service Systems, and Structures in the Vicinity of Project Segment 3

Figure 5.12-3

Sources: GEI Consultants, Inc. 2006; U.S. Army Corps of Engineers As-Built Plans for Sacramento River Flood Control System Phase II, revised April 1999, CaSIL 1998

levee at Myrna Avenue. A second line crosses the levee along the south side of Island Road and a spur line splits from this line at the levee crest to feed Pump Station No. 9. Pump Station No. 9 consists of two pumps that discharge drainage water into the Feather River via pipes installed in the levee. A third 12-kV overhead electrical line crosses the levee approximately 250 feet south of the confluence of the Yuba and Feather Rivers. Another line runs along the crown of the Yuba River levee from the end of Garden Avenue eastward across the Western Pacific Railroad crossing.

Overhead telephone lines are attached to power poles along several of the alignments described above. A buried cable television line runs along the landside toe of the Yuba River left bank levee for approximately 900 feet just west of the Western Pacific Railroad crossing.

Based on drawings provided by PG&E, a 16-inch diameter gas line crosses the Feather River left bank levee in project Segment 3 along the south side of Island Road (GEI 2006). In addition, a gas line that varies from 8 to 16 inches in diameter follows the crest of the levee embankment from the end of Garden Avenue to the Western Pacific Railroad and SR 70. A smaller gas line that varies from 2 to 4 inches in diameter parallels this 10-inch line, but is installed within the levee closer to the landside toe.

On the land side of the levee at approximately PLM 23.9 is the Linda County Water District Wastewater Treatment Plant. Based on available drawings, a 30-inch-diameter concrete encased steel discharge pipe extends beneath the levee from the treatment plant to a junction box at the waterside toe of the levee.

Surface runoff from the primarily urban northern reach of Segment 3 is conveyed by Lateral 15 to Pump Station No. 9, where it is pumped over the levee to the Feather River (Figure 5.12-3). Surface runoff from the primarily agricultural southern reach of Segment 3 is conveyed by the Algodon Canal to Pump Station No. 6 (in the southern portion of the RD 784 area), where it is discharged to the Bear River. RD 784 plans to construct a new pump station on Ella Road to divert the runoff from the area encompassing the southern portion of Segment 3, along with runoff from planned development to the east, directly to the Feather River. The schedule for construction of this pump station is not known at this time.

5.12.3 ENVIRONMENTAL IMPACTS

THRESHOLDS OF SIGNIFICANCE

Thresholds for determining the significance of impacts related to public services, utilities, and service systems are based on the environmental checklist form in Appendix G of the California Environmental Quality Act Guidelines (State CEQA Guidelines). A project alternative would have a significant impact on public services, utilities, and service systems if it would:

- increase risk of structural failure of, or substantially interfere with service from, existing gas facilities and pipelines, electrical transmission or distribution lines, telephone lines, drainage improvements, or water distribution facilities;
- increase demand for emergency services, power or natural gas facilities, communications systems, water infrastructure, sewer lines, or solid-waste services beyond their current

capacity, resulting in substantial adverse physical changes associated with meeting the increased demand; or

- increase response times for emergency service providers.

Because the FRLRP does not include new development, it would not result in demand for increased natural gas facilities, communication systems, water infrastructure, sewer lines, or solid-waste services beyond their current capacity. Therefore, increased demand for these services is not evaluated. Effects of project alternatives on local drainage systems are addressed in Section 5.3, "Water Resources and River Geomorphology."

IMPACT ANALYSIS

Alternative 1 – The Levee Strengthening Alternative

Impact LS-5.12-a

Damage of Public Utility Infrastructure and Disruption of Service in the Project Area. Various aboveground and buried utility lines identified in the project area either are near or cross the Feather River and Yuba River levee segments planned for repair and strengthening and the area considered for a detention basin/soil borrow site. The potential exists for additional buried gas, electrical, cable television, or telephone lines that have not already been identified to be located near or to cross these areas. Construction activities associated with project implementation could cause minor damage to public utility infrastructure or temporarily disrupt utility service. However, detailed project design would include consultation with all potential service providers to identify utility line locations and appropriate protection measures, and consultation would continue during construction to ensure avoidance/protection of these utilities as construction proceeds. Implementation of Alternative 1 would not result in substantial interference with gas, electrical, cable television, or telephone service. This impact would be **less than significant.**

Existing utilities in each project segment are described in detail above in Section 5.12.2, "Environmental Setting." Overhead and buried phone lines are located in the vicinity of the levee repair areas in each of the three project segments. Overhead electrical power lines are also located near the Feather and Yuba River levees in all three project segments, and two or more overhead power lines cross over the levees in both Segment 2 and Segment 3. An overhead power line also crosses the northern edge of the area considered as a site for a detention basin/soil borrow area. In Segment 1 a buried power line crosses under the Feather River levee. In Segment 3 one natural-gas pipeline crosses through the Feather River levee, and segments of two additional pipelines parallel a portion of the Yuba River levee buried in the embankment. A buried cable television line is located in the vicinity of the levee in Segment 3. Please note that utility lines related to water/irrigation and drainage are discussed below in Impact LS-5.12-b.

Although service providers have been contacted for information on the locations of utility infrastructure in the project vicinity, and preliminary surveys have been conducted, the potential exists for additional buried utility lines (e.g., gas, electrical, cable television, telephone) that have not been identified to be located near or crossing the project area.

Project activities under Alternative 1 are not anticipated to require existing utilities to be temporarily taken off-line during construction. However, should utility shutdowns be required, they would be temporary and brief (minutes to hours), and they would not substantially interfere with service. Construction activities could cause minor accidental damage to both identified and

unidentified public utility infrastructure, resulting in temporary disruptions to service. However, detailed design would include consultation with all potential service providers to identify utility line locations and appropriate protection measures, and consultation would continue during construction to ensure avoidance/protection of these utilities as construction proceeds. Therefore, the potential for damage to utility infrastructure during construction is remote, and if damage were to occur, disruptions to service would be short term and temporary until repairs were completed.

Implementation of Alternative 1 would not result in substantial interference with gas, electrical, cable television, or telephone service. This impact would be less than significant.

Impact LS-5.12-b

Damage of Water Supply and Drainage Facilities and Interference with Service in the Project Area. Various aboveground and buried water supply and drainage lines identified in the project area either are near or cross the Feather River and Yuba River levee segments planned for repair and strengthening and the area considered for a detention basin/soil borrow site. The potential exists for additional buried water supply and drainage facilities that have not already been identified to be located near or to cross these areas. Construction activities associated with project implementation could damage water supply and drainage infrastructure or temporarily disrupt service. However, detailed project design would include consultation with appropriate agencies and individuals responsible for water delivery and drainage facilities in the area to identify facility locations and appropriate protection measures, and consultation would continue during construction to ensure avoidance/protection of these utilities as construction proceeds. In addition, the project would be designed to maintain water supply and drainage service equivalent to existing conditions. Implementation of Alternative 1 would not result in substantial interference with water supply or drainage service. This impact would be **less than significant.**

Existing utilities in each project segment are described in detail above in Section 5.12.2, “Environmental Setting.” In both Segments 1 and 2 buried irrigation pipes and irrigation risers are located adjacent to the levee repair areas and nearby wells and drainage canals (e.g., Clark Slough, Lateral 6 canal, Lateral 7/8 canal, Plumas Lake Canal). Clark Slough terminates at Pump Station No. 2 in Segment 1. Pump Station No. 2 includes a 7-foot by 5-foot box culvert through the Feather River levee to allow gravity flow of drainage water into the river, as well as two 36-inch diameter pipelines through the levee for use when gravity flow is not possible and drainage water must be actively pumped into the river. Canals in Segment 2 drain to Pump Station No. 3, which also includes pipelines that pass through the Feather River levee. The Plumas Lake Canal Cross the area being considered for a detention basin/soil borrow site. In Segment 3, Pump Station No. 9 discharges drainage water into the Feather River via pipes installed in the levee.

On the river side of the Feather River levee in Segment 1 is the Plumas Mutual pump station. This station pumps irrigation water from the river to the land side of the levee via two 36-inch pipelines that cross under the levee. The Linda Water District Wastewater Treatment Plant in Segment 3 includes a 30-inch diameter discharge pipeline that passes beneath the Feather River levee.

These water supply and drainage facilities consist of substantial infrastructure elements, and significant effort could be required to repair, relocate, or replace these elements depending on the levee repair and construction methods implemented at each location. For example, trenching for slurry cutoff walls would likely pass through pipelines and culverts buried in the levee

embankment; repair, replacement, or relocation of the pipelines would be required for service to continue. If stability berms were installed over existing irrigation pipelines or standpipes, these facilities would have to be relocated for service to continue.

During detailed project design the presence of existing water supply and drainage infrastructure would be considered in selecting appropriate levee repair methods and construction practices. Where possible, repair methods and construction practices would be selected that would not affect existing infrastructure. If effects could not be avoided, appropriate infrastructure repair, replacement, or relocation activities would be included in the project design and implemented during construction. Repair, replacement, or relocation of infrastructure elements would provide water supply and drainage service equivalent to existing conditions. The detailed project design would include consultation with appropriate agencies and individuals responsible for water delivery and drainage facilities in the area to identify facility locations and appropriate protection or corrective measures. Consultation would continue during construction to ensure appropriate implementation of avoidance/protection or corrective measures as construction proceeds.

Although reasonable attempts have been made to determine the locations of water supply and drainage infrastructure in the project area, and preliminary surveys have been conducted, the potential exists for additional buried infrastructure elements that have not already been identified to be located near or cross the project area. Construction activities could cause minor accidental damage to both identified and unidentified utility infrastructure, resulting in temporary disruptions to service. However, as stated above, detailed project design would include consultation with all potential service providers to identify infrastructure locations and appropriate protection measures, and consultation would continue during construction to ensure avoidance/protection of facilities as construction proceeds. Therefore, the potential for accidental damage to utility infrastructure during construction is remote, and if damage were to occur, disruptions to service would be short term and temporary until repairs were completed.

Construction of Alternative 1 could result in the need to temporarily take individual water supply and drainage infrastructure elements out of service for short periods. However, various methods are available to prevent or minimize service interruptions: service interruptions could be staged (i.e., one pipeline taken off-line while another pipeline remains available) or timed when service is not needed (i.e., irrigation pipelines shut down during periods of low irrigation demand), or temporary replacement pipelines or other infrastructure could be installed during construction. If utility shutdowns are required, they would be temporary and implemented in a manner designed to avoid adversely affecting service.

Based on the information provided above, implementation of Alternative 1 would not result in substantial interference with water supply or drainage services. This impact would be less than significant.

Impact LS-5.12-c

Potential for Conflicts with Emergency Response Vehicles during Construction. Feather River Boulevard is an emergency-vehicle route. The increased traffic on Feather River Boulevard associated with levee repair and strengthening activities could increase emergency response times and otherwise make access to the area more difficult for emergency service providers. This impact would be **potentially significant.**

Feather River Boulevard provides access for emergency vehicles to areas of southwestern Yuba County and to the Feather River (via the Star Bend Boat Launch and Fishing Access). No accidents related to river recreation that required emergency response have occurred in several years. Development in this part of the county is relatively sparse, including scattered rural residences and two fruit packing warehouses along Feather River Boulevard. However, areas of higher density development occur near the northern end of Feather River Boulevard in project Segment 3, and at the southern end in the Plumas Lake area in Segment 1. Emergency access from SR 70 to areas near this roadway is generally expected to be related to fire control during dry months and flood control during wet months (Boeck, pers. comms., 2002 and 2004).

Project construction would occur over a period of approximately 2 years. It is important that access to areas along Feather River Boulevard remains open for emergencies related to late-season flood events, and particularly for potential fire-control events during the dry season. The increased traffic on Feather River Boulevard from trucks and other vehicles associated with levee repair and strengthening activities could increase emergency response times and otherwise make access to the area more difficult for emergency service providers. This impact would be potentially significant.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impact ASB-5.12-a

Damage of Public Utility Infrastructure and Disruption of Service in the Levee Repair and ASB Levee Setback Areas. Impacts related to utilities in project Segments 1 and 3 and the area considered for a detention basin/soil borrow site would be the same as those described above in Impact LS-5.12-a under Alternative 1. Most of the public utilities in the proposed ASB levee setback area in Segment 2 would no longer be needed and would be removed. However, a PG&E transmission line and two PG&E distribution lines cross this area and would remain in place under project implementation, and floodwaters could threaten the stability of the steel towers and wooden poles that support these lines. In addition, buried utilities could be present in locations that have not been identified in preliminary surveys and contact with service providers. Utilities infrastructure remaining in the levee setback area could be damaged by levee construction, by a proposed soil borrow area, or by floodwaters passing through the setback area, possibly resulting in interruption of service. This impact would be **potentially significant.**

Impacts related to utilities resulting from levee repairs and strengthening in project Segments 1 and 3 and use of the area considered for a detention basin/soil borrow site would be the same as those described above in Impact LS-5.12-a under Alternative 1.

Several electrical transmission and distribution lines are located within the proposed ASB levee setback area in Segment 2, and some above- and belowground telephone lines extend into the area. A buried PG&E natural-gas pipeline also runs along the east side of Feather River Boulevard in the Star Bend area. Buried lines in the levee setback area and the transmission towers and wooden power poles that support the aboveground lines are currently protected from regular flooding by the existing levee. With implementation of the levee setback, flood waters would occasionally flow through the setback area. This flooding could have a detrimental effect on these utilities, as flood waters are likely to inundate any underground utility lines in the levee setback area and could threaten the stability of power poles and transmission towers and the lines they support. In addition, a proposed soil borrow site in the levee setback area could adversely affect aboveground and buried utilities.

All of the telephone lines and most of the electrical lines in the proposed levee setback area serve the existing residences and agricultural wells, buildings, and pump station in the levee setback area and terminate there. These structures and facilities would need to be removed before the setback levee is completed and the floodway is expanded, halting the need for continued service in the levee setback area itself. Those electrical and telephone lines that currently serve these existing uses would be removed as well, and no service disruption would be associated with their removal. It is unclear at this time whether the natural-gas pipeline in Feather River Boulevard near Star Bend only serves facilities in the levee setback area, or whether it is a segment of a longer pipeline that delivers natural gas to other areas. For the purposes of this analysis, a conservative approach is taken and it is assumed that the pipeline serves other areas.

In addition to the electrical lines that terminate in the proposed levee setback area, the PG&E Bogue Loop 115-kV high-power transmission line and two PG&E distribution lines cross the ASB levee setback area. The Bogue Loop line crosses the northern end of the proposed levee setback area in an east-west direction and continues into Sutter County west of the project area. The other lines parallel Ella Avenue and Country Club Avenue and terminate west of the existing levee (Figure 5.12-2). It is assumed that all of these lines would need to be maintained to continue to serve existing uses. However, with implementation of the levee setback, the lower parts of the transmission towers and poles supporting these lines within the levee setback area would be subject to periodic flooding and could be damaged by the force of flood waters in the expanded floodway. The preliminary design of the setback levee suggests that reinforcement of these structures would be necessary, and that the distribution lines may need to be raised at the setback levee crossing. The PG&E natural-gas pipeline in Feather River Boulevard (if it were to be retained) would be subject to the same periodic flooding and could possibly require additional reinforcement or protection, such as being reburied at a greater depth.

Design engineers conducted a preliminary survey in October 2002 of the existing facilities and utilities that would be affected by the levee setback. The following is a summary of the assessment of the identified utilities and conceptual plans for their removal, relocation, or reinforcement, as described in Appendix E, “Preliminary Design,” of Yuba County Water Agency’s (YCWA’s) report on feasibility of the Y-FSFCP (Yuba County Water Agency 2003). Additional or updated information collected in 2006 as part of preliminary design investigations and during additional field reviews has been added where appropriate.

Electrical Transmission Lines. It is expected that the steel towers supporting the Bogue Loop in the levee setback area would remain in their current locations, but that their foundations and the lower part of the towers would need to be reinforced to resist water forces and scour during flood inundation.

Electrical Power Distribution Lines. The 12-kV power distribution lines that currently supply residences, wells, buildings, and pump stations in the levee setback area would be removed from this area once the facilities that are serviced by the lines are removed, or in the case of Pump Station No. 3, relocated to the land side of the levee. In addition, two power distribution lines that service existing river diversion pumps—one line just south of the 115-kV transmission line paralleling Ella Avenue, and the other paralleling Country Club Avenue—cross the Feather River. These two lines would remain in place, but the poles in the levee setback area may need reinforcement. The lines may need to be upgraded where they cross the setback levee to provide

the appropriate clearance in accordance with California Code of Regulations (CCR) Section 123. New distribution lines would be installed to service replacement wells and relocated pump stations.

Natural-Gas Lines. A buried PG&E natural-gas pipeline runs along the east side of Feather River Boulevard in the Star Bend area. It is unclear at this time whether this pipeline only serves facilities in the setback area, or whether it is a segment of a longer pipeline that delivers natural gas to other areas. For the purposes of this analysis, a conservative approach is taken and it is assumed that the pipeline serves other areas and would be retained. Further study would be required to determine whether additional reinforcement or protection would be required (such as being reburied at a greater depth) for the pipeline to withstand periodic flooding in the levee setback area.

Overhead Telephone Lines. In general, telephone lines in the project area are aboveground and secured to power poles. One dedicated overhead phone line was observed along Anderson Avenue, but this line would not be affected by the levee setback. All telephone lines in the levee setback area would be removed when the power distribution lines are removed.

Other. No buried communications lines were identified in the levee setback area. However, more detailed surveys will be conducted during detailed design once access to all of the levee setback area becomes available.

It can be assumed that the levee setback would have no effect on electrical and telephone services that currently terminate in the levee setback area because, as described above, these facilities would be removed along with the residences and any other structures they serve. However, the steel towers supporting PG&E's Bogue Loop, the wooden poles supporting the PG&E electrical distribution lines that cross the levee setback area, and the buried PG&E natural-gas pipeline in Feather River Boulevard near Star Bend could be damaged by flood waters and/or soil borrow activities if these structures are not reinforced adequately before construction of the setback levee. Electrical and/or natural-gas service outside the levee setback area could be disrupted if these facilities are damaged.

In addition, although service providers have been contacted for information on the locations of utility infrastructure and preliminary surveys of the facilities have been conducted, it is possible that some utilities that could be affected by project implementation may not have been identified.

Construction activity has the potential to affect both identified and unidentified electrical, natural-gas, and telephone infrastructure remaining in the levee setback area, and flood water passing through the levee setback area could damage any infrastructure that remains there, possibly resulting in interruption of service. Therefore, this impact would be potentially significant.

Impact ASB-5.12-b

Damage of Water Supply and Drainage Facilities and Interference with Service in the Levee Repair and ASB Levee Setback Areas. Impacts on water supply and drainage facilities in project Segments 1 and 3 and the area considered for a detention basin/soil borrow site would be the same as those described above in Impact LS-5.12-b under Alternative 1. Implementation of the levee setback would cut off local drainage systems and could damage privately owned water supply systems that serve agricultural uses. The

preliminary design for the setback levee includes conceptual plans for abandoning, relocating, and modifying these systems. Three Rivers Levee Improvement Authority (TRLIA) and its design engineers would coordinate with RD 784 and local landowners to relocate pumps and replace wells and irrigation systems as necessary, as determined in final design. Effects of the levee setback on the drainage system are addressed in Section 5.3, "Water Resources and River Geomorphology." The impact on water supply and drainage facilities would be **less than significant.**

Impacts on water supply and drainage facilities resulting from levee repairs and strengthening in project Segments 1 and 3 and the area considered for a detention basin/soil borrow site would be the same as those described above in Impact LS-5.12-b under Alternative 1.

If RD 784 Pump Station No. 3 in project Segment 2 were left in its current location (which is not proposed under any of the three FRLRP project alternatives), it would be inundated by flood waters with implementation of the levee setback and resulting expansion of the floodway. However, Alternative 2 includes relocation of Pump Station No. 3 to the land side of the ASB setback levee. Therefore, there would be no adverse effects on this facility.

Privately owned wells, water fill stations, and irrigation systems in the levee setback area could be inundated by flood waters, and irrigation systems would also be cut off at the setback levee alignment. In addition, water supply and drainage facilities could be damaged by soil borrow activities. Residences and agricultural uses that rely on some of the wells and the water fill stations would be removed from the levee setback area with project implementation, and the facilities that service them would no longer be needed. However, wells and irrigation systems would be needed for agricultural operations that could continue in the levee setback area.

Design engineers conducted a preliminary survey in October 2002 of the existing water delivery and drainage systems as well as public utilities that would be affected by the levee setback. The locations of facilities that were identified during the survey, and conceptual plans for their disposition, are shown in Figure 5.12-2. The following is a summary of the assessment of the identified water service and drainage components and conceptual plans for their removal, relocation, or reinforcement, as described in Appendix E, "Preliminary Design," of YCWA's report on feasibility of the Y-FSFCP (Yuba County Water Agency 2003), supplemented by information on water well requirements. Additional or updated information collected in 2006 as part of preliminary design investigations and during additional field reviews has been added where appropriate.

Drainage Laterals and Ditches. Lateral 6 lies entirely within the levee setback area. The lateral may be abandoned and/or could be integrated with habitat enhancement/restoration measures if these are implemented in the levee setback area.

Lateral 7/8 currently drains westward and discharges into Lateral 6 through a buried culvert. The buried culvert crosses the setback levee footprint and would be removed. Lateral 7/8 would be regraded to drain eastward along Anderson Avenue to Feather River Boulevard. A new drainage ditch would need to be constructed to discharge the lateral to the most convenient point, which could be either north along Feather River Boulevard to Lateral 10, or south along Feather River Boulevard to Lateral 9. The most appropriate route would be selected during detailed design based on topography, access, capacity of existing drainage facilities, and other considerations.

Wells. Approximately 20 wells were identified within the ASB levee setback area. Standards and requirements for wells are described in DWR Bulletins 74-81 and 74-91 (California Department of Water Resources 1981, 1991). In general, one of the objectives of the standards is to prevent surface waters from entering wells that draw usable groundwater supplies of superior quality. Wells are required to be located and constructed so that the top of the well casing terminates above known levels of flooding by drainage or runoff from the surrounding land, unless this is impracticable and the enforcing agency specifies an alternative means of protection. It is assumed that this requirement would apply to existing wells in the levee setback area. Destruction of the wells within the levee setback area and replacement with wells outside the area is presumed to be more feasible than protecting the existing wells, which might require raising and reinforcing power lines and transformers, modifying casings or installing special valves, changing out pumps, and relocating electrical controls; however, modification of existing wells is not precluded as an option for continuing water supply in the levee setback area (Pujol, pers. comm., 2006). Wells within the levee setback area would be destroyed (or modified) in accordance with the applicable water well regulations. Although most of these wells service land and facilities entirely within the levee setback area, some may also supply water to the land east of this area. Therefore, if wells are destroyed, some replacement wells may have to be installed on the land side of the setback levee. Figure 5.12-2 shows conceptual locations for an estimated five replacement wells. In addition, other wells may have to be installed on the land side of the setback levee to irrigate land within the levee setback area that would continue in agricultural production.

Irrigation Lines. Irrigation pipelines are buried beneath the surface of the levee setback area. Surface manifestations include irrigation risers and standpipes. All irrigation lines would be removed from within the footprint of the setback levee and associated toe easements. Within the levee setback area, lines that are to be abandoned would be plugged and abandoned in place. Risers, standpipes, and other aboveground portions of irrigation lines would be removed. However, irrigation lines would be required to remain within the levee setback area to irrigate the land that would continue in agricultural production. It has been assumed that such existing lines would be connected to modified existing wells, or replacement irrigation wells by means of new lines that would cross the setback levee. Pipeline crossings of the setback levee would be designed in accordance with CCR Section 123.

Final design of the levee setback would include coordination with RD 784 and local landowners to relocate pumps and replace wells and irrigation systems as needed. Replacement of privately owned water supply and delivery facilities (wells and irrigation systems) would depend on the extent of the need for continued irrigation of crops throughout the levee setback area. Such replacement would be considered as part of the land management planning for the levee setback area that TRLIA would conduct with landowners, resource agencies, and other stakeholder groups in final design for the setback levee. Impacts of the levee setback on drainage in the levee setback area are addressed in Section 5.3, “Water Resources and River Geomorphology.” The public-service impact of the levee setback on water supply and drainage facilities that could be damaged by construction activity (i.e., excavation) or through inundation would be less than significant.

Impact ASB-5.12-c

Potential for Conflicts with Emergency Response Vehicles during Construction. This impact would be similar to Impact LS-5.12-a described under Alternative 1 above. However, construction traffic on Feather River Boulevard would potentially be greater under Alternative 2 because of the greater number of truck haul trips associated with construction of the setback levee. For the same reasons as described above, this impact would be **potentially significant.**

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impact IS-5.12-a

Damage of Public Utility Infrastructure and Disruption of Service in the Levee Repair and Intermediate Levee Setback Areas. This impact would be similar to Impact ASB-5.12-a, described under Alternative 2 above. However, the extent of affected utilities would be somewhat less under Alternative 3 because the intermediate setback levee alignment is located farther to the west, resulting in a smaller setback area and effects on fewer facilities. For the same reasons as described above, this impact would be **potentially significant.**

Impact IS-5.12-b

Damage of Water Supply and Drainage Facilities and Interference with Service in the Levee Repair and Intermediate Levee Setback Areas. This impact would be similar to Impact ASB-5.12-b, described under Alternative 2 above. However, the extent of affected water supply and drainage facilities would be somewhat less under Alternative 3 because the intermediate setback levee alignment is located farther to the west, resulting in a smaller setback area and effects on fewer facilities. For the same reasons as described above, this impact would be **less than significant.**

Impact IS-5.12-c

Potential for Conflicts with Emergency Response Vehicles during Construction. This impact would be the same as Impact ASB-5.12-c, described under Alternative 2 above. For the same reasons as described above, this impact would be **potentially significant.**

5.12.4 MITIGATION MEASURES

ALTERNATIVE 1 – THE LEVEE STRENGTHENING ALTERNATIVE

No mitigation is required for Impact LS-5.12-a (damage of public utility infrastructure and service disruption in the project area) and Impact LS-5.12-b (damage of water supply/drainage facilities and service interference in the project area). Mitigation is provided below for Impact LS-5.12-c (potential for conflicts with emergency response vehicles).

LS-5.12-c **Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways.** This measure is identical to Mitigation Measure LS-5.11-b, "Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways," in Section 5.11, "Transportation and Circulation." This mitigation would reduce the potential impact to a less-than-significant level.

ALTERNATIVE 2 – THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impact ASB 5.12-b (damage of water supply/drainage facilities and service interference in the levee repair and setback areas).

Mitigation is provided below for Impact ASB-5.12-a (damage of public utility infrastructure and service disruption in the levee repair and setback areas) and Impact ASB-5.12-c (potential for conflicts with emergency response vehicles).

ASB-5.12-a Coordinate with Utility Providers to Remove, Reinforce, and Modify Public Utility Infrastructure in the ASB Levee Setback Area and Prevent Damage of Facilities. This mitigation would reduce the impact to a less-than-significant level.

TRLIA, the design engineers, or the primary construction contractor for the levee setback, as appropriate, shall implement the following measures before the beginning of construction to ensure that the levee setback does not adversely affect public utility infrastructure or result in interruption of utility service:

(a) Coordinate with PG&E to protect electrical lines that cross the levee setback area. To maintain PG&E electrical service through the Bogue Loop 115-kV high-power transmission line and the two standard electrical lines that run along Ella Avenue and Country Club Avenue, TRLIA or its representative shall coordinate with PG&E to raise, relocate, or reinforce the steel towers and wood poles that stand in the proposed bypass area.

(b) Ensure that all utility lines in the setback area have been identified and removed or reinforced as necessary. TRLIA or its representative shall ensure that any electrical, telephone, gas, and cable television lines within the levee setback area have been identified before the initiation of any ground-disturbing construction activity. Before the beginning of any construction-related ground disturbance, TRLIA or its representative shall coordinate with all potential service providers known to have, or potentially having, utility infrastructure in the levee setback area, including but not limited to PG&E, AT&T, Comcast, OPUD, and RD 784, to ensure that the utility lines are removed or reinforced as appropriate.

Ensuring that flooding of the levee setback area would not affect PG&E overhead lines that would remain in the levee setback area, and ensuring removal or protection of all other public utility infrastructure, would reduce this impact to a less-than-significant level.

ASB-5.12-c Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways. This measure is identical to Mitigation Measure LS-5.11-b, "Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways," in Section 5.11, "Transportation and Circulation." This mitigation would reduce the potential impact to a less-than-significant level.

ALTERNATIVE 3 – THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE

No mitigation is required for Impact IS-5.12-b (damage of water supply/drainage facilities and service interference in the levee repair and setback areas).

Mitigation is provided below for Impact IS-5.12-a (damage of public utility infrastructure and service disruption in the levee repair and intermediate levee setback areas) and Impact IS-5.12-c (potential for conflicts with emergency response vehicles).

IS-5.12-a **Coordinate with Utility Providers to Remove, Reinforce, and Modify Public Utility Infrastructure in the Intermediate Levee Setback Area and Prevent Damage of Facilities.** This measure is identical to Mitigation Measure ASB-5.12-a above. This mitigation would reduce the impact to a less-than-significant level.

IS-5.12-c **Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways.** This measure is identical to Mitigation Measure LS-5.11-b, "Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways," in Section 5.11, "Transportation and Circulation." This mitigation would reduce the potential impact to a less-than-significant level.

5.12.5 IMPACTS REMAINING SIGNIFICANT AFTER MITIGATION

With implementation of the mitigation listed above, all impacts on public services, utilities, and service systems would be reduced to a less-than-significant level.

SECTION 5.13 PALEONTOLOGICAL RESOURCES

Paleontological resources (fossils) are the remains or traces of prehistoric animals and plants. This section assesses the potential for earthmoving activities associated with the proposed levee repairs to affect scientifically important fossil remains, as recommended under the California Environmental Quality Act Guidelines (State CEQA Guidelines). The analysis presented in this section conforms to Society of Vertebrate Paleontology (SVP) criteria.

5.13.1 REGULATORY SETTING

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

No federal plans, policies, or laws related to paleontological resources are applicable to the proposed project.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

No state or local agencies have specific jurisdiction over paleontological resources on private lands. No state or local agency requires a paleontological collecting permit to allow for the recovery of fossil remains discovered as a result of construction-related earthmoving on state or private land in a project site. However, if a state agency were to acquire ownership of project lands, California Public Resources Code Chapter 1.7 ("Archaeological, Paleontological, and Historical Sites"), Section 5097.5, could apply. This section of the Public Resources Code specifies that state agencies may undertake surveys, excavations, or other operations as necessary on state lands to preserve or record paleontological resources.

LOCAL PLANS, POLICIES, REGULATIONS, AND LAWS

No local plans, policies, or ordinances related to paleontological resources are applicable to the proposed project. Yuba County has not adopted goals for protection of paleontological resources.

PROFESSIONAL STANDARDS

The SVP (1995, 1996), a national scientific organization of professional vertebrate paleontologists, has established standard guidelines that outline acceptable professional practices in the conduct of paleontological resource assessments and surveys, monitoring and mitigation, data and fossil recovery, sampling procedures, specimen preparation, analysis, and curation. Most practicing professional paleontologists in the nation adhere to the SVP assessment, mitigation, and monitoring requirements, as specifically spelled out in the organization's standard guidelines. The criteria for determining sensitivity of paleontological resources are described below under "Paleontological Resource Assessment Criteria" and "Thresholds of Significance."

5.13.2 ENVIRONMENTAL SETTING

GEOGRAPHIC LOCATION AND PHYSIOGRAPHIC ENVIRONMENT

As discussed in Section 5.2, "Geology, Soils, and Mineral Resources," the area considered for the Feather River Levee Repair Project (FRLRP) is located in the Sacramento Valley. The Sacramento Valley and the San Joaquin Valley comprise the Great Valley of California, which is located between the Sierra Nevada on the east and the Coast Range mountains on the west.

The Great Valley is composed of thousands of feet of sedimentary deposits that have undergone periods of subsidence and uplift over millions of years. During the Jurassic and Cretaceous periods of the Mesozoic era, the Great Valley existed in the form of an ancient ocean. By the end of the Mesozoic, the northern portion of the Great Valley began to fill with sediment as tectonic forces caused uplift of the basin. By the time of the Miocene epoch, approximately 24 million years ago, sediments deposited in the Sacramento Valley were mostly of terrestrial origin.

Most of the surface of the Great Valley is covered with Recent (Holocene, i.e., 10,000 years Before Present [BP] to present day) and Pleistocene (i.e., 10,000–1,800,000 years BP) alluvium. This alluvium is composed of sediments from the Sierra Nevada to the east and the Coast Range to the west that were carried by water and deposited on the valley floor. Siltstone, claystone, and sandstone are the primary types of sedimentary deposits.

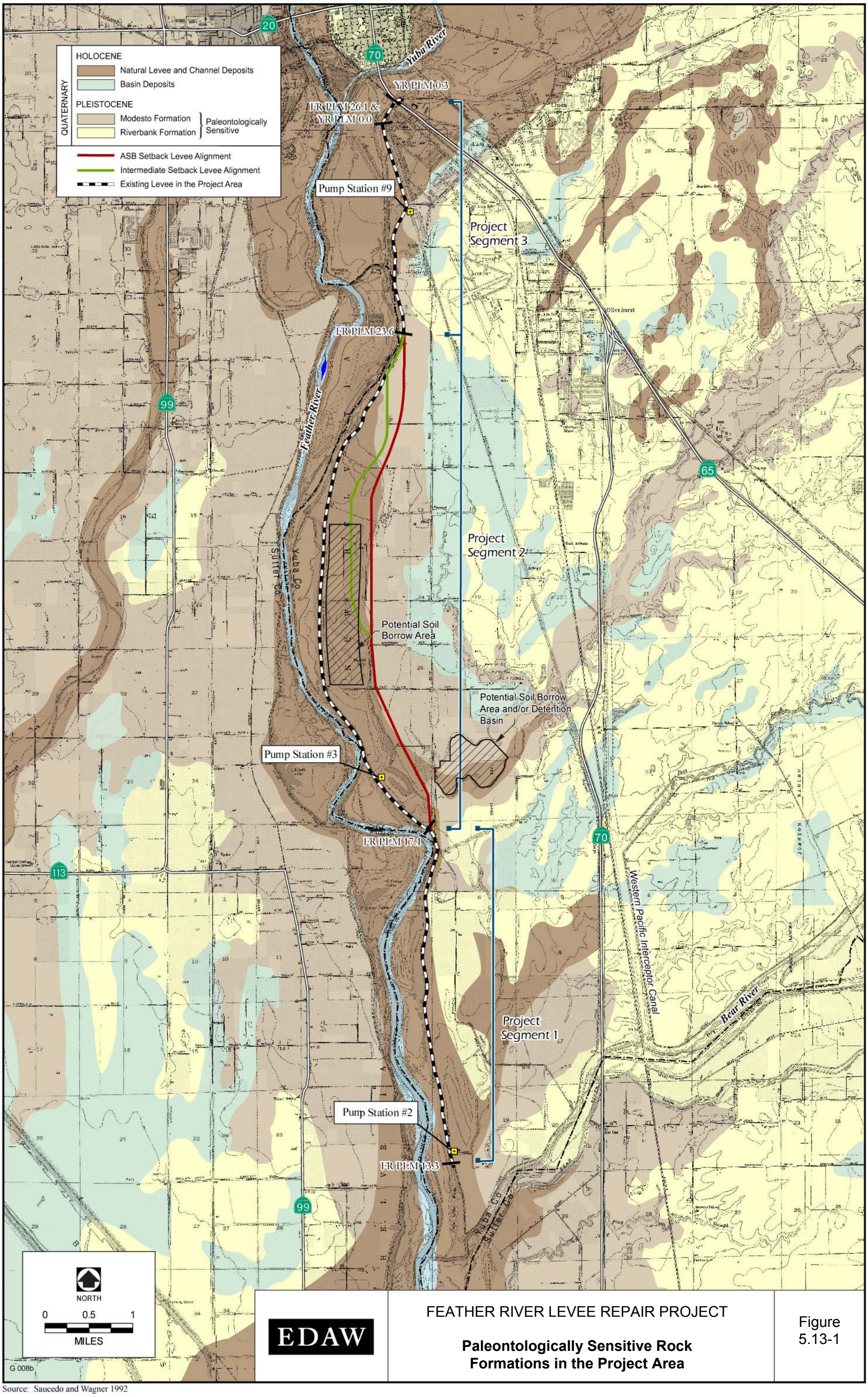
The proposed levee repair area is located entirely within Yuba County and within the U.S. Geological Survey (USGS) Nicolaus, Olivehurst, and Yuba City Quadrangles (1:24,000).

REGIONAL GEOLOGIC SETTING

Geology of the Sacramento Valley has been described in some detail by various authors such as Hackel (1966), Page (1986), Graham and Olson (1988), and Bartow (1991). Geologic history and conditions are relevant to the evaluation of paleontological resources because they influence the type of fossils that may be found (i.e., aquatic vs. terrestrial organisms) and the probability that any prehistoric remains would be subject to fossilization rather than normal decay. As discussed in Section 5.2, "Geology, Soils, and Mineral Resources," the depositional history of the Sacramento Valley during the late Quaternary period included several cycles related to fluctuations in regional and global climate that caused alternating periods of deposition followed by periods of subsidence and erosion. Thus, during the Pleistocene epoch the Sacramento Valley consisted of stages of wetlands and floodplain creation as tidewaters rose in the valley from the west, areas of erosion when tidewaters receded, and alluvial fan deposition from streams emanating from the adjacent mountain ranges (Atwater 1982, Bartow 1991).

Holocene Alluvium

Sediments adjacent to the Feather and Yuba Rivers are composed of Recent (Holocene) alluvial floodplain deposits (Figure 5.13-1, "Paleontologically Sensitive Rock Formations in the Project Area"). In general, these deposits consist primarily of unconsolidated sand and silt. Holocene alluvial deposits overlie an older alluvial fan system composed of Pleistocene-age sediments.



EDAW

FEATHER RIVER LEVEE REPAIR PROJECT

Paleontologically Sensitive Rock Formations in the Project Area

Figure 5.13-1

Source: Saucedo and Wagner 1992

Modesto Formation

Gale et al. (1938) and Piper et al. (1939) were the first to publish detailed geologic maps in the southern Sacramento/northern San Joaquin Valley areas, and designated the older alluvial Pleistocene deposits as the Victor Formation. However, in 1959, Davis and Hall proposed a subdivision of the Victor Formation into the Turlock Lake (oldest), Riverbank (middle), and Modesto (youngest) Formations. The type section (i.e., initial documented discovery) of the Modesto Formation was designated along the south bluff of the Tuolumne River south of the city of Modesto. In 1981, Marchand and Allwardt proposed that the name "Victor Formation" be abandoned and that the Turlock Lake, Riverbank, and Modesto Formations be adopted as formal nomenclature for Quaternary deposits in the Sacramento and San Joaquin Valleys. Researchers since have followed this recommendation.

In the FRLRP project vicinity, the Modesto Formation forms alluvial fans along the Feather River (Figure 5.13-1). Researchers differ as to the age of this formation: Marchand and Allwardt (1981) place the age between approximately 12,000 and 42,000 years BP; Atwater (1982) places the age from 9,000 to 73,000 years BP; and Helley and Harwood (1985) follow Marchand and Allwardt's dating scheme. The Modesto Formation can be divided into an upper and lower member (i.e., distinct upper and lower levels), both of which occur in the project area. The lower member of the Modesto is composed of consolidated, slightly weathered, well-sorted silt and fine sand, locally containing gravels. Age estimates for the lower member range from 42,000 to 73,000 years BP. The upper member of the Modesto is composed of unconsolidated, unweathered gravel, sand, silt, and clay. These deposits form alluvial terraces that are topographically higher than those of the lower member. Age estimates for the upper member range from 12,000 to 26,000 years BP.

Riverbank Formation

Davis and Hall (1959) were the first to name the Riverbank Formation. They designated the type section in the city of Riverbank in an area along the south bank of the Stanislaus River. Sediments in the Riverbank Formation consist of weathered reddish gravel, sand, and silt that form alluvial terraces and fans. In the Sacramento Valley, this formation contains more maficigneous rock fragments than the San Joaquin Valley, and thus tends toward stronger soil-profile developments that are more easily distinguishable from the Modesto Formation.

The Riverbank Formation is Pleistocene in age, but is considerably older than the Modesto Formation; estimates place it between 130,000 and 450,000 years BP. Similar to the Modesto Formation, the Riverbank Formation forms alluvial fans and terraces of the Feather and Bear Rivers; however, Riverbank fans and terraces are higher in elevation and generally have a more striking topography than those formed by the Modesto. In the project area, the Riverbank Formation is found in a mixture with the Modesto Formation, containing more arkosic rocks, along the existing Feather River levee in project Segment 1.

PALEONTOLOGICAL RESOURCE INVENTORY METHODS

A stratigraphic inventory and paleontological resource inventory were completed to develop a baseline paleontological resource inventory of the project area and the vicinity by rock unit, and

to assess the potential paleontological productivity of each rock unit. Research methods included a review of published and unpublished literature and a cursory field survey. These tasks complied with SVP (1995) guidelines.

Stratigraphic Inventory

Geologic maps and reports covering the geology of the project area were reviewed to determine the exposed rock units and to delineate their respective areal distributions in the project area.

Paleontological Resource Inventory

Published and unpublished geological and paleontological literature was reviewed to document the number and locations of previously recorded fossil sites from rock units exposed in and near the project area, as well as the types of fossil remains each rock unit has produced. The literature review was supplemented by an archival search conducted at the University of California Museum of Paleontology (UCMP) in Berkeley, California, on May 30, 2006.

Field Survey

A field reconnaissance was conducted in May 2006 to document the presence of any previously unrecorded fossil sites and of strata that might contain fossil remains. Reconnaissance was limited to inspection of the visible ground surface in the project area. Only those parcels where access was available and that appeared to be underlain by or adjacent to the Modesto Formation were surveyed. The ground surface was clearly visible in all areas surveyed, and the site was completely flat. No exposures of potentially fossiliferous strata were observed in the areas surveyed.

PALEONTOLOGICAL RESOURCE ASSESSMENT CRITERIA

The potential paleontological importance of the project area can be assessed by identifying the paleontological importance of exposed rock units within the area. Because the areal distribution of a rock unit can be easily delineated on a topographic map, this method is conducive to delineating parts of the site that are of higher and lower sensitivity for paleontological resources and to delineating parts of the project area that may therefore require monitoring during construction.

A paleontologically important rock unit is one that (1) has a high potential paleontological productivity rating and (2) is known to have produced unique, scientifically important fossils. The potential paleontological productivity rating of a rock unit exposed at a project site refers to the abundance/densities of fossil specimens and/or previously recorded fossil sites in exposures of the unit in and near the site. Exposures of a specific rock unit at a project site are most likely to yield fossil remains representing particular species in quantities or densities similar to those previously recorded from the unit in and near the site.

A variety of factors are considered in determining whether an individual vertebrate fossil specimen may be considered unique or significant, including whether the fossil is:

- identifiable;
- complete;
- well preserved;
- age diagnostic;
- useful in paleoenvironmental reconstruction;
- a type specimen;
- a member of a rare species;
- a species that is part of a diverse assemblage; or
- a skeletal element different from, or a specimen more complete than, those now available for its species.

For example, identifiable vertebrate marine and terrestrial fossils are generally considered scientifically important because they are relatively rare. The value or importance of different fossil groups varies, depending on the age and depositional environment of the rock unit that contains the fossils, their rarity, the extent to which they have already been identified and documented, and the ability to recover similar materials under more controlled conditions such as part of a research project. Marine invertebrates are generally common, well developed, and well documented. They generally would not be considered a unique paleontological resource.

The following tasks were completed to establish the paleontological importance of each rock unit exposed at the project site:

- The potential paleontological productivity of each rock unit was assessed, based on the number of fossil remains previously documented within the rock unit.
- The potential for rock units exposed within the project site to contain unique paleontological resources was considered.

RESOURCE INVENTORY RESULTS

Stratigraphic Inventory

Regional and local surficial geologic mapping and correlation of the various geologic units in the project vicinity has been provided at a scale of 1:250,000 by Saucedo and Wagner (1992) and 1:62,500 by Helley and Harwood (1985).

Paleontological Resource Inventory and Assessment by Rock Unit

Vertebrate mammalian fossils have proven helpful in determining the relative age of alluvial fan sedimentary deposits (Louderback 1951, Savage 1951, Albright 2000). Mammalian inhabitants

of the Pleistocene alluvial fan and floodplain included mammoths, horses, mastodons, camels, ground sloths, and pronghorns.

The Pleistocene epoch, known as the "great ice age," began approximately 1,800,000 years ago. Surveys of Late Cenozoic land mammal fossils in northern California have been provided by Hay (1927), Stirton (1939), Savage (1951), Lundelius et al. (1983), and Jefferson (1991a, 1991b). On the basis of his survey of vertebrate fauna from the nonmarine Late Cenozoic deposits of the San Francisco Bay region, Savage (1951) concluded that two major divisions of Pleistocene-age fossils could be recognized: the Irvingtonian (older Pleistocene fauna) and the Rancholabrean (younger Pleistocene and Holocene fauna). These two divisions of Quaternary Cenozoic vertebrate fossils are widely recognized today in the field of paleontology. The age of the more Recent Pleistocene, Rancholabrean fauna was based on the presence of bison and on the presence of many mammalian species that are inhabitants of the same area today. In addition to bison, large land mammals identified as part of the Rancholabrean fauna include mammoths, mastodons, camels, horses, and ground sloths.

Holocene Alluvium

Project-related activities that would occur within alluvial floodplain or basin deposits identified in Figure 5.13-1 would be located within Holocene (10,000 years BP and younger) sediments. Because, by definition, an object must be more than 10,000 years old to be considered a fossil, activities in these deposits would not have an impact on paleontological resources.

Modesto and Riverbank Formations

Remains of land mammals have been found at a number of localities in alluvial deposits referable to the Modesto Formation or the Riverbank Formation. Jefferson (1991a, 1991b) compiled a database of California Late Pleistocene vertebrate fossils from published records, technical reports, unpublished manuscripts, information from colleagues, and inspection of museum paleontological collections at more than 40 public and private institutions. Although Jefferson did not list any fossil sites in Yuba County, three nearby sites in Sutter County have yielded Rancholabrean vertebrate fossils recovered from Pleistocene-age sediments. The closest vertebrate fossil to the project site was recovered from an area across the Feather River approximately 3.5 miles west of the levee, near Yuba City (UCMP V-6426), in sediments referable to the Modesto Formation. This site yielded a vertebra from a Pleistocene (Irvingtonian) age Proboscidea, an order that includes mammoths, mastodons, and elephants. UCMP locality V-3915 on Oswald Road, approximately 8 miles northwest of the project area, yielded remains from a Pleistocene-age bison in sediments referable to the Modesto Formation. UCMP locality V-4043 in the Sutter Buttes, approximately 12 miles northwest of the northern end of the project area, yielded remains from a Pleistocene-age horse in sediments referable to the Riverbank Formation.

Fossil specimens from the Modesto Formation have been reported by Marchand and Allwardt (1981) near the type locality in the city of Modesto. These authors also reported fossil specimens from the Riverbank Formation near its type locality in the city of Riverbank. Other locations are also known throughout the northern and Central Valley (University of California Museum of Paleontology 2006). For example, there are several sites approximately 20–30 miles away in

Yolo County, near the cities of Davis and Woodland, that have yielded Rancholabrean-age rodents, snakes, horses, antelope, Harlan's ground sloth, mammoth, and saber-toothed tiger from sediments referable to both the Modesto and Riverbank Formations (Hay 1927, University of California Museum of Paleontology 2004). There are at least eight recorded Rancholabrean-age vertebrate fossil sites from the Riverbank Formation in the city of Sacramento, approximately 20 miles south of the project area (Hilton et al. 2000, Kolber 2004, University of California Museum of Paleontology 2006). These sites have yielded remains of mammoth, bison, coyote, horse, camel, antelope, several types of reptiles, and Harlan's ground sloth.

Results of a paleontological records search at the UCMP indicated no fossil remains within the project area, and no fossils were observed during a cursory field visit. However, the occurrence of Pleistocene vertebrate fossil remains in sediments referable to the Modesto and Riverbank Formations from near Yuba City, other locations in Sutter County, as well as in Davis, Woodland, and numerous other areas throughout the northern and Central Valleys, suggests there is a potential for uncovering additional similar fossil remains in appropriate rock/soil types during construction-related earthmoving activities within the project area.

5.13.3 ENVIRONMENTAL IMPACTS

THRESHOLDS OF SIGNIFICANCE

Thresholds for determining the significance of impacts related to paleontological resources are based on the environmental checklist form in Appendix G of the State CEQA Guidelines, and on the SVP criteria discussed below. Based on the State CEQA Guidelines, a project alternative would have a significant impact on paleontological resources if it would directly or indirectly destroy a unique paleontological resource or site.

In its standard guidelines for assessment and mitigation of adverse impacts on paleontological resources, the SVP (1995) established three categories of sensitivity for paleontological resources—high, low, and undetermined:

- **High sensitivity.** Areas where fossils have been previously found are considered to have a high sensitivity and a high potential to produce fossils. In areas of high sensitivity that are likely to yield unique paleontological resources, full-time monitoring is typically recommended during any project ground disturbance.

- **Low sensitivity.** Areas that are not sedimentary in origin and that have not been known to produce fossils in the past typically are considered to have low sensitivity and monitoring is usually not needed during project construction.

- **Undetermined sensitivity.** Areas or rock formations that have not had any previous paleontological resource surveys or fossil finds are considered undetermined until surveys and mapping are performed to determine their sensitivity. After reconnaissance surveys, observation of exposed cuts, and possibly subsurface testing, a qualified paleontologist can determine whether the area should be categorized as having a high or low sensitivity.

In keeping with the significance criteria of the SVP (1995), all vertebrate fossils are generally categorized as having potential significance based on their scientific value.

IMPACT ANALYSIS

Alternative 1 – The Levee Strengthening Alternative

Impact LS-5.13-a

Disturbance of Unknown Paleontological Resources during Earthmoving Activities. Portions of the project area and immediate vicinity are underlain by the Modesto and Riverbank Formations, which are paleontologically sensitive rock formations. Construction activities in the Modesto and Riverbank Formations associated with proposed levee strengthening (e.g., slurry cutoff walls, relief wells), use of the soil borrow area/detention basin location, and related activities (e.g., relocation of Pump Station No. 3) could adversely affect unknown subsurface paleontological resources. This impact would be **potentially significant**.

Based on the records search conducted at the UCMP, there are no previously recorded fossil sites within the project area. The nearest recorded fossil site, UCMP V-6426, is located approximately 3.5 miles west of the project area. By definition, sediments associated with Holocene-age alluvium do not contain paleontologically sensitive resources; therefore, earthmoving activities in most of the sediments contained within and adjacent to the existing levee would result in no impacts on paleontological resources.

However, segments of the northern portion of the existing levee are located in Pleistocene-age sediments of the Modesto Formation and a portion of the existing levee in the northern portion of project Segment 1 is located in the Riverbank Formation (Figure 5.13-1). In addition, most of the area east of Star Bend that has been identified as a potential detention basin and/or soil borrow site is underlain by Modesto Formation sediments. The Modesto and Riverbank Formations are paleontologically sensitive rock formations under SVP criteria. In these areas, construction activities on and slightly below the existing ground surface would not adversely affect resources because Pleistocene-age fossils would not be encountered until approximately 10 feet below ground surface. However, excavations deeper than 10 feet, such as for the installation of slurry cutoff walls in the levee alignment or installation of relief wells, have the potential to encounter and possibly damage paleontologically sensitive resources. A new location for Pump Station No. 3 has not been identified at this time. If the relocated Pump Station No. 3 were placed in an area underlain by the Modesto Formation rock unit, excavations associated with this facility could also have the potential to encounter and possibly damage paleontologically sensitive resources. This impact would be potentially significant.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impact ASB-5.13-a

Disturbance of Unknown Paleontological Resources during Earthmoving Activities. Portions of the project area and immediate vicinity are underlain by the Modesto and Riverbank Formations, which are paleontologically sensitive rock formations. Construction activities in the Modesto and Riverbank Formations associated with proposed levee strengthening (e.g., slurry cutoff walls, relief wells), construction of the ASB setback levee, use of the soil borrow area/detention basin location, and related activities (e.g., relocation of Pump Station No. 3) could adversely affect unknown subsurface paleontological resources. This impact would be **potentially significant**.

Construction activities to strengthen existing levees in project Segments 1 and 3 and to relocate Pump Station No. 3 could have an adverse impact on paleontological resources, for the reasons described above (for all project segments) in Impact LS-5.13-a. Under Alternative 2, potential

impacts on paleontological resources for project Segments 1 and 3 would be the same as described in Impact LS-5.13-a for Alternative 1.

The northern portion of the proposed ASB levee setback area in project Segment 2 is located entirely within sediments of the Modesto Formation, which is a paleontologically sensitive rock formation under SVP guidelines (Figure 5.13-1) (Society of Vertebrate Paleontology 1995, 1996). The remainder of the ASB levee setback alignment is located on the border between the Modesto Formation and adjacent natural levee and channel deposits, but the final design would favor placing as much of the levee as possible on Modesto Formation sediments because they have better engineering characteristics for levee foundation construction. Piling of soil to form levees or berms on top of the existing ground surface would not adversely affect resources because Pleistocene-age fossils would not be encountered until approximately 10 feet below ground surface. However, excavations deeper than 10 feet (e.g., for the installation of slurry cutoff walls in the setback levee) have the potential to encounter and possibly damage paleontologically sensitive resources. In addition, most of the area east of Star Bend that has been identified as a potential detention basin and/or soil borrow site is underlain by Modesto Formation sediments. This impact would be potentially significant.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impact IS-5.13-a

Disturbance of Unknown Paleontological Resources during Earthmoving Activities. Portions of the project area and immediate vicinity are underlain by the Modesto and Riverbank Formations, which are paleontologically sensitive rock formations. Construction activities in the Modesto and Riverbank Formations associated with proposed levee strengthening (e.g., slurry cutoff walls, relief wells), construction of the intermediate setback levee, use of the soil borrow area/detention basin location, and related activities (e.g., relocation of Pump Station No. 3) could adversely affect unknown subsurface paleontological resources. This impact would be **potentially significant**.

Construction activities to strengthen the existing levee in project Segments 1 and 3 and to relocate Pump Station No. 3 could have an adverse impact on paleontological resources, for the reasons described previously (for all project segments) in Impact LS-5.13-a. Under Alternative 3, potential impacts on paleontological resources for project Segments 1 and 3 would be the same as described in Impact LS-5.13-a for Alternative 1.

Within project Segment 2, most of the proposed intermediate setback levee alignment would occur in Holocene-age sediments (Figure 5.13-1). By definition, sediments associated with Holocene-age alluvium do not contain paleontologically sensitive resources; therefore, earthmoving activities in these areas would result in no impacts on paleontological resources. However, where the alignment occurs at the interface of Holocene-age sediments and sediments associated with the Modesto Formation, the final design would favor placing as much of the levee as possible on Modesto Formation sediments because they have better engineering characteristics for levee foundation construction.

The northern portion of the proposed intermediate setback levee, also within project Segment 2, would be placed in sediments of the Modesto Formation, which is a paleontologically sensitive rock formation under SVP guidelines (Society of Vertebrate Paleontology 1995, 1996). As described above under Impact ASB-5.13-b, piling of soil to form levees or berms on top of the

existing ground surface would not adversely affect resources because Pleistocene-age fossils would not be encountered until approximately 10 feet below ground surface. Excavations deeper than 10 feet (e.g., for the installation of slurry cutoff walls in the setback levee) have the potential to encounter and possibly damage paleontologically sensitive resources. In addition, most of the area east of Star Bend that has been identified as a potential detention basin and/or soil borrow site is underlain by Modesto Formation sediments. Therefore, excavation and grading activities at this location also have the potential to encounter and possibly damage paleontologically sensitive resources. This impact would be potentially significant.

5.13.4 MITIGATION MEASURES

ALTERNATIVE 1 – THE LEVEE STRENGTHENING ALTERNATIVE

Mitigation is provided below for Impact LS-5.13-a (disturbance of unknown paleontological resources).

LS-5.13-a **Conduct Training for Construction Personnel, Cease Work if Paleontological Resources are Encountered, and Implement an Appropriate Mitigation Strategy.** This mitigation measure would reduce the potential impact to a less-than-significant level.

Three Rivers Levee Improvement Authority (TRLIA) or its primary construction contractor shall implement the following measures:

(a) Before the start of construction activities, construction personnel involved with earthmoving activities shall be informed of the possibility of encountering fossils, the appearance and types of fossils likely to be seen during construction activities, and proper notification procedures should fossils be encountered. This worker training may either be prepared and presented by an experienced field archaeologist at the same time as construction worker education on cultural resources, or be prepared and presented separately by a qualified paleontologist.

(b) If paleontological resources are discovered during earthmoving activities, the construction crew shall immediately cease work within at least 25 feet of the find. TRLIA shall retain a qualified paleontologist to evaluate the resource and prepare a proposed mitigation plan in accordance with SVP guidelines (1995). The proposed mitigation plan may include a field survey, construction monitoring, sampling and data recovery procedures, museum storage coordination for any specimen recovered, and a report of findings. Recommendations determined by TRLIA to be necessary and feasible shall be implemented before construction activities can resume at the site where the paleontological resources were discovered.

Implementing this mitigation measure would reduce the potential impact on paleontological resources to a less-than-significant level.

ALTERNATIVE 2 – THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE

Mitigation is provided below for Impact ASB-5.13-a (disturbance of unknown paleontological resources).

ASB-5.13-a **Conduct Training for Construction Personnel, Cease Work if Paleontological Resources are Encountered, and Implement an Appropriate Mitigation Strategy.** This measure is identical to Mitigation Measure LS-5.13-a. Implementing this mitigation measure would reduce the potential impact on paleontological resources to a less-than-significant level.

ALTERNATIVE 3 – THE LEVEE STRENGTHENING AND INTERMEDIATE SETBACK LEVEE ALTERNATIVE

Mitigation is provided below for Impact IS-5.13-a (disturbance of unknown paleontological resources).

IS-5.13-a **Conduct Training for Construction Personnel, Cease Work if Paleontological Resources are Encountered, and Implement an Appropriate Mitigation Strategy.** This measure is identical to Mitigation Measure LS-5.13-a. Implementing this mitigation measure would reduce the potential impact on paleontological resources to a less-than-significant level.

5.13.5 IMPACTS REMAINING SIGNIFICANT AFTER MITIGATION

With implementation of the mitigation described above, all impacts on paleontological resources would be reduced to a less-than-significant level.

CHAPTER 6 CUMULATIVE IMPACTS

6.1 CEQA REQUIREMENTS

Section 15130 of the California Environmental Quality Act Guidelines (State CEQA Guidelines) requires that an environmental impact report (EIR) discuss cumulative impacts of a project when the project's incremental effect is "cumulatively considerable." According to Section 15065, "Cumulatively considerable means that the incremental effects of an individual project are considerable when viewed in the connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects as defined in Section 15130." Sections 15130 and 15355 both stress cumulative impacts in the context of "closely related" projects and from projects "causing related impacts."

Pursuant to Section 15130(b) of the State CEQA Guidelines,

> [t]he discussion of cumulative impacts shall reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great detail as is provided for the effects attributable to the project alone. The discussion should be guided by standards of practicality and reasonableness, and should focus on the cumulative impact to which the identified other projects contribute rather than the attributes of other projects which do not contribute to the cumulative impact.

A project alternative is considered to have a significant cumulative effect if:

- the cumulative effects of related projects (past, current, and reasonably foreseeable future projects) without the proposed project are not significant and the proposed project's additional impact is substantial enough (i.e., is considerable), when added to the cumulative effects, to result in a significant impact; or

- the cumulative effects of related projects (past, current, and reasonably foreseeable future projects) without the proposed project are already significant and the proposed project's incremental effect is cumulatively considerable.

The term "considerable" is subject to interpretation. The standards used herein to determine whether an effect is considerable are that either the impact of the proposed project would contribute in any manner to the existing significant cumulative impact, or the cumulative impact would exceed an established threshold of significance when the proposed project's incremental effects are combined with similar effects from other projects.

When feasible, mitigation measures are to be developed that reduce the project's contribution to cumulative effects.

6.2 PROJECTS WITH EFFECTS SIMILAR TO THOSE OF THE PROPOSED PROJECT

The analysis of cumulative environmental impacts associated with the Feather River Levee Repair Project (FRLRP) addresses the potential incremental impacts of the three proposed project alternatives and associated project components in combination with similar effects of other past, present, and probable future projects. The geographic area considered in the analysis varies depending on the particular resource under consideration and the extent to which it could be influenced by the project. The rationale for the selection of each geographic area under consideration in the cumulative impact analysis is described first in this section. This discussion is followed by information on general development trends in the project area. The final subsection describes relevant individual past, present, and future projects and related studies.

6.2.1 GEOGRAPHIC SCOPE

The geographic area that could be affected by a project alternative varies depending on the type of environmental resource being considered. When the effects of a project alternative are considered in combination with those of other past, present, and future projects to identify cumulative impacts, the other projects that are considered may also vary depending on the type of environmental effects being assessed. The following are the general geographic areas associated with the different resources addressed in the analysis:

- Land use—mostly regional (Yuba County), also some local (project site)
- Geology, soils, and mineral resources—local (project site)
- Water resources and river geomorphology—mostly local (project site; Feather, Yuba, and Bear Rivers), some regional (Sacramento River system)
- Fisheries—mostly local (project site; Feather, Yuba, and Bear Rivers), some regional (Sacramento River system)
- Terrestrial biological resources—mostly local (project site and surrounding areas), some regional
- Recreation—local (project site and adjacent lands)
- Aesthetic resources—immediate vicinity of project site
- Cultural resources—local area
- Air quality—regional (area under the jurisdiction of the Feather River Air Quality Management District [FRAQMD], consisting of Yuba and Sutter Counties)
- Noise—immediate project vicinity where project effects are noticeable
- Transportation and circulation—roadways in the project area

- Public services, utilities, and service systems—local facilities
- Paleontological resources—local area

The geographic context relevant to the consideration of most environmental effects of the three proposed project alternatives is as follows:

- Alternative 1, The Levee Strengthening Alternative—The existing Feather River left (east) bank levee from Project Levee Mile (PLM) 13.3 to PLM 26.1 (from approximately Pump Station No. 2 to the mouth of the Yuba River), and the Yuba River left (south) bank levee from PLM 0.0 to PLM 0.3 (from the confluence with the Feather River to the Union Pacific Railroad crossing at the State Route [SR] 70 bridge). The potential borrow site/detention basin area shown in Figure 4-1, "FRLRP Project Features." Also, lands adjacent to each of these locations.
- Alternative 2, The Levee Strengthening and ASB Setback Levee Alternative—The existing Feather River left bank levee from PLM 13.3 to PLM 26.1 and the Yuba River left bank levee from PLM 0.0 to PLM 0.3. The Above Star Bend (ASB) setback levee alignment shown in Figure 4-1 between approximately Feather River PLM 17.1 and PLM 23.6. Lands between the setback levee alignment and the existing levee. The potential detention basin/soil borrow area site shown in Figure 4-1. Lands adjacent to each of these locations.
- Alternative 3, The Levee Strengthening and Intermediate Setback Levee Alternative—The existing Feather River left bank levee from PLM 13.3 to PLM 26.1 and the Yuba River left bank levee from PLM 0.0 to PLM 0.3. The intermediate setback levee alignment shown in Figure 4-1 between approximately Feather River PLM 17.1 and PLM 23.6. Lands between the setback levee alignment and the existing levee. The potential detention basin/soil borrow area site shown in Figure 4-1. Lands adjacent to each of these locations.

Alternatives 2 and 3 would affect high-flow conditions in the Feather River. Therefore, the listing of individual projects provided later in this section is focused on projects that could directly affect Feather River and Yuba River flood flows and flood protection, in addition to projects that could affect the areas in the vicinity of the project site.

As shown in the listing above, some types of project effects (e.g., land use, flood control, and air quality) are considered on a regional scale. The regional context for the cumulative impact analysis addressing these effects is described more generally rather than in relation to individual development projects, for the reasons discussed below.

Listing individual projects on the broader regional scale for the purposes of cumulative impact assessment would be impractical to attempt and is unnecessary given the nature of the regional impacts under consideration (e.g., agricultural land conversion, short-term air quality effects). Information on these resources is generally collected based on regional resource studies and plans; using these studies and plans, rather than developing lists of projects on a regional basis, ensures that all resource studies and development are considered.

Information on agricultural land conversion in Yuba County was obtained from the Farmland Mapping and Monitoring Program (FMMP) of the California Department of Conservation. These

data are the most complete available on this topic and encompass the land use conversions attributable to all development projects.

The regional context for air quality emissions is the portion of the Northern Sacramento Valley Air Basin (NSVAB) under the jurisdiction of FRAQMD (i.e., Yuba and Sutter Counties), which administers federal, state, and local air quality management programs for Yuba County. The FRAQMD *Indirect Source Review Guidelines* and online CEQA guidance (Feather River Air Quality Management District 1998, 2006) provide recommended thresholds of significance for project-generated emissions. In accordance with these recommended thresholds, a project may be considered to pose a significant air quality impact if project-generated emissions are near or exceed the thresholds. Although cumulative impacts are not discussed in the guidelines, limits are provided that apply to individual projects regardless of pollutant emissions expected from other projects. Therefore, the air quality emissions of individual projects throughout FRAQMD are not discussed, but regional air pollution is considered.

6.2.2 DEVELOPMENT TRENDS IN THE YUBA COUNTY AREA

Because historical land use patterns underlie general present-day trends in regional and local flood protection efforts and environmental changes, information on historical development is summarized here to provide context for the discussion of cumulative impacts. This description is followed by a description of current trends in population and agricultural land conversion.

Historical Flood Control Efforts

Early levee construction was conducted primarily by landowners to address local flooding issues and did not consider the hydraulic impacts on other areas or the natural processes of the rivers. The early levees cut off areas of the floodplain and its water storage capacity, causing flood flows to greatly exceed the capacity of channels in many areas. The impacts of upstream hydraulic gold mining exacerbated the flooding problems. In the early 1900s, the federal and state governments began constructing systemwide flood management facilities that included levees, weirs, and bypass channels designed to protect lives and property, aid navigation, and flush sediment remaining from hydraulic mining. These conveyance facilities improved flood protection and navigation and allowed continued agricultural and urban development but constrained the rivers to specific alignments, significantly reducing channel meandering, and further isolated rivers from their historical floodplains. (U.S. Army Corps of Engineers and State of California Reclamation Board 2002.) As agricultural and urban development increased within the floodplain, more communities and properties were at risk of flooding, and improvements to the system were made periodically to meet local needs. Major modifications, reconstructions, and upgrades have been implemented by the U.S. Army Corps of Engineers (Corps) over the years in response to deficiencies identified during flood events.

Large-scale dam construction began in the 1930s and continued into the 1970s. Major dams include Oroville Dam on the Feather River and New Bullards Bar Dam and Englebright Dam on the Yuba River. These and other dams and reservoirs provide flood control benefits by reducing seasonal high flows so that downstream flood conveyance systems can operate more safely and effectively. They also provide numerous other benefits, such as recreational opportunities and water supply for municipal uses, crop irrigation, and energy generation.

Current Trends in Population Growth and Conversion of Agricultural Land

The population of Yuba County grew moderately in recent decades, increasing by 3.4% between 1990 and 2000. The Sacramento Area Council of Governments (SACOG) projects a more rapid population increase for the county in the coming years as approved master planned developments begin construction and transportation improvements stimulate further development in Yuba County. (Yuba County Community Development Department 2004.) This is evident from population growth since 2000 compared to population growth in the 1990s. According to U.S. Census records, the population in Yuba County grew from 58,228 in 1990 to 60,219 in 2000, an increase of 3.4% (California Department of Finance 2000). The current population as of January 1, 2006, is estimated to be 69,827 (California Department of Finance 2006), an increase of 16% since 2000.

The county's population is projected to reach approximately 97,561 by 2020 and 109,875 by 2025 (Sacramento Area Council of Governments 2004). The gain in new residents would be approximately 40,048 by 2025, or a little more than 35%. Yuba County and the cities within the county are facing numerous regional growth issues pertaining to air quality degradation, traffic generation, biological habitat loss, loss of farmland, and other environmental changes related to urban development.

Table 6-1, "Land Use Conversions Involving Important Farmland," shows the recent data compiled by the FMMP on land use conversions involving Important Farmland (Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance) in Yuba County. Although the FMMP data also include statistics on grazing land, these are not included in Table 6-1 because conversion of grazing land to nonagricultural uses is not used as a threshold of significance in CEQA and in the analysis of project effects.

As indicated by a comparison between the net totals for acreage changes and the total changes in acreage attributable to conversion to urban and built-up land, most of the reported conversions of Important Farmland are to FMMP land use categories other than "urban and built-up land." These other areas include "grazing land" and "other land." The majority of the acreage converted to "grazing land" was agricultural land being fallowed. "Other land" may include land uses such as feedlots and other rural uses, low-density rural residential, government lands, and road systems.

6.2.3 PAST, PRESENT, AND FUTURE PROJECTS

This section describes implemented, developed, or planned projects that may result in environmental effects similar to those of the FRLRP, such that these effects, when combined, constitute cumulative impacts. It also describes some important studies that are expected to provide the basis for development of future projects. The projects and studies are grouped into three general categories: flood control efforts, development projects, and ecosystem and habitat restoration efforts. These categories provide a basis for discussing general types of environmental effects, but components of these studies and projects could potentially belong in more than one category.

Table 6-1
Land Use Conversions Involving Important Farmland

Changes in Important Farmland	Yuba County (Acres)
Total Acreage of Important Farmland Inventoried	
1992	93,662
1994	94,307–94,419*
1996	95,336–95,347*
1998	93,745–93,756*
2000	90,176
2002	89,217
2004	86,880
Total Losses and Gains of Important Farmland	
1992–1994	-69 + 714 = 645 net gain
1994–1996	-889 + 1,806 = 917 net gain
1996–1998	-2,428 + 837 = 1,591 net loss
1998–2000	-4,596 + 1,027 = 3,569 net loss
2000–2002	-2,530 + 1,574 = 956 net loss
2002–2004	-3,003 + 705 = 2,298 net loss
Amount of Important Farmland Converted to Urban and Built-Up Land	
1992–1994	15
1994–1996	55
1996–1998	0
1998–2000	86
2000–2002	14
2002–2004	4

* Total number of acres inventoried for these years differs between Farmland Mapping and Monitoring Program reports because of changes in mapping methods.

Sources: California Department of Conservation 1996, 1998, 2000a, 2002a, 2004a, 2006

Flood Control Efforts

This section describes past, present, and future studies and projects that are related to flood control in the project vicinity. The section focuses on levee improvement projects in the project area and additional nonlevee flood control projects that are planned or under study. Many of the nonlevee flood control projects that are planned or under study were described in the Yuba-Feather Supplemental Flood Control Project (Y-FSFCP) programmatic EIR. Information from the Y-FSFCP programmatic EIR is summarized below; however, see the programmatic EIR for complete descriptions of these potential future flood control elements.

Some of the efforts discussed below are ongoing and provide recommendations and guidance for developing future flood control projects. In these instances, there is no specific, reasonably foreseeable project to include in the evaluation of cumulative impacts provided in Section 6.3, but these efforts are described here to provide a more complete context for understanding the relationship of the FRLRP to regional flood control efforts.

Emergency Levee Repairs

In February 2006, the Governor declared a state of emergency for California's levee system and signed Executive Order S-01-06 to allow the California Department of Water Resources (DWR) to repair critical levee erosion sites. Since that time, DWR has identified 29 critical erosion sites within the Sacramento River flood control system, in Colusa, Sacramento, Solano, Sutter, Yolo, and Yuba Counties.

Under a Memorandum of Understanding signed by the key federal permitting agencies (the National Marine Fisheries Service [NMFS], the U.S. Fish and Wildlife Service [USFWS], the Corps, and DWR, the federal agencies agreed to expedite federal permitting to ensure that critical repairs are completed. As part of the agreement, the State of California would be required to ensure that levee repair projects are planned to avoid jeopardizing threatened or endangered species and to maintain water quality, and that they consider other relevant environmental effects.

As of June 27, 2006, DWR had obtained all necessary environmental permits and regulatory approvals to repair the 29 critical levee erosion sites. Construction on most of the sites is planned to begin in July 2006 and be completed by November 2006. DWR will be responsible for repairing erosion at 19 levee sites, and the Corps will repair erosion on 10 levee sites. Most of the erosion repairs are expected to consist of placing rock on the water side of the levee. The repairs would reestablish the levee slope and the supporting toe structure, bringing the levee up to its original level of flood protection. At least four of the 29 sites will require a setback levee design. (DWR 2006a.)

In the FRLRP project vicinity, DWR plans to repair two erosion sites on the left (south) bank Bear River levee in Sutter County: one at River Mile (RM) 2.4 near Rio Oso, and one at RM 10.1 near Wheatland. Of the remaining sites, 21 are on the Sacramento River in Colusa, Sacramento, Sutter, and Yolo Counties; five are on Cache Creek in Solano and Yolo Counties; and one is on Steamboat Slough in Solano County. (DWR 2006b.)

Locally Planned Projects to Improve and Reconstruct Local Levees

Feather River Setback Levee at Star Bend Project

The proposed Feather River Setback Levee at Star Bend Project would be implemented by Sutter County. The project is located in Sutter County on the right (west) bank of the Feather River, less than 1 mile northeast of the intersection of SR 99 and Garden Highway. The project would construct a setback levee that would begin near Feather River RM 18.0 and extend in a southeasterly direction from the intersection of Star Bend Boulevard and the existing right bank Feather River levee at Levee District (LD) No. 1 Levee Mile 4.5 to the approximate intersection of Tudor Road with the right bank Feather River levee at LD 1 Levee Mile 3.75. The total

approximate length of the setback levee would be approximately 3,330 feet. The setback levee alignment is currently planted in orchards. Agricultural land in the setback levee alignment is designated by the FMMP as Prime Farmland and Farmland of Local Importance. This project is anticipated to begin construction in spring 2007. (EIP Associates 2006.)

Three Rivers Levee Improvement Authority Flood Control Improvements

The FRLRP is part of Phase 4 of Three Rivers Levee Improvement Authority's (TRLIA's) four-phase program of flood control improvements for southwestern Yuba County. Phase 1 was completed in 2004, construction of Phases 2 and 3 began in September 2005 and is expected to be completed in 2006, and the Yuba River (non-FRLRP) portion of Phase 4 is expected to be constructed in 2006. The improvements are intended to address factors that may compromise the integrity of the existing levees, including:

- deficiencies in levee height relative to the 100-year and 200-year storm events,
- levee through-seepage and underseepage, and
- wind and wave erosion on levee slopes.

The elements of the four work phases that are expected to contribute, along with the FRLRP, to cumulative flood control benefits and other cumulative environmental effects are listed below.

Phase 1 Improvements (2004)

- **Yuba River Levee:** Construction of a 50-foot-deep slurry cutoff wall through the top of the levee from SR 70 to a site that breached in 1986, a length of 2,200 feet.

Phase 2 Improvements (2005)

- **Yuba River Levee:** Construction of 90- and 300-foot-wide landside seepage berms to protect against underseepage.

- **Olivehurst Detention Basin:** Improvements to major drain channels in the Olivehurst basin, including widening and deepening of these channels, Clark Lateral and Clark Slough, to accommodate 100-year flows; construction of a detention basin to store floodwaters; modifications to the culvert under SR 70 to prevent backflow from the Bear River; and connection of a forcemain to a new stormwater pumping facility, which would be designed to pump the 100-year storm event out of the pond over a 3-day period.

- **Upper Western Pacific Interceptor Canal (WPIC) Levee:** Construction of a 500-foot-long, 38-foot-deep slurry cutoff wall and an 1,100-foot, 44-foot-deep slurry cutoff wall to minimize underseepage at Plumas Lake.

- **Lower WPlC Levee:** Construction of a landside toe ditch filled to provide protection against underseepage.

- **Upper Bear River Levee:** Reconstruction of 300 feet of levee and construction of rock slope protection at the confluence with the WPIC to provide erosion protection.

Phase 2 Improvements (2006)

- **Olivehurst Detention Basin:** Construction of a ring levee between SR 70 and the Clark Lateral levee.
- **WPIC Levee:** Construction of a levee crown raise to provide adequate freeboard.
- **Upper Bear River Levee:** Construction of a levee crown raise to provide adequate freeboard and a waterside impervious zone to prevent through-seepage. Removal of Pump Station No. 6 and installation of a new setback pump station to protect against underseepage at the Algodon Canal. Tie-in for the Bear River setback levee.

Phase 3 Improvements (2005)

- **Lower River Bear Levee:** The following activities were completed in 2005 as part of the Feather-Bear Rivers Levee Setback Project (F-BRLSP):
  - clearing, grubbing, and stripping of the setback levee foundation;
  - excavation and backfilling of approximately 9,500 feet of inspection trench;
  - construction of approximately 9,500 feet (430,000 square feet) of soil-bentonite slurry cutoff wall;
  - construction of a setback levee tie-in embankment with the existing Feather River levee; and
  - initial construction of detention basins.

Phase 3 Improvements (2006–2007)

- **Lower River Bear Levee:** The following activities are being completed in 2006 as part of the F-BRLSP:
  - demolition of existing structures within the levee setback area,
  - completion of planned tree removal in the setback area,
  - construction of the setback levee embankment,
  - installation of approximately 18 relief wells,
  - completion of construction of two detention basins with total capacity of 300 acre-feet,
  - removal of portions of the existing Bear and Feather River levees, and
  - construction of a floodplain swale to mitigate potential fish stranding.
- **Environmental Restoration:** Planting of more than 600 acres of native habitat types in the levee setback area and the existing Bear River floodway.

Phase 4 Improvements (2006–2007)

- **Upper Yuba Levee:** Construction of a cutoff wall between the Union Pacific Railroad track and Simpson Lane to protect against underseepage. Filling of a ditch along the water side of the Yuba River levee east of Simpson Lane near the Goldfields.

Recent and Planned U.S. Army Corps of Engineers Projects to Improve and Reconstruct Local Levees

Sacramento River Flood Control System Evaluation Phase II Project

In the 1990s, the Corps performed an extensive levee evaluation and reconstruction effort of the Feather and Yuba River levees as part of the Sacramento River Flood Control System Evaluation Phase II Project (System Evaluation). The purpose of the project was to restore the design level of flood protection provided by the levees. The Feather River levee crest was reestablished to its original grades, and a landside stability berm and drain were installed between PLM 20.1 and PLM 23.0 (north of Broadway). Remedial modifications for the 3-mile-long reach of the Feather River levee from Broadway to Star Bend (between PLM 17.1 and PLM 20.1) were also completed; this work consisted mainly of the installation of a 70-foot-deep slurry cutoff wall along the waterside toe of the levee. A shallower slurry cutoff wall was installed through the crest of the levee between PLM 16.6 and PLM 17.1 along Feather River Boulevard just downstream of Star Bend. A landside stability berm and drain were installed between PLM 15.9 and PLM 16.6 south of Star Bend. (Yuba County Water Agency 2003b.)

Marysville–Yuba City Mitigation Area: Adjacent to the Above Star Bend project area is the Marysville–Yuba City Mitigation Area, a site established and maintained by the Corps to mitigate the loss of habitat associated with the System Evaluation levee work in the Marysville and Yuba City areas. This project consolidates mitigation requirements resulting from work on levees into one large area for a better functioning system. The project site is 75.8 acres, which includes 2.2 acres of seasonal wetland and 73.6 acres of riparian forest and uplands. The project is near the southern portion of FRLRP project Segment 2 on a high terrace, above the average summer flows of the Feather River. The land had been under crop production for many years, but site conditions were favorable for riparian forest restoration as well as seasonal wetland creation. The seasonal wetland was incorporated to provide sufficient groundwater levels for the riparian forest. Additionally, a small bioengineered drainage was excavated between the river and wetland area to limit damage to the wetland from flood waters.

Yuba River Basin Investigation

In 1998, the Corps conducted a feasibility study to increase the level of flood protection for Yuba County. This project is referred to as the Yuba River Basin Investigation or the Yuba River Basin Project. The purpose of the levee improvements included in the project is to raise the probable nonfailure point of the existing levee system (defined as the highest water level at which it is highly likely that the levee would not fail) by strengthening the levees, and thus to increase the level of flood protection. The work consists of extensions and/or additions to the System Evaluation reconstruction work. Some of the Yuba River Basin Project work has already been completed in conjunction with the System Evaluation work, including work between Feather River PLM 20.1 and PLM 23.0, between PLM 16.6 and PLM 17.1, and between PLM 15.9 and PLM 16.6; additional improvements are planned, consisting of extensions and/or

additions to the System Evaluation reconstruction work. In 2003, new Corps underseepage guidelines led to reevaluation of the project, which substantially increased the estimated cost. Because of this cost increase, the project must be reauthorized by Congress. Congressional reauthorization is currently being sought. Project components would include deepening slurry cutoff walls, removing some berms, installing some new slurry cutoff walls, increasing the widths of some berms, adding impervious fill and drain blankets to the levees, relocating slurry cutoff walls from the levee toe to crown, and reshaping some levees (U.S. Environmental Protection Agency 2004).

Nonlevee Flood Control Projects

Oroville Facilities Relicensing Process

DWR constructed and operates the Oroville Facilities (dam, reservoir, powerhouse, afterbay, etc.). The facilities store and deliver water to municipal, industrial, and agricultural users and local senior water rights holders. In addition, the facilities are operated to provide power generation, improve water quality in the Sacramento–San Joaquin Delta, manage the Feather River floodwaters, provide recreation, and enhance fish and wildlife. The Oroville Facilities are operated under a license issued by the Federal Energy Regulatory Commission (FERC) on February 11, 1957, for a term of 50 years. The license for the facilities will expire on January 31, 2007. As required by the Federal Power Act and the FERC regulations, DWR (the licensee) filed an application for a new license on January 31, 2005, although studies, analysis, public outreach, and other activities related to relicensing were initiated well before the application was filed.

DWR, federal and state agencies, Native American tribes, local government officials, and interested members of the public have actively participated in the relicensing process as a collaborative team to identify issues; plan studies; and consider potential protection, mitigation, and enhancement measure (PM&E) measures. DWR issued a National Environmental Policy Act (NEPA) Scoping Document 2 and Amended CEQA Notice of Preparation on February 25, 2003, to further the public's understanding of the Oroville Facilities and solicit comments on the scope of the environmental assessment of the project (California Department of Water Resources 2003). FERC is expected to issue a draft environmental impact statement under NEPA for the Oroville Facilities Relicensing in September 2006, with a final environmental impact statement to follow in March 2007. DWR anticipates releasing a draft EIR under CEQA in November 2006, with a final EIR to follow in March 2007. The proposed action/proposed project is the implementation of the new terms and conditions contained in the new FERC license and settlement agreement. Terms and conditions will include PM&E measures that could have direct or indirect effects on the environment. Some of these measures remain programmatic in nature, while others have been sufficiently developed for reasonably foreseeable environmental effects of the proposal to be identified. It is likely that any modified operations resulting from the FERC relicensing process would have less environmental impact than operations under the current 50-year license granted in 1957.

New Colgate Powerhouse Tailwater Depression Project

Implementation of the New Colgate Powerhouse tailwater depression project would overcome a physical limitation of the powerhouse that requires the curtailment of releases from New Bullards Bar Reservoir through the powerhouse during periods of higher flows.

Currently, when flow in the Yuba River exceeds about 10,000 cubic feet per second (cfs) (including spillway discharges from New Bullards Bar Dam), the river stage begins to submerge the turbines at New Colgate Powerhouse and affect turbine operation, resulting in the need to reduce the releases from the powerhouse. The powerhouse must be totally shut down when river flows exceed 25,000 cfs. Curtailing flows through the powerhouse during periods of high river flows reduces the allowable rate of release from New Bullards Bar Reservoir. As a consequence, the amount of reservoir flood storage that can be kept empty ahead of the flood peak is reduced. A tailwater depression system would overcome this limitation, thereby allowing releases to continue through the powerhouse during high flows and increasing the amount of reservoir flood storage space available to incoming floodwaters. This project was approved in 2002 and detailed design was completed in 2004, but has since been put on hold. Yuba County Water Agency (YCWA) intends to implement this project in the future when funding becomes available, but no defined schedule for project initiation has been identified.

Lake Oroville Surcharge Operations and Thermalito Afterbay Emergency Reoperation

The Lake Oroville surcharge operations (also called Oroville Dam modification) and Thermalito Afterbay emergency reoperation would involve improved flood storage capabilities at State Water Project (SWP) facilities on the Feather River. Surcharge of Lake Oroville was initially envisioned as using inflatable crest gates on the Oroville Dam emergency spillway to create additional temporary flood storage capability. It was subsequently determined that surcharging could be done by managing releases through the spillway gates, although spills over the emergency spillway would cause erosion. The proposed emergency reoperation of Thermalito Afterbay would use the operating pool at Thermalito Afterbay for flood control.

Both of these measures would need to be implemented by DWR, which operates the Oroville-Thermalito Complex. YCWA prepared technical memoranda on these proposals for DWR consideration (Yuba County Water Agency 2002a, 2002b) and recommends their implementation by DWR to improve flood control operations in the Yuba-Feather River Basin; however, DWR has no specific plans for their implementation.

Yuba-Feather River Forecast-Coordinated Operations Program

The Yuba-Feather River Forecast-Coordinated Operations (F-CO) Program is a cooperative planning and model development process directed toward strengthening flood control operations for the Yuba and Feather Rivers. This program is in the first stages of implementation. The program objective is to maintain flow targets at key downstream points on the Feather River during high-water events. This objective will be achieved through the following program components:

- integrating flood control operations of Lake Oroville, operated by DWR, with New Bullards Bar Reservoir, operated by YCWA;
- improving flood forecasting by installing new gauging stations and refining forecasting methods;

- developing a Decision Support System with enhanced communication protocols that will improve coordinated operations during major floods; and
- updating emergency management protocols for both YCWA and the SWP.

Conceived and approved by the YCWA flood control study team as an element of the Y-FSFCP, the program is being implemented cooperatively by YCWA, the National Weather Service, the Corps, and DWR. As of November 2005, nine of 12 planned new precipitation gauges had been installed throughout the watershed, two snow pillows were planned for installation by summer 2006, a new stream gauge had been installed on the North Fork Yuba River, and planning was under way for the installation of six additional stream gauges in the watershed (California Department of Water Resources 2005). Improved flood forecasting and coordination of the flood control operations of the Oroville and New Bullards Bar facilities are expected to provide significant regional flood control benefits downstream, particularly along the Yuba and Feather Rivers. One reasonably foreseeable application of F-CO is the use of improved inflow forecasts to initiate flood releases in advance of those required by Corps reservoir operating rules (i.e., before the encroachment of reservoir inflows into the flood reserve space), which will help reduce potential downstream flood flow peaks and make additional reservoir storage space available to incoming flows (Yuba County Water Agency 2003b).

New Bullards Bar Reservoir Outlet/Spillway Capacity Increase

The New Bullards Bar Outlet Capacity Increase was proposed and approved by YCWA as an element of the Y-FSFCP. As conceived, the project would entail doubling release capability at the bottom of the reservoir flood pool of New Bullards Bar Reservoir through the addition of a new upper-level outlet works to augment the existing dam outlets. The new outlet system would provide the physical means to release water in early stages of, or in advance of, a storm. Although YCWA completed a feasibility study for this element that included a project-level environmental review (Yuba County Water Agency 2003c), this flood control element was not carried forward into detailed design because of funding limitations. When implementation funding becomes available, YCWA intends to pursue a modified version of this element, the New Bullards Bar Spillway Capacity Increase.

Development Projects

This section provides a general description of major current and planned development projects in Yuba County. See “Current Trends in Population Growth and Conversion of Agricultural Land” above for information on total conversion of Important Farmland attributable to all projects since 1992. These projects are considered for purposes of this analysis to be “current” or “reasonably foreseeable.” Environmental clearances and permitting for some developments in the Plumas Lake Specific Plan and East Linda Specific Plan areas have been obtained and development in these areas has already begun. Development in the River Highlands Community Plan area is undergoing review by Yuba County (County).

Plumas Lake Specific Plan

The Plumas Lake Specific Plan would develop or redevelop approximately 5,300 acres in the vicinity of historic Plumas Lake. The specific plan area is located west of SR 70 between

Olivehurst and the Bear River, just east of the proposed FRLRP levee setback areas. The plan includes low-, medium-, and high-density residential development; shopping centers; business parks; and medical centers. Development began in 2002 and is expected to remain roughly constant (assuming that adequate flood protection can be provided), with construction occurring at a uniform pace, until full buildout in approximately 20 years. As of June 2005, 17 subdivision tract maps, representing 14,767 residential lots, had been approved or were being considered for County approval (Yuba County Community Development and Public Works 2005). The most recent available FMMP mapping shows approximately 2,700 acres in this development area classified as Important Farmland (California Department of Conservation 2002b).

East Linda Specific Plan

The East Linda Specific Plan would develop 1,760 acres, of which 1,330 acres would be residential development and 430 acres would be commercial development. The southwestern boundary of the plan area is about 3 miles northeast of the proposed FRLRP levee setback areas. The specific plan area is bounded by the Linda levee on the north, Erle Road on the south, Yuba College and urban areas of Linda on the west, and Griffith Avenue on the east. Planned land uses include schools, parks, and recreation/floodway easements. Development began in 2002 and is expected to remain roughly constant, with construction occurring at a uniform pace, until full buildout in approximately 20 years (Yuba County Water Agency 2003c). As of July 2005, eight subdivision tract maps, representing 2,482 residential lots, had been approved or were being considered for County approval (Yuba County Community Development and Public Works 2005). The most recent available FMMP mapping shows approximately 200 acres of Important Farmland in this area (California Department of Conservation 2002b).

River Highlands Community Plan

The River Highlands Community Plan, which was approved in December 1993, would develop approximately 22,600 acres, of which 14,115 acres would be residential development, 42 acres commercial development, 540 acres industrial development, 1,218 acres public land, 108 acres for schools, and 6,600 acres open space. The area is bordered by the Yuba River on the north, Nevada County on the east, and Beale Air Force Base on the south and west (Cotter, pers. comm., 2003). None of the River Highlands Community Plan area is designated as Important Farmland (California Department of Conservation 2002b). A draft specific plan for a portion of the community plan area, called Yuba Highlands, was submitted to the County in September 2002. The Yuba Highlands development would encompass approximately 3,000 acres and would be the first major development in the River Highlands Community Plan area. Development in the Yuba Highlands area would include a mix of land uses, including residential development at various densities, commercial development, industrial development, and open space. (Yuba Foothills Associates 2002.) The specific plan is being evaluated in an EIR, and the project is undergoing County review (Yuba County Community Development and Public Works 2005).

Other Recent Development Projects

Other development projects that were recently approved or are currently under consideration by the County include several small subdivisions in the Loma Rica/Browns Valley and Linda communities (e.g., East Linda Estates, Oak Grove Estates, Rothwell Estates), as well as eight

subdivisions, totaling approximately 2,200 residential units, in the North Arboga Study Area (e.g., Pheasant Point, Hawes Ranch Estates, Feather Glen, Thoroughbred Acres, Draper Ranch South, Village Greens) (Yuba County Community Development and Public Works 2005). In addition, EIRs are currently being prepared for an approximately 2,100-housing-unit mixed-use development that would be annexed into the Plumas Lake Specific Plan Area, and the Woodbury project near Olivehurst, a proposed 6,500-housing-unit mixed-use development.

The following are other development projects in Yuba County identified by the California Department of Conservation as having converted land classified by the FMMP as Important Farmland, grazing land, or other land to urban and built-up uses between 1998 and 2004 (California Department of Conservation 2000, 2002a, 2002b, 2004b):

- **Sacramento Valley Amphitheater**—converted approximately 25 acres of Important Farmland to public use near Olivehurst;
- **Pacific Millwork Processing Plant**—converted approximately 10 acres of Important Farmland to industrial use near Olivehurst;
- **three Mariani Fruit Packing Plants**—converted approximately 45 acres of Important Farmland to industrial uses north of Marysville;
- **expansion of the Yuba-Sutter Recovery Facility**—converted approximately 10 acres of grazing and other land to industrial use near Marysville;
- **Gold Village Housing Community**—converted approximately 30 acres of grazing and other land to residential use near Smartville;
- **American Wood Fibers Processing Plant**—converted approximately 15 acres of grazing and other land to industrial use near Olivehurst;
- **Norcal Moulding Processing Plant**—converted approximately 5 acres of grazing and other land to industrial use near Olivehurst;
- **expansion of Ostrom Road Landfill**—converted approximately 35 acres of grazing and other land to landfill near Beale Air Force Base;
- **expansion of the Sleep Train Amphitheatre parking lot**—converted irrigated farmland to urban land;
- **Wheatland Ranch Homes**—converted approximately 50 acres of grazing and other land to residential use in Wheatland;
- **development of new homes (no project name)**—converted approximately 20 acres of grazing and other land to residential use near Wheatland and west of SR 65;
- **Wal-Mart**—converted approximately 10 acres of grazing and other land to commercial use near Linda; and

- **Beale Heights**—converted approximately 15 acres of grazing and other land to residential use near Beale Air Force Base.

Additional development since 2004 has also resulted in the conversion of farmland. However, this information is not yet available from the California Department of Conservation.

Ecosystem and Habitat Restoration Efforts

Under the FRLRP, land uses in the proposed levee setback area in project Segment 2 could consist of agricultural operations and/or habitat restoration activities that are compatible with flood control objectives. No specific plans for habitat restoration in the levee setback area are proposed at this time, although this is considered a potential future use. It is possible that several hundred to more than 1,000 acres of habitat in the levee setback area could be restored at some time in the future. Therefore, this section describes major studies and projects related to habitat and floodplain management and restoration along the Sacramento, Feather, and Yuba Rivers and tributaries, the effects of which could combine with possible FRLRP restoration activities to result in cumulative effects.

CALFED Bay-Delta Program

Initiated in 1995, the CALFED Bay-Delta Program (CALFED) is a collaboration among state and federal agencies and the state's leading urban, agricultural, and environmental interests to address and resolve environmental and water management problems associated with the San Francisco Bay/Sacramento–San Joaquin Delta (Bay-Delta) system. The mission of CALFED is to develop and implement a long-term comprehensive plan that would restore ecological health and improve water management for beneficial uses. CALFED addresses four interrelated, interdependent programs concurrently: water supply reliability, water quality, ecosystem restoration, and levee system integrity.

The Feather and Yuba Rivers are addressed in the Ecosystem Restoration Program (ERP). The ERP effort presents the visions for ecological management zones in the Bay-Delta system and their ecological management units. The Feather River/Sutter Basin Ecological Management Zone includes Feather River and Yuba River Ecological Management Units.

The visions for the Feather River Ecological Management Unit include the following (CALFED Bay-Delta Program 2000):

- Improve natural spawning populations of spring- and fall-run chinook salmon and steelhead. This involves improving spring (March) flows below Oroville in dry and normal water years, improving spring-through-fall base flows, providing suitable water temperatures for summer rearing, and improving spawning and rearing habitat in the lower river below Oroville.

- Reactivate or maintain important ecological processes that create and sustain habitats for anadromous fish. The most important processes include floodplain and flood processes and a natural streamflow pattern in the river, to which most of the anadromous and resident native fishes are adapted.

The visions for the Yuba River Ecological Management Unit include the following (CALFED Bay-Delta Program 2000):

- Improve spring streamflows for spawning runs of spring-run chinook salmon (potentially), steelhead, sturgeon, and American shad.
- Evaluate gravel recruitment and sediment transport processes, stream-channel configuration, and riparian habitats in the lower Yuba River floodplain to improve anadromous and resident fish production and survival.

The CALFED ERP also includes an Upper Yuba River Studies Program, the purpose of which is to determine whether the introduction of wild chinook salmon and steelhead to the upper Yuba River watershed is biologically, environmentally, and socioeconomically feasible over the long term. The studies program is ongoing, with regular work group meetings. Removal of Englebright Dam is a key alternative that will be evaluated. Although major funding has been provided for this program, baseline study results are not available and the feasibility study of alternatives has not yet begun (Upper Yuba River Studies Program 2005). This project is not considered reasonably foreseeable because it is not sufficiently developed.

There are several specific CALFED projects that have been completed or are ongoing that would have effects that may combine with those of the three FRLRP alternatives. The following past, current, and reasonably foreseeable CALFED projects would have effects closely related to those of the three project alternatives:

- South Yuba River Coordinated Watershed Management Plan;
- Development of Implementation Plan for Lower Yuba River Anadromous Fish Habitat Restoration;
- Sacramento River Conservation Area Program;
- Sacramento River Floodplain Acquisition and Riparian Restoration (three projects);
- Sacramento River Meander Restoration;
- Floodplain Acquisition, Management, and Monitoring on the Sacramento River;
- Floodplain Acquisition and Subreach/Site-Specific Management Planning on the Sacramento River (Red Bluff to Colusa);
- Riparian Habitat Restoration on the Sacramento River—Verona to Collinsville;
- Sacramento River Gravel Restoration Project;
- Watershed Management Planning for Sacramento River Riparian Program;
- Yolo Bypass Habitat Restoration Study;
- Cosumnes Floodplain Acquisition and Restoration;

- Inundation of a Section of the Yolo Bypass to Restore Sacramento Splittail and other Native Species; and
- Cosumnes/Mokelumne Corridor Floodplain Acquisitions, Management, and Restoration Planning.

Fundamental goals of these projects are to improve fisheries, riparian habitat, stream channel and floodplain functions, and/or watershed environments. Although some adverse environmental impacts may result from these projects in total, especially with respect to agricultural production, these projects would improve the function and integrity of the riverine and riparian ecosystem. Several projects would also improve flood conveyance capacity.

Lower Yuba River Fisheries Technical Working Group

The Lower Yuba River Fisheries Technical Working Group is a stakeholder group that concentrates on efforts to improve the fishery and environment in the lower Yuba River below Englebright Dam. Members include YCWA, Pacific Gas and Electric Company (PG&E), USFWS, NMFS, the California Department of Fish and Game (DFG), DWR, CALFED, the South Yuba River Citizens League, Friends of the River, the California Sportfishing Protection Alliance, Cordua Irrigation District, Reclamation District (RD) 784, and other stakeholders. The goal of the group is to improve lower Yuba River fish resources by restoring ecosystem processes and minimizing stressors to fish populations. Emphasis is on anadromous fish populations. The working group is examining options for improving salmon and steelhead passage around Daguerre Point Dam and is developing an Implementation Plan for Lower Yuba River Anadromous Fish Habitat Restoration (South Yuba River Citizens League 2006, Yuba County Water Agency 2002c).

Yuba County Water Agency Fisheries-Related Projects and Investigations

YCWA has implemented several fisheries studies and enhancement projects on its own, as well as through the Lower Yuba River Fisheries Technical Work Group. The past, current, and reasonably foreseeable projects are as follows (Yuba County Water Agency et al. 2004):

- Browns Valley Irrigation District and Cordua-Hallwood Irrigation District fish screen installation;
- Narrows 2 Powerplant Intake Extension Project to conserve cold water for salmon and steelhead;
- Narrows 2 Powerplant Flow Bypass System Project to reduce flow fluctuations and reductions;
- Narrows 2 Powerplant flow ramping modifications to minimize ramping;
- incorporation of fishery enhancement flows in regular operations and water transfers;
- use of New Bullards Bar Reservoir’s lower outlet on a year-round basis to provide coldwater flows for salmon and steelhead;

- off-stream channel investigation in the Yuba Goldfields for salmon rearing;
- funding of Yuba County Fish and Game Commission projects;
- funding of arctic coolers for County school program to rear fish;
- installation, operation, and maintenance of Yuba River and Feather River temperature monitoring equipment;
- reconstruction of a DFG fence on the Yuba River;
- annual chinook salmon spawning escapement surveys (1991–present);
- annual monitoring and evaluation of the effects of water transfers on juvenile and adult salmon and steelhead (2001–present);
- a comprehensive program to evaluate the effectiveness of flow fluctuation criteria from the State Water Resources Control Board's Water Right Decision 1644 and Revised Decision 1644 in protecting redds and fry from dewatering and stranding;
- funding for research by a graduate student from the University of California, Davis, on juvenile steelhead distribution and abundance in the lower Yuba River (2001–2002);
- ongoing field monitoring to assist YCWA with flow scheduling to protect salmon and steelhead redds and juveniles from dewatering and stranding;
- research on the life history and run composition of steelhead in the lower Yuba River, funded jointly by CALFED, USFWS, and YCWA (2001–present);
- an implementation plan for the Lower Yuba River Anadromous Fish Habitat Restoration Program;
- participation in the Lower Yuba River Temperature Coordinating Committee, Lower Yuba River Fisheries Technical Working Group, Yuba-Feather Work Group, and CALFED Upper Yuba River Studies Program; and
- Olivehurst Floodplain Federal Emergency Management Agency (FEMA) certification.

River Partners

River Partners, formerly the Sacramento River Partners, works in conjunction with numerous federal, state, and local entities: DFG; the California Department of Parks and Recreation; California State University, Chico; Glenn-Colusa Irrigation District; the Corps; USFWS; the State Wildlife Conservation Board; the Great Valley Center L.E.G.A.C.I. Program; the California Waterfowl Association; Sacramento River National Wildlife Refuge; and San Joaquin River National Wildlife Refuge. The goal of River Partners is to create "high-quality wildlife habitat for the benefit of the environment and local communities" by using a variety of techniques to restore riparian areas along the Sacramento and San Joaquin Rivers and their tributaries while protecting agricultural investments. Projects focus on:

- restoring riparian habitat;
- reconnecting and linking fragmented habitats;
- providing erosion control for the riverbanks;
- building and strengthening relationships between partner entities, local and county governments, and local farmers;
- providing recreational opportunities, such as hunting, hiking, and bird watching, at some project areas;
- educating the public on the benefits of habitat restoration;
- providing research opportunities; and
- enhancing scenic views with mature riparian habitat.

Approximately 19 projects in the Sacramento River system are complete or in progress; project areas range in size from approximately 2.5 acres to 1,361 acres. Project sites in the Sacramento River system are generally between the Hamilton City Pumping Plant in Glenn County and 10 miles north of Colusa in Colusa County. The O'Connor Lake Project with DFG entails the restoration of riparian habitat on 228 acres dominated by invasive nonnative species at the O'Connor Lake Ecological Preserve on the Feather River. Project funding is from various sources, including CALFED, the Wildlife Conservation Board, USFWS, DFG, Glenn-Colusa Irrigation District, and the U.S. Bureau of Reclamation. (Sacramento River Partners 2002, 2005.) It is reasonably foreseeable that River Partners will continue these efforts and restore additional habitats, although specific additional projects are unknown.

Sacramento River Conservation Area

The Nature Conservancy and its partners USFWS, the California Wildlife Commission, and DFG, along with stakeholders, have undertaken riparian restoration of a continuous 100-mile-long stretch of the Sacramento River between Red Bluff and Colusa. Aspects of the project include implementing large-scale riparian habitat restoration, creating a sustainable farming program, and restoring the river's hydrology and bank condition (including possibly setting back levees) to improve the ability of the river to move freely within its meander belt. The goal of the project is to improve the Sacramento River's ecological health, protect the area's plant and wildlife species, and demonstrate examples of successful integrated land use (Sacramento River Conservation Area Forum 2002).

The Nature Conservancy is purchasing floodprone riverside farmland from willing sellers where agricultural production is declining. It restores land within these areas while developing site-specific plans, including conservation easements, set-aside agreements, bank protection, landowner protections, and floodplain management strategies; developing a program to improve permit and regulatory coordination and consistency; developing educational and outreach programs; and supporting monitoring and research programs. (The Nature Conservancy 2002.) It

is reasonably foreseeable that The Nature Conservancy will continue these efforts and make additional purchases of land for conservation; however, specific details are unknown.

Feather River Coordinated Resource Management Group

The Feather River Coordinated Resource Management (FRCRM) group is a partnership of 22 public and private groups that formed in 1985 to collectively improve watershed health in the upper Feather River watershed above Lake Oroville. The FRCRM has focused on cumulative watershed effects on water quality, desertification, and reductions in biodiversity on public and private lands. It has used education, restoration technology, and demonstration projects to encourage cooperation and participation in its efforts (Feather River Coordinated Resource Management 2006).

More than 50 watershed projects have been completed since 1989 in the upper Feather River watershed, including Wolf Creek, Red Clover Creek, Black Rock Creek, Boulder Creek, Greenhorn Creek, Clarks Creek, Carmen Creek, Hosselkus Creek, Elizabethtown Creek, North Canyon Creek, and Last Chance Creek. Projects have included urban stream restoration, meadow rewatering, construction of check dams, and bank stabilization. Projects planned for 2006 include ongoing monitoring of upper Last Chance Creek, reevaluation of the Spanish Creek gravel sampling project, and continued channel restoration on Red Clover Creek. The FRCRM group will continue these efforts in accordance with concepts outlined in the Feather River Watershed Management Strategy. (Feather River Coordinated Resource Management 2006.)

6.3 CUMULATIVE IMPACT ANALYSIS

Chapter 5, “Environmental Analysis,” identifies potential direct and indirect environmental effects of the three FRLRP project alternatives. These effects are assessed in this section in terms of their potential to combine with similar environmental effects of the other projects (past, current, and reasonably foreseeable) listed above, resulting in cumulative impacts. The analysis is focused on considering the potential for those impacts identified in Chapter 5 to contribute considerably to cumulative impacts after mitigation.

As explained earlier in this chapter in the section “Geographic Scope,” the extent of the geographic area that may be affected with implementation of the FRLRP varies depending on the resource under consideration. Not all projects discussed above would contribute, along with the FRLRP, to cumulative environmental effects. Also, Section 15130(a)(1) of the State CEQA Guidelines states that an EIR “should not discuss impacts which do not result in part from the project evaluated in the EIR.” Therefore, for each discussion below, the past, present, and reasonably foreseeable future projects that are considered are limited to those having potential effects similar to those of the proposed project that would affect the same geographic area as the FRLRP.

6.3.1 LAND USE

Alternative 1 – The Levee Strengthening Alternative

Under Alternative 1 placement of seepage/stability berms (primarily in project Segment 2), relocation of Pump Station No. 3, and construction of a detention basin could result in the conversion of up to approximately 180 acres of Prime Farmland to nonagricultural uses.

As shown in Table 6-1 in "Current Trends in Population Growth and Conversion of Agricultural Land," in Section 6.2 above, the latest FMMP data indicate that from 1992 through 2004, Yuba County experienced a net loss of Important Farmland (consisting of land classified as Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance) totaling approximately 2,300 acres out of approximately 87,000 acres inventoried. Gains in Important Farmland were recorded for the county for the 1992–1994 and 1994–1996 periods; these were slightly more than offset by losses in the 1996–1998 period. Both losses and gains were recorded for the 1998–2000 and 2000–2002 periods, resulting in a total net loss for both of these periods. Both losses and gains were recorded for the most recent reported period, 2002–2004, with a total net loss of 2,298 acres for this period.

Comparison of these statistics with those in the lower part of Table 6-1 shows that most of the acreage lost was not converted to urban and built-up uses. Other possible mechanisms for the loss of Important Farmland as recorded by the FMMP are conversions to grazing land or the fallowing of farmland. Although land may be converted from grazing or fallow lands back to Important Farmland in future reporting periods, the trends in development and population growth in the region, described in Section 6.2.2, "Development Trends in the Yuba County Area," indicate that net increases in Important Farmland, like those recorded in the 1992–1994 and 1994–1996 periods, are unlikely. Some future farmland conversion would take place in the Plumas Lake Specific Plan and East Linda Specific Plan areas, which are planned for gradual buildout over approximately the next 20 years. Additional development proposals in the project region currently being evaluated could also result in further farmland conversions. Locally, the F-BRLSP downstream on the Feather River and lower Bear River is converting approximately 300 acres of agricultural land in the levee setback area to habitat. On a regional scale, the Sacramento Valley has lost Important Farmland to environmental restoration (along river corridors) and urban development (areas surrounding existing cities). Additionally, it is reasonably foreseeable that there will be future environmental restoration and urban development projects in the Sacramento Valley, given the restoration programs and urban development currently under way.

Installation of seepage/stability berms under Alternative 1 and construction of the proposed detention basin would contribute to the cumulative conversion of Important Farmland to nonagricultural uses locally and regionally. Although mitigation is included in Section 5.1, "Land Use," that would help to reduce the potential impact on Important Farmland, the direct impact would not be reduced to a less-than-significant level, and this alternative would make a considerable contribution to this existing cumulative impact that would be significant and unavoidable.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 and the relocation of Pump Station No. 3 would be the same as the effects described previously (for all project segments) for Alternative 1.

Implementation of the ASB levee setback in Segment 2 would conflict with specific County policies for the preservation of agricultural land where the setback levee would result in the removal of agricultural land from production. Uses of the levee setback area may be inconsistent with current zoning. Inconsistencies with County land use policies and zoning are considered significant direct impacts on land use. However, these effects are project specific and limited to a local site; therefore, they are not considered to contribute to a cumulative impact.

The ASB levee footprint and levee easements in project Segment 2 would permanently convert a total of approximately 210 acres of Prime Farmland, 35 acres of Farmland of Statewide Importance, and 2 acres of Unique Farmland to nonagricultural uses. Construction of a detention basin would likely occur on up to several hundred acres of land that is currently in agricultural use.

Land uses in the levee setback area could consist of agricultural operations and/or habitat restoration activities that are compatible with flood control objectives. No specific plans for habitat restoration in the setback area are proposed at this time, although this is considered a potential future use. For purposes of the analysis in this EIR, and to assess the highest level of impacts, it is conservatively assumed that the entire levee setback area would be used for habitat restoration, and would therefore include the conversion of up to approximately 1,025 acres of Prime Farmland, 10 acres of Farmland of Statewide Importance, and 10 acres of Unique Farmland to nonagricultural uses.

The cumulative conversion of agricultural land in the project region to nonagricultural uses is characterized above in the discussion of Alternative 1. The levee setback and detention basin construction would contribute to the cumulative conversion of Important Farmland to nonagricultural uses locally and regionally. Although mitigation is included in Section 5.1, “Land Use,” that would help to reduce the potential impact on Important Farmland, the direct impact would not be reduced to a less-than-significant level, and this alternative would make a considerable contribution to this existing cumulative impact that would be significant and unavoidable. It should be noted, however, that any lands that might be converted to habitat may not necessarily be lost in perpetuity from agricultural use, as occurs with urban development. While the conversion from agriculture to habitat would be long term, it would not necessarily be permanent. This would not be the case if the conversion to habitat were tied to a permitting or mitigation requirement, or if there were some other legal mechanism in effect calling for the habitat to be retained in perpetuity.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1, and the impacts associated with construction of the setback levee in Segment 2 would be the same as the effects described previously for Alternative 2.

However, the levee setback area would be somewhat smaller under Alternative 3 than under Alternative 2 because the intermediate setback levee alignment is located farther to the west than the ASB setback levee alignment.

The intermediate levee setback footprint and levee easements in Segment 2 would permanently convert approximately 210 acres of Prime Farmland, 10 acres of Farmland of Statewide Importance, and 5 acres of Unique Farmland to nonagricultural uses, and would potentially convert up to several hundred additional acres of Important Farmland for the proposed detention basin. As discussed for the ASB levee setback above, it is conservatively assumed for the analysis in this EIR that the entire levee setback area would be used for habitat restoration, and would therefore include the conversion of up to approximately 700 acres of Prime Farmland, 10 acres of Farmland of Statewide Importance, and 10 acres of Unique Farmland to nonagricultural uses.

For the reasons described above, the intermediate levee setback and detention basin construction would contribute to the cumulative conversion of Important Farmland to nonagricultural uses locally and regionally. Although mitigation is included in Section 5.1 that would help to reduce the potential impact on Important Farmland, the direct impact would not be reduced to a less-than-significant level, and this alternative would make a considerable contribution to this existing cumulative impact that would be significant and unavoidable. As noted above, however, any lands that might be converted to habitat would not necessarily be lost in perpetuity from agricultural use, as occurs with urban development, unless a mitigation or regulatory requirement were to call for permanent preservation of the habitat.

6.3.2 GEOLOGY, SOILS, AND MINERAL RESOURCES

Alternative 1 – The Levee Strengthening Alternative

Although levee repair and strengthening activities would disturb earth, thereby potentially accelerating erosion, construction disturbance would be temporary, and soils in disturbed areas would be vegetated or otherwise stabilized after construction is complete. In addition, part of Alternative 1 includes correction of existing erosion problem areas on the water side of the Feather River left bank levee in project Segment 2. Based on these conditions, there is only a minimal risk of soil erosion hazard, if any, associated with levee repair and strengthening activities. In addition, there are no other planned projects in the local area that would result individually or cumulatively in significant erosion hazards. Therefore, Alternative 1 would not make a cumulatively considerable contribution to any significant impacts related to soil erosion hazards.

Up-to-date engineering methods would be used during levee repair and strengthening activities, ensuring that the stability of the existing Feather and Yuba River levees would increase over existing conditions and that the risks of geologic/soils/seismic related failure would be lower. This is a beneficial effect. With the F-BRLSP, other TRLIA flood control projects, the Corps levee improvements conducted as part of the System Evaluation Project and as a result of the Yuba River Basin Investigation, and the other levee improvements planned for the area by YCWA, a similar beneficial effect would occur on a cumulative level. The FRLRP would contribute to this cumulative beneficial effect.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1.

Although construction activities associated with construction of the ASB setback levee would disturb earth, thereby potentially accelerating erosion, construction disturbance would be temporary and soils in disturbed areas would be vegetated or otherwise stabilized after construction is complete. In addition, the levee setback area is nearly level and is well drained, and the risk of erosion and associated hazards is slight. Some soil erosion could also occur during flood operations when flows pass through the levee setback area, but because velocities would be low, erosion potential is not considered high. In addition, vegetative cover in the levee setback area (agriculture or habitat) would reduce the potential for erosion. Consequently, there is only a minimal risk of soil erosion hazard, if any, associated with the proposed levee setback. In addition, there are no other planned projects in the local area that would result individually or cumulatively in significant erosion hazards. Therefore, the ASB levee setback would not make a cumulatively considerable contribution to any significant soil erosion impact.

The setback levee would be engineered and constructed to modern standards with appropriate seepage control features, making it more stable than the existing levee and decreasing the risk of levee failure associated with geologic/soils/seismic hazards. This is a beneficial effect. With the F-BRLSP, other TRLIA flood control projects, the Corps levee improvements conducted as part of the System Evaluation Project and as a result of the Yuba River Basin Investigation, and the other levee improvements planned for the area by YCWA, a similar beneficial effect would occur on a cumulative level. The FRLRP would contribute to this cumulative beneficial effect.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1. The impacts associated with construction of the setback levee in Segment 2 would be the same as the effects described previously for Alternative 2. For the reasons described above, the intermediate levee setback would not result in a considerable contribution to any significant adverse cumulative soil erosion hazard impacts, and would contribute to a beneficial cumulative impact related to reduced geologic/soils/seismic hazards in combination with other flood control projects.

6.3.3 WATER RESOURCES AND RIVER GEOMORPHOLOGY

Alternative 1 – The Levee Strengthening Alternative

Levee repair and strengthening activities could allow soil and sediment to enter local waterways via erosion, resulting in adverse effects on water quality and contamination of waterways by toxic substances. Mitigation described in Section 5.3, “Water Resources and River Geomorphology,” however, would ensure that appropriate erosion control and spill containment measures would be implemented to minimize any potential for water quality effects. Because these measures would be incorporated into construction practices, this potential temporary effect

would be less than significant both as a direct impact and as a potential contribution to any cumulative impact. In addition, other levee reconstruction and repair efforts conducted by the Corps along the left bank Feather and Yuba River levees in recent years and planned for future implementation have been and will be required to incorporate similar measures to ensure the protection of water quality from potential sedimentation and effects of toxic spills. All projects in the area that would result in the disturbance of more than 1 acre of land are also required to implement a Stormwater Pollution Prevention Plan (SWPPP) through the National Pollutant Discharge Elimination System (NPDES) permit process. The SWPPP must include measures to control erosion and protect water quality. For these reasons, levee repair and strengthening activities would not make a cumulatively considerable contribution to any significant cumulative impact on water quality.

Levee repair and strengthening would also provide a levee that would be more reliable and less subject to seepage than the existing levee. These changes would improve local flood protection providing a beneficial effect. Levee repair and strengthening would combine with the effects of other recent and planned flood control projects to result in a cumulatively beneficial effect on flood protection in the Feather-Yuba River Basin above the confluence of the Feather and Bear Rivers.

Levee repairs and strengthening of the existing levee would not change Feather River flood stage elevations; therefore, these activities would not result in any long-term changes to the existing drainage pattern of the project site, would not affect the rate or amount of surface runoff in the project area, and would not reduce water supply or alter regional or local hydrology. Therefore, the FRLRP would not make a considerable contribution to any potential cumulative effects on sediment deposition, water supply, or geomorphic processes.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1. Impact conclusions related to soil, sediment, and contaminants entering local waterways would also apply to the setback levee in Segment 2.

Potential changes in land use associated with the ASB levee setback would not adversely affect local water demand and supply and may, in fact, cause demand to decrease. Effects of the levee setback related to sediment deposition in the ASB levee setback area are not expected to be measurable. No other known projects would contribute to similar potential effects in a manner that would result in a significant cumulative impact. Therefore, there would be no cumulative effect on water supply or sediment deposition to which the levee setback would make a considerable contribution.

The ASB setback levee would cross existing drainage infrastructure and sever parts of the drainage system for the local area. Drainage patterns within the levee setback area could be changed by project implementation as well. Measures included in Section 5.3 would preclude any adverse effects of a levee setback on local drainage. These effects are project specific and limited to a local site; therefore, they are not considered to contribute to a cumulative impact.

Implementation of the ASB levee setback could result in changes in geomorphic processes by altering velocities in the existing floodway in this area and upstream, leading to decreased shear stresses from Star Bend to just below Shanghai Bend (project Segment 2) and increased shear stresses at Shanghai Bend (Segment 3) and some distance upstream on both the Feather River and the Yuba River. However, increases in shear stresses would be minor and would not result in erosion of the levee system or substantial increases in the mobilization and/or deposition of sediments. None of the other projects included in this cumulative analysis, when considered together with the FRLRP, would contribute substantially to potential effects associated with increased shear stresses. Therefore, no significant cumulative impact would occur.

With a reduction in water surface elevations at and above the ASB levee setback area, peak flows in the Feather River downstream of the setback levee would increase slightly, from 271,938 cfs to 272,406 cfs during the 1-in-100 AEP event, an increase of less than 1%. Modeling results indicate that the slight increase in flows would result in an increased water surface elevation of 0.02 foot in the Feather River from the southern end of the setback levee alignment to the confluence with the Bear River. For the 1-in-200 AEP event, the flows would increase from 347,031 cfs to 348,879 cfs, an increase of less than 1%. The water surface elevation in the Feather River from the southern end of the setback levee alignment to the confluence with the Bear River is expected to increase by 0.08 foot as a result of the increased flow. These increases in downstream floodwater flows with the ASB levee setback are small (less than 1%), and the increases in downstream flood stage elevation would be less than 1 inch for the 1-in-100 and 1-in-200 AEP events. In addition, with implementation of the F-CO (see description of the F-CO in Section 6.2.3, “Past, Present, and Future Projects”), any increases in downstream flood stage elevations associated with the ASB levee setback would be less than described above. The impact of this very slight increase in risk would be less than significant.

The recent and proposed development projects listed in Section 6.2.3, including development of the Plumas Lake Specific Plan, East Linda Specific Plan, and River Highlands Community Plan areas, have the potential to incrementally increase runoff associated with storm events by increasing impervious surfaces within the Feather-Yuba River watershed. However, these developments are required to mitigate these increases in runoff through the construction and operation of detention basins. Any increase in runoff volumes from these developments that reaches the surrounding rivers during storm events would be a minor incremental contribution to river flows and would not result in a significant cumulative impact. Because the increased risk of downstream flooding associated with the ASB levee setback would also be minor, this effect is considered to be inconsequential in a cumulative context as well as in a direct sense. Therefore, the ASB levee setback would not be considered to contribute to a significant cumulative impact on potential downstream flooding associated with changes in downstream hydrology.

Setting back the left bank Feather River levee along the ASB setback levee alignment would decrease flood stages on the river. The levee setback would also provide a well-designed, well-constructed levee that would be more reliable and less subject to seepage than the existing levee. These changes would improve local flood protection, providing a beneficial effect. The ASB levee setback would combine with the effects of other recent and planned flood control projects to result in a cumulatively beneficial effect on flood protection in the Feather-Yuba River Basin above the confluence of the Feather and Bear Rivers.

Potentially hazardous materials related to agricultural activities could be transported downstream when the ASB levee setback area becomes inundated during flood events. These materials could contaminate floodwater and adversely affect river water quality. However, measures described in Section 5.3 would reduce the potential for the release of hazardous materials. For this reason, the levee setback is not expected to result in a considerable contribution to a cumulative water quality impact.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1. The impacts associated with the construction of the setback levee in project Segment 2 would be the same as or very similar to the effects described previously for Alternative 2. However, the levee setback area would be somewhat smaller under Alternative 3 than under Alternative 2 because the intermediate setback levee alignment is located farther to the west than the ASB setback levee alignment.

Modeling results indicate that with a reduction in water levels at and above the intermediate levee setback area, peak flows in the Feather River downstream of the setback levee would increase slightly, from 271,938 cfs to 272,262 cfs during the 1-in-100 AEP event, an increase of less than 1%. This slight increase in flow is expected to result in a 0.02-foot increase in the water surface elevation in the Feather River from the southern end of the setback levee alignment to the confluence with the Bear River. For the 1-in-200 AEP event, modeling results show that the flows would increase from 347,031 cfs to 348,624 cfs, an increase of less than 1%. The water surface elevation in the Feather River from the southern end of the setback levee alignment to the confluence with the Bear River is expected to increase by 0.07 foot as a result of the increased flow. These increases in downstream floodwater flows with the intermediate levee setback are small (less than 1%), and the increases in downstream flood stage elevation would be less than 1 inch for the 1-in-100 and 1-in-200 AEP events. In addition, with implementation of the F-CO, any increases in downstream flood stage elevations associated with the intermediate levee setback would be less than described above. The impact of this very slight increase in risk would be less than significant.

For the reasons described above, the intermediate levee setback is not expected to result in a considerable contribution to any significant cumulative impacts related to water resources and river geomorphology.

6.3.4 FISHERIES

Alternative 1 – The Levee Strengthening Alternative

Levee repair and strengthening activities could cause sedimentation and contamination of waterways by toxic substances and adversely affect fish in the Feather and Yuba River channels and downstream. Mitigation described in Section 5.3, “Water Resources and River Geomorphology,” and repeated in Section 5.4, “Fisheries,” would ensure that appropriate erosion control and spill containment measures would be implemented to minimize any effects on fish habitat and fish populations associated with sedimentation or contamination. Because these measures would be incorporated into construction practices, this potential temporary effect

would be less than significant both as a direct impact and as a potential contribution to any cumulative impact. In addition, other levee reconstruction and repair efforts conducted and planned for the Feather, Yuba, and Bear River levees by the Corps, TRLIA, and/or other agencies have been and will be required to incorporate similar measures to ensure the protection of water quality and fish habitat from potential sedimentation and effects of toxic spills, in accordance with existing regulations. Also, all projects in the area that would result in the disturbance of more than 1 acre of land are required to implement a SWPPP through the NPDES permit process. The SWPPP must include measures to control erosion, prevent releases of contaminants, and protect water quality.

For these reasons, levee repair and strengthening activities would not make a cumulatively considerable contribution to any significant impact associated with sedimentation and introduction of toxic materials into fish habitat.

Any direct effects of construction activities on overhead cover or woody material that could degrade fish habitat would be negligible, and any potential contribution to a cumulative effect on these habitat features would also be negligible.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1. Impact conclusions related to sedimentation and introduction of toxic materials into fish habitat would also apply to the setback levee in Segment 2.

Flood operations with implementation of the ASB levee setback have the potential to result in the stranding and mortality of fish, including protected species, in areas within the expanded floodway (i.e., levee setback area) where water collects and fish become trapped as floodwaters recede. This effect, if not mitigated, could combine with the deleterious effects of more than 150 years of past actions in the Sacramento River Basin that have reduced populations of chinook salmon and steelhead in the region enough that these are now designated special-status species. Levee projects in general have had a significant cumulative effect on these species. However, to reduce the potential for fish to become stranded in the levee setback area, a drainage and grading plan for the area would be developed and implemented in consultation with DFG, NMFS, and USFWS as described in Section 5.4 of this EIR. The plan would ensure that the project design incorporates appropriate features to minimize the potential for stranding and ensure that only a minor incidental loss of fish would result from the levee setback (a loss expected to be offset by increases in growth and survival of juvenile fish that would use new habitat created in the levee setback area). For these reasons, the ASB levee setback would not contribute considerably to any significant cumulative adverse effect on fish populations.

It is unknown at this time how much, if any, of the levee setback area might be converted to riparian, wetland, or other habitat if the ASB setback levee is constructed. If this potential land use is implemented in the future, the levee setback area would provide a riparian and aquatic habitat corridor, providing additional floodplain habitat for fish along the Feather and Yuba Rivers and potentially improving the success of fish species that use the area. This potential benefit could make a considerable contribution to cumulative benefits to fish that may be derived

from projects that expand the floodplain corridor that are being implemented in the Sacramento River system, including the F-BRLSP (currently under construction), River Partners, and Sacramento River Conservation Area efforts described above, as well as potential future projects that may be developed through the CALFED Upper Yuba River Studies Program and the Lower Yuba River Fisheries Technical Working Group. Overall, downward trends in fish populations are reversing, largely because of the substantial efforts being made for salmon and steelhead recovery. The ASB levee setback could contribute to this trend and, given the mitigation described in Section 5.4, could contribute to species recovery. Consequently, the ASB levee setback would not contribute to a significant adverse cumulative impact on fisheries.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1, and the impacts associated with construction of the setback levee in Segment 2 would be the same as the effects described previously for Alternative 2.

However, the intermediate levee setback would affect a smaller land area than would be affected by the ASB setback levee. Like the ASB levee setback, the intermediate levee setback would not result in a considerable contribution to any significant adverse cumulative impact with the implementation of mitigation measures. The intermediate levee setback would result in a smaller setback area with less potentially available floodplain habitat than the ASB levee setback, resulting in a slightly reduced potential beneficial impact on fisheries.

6.3.5 TERRESTRIAL BIOLOGICAL RESOURCES

Alternative 1 – The Levee Strengthening Alternative

Levee repair and strengthening activities would have less-than-significant project-specific impacts, without the need for mitigation, on the following resources: general biological resources, special-status bird species other than raptors, Pacific western big-eared bat, and wildlife corridors. The project would not provide a substantial contribution to any potential significant cumulative impacts related to these resources.

As stated in Section 5.5, “Terrestrial Biological Resources,” construction activities associated with Alternative 1 could have potential adverse effects on the following resources: jurisdictional waters of the United States and riparian habitat, special-status plants, valley elderberry longhorn beetle, northwestern pond turtle, giant garter snake, and Swainson’s hawk and other nesting raptors. Mitigation included in Section 5.5 would be implemented to address potential direct effects on these resources. Any unavoidable effects on waters of the United States and riparian habitat would be addressed through restoration or replacement according to methods and terms agreed upon through consultation with the Corps and/or DFG, ensuring no net loss of the affected resources. Surveys, maintenance of buffer areas where practicable, and other avoidance measures described in the mitigation presented in Section 5.5 would ensure minimization of any potential temporary effects of construction on valley elderberry longhorn beetles, northwestern pond turtles, giant garter snakes, and nesting Swainson’s hawks and other raptors and their habitats.

Any other projects would be required to implement measures similar to those that would be undertaken for Alternative 1 to ensure minimization of impacts on these potentially affected species, most of which are protected by the federal Endangered Species Act (ESA) and/or sections of the California Fish and Game Code, including the California Endangered Species Act (CESA). Past and ongoing levee repair efforts being conducted by the Corps, TRLIA, and others have provided relatively large habitat restoration areas such as the Corps Marysville–Yuba City Mitigation Area and habitat restoration associated with the F-BRLSP. These restoration areas provide a cumulative benefit to terrestrial biological resources that assists in compensating for any adverse cumulative impacts.

Based on the foregoing, Alternative 1 would not be considered to make a considerable contribution to any significant adverse cumulative effects on terrestrial biological resources.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1. Impact conclusions related to all terrestrial biological resources addressed in Section 5.5 would also apply to the setback levee in Segment 2. For the reasons discussed above for various biological resources where significant impacts are mitigated to less-than-significant levels, the impacts under Alternative 2 would not make a considerable contribution to any significant cumulative effects on terrestrial biological resources.

Implementation of the ASB levee setback has the potential to contribute considerably to a cumulative benefit to terrestrial biological resources through restoration actions that would enhance the riverine ecosystem along the Feather River. If the restoration of wetlands, enhancement of floodway riparian communities, or restoration of open grassland, for example, is included in future land management of the levee setback area, regional benefits could result, including increasing the effective amount of habitat available to species and helping to reverse habitat fragmentation. These efforts, in combination with other restoration projects described in Section 6.2.3, would combine to enhance regional migratory corridors; provide larger habitat units for wildlife and species that require large home ranges; and provide greater opportunities for separate populations to interbreed, potentially increasing species' genetic diversity.

Based on the foregoing, Alternative 2 would not be considered to make a considerable contribution to any significant adverse cumulative effects on terrestrial biological resources.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1, and the impacts associated with construction of the setback levee in project Segment 2 would be the same as the effects described previously for Alternative 2. The levee setback area would be somewhat smaller under Alternative 3 than under Alternative 2 because the intermediate setback levee alignment is located farther to the west than the ASB setback levee alignment. Like the ASB levee setback, the intermediate levee setback would not result in a considerable contribution to any significant adverse cumulative impact on terrestrial biological resources.

6.3.6 RECREATION

Alternative 1 – The Levee Strengthening Alternative

Levee repair and strengthening activities may have minor and temporary (less-than-significant) direct effects on recreational resources, such as hunting, boating, and nature viewing, in areas adjacent to or near the existing Feather River levee alignment in the existing river channel. No substantial long-term changes in recreational opportunities would be associated with repair and strengthening of the existing Feather and Yuba River levees. Feather River flood stage elevations would not change, the project site would be restored and reclaimed as appropriate to preexisting conditions after completion of construction activities, and recreational opportunities are expected to be available to the extent that these opportunities are available under preproject conditions. Levee repair and strengthening activities would not contribute to any potential significant cumulative impacts on recreation.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impacts associated with repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1.

Construction of the ASB setback levee may have minor and temporary (less-than-significant) direct effects on recreational resources, such as hunting, boating, and nature viewing, in areas adjacent to or near the levee setback area in the existing Feather River channel. Implementation of the ASB levee setback in Segment 2 would also contribute to a less-than-significant impact associated with potential losses of wildlife from flooding in the setback area that could adversely affect long-term hunting opportunities or other recreational activities. The ASB setback levee would not contribute to any potential significant cumulative impacts on recreation.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1, and the impacts associated with construction of the setback levee in Segment 2 would be the same as the effects described previously for Alternative 2. For the reasons described above, the intermediate setback levee would not contribute to any potential significant cumulative impacts on recreation.

6.3.7 AESTHETIC RESOURCES

Alternative 1 – The Levee Strengthening Alternative

Levee repair and strengthening activities would temporarily reduce the aesthetic qualities of views by introducing earthmoving equipment and other construction equipment, materials, and work crews into the viewshed of recreationists, motorists on SR 70 and Feather River Boulevard, workers in nearby farming areas, and residents of the area. However, aesthetic conditions would be the same after construction as before the levee repairs. Construction of a detention basin east of Feather River Boulevard would permanently alter views, especially where orchards may be removed.

However, this change would not substantially affect the quality of views. No scenic vistas would be affected. Because construction activities would be temporary and would affect few viewers, and the essential character of views of the area would not change, repair and strengthening of the Feather and Yuba River levees would not contribute to any potential significant cumulative aesthetic impacts.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impacts associated with repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1. Effects of detention basin construction east of Feather River Boulevard would be the same as described for Alternative 1.

Construction of the proposed ASB setback levee would temporarily reduce the aesthetic qualities of views by introducing earthmoving equipment and other construction equipment, materials, and work crews into the viewshed of recreationists, motorists on SR 70 and Feather River Boulevard, workers in nearby farming areas, and residents of the area. However, because construction activities would be temporary and would affect few viewers, this impact would be less than significant.

Long-term changes in aesthetic conditions associated with the presence of the setback levee would not change the essential character of views of the area in Segment 2 (rural, bordering a floodway with riparian components) or the quality of those views (moderate aesthetic value) and would not substantially affect a scenic vista. Because construction activities would be temporary and would affect few viewers, and the essential character of views of the area would not change with the presence of the setback levee, the ASB levee setback would not contribute to any potential significant cumulative aesthetic impacts.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1. The setback levee area would be somewhat smaller under Alternative 3 than under Alternative 2 because the intermediate setback levee alignment is located farther to the west than the ASB setback levee alignment. The intermediate setback levee would not make a considerable contribution to any potential significant cumulative impacts on aesthetic resources for the same reasons as stated above.

6.3.8 CULTURAL RESOURCES

Alternative 1 – The Levee Strengthening Alternative

Table 5.8-2, “Summary of Cultural Resources in the Project Area,” in Section 5.8, “Cultural Resources,” presents a list of previously identified and newly identified resources in and directly adjacent to the FRLRP project area, along with the National Register of Historic Places and California Register of Historical Resources eligibility status of each resource. Mitigation described in Section 5.8 would ensure the protection in place, or the recovery and subsequent protection, of any significant cultural resources determined to be present in the existing Feather or Yuba River levee alignment or elsewhere in the project area that could be damaged by project-

related activities. These management actions would ensure that the value of any significant cultural resource would be preserved. They also would ensure that project activities would not contribute to any significant impact on cultural resources that may have occurred as a result of disturbance or destruction of prehistoric sites likely to have taken place before the enforcement of protections afforded by current laws such as CEQA.

In addition, activities associated with the proposed levee strengthening (e.g., construction of slurry cutoff walls) and related activities (e.g., relocation of Pump Station No. 3, construction of the detention basin) have the potential to encounter and possibly damage unknown as-yet-undiscovered subsurface cultural resources. Mitigation described in Section 5.8 would be initiated to prevent any significant impacts on cultural resources from occurring.

Implementing mitigation measures provided in Section 5.8 would ensure that construction under Alternative 1 would not incrementally contribute to any significant cumulative impacts on important cultural resources in the project region. These measures are fairly standard to ensure compliance with Section 15064.5 of the State CEQA Guidelines and related provisions of the Public Resources Code, and it is assumed that similar measures would be applied to related projects, and other projects in the region, as appropriate. Where federal agency approvals are required to implement projects, moreover, additional protection would also be anticipated under the National Historic Preservation Act, which is commonly implemented by federal agencies, making measures such as those described herein fairly standard as well.

For these reasons, repair and strengthening of the Feather and Yuba River levees would not incrementally contribute to a significant cumulative effect on cultural resources.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1.

Mitigation described in Section 5.8 would ensure the protection in place, or recovery and subsequent protection, of any significant cultural resources determined to be present in the ASB levee setback area or elsewhere in the project area that could be damaged by project-related activities. In addition, construction of the ASB setback levee in Segment 2 and related activities (e.g., use of the soil borrow area/detention basin location) have the potential to encounter and possibly damage unknown as-yet-undiscovered subsurface cultural resources. Mitigation described in Section 5.8 would be initiated to prevent any significant cumulative impacts on cultural resources from occurring.

For the reasons discussed above, the ASB setback levee would not incrementally contribute to a significant cumulative effect on cultural resources.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1, and the impacts associated with construction of the setback

levee in project Segment 2 would be the same as the effects described previously for Alternative 2. However, the levee setback area would be somewhat smaller under Alternative 3 than under Alternative 2 because the intermediate setback levee alignment is located farther to the west than the ASB setback levee alignment, resulting in less ground disturbance, and therefore less potential for disturbing unknown cultural resources. For the reasons described above, the intermediate levee setback would not incrementally contribute to a significant cumulative effect on cultural resources.

6.3.9 AIR QUALITY

Virtually all pollutant emissions associated with the three proposed project alternatives would be the result of construction-related activity; any operational emissions would be extremely minor and would not contribute measurably to cumulative air quality emissions. Therefore, this evaluation focuses only on the pollutants of concern that would be associated with construction-related emissions: reactive organic gases (ROG), oxides of nitrogen (NO_X), and particulate matter greater than 10 microns in diameter (PM_{10}).

The FRAQMD portion of the NSVAB is designated as a nonattainment area with respect to the state standards for ozone (1-hour) and PM_{10}. Yuba and Sutter Counties are designated as a nonattainment area with respect to the state standards for ozone (1-hour) and PM_{10}, and are either in attainment or unclassified for the remaining state standards. Yuba and Sutter Counties are either in attainment or unclassified for federal standards (Feather River Air Quality Management District 2006).

Any project that is constructed in the FRAQMD has the potential to add traffic and other pollution-emitting sources that would contribute to the cumulative degradation of air quality in the region. This is particularly true of large-scale housing and commercial developments, such as development of the Plumas Lake Specific Plan, East Linda Specific Plan, and River Highlands Community Plan areas. At the same time, vehicles throughout the region are continuously being modernized as consumers replace older vehicles, and the newer vehicles have improved air emission levels. Furthermore, FRAQMD is required to make progress toward compliance with federal clean air standards. It can be assumed that policies and regulatory programs (requirements for best available control technology) will minimize air quality impacts over time; however, it cannot be stated with certainty that future air quality, with growth projected to occur throughout the region (see “Current Trends in Population Growth and Conversion of Agricultural Land” above), will be better in the future than it is today.

Because of the nature of conditions that affect air quality, impacts on air quality are considered on a regional basis; in the case of the project area, this region covers at least Yuba County and Sutter County, which is under FRAQMD jurisdiction. It is neither practical nor reasonable to consider a complete list of all projects that would affect this large region. Rather, attainment plans form the basis of projecting and resolving adverse air quality conditions throughout the region.

Alternative 1 – The Levee Strengthening Alternative

Construction-related emissions associated with levee repair and strengthening activities would result in emissions of toxic air contaminants (TACs) associated with the operation of diesel-

powered construction equipment. This impact would be less than significant because several factors would limit the exposure of sensitive receptors to TACs: the distance of receptors from the project site, the limited amount of emissions, the temporary nature of exposure, or a combination of these factors. Therefore, implementation of Alternative 1 would not incrementally contribute to any potential cumulative impacts related to TAC exposure.

Construction-related emissions associated with Alternative 1 are expected to temporarily and periodically exceed one or more of the FRAQMD thresholds for ROG, NO_X, and PM_{10}. FRAQMD's *Indirect Source Review Guidelines* and CEQA guidance (Feather River Air Quality Management District 2006) provide mitigation measures for reducing these short-term air quality impacts, as described in Section 5.9, "Air Quality." The direct impact would be temporary and intermittent and would be reduced by implementation of these measures; however, because of the potential magnitude of pollutant emissions and the amount by which they may exceed FRAQMD's recommended daily thresholds, implementing this mitigation would not reduce the impact to a less-than-significant level. In addition, it can be assumed that the construction period for Alternative 1 would overlap with construction periods or implementation phases of other projects in the Yuba County and Sutter County areas and throughout the basin, such as construction or occupation of the major development areas and other levee repair projects noted above. Each individual project would contribute measurably to adverse air quality conditions, therefore also contributing to nonattainment of FRAQMD air quality standards and resulting in a significant cumulative air quality impact. There is no feasible mitigation available that would cause all FRAQMD air quality standards to be met by the time construction of the FRLRP takes place.

Despite the implementation of the required mitigation, construction-related emissions under Alternative 1 would contribute substantially to nonattainment of FRAQMD air quality standards, resulting in a significant contribution to a significant and unavoidable cumulative impact.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1. Impacts related to TACs under Alternative 1 would apply to all three project segments under Alternative 2.

Construction-related emissions associated with construction of the ASB setback levee in Segment 2 are expected to temporarily and periodically exceed one or more of the FRAQMD thresholds for ROG, NO_X, and PM_{10}. However, these emissions would be expected to be greater than under Alternative 1 because construction of the setback levee, removal of the existing levee, and the need to develop additional soil borrow areas would result in a larger construction area and disturbed surface and hauling of greater volumes of soil. As described above, implementation of mitigation measures would not reduce the impact to a less-than-significant level.

In addition, it can be assumed that the construction period for the ASB levee setback would overlap with construction periods or implementation phases of other projects in the Yuba County and Sutter County areas and throughout the basin, such as construction or occupation of the

major development areas and other levee projects noted above. Each individual project would contribute measurably to adverse air quality conditions, therefore also contributing to nonattainment of FRAQMD air quality standards and resulting in a significant cumulative air quality impact. There is no feasible mitigation available that would cause all FRAQMD air quality standards to be met by the time construction of the FRLRP takes place.

Despite the implementation of the required mitigation, construction-related emissions under Alternative 2 would contribute substantially to nonattainment of FRAQMD air quality standards, resulting in a significant contribution to a significant and unavoidable cumulative impact.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1, and the impacts associated with construction of the setback levee in project Segment 2 would be the same as the effects described previously for Alternative 2. However, the levee setback area would be somewhat smaller under Alternative 3 than under Alternative 2 because the intermediate setback levee alignment is located farther to the west than the ASB setback levee alignment, resulting in slightly less construction-related emissions. For the reasons described above, the effects of the intermediate setback levee on air quality, despite the implementation of the required mitigation, would contribute to nonattainment of FRAQMD air quality standards, resulting in a significant contribution to a significant and unavoidable cumulative impact.

6.3.10 NOISE

The discussion of cumulative noise effects is focused on the areas near the existing and proposed setback levee alignments where noise from construction activities would combine with noise from other projects and exceed established thresholds for sensitive receptors.

Alternative 1 – The Levee Strengthening Alternative

Construction work for Alternative 1 is expected to generate noise levels that, even with mitigation, would exceed the thresholds for sensitive receptors. At least one residence is within about 150 feet of the existing Feather River levee along project Segment 1 and multiple residences are within 150 feet of the existing levee in Segment 3. These significant noise increases would be short term and intermittent, corresponding to periods when numerous pieces of construction equipment are operating simultaneously at locations close enough to the residence to produce noise at nuisance levels. Implementation of mitigation described in Section 5.10, “Noise,” would reduce the potential temporary noise impact, but not to a less-than-significant level.

Noise is a localized occurrence and attenuates with distance. Therefore, only future cumulative development projects in the direct vicinity of the FRLRP project site would have the potential to add to anticipated project-generated noise, thus resulting in cumulative noise impacts. However, projects considered in this cumulative analysis that have the potential to be under construction concurrently with the FRLRP are located more than 2,000 feet from the FRLRP project site at a minimum, and some are located miles from the site. The closest “cumulative project” is the

Plumas Lake Specific Plan area, which, at its nearest points, is located between 2,000 and 3,000 feet east of project Segments 1 and 2. However, if construction activities associated with Alternative 1 and the Plumas Lake Specific Plan were to occur concurrently, it is possible that construction noise associated with these projects together could combine to result in greater noise levels at some of the dispersed rural residences in the area than noise levels from each project alone. Therefore, a significant cumulative noise impact could occur and the FRLRP would make a substantial contribution to this impact.

Mitigation to reduce construction noise generation is included in the FRLRP. It is assumed that similar mitigation is included for the Plumas Lake Specific Plan. No further feasible mitigation measures are available to reduce cumulative construction noise at sensitive receptors to less-than-significant levels.

Alternative 1 would result in a less-than-significant impact related to generation of groundborne vibration during construction. Groundborne vibration attenuates rapidly with distance and projects must be in close proximity to each other (within the range of approximately 100 feet, depending on the type of equipment generating the vibration) to simultaneously contribute to vibration levels at the same location. There are no opportunities for projects addressed in this cumulative analysis to interact with the FRLRP in regard to groundborne vibration, and no cumulative impact would occur.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1. Impacts associated with groundborne vibration described for Alternative 1 would also apply to all project segments under Alternative 2.

The ASB setback levee alignment in Segment 2 is located closer to the Plumas Lake Specific Plan area than the existing levee alignment. Therefore, there is greater potential for a cumulative impact related to construction noise to occur. As discussed above for Alternative 1, under Alternative 2 construction of the FRLRP could provide a substantial contribution to a significant and unavoidable cumulative impact related to construction noise.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be similar to the effects described previously (for all project segments) for Alternative 1, and the impacts associated with construction of the setback levee in Segment 2 would be similar to the effects described previously for Alternative 2. For the reasons described above, construction of the FRLRP under Alternative 3 could provide a substantial contribution to a significant and unavoidable cumulative impact related to construction noise.

6.3.11 TRANSPORTATION AND CIRCULATION

Alternative 1 – The Levee Strengthening Alternative

Construction-related traffic, commute trips, and haul truck trips associated with levee repair and strengthening activities would cause a moderate (less-than-significant) temporary increase in traffic on Feather River Boulevard, SR 70, and local roadways that provide access to the project alignment (e.g., Anderson Avenue, Country Club Avenue, Riverside Drive).

Alternative 1 could also temporarily increase traffic hazards on Feather River Boulevard near the existing Feather River levee alignment; however, mitigation measures described in Section 5.11, "Transportation and Circulation," would be implemented to ensure that any potential hazards are minimized. There are no known projects that would contribute substantially to increased traffic on these roadways or that would contribute substantially to a localized potential increase in traffic hazards on Feather River Boulevard during the anticipated FRLRP construction period. The East Linda Specific Plan and River Highlands Community Plan areas are sufficiently distant from the project area that construction and added population in these areas is not expected to contribute traffic on local roadways that would be affected by project construction. Traffic associated with construction work and new residential and commercial development in the Plumas Lake Specific Plan area would likely result in a moderate increase in short-term and long-term traffic on Feather River Boulevard and an increase in traffic on SR 70. During the construction period for Alternative 1, some of the traffic increases associated with construction in the Plumas Lake Specific Plan area and with other construction projects for levee improvements in the area may coincide with the construction traffic that would be generated by the proposed project. As described in Section 5.11, construction-related trips would not exceed the thresholds established by the Institute of Traffic Engineers (ITE) for temporary traffic increases and would not represent a substantial increase in traffic levels on these roadways or other local roads. Therefore, this traffic would not be considered to contribute substantially to traffic volumes, either directly or when considered in combination with other projects. Levee repair and strengthening and relocation of Pump Station No. 3 would not make a cumulatively considerable contribution to any significant cumulative impact associated with transportation and circulation.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1.

Because of the construction of the ASB setback levee, Alternative 2 would generate a greater number of construction-related trips than Alternative 1. Such trips would be associated with the transport of larger quantities of borrow material. However, the trip generation from all sources would not exceed the thresholds established by ITE for temporary traffic increases and would not represent a substantial increase in traffic levels on these roadways or other local roads. Construction of the ASB setback levee could also temporarily increase traffic hazards on Feather River Boulevard near the levee alignment. Implementation of mitigation measures described in Section 5.11 would ensure that any potential hazards are minimized. For the reasons described

above, and in the discussion of Alternative 1, construction of the ASB setback levee would not make a cumulatively considerable contribution to any significant cumulative impact associated with transportation and circulation.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1, and the impacts associated with construction of the setback levee in project Segment 2 would be the same as the effects described previously for Alternative 2. Trip generation from all sources is expected to be approximately the same under Alternative 3 as under Alternative 2. For the reasons described above, construction of the intermediate setback levee would not make a cumulatively considerable contribution to any significant cumulative impact associated with transportation and circulation.

6.3.12 PUBLIC SERVICES, UTILITIES, AND SERVICE SYSTEMS

Alternative 1 – The Levee Strengthening Alternative

Although reasonable attempts have been made to determine the locations of public utility infrastructure in the project area, and preliminary surveys have been conducted, the potential exists for additional buried infrastructure elements that have not already been identified to be located near or crossing the levee. Construction activities could cause minor accidental damage to both identified and unidentified utility infrastructure, resulting in temporary disruptions to service. However, detailed design of the levee repairs would include consultation with all potential service providers to identify infrastructure locations and appropriate protection measures, and consultation would continue during construction to ensure avoidance/protection of facilities as construction proceeds. Therefore, the potential for accidental damage to utility infrastructure during construction is remote, and if damage were to occur, disruptions to service would be short term and temporary until repairs were completed. Implementation of Alternative 1 would not result in substantial interference with utility infrastructure and services. Similar precautions would be expected to be taken during construction of other projects considered in this cumulative analysis, with a similar low likelihood of disruptions to service, and any disruptions, if they were to occur, would be short term and temporary. Therefore, no significant cumulative impact related to disruptions of utility service during construction is expected to occur. If such a cumulative impact were significant, the FRLRP would not contribute substantially to the impact.

The increased traffic on Feather River Boulevard associated with levee repair and strengthening activities could increase emergency response times and otherwise make access to the area more difficult for emergency service providers. Areas of higher density development occur near the northern end of Feather River Boulevard in project Segment 3, and at the southern end in the Plumas Lake area in Segment 1. It is important that access to areas along Feather River Boulevard remains open for emergencies related to late-season flood events, and particularly for potential fire-control events during the dry season. Mitigation described in Section 5.12, “Public Services, Utilities, and Service Systems,” would ensure avoidance of this potential impact, and

levee repairs and strengthening would not make a considerable contribution to any potential cumulative impacts related to emergency access.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1.

Implementation of the ASB levee setback could result in damage to public utility infrastructure and service disruption in the levee setback area. Although service providers have been contacted for information on the locations of utility infrastructure and preliminary surveys of the facilities have been conducted, it is possible that some utilities that could be affected by project implementation may not have been identified. Infrastructure remaining in the levee setback area could be damaged by construction of the setback levee, by use of a proposed soil borrow area, or by the passage of floodwaters through the setback area, possibly resulting in interruption of service.

As discussed above, the increased traffic on Feather River Boulevard associated with levee repair and strengthening activities could increase emergency response times and otherwise make access to the area more difficult for emergency service providers. Construction traffic on Feather River Boulevard would potentially be greater under Alternative 2 than under Alternative 1 because a larger number of haul truck trips would be associated with construction of the setback levee.

Mitigation described in Section 5.12, however, would ensure avoidance of potential impacts on public utility infrastructure, utility service disruptions, and interference with emergency response. The ASB setback levee would not make a considerable contribution to any potential cumulative impacts on public services, utilities, and service systems.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1, and the impacts associated with construction of the setback levee in project Segment 2 would be the same as the effects described previously for Alternative 2. However, the extent of affected utilities would be somewhat less under Alternative 3 than under Alternative 2 because the intermediate setback levee alignment is located farther to the west than the ASB setback levee alignment, resulting in a smaller setback area. For the reasons described above, the intermediate setback levee would not contribute to any potential significant cumulative impacts on public services, utilities, and service systems.

6.3.13 PALEONTOLOGICAL RESOURCES

Alternative 1 – The Levee Strengthening Alternative

Activities associated with the proposed levee strengthening (e.g., construction of slurry cutoff walls) and related activities (e.g., relocation of Pump Station No. 3, construction of a detention basin) have the potential to encounter and possibly damage unknown paleontological resources.

If any previously undiscovered paleontological resources are found in the levee alignment, at the pump station, or at the soil borrow/detention basin sites as a result of construction activity, mitigation described in Section 5.13, "Paleontological Resources," would be initiated that would prevent any significant impacts on paleontological resources from occurring. Therefore, implementation of Alternative 1 would not make a considerable contribution to any potential cumulative impacts on paleontological resources.

In addition, a potential cumulative net benefit on paleontological resources in the region could occur because construction activity may encounter resources that would otherwise go undiscovered. The protection of those resources would allow future study that would contribute to the body of scientific knowledge.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1.

Construction of the ASB setback levee in Segment 2 and related activities (e.g., use of the soil borrow area/detention basin) have the potential to encounter and possibly damage unknown paleontological resources. If any previously undiscovered paleontological resources are found in the ASB levee setback area or in the soil borrow area/detention basin as a result of construction activities, mitigation described in Section 5.13 would be initiated to prevent any significant impacts on paleontological resources from occurring. Therefore, implementation of Alternative 2 would not make a considerable contribution to any potential cumulative impacts on paleontological resources.

As described above, a potential cumulative net benefit to paleontological resources in the region could occur because construction activity may encounter resources that would otherwise go undiscovered. The protection of those resources would allow future study that would contribute to the body of scientific knowledge.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

Impacts associated with the repair and strengthening of the existing Feather and Yuba River levees in project Segments 1 and 3 would be the same as the effects described previously (for all project segments) for Alternative 1, and the impacts associated with construction of the setback levee in project Segment 2 would be the same as the effects described previously for Alternative 2. However, the levee setback area would be somewhat smaller under Alternative 3 than under Alternative 2 because the intermediate setback levee alignment is located farther to the west than the ASB setback levee alignment, resulting in less potential for disturbance of unknown paleontological resources. For the reasons described above, the intermediate levee setback would not contribute to any potential significant cumulative impacts on paleontological resources.

CHAPTER 7 OTHER CEQA-REQUIRED SECTIONS

7.1 GROWTH-INDUCING EFFECTS

7.1.1 CEQA REQUIREMENTS

The California Environmental Quality Act Guidelines (State CEQA Guidelines) require that an environmental impact report (EIR) evaluate the growth-inducing impacts of a proposed project (Section 21100[b][5]). Growth-inducing impacts are described in Section 15126.2(d) of the State CEQA Guidelines as follows:

> [T]he ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth (a major expansion of a wastewater treatment plant might, for example, allow for more construction in service areas). Increases in the population may tax existing community service facilities, requiring construction of new facilities that could cause significant environmental effects…. [In addition,] the characteristics of some projects…may encourage and facilitate other activities that could significantly affect the environment, either individually or cumulatively. It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.

Included in this definition are public works projects that would remove obstacles to population growth. Direct growth inducement would result if a project, for example, involved the construction of new housing. Indirect growth inducement would result if a project established substantial new permanent employment opportunities (e.g., new commercial, industrial, or governmental enterprises), involved a construction effort with substantial short-term employment opportunities that would indirectly stimulate the need for additional housing and services, or removed an obstacle to housing development.

Growth inducement itself is not an environmental effect, but it may foreseeably lead to environmental effects. If substantial growth inducement occurs, it can result in secondary environmental effects, such as increased demand on community and public services and infrastructure, increased traffic and noise, degradation of air or water quality, degradation or loss of plant or animal habitats, or conversion of agricultural and open-space land to urban uses. However, these adverse effects are less likely to occur, and where they do occur they are more likely to be adequately mitigated, if the induced growth is consistent with or accommodated by the land use plans and growth management plans and policies for the area affected (e.g., city and county general plans, specific plans, transportation management plans). Local land use plans provide for land use development patterns and growth policies that encourage orderly urban development supported by adequate urban public services such as water supply, roadway infrastructure, sewer services, and solid waste services. A project that would induce “disorderly” growth (i.e., growth that would conflict with the local land use plans) could indirectly cause additional adverse environmental impacts and other public services impacts.

If significant indirect environmental effects of growth may occur, the question must be answered whether those effects have already been considered and mitigated, or overridden if unavoidable, in a completed CEQA process, or whether they instead need to be disclosed and analyzed in the proposed project's EIR. If the induced growth is consistent with an approved general plan, specific plan, or similar planning document, and a CEQA document on that plan adequately addresses the effects of growth in the plan, the environmental effects of growth induced by the proposed project have already been evaluated. In this case, the EIR for the proposed project can refer to the completed CEQA document for the impact analysis and need not evaluate it in detail again. A project that would induce growth that is not consistent with a general plan, specific plan, or similar planning document could indirectly cause additional significant environmental impacts beyond those evaluated in the earlier CEQA documents on the plan. In this case, the EIR for the proposed project would need to disclose and evaluate potential additional significant effects and proposed mitigation for those effects, if feasible.

7.1.2 GROWTH-INDUCEMENT POTENTIAL OF THE PROPOSED PROJECT

Fostering Growth—Housing and Employment

Because the Feather River Levee Repair Project (FRLRP) would not involve the construction of housing, it would not be directly growth inducing. Construction activities associated with the FRLRP would generate short-term employment opportunities that would have the potential to indirectly stimulate the need for additional housing and services during the construction periods, which would occur over 2 years in 2007–2008. Active construction would occur primarily from spring through late fall during these 2 years, and depending on the alternative selected by Three Rivers Levee Improvement Authority (TRLIA), the construction effort would require a typical labor force of approximately 50–70 people. Intensive construction periods could require an increase in construction staff to a total of as many as 100 people at any one time. However, because of the limited number and type of new jobs that would be generated and the temporary nature of those jobs, it is anticipated that the new jobs would be filled using the existing local employment pool. Existing available housing in the Marysville–Yuba City area would easily accommodate any workers who relocate from outside the area, if needed. Moreover, project operations and maintenance necessary for the FRLRP would not require new workers. Therefore, indirect growth-inducing impacts resulting from implementation of the FRLRP would be less than significant.

Removing Obstacles to Growth—Flood Protection

Overview of Flood Protection Efforts and Planned Development in the RD 784 Area

As described in detail in Chapter 3, "Project Purpose, Need, and Development," flooding that occurred in the Central Valley in 1986 resulted in initiation of various flood control studies and projects in the Yuba River basin and in the Reclamation District (RD) 784 area of Yuba County. The System Evaluation Project prepared by the U.S. Army Corps of Engineers (Corps) and the California Department of Water Resources was the first of these flood control projects. This project was followed in 1988 by Yuba County Water Agency's (YCWA's) initiation of the Yuba Basin Project.

In 1993, following the initiation of the System Evaluation Project and the Yuba River Basin Project, and before the floods of 1997, Yuba County (County) had approved the Plumas Lake Specific Plan, which provides for a 12,000-home development on 5,200 acres in the southern portion of the RD 784 area. A few years before, the County had also approved the smaller East Linda Specific Plan adjacent to Yuba Community College, north of Olivehurst. Construction of the Plumas Lake and East Linda developments began in 2002. However, the results of a Corps floodplain mapping study completed in 2003 indicates that the people and property in the RD 784 area, including homes that had already been built in the Plumas Lake Specific Plan area before the release of the Corps study, are subject to a much higher flood risk than previously believed. Without levee improvements that meet Federal Emergency Management Agency (FEMA) criteria, FEMA could issue new Flood Insurance Rate Maps for the RD 784 area.

To avoid having RD 784 mapped into the FEMA 100-year floodplain, YCWA, RD 784, and the County, in consultation with many landowners and developers in the south county, elected to move aggressively on a program for achieving FEMA certification of the RD 784 levees. As a result of this program, various levee repair/improvement projects and other flood protection projects have been completed, are under way, or are being studied in the RD 784 area, including the FRLRP.

In 2005, the State of California Reclamation Board (The Reclamation Board) issued an encroachment permit for work on Phase 3 of the program of elements under the Y-FSFCP, which included Bear River and WPIC levee improvements and construction of the Olivehurst detention basin. Notably, the encroachment permit contained a special condition that limited the issuance of building permits in the RD 784 area to 800 in 2005 and 700 in 2006. Limitations on building permits would be removed after planned flood protection projects were completed. This condition in The Reclamation Board's encroachment permit, which was agreed to by the County, provided a nexus between completion of flood protection efforts and future growth/development in the RD 784 area.

Since 2005, remaining state bond funding for TRLIA's levee improvements under the Costa-Machado Water Act of 2000 has been expended. The lack of available funding has constrained TRLIA's ability to continue planned flood protection improvements, including implementation of the FRLRP (the subject of this EIR) as well as additional levee repair work on the Yuba River left (south) bank levee. These circumstances contributed to the April 21 and May 19, 2006, decisions by The Reclamation Board to approve a resolution allowing TRLIA to accelerate its levee improvement program using developer-generated funding (The Reclamation Board's meeting transcripts are available online at http://recbd.ca.gov/meeting_transcripts/2006/). The resolution allows developers to generate these funds by removing the previous Reclamation Board limitation on building permits (800 in 2005 and 700 in 2006). The Reclamation Board found that the building permit limitation in the Plumas Lake Specific Plan area was, indeed, limiting TRLIA's ability to continue necessary levee improvement and construction projects. Therefore, development could proceed in the specific plan area without the previous constraints.

However, The Reclamation Board's April 2006 resolution includes various conditions that must be met to allow continued development, to which all parties agreed. TRLIA made a commitment to use its best efforts to complete all elements of the flood control program by 2008. The developers must purchase flood insurance for homeowners in the Plumas Lake Specific Plan

developments until 2008, or until completion of necessary flood protection efforts. Furthermore, the County agreed to satisfy concerns expressed by The Reclamation Board regarding the status of its Flood Safety Information and Emergency Evacuation Plan. The decision by The Reclamation Board to lift the previous building restrictions allows TRLIA, in partnership with the County and the local landowners, to finalize and implement its finance program to raise the $135 million necessary to complete the levee improvement program.

Growth-Inducing Effects of the FRLRP

As described above, the Plumas Lake Specific Plan was approved in 1993. Construction of the first homes in the developments began in spring 2003. Based on the circumstances described above, continuing buildout of the Plumas Lake Specific Plan area is directly linked to continuing levee improvements that are proposed under the FRLRP. Based on the conditions of The Reclamation Board's April 2006 resolution, to which the involved parties agreed, without implementation of the FRLRP and other flood protection projects, development in the Plumas Lake Specific Plan area could not proceed beyond 2008. Therefore, implementation of the FRLRP is growth inducing in the sense that it removes an obstacle to future development.

However, development supported by completion of the FRLRP is consistent with existing land use and project plans in the RD 784 area that had been approved long before the need for the proposed levee improvements had become apparent. Development in these areas is proceeding in accordance with the applicable plans, which include the *Plumas Lake Specific Plan* (Yuba County 1992a), *East Linda Specific Plan* (Yuba County 1990a), and *Yuba County General Plan* (Yuba County 1994a, 1996a).

CEQA analyses have been completed for these plans and associated projects that disclose the environmental effects associated with their implementation. Applicable CEQA analyses include the draft and final EIRs for the *Plumas Lake Specific Plan* (Yuba County 1992b, 1993); for the *East Linda Specific Plan* (Yuba County 1990b, 1990c); and for the *Yuba County General Plan* (Yuba County 1994b, 1996b).

CEQA analyses are under way for two additional large-scale mixed-use projects consisting of up to approximately 6,500 and 2,100 housing units, respectively. However, EIRs for these projects are not yet available.

Implementation of the FRLRP would not alter the location or amount of growth and development envisioned in the available EIRs prepared for local planning documents. Any effects on the environment resulting from the FRLRP removing an obstacle to existing planned growth in the RD 784 area are identified in these available documents. Significant impacts identified in these documents are summarized below.

Some people may argue that implementation of the FRLRP could induce additional new development in the RD 784 area that is currently unplanned and unknown. The degree to which the additional flood protection provided by the FRLRP would alter future development patterns or increase the potential for growth in areas afforded greater flood protection is speculative; therefore, no further discussion is required (State CEQA Guidelines Section 15145).

Land Use

The EIRs for the *Yuba County General Plan* and *East Linda Specific Plan* found no significant impacts related to land use as a result of project implementation.

The *Plumas Lake Specific Plan* EIR found that the specific plan would endanger agricultural lands adjacent to the plan area boundaries because of land use conflicts between urban and agricultural uses. Mitigation measures are provided, but the impact is still identified as significant and unavoidable. The EIR also found that public health impacts could potentially arise from agricultural aerial spraying in lands adjacent to the plan area. A mitigation measure was provided, but the impact is still considered potentially significant. Inconsistency of the specific plan with the goal and with Policy 1a of the Agricultural Lands section of the Land Use Element of the *Yuba County General Plan* was found to be a significant and unavoidable impact in the EIR. The EIR also concludes that the conversion of 5,000 acres of agricultural land to nonagricultural uses is a significant and unavoidable impact, as is the permanent change in character and use of a large amount of land. The *Plumas Lake Specific Plan* EIR recognizes potential impacts from residential land uses abutting commercial, industrial, and infrastructure land uses. This impact is reduced to a less-than-significant level by a mitigation measure. However, potential impacts on public health and safety where residential areas are adjacent to the All Pure Chemical plant are considered significant and unavoidable, although mitigation is provided.

Population and Housing

The EIRs for the *Yuba County General Plan* and *Plumas Lake Specific Plan* found no significant impacts related to housing and population that would arise from project implementation. The *East Linda Specific Plan* EIR states in the section related to population and housing that there are no significant impacts resulting from project implementation related to these topic areas. However, elsewhere in the EIR it identifies population growth as a significant and unavoidable impact.

Geology, Soils, and Mineral Resources

The EIRs for the *Yuba County General Plan* and *Plumas Lake Specific Plan* do not identify any significant impacts related to geology, soils, and mineral resources. The *East Linda Specific Plan* EIR concludes that construction of new roads, underground utilities, drainage retention areas, dwelling units, commercial developments, and school facilities will cause the displacement, disruption, compaction, and covering over of plan area soils. Mitigation measures reduce these impacts to less-than-significant levels.

Hydrologic Conditions, Water Supply and Quality, and Drainage

The *Yuba County General Plan* EIR identifies flooding impacts in the Wheatland/Bear River area as significant. The EIR provides a mitigation measure that reduces these impacts to a less-than-significant level. The *Plumas Lake Specific Plan* EIR identifies no significant impacts related to hydrologic conditions, water supply and quality, or drainage as a result of project implementation.

The *East Linda Specific Plan* EIR concludes that development of the specific plan area would have the following impacts: increase in the rate and amount of surface-water runoff; increase in

the amount of unnatural objects carried from place to place by runoff; increase in the amount of harmful chemicals from human activities and machinery released into runoff water; erosion during construction activity; alteration of the course of floodwaters; and change in the quantity of groundwater. Mitigation measures reduce these impacts to less-than-significant levels.

Biological Resources

The *Plumas Lake Specific Plan* EIR discusses the development of the plan area and its impact on loss of habitat area. The EIR also discusses potential project impacts related to removal of the riparian forest and scrub areas within the plan area boundaries, as well as potential indirect impacts on and direct removal of permanent water and seasonally ponded wetlands, including U.S. Army Corps of Engineers jurisdictional wetlands. All of these impacts are reduced to less-than-significant levels with mitigation measures.

The *Yuba County General Plan* EIR addresses indirect and secondary effects on biological resources. These impacts can occur via illegal hunting, domestic dog activity, off-road vehicle use, the use of pesticides and other harmful chemicals, and other factors related to more intense human presence and activity. A mitigation measure is provided to mitigate this impact, but it remains potentially significant.

The *East Linda Specific Plan* EIR discusses the potential for project impacts on vernal pools and vernal pool habitat. Mitigation measures reduce these impacts to less-than-significant levels.

Aesthetic Resources

The EIRs for the *Yuba County General Plan* and *Plumas Lake Specific Plan* found no significant impacts related to aesthetics or scenic resources that would arise from project implementation. The *East Linda Specific Plan* EIR considers the change in the visual character of the site from rural to urban to be a significant and unavoidable impact.

The EIRs for the *Yuba County General Plan* and *Plumas Lake Specific Plan* found no significant impacts related to light and glare that would arise as a result of project implementation. The *East Linda Specific Plan* EIR found that light spillage from parking lots or sign lighting onto adjacent residential properties could result in significant glare impacts. Mitigation measures reduce these impacts to less-than-significant levels.

Cultural Resources

The *Yuba County General Plan* EIR concluded that as a result of new development allowed by the general plan, existing cultural resources would be significantly more susceptible to vandalism, impacts from off-road vehicles, and other secondary or indirect effects. This increase in susceptibility would occur because of the greater numbers of people in the county and because of new developments located relatively close to certain cultural resources. The EIR provides a mitigation measure that reduces this impact to a less-than-significant level.

The *Plumas Lake Specific Plan* EIR concluded that development of the specific plan area could disrupt or destroy significant historical sites. Mitigation measures reduce this impact to a less-than-significant level. The *East Linda Specific Plan* EIR found no significant impacts related to cultural resources that would arise from project implementation.

Air Quality

The *Yuba County General Plan* EIR identifies significant air quality impacts related to new development, primarily because the air basin is already in nonattainment for some constituents. No mitigation measures were identified that would guarantee that this impact could be reduced to a less-than-significant level, so it remains potentially significant.

The *Plumas Lake Specific Plan* EIR discusses air quality impacts related to construction dust emissions and hazardous emissions from construction equipment. These impacts are reduced to less-than-significant levels by mitigation measures. The EIR concludes that development in the plan area could add to a significant cumulative decline in air quality in the region. Mitigation measures are provided, but the impact remains significant and unavoidable.

The *East Linda Specific Plan* EIR identifies construction dust and increased motor vehicle emissions as impacts anticipated as part of development of the plan area. Mitigation measures reduce these impacts to less-than-significant levels.

Noise

The *Yuba County General Plan* EIR recognizes significant direct and cumulative noise impacts from the development of noise-sensitive land uses closer to existing railroads and commercial, industrial, and recreational noise sources, and from the development of new commercial, industrial, and recreational noise sources closer to existing noise-sensitive land uses. The EIR also discusses the potential impact of the development of noise-sensitive uses close to Beale Air Force Base, the Brownsville Aero Pines Airport, and the Yuba County Airport, exposing these uses to aircraft noise. Mitigation measures reduce all of these impacts to less-than-significant levels. The General Plan EIR also anticipates traffic noise impacts at new noise-sensitive land uses from new and existing roadways, and at existing land uses from new roadways. These impacts are reduced by mitigation measures to less-than-significant levels. The exposure of existing noise-sensitive land uses to increased traffic noise from existing roadways is also identified as a significant impact. A mitigation measure is provided for this impact, but this mitigation may not be possible in some instances, leaving the impact as potentially significant.

The *Plumas Lake Specific Plan* EIR found two significant noise impacts: railroad, future traffic, and existing industrial noise impacts on noise-sensitive land uses, and construction activity noise impacts on surrounding uses. Both impacts are mitigated to less-than-significant levels.

The *East Linda Specific Plan* EIR concludes that sensitive uses within the 65–75 decibel (dB) community noise equivalent level (CNEL) noise contour for State Route (SR) 70 and people living near the SR 70 bypass, the railroad, and other major arterials may be subject to unacceptably high noise levels. These impacts are reduced by mitigation measures to less-than-significant levels.

Transportation and Circulation

One transportation-related impact identified in the *Yuba County General Plan* EIR is that growth and development under the general plan could affect the development and maintenance of an efficient and effective roadway system with acceptable levels of service (LOS). Some roads that would need to be widened to ensure acceptable LOS, because of the level of growth allowed by the general plan, might not be widened. A mitigation measure in the EIR proposes (a) the

widening of each such road for which widening is possible and (b) alternative measures to mitigate the decreased LOS for roads that cannot be widened because of physical constraints. If these measures are effective, the impact is reduced to a less-than-significant level, but the impact remains potentially significant pending the effectiveness of the measures.

The *Plumas Lake Specific Plan* EIR discusses LOS impacts on multiple intersections under the "Existing Plus Project Scenario," all of which are mitigated to less-than-significant levels. These intersections include the following: Arboga Road/Erie Road; SR 70 southbound ramps/Erie Road; Arboga Road/McGowan Parkway; SR 70 southbound ramps/McGowan Parkway; SR 70 northbound ramps/McGowan Parkway; SR 70 southbound ramps/Feather River Boulevard; SR 70 northbound ramps/Feather River Boulevard; SR 70 southbound ramps/Plumas-Arboga Road; and SR 70 northbound ramps/Plumas-Arboga Road. Also under the "Existing Plus Project Scenario," the *Plumas Lake Specific Plan* EIR discusses additional impacts on SR 70 and SR 65 mainlines and interchanges. One impact is that projected travel demand at the Algodon Road/Plumas-Arboga Road and Feather River Boulevard interchanges with SR 70 will create the need for major interchange modifications. A mitigation measure is provided for this impact, but it remains potentially significant. Another impact is that traffic generated by development of the plan area will create the need for greater capacity on SR 70; this impact is reduced to a less-than-significant level with mitigation.

Under the "Cumulative Plus Project Scenario," the *Plumas Lake Specific Plan* EIR discusses LOS impacts on multiple intersections, all of which are mitigated to less-than-significant levels. These intersections include the following: Arboga Road/Erie Road; SR 70 southbound ramps/Erie Road; SR 70 northbound ramps/Lindhurst Road; Arboga Road/McGowan Parkway; SR 70 southbound ramps/McGowan Parkway; SR 70 northbound ramps/McGowan Parkway; SR 65 northbound/McGowan Parkway; Feather River Boulevard/Ella Avenue; Plumas-Arboga Road/Algodon Road; SR 70 southbound ramps/Feather River Boulevard; SR 70 northbound ramps/Feather River Boulevard, and; SR 70 southbound ramps/Plumas-Arboga Road. Also under the "Cumulative Plus Project Scenario," the Plumas Lake Specific Plan EIR discusses the impact of future cumulative traffic growth resulting from project implementation on LOS on several roadway segments. This impact is reduced to a less-than-significant level with mitigation.

As under the "Existing Plus Project Scenario," the *Plumas Lake Specific Plan* EIR discusses additional impacts on SR 70 and SR 65 mainlines and interchanges under the "Cumulative Plus Project Scenario." These impacts include the following: increased traffic creating a need for major intersection modification to the Algodon Road/Plumas-Arboga Road and Feather River Boulevard interchanges with SR 70; increased traffic resulting in the need for greater capacity on SR 70; increased public transit demand as a result of increased population; and insufficient funding for improvements because of the lack of an impact fee structure. All of these impacts are mitigated to less-than-significant levels.

The *East Linda Specific Plan* EIR states that if full buildout were to occur before the completion of the SR 70 bypass, unacceptable LOS would occur on SR 70 from the E Street Bridge to the SR 70/SR 65 intersection. This impact remains potentially significant even after mitigation measures are applied.

Public Services, Utilities, and Parks and Recreation

The *Yuba County General Plan* EIR found no significant impacts related to public services and utilities or parks and recreation resulting from project implementation.

The *Plumas Lake Specific Plan* EIR discusses impacts of development of the plan area on increased water and wastewater facility and service demands and increased stormwater facility demands. Other impacts include public safety hazards potentially created by floodplain development and declining water quality potentially caused by development of the plan area. All of these impacts are mitigated to less-than-significant levels. The EIR also identifies the impact of additional fire service demands resulting from development of the specific plan area and the potential impact of structural and suburban land use–related fires resulting from this development. These impacts are reduced to less-than-significant levels via mitigation.

Significant impacts in the *Plumas Lake Specific Plan* EIR related to additional demands for law enforcement services and the anticipated increase in suburban-type crimes are both mitigated to less-than-significant levels. Significant impacts related to increased demand for solid waste collection and disposal are also reduced to less-than-significant levels with mitigation.

The *Plumas Lake Specific Plan* EIR discusses how development of the plan area would remove current recreation opportunities and create demand for additional ones. Mitigation measures reduce this impact to a less-than-significant level. The EIR also states that development of the specific plan area would create significant demands for educational facilities and services. Mitigation measures reduce this impact to a less-than-significant level.

The *East Linda Specific Plan* EIR identifies water and wastewater impacts related to portions of the plan area not being included in the Linda County Water District. It also discusses impacts related to a new water main and distribution lines not yet being in place and additional standby power needed to meet system demands and design criteria. Other impacts in the EIR relate to insufficient capacity of sewer trunk lines, wastewater treatment facilities, and stormwater drainage facilities to serve the plan area at buildout. The EIR also identifies impacts related to the need for new firefighting equipment and increased demands for service from the Yuba County Sheriff's Department. School impacts include the need for new school facilities to serve the plan area and the cost of land acquisition, site improvement, and building construction, which would exceed available revenue. The need for new parks is also identified as an impact. Mitigation measures are listed in the *East Linda Specific Plan* EIR for each of the public services and facilities impacts discussed above, but increased demand for public services is also listed as a significant and unavoidable impact. Sewage treatment and water supply are specifically listed in the section discussing significant and unavoidable impacts.

Risk of Upset/Public Health and Safety

The EIRs for the *Yuba County General Plan* and *East Linda Specific Plan* found no significant impacts related to risk of upset or public health and safety. The *Plumas Lake Specific Plan* EIR discusses how development could be hindered or slowed by the discovery of and investigation of hazardous materials on-site. This impact is mitigated to a less-than-significant level.

Paleontological Resources

The EIRs for the *Yuba County General Plan*, *East Linda Specific Plan*, and *Plumas Lake Specific Plan* do not address paleontological resources.

7.2 AREAS OF KNOWN CONTROVERSY

The primary area of potential controversy associated with the FRLRP is the change in land uses that would occur as a result of setting back the left bank Feather River levee between Star Bend and Shanghai Bend under either Alternative 2 or Alternative 3. Under Alternative 2, a total of approximately 1,600 acres would be included in the setback levee footprint and easements and the setback area (new floodway). Of that total acreage, approximately 250 acres would be required for the setback levee footprint and easements, and the remaining approximately 1,350 acres would be subject to periodic inundation during high river flows. Under Alternative 3, approximately 230–240 acres would be required for the setback levee footprint and easements, and approximately 1,600–1,700 acres would be included in the new floodway. The majority of the land within the levee setback area is currently used for agriculture. Continued farming operations may be feasible in many parts of the setback area but could be impractical in other areas as a result of project implementation. Under Alternatives 2 and 3, up to several hundred acres of agricultural land could also be converted to a detention basin. It should be noted that under Alternative 1 up to approximately 180 acres of agricultural land would be removed from production to accommodate a detention basin and seepage/stability berms.

With implementation of the FRLRP, periodic episodes of inundation in the levee setback area are expected to be infrequent enough and of short enough duration to allow farming to continue on some portion of the land in the setback area. TRLIA may acquire flood easements from landowners who want to continue to farm or use their land in ways that are compatible with flowage easements. Some portion of the land in the levee setback area may be permanently removed from agricultural production and would be acquired through fee-title. Future management plans for these acquired properties could include restoration of habitat and wetland areas as a substitute for agricultural uses where opportunities are present.

Setting back the Feather River levee may be controversial because private property would be transected by a new levee, some property owners would be displaced, homes and other structures in the setback area would be removed, farmable land would be subject to flooding, and prime agricultural land would be removed from agricultural use. Furthermore, if habitat restoration is included in the FRLRP, converting agricultural land to riparian and wildlife habitat is controversial in some agricultural communities, especially in the Sacramento Valley, where extensive areas are being converted or are proposed for conversion from agricultural use to riparian habitat. County tax revenues also may change as a result of potential land use changes.

An additional area of potential controversy is project construction. Levee strengthening and/or construction of a setback levee would likely pose a temporary nuisance to nearby residents. All construction-related impacts identified in this EIR (see Chapter 5) have appropriate mitigation measures that would be implemented as part of the project; however, short-term impacts associated with construction, such as those associated with noise, dust, and traffic, could exacerbate any public controversy regarding the FRLRP.

This project would help resolve a current area of known and long-standing controversy, namely, the existing risk of flooding impacts in the Yuba-Feather River watershed, as demonstrated by recent catastrophic flooding events. Implementation of any of the three FRLRP alternatives examined in this EIR would result in the levees in the project area providing flood protection for the 1-in-200 annual exceedance probability flood and increasing the overall level of flood protection in the RD 784 area.

Overall, the FRLRP would reduce the ongoing concern and controversy over flood protection in the nearby communities. Any continuing controversy surrounding the project would be related primarily to the direct effects of the proposed levee setback under Alternatives 2 and 3 on affected landowners as well as the effects on agricultural production associated with lands in the levee setback area.

7.3 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS OF RESOURCES

The FRLRP would result in the irretrievable commitment of:

- fossil fuels during construction of the project;
- energy resources needed to repair the existing levees, and under Alternatives 2 and 3, to construct the setback levee and associated features and to relocate utilities; and
- construction materials.

If FRLRP Alternative 2 or Alternative 3 were selected, a newly constructed setback levee would become a permanent landscape feature along the Feather River and an irreversible change in land use would result.

7.4 UNRESOLVED ISSUES

TRLIA would need to select which alternative to approve among the three alternatives evaluated at an equal level of detail in this EIR. The decision would be based on numerous factors besides environmental impacts, including cost, availability of financing, effects on landowners, the potential for regional flood control benefits, future permitting requirements, and implementation schedule.

Regardless of which alternative is selected for implementation, detailed design of project features and planning of construction would need to be coordinated with mitigation requirements in this EIR so that sensitive resources, utilities, and disturbance to adjacent landowners are avoided where practicable. Detailed plans for mitigation of effects on biological resources that cannot be physically avoided during construction would need to be developed in compliance with applicable federal and state laws (e.g., the federal and California Endangered Species Acts) and in coordination with the regulatory agencies.

Land uses in the levee setback area under Alternatives 2 and 3 could consist of agricultural operations and/or habitat restoration activities. Special operations and maintenance plans would need to be prepared and implemented to ensure the long-term maintenance of any agricultural and/or habitat areas, and to ensure that such areas would not conflict with the flood control

function of the levee setback area. Any future management plans would require consultation with affected landowners, resource agencies, and other stakeholders.

CHAPTER 8 ALTERNATIVES

8.1 CEQA REQUIREMENTS

The guiding principles for the selection of alternatives for analysis in an environmental impact report (EIR) are provided by the California Environmental Quality Act Guidelines (State CEQA Guidelines). Section 15126.6 of the State CEQA Guidelines indicates that the alternatives analysis must:

- describe a range of reasonable alternatives to the project that could feasibly attain the basic objectives of the project;
- consider alternatives that could reduce or eliminate any significant environmental impacts of the proposed project, including alternatives that may be more costly or could otherwise impede the project's objectives; and
- evaluate the comparative merits of the alternatives.

The range of reasonable alternatives must be selected and discussed in a manner that fosters meaningful public participation and informed decision making (State CEQA Guidelines Section 15126.6[f]).

The alternatives analysis in this EIR is governed by the "rule of reason" in accordance with Section 15126.6(f) of the State CEQA Guidelines. That is, the range of alternatives presented in this EIR is limited to ones that will inform a reasoned choice by Three Rivers Levee Improvement Authority's (TRLIA's) decision makers. In addition to the guiding principles for the selection of alternatives as set forth above, Section 15126.6 of the State CEQA Guidelines requires that an EIR (1) evaluate a "No Project Alternative," (2) identify alternatives that were initially considered but then rejected from further evaluation, and (3) identify the "environmentally superior alternative."

Alternatives may be eliminated from detailed consideration in the EIR if they fail to meet most of the basic project objectives, are infeasible, or could not avoid any significant environmental effects (State CEQA Guidelines Section 15126.6[c]). Lead agencies are guided by the general definition of feasibility found in CEQA: "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors" (State CEQA Guidelines Section 15364).

In addition to CEQA, the National Environmental Policy Act and Section 404 of the Clean Water Act provide guidance on alternatives. These guidelines, as well as those of CEQA, have been considered in the identification, evaluation, screening, and finalizing of alternatives for the Feather River Levee Repair Project (FRLRP) to support future decision making in compliance with these acts.

Section 8.2 provides an overview of the alternatives selection process for the FRLRP. Section 8.3 describes the alternatives evaluated in this EIR. Section 8.4 compares the environmental effects of the alternatives, and Section 8.5 discusses the environmentally superior alternative.

8.2 ALTERNATIVES SCREENING PROCESS

As described in Chapter 3, "Project Purpose, Need, and Development," the proposed FRLRP is an expansion and modification of the Above Star Bend (ASB) levee setback previously evaluated in the programmatic EIR for the Yuba-Feather Supplemental Flood Control Project (Y-FSFCP) (Yuba County Water Agency 2003). The following discussion briefly summarizes the development of the FRLRP. See Section 3.3, "Development of the Feather River Levee Repair Project," for additional information.

8.2.1 YUBA-FEATHER SUPPLEMENTAL FLOOD CONTROL PROJECT—FEATHER RIVER LEVEE SETBACK

The Y-FSFCP programmatic EIR contains a substantial amount of background information provided to assist reviewers in understanding both the alternatives development process and the rational basis for the selection of three elements, including a Feather River levee setback, for detailed feasibility analysis. Section 3.2, "Need for Supplemental Flood Control," of the Y-FSFCP programmatic EIR describes the combination of environmental conditions, institutional factors, and physical and operational characteristics of the flood control system that were factored into the selection of alternative flood control elements for detailed evaluation by Yuba County Water Agency (YCWA) and its flood control study team. Section 3.3, "Formulation of the Proposed Project," of the Y-FSFCP programmatic EIR summarizes the lengthy screening process that led to the selection of the alternatives evaluated in the EIR.

The selection of the alternatives evaluated previously in the Y-FSFCP programmatic EIR was based largely on findings of previous studies by the flood control study team. In these studies, more than 30 potential elements of a flood control program were identified and screened separately and in combination. The basic project purpose of the Y-FSFCP was to define and implement cost-effective and practicable measures as soon as possible within the budget provisions of the Costa-Machado Water Act of 2000 (Water Act of 2000) to provide the greatest possible increment of flood protection from the Yuba and Feather Rivers. The focus of the study, like the focus of the FRLRP, was primarily on providing benefits for Yuba County and secondarily on providing benefits for other areas that might also contribute to project implementation.

The Feather River levee setback element was developed to provide flood protection by lowering channel water levels. The other flood control elements that would also have the potential to lower Feather River water levels are new storage in existing, upstream flood control reservoirs; more efficient operation of these reservoirs; and dredging of the Feather River channel. The studies determined that new reservoir storage would be effective in increasing flood protection; however, the construction of new dams is not authorized as part of the Water Act of 2000. The Y-FSFCP efforts completed to date have been funded in large part through this act; therefore, new reservoir storage was eliminated from further consideration as a viable project alternative because it would entail the construction of new dams.

More efficient operation of existing flood control reservoirs was investigated and recommended as a project feature in the form of two elements: Forecast-Coordinated Operations of Lake Oroville and New Bullards Bar Reservoir for Major Storms (F-CO), which is being implemented, as described in Chapter 6, "Cumulative Impacts," and New Bullards Bar Outlet Capacity Increase.

Dredging of the Feather River channel was screened as a potential flood control improvement measure. This option was rejected because it was concluded that dredging would not be effective in reducing flood stages. The channel area that could be dredged represents a small portion of the entire floodway (levee to levee); as a result, it was determined that lowering the main channel would not provide significant reductions in flood levels. Dredging would also have the potential to break through geologic controls (hard points) in the channel and create a dangerous condition of channel movement.

Selection of specific levee setback options was based on several considerations: improvement to the hydraulic characteristics of the Feather River, levee stability and performance, costs, and impacts on land users. Hydraulic evaluations focused on increasing the width of constricted river reaches. It was determined that the two previously considered setback options, Above Star Bend and Below Star Bend, would provide both significant hydraulic benefits for Yuba and Sutter Counties and important levee stability/performance benefits for Yuba County. (As described below, the Below Star Bend levee setback has been eliminated from consideration because of improvements that have subsequently been made to the southernmost portion of the Feather River levee between Star Bend and the Bear River.) Comparable channel widening on the Sutter County side of the Feather River would be as long, or longer, depending on the selected alignment and would not provide stability/performance benefits for Yuba County. It was found that the possible levee setback in Sutter County near the airport at Yuba City would not provide any significant flood reduction benefit. The possible setback on the wide bend where State Route (SR) 99 crosses the Feather River was determined to be cost-prohibitive and to entail substantial implementation complications because of the need to modify the SR 99 crossing itself.

In summary, the previous flood control studies and alternatives screening entailed careful consideration of a wide range of potential flood control elements in the context of a complex set of factors affecting performance of the existing flood protection system. See *Alternatives Analysis Report for the Yuba-Feather Supplemental Flood Control Project* (Yuba County Water Agency 2002) and Chapter 8 of the Y-FSFCP draft environmental impact report (DEIR) (Yuba County Water Agency 2003) for complete descriptions of the previous alternatives selection process.

8.2.2 FEATHER RIVER LEVEE REPAIR PROJECT

Recent studies by the U.S. Army Corps of Engineers (Corps) and TRLIA indicate that several reaches of the Feather River left (east) bank levee between the mouth of the Yuba River and the mouth of the Bear River, as well as reaches of the lower Yuba River left (south) bank levee, do not satisfy geotechnical criteria for seepage for the 1-in-100 annual exceedance probability (AEP) flood (i.e., the "100-year flood"). For example, the Corps prepared the Lower Feather River Floodplain Mapping Study, dated Feb. 17, 2005. The report identified various deficiencies

with the Feather River, Yuba River, Bear River, and Western Pacific Interceptor Canal levees in the Reclamation District (RD) 784 area.

More recently, a Problem Identification Report (PIR) prepared for TRLIA (Kleinfelder 2006) addressed the condition of the Feather River left bank levee from Project Levee Mile (PLM) 13.3 (just south of Pump Station No. 2) to the beginning of the Yuba River left bank levee at PLM 26.1, and the Yuba River left bank levee from PLM 0.0 (beginning of the levee) to PLM 0.3, and from PLM 2.2 to PLM 6.1. The purpose of the PIR was to perform a feasibility-level evaluation of subsurface geotechnical conditions and levee conditions in accordance with the requirements of the Federal Emergency Management Agency (FEMA). The PIR concluded that portions of the subject levees do not currently meet FEMA's geotechnical certification requirements for through-seepage (water seeping through levee soils) and underseepage (water seeping under levee soils) during flood events.

In addition, the *Phase 4 Erosion Investigation Report* prepared for TRLIA (MBK Engineers 2006) assessed existing levee erosion issues on the left bank levees of the Feather River and lower Yuba River. The investigation report identified several areas of concern regarding erosion along the levee embankment slope in the area identified in this DEIR as project Segment 2 (see Figure 4-1, "FRLRP Project Features," in Chapter 4 of this DEIR). The report identified the need for ongoing assessment, monitoring, and corrective action at these locations.

Development of the FRLRP was initiated in response to levee deficiencies identified in the various available studies. The primary purpose of the FRLRP is to correct identified deficiencies in the left bank levees of the Feather and Yuba Rivers, and consequently to improve flood protection for the RD 784 area of Yuba County. The project design objectives focus on measures to bring the levees into compliance with FEMA's geotechnical certification requirements for underseepage and through-seepage, as well as engineering standards for the State of California Reclamation Board (The Reclamation Board) and the Corps.

The objectives of the FRLRP, as identified previously in Section 3.1, "Project Purpose and Objectives," are:

- to secure flood protection for at least a flood event with a 0.5% (or 1-in-200) annual chance of exceedance,
- to help secure FEMA certification of the subject reaches of levee,
- to avoid increasing downstream flow and stage during peak-flow conditions,
- to achieve these objectives as soon as possible, and
- to incorporate environmental mitigation as appropriate.

Various approaches to achieve these objectives were considered for each of the three project segments identified in this DEIR (see Figure 4-1). The alternatives screening process for each segment is described below.

Segment 1

Project Segment 1 extends from Feather River PLM 13.3 (approximately 0.5 mile north of the confluence with the Bear River) to PLM 17.1 at Star Bend. This area was considered for the Below Star Bend levee setback in the Y-FSFCP programmatic EIR. However, the October 2004 feasibility study for the Bear River setback levee found that a setback levee at the confluence of the Feather and Bear Rivers would provide some of the hydraulic and flood control benefits that would be provided by setting back the existing Feather River left bank levee below Star Bend. Further study conducted in support of the EIR prepared for the Feather-Bear Rivers Levee Setback Project (F-BRLSP) found that the hydraulic and flood control benefits resulting from this project preclude the need to improve the Feather River left bank levee below Pump Station No. 2 (approximately PLM 13.4). The EIR for the F-BRLSP was certified in November 2004 and project construction began in 2005.

Because of the presence of the F-BRLSP setback levee, a setback levee in FRLRP Segment 1 would provide few flood control benefits, yet it would result in impacts on property, facilities, and landowners associated with placing new lands in the floodplain. Therefore, a setback levee in Segment 1 was not considered further and levee strengthening was adopted as the preferred approach to addressing levee deficiencies in this area. As described in Chapter 4, "Description of the Proposed Project," all three project alternatives include the same levee strengthening approach in Segment 1.

Segment 2

Project Segment 2 extends from Feather River PLM 17.1 to PLM 23.6. This area includes the ASB levee setback described in the Y-FSFCP programmatic EIR. A levee setback was considered in this area for several reasons:

- a setback levee would replace the existing levee, thereby "correcting" any deficiencies in the existing levee;
- hydraulic and flood control benefits would be achieved by widening an existing narrow point in the river;
- a new setback levee would be constructed using materials and methods consistent with modern standards; and
- a setback levee placed sufficiently eastward of the existing levee could be placed on soils more suitable for supporting a levee foundation.

The ASB setback levee alignment included in the Y-FSFCP programmatic EIR provided a starting point for identifying alternatives for Segment 2 in the FRLRP. TRLIA staff members, project engineers, hydrologists, and others conducted various studies, meetings, and workshops to further develop and refine project alternatives.

Abandoning the setback levee concept and strengthening the existing levee in place was considered as an alternative approach for Segment 2. This approach was considered to allow evaluation of the effects of correcting the levee deficiencies without obtaining the hydraulic and

flood control benefits of a setback levee. As in Segment 1, strengthening the existing levee in Segment 2 would avoid any impacts on property, facilities, and landowners associated with placing new lands in the floodplain. This approach is reflected in this EIR in Alternative 1, The Levee Strengthening Alternative.

Alternative 2 in this EIR, The Levee Strengthening and ASB Setback Levee Alternative, includes a setback levee in Segment 2 that generally follows the alignment of the ASB setback levee included in the Y-FSFCP programmatic EIR. However, as part of the alternatives development process, the northern portion of the setback levee alignment was extended to encompass an area of seepage concerns identified in the PIR. The Levee Strengthening and ASB Setback Levee Alternative was selected for analysis in this EIR because it allows decision makers to evaluate an alternative that provides the benefits of the ASB setback levee listed above, while weighing these benefits against impacts on property, facilities, and landowners associated with placing new lands in the floodplain.

Several other potential setback levee alignments were considered during the alternatives development process. Almost all of these alignments were located to the west of the ASB setback levee alignment. Evaluation of a setback levee alignment between the ASB levee alignment and the existing Feather River levee was considered desirable because it would allow consideration of an intermediate condition, or a balance of benefits and impacts: because of the smaller setback area, hydraulic and flood control benefits could be reduced, but impacts on property, facilities, and landowners associated with placing new lands in the floodplain would also be reduced. Factors considered when potential intermediate setback alignments were developed and evaluated included the suitability of underlying soil conditions to support a levee foundation, the goal of minimizing the splitting of landowner parcels, and effects on potential upstream hydraulic benefits.

The setback levee alignment reflected in this EIR in Alternative 3, The Levee Strengthening and Intermediate Setback Levee Alternative, was considered an appropriate representation of the intermediate setback levee scenario to allow decision makers to evaluate the competing interests of increasing flood control benefits through construction of a setback levee while reducing the placement of property and facilities in the floodplain. The intermediate setback levee alignment shown in Alternative 3 (see Figure 4-1 in Chapter 4) is considered a general representation of the various intermediate setback alignments considered in the alternatives development process. If Alternative 3 is selected for implementation, the ultimate alignment of an intermediate setback levee may be shifted east or west during the final design process based on soil conditions, to avoid structures or utilities, and based on other factors. The analysis of Alternative 3 in this EIR could be used to support a range of intermediate setback levee alignments between the existing levee and the ASB setback levee alignment.

Segment 3

Project Segment 3 includes the Feather River left bank levee from PLM 23.6 to PLM 26.1 (the confluence with the Yuba River) and the Yuba River left bank levee from PLM 0.0 to PLM 0.3. Unlike Segments 1 and 2, in Segment 3 substantial development is located adjacent to the existing Feather River levee, including the Linda County Water District Wastewater Treatment Plant and multiple homes and other structures in the community of Linda. It would not be

feasible to relocate such a large number of residences, structures, and facilities to allow creation of a setback levee in this area. Therefore, a setback levee in Segment 3 was not considered further and levee strengthening was adopted as the preferred approach to addressing levee deficiencies in this area. As described in Chapter 4, "Description of the Proposed Project," all three project alternatives include the same levee strengthening approach in Segment 3.

8.2.3 ALTERNATIVES CONSIDERED AND REJECTED

As discussed previously, a setback levee in project Segment 1 was considered in the Y-FSFCP programmatic EIR (i.e., the Below Star Bend setback levee), but was rejected for further analysis because development of the F-BRLSP precludes the need for a setback levee in Segment 1. Also as discussed above, a setback levee in Segment 3 was excluded from further consideration because of the infeasibility of relocating the large numbers of residences, structures, and facilities in this area.

The concept of placing a setback levee east of the ASB setback levee alignment was considered. However, a preliminary hydraulic evaluation found that flood control benefits relative to the ASB setback levee alignment would not be significant. It was determined that any minor flood control benefits would be outweighed by impacts on property, facilities, and landowners by placing additional land in the floodplain. Therefore, alternatives related to placing setback levees east of the ASB levee setback alignment were not evaluated further.

8.3 PROJECT ALTERNATIVES EVALUATED IN THIS EIR

The following alternatives are considered in this EIR:

- Alternative 1 – The Levee Strengthening Alternative,
- Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative,
- Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative, and
- the No-Project Alternative.

Descriptions of the alternatives are provided below.

8.3.1 PROJECT ALTERNATIVES

The FRLRP consists of implementation of one of three potential alternatives. Each alternative includes actions in the three project segments that are used to define the project area (see Figure 4-1):

- Project Segment 1 consists of the existing Feather River left bank levee from PLM 13.3 to PLM 17.1 (from approximately RD 784 Pump Station No. 2 upstream to Star Bend).

- Project Segment 2 consists of the existing Feather River left bank levee from PLM 17.1 to PLM 23.6 (from approximately Star Bend upstream to west of the Yuba County Airport).

- Project Segment 3 consists of the existing Feather River left bank levee from PLM 23.6 to PLM 26.1, and the Yuba River left bank levee from PLM 0.0 to PLM 0.3 (west of the Yuba County Airport to the railroad crossing adjacent to the SR 70 bridge).

Alternative 1 – The Levee Strengthening Alternative

Under this alternative, levee repair and strengthening activities would be completed along the entire length of project Segments 1, 2, and 3. Levee repairs and strengthening would consist of various activities, including installation of slurry cutoff walls, relief wells, and seepage/stability berms, and placement of buried cobble in areas where erosion of the levee embankment has been identified as a problem. RD 784 Pump Station No. 3 is located next to the existing Feather River levee. Implementation of Alternative 1 would involve removing Pump Station No. 3 and installing a new pump station farther east of the levee, which would correct seepage deficiencies related to the existing pump station. Because discharges from new relief wells could exceed the capacity of the new Pump Station No. 3 during peak-flow periods, implementation of this project alternative would require construction of a detention basin to temporarily hold these peak flows. Soil taken from the detention basin could be used as borrow material for levee repair and strengthening activities. Additional borrow material could also be used from other sources.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Under this alternative, levee repair and strengthening activities would be completed along project Segments 1 and 3. Repair and strengthening activities in these segments would be the same as under Alternative 1. In project Segment 2, a setback levee would be constructed roughly following the ASB setback levee alignment identified in the Y-FSFCP EIR. Because of unfavorable soil conditions, implementation of various seepage control measures would be required along the setback levee. These measures could include zoned embankments, slurry cutoff walls, seepage berms, and relief wells. Portions of the existing Feather River levee along the setback levee alignment would be removed to allow water to flow into and out of the new floodway/setback area (i.e., the area between the existing levee and the setback levee) during high river stages. The setback levee footprint and associated floodway/setback area would occupy approximately 1,600 acres. This acreage includes residences and other structures; appropriate compensation would be negotiated with affected landowners and relocation assistance would be provided consistent with applicable federal and state statutes. With removal of portions of the existing levee, removal or protection of utilities and wells in the setback area would also be required, and lands in the floodway would be contoured and managed to prevent fish stranding as high flows recede.

Because local drainage patterns would be changed by the setback levee, implementation of this project alternative would require construction of a detention basin to prevent adverse flooding effects on nearby properties. Soil taken from the detention basin site could be used to construct the setback levee embankment. Additional soil borrow areas would be established to provide sufficient material to construct the setback levee embankment. As under Alternative 1, a pump station to replace Pump Station No. 3 would be installed. The new pump station would be located immediately east of the new setback levee. Land uses in the levee setback area (i.e., the area between the existing levee and the new setback levee) could consist of agricultural operations and/or habitat restoration activities that do not impede the flood flow function of the setback area. No specific plans for habitat restoration in the levee setback area are proposed at this time, although this is considered a potential future use.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

FRLRP Alternative 3 is very similar to Alternative 2. The same levee repair and strengthening activities described for Alternatives 1 and 2 would be conducted in project Segments 1 and 3. In Segment 2 a setback levee would be constructed. Approximately the southern one-third of this setback levee alignment would follow the ASB setback levee alignment identified in Alternative 2. However, in the vicinity of Anderson Avenue the setback levee would shift to the west of the alignment proposed under Alternative 2 (see Figure 4-1 as well as Figure 2-3, "FRLRP Project Area," in Chapter 2). This westward shift would allow less land to be placed in the new floodway under Alternative 3 than under Alternative 2. Fewer houses, structures, and other facilities would be affected by levee construction or would need to be removed from the floodway/levee setback area. The setback levee footprint and associated floodway/setback area would occupy approximately 1,300 acres under Alternative 3 if the alignment shown in Figure 4-1 is used. However, the intermediate setback levee alignment is representative of a range of potential setback levee locations between the existing levee and the ASB setback levee alignment. It is acknowledged that during detailed project design, various factors may influence the specific location of the intermediate setback levee if this alternative is adopted.

The general design, construction, and operational characteristics of an intermediate setback levee under Alternative 3 (land uses in the levee setback area, the relocation/replacement of Pump Station No. 3, and creation of detention basins and soil borrow areas) would be the same as those for the ASB setback levee under Alternative 2.

8.3.2 NO-PROJECT ALTERNATIVE

The No-Project Alternative represents conditions that "would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services" (State CEQA Guidelines Section 15126.6[e][2]). As required by CEQA, a No-Project Alternative has been included to allow TRLIA to compare the impacts of approving the proposed project (either Alternative 1, Alternative 2, or Alternative 3) with the impacts of not approving the proposed project.

The No-Project Alternative would consist of retaining the Feather River and lower Yuba River left bank levees in the project area in their current condition. No action would be taken. No levee repairs or strengthening would be implemented. Erosion problem areas identified in project Segment 2 would not be addressed. Pump Station No. 3 would be retained in its current condition at its current location.

If the FRLRP were not implemented, it is reasonable to expect that the deficiencies in the subject levees would ultimately be addressed some time in the future because of the need to increase flood protection in the RD 784 area. However, other than the FRLRP, there are no other near-term plans to comprehensively repair or improve the subject levees. If TRLIA were not to implement the FRLRP, there are no other current plans available for TRLIA, the Corps, the California Department of Water Resources, or other agencies with jurisdiction over the levees to implement.

8.4 COMPARISON OF THE ENVIRONMENTAL EFFECTS OF THE ALTERNATIVES

8.4.1 ENVIRONMENTAL EFFECTS OF THE PROJECT ALTERNATIVES

The environmental effects of Alternatives 1, 2, and 3 are described in Chapter 5, "Environmental Analysis." See Sections 5.1 through 5.13 for detailed descriptions of potential effects of these individual project alternatives.

8.4.2 ENVIRONMENTAL EFFECTS OF THE NO-PROJECT ALTERNATIVE

Consistent with Section 15126.6(d) of the State CEQA Guidelines, the No-Project Alternative is evaluated in less detail in this EIR than the FRLRP alternatives. Sufficient information is provided about the No-Project Alternative to allow for a meaningful evaluation, analysis, and comparison of this alternative with the other alternatives evaluated previously in this EIR.

Land Use: There would be no direct changes in land use or conversion of farmland to other uses under the No-Project Alternative. No existing structures or residences would need to be removed or relocated. Therefore, there would be no direct land use impacts. However, indefinite postponement of levee strengthening actions needed to remedy identified underseepage and through-seepage conditions could result in levee failures during future high-flow conditions, with corresponding flooding and associated damage to farmland, agriculture-related structures, and residences and potential for injury and loss of life.

Geology, Soils, and Mineral Resources: There would be no ground-disturbing activities under the No-Project Alternative, nor would any new areas be exposed to erosive forces (i.e., exposure of the new levee setback area to floodwaters). Therefore, there would be no impacts on geology, soils, and mineral resources. The beneficial effect of reduced risks from geological hazards associated with strengthening the levees under the three project alternatives would not occur under the No-Project Alternative.

Water Resources and River Geomorphology: Under the No-Project Alternative surface water or groundwater conditions, hydrology, geomorphology, or water quality would not change relative to existing conditions. Therefore, there would be no impacts related to water resources and geomorphology. Beneficial effects related to improved flood hydrology under Alternatives 2 and 3 would not occur under the No-Project Alternative, and the lack of a comprehensive program of levee strengthening in the short term would perpetuate the risk to lives and property in the RD 784 area that is associated with potential levee failure. In addition, potential benefits associated with decreases in water demand under Alternatives 2 and 3 resulting from possible conversion of agricultural land to habitat would not occur under the No-Project Alternative.

Fisheries: There would be no ground-disturbing activities or vegetation removal that might affect fish habitat under the No Project Alternative, and this alternative does not have the potential to create areas where fish might be stranded. Therefore, there would be no impacts related to fisheries. Beneficial effects related to increased fish habitat in the levee setback area under Alternatives 2 and 3 would not occur under the No-Project Alternative.

Terrestrial Biological Resources: Existing habitat conditions would not be modified under the No-Project Alternative, and no construction activities that could directly or indirectly affect vegetation or wildlife would occur. Therefore, there would be no impacts related to terrestrial biological resources. Potential benefits to biological resources under Alternatives 2 and 3 associated with possible conversions of agricultural land to habitat would not occur under the No-Project Alternative.

Recreation: No construction activities that could temporarily affect recreational opportunities would occur under the No-Project Alternative, nor would any changes be made to facilities or land use conditions that could affect recreational facilities. Therefore, there would be no impacts related to recreational resources.

Aesthetic Resources: Existing views would not change under the No-Project Alternative and there would be no potential for new sources of light and glare. Therefore, there would be no impacts related to aesthetic resources.

Cultural Resources: Under the No-Project Alternative there would be no ground-disturbing activities that might adversely affect known or currently undiscovered cultural resources. There would be no impacts on cultural resources.

Air Quality: Under the No-Project Alternative there would be no use of construction equipment, no ground-disturbing activities, or modifications in current maintenance and operations activities that could result in increased emissions of pollutants or toxic air contaminants (TACs). Therefore, there would be no impacts related to air quality. Potential beneficial effects related to decreased agricultural emissions if agricultural lands are converted to habitat in the levee setback area under Alternatives 2 and 3 would not occur under the No-Project Alternative.

Noise: No activities that would increase noise or groundborne vibration levels above existing conditions would occur under the No-Project Alternative. Therefore, there would be no impacts related to noise and vibration.

Transportation and Circulation: No new vehicle trips would be generated under the No-Project Alternative and there would be no new traffic hazards. Therefore, there would be no impacts related to traffic and circulation.

Public Services, Utilities, and Service Systems: There would be no ground-disturbing activities under the No-Project Alternative that could damage existing utilities or would require their removal or relocation. There would also be no changes to transportation systems or increases in traffic that could affect the ability of emergency responders to move through the project area. Therefore, there would be no direct impacts related to public services, utilities, or service systems. However, the lack of increased flood protection associated with the No-Project Alternative would continue to limit the construction of schools and other public services facilities needed to serve existing development in the RD 784 area. Therefore, the No-Project Alternative would contribute to a situation in which portions of the RD 784 area could continue to be underserved.

Paleontological Resources: There would be no ground-disturbing activities under the No-Project Alternative that might adversely affect paleontological resources. Therefore, there would be no impacts on paleontological resources.

8.4.3 COMPARISON OF THE ALTERNATIVES

Table 8-1, "Summary of the Environmental Effects of the Alternatives," summarizes the potential environmental effects of the project alternatives and the No-Project Alternative.

Table 8-1
Summary of the Environmental Effects of the Alternatives

Environmental Effect	No-Project Alternative	The Levee Strengthening Alternative (Alternative 1)	The Levee Strengthening and ASB Setback Levee Alternative (Alternative 2)	The Levee Strengthening and Intermediate Setback Levee Alternative (Alternative 3)
Land Use				
Conflicts with land use planning	–	LTS	SU	SU
Prime Farmland conversion	–	SU	SU	SU
Displacement of housing	–	–	LTS	LTS
Geology, Soils, and Mineral Resources				
Risk of geologic hazards	–	B	B	B
Construction-related erosion hazards	–	LTS	LTS	LTS
Setback area erosion	–	–	LTS	LTS
Water Resources and River Geomorphology				
Construction effects on water quality	–	LTS (m)	LTS (m)	LTS (m)
Local drainage changes	–	–	LTS (m)	LTS (m)
Changes in local flood hydrology	–	–	B	B
Changes in downstream flood hydrology	–	–	LTS	LTS
Changes in water demand and supply	–	–	B	B
Effects on groundwater levels	–	LTS	LTS	LTS
Effects of flood operations on water quality	–	–	LTS (m)	LTS (m)
Sediment deposition in setback area	–	–	LTS	LTS
Geomorphic processes/erosion	–	–	LTS	LTS
Fisheries				
Loss of fish habitat during construction	–	LTS (m)	LTS (m)	LTS (m)
Loss of overhead cover/instream woody material	–	LTS	LTS	LTS
Habitat effects from borrow material contaminants	–	–	LTS (m)	LTS (m)
Stranding	–	–	LTS (m)	LTS (m)

Table 8-1
Summary of the Environmental Effects of the Alternatives

Environmental Effect	No-Project Alternative	The Levee Strengthening Alternative (Alternative 1)	The Levee Strengthening and ASB Setback Levee Alternative (Alternative 2)	The Levee Strengthening and Intermediate Setback Levee Alternative (Alternative 3)
Increased habitat in floodplain area	–	–	B	B
Terrestrial Biological Resources				
Effects on general biological resources	–	LTS	LTS	LTS
Effects on sensitive habitats (e.g., jurisdictional waters, riparian habitat)	–	LTS (m)	LTS (m)	LTS (m)
Effects on special-status plants	–	LTS (m)	LTS (m)	LTS (m)
Effects on valley elderberry longhorn beetle	–	LTS (m)	LTS (m)	LTS (m)
Effects on northwestern pond turtle	–	LTS (m)	LTS (m)	LTS (m)
Effects on giant garter snake	–	LTS (m)	LTS (m)	LTS (m)
Effects on Swainson's hawk and other nesting raptors	–	LTS (m)	LTS (m)	LTS (m)
Effects on other special-status birds	–	LTS	LTS	LTS
Effects on Pacific western big-eared bat	–	LTS	LTS	LTS
Effects on wildlife corridors	–	LTS	LTS	LTS
Recreation				
Short- or long-term recreation effects	–	LTS	LTS	LTS
Aesthetic Resources				
Short- or long-term effects on views	–	LTS	LTS	LTS
Light and glare	–	LTS	LTS	LTS
Cultural Resources				
Disturbance of unknown resources or human remains	–	LTS (m)	LTS (m)	LTS (m)
Disturbance of known resources	–	LTS (m)	LTS (m)	LTS (m)
Air Quality				
Temporary effects on air quality	–	SU	SU	SU
Long-term effects on air quality	–	LTS	B	B
TAC emissions	–	LTS	LTS	LTS
Noise				
Temporary noise disturbance	–	SU	SU	SU
Groundborne vibration during construction	–	LTS	LTS	LTS
Transportation and Circulation				
Increase in traffic during construction	–	LTS	LTS	LTS

Table 8-1
Summary of the Environmental Effects of the Alternatives

Environmental Effect	No-Project Alternative	The Levee Strengthening Alternative (Alternative 1)	The Levee Strengthening and ASB Setback Levee Alternative (Alternative 2)	The Levee Strengthening and Intermediate Setback Levee Alternative (Alternative 3)
Traffic hazards during construction	–	LTS (m)	LTS (m)	LTS (m)
Public Services, Utilities, and Service Systems				
Effects on utility infrastructure	–	LTS	LTS (m)	LTS (m)
Effects on water supply and drainage	–	LTS	LTS	LTS
Effects on emergency response during construction	–	LTS (m)	LTS (m)	LTS (m)
Paleontological Resources				
Disturbance of unknown resources	–	LTS (m)	LTS (m)	LTS (m)

Notes: – = no impact; B = beneficial or potentially beneficial effect; LTS = less-than-significant impact; LTS (m) = significant or potentially significant impact that would be less than significant with mitigation; SU = significant impact, despite mitigation (i.e., significant and unavoidable)

Many of the impacts identified as less than significant or as less than significant with mitigation cannot be predicted with certainty to occur. For example, whether construction activity would affect various special-status wildlife species would depend on the presence (or absence) of individuals of these species at the project site at the time of construction; nevertheless, because there is the potential for various species to be adversely affected by construction under any of the alternatives, the potential for significant effects is identified and appropriate actions have been included as required mitigation to ensure that any such effects are reduced to a less-than-significant level.

For purposes of this comparison, the following levels of effect are generally considered to be equivalent: potentially significant and significant impacts that would be less than significant with the required mitigation, which are identified in Table 8-1 as LTS (m), and impacts that would be less than significant even without mitigation, which are identified as LTS. In addition, where effects are identified in the impact analysis as less than significant but are considered to be minimal, they are considered for purposes of this comparison to be negligible.

The potential adverse and beneficial effects of the proposed Levee Strengthening and ASB Setback Levee Alternative (Alternative 2) and Levee Strengthening and Intermediate Setback Levee Alternative (Alternative 3) are generally the same. Therefore, the number and magnitude of potential environmental impacts as shown in Table 8-1 are the same for both alternatives. However, the potential adverse effects of Alternative 2 would be somewhat greater because this alternative includes a larger levee setback area and would therefore entail more land disturbance and more construction activity. The potential environmental benefits, including flood control benefits, are also greatest with Alternative 2. Several impacts related to water resources and river geomorphology and to fisheries, and one impact related to land use and one related to geology,

soils, and mineral resources, would specifically result from construction of a setback levee and creation of a levee setback area. These include beneficial impacts and impacts in the LTS and LTS (m) categories in Table 8-1. These impacts would not occur under The Levee Strengthening Alternative (Alternative 1), where no setback levee is proposed. Most of the adverse impacts associated with any of the three project alternatives are short-term, temporary construction-related impacts, whereas the environmental benefits would be long-term.

Following is a summary of the main points of comparison between the environmental effects of the alternatives for each resource area:

Land Use: Alternatives 2 and 3 would have significant unavoidable effects related to land use planning conflicts. All three alternatives would have significant unavoidable impacts related to the conversion of Prime Farmland to nonagricultural uses. The No-Project Alternative would not have any direct effects on land use, although lack of levee strengthening under the FRLRP could lead to future levee failure, flooding of the RD 784 area, and related adverse effects on Prime Farmland and other productive agricultural land, homes, and individuals.

Geology, Soils, and Mineral Resources: All three project alternatives would enhance the stability of levees in the project area and reduce the risk of catastrophic levee failure. Construction erosion hazards would be less than significant under all three alternatives. Impacts associated with erosion in the levee setback area would also be less than significant, but would occur only under Alternatives 2 and 3. The No-Project Alternative would not have any effects (either beneficial or adverse impacts) related to geology, soils, and mineral resources.

Water Resources and River Geomorphology: Construction activities under any of the three project alternatives could potentially result in significant adverse effects on water quality. However, implementation of mitigation measures would reduce these impacts to less-than-significant levels. All three alternatives could also affect groundwater levels; however, impacts would be less than significant. Remaining impacts on water resources and river geomorphology relate to the presence of a setback levee and/or related levee setback area and would not apply to Alternative 1. For each of these impacts, whether beneficial or adverse, the effects would be somewhat less under Alternative 3 than under Alternative 2 because of the smaller size of the levee setback area. Alternatives 2 and 3 would result in a beneficial effect by reducing flood stage elevations upstream of the levee setback area. These alternatives would also have a hydraulic impact that would increase downstream flood flows by relatively minor amounts, resulting in less-than-significant potential increases in flood risk. A small benefit in water supply may be associated with Alternatives 2 and 3, depending on changes in land use that could accompany the levee setback. Alternatives 2 and 3 would also result in impacts related to changes in local drainage systems, changes in water quality during flooding of the levee setback area, sediment deposition in the levee setback area, and erosion potential resulting from changes in geomorphic processes. Depending on the impact, these impacts would be less than significant either before or after mitigation. The No-Project Alternative would not have any effects (either beneficial or adverse impacts) related to water resources and river geomorphology.

Fisheries: All three project alternatives could potentially affect fish habitat during construction. Implementation of mitigation measures would reduce these construction-related impacts to less-than-significant levels. All three project alternatives could also result in the loss of overhead

cover/instream woody material. However, this impact would be less than significant under all alternatives. Remaining fisheries impacts relate to the presence of a setback levee and/or related levee setback area and would not apply to Alternative 1. For each of these impacts, whether beneficial or adverse, the effects would be somewhat less under Alternative 3 than under Alternative 2 because of the smaller size of the levee setback area. Alternatives 2 and 3 could both result in fish stranding and adverse effects on water quality when floodwaters come in contact with soils in the levee setback area. Both of these impacts would be mitigated to less-than-significant levels. Inundation of the levee setback area and potential habitat restoration under Alternatives 2 and 3 would provide benefits to fish species. The No-Project Alternative would not have any effects (either beneficial or adverse impacts) on fisheries.

Terrestrial Biological Resources: All three project alternatives would have less-than-significant effects on general biological resources, special-status birds, Pacific western big-eared bats, and wildlife corridors. All three alternatives would have significant impacts on sensitive habitats, special-status plants, valley elderberry longhorn beetle, northwestern pond turtle, giant garter snake, and Swainson's hawk and other raptors. However, each of these impacts would be reduced to a less-than-significant level with mitigation. The No-Project Alternative would not have any effects on terrestrial biological resources.

Recreation: None of the project alternatives would have a significant effect on recreation. The No-Project Alternative would not have any effects related to recreation.

Aesthetic Resources: None of the project alternatives would have a significant effect on aesthetic resources. The No-Project Alternative would not have any effects on aesthetic resources.

Cultural Resources: All three project alternatives have the potential to adversely affect sites that may contain significant cultural resources. Each of the project alternatives could also potentially affect an unknown/subsurface cultural resource site or human remains. However, implementation of required mitigation would ensure that any effect on known or unknown cultural resources would be less than significant. The No-Project Alternative would not have any effects on cultural resources.

Air Quality: All three project alternatives are expected to contribute to exceedances of relevant air quality standards during construction. Construction emissions would be less under Alternative 1 than under Alternatives 2 and 3 because of the reduced disturbance area and the need for fewer haul trips to carry borrow material. Implementation of mitigation measures would reduce construction emission impacts for each alternative, but not to less-than-significant levels. All three alternatives would result in less-than-significant impacts related to the emission of TACs. Alternatives 2 and 3 could have a small long-term beneficial effect on air quality because of the potential reduction in agricultural use of some lands associated with the levee setback area. This beneficial effect would not occur under Alternative 1 because this alternative does not include a levee setback area. The No-Project Alternative would not have any effects (either beneficial or adverse impacts) related to air quality.

Noise: Construction activities associated with all three project alternatives would result in noise levels that exceed Yuba County noise standards at sensitive receptors. Noise associated with

construction activities would not be mitigated to less-than-significant levels, although the significant and unavoidable noise effect would likely last only a few weeks. All three project alternatives would result in less-than-significant impacts related to construction-generated groundborne vibration. The No-Project Alternative would not have any effects related to noise and vibration.

Transportation and Circulation: All three project alternatives would have less-than-significant impacts related to increases in traffic during construction. Each alternative would result in significant impacts related to the generation of traffic hazards during construction. However, this impact would be reduced to a less-than-significant level with mitigation. Although none of the three alternatives would result in significant traffic impacts after mitigation, construction traffic would be less under Alternative 1 than under Alternatives 2 and 3 because of the smaller number of haul trips to carry borrow material. The No-Project Alternative would not have any effects on traffic and circulation.

Public Services, Utilities, and Service Systems: With implementation of the required mitigation, the three project alternatives would not significantly affect emergency response services during construction. Although each alternative would have some effect on existing water supply and drainage infrastructure in the project area, these effects would be less than significant. Under Alternatives 2 and 3 utilities retained in the levee setback area could be damaged when the levee setback area is inundated, resulting in interruptions in service. This impact would be reduced to a less-than-significant level with mitigation. Alternative 1 does not include a levee setback area and impacts on existing utilities would be less than significant. The No-Project Alternative would not have any effects on public services, utilities, and service systems.

Paleontological Resources: All three project alternatives could potentially affect an unknown paleontological resource site. However, implementation of the required mitigation would ensure that any effect on paleontological resources would be less than significant. The No-Project Alternative would not have any effects on paleontological resources.

8.5 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

The State CEQA Guidelines call for identification of an environmentally superior alternative and specify that “if the environmentally superior alternative is the ‘no project’ alternative, the EIR shall also identify an environmentally superior alternative among other alternatives.”

However, there are a number of interconnected as well as opposing factors to consider when evaluating the various FRLRP alternatives that result in no clear environmentally superior alternative. These factors include:

- minimizing environmental effects,
- providing flood protection to the RD 784 area,
- the potential for providing more regional flood protection benefits,
- effects on lands and landowners that might be included in a levee setback area, and
- potential beneficial environmental effects associated with creating a levee setback area.

From the perspective of purely minimizing effects on the existing environment, the No-Project Alternative would be the superior alternative because it would result in no changes in the existing condition. However, the No-Project Alternative would result in no improvements to flood protection facilities in the project area and would perpetuate the existing risks for levee failure, flooding, and related adverse effects on the environment, people, and property. The No-Project Alternative would not meet key project objectives of securing flood protection for at least the 1-in-200 year event and securing FEMA certification of the subject levee reaches (see Section 8.2.2, "Feather River Levee Repair Project"). This alternative would have no direct effects on property owners in the area, but also would not provide them the flood protection benefits inherent in Alternatives 1, 2, and 3. The No-Project Alternative also would not provide potential beneficial effects related to fisheries, biological resources, water resources, and air quality associated with Alternatives 2 and 3.

Alternative 1, The Levee Strengthening Alternative, would meet all project objectives related to increasing flood protection and would not affect lands and residences that might be included within a levee setback area as would occur under Alternatives 2 and 3. Compared to Alternatives 2 and 3, Alternative 1 would also have fewer direct effects on the environment, primarily because it does not include a setback levee (see Table 8-1). However, because Alternative 1 does not include a setback levee, potential beneficial effects related to fisheries, biological resources, water resources, and air quality associated with Alternatives 2 and 3 would not occur. In particular, Alternative 1 would not provide regional flood control benefits (i.e., decreases in upstream flood stage elevations, including through the urbanized areas of Marysville and Yuba City) associated with creation of a setback levee. In addition, as past levee repair efforts would indicate, based on the condition of soils in levee foundations and embankments, the success of repairs to the existing levee is not assured. Additional repairs or other remedial actions may be required after initial repairs are complete. These conditions are less likely to occur where a new levee (e.g., a setback levee) is constructed using modern methods on stable foundation soils.

From the perspective of maximizing flood protection benefits, Alternative 2, The Levee Strengthening and ASB Setback Levee Alternative, would be the superior alternative. Flood protection benefits under Alternative 2 would derive from:

- addressing deficiencies associated with the existing levees,
- providing increased flood protection designed to withstand the 1-in-200 AEP event,
- providing a new setback levee in project Segment 2 constructed on a more stable foundation using modern engineering methods, and
- reducing flood stage elevations upstream of the setback levee area by more than 1 foot depending on the location and size of the flood event. Reductions in flood stage elevations would extend upstream on the Feather and Yuba Rivers into river reaches adjacent to Marysville and Yuba City.

As identified above, the last two of these benefits are directly associated with the construction of a setback levee and would not occur under Alternative 1. Because these two benefits are associated with a setback levee, they would also occur under Alternative 3, The Levee Strengthening and Intermediate Setback Levee Alternative; however, the level of benefit would

be less because soil conditions in the area considered for the intermediate setback levee alignment are not as favorable for levee construction and operation as those found along the ASB setback levee alignment (i.e., the soil is more porous and susceptible to underseepage) and the smaller setback area would provide reduced upstream benefits.

If maximizing flood protection is a priority, the flood protection benefits associated with Alternative 2 could be considered to outweigh this alternative's additional direct impacts on the environment relative to Alternative 1, and effects on property and property owners from placing lands in a levee setback area. In addition, Alternative 2 provides the potential for substantial long-term benefits associated with possible habitat improvement and/or restoration in the levee setback area, such as increases in fish and wildlife habitat, riparian corridor width, ecosystem complexity, and recreation opportunities.

Alternative 3 would provide flood control and environmental benefits similar to those of Alternative 2, but to a lesser degree because of the smaller levee setback area in Segment 2. Because of the smaller setback area, Alternative 3 would have a lesser effect related to placing property in the levee setback area, although approximately the same number of residences would be affected.

As stated at the beginning of this discussion, because there are a number of interconnected as well as opposing factors to consider when evaluating the various FRLRP alternatives, there is no clear environmentally superior alternative. If strictly minimizing direct environmental effects is the top priority, then the No-Project Alternative and Alternative 1 would be superior. If providing flood protection to the RD 784 area is the discriminating factor, then Alternatives 1, 2, and 3 are almost equal, although Alternative 2 would be somewhat superior. If providing regional flood protection benefits is desired, then Alternative 2 would be superior, with Alternative 3 providing similar benefits, but to a lesser degree. If effects on lands and landowners are to be minimized, then Alternative 1 would be superior because it does not include a setback levee, yet provides flood control benefits. If the focus is on potential beneficial environmental effects associated with creating a levee setback area (mostly related to the possible creation/restoration of native habitat), then Alternative 2 provides the greatest potential for these benefits, with Alternative 3 allowing for similar benefits to a lesser degree.

When evaluating these factors, it is difficult to weigh such things as the various gradients of flood protection and associated increased or decreased risks to life and property against the variety of types and extents of environmental effects associated with each alternative. Although the No-Project Alternative can be removed from consideration as the environmentally superior alternative because it does not meet the basic project objective, a distinct environmentally superior alternative is not identified among Alternatives 1, 2, and 3.

CHAPTER 9 CONSULTATION AND COORDINATION

This chapter describes initial and ongoing consultation and coordination efforts made by the flood control study team led by Three Rivers Levee Improvement Authority (TRLIA) to engage the local community; stakeholders; and federal, state, and local agencies in identifying solutions to flooding in the Reclamation District (RD) 784 service area. Consultation and coordination efforts of Yuba County Water Agency (YCWA) regarding the Yuba-Feather Supplemental Flood Control Project (Y-FSFCP) are also included in this chapter because the levee setback included in Alternatives 2 and 3 of the Feather River Levee Repair Project (FRLRP), the current project, is a modification of the Feather River levee setback element of the Y-FSFCP. As described below, focused consultation and coordination efforts have been conducted through three primary mechanisms with three key groups:

- public involvement,
- Yuba-Feather Work Group (Y-FWG) involvement, and
- agency consultation.

9.1 PUBLIC INVOLVEMENT

Public and stakeholder involvement is an important element of efforts to improve flood control in the RD 784 area and is critical to reaching solutions that meet the needs of the local community and the region. Section 15083 of the California Environmental Quality Act Guidelines (State CEQA Guidelines) authorizes and encourages an early consultation or scoping process to help identify the range of actions, alternatives, mitigation measures, and significant effects to be analyzed in depth in an EIR and to help resolve concerns of affected agencies and individuals.

As mentioned above, the potential setback of the Feather River levee included in the current project, the FRLRP, is a modification of one of the segments of the Feather River levee setback that was proposed and evaluated in the Y-FSFCP programmatic EIR. Therefore, a number of public outreach activities that were conducted for the Y-FSFCP laid a foundation for the subsequent consideration of a levee setback under the current project. These activities are summarized below, followed by a description of scoping activities for the FRLRP.

9.1.1 PRIOR PUBLIC INVOLVEMENT ACTIVITIES

Representatives of YCWA and RD 784 began coordination with landowners well before the FRLRP was initiated by TRLIA and the CEQA process was started for the current project. Flood control elements of the Y-FSFCP were defined through a process that included public scoping. These elements included a levee setback along the Feather River downstream of the Yuba River. The Y-FSFCP levee setback was proposed for two segments, which were referred to as the Above Star Bend and Below Star Bend levee setbacks.

On October 23, 2001, YCWA issued a Notice of Preparation (NOP) informing agencies and the general public that an EIR for the Y-FSFCP was being prepared and inviting specific comments on the scope and content of the document at public scoping meetings. The NOP included a

description of the project and the alternatives being considered. YCWA held scoping meetings in Marysville and Oroville in August 2001 to solicit public comments and to determine the scope of the EIR. Notices were published in local newspapers announcing the date, time, location, and purpose of the meetings. Each scoping meeting presented an overview of the meeting's purpose and a description of the Y-FSFCP, and identified potentially significant environmental issues. More than 20 attendees gave written and/or oral comments.

A scoping report was prepared that summarized the input received at the scoping meetings and the written comments received in response to the NOP. YCWA reconsidered and reformulated proposed flood control elements based in part on this input. In addition, in spring 2002, the YCWA Board of Directors held a public workshop to present the progress of its development of flood control elements and solicit feedback.

Public comments were subsequently solicited on the Y-FSFCP programmatic EIR, including the Feather River levee setback in the Above Star Bend segment. Comments were received in a public meeting held December 9, 2003, and in comment letters received during the public comment period (Yuba County Water Agency 2004).

9.1.2 SCOPING FOR THE FEATHER RIVER LEVEE REPAIR PROJECT

On June 14, 2006, TRLIA issued an NOP informing agencies and the general public that an EIR for the FRLRP was being prepared and inviting specific comments on the scope and content of the document. The NOP was sent individually to approximately 100 local landowners in the project area, in addition to approximately 150 representatives of federal, state, regional, and local agencies. The NOP included a description of the project and the alternatives being considered.

TRLIA held a scoping and informational meeting in Marysville on June 29, 2006, to solicit public comments and to determine the scope of this EIR, and to provide information on TRLIA's full program of completed and ongoing flood control improvements. Notices were published in local newspapers announcing the date, time, location, and purpose of the meeting. Information on the date, time, location, and purpose of the scoping meeting was also included in the NOP. The scoping meeting presented an overview of the meeting's purpose and a description of the FRLRP, and identified potentially significant environmental issues. Several attendees discussed project features with board members, management, and the consultant flood control team, and some attendees provided oral and written comments. A transcript of the comments received at the scoping meeting and the written comments received in response to the NOP is included in Appendix A of this EIR. All comments received during the scoping process have been considered during preparation of this EIR. At least one public meeting will be held during the public review period for this draft environmental impact report (DEIR) (see Section 2.12, "Public Participation and Additional Steps in the CEQA Review Process," in Chapter 2), as well as a subsequent public meeting to consider certification of the final environmental impact report (FEIR).

9.2 YUBA-FEATHER WORK GROUP INVOLVEMENT

The Y-FWG was formed in 2000 as an advisory group focused on evaluating and making recommendations regarding ecologically sustainable, no-new-dam flood control elements for the Yuba-Feather River system. The Y-FWG membership includes 12 participating entities,

including the key federal, state, and local agencies and major stakeholders in Yuba-Feather River flood management and ecosystem restoration activities. Consequently, the Y-FWG is a unique combination of agencies and stakeholders focused on flood control and resource management issues related to the Yuba-Feather River system. Y-FWG discussions have greatly enhanced the member organizations' understanding and agreement about approaches to flood control in the RD 784 area. The group's recommendations have helped shape the Y-FSFCP's integrated approach to flood management and ecosystem restoration, particularly the development of TRLIA's levee setback options, and Y-FWG members have spoken before The State of California Reclamation Board (The Reclamation Board) in support of the TRLIA projects.

9.3 INFORMAL CONSULTATION WITH AGENCIES

Representatives of TRLIA and YCWA have consulted informally with various agencies regarding RD 784 flood management activities. As discussed above, the potential setback of the Feather River levee is an expansion and modification of the Above Star Bend segment of the Feather River levee setback element of YCWA's Y-FSFCP programmatic EIR; therefore, a considerable amount of informal agency consultation for what became the FRLRP was completed for the Y-FSFCP, before the FRLRP was formally initiated. These consultation activities are described in detail in Chapter 9, "Consultation and Coordination," of the Y-FSFCP programmatic EIR (Yuba County Water Agency 2003). Comment letters were also received from several agencies, including the California Department of Conservation, California Department of Fish and Game (DFG), California Department of Transportation, California Department of Water Resources (DWR), the Sacramento Area Flood Control Agency, and the Sutter County Community Services Department, on the Y-FSFCP programmatic EIR (Yuba County Water Agency 2004). These comments were taken into consideration in the development of the FRLRP.

TRLIA's Phase 2 and 3 flood control improvements have included very close coordination with the U.S. Army Corps of Engineers (Corps), DWR, The Reclamation Board, Sutter County, Yuba County, RD 784, RD 1001, and federal and state resource agencies; these coordination efforts are continuing into the FRLRP effort. Moreover, the key agencies are part of the Y-FWG and receive updates and participate in planning discussions through the Y-FWG.

9.4 NOTIFICATION AND CONSULTATION LIST

The following entities will receive a copy of the DEIR or notice of its availability. Individuals who have expressed an interest in the DEIR will receive a notice of its availability and public libraries in Marysville, Yuba City, and Sacramento will receive a copy of the DEIR for public review.

Local Agencies

City of Marysville

City of Yuba City

Feather River Air Quality Management District

Olivehurst Public Utilities District

Reclamation District 784

Reclamation District 1001

Sacramento Area Council of Governments

Sacramento Area Flood Control Agency

Sutter County Board of Supervisors

Sutter County Department of Public Works

Sutter County Planning Department

Yuba County Agriculture Department

Yuba County Board of Supervisors

Yuba County Community Development Department

Yuba County Water Agency

State of California

California Air Resources Board

California Department of Boating and Waterways

California Department of Conservation

California Department of Fish and Game – Region II

California Department of Toxic Substances Control

California Department of Transportation

California Department of Water Resources

Central Valley Regional Water Quality Control Board

Governor's Office of Planning and Research – State Clearinghouse

Native American Heritage Commission

Office of Historic Preservation

State Lands Commission

State Water Resources Control Board – Water Quality

The Reclamation Board

The Resources Agency

Federal Agencies

U.S. Army Corps of Engineers – Regulatory Branch and Civil Works Branch

U.S. Department of Agriculture, Natural Resources Conservation Service

U.S. Environmental Protection Agency – Region IX

Federal Emergency Management Agency

U.S. Fish and Wildlife Service – Ecological Services Division

National Marine Fisheries Service

Elected Representatives

California State Assembly – Assemblymember Rick Keene

California State Assembly – Assemblymember Doug LaMalfa

California State Assembly – Assemblymember Tim Leslie

California State Senate – Senator Sam Aanestad

California State Senate – Senator Dave Cox

U.S. House of Representatives – Congressman Wally Herger

U.S. House of Representatives – Congressman Dan Lungren

U.S. Senate – Senator Dianne Feinstein

U.S. Senate – Senator Barbara Boxer

Stakeholder Groups

Environmental Defense

Friends of the River

Sierra Club

South Yuba River Citizens League

CHAPTER 10 REFERENCES

CHAPTER 1, "SUMMARY"

Yuba County Water Agency. 2004 (March). *Final Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project.* State Clearinghouse #2001072062. Marysville, CA. Prepared by EDAW, Jones & Stokes, and Flood Control Study Team.

CHAPTER 2, "INTRODUCTION"

California Floodplain Management Task Force. 2002 (December). *California Floodplain Management Task Force Final Recommendations Report.* Sacramento, CA.

U.S. Army Corps of Engineers and State of California Reclamation Board. 2002 (December 20). *Interim Report, Sacramento and San Joaquin River Basins Comprehensive Study.* Sacramento, CA.

Yuba County Water Agency. 2003 (October). *Draft Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project.* State Clearinghouse #2001072062. Marysville, CA. Prepared by EDAW, Jones & Stokes, and Flood Control Study Team.

Yuba County Water Agency. 2004 (March). *Final Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project.* State Clearinghouse #2001072062. Marysville, CA. Prepared by EDAW, Jones & Stokes, and Flood Control Study Team.

CHAPTER 3, "PROJECT PURPOSE, NEED, AND DEVELOPMENT"

Three Rivers Levee Improvement Authority. 2004 (May). *Bear River and Western Pacific Interceptor Canal Levee Improvements Project Draft Environmental Impact Report.* State Clearinghouse #2004032118. Marysville, CA. Prepared by Jones & Stokes, Sacramento, CA.

Yuba County Water Agency. 2003 (October). *Draft Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project.* State Clearinghouse #2001072062. Marysville, CA. Prepared by EDAW, Jones & Stokes, and Flood Control Study Team.

Yuba County, Yuba County Water Agency, and Reclamation District No. 784. 2004 (March). *Achieving FEMA Certification for Reclamation District No. 784.* Staff report (unpublished). Prepared by Yuba County Water Agency staff, MBK Engineers, and GEI Consultants. Marysville and Sacramento, CA.

CHAPTER 4, "DESCRIPTION OF THE PROPOSED PROJECT"

Kleinfelder, Inc. 2006 (February 20). *Problem Identification Report, TRLIA Phase 4 Feather River and Yuba River Left Bank Levees, Reclamation District No. 784.* Sacramento, CA.

MBK Engineers. 2006 (February 20). *Three Rivers Levee Improvement Authority Phase IV Erosion Investigation.* Sacramento, CA.

U.S. Army Corps of Engineers. 2000 (April 30). *Engineering and Design—Design and Construction of Levees.* Engineering Manual EM 1110-2-1913. Washington, DC.

Yuba County Water Agency. 2003a (October). *Draft Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project.* Marysville, CA. State Clearinghouse #2001072062. Prepared by EDAW, Jones & Stokes, and Flood Control Study Team.

Yuba County Water Agency. 2003b (May). *Report on Feasibility, Yuba-Feather Supplemental Flood Control Project.* Marysville, CA.

SECTION 5.1, "LAND USE"

California Department of Conservation. 2004. Yuba County 2002–2004 Land Use Conversion. Farmland Mapping and Monitoring Program. Available: <http://www.consrv.ca.gov/dlrp/fmmp/pubs/2002–2004/conversion_tables/yubcon04.xls>. Sacramento, CA.

California Department of Conservation. 2006 (May). Map Categories, Criteria and Uses: Important Farmland Categories. <http://www.consrv.ca.gov/DLRP/fmmp/mccu/map_categories.htm>. Farmland of Local Importance. <http://www.consrv.ca.gov/DLRP/fmmp/pubs/Local_definitions_00.pdf>. Division of Land Resource Protection, Farmland Mapping and Monitoring Program website. Last edited May 19, 2006.

Natural Resources Conservation Service. 1998. *Soil Survey of Yuba County, California.* Prepared by D. J. Lytle. Washington, DC.

Three Rivers Levee Improvement Authority. 2004 (September). *Draft Environmental Impact Report for the Feather-Bear Rivers Levee Setback Project.* State Clearinghouse #2004072113. Marysville, CA. Prepared by EDAW and Flood Control Study Team.

U.S. Census Bureau. 2006. American FactFinder—Decennial Census Data for Marysville City, California. Available: <http://factfinder.census.gov/home/saff/main.html?_lang=en>. Accessed August 1, 2006.

Yuba County. 1994 (May). *Yuba County General Plan.* Volume I. Environmental Setting and Background. Department of Planning and Building Services. Marysville, CA. Prepared by QUAD Consultants, Sacramento, CA, in association with Brown-Buntin Associates, kdAnderson Transportation Engineers, and Youngdahl and Associates.

Yuba County. 1996. *Yuba County General Plan.* Volume II. Land Use, Circulation, Conservation and Open Space. Yuba County Planning Department. Marysville, CA. Prepared by QUAD Consultants, Sacramento, CA. Adopted December 10, 1996, by Yuba County Board of Supervisors.

Yuba County. 2005 (April). Yuba County Zoning and Specific Plan Designations. Available: <http://www2.co.yuba.ca.us/gis/portal/mapimages/ZoningMap.pdf#search='yuba%20county%20zoning>. Last modified April 8, 2005. Accessed May 2006.

Yuba County Economic Development Department. 2006. Housing and Real Estate Data for Yuba County. Available: <http://www.yubacounty.org/Demographics/2_Housing %20&%20Real%20Estate.pdf>. Accessed August 1, 2006.

Yuba County Water Agency. 2003 (October). *Draft Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project.* Marysville, CA. State Clearinghouse #2001072062. Prepared by EDAW, Jones & Stokes, and Flood Control Study Team.

SECTION 5.2, "GEOLOGY, SOILS, AND MINERAL RESOURCES"

California Department of Water Resources. 1979. *The August 1, 1975 Oroville Earthquake Investigations.* Bulletin 203-78. Sacramento, CA.

California Geological Survey. 1999. Index to Official Maps of Alquist-Priolo Earthquake Fault Zones. Available: <http://www.consrv.ca.gov/CGS/rghm/ap/Map_index/index.htm> Accessed June 20, 2006.

Habel, R. S., and L .F. Campion. 1988. *Mineral Land Classification: Portland Cement Concrete-Grade Aggregate in the Yuba City–Marysville Production-Consumption Region.* California Division of Mines and Geology. Special Report 132. Sacramento, CA.

Hart, E. W., and W. A. Bryant. 1999. *Fault-Rupture Hazard Zones in California, Alquist-Priolo Earthquake Fault Zoning Act with Index to Earthquake Fault Zone Maps.* California Division of Mines and Geology, Special Publication 42. Sacramento, CA.

Jennings, C. W. 1994. Fault Activity Map of California and Adjacent Areas. California Division of Mines and Geology. Geologic Data Map No. 6. Sacramento, CA.

Kleinfelder, Inc. 2006 (February 20). *Problem Identification Report, TRLIA Phase 4 Feather River and Yuba River Left Bank Levees, Reclamation District No. 784.* Sacramento, CA.

Natural Resources Conservation Service. 1998. *Soil Survey of Yuba County, California.* Prepared by D. J. Lytle. Washington, DC.

Petersen, M. D., W. A. Bryant, C. H. Cramer, T. Chao, M. S. Reichle, A. D. Frankel, J. J. Lienkaemper, P. A. McCory, and D. P. Schwartz. 1996. *Probabilistic Seismic Hazard Assessment for the State of California.* California Division of Mines and Geology Open-File Report 96-08 and U.S. Geological Survey Open-File Report 96-706. Sacramento, CA.

Philip Williams & Associates, Ltd. 2006 (July 20). *Geomorphic Assessment of Project Alternatives for Feather River Levee Improvements Between the Bear and Yuba Rivers*. Draft Report. Prepared for Bookman-Edmonston Engineering and Three Rivers Levee Improvement Authority. Sacramento, CA.

Saucedo, G. L., and D. L. Wagner. 1992. Geologic Map of the Chico Quadrangle. California Division of Mines and Geology. Regional Geologic Map Series, Map No. 7A. Sacramento, CA.

U.S. Army Corps of Engineers. 2000 (April 30). *Engineering and Design—Design and Construction of Levees.* Engineering Manual 1110-2-1913. Washington, DC.

Yuba County. 1994. *Yuba County General Plan.* Volume I. Environmental Setting and Background. Department of Planning and Building Services. Marysville, CA. Prepared by QUAD Consultants, Sacramento, CA, in association with Brown-Buntin Associates, kdAnderson Transportation Engineers, and Youngdahl and Associates.

Yuba County Water Agency. 2003 (May). *Report on Feasibility, Yuba-Feather Supplemental Flood Control Project*. Appendix E. Preliminary Design. Marysville, CA. Prepared by Flood Control Study Team.

SECTION 5.3, "WATER RESOURCES AND RIVER GEOMORPHOLOGY"

Boles, Jerry. Hydrologist. California Department of Water Resources, Red Bluff, CA. May 17, 2001—unpublished groundwater data.

Bookman-Edmonston Engineering. 2000 (January). *Groundwater Substitution Opportunity in the Yuba-Sutter Basin.* Rancho Cordova, CA.

California Department of Fish and Game. 2000. *Water Quality Criteria for Diazinon and Chlorpyrifos.* Office of Spill Prevention and Response. Administrative Report 00-3. Sacramento, CA.

California Department of Water Resources. 1995. *Compilation of Sediment and Soil Standards, Criteria, and Guidelines.* Division of Local Assistance. Sacramento, CA.

California Department of Water Resources. 2003. *California's Groundwater—Bulletin 118, Update 2003.* Available: <http://www.groundwater.water.ca.gov/bulletin118/update2003/index.cfm>. Last revised 2003. Accessed July 1, 2004.

Central Valley Regional Water Quality Control Board. 1989 (June). *Designated Level Methodology for Waste Classification and Cleanup Level Determination.* Sacramento, CA.

Countryman, Joe. President. MBK Engineers, Sacramento, CA. June 7, 2004—e-mail to EDAW regarding level of flood protection for RD 784; July 20, 2004—e-mail to EDAW regarding discussions with RD 1001 and The Reclamation Board about levee maintenance requirements.

Environmental Data Resources, Inc. 2004a. *The EDR Radius Map with GeoCheck, Feather-Bear Rivers Levee Setback, Northern Bear Alignment.* Inquiry Number: 01219159.1r.

Environmental Data Resources, Inc. 2004b. *The EDR Radius Map with GeoCheck, Feather-Bear Rivers Levee Setback, Southern Bear Alignment.* Inquiry Number: 01219163.1r.

Foothill Associates. 1999. *Water Quality Impact Assessment—State Route 70/Motorplex Parkway Interchange.* Administrative Draft Technical Report. Prepared for URS Greiner-Woodward Clyde and California Department of Transportation. Roseville, CA.

Goff, Rick. Reclamation District 784, Marysville, CA. October 15, 2003—conversation with Roberta Childers of EDAW about well yields in RD 784.

Hoover, M. B., H. E. Rensch, E. G. Rensch, and W. N. Abeloe. 1990. *Historic Spots in California.* Stanford University Press. Stanford, CA.

Larry Walker Associates. 2001. *1999–2000 Annual Monitoring Report.* Prepared for the Sacramento River Watershed Program. Davis, CA.

MacDonald, D. D., and T. A. Berger. 2000. Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems. *Archives of Environmental Contamination and Toxicology* 39:20–31.

MBK Engineers. 2006. *Hydraulic and Hydrologic Analysis of the Three Rivers Levee Improvement Authority's Phase IV Project—Feather River Levee Repair Project.* Prepared for Three Rivers Levee Improvement Authority. Sacramento, CA.

MHM. n.d. Reclamation District Number 784 Boundary Line, Drainage, and Flood Control Improvements Map. Marysville, CA.

Philip Williams & Associates, Ltd. 2006 (July 20). *Geomorphic Assessment of Project Alternatives for Feather River Levee Improvements Between the Bear and Yuba Rivers*. Draft Report. Prepared for Bookman-Edmonston Engineering and Three Rivers Levee Improvement Authority. Sacramento, CA.

State Water Resources Control Board. 2002. *Central Valley Regional Water Quality Control Board, CWA Section 303(d) List of Water Quality Limited Segments.* Sacramento, CA.

Trieu, Don. Engineer. MBK Engineers, Sacramento, CA. June 6, 2006—e-mail to Diane Wagner of EDAW regarding hydraulics associated with ASB levee setback.

U.S. Army Corps of Engineers. 2000 (April 30). *Engineering and Design—Design and Construction of Levees.* Engineering Manual 1110-2-1913. Washington, DC.

U.S. Army Corps of Engineers and State of California Reclamation Board. 1998 (January). *Yuba River Basin Investigation, California: Draft Feasibility Report, Appendixes and Environmental Impact Statement/Environmental Impact Report.* U.S. Army Corps of Engineers Sacramento District, Sacramento, CA, and The Reclamation Board, Sacramento, CA.

U.S. Army Corps of Engineers and State of California Reclamation Board. 2002 (December). *Sacramento and San Joaquin River Basins California Comprehensive Study, Interim Report.* U.S. Army Corps of Engineers Sacramento District, Sacramento, CA, and The Reclamation Board, Sacramento, CA.

U.S. Geological Survey. 2000. *Water-Quality Assessment of the Sacramento River Basin, California: Water-Quality, Sediment and Tissue Chemistry, and Biological Data, 1995–1998.* Open-File Report 00-391. Sacramento, CA.

U.S. Geological Survey. 2001. *Water Resources Data—California, Water Year 2001*. Volume 4. Northern Central Valley Basins and the Great Basin from Honey Lake Basin to Oregon State Line. Water-Data Report CA-01-4. Sacramento, CA.

U.S. Geological Survey. 2006. Surface-Water Monthly Statistics for California. Available: <http://waterdata.usgs.gov/ca/nwis/sw>. Accessed June 2006.

Yuba County. 1994 (May). *Yuba County General Plan.* Volume I. Environmental Setting and Background. Department of Planning and Building Services. Marysville, CA. Prepared by QUAD Consultants, Sacramento, CA, in association with Brown-Buntin Associates, kdAnderson Transportation Engineers, and Youngdahl and Associates.

Yuba County Water Agency. 2002a (June). *Report on Feasibility, Yuba-Feather Supplemental Flood Control Project.* Appendix A, Hydrology. Marysville, CA. Prepared by MBK Engineers and Flood Control Study Team.

Yuba County Water Agency. 2002b (September). *Report on Feasibility, Yuba-Feather Supplemental Flood Control Project.* Appendix B, Flood Operations. Marysville, CA. Prepared by MBK Engineers and Flood Control Study Team.

Yuba County Water Agency. 2003a (October). *Draft Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project*. State Clearinghouse #2001072062. Marysville, CA. Prepared by EDAW, Jones and Stokes, and Flood Control Study Team.

Yuba County Water Agency. 2003b (May). *Report on Feasibility, Yuba-Feather Supplemental Flood Control Project.* Appendix E, Preliminary Design. Marysville, CA. Prepared by Flood Control Study Team.

Yuba County Water Agency. 2004 (June). *Land Acquisition and Management Plan for the Feather-Bear River Levee Setback Project*. Marysville, CA. Prepared by EDAW and Flood Control Study Team.

Yuba County Water Agency and Three Rivers Levee Improvement Authority. 2004 (October). *Report on Feasibility of RD 784 Supplemental Flood Control Improvements of the Yuba-Feather Supplemental Flood Control Project. Appendix I, Hydraulic Analyses.* Marysville, CA. Prepared by MBK Engineers and Flood Control Study Team.

SECTION 5.4, "FISHERIES"

Barnhart, R. A. 1986 (June). *Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (Pacific Southwest)—Steelhead.* (Biological Report 82 [11.60], TREL-82-4.) U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, Coastal Ecology Group, Waterways Experiment Station. Slidell, LA.

Baxter, R., W. Harrell, and L. Grimaldo. 1996. 1995 Splittail Spawning Investigations. *Interagency Ecological Program for the Sacramento–San Joaquin Estuary Newsletter* 9(4):27–31.

Baxter, R. D. 1999. Status of Splittail in California. *California Fish and Game* 85(1):28–30.

Bell, M. C. 1991. *Fisheries Handbook of Engineering Requirements and Biological Criteria*. Third edition. U.S. Army Corps of Engineers, Office of the Chief of Engineers, Fish Passage Development and Evaluation Program. Portland, OR.

Bryan, M., P. Bratovich, W. Mitchell, S. Grinnell, and Y. H. Sun. 2000. Expert testimony on Yuba River fisheries issues by Surface Water Resources, Inc., Jones & Stokes Associates, and Bookman-Edmonston Engineering, Inc., aquatic and engineering specialists for Yuba County Water Agency. Prepared for California State Water Resources Control Board, Water Rights Hearings on the Lower Yuba River. Sacramento, CA.

CALFED Bay-Delta Program. 2000 (July). *Ecosystem Restoration Program Plan. Volume II: Ecological Management Zone Visions.* Final Programmatic Environmental Impact Statement/Environmental Impact Report Technical Appendix. Sacramento, CA.

CALFED Bay-Delta Program. 2001. *Ecosystem Restoration Program, Draft Stage 1 Implementation Plan.* Sacramento, CA.

California Department of Fish and Game. 1991. *Lower Yuba River Fisheries Management Plan*. Stream Evaluation Report No. 91-1. Sacramento, CA.

California Department of Fish and Game. 1998. *A Status Review of the Spring-Run Chinook Salmon (*Oncorhynchus tshawytscha*) in the Sacramento River Drainage*. Report to the Fish and Game Commission, Candidate Species Status Report 98-01. Sacramento, CA.

California Department of Fish and Game. 2006. Weekly Anadromous Fish Counts. Available: <http://www.dfg.ca.gov/lands/fh/weekly_counts/feather.htm>. Accessed June 8, 2006.

California Department of Water Resources. 1997. *Implications of the Delay at the Suisun Marsh Salinity Control Gates on Chinook Salmon Upstream Migrants.* Environmental Services Office. Sacramento, CA.

California Department of Water Resources and California Department of Fish and Game. 1983 (August). *Agreement Concerning the Operation of the Oroville Division of the State Water Project for Management of Fish & Wildlife.* Sacramento, CA.

California Natural Diversity Database. 2006 (March). Results of electronic record search. California Department of Fish and Game, Wildlife and Habitat Data Analysis Branch. Sacramento, CA.

Cramer, S. P., and D. B. Demko. 1997. *The Status of Late-Fall and Spring Chinook Salmon in the Sacramento River Basin Regarding the Endangered Species Act*. Submitted to the National Marine Fisheries Service on behalf of the Association of California Water Agencies and California Urban Water Agencies.

Fisher, F. W. 1994. Past and Present Status of Central Valley Chinook Salmon. *Conservation Biology* 8(3):870–873.

Hallock, R. J., and F. W. Fisher. 1985. *Status of the Winter-Run Chinook Salmon (*Oncorhynchus tshawytscha*) in the Sacramento River*. Anadromous Fisheries Branch Office Report. California Department of Fish and Game. Sacramento, CA.

Jones & Stokes. 1999. *Use of Restored Floodplain Habitat on the American River by Juvenile Chinook Salmon and Other Fish Species.* Sacramento, CA. Prepared for Sacramento Area Flood Control Agency, Sacramento, CA.

Jones & Stokes. 2001 (June 20). *Change in Potential Stranding Losses of Splittail and Juvenile Chinook Salmon in the Sacramento Bypass, 1999–2001.* Final Report. Sacramento, CA. Prepared for U.S. Army Corps of Engineers, Sacramento, CA.

Kohlhorst, D. W., L. W. Botsford, J. S. Brennan, and G. M. Cailliet. 1991. Aspects of the Structure and Dynamics of an Exploited Central California Population of White Sturgeon (*Acipenser transmontanus*). Pages 277–283 in P. Williot (ed.), *Acipenser: Actes du Premier Colloque International sur l'Esturgeon.* CEMAGREF, Bordeaux, France.

McEwan, D., and T. A. Jackson. 1996. *Steelhead Restoration and Management Plan for California*. California Department of Fish and Game, Inland Fisheries Division. Sacramento, CA.

Moyle, P. B. 2002. *Inland Fishes of California, Revised and Expanded*. Second edition. University of California Press. Berkeley, CA.

Moyle, P. B., P. J. Foley, and R. M. Yoshiyama. 1992. *Status of Green Sturgeon,* Acipenser medirostris*, in California.* Final Report submitted to National Marine Fisheries Service. University of California, Davis. Davis, CA.

Moyle, P. B., R. D. Baxter, T. Sommer, T. C. Foin, and R. R. Abbot. 2000. *Sacramento Splittail White Paper.*

Moyle, P. B., R. M. Yoshiyama, J. E. Williams, and E. D. Wikramanayoke. 1995. *Fish Species of Special Concern of California*. California Department of Fish and Game. Rancho Cordova, CA.

National Marine Fisheries Service. 2005. *Green Sturgeon* (Acipenser medirostris) *Status Review Update.* Prepared by Biological Review Team, Santa Cruz Laboratory, Southwest Fisheries Science Center. Santa Cruz, CA.

Painter, R. E., L. H. Wixom, and S. N. Taylor. 1977. *An Evaluation of Fish Populations and Fisheries in the Post–Oroville Project Feather River*. A report submitted to California Department of Water Resources in accordance with Federal Power Commission License No. 2100. Sacramento, CA.

Raleigh, R. F., W. J. Miller, and P. C. Nelson. 1986. *Habitat Suitability Index Models and Instream Flow Suitability Curves: Chinook Salmon.* Biological Report 82 (10.122). U.S. Fish and Wildlife Service. Washington, DC.

Reynolds, F. L., T. Mills, R. Benthin, and A. Low. 1993. *Central Valley Anadromous Fisheries and Associated Riparian and Wetlands Areas Protection and Restoration Action Plan*. Draft. California Department of Fish and Game, Inland Fisheries Division. Sacramento, CA.

Rich, A. A. 1997. Testimony of Alice A. Rich, Ph.D., regarding water rights applications for the Delta Wetlands Project, proposed by Delta Wetlands Properties for water storage on Webb Tract, Bacon Island, Bouldin Island, and Holland Tract in Contra Costa and San Joaquin Counties. July 1997. California Department of Fish and Game Exhibit DFG-7. Submitted to State Water Resources Control Board. Sacramento, CA.

Sommer, T. R., L. Conrad, G. O'Leary, F. Feyrer, and W. C. Harrell. 2002. Spawning and Rearing of Splittail in a Model Floodplain Wetland. *Transactions of the American Fisheries Society* 131:966–974.

Sommer, T. R., M. L. Nobriega, W. C. Harrell, W. Batham, and W. J. Kimmerer. 2001. Floodplain Rearing of Juvenile Chinook Salmon: Evidence of Enhanced Growth and Survival. *Canadian Journal of Fisheries and Aquatic Sciences* 58:325–333.

Sommer, T. R., R. Baxter, and B. Herbold. 1997. Resilience of Splittail in the Sacramento–San Joaquin Estuary. *Transactions of the American Fisheries Society* 126:961–976.

State Water Resources Control Board. 2001 (March 1). Water Right Decision 1644. In the Matter of Protection of Fishery Resources and Other Issues Relating to Diversion and Use of Water from the Lower Yuba River. Sacramento, CA.

State Water Resources Control Board. 2003. Revised Water Right Decision 1644. In the Matter of Fishery Resources and Water Right Issues of the Lower Yuba River. Sacramento, CA.

State Water Resources Control Board. 2006. Yuba County Water Agency Change Petition Hearing regarding Revised Water Right Decision 1644. Sacramento, CA. Available: <http://www.waterrights.ca.gov/hearings/January%202006%20Hearing-YCWA%20Change%20Petition.htm>. Last updated April 24, 2006. Accessed June 6, 2006.

Stevens, D. E. 1989 (June 19). *When Do Winter-Run Chinook Salmon Smolts Migrate through the Sacramento–San Joaquin Delta?* Memorandum. California Department of Fish and Game. Stockton, CA.

Tracy, C. 1990. *Memorandum: Green Sturgeon Meeting and Comments.* Washington Department of Fisheries. Olympia, WA.

U.S. Fish and Wildlife Service. 1993. *Abundance and Survival of Juvenile Chinook Salmon in the Sacramento–San Joaquin Estuary.* (1992 Annual Progress Report.) Stockton, CA.

Wang, J. C. S. 1986. *Fishes of the Sacramento–San Joaquin Estuary and Adjacent Waters, California: A Guide to the Early Life Histories*. (FS/10-4ATR86-9.) California Department of Water Resources. Sacramento, CA. Prepared for Interagency Ecological Study Program for the Sacramento–San Joaquin Estuary, Sacramento, CA.

Waters, T. F. 1995. *Sediment in Streams: Sources, Biological Effects, and Control*. American Fisheries Society Monograph 7. Bethesda, MD.

Yoshiyama, R. M., F. W. Fisher, and P. B. Moyle. 1998. Historical Abundance and Decline of Chinook Salmon in the Central Valley Region of California. *North American Journal of Fisheries Management* 18:487–521.

Yuba County. 1996. *Yuba County General Plan.* Volume II. Land Use, Circulation, Conservation and Open Space. Yuba County Planning Department. Marysville, CA. Prepared by QUAD Consultants, Sacramento, CA. Adopted December 10, 1996, by Yuba County Board of Supervisors.

SECTION 5.5, "TERRESTRIAL BIOLOGICAL RESOURCES"

California Department of Fish and Game. 1995 (October). *Staff Report on Burrowing Owl Mitigation.* Memorandum to Division Chiefs and Regional Managers. Sacramento, CA.

California Native Plant Society. 2006. *Inventory of Rare and Endangered Vascular Plants of California* (online edition, v7-06b 4-18-06). Rare Plant Scientific Advisory Committee. Sacramento, CA.

California Natural Diversity Database. 2006 (March). Results of electronic record search. California Department of Fish and Game, Wildlife and Habitat Data Analysis Branch. Sacramento, CA.

Holland, R. 1986. *Preliminary Descriptions of Plant Communities in California*. California Department of Fish and Game. Sacramento, CA.

Swainson's Hawk Technical Advisory Committee. 2000 (May). *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley.*

U.S. Fish and Wildlife Service. 1999 (July). *Conservation Guidelines for the Valley Elderberry Longhorn Beetle.* Sacramento Fish and Wildlife Office. Sacramento, CA.

Yuba County. 1996. *Yuba County General Plan.* Volume II. Land Use, Circulation, Conservation and Open Space. Yuba County Planning Department. Marysville, CA. Prepared by QUAD Consultants, Sacramento, CA. Adopted December 10, 1996, by Yuba County Board of Supervisors.

Yuba County Water Agency. 2003 (October). *Draft Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project.* State Clearinghouse #2001072062. Marysville, CA. Prepared by EDAW, Jones & Stokes, and Flood Control Study Team.

Yuba County Water Agency. 2004 (June). *Land Acquisition and Management Plan for the Feather-Bear Rivers Levee Setback Project.* Prepared for Yuba County Water Agency.

SECTION 5.6, "RECREATION"

California Department of Fish and Game. 2006. Feather River Wildlife Area. Available: <http://www.dfg.ca.gov/lands/wa/region2/featherriver.html>. Last updated January 2006. Accessed May 2006.

City of Marysville. 1985 (August). *City of Marysville General Plan.* Marysville, CA. Available: <http://208.186.112.160/apadmin/img/upload/General%20Plan%20Intro.PDF>. Accessed June 12, 2006.

EDAW, Inc. 2001. *Environmental Analysis: Proposed Temporary Transfer of Water from Yuba County Water Agency to California Department of Water Resources, Year 2001.* Sacramento, CA.

Sacramento Audubon Society. 2006. Bobelaine Audubon Sanctuary. Available: <http://www.sacramentoaudubon.org/boblaine.htm>. Last updated May 7, 2006. Accessed May 10, 2006.

State Water Resources Control Board. 1997. Draft Environmental Impact Report for Implementation of the 1995 Bay/Delta Water Quality Control Plan. Sacramento, CA.

Three Rivers Levee Improvement Authority. 2004a (May). *Bear River and Western Pacific Interceptor Canal Levee Improvements Project Draft Environmental Impact Report.* State Clearinghouse #2004032118. Marysville, CA. Prepared by Jones & Stokes, Sacramento, CA.

Three Rivers Levee Improvement Authority. 2004b (September). *Draft Environmental Impact Report for the Feather-Bear Rivers Levee Setback Project.* State Clearinghouse #2004072113. Marysville, CA. Prepared by EDAW and Flood Control Study Team.

U.S. Bureau of Reclamation. 1997. Central Valley Project Improvement Act Draft Programmatic Environmental Impact Statement. Mid-Pacific Region. Sacramento, CA.

Wanket, Dan. Project Manager. GEI Consultants, Oakland, CA. June 7, 2006—e-mail to Sean Bechta of EDAW regarding access to the Star Bend Boat Launch and Fishing Access during project construction.

Whitmore, Dale. Wildlife Biologist. California Department of Fish and Game, Marysville, CA. May 24, 2006—telephone conversation with Jeanine Hinde of EDAW regarding recreational uses of management units within the Feather River Wildlife Area.

Yuba County. 1994 (May). *Yuba County General Plan.* Volume I. Environmental Setting and Background. Department of Planning and Building Services. Marysville, CA. Prepared by QUAD Consultants, Sacramento, CA, in association with Brown-Buntin Associates, kdAnderson Transportation Engineers, and Youngdahl and Associates.

Yuba County. 1996. *Yuba County General Plan. Volume II. Land Use, Circulation, Conservation and Open Space.* Yuba County Planning Department. Marysville, CA. Prepared by QUAD Consultants, Sacramento, CA. Adopted December 10, 1996, by Yuba County Board of Supervisors.

Yuba Sutter Tourism Board. 2004. Yuba Sutter—Visit Us Today!: Recreation—Yuba-Sutter Wildlife. Available: <http://www.visityubasutter.com/recreation/wildlife.htm>. Accessed May 2006.

Yuba County Water Agency. 2003 (October). *Draft Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project.* State Clearinghouse #2001072062. Marysville, CA. Prepared by EDAW, Jones & Stokes, and Flood Control Study Team.

Yuba County Water Agency. 2004 (June). *Land Acquisition and Management Plan for the Feather-Bear Rivers Levee Setback Project.* Marysville, CA. Prepared by EDAW and Flood Control Study Team.

SECTION 5.7, "AESTHETIC RESOURCES"

California Department of Transportation. 2003. Officially Designated State Highways. Available: <http://www.dot.ca.gov/hq/LandArch/scenic/schwy1.html>. Last updated June 2, 2003. Accessed May 24, 2006.

Federal Highway Administration. 1983. *Visual Impact Assessment for Highway Projects.* (Contract DOT-FH-11-9694.) Washington, DC.

Three Rivers Levee Improvement Authority. 2006 (February). *Three Rivers Levee Improvement Authority Phase IV Erosion Investigation.* Prepared by MBK Engineers, Sacramento, CA.

Yuba County. 1994 (May). *Yuba County General Plan.* Volume I. Environmental Setting and Background. Department of Planning and Building Services. Marysville, CA. Prepared by QUAD Consultants, Sacramento, CA, in association with Brown-Buntin Associates, kdAnderson Transportation Engineers, and Youngdahl and Associates.

SECTION 5.8, "CULTURAL RESOURCES"

Abeloe, W. N. 1966. *Historic Spots in California.* 3rd ed. Stanford University Press. Stanford, CA.

Beardsley, R. K. 1954. Temporal and Areal Relationships in Central California Archeology. *University of California Archaeological Survey Reports*, Nos. 24, 25. Berkeley, CA.

Bouey, P. D. 1990. *Sacramento River Flood Control System Evaluation, Marysville–Yuba City Area Cultural Resources Survey.* Prepared by Far Western Anthropological Research Group, Inc., Davis, CA. Prepared for U.S. Army Corps of Engineers, Sacramento District, Sacramento, CA. On file, North Central Information Center of the California Historical Resources Information System, California State University, Sacramento.

California Office of Historic Preservation. 1995 (March). *Instructions for Recording Historical Resources.* Sacramento, CA.

Derby, L. 1849. Map of the Sacramento Valley from the American River to Butte Creek. Surveyed and Drawn by Order of General Riley, Commanding 10th Military Department, by Lieutenant Derby, Topographical Engineers, September and October 1849. On file, North Central Information Center of the California Historical Resources Information System, California State University, Sacramento, CA.

EDAW, Inc. 2006. *National Register Of Historic Places Evaluation for CA-Yub-1312 and CA-Yub-1313, Feather-Bear Rivers Levee Setback Project, Yuba and Sutter Counties, California.* Sacramento, CA. Prepared for Three Rivers Levee Improvement Authority.

Elsasser, A. B. 1953. *Archaeological Site Survey Record for CA-Yub-6 (P-58-24), State of California Division of Beaches and Parks.* On file, North Central Information Center of the California Historical Resources Information System, California State University, Sacramento, CA.

Elsasser, A. B., and M. A. Baumhoff. 1953. *Archaeological Site Survey Record for CA-Yub-5.* On file, North Central Information Center of the California Historical Resources Information System, California State University, Sacramento.

General Land Office. 1859. Plat of the New Helvetia Rancho. Map on file, North Central Information Center of the California Historical Resources Information System, California State University, Sacramento, CA.

Gordon, M. 1988. *Changes in Harmony: An Illustrated History of Yuba and Sutter Counties.* Windsor Publications. Northridge, CA.

Hoover, M., H. E. Rensch, and E. G. Rensch. 1966. *Historic Spots in California.* Third edition revised by W. N. Abeloe. Stanford University Press. Stanford, CA.

Jensen, P. M. 2005. *Class I Archaeological Survey. Reclamation District 784 Master Plan Update, Yuba County, California.* Report prepared for Foothill Associates, Inc., Rocklin, CA. On file, North Central Information Center of the California Historical Resources Information System, California State University, Sacramento, CA.

Johnson, J. J., C. M. Blount, S. D. Dondero, and D. J. Theodoratus. 1984. *Black Butte Lake Intensive Cultural Resources Survey.* The Foundation of California State University, Sacramento. Prepared for the U.S. Army Corps of Engineers, Sacramento, CA.

Jones & Stokes. 2003. Cultural Resources Inventory and Evaluation Report for the Yuba-Feather Supplemental Flood Control Project, Yuba County, California. Sacramento, CA.

Jones & Stokes. 2005. *Archaeological Testing and Evaluation Report for the Feather-Bear Rivers Setback Levee Project, Yuba County, California.* Sacramento, CA. Report prepared for the Three Rivers Levee Improvement Authority, Marysville, CA. On file, North Central Information Center of the California Historical Resources Information System, California State University, Sacramento, CA.

JRP Historical Consulting Services. 1994. *Historic Resource Evaluation Report: Reclamation Facilities, RD 1001 and RD 784.* Davis, CA. Prepared for California Department of Transportation, District 3, Marysville, CA.

Kroeber, A. L. 1925. *Handbook of the Indians of California.* Reprinted in 1976 by Dover Publications. New York, NY.

Lillard, J. B., R. F. Heizer, and F. Fenenga. 1939. *An Introduction to the Archaeology of Central California.* Sacramento Junior College, Department of Anthropology Bulletin 2.

Littlejohn, H. W. 1928. *Nisenan Geography.* Manuscript at University of California Archives, Department of Anthropology, Document 18. Berkeley, CA.

McGowan, J. A. 1961. *History of the Sacramento Valley.* Lewis Historical Publishing Company. New York, NY.

Moratto, M. J. 1984. *California Archaeology.* Academic Press. Orlando, FL.

Nelson, W. J., M. Carpenter, and K. L. Holanda. 2000. *Cultural Resources Survey for the Level (3) Communications Long Haul Fiber Optics Project—Segment WS04: Sacramento to Bakersfield.* Prepared by Far Western Anthropological Research Group, Davis, CA. Prepared for Parsons Brinckerhoff Network Services, Pleasanton, CA. On file, North Central Information Center of the California Historical Resources Information System, California State University, Sacramento, CA.

Offerman, J. 1992. *Negative Archaeological Survey Report. California Department of Transportation, Expenditure Authorization 297300.* On file, North Central Information Center of the California Historical Resources Information System, California State University, Sacramento, CA.

Offerman, J. 2001. *Negative Archaeological Survey Report. California Department of Transportation, Expenditure Authorization OA2900 and 4A8900.* On file, North Central Information Center of the California Historical Resources Information System, California State University, Sacramento, CA.

Olsen, W. H. 1957. *Archaeological Site Survey Record for CA-Yub-13.* On file, North Central Information Center of the California Historical Resources Information System, California State University, Sacramento, CA.

Olsen, W. H., and F. A. Riddell. 1960. *Archaeological Site Survey Record for CA-Yub-13.* On file, North Central Information Center of the California Historical Resources Information System, California State University, Sacramento, CA.

Olsen, W. H., and F. A. Riddell. 1962. *Salvage of the Rio Oso Site, Yuba County, California.* California Department of Parks and Recreation, Division of Beaches and Parks. Sacramento, CA.

Peak & Associates, Inc. 1988. *Cultural Resource Assessment of the Proposed Wastewater Treatment Plant Modification Along the Southern Bank of the Yuba River, Yuba County, California.* Sacramento, CA. Report prepared for Jones & Stokes Associates, Inc., Sacramento, CA. On file, North Central Information Center of the California Historical Resources Information System, California State University, Sacramento, CA.

Riddell, F. A. 1960. *Archaeological Site Survey Record for CA-Yub-6, University of California Archaeological Survey.* On file, North Central Information Center of the California Historical Resources Information System, California State University, Sacramento, CA.

Shipley, W. F. 1978. Native Languages of California. Pages 80–90 in R. F. Heizer (vol. ed.), *California. Handbook of North American Indians,* Vol. 8, W. C. Sturtevant, gen. ed. Smithsonian Institution Press. Washington, DC.

Stoll, M., and S. Thompson. 1961. *Report on the Archeological Survey of the Bear River.* Submitted to W. Beeson, Department of Anthropology, Sacramento State College. On file, North Central Information Center of the California Historical Resources Information System, California State University, Sacramento, CA.

Storm, D. J. n.d. *Cultural Resources Statement, West Linda Drainage Project.* On file, North Central Information Center of the California Historical Resources Information System, California State University, Sacramento, CA.

Thompson, J. 1958. *The Settlement and Geography of the Sacramento–San Joaquin Delta, California.* University Microfilms International. Ann Arbor, MI.

Thompson & West. 1879. *History of Yuba County, California.* Oakland, CA.

U.S. Army Corps of Engineers. 1993. *Cultural Resources Survey and Investigation. Sacramento River Flood Control Project Marysville–Yuba City Mitigation Area, Yuba County, California.* On file, North Central Information Center of the California Historical Resources Information System, California State University, Sacramento, CA.

U.S. Geological Survey. 1910. 7.5-minute Nicolaus, California, quadrangle. On file, North Central Information Center of the California Historical Resources Information System, California State University, Sacramento, CA.

U.S. Geological Survey. 1911. 7.5-minute Ostrum, California, quadrangle. On file, North Central Information Center of the California Historical Resources Information System, California State University, Sacramento, CA.

Wilson, N. L., and A. H. Towne. 1978. Nisenan. Pages 387–397 in R. F. Heizer (vol. ed.), *California. Handbook of North American Indians,* Vol. 8, W. C. Sturtevant, gen. ed. Smithsonian Institution. Washington, DC.

Yuba County Water Agency. 2003 (October). *Draft Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project.* State Clearinghouse #2001072062. Marysville, CA. Prepared by EDAW, Jones & Stokes, and Flood Control Study Team.

SECTION 5.9, "AIR QUALITY"

California Air Resources Board. 1994 (February). *California Surface Wind Climatology*. Sacramento, CA.

California Air Resources Board. 2003. EMission FACtors Computer Model Version 2.2. Sacramento, CA.

California Air Resources Board. 2005 (March). *Air Quality and Land Use Handbook: A Community Health Perspective.* Sacramento, CA.

California Air Resources Board. 2006a. Area Designation Maps/State and National. Available: <www.arb.ca.gov/desig/adm/adm.htm#state>. Accessed June 2006.

California Air Resources Board. 2006b. Air Quality Data Statistics. Available: <www.arb.ca.gov/adam/welcome.html>. Accessed June 2006.

Feather River Air Quality Management District. 1998. *Indirect Source Review Guidelines*. Marysville, CA.

Feather River Air Quality Management District. 2006. CEQA Planning: Air Quality CEQA Review. Available: <http://www.fraqmd.org/PlanningTools.htm>. Accessed June 2006.

Godish, T. 1991. *Air Quality*. Lewis Publishers, Inc. Chelsea, MI.

Sacramento Metropolitan Air Quality Management District. 2004 (July). *Guide to Air Quality Assessment in Sacramento County.* Sacramento, CA.

Salinas, Julio. Staff Toxicologist. Office of Health Hazard Assessment, Sacramento, CA. August 3, 2004—telephone conversation with Kurt Legleiter of EDAW regarding exposure period for determining heath risk.

South Coast Air Quality Management District. 1993. *CEQA Air Quality Handbook*. Diamond Bar, CA.

Three Rivers Levee Improvement Authority. 2004 (September). *Draft Environmental Impact Report for the Feather-Bear Rivers Levee Setback Project*. State Clearinghouse #2004072113. Marysville, CA. Prepared by EDAW and Flood Control Study Team.

U.S. Environmental Protection Agency. 1985. *Compilation of Air Pollutant Emission Factors* (EPA AP-42). Washington, DC.

U.S. Environmental Protection Agency. 2006a. Criteria Air Pollutant Information and Attainment Designations. Available: <http://www.epa.gov>. Accessed June 2006.

U.S. Environmental Protection Agency. 2006b. National Ambient Air Quality Standards. Available: <www.epa.gov/air/criteria.html>. Accessed June 2006.

U.S. Environmental Protection Agency. 2006c. Monitor Value Report (NAAQS). Available: <www.epa.gov/air/data/geosel.html>. Accessed June 2006.

Zhu, Y., W. C. Hinds, S. Kim, and S. Shen. 2002. Study of Ultrafine Particles Near a Major Highway with Heavy-duty Diesel Traffic. *Atmospheric Environment* 36:4323–4335.

SECTION 5.10, "NOISE"

California Air Resources Board. 2002. URBEMIS2002 Version 8.7.0 computer model. Sacramento, CA.

California Department of Transportation. 1998 (October). *Traffic Noise Analysis Protocol: Technical Noise Supplement.* Sacramento, CA.

California Department of Transportation. 2002 (February 20). *Transportation Related Earthborne Vibrations.* Sacramento, CA.

California Department of Transportation. 2006. *2005 Traffic Volumes on the California State Highway System.* Traffic and Vehicle Data Systems Unit. Sacramento, CA. Available: <http://www.dot.ca.gov/hq/traffops/saferesr/trafdata/2005all.htm>. Accessed July 27, 2006.

Egan, M. D. 1972. *Concepts in Architectural Acoustics.* McGraw-Hill Science/Engineering/ Math. New York, NY.

Federal Highway Administration. 1988. FHWA Traffic Noise Prediction Model. Washington, DC.

Federal Transit Administration. 1995 (April). *Transit Noise and Vibration Impact Assessment.* Washington, DC.

Governor's Office of Planning and Research. 2003. *State of California General Plan Guidelines.* Sacramento, CA.

Three Rivers Levee Improvement Authority. 2004 (September). *Draft Environmental Impact Report for the Feather-Bear Rivers Levee Setback Project*. State Clearinghouse #2004072113. Marysville, CA. Prepared by EDAW and Flood Control Study Team.

U.S. Department of Housing and Urban Development. 2002. *The Noise Guidebook.* Washington, DC.

U.S. Environmental Protection Agency. 1971 (December). *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances.* Washington, DC.

Yuba County. 1980 (August). *Yuba County General Plan* Noise Element. Yuba County Community Development Department. Marysville, CA.

Yuba County. 1994 (May). *Yuba County General Plan.* Volume I. Environmental Setting and Background. Department of Planning and Building Services. Marysville, CA. Prepared by QUAD Consultants, Sacramento, CA, in association with Brown-Buntin Associates, kdAnderson Transportation Engineers, and Youngdahl and Associates.

Yuba County Water Agency. 2003 (October). *Draft Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project.* State Clearinghouse #2001072062. Marysville, CA. Prepared by EDAW, Jones & Stokes, and Flood Control Study Team.

SECTION 5.11, "TRANSPORTATION AND CIRCULATION"

California Department of Transportation. 2006. *2005 Traffic Volumes on the California State Highway System.* Traffic and Vehicle Data Systems Unit. Sacramento, CA. Available: <http://www.dot.ca.gov/hq/traffops/saferesr/trafdata/2005all.htm>. Accessed July 27, 2006.

Cucci, Daniel. Assistant Planner. Yuba County Community Development Department, Marysville, CA. May 12, 2006—e-mail to Jason Barrett of EDAW regarding emergency access in the project area.

Institute of Transportation Engineers. 1989. *Traffic Access and Impact Studies for Site Development.* Transportation Planners Council. Washington, DC.

Yuba County. 1994 (May). *Yuba County General Plan.* Volume I. Environmental Setting and Background. Department of Planning and Building Services. Marysville, CA. Prepared by QUAD Consultants, Sacramento, CA, in association with Brown-Buntin Associates, kdAnderson Transportation Engineers, and Youngdahl and Associates.

Yuba County. 1996. *Yuba County General Plan.* Volume II. Land Use, Circulation, Conservation and Open Space. Yuba County Planning Department. Marysville, CA. Prepared by QUAD Consultants, Sacramento, CA. Adopted December 10, 1996, by Yuba County Board of Supervisors.

SECTION 5.12, "PUBLIC SERVICES, UTILITIES, AND SERVICE SYSTEMS"

Boeck, Van. Managing Engineer. Yuba County Public Works Department, Marysville, CA. September 2002—telephone conversation with Craig Cross of EDAW; July 26, 2004—telephone conversation with Jeanine Hinde of EDAW.

California Department of Water Resources. 1981 (December). *Water Well Standards: State of California.* Bulletin 74–81. Sacramento, CA.

California Department of Water Resources. 1991 (June). *California Well Standards.* Bulletin 74–91. Sacramento, CA.

Chambers, Don. Land Agent. Pacific Gas and Electric Company. Chico, CA. July 21, 2004—telephone conversation with Jeanine Hinde of EDAW regarding PG&E electric distribution maps numbered S-23, S-24, T-23, and T-24.

Cucci, Daniel. Assistant Planner. Yuba County Community Development Department, Marysville, CA. May 12, 2006—e-mail to Jason Barrett of EDAW regarding Yuba County public services and utilities.

Freeman, Gregg. Engineer. SBC Communications. Grass Valley, CA. November 11, 2002—telephone conversation with Sara Martin of Jones & Stokes.

GEI Consultants. 2006. *Levee Strengthening Basis of Design Report.* Oakland, CA.

Klein, John. Engineer. SBC Communications. Chico, CA. July 10, and July 31, 2002—telephone conversations with Sara Martin of Jones & Stokes.

Lee, Michael. Assistant Director. Yuba County Public Works Department, Marysville, CA. May 10, 2006—telephone conversation with Jason Barrett of EDAW concerning Yuba County roadways, utilities, and public services.

MHM Inc. n.d. Reclamation District Number 784 Boundary Line, Drainage and Flood Control Improvements Map. Marysville, CA.

Pacific Gas and Electric Company. 2001 (November). Electric Distribution Maps R-22, R-23, Q-22, Q-23, S-23, T-23, Q-23-12, and Q-23-17.

Pujol, Alberto. GEI Consultants, Oakland, CA. July 6, 2006—e-mail to Sean Bechta of EDAW regarding requirements for well abandonment and protection.

Shaw, Tim. General Manager. Olivehurst Public Utility District, Marysville, CA. May 8, 2006—telephone conversation with Jason Barrett of EDAW concerning local public services and utilities.

Wanket, Dan. Project Manager. GEI Consultants, Oakland, CA. May 18, 2006—e-mail to Sean Bechta of EDAW regarding public services, utilities, and service systems in the project area.

Yuba County Water Agency. 2003 (May). *Report on Feasibility, Yuba-Feather Supplemental Flood Control Project.* Appendix E, Preliminary Design. Marysville, CA. Prepared by Flood Control Study Team.

SECTION 5.13, "PALEONTOLOGICAL RESOURCES"

Albright, L. B., III. 2000. *Biostratigraphy and Vertebrate Paleontology of the San Timoteo Badlands, Southern California.* University of California Publications, Geological Sciences, Vol. 144. University of California Press. Berkeley, CA.

Atwater, B. F. 1982. Geologic Maps of the Sacramento–San Joaquin Delta, California. U.S. Geological Survey Map MF-1401.

Bartow, J. A. 1991. *The Cenozoic Evolution of the San Joaquin Valley, California.* U.S. Geological Survey Professional Paper 1501. Washington, DC.

Davis, S. N., and F. R. Hall. 1959. *Water Quality of Eastern Stanislaus and Northern Merced Counties, California.* Stanford University Publications, Geological Sciences, Vol. 6, No. 1.

Gale, H. S., H. E. Thomas, and A. M. Piper. 1938. *Geologic and Hydrologic Map of the Mokelumne Area, California.* U.S. Geological Survey.

Graham, S. A., and H. C. Olson (eds.). 1988. *Studies of the Geology of the San Joaquin Basin.* Pacific Section, Society of Economic Paleontologists and Mineralogists.

Hackel, O. 1966. Great Valley Province. Pages 217–238 in E. H. Bailey (ed.), *Geology of Northern California*. U.S. Geological Survey Bulletin 190. San Francisco, CA.

Hay, O. P. 1927. *The Pleistocene of the Western Region of North American and its Vertebrated Animals.* Carnegie Institute Washington, Publication 322B.

Helley, E. J., and D. W. Harwood. 1985. Geologic Map of the Late Cenozoic Deposits of the Sacramento Valley and Northern Sierran Foothills, California. U.S. Geological Survey MF-1790.

Hilton, R. P., D. C. Dailey, and H. G. McDonald. 2000. A Late Pleistocene Biota from the Arco Arena Site, Sacramento, California. *PaleoBios Abstracts* 20(1), April 15, 2000. University of California Museum of Paleontology. Berkeley, CA.

Jefferson, G. T. 1991a. *A Catalogue of Late Quaternary Vertebrates from California: Part One, Nonmarine Lower Vertebrate and Avian Taxa.* Natural History Museum of Los Angeles County, Technical Report no. 5.

Jefferson, G. T. 1991b. *A Catalogue of Late Quaternary Vertebrates from California: Part Two: Mammals.* Natural History Museum of Los Angeles County, Technical Report no. 7.

Kolber, M. 2004. Mammoth Coup: Discovery of Huge Fossil Near Elk Grove is a Big Deal for Northern California. *Sacramento Bee,* July 27, 2004.

Louderback, G. D. 1951. *Geologic History of San Francisco Bay.* California Division of Mines and Geology Bulletin 154.

Lundelius, E. L. Jr., R. W. Graham, E. Anderson, J. Guilday, J. A. Holman, D. W. Steadman, and S. D. Webb. 1983. Terrestrial Vertebrate Faunas. Pages 311–353 in H. E. Wright, Jr. and S. C. Porter (eds.), *Late-Quaternary Environments of the United States, Volume 1, The Late Pleistocene.* University of Minnesota Press.

Marchand, D. E., and A. Allwardt. 1981. *Late Cenozoic Stratigraphic Units, Northeastern San Joaquin Valley, California.* U.S. Geological Survey Bulletin 1470.

Page, R. W. 1986. *Geology of the Fresh Ground-Water Basin of the Central Valley, California.* U.S. Geological Survey Professional Paper 1401-C.

Piper, A. M., H. S. Gale, H. E. Thomas, and T. W. Robinson. 1939. *Geology and Ground-Water Hydrology of the Mokelumne Area, California.* U.S. Geological Survey Water-Supply Paper 780.

Saucedo, G. J., and D. L. Wagner. 1992. Geologic Map of the Chico Quadrangle. California Division of Mines and Geology, Regional Geologic Map Series, Map No. 7A. Sacramento, CA.

Savage, D. E. 1951. Late Cenozoic Vertebrates of the San Francisco Bay Region. *University of California Department of Geological Sciences Bulletin* 28(10):215–314.

Society of Vertebrate Paleontology. 1995. Assessment and Mitigation of Adverse Impacts to Nonrenewable Paleontologic Resources—Standard Guidelines. *Society of Vertebrate Paleontology News Bulletin* 163:22–27.

Society of Vertebrate Paleontology. 1996. Conditions of Receivership for Paleontologic Salvage Collections. Final draft. *Society of Vertebrate Paleontology News Bulletin* 166:31–32.

Stirton, R. A. 1939. Cenozoic Mammal Remains from the San Francisco Bay Region. *University of California Department of Geological Sciences Bulletin* 24(13).

University of California Museum of Paleontology. 2004. Paleontology Collections Database. University of California, Berkeley. Available: <http://elib.cs.berkeley.edu/ucmp/>. Accessed July 19, 2004.

University of California Museum of Paleontology. 2006. Paleontology Collections Database. University of California, Berkeley. Available: <http://bscit.berkeley.edu/ucmp/loc.shtml>. Accessed May 30, 2006.

CHAPTER 6, "CUMULATIVE IMPACTS"

CALFED Bay-Delta Program. 2000 (July). *Ecosystem Restoration Program Plan. Volume II: Ecological Management Zone Visions.* Final Programmatic EIS/EIR Technical Appendix. Sacramento, CA.

California Department of Conservation. 1996. *Farmland Conversion Report 1992 to 1994.* Prepared by the Farmland Mapping and Monitoring Program, Sacramento, CA.

California Department of Conservation. 1998. *Farmland Conversion Report 1994 to 1996.* Prepared by the Farmland Mapping and Monitoring Program, Sacramento, CA.

California Department of Conservation. 2000. *Farmland Conversion Report 1996 to 1998.* Prepared by the Farmland Mapping and Monitoring Program, Sacramento, CA.

California Department of Conservation. 2002a. *Farmland Conversion Report 1998 to 2000.* Prepared by the Farmland Mapping and Monitoring Program, Sacramento, CA.

California Department of Conservation. 2002b. Important Farmland in California, 2002. Available: <http://www.consrv.ca.gov/dlrp/FMMP/map_products/index.htm>.

California Department of Conservation. 2004a. *Farmland Conversion Report 2000 to 2002.* Prepared by the Farmland Mapping and Monitoring Program, Sacramento, CA.

California Department of Conservation. 2004b. *2004 Field Report for Yuba County.* Prepared by the Farmland Mapping and Monitoring Program, Sacramento, CA.

California Department of Conservation. 2006. *Farmland Conversion Report 2002 to 2004.* Prepared by the Farmland Mapping and Monitoring Program, Sacramento, CA.

California Department of Finance. 2000. *California State Census Data Center, Census 2000. Table One, Population Changes 1990–2000.* Prepared by Demographic Research Unit, Sacramento, CA.

California Department of Finance. 2006 (May). E-1 Population Estimates for Cities, Counties and the State with Annual Percent Change—January 1, 2005 and 2006. Sacramento, California. Available: <http://www.dof.ca.gov/HTML/DEMOGRAP/E-1table.xls>.

California Department of Water Resources. 2003 (February 25). *NEPA Scoping Document 2 and Amended CEQA Notice of Preparation, Oroville Facilities Relicensing, FERC Project No. 2100.* Sacramento, CA.

California Department of Water Resources. 2005. Proposed New Gauges for the Yuba-Feather Forecast-Coordinated Operations Program. Boone Lek, November 18, 2005. Available: <http://cdec.water.ca.gov/snow/meeting/CCSS_2005_Meeting/New_Gages_F-CO_Program_2005_CCSS_meeting.pdf>. Accessed July 3, 2006.

California Department of Water Resources. 2006a (June). Governor's Leadership Secures Permits for DWR Critical Levee Site Repair Schwarzenegger Helps to Expedite Process, Protect Environmental Concerns. Public Affairs Office. Available: <http://www.publicaffairs.water.ca.gov/newsreleases/2006/06-27-06oped.cfm>.

California Department of Water Resources. 2006b (April). 29 Critical Erosion Sites in the Sacramento River Flood Control System. Public Affairs Office. Available: <http://www.publicaffairs.water.ca.gov/newsreleases/2006/04-20-06added_critical.pdf>.

Cotter, Colleen. Assistant Planner. Yuba County Planning Department, Marysville, CA. April 15, 2003—e-mail to Jenifer King of EDAW.

EIP Associates. 2006 (May). *Notice of Preparation and Initial Study: Feather River Setback Levee at Star Bend.* Prepared for Levee District No. 1 of Sutter County. Sacramento, CA.

Feather River Air Quality Management District. 1998. *Indirect Source Review Guidelines.* Marysville, CA.

Feather River Air Quality Management District. 2006. CEQA Planning: Air Quality CEQA Review. FRAQMD Web site. <http://www.fraqmd.org/PlanningTools.htm>. Accessed June 2006.

Feather River Coordinated Resource Management. 2006. Feather River Coordinated Resource Management Web site. Available: <http://www.feather-river-crm.org>. Accessed June 2006.

Nature Conservancy, The. 2002. Sacramento River Project. The Nature Conservancy Web site. Available: <http://www.tnccalifornia.org/our_proj/sacto_river/>. Last updated 2002. Accessed March 25, 2003.

Sacramento Area Council of Governments. 2004 (December). SACOG Projection Data. Jurisdictions from 2005 to 2025. Available: <http://www.sacog.org/demographics/projections/files/split/Sacog%20Projections%20Adopted%2012.16.04%20for%20Jurisdictions%202005%20-%202025.xls>.

Sacramento River Conservation Area Forum. 2002 (June). *Sacramento River Conservation Area Forum Handbook.* Prepared for the State of California Resources Agency. Prepared by the Sacramento River Advisory Council. Revised and updated by the Sacramento River Conservation Area Forum. Available: <http://www.sacramentoriver.ca.gov>.

Sacramento River Partners. 2002. Sacramento River Projects 1998–2004. Sacramento River Partners Web site. Available: <http://www.riverpartners.org>. Last updated March 2003. Accessed June 14, 2006.

Sacramento River Partners. 2005. Sacramento River Partners Journal. Fall 2005. Volume I, Issue I. Available: <http://www.riverpartners.org/documents/journal_fall_2005.pdf>.

South Yuba River Citizens League. 2003. South Yuba River Citizens League Web site. Available: <http://www.syrcl.org/whatwedo/whatwedo-loweryuba.asp>. Accessed June 14, 2006.

Upper Yuba River Studies Program. 2005. Upper Yuba River Studies Program Web site. Available: <http://calwater.ca.gov/Programs/EcosystemRestoration/UpperYuba/aboutProject-1.asp.htm>. Accessed June 2006.

U.S. Army Corps of Engineers and State of California Reclamation Board. 2002 (December). *Sacramento and San Joaquin River Basins California Comprehensive Study. Interim report.* U.S. Army Corps of Engineers Sacramento District, Sacramento, CA, and The Reclamation Board, Sacramento, CA.

U.S. Environmental Protection Agency. 2004. "Intent to Prepare a Draft Supplemental Environmental Impact Statement/Environmental Impact Report for the Yuba River Basin Project, Yuba County, CA." *Federal Register*, March 17, 2004 (Volume 69, Number 52).

Yuba County Community Development Department. 2004 (December). *Draft Housing Element 2004.* Prepared by Cotton/Bridges Associates, Sacramento, CA. Available: <http://www2.co.yuba.ca.us/yubacomdev/planning/he/default.asp>.

Yuba County Community Development and Public Works. 2005. Planning Division Web site. Available: <http://www.yubacomdev.org/planning>. Accessed June 14, 2006.

Yuba County Water Agency. 2002a (August). *Technical Memorandum on Controlled Surcharge of Lake Oroville for Additional Flood Control.* Prepared for submittal to California Department of Water Resources, Sacramento, CA.

Yuba County Water Agency. 2002b (August). *Technical Memorandum on Thermalito Afterbay Emergency Reoperation for Flood Control.* Prepared for submittal to California Department of Water Resources, Sacramento, CA.

Yuba County Water Agency. 2002c (May 7). Minutes of Meeting of the Yuba County Water Agency Board of Directors. Marysville, CA.

Yuba County Water Agency. 2003a (October). *Draft Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project.* State Clearinghouse #2001072062. Marysville, CA. Prepared by EDAW, Jones & Stokes, and Flood Control Study Team.

Yuba County Water Agency. 2003b. *Report on Feasibility, Yuba-Feather Supplemental Flood Control Project. Appendix E, Preliminary Design.* Marysville, CA. Prepared by Flood Control Study Team.

Yuba County Water Agency. 2003c (January). *Report on Feasibility, Yuba-Feather Supplemental Flood Control Project. Appendix D, Benefit Analysis.* Marysville, CA. Prepared by David Ford Consulting Engineers and Flood Control Study Team.

Yuba County Water Agency, MBK Engineers, and GEI Consultants. 2004 (March). Staff Report: *Achieving FEMA Certification for Reclamation District No. 784.* Prepared for Yuba County, Yuba County Water Agency, and Reclamation District No. 784.

Yuba Foothills Associates, LLC. 2002 (September). *Draft Yuba Highlands Specific Plan.* Prepared for Yuba County Planning Department, Marysville, CA.

CHAPTER 7, "OTHER CEQA-REQUIRED SECTIONS"

Yuba County. 1990a. *East Linda Specific Plan.* Yuba County Planning Department. Marysville, CA. Prepared by Wade Associates, Roseville, CA, and Terrance Lowell & Associates, Inc., Rocklin, CA. Adopted by the Yuba County Board of Supervisors May 14, 1990.

Yuba County. 1990b. *Draft Environmental Impact Report for the East Linda Specific Plan.* State Clearinghouse #1989081407. Marysville, CA.

Yuba County. 1990c. *Final Environmental Impact Report for the East Linda Specific Plan.* State Clearinghouse #1989081407. Marysville, CA.

Yuba County. 1992a (October). *Plumas Lake Specific Plan.* Yuba County Department of Planning and Building Services. Marysville, CA. Prepared by Richard Floch & Associates, Omni-means, Inc., and Economic & Planning Systems. Adopted by Yuba County Planning Commission August 4, 1993. Adopted by Yuba County Board of Supervisors September 21, 1993.

Yuba County. 1992b (November). *Draft Environmental Impact Report for the Plumas Lake Specific Plan.* State Clearinghouse #92072070. Marysville, CA. Prepared by OMNI-Means, Ltd., Roseville, CA.

Yuba County. 1993 (June). *Final Environmental Impact Report for the Plumas Lake Specific Plan.* State Clearinghouse #92072070. Marysville, CA. Prepared by OMNI-Means, Ltd., Roseville, CA.

Yuba County. 1994a (May). *Yuba County General Plan.* Volume I. Environmental Setting and Background. Department of Planning and Building Services. Marysville, CA. Prepared by QUAD Consultants, Sacramento, CA, in association with Brown-Buntin Associates, kdAnderson Transportation Engineers, and Youngdahl and Associates.

Yuba County. 1994b (May). *Draft Yuba County General Plan Environmental Impact Report.* State Clearinghouse #92112053. Yuba County Planning Department. Marysville, CA. Prepared by QUAD Consultants, Sacramento, CA.

Yuba County. 1996a. *Yuba County General Plan.* Volume II. Land Use, Circulation, Conservation and Open Space. Yuba County Planning Department. Marysville, CA. Prepared by QUAD Consultants, Sacramento, CA. Adopted December 10, 1996, by Yuba County Board of Supervisors.

Yuba County. 1996b (October). *Final Yuba County General Plan Environmental Impact Report.* State Clearinghouse #92112053. Yuba County Planning Department. Marysville, CA. Prepared by QUAD Consultants, Sacramento, CA.

CHAPTER 8, "ALTERNATIVES"

Kleinfelder, Inc. 2006 (February 20). *Problem Identification Report, TRLIA Phase 4 Feather River and Yuba River Left Bank Levees, Reclamation District No. 784.* Sacramento, CA.

MBK Engineers. 2006 (February 20). *Three Rivers Levee Improvement Authority Phase IV Erosion Investigation.* Sacramento, CA.

Yuba County Water Agency. 2002 (August). *Alternatives Analysis Report for the Yuba-Feather Supplemental Flood Control Project*. Prepared by Yuba-Feather Flood Control Study Team. Marysville, CA.

Yuba County Water Agency. 2003 (October). *Draft Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project.* Marysville, CA. State Clearinghouse #2001072062. Prepared by EDAW, Jones & Stokes, and Flood Control Study Team.

CHAPTER 9, "CONSULTATION AND COORDINATION"

Yuba County Water Agency. 2003 (October). *Draft Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project.* State Clearinghouse #2001072062. Marysville, CA. Prepared by EDAW, Jones & Stokes, and Flood Control Study Team.

Yuba County Water Agency. 2004 (March). *Final Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project.* State Clearinghouse #2001072062. Marysville, CA. Prepared by EDAW, Jones & Stokes, and Flood Control Study Team.

CHAPTER 11 PREPARERS OF THE ENVIRONMENTAL DOCUMENT

This environmental impact report (EIR) was prepared by EDAW in cooperation with the other members of the flood control study team. EDAW was responsible for project management and EIR preparation. The EIR technical team and other flood control study team members provided technical expertise, as presented below.

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Water Resources and River Geomorphology – Diane Wagner

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Cultural Resources – Richard Deis, Brian Ludwig

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Noise – Honey Walters, Heather Phillips

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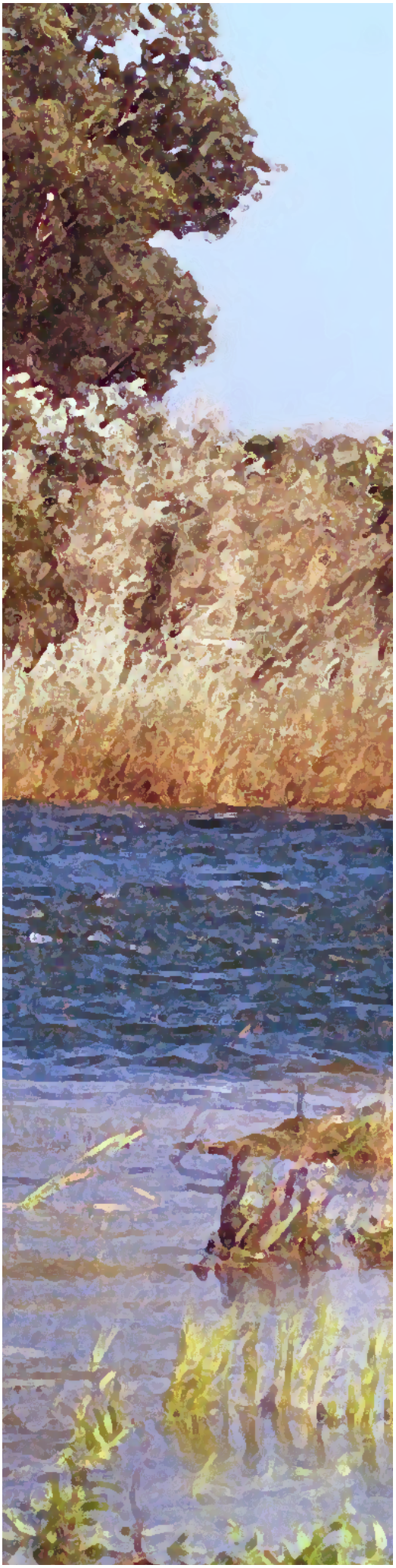

DRAFT ENVIRONMENTAL IMPACT REPORT

FOR THE FEATHER RIVER LEVEE REPAIR PROJECT

AN ELEMENT OF THE YUBA-FEATHER SUPPLEMENTAL FLOOD CONTROL PROJECT

VOLUME II: APPENDICES

STATE CLEARINGHOUSE NO. 2006062071

PREPARED FOR

THREE RIVERS LEVEE IMPROVEMENT AUTHORITY

PREPARED BY

EDAW
FLOOD CONTROL STUDY TEAM

August 2006

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APPENDIX A

Project Scoping

THREE RIVERS LEVEE IMPROVEMENT AUTHORITY

Notice of Preparation

To: Agencies and Interested Parties

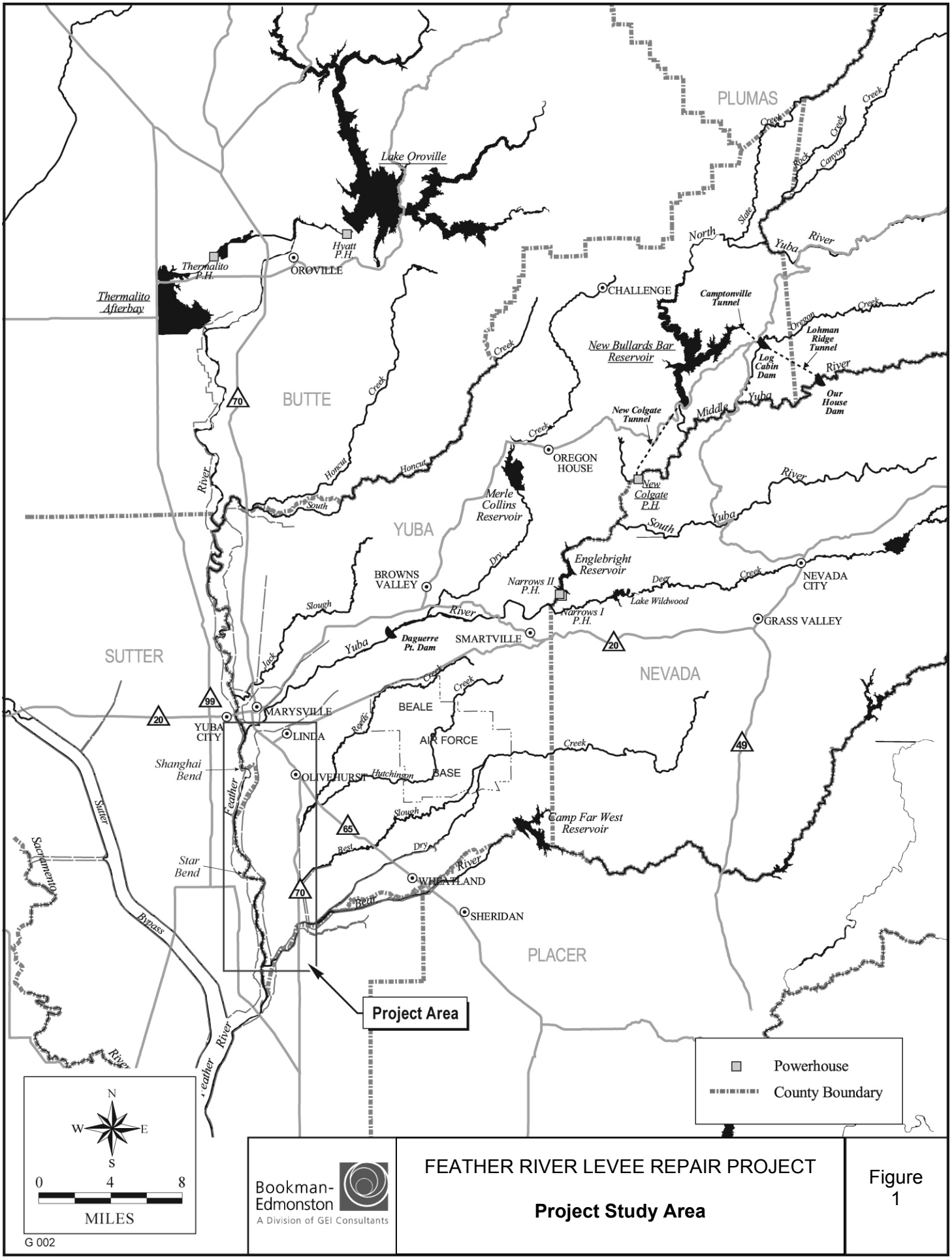
From: Paul Brunner, Executive Director, Three Rivers Levee Improvement Authority

Date: June 13, 2006

Subject: Notice of Preparation of a Draft Environmental Impact Report on the Feather River Levee Repair Project, and Announcement of a Public Scoping Meeting to be held on June 29, 2006, from 5:30 to 7:30 p.m. at the Yuba County Government Center, 915 Eighth Street, Marysville, CA 95901.

The Three Rivers Levee Improvement Authority (TRLIA) is proposing the Feather River Levee Repair Project (FRLRP), an element of the Yuba-Feather Supplemental Flood Control Project (Y-FSFCP), to increase flood protection in the Reclamation District (RD) 784 area of Yuba County. RD 784 is bounded by the Yuba River on the north, the Feather River on the west, the Bear River on the south, and the Western Pacific Interceptor Canal (WPIC) on the east. The project would address identified deficiencies in the Feather River levee, and would make related improvements to the Yuba River levee near its confluence with the Feather River. It would entail strengthening the existing Feather River left (east) bank levee from Project Levee Mile (PLM) 13.3 to PLM 17.1 and from PLM 23.6 to PLM 26.1, and strengthening the existing Yuba River left (south) bank levee from the confluence with the Feather River (PLM 0.0) upstream to PLM 0.3. (Note: References to the “left” bank indicate the left side of the river when facing downstream.) The segment of the Feather River left bank levee between PLM 17.1 and PLM 23.6 would be either strengthened in its current location or set back following one of two possible alignment scenarios.

Constructing a setback levee a sufficient distance from the existing levee would remove current channel constrictions in the Feather River, thereby improving the level of flood protection for the RD 784 area and for the Marysville and Yuba City areas by lowering upstream water surface elevations. If a levee setback option is selected, land uses in the setback area could consist of agricultural operations and/or habitat restoration activities that would not impede the flood flow function of the setback area. Figure 1 shows the general study area for the project in a regional context. Figure 2 shows the extent of the project site. The project is described in more detail in “Overview of the Proposed Feather River Levee Repair Project” below.



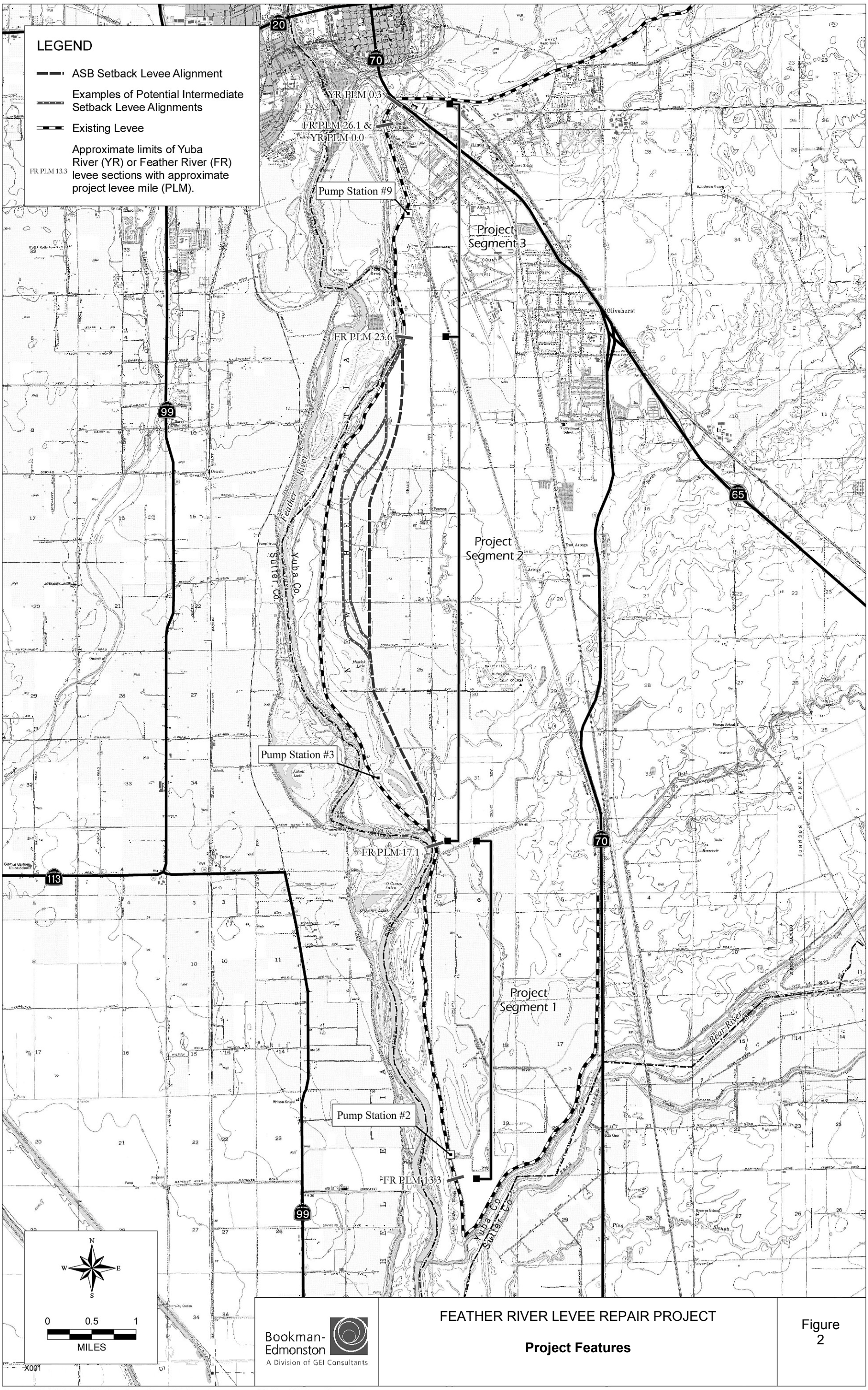
Bookman-Edmonston
A Division of GEI Consultants

FEATHER RIVER LEVEE REPAIR PROJECT

Project Study Area

Figure 1

Source: Yuba County Water Agency 2001



FEATHER RIVER LEVEE REPAIR PROJECT

Project Features

Figure 2

Sources: EDAW 2004; GEI Consultants, Inc. 2004; Topo basemap provided by GEI Consultants, Inc.

Purpose of the Notice of Preparation

The California Environmental Quality Act (CEQA) specifies that a public agency must prepare an environmental impact report (EIR) on any project that it proposes to carry out or approve that may have a significant direct or indirect impact on the environment (Public Resources Code Section 21100[a]). TRLIA has determined that the FRLRP may have significant impacts on the environment. Therefore, TRLIA, as the lead agency for CEQA compliance, intends to prepare an EIR on the proposed project and has prepared this notice of preparation (NOP) as an initial step in the CEQA process.

The purpose of this notice is twofold:

1. to solicit input, by July 14, 2006, from interested agencies, organizations, and individuals about the content and scope of the draft EIR (DEIR) to be prepared for the proposed project; and

2. to announce a public scoping meeting on the proposed project, to be held from 5:30 to 7:30 p.m. on Thursday June 29, 2006, at the Yuba County Government Center, 915 Eighth Street, Marysville, CA 95901.

Purpose of and Need for the Feather River Levee Repair Project

Background

Yuba County has a long history of flooding. Floods in the Central Valley in 1986 and again in 1997 were catastrophic for Yuba County, inundating tens of thousands of acres, destroying thousands of homes and businesses, and causing loss of life. Two major flood protection efforts resulted from the 1986 Central Valley floods. First, the U.S. Army Corps of Engineers (Corps) and California Department of Water Resources (DWR) initiated the System Evaluation Project, which restored federally constructed levees in RD 784 to current design standards and reestablished the 1957 design top-of-levee profile. Most of the System Evaluation levee reconstruction work in RD 784 was completed in 1998. (Note that the 1997 floods resulted in the identification of additional levee seepage problems, which led to the Corps's System Evaluation Site 7 Extension project.)

The second effort was Yuba County Water Agency's (YCWA's) initiation in 1988 of the Yuba Basin Project, which led to a Corps project designed to achieve what was then considered to be a "200-year" level of protection for RD 784 levees. The Yuba Basin

Project was approved by Congress in 1998, and a construction start was authorized in 2002. In 2003, however, new Corps underseepage guidelines led to reevaluation of the project, which substantially increased the estimated cost. Because of this cost increase, the Yuba Basin Project must be reauthorized by Congress. A General Reevaluation Report is currently being prepared to obtain a new project authorization and to initiate construction.

Ongoing Local Agency Efforts

In response to the catastrophic flood of 1997, YCWA initiated a seven-phase program of flood control studies to identify methods to achieve a higher level of protection, particularly for the areas in RD 784 that had been subject to flooding several times in the past. The goal of this effort was to substantially improve the flood protection that would be provided by the System Evaluation Project and the Yuba Basin Project.

Following the passage of the Costa-Machado Water Act (Proposition 13) by California voters in 2000, YCWA's flood control study team turned the focus of its seven-phase program of studies to those measures that could be achieved within the budget provisions of Proposition 13, which provided for a total of $90 million in bond funds targeted for the Yuba-Feather River basin. This effort, funded through Proposition 13 grant monies, is the Y-FSFCP. As part of the Y-FSFCP studies, YCWA prepared a feasibility study, including a DEIR (released in October 2003). The feasibility study and EIR evaluated combinations of three flood control elements: an outlet capacity increase at New Bullards Bar Reservoir, forecast-coordinated operations of New Bullards Bar Reservoir and Lake Oroville, and a setback of the left bank levee of the Feather River between Shanghai Bend and the Bear River. The levee setback was proposed for two segments, which were referred to as the Above Star Bend and Below Star Bend levee setback areas. (The Y-FSFCP Above Star Bend levee setback area generally corresponds to the area considered for a levee setback as part of the FRLRP [i.e., the proposed project described in this NOP]). The final EIR for the Y-FSFCP was certified and the program of elements was approved by the YCWA Board in March 2004.

In May 2003, while YCWA was completing the first level of Y-FSFCP studies, the Corps, in a separate draft floodplain mapping study for DWR on the Feather River and its tributaries, identified several deficiencies in freeboard on the Bear River and WPIC levees that prevent these levees from meeting the Federal Emergency Management Agency (FEMA) criteria for providing protection for RD 784 from a "100-year" flood event. This information was unexpected by Yuba County officials because the 1998 Corps Yuba Basin study did not recommend any work for the WPIC and Bear River levees to achieve a 200-year level of protection for the RD 784 area. In addition, it was found that a 2,800-foot stretch of the Yuba River levee on the upstream side of State Route (SR) 70 did not meet slope stability requirements.

In 1993, following the initiation of the System Evaluation Project and the Yuba Basin Project, and before the most recent devastating flood (in 1997), Yuba County approved the Plumas Lake Specific Plan, which provides for a 12,000-home development on

5,200 acres in the southern portion of the RD 784 area. Development was initiated in the Plumas Lake Specific Plan area in 2002. The results of the 2003 Corps floodplain mapping study indicate that people and property in the RD 784 area, including homes that had already been built in the Plumas Lake Specific Plan area before the release of the Corps study, are subject to a much higher flood risk than previously believed.

Consequently, YCWA, RD 784, and Yuba County, in consultation with landowners and developers in the south county, elected to move aggressively on a program for improving flood control for the RD 784 area. One step was the formation of TRLIA, a joint powers authority composed of Yuba County and RD 784 focused on addressing funding and implementation of levee repairs for the RD 784 area. Based on the results of studies completed by RD 784, TRLIA, and others, the improvement program was planned to be implemented in four phases. Priority was given to implementing improvements to the Yuba River levee above SR 70 (Phase 1); improvements to the upper Bear River and WPIC levees, modifications of RD 784 Pump Station No. 6, and construction of the Olivehurst Detention Basin (Phase 2); and construction of a setback levee along the lower Bear River, tying into the Feather River levee just below Clark Slough (Phase 3). These projects are all either completed or under way. The Bear River levee setback precludes the need to improve the Feather River levee below Pump Station No. 2.

The project that is the subject of this NOP, the FRLRP, consists of repairs to the Feather River levee and a small portion of the Yuba River levee near the confluence with the Feather River, from approximately Pump Station No. 2 to the railroad crossing just west of SR 70 (approximately Feather River PLM 13.3 to PLM 26.1 and Yuba River PLM 0.0 to PLM 0.3). An alternative approach to improving the existing levee segment from Feather River Levee PLM 17.1 to PLM 23.6 is a levee setback, which would be a modification of the Above Star Bend segment of the Feather River levee setback that was previously proposed and evaluated in the Y-FSFCP EIR.

Overview of the Proposed Feather River Levee Repair Project

Project Location

The project site is in Yuba County. The site consists of portions of the left (east) bank levee of the Feather River, the left (south) bank levee of the Yuba River, and adjacent lands in the RD 784 area. As shown in Figure 2, the project site extends along the Feather River from PLM 13.3 in the south to PLM 26.1 in the north. Along the Yuba River, the project site extends from PLM 0.0 (which corresponds to PLM 26.1 on the Feather River) north to PLM 0.3. The project site is divided into three segments, with the middle segment, project Segment 2, considered for either improvements to the existing levee or a potential setback levee. Setback levee alignments being considered are shown in Figure 2

and are described in more detail below. Existing land uses in the project area include agriculture, rural residential, and residential.

Project Purpose

The primary purpose of the proposed project is to correct deficiencies in the Feather and Yuba River left bank levees, and consequently to improve flood protection for the RD 784 area of Yuba County. To a large extent, levee deficiencies in the project area relate to the potential for water to seep under (underseepage) and through (through-seepage) the levee soils during flood events, potentially leading to levee failures. The project design objectives focus on measures to bring the levees into compliance with FEMA geotechnical certification requirements for underseepage or through-seepage, as well as engineering and design standards of the State of California Reclamation Board (The Reclamation Board) and the Corps. The proposed project is also intended to address areas along the Feather River levee where erosion of the levee is a concern.

Summary Description of the Proposed Project

Three project alternatives are being considered to meet the objectives of correcting underseepage, through-seepage, and erosion concerns identified along the Feather River and Yuba River levees. Under all project alternatives, it is anticipated that the detailed design of proposed activities in project Segments 1 and 3 (see Figure 2) would be completed in 2006 and construction would take place in 2007. For activities in project Segment 2, detailed design would occur in late 2006 and through 2007, and construction would take place in 2008.

Alternative 1 – The Levee Strengthening Alternative

Under this alternative, levee repair and strengthening activities would be completed along the existing Feather River left bank levee from PLM 13.3 to PLM 26.1 and along the Yuba River left bank levee from PLM 0.0 to PLM 0.3 (Figure 2). Levee repairs/ strengthening would consist of various activities, including installation of cutoff walls and relief wells and placement of buried cobble in areas where erosion of the levee embankment has been identified as a problem. Note that areas where erosion is a concern are all located in project Segment 2, between PLM 17.1 and PLM 23.6 (Figure 2). In addition, the existing Pump Station No. 3 would be removed and a new pump station would be constructed farther to the east (farther from the existing levee) to correct existing seepage deficiencies related to the existing pump station location. The capacity of Pump Station No. 3 may also need to be increased to accommodate flows from operation of new relief wells installed during levee repairs.

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative

Under this alternative, levee repair and strengthening activities would be completed along the existing Feather River left bank levee from PLM 13.3 to PLM 17.1 and PLM 23.6 to PLM 26.1 and along the Yuba River left bank levee from PLM 0.0 to PLM 0.3 (project

Segments 1 and 3 shown in Figure 2). Levee repair and strengthening activities along these segments would be the same as for Alternative 1. From PLM 17.1 to PLM 23.6 on the Feather River left bank (project Segment 2 in Figure 2), a setback levee would be constructed roughly following the Above Star Bend (ASB) setback levee alignment identified in the Y-FSFCP EIR. Portions of the existing levee along the setback alignment would be removed to allow water to flow into the new floodway/setback area (i.e., the area between the existing levee and the setback levee) during high river stages.

The ASB setback levee alignment considered for this project would be approximately 5.7 miles (roughly 30,000 feet) long. The setback levee height would typically range from 20 to 30 feet above existing ground, with an average height of about 25 feet. The levee would average about 170 feet wide at its base and would cover a total of roughly 120 acres. In addition, a 50-foot-wide access corridor would be maintained along the toe of both sides of the setback levee. Approximately 2.7 million cubic yards of borrow material would be required to construct the setback levee. Borrow material could potentially come from lands on either side of the setback levee alignment and/or from the existing levee embankment.

Because of unfavorable soil conditions, various seepage control measures are anticipated to be needed for the setback levee. These could include zoned embankments, slurry cutoff walls, seepage berms, and relief wells. In addition, local surface drainage patterns would be changed by the setback levee on the land side (i.e., east side) of the levee, necessitating the creation of one or more detention basins to prevent adverse flooding effects on nearby properties. Pump Station No. 3 would need to be moved from its existing location to the land side of the setback levee. The capacity of Pump Station No. 3 may also need to be increased to accommodate flows from the operation of new relief wells installed as part of the project.

Approximately 1,600 acres of land would become part of the new floodway/setback area. This area contains several residences and approximately 30 other structures that would need to be removed. Removal or protection of utilities and wells in the levee setback area would also be required. Appropriate compensation would be negotiated with landowners affected by the setback levee footprint, the access corridor along the levee toe, and the expansion of the Feather River floodway.

Land uses in the levee setback area could consist of agricultural operations and/or habitat restoration activities that would not impede the flood flow function of the setback area. There are no specific plans for habitat restoration in the levee setback area at this time, although this is considered a potential future use. Lands in the floodway would be contoured and managed to prevent fish stranding after high flows recede.

Construction of the setback levee would correct underseepage, through-seepage, and erosion deficiencies in the existing levee by providing a replacement levee that meets design requirements of FEMA, The Reclamation Board, and the Corps. In addition, the setback levee would provide increased flood storage capacity in the levee setback area and would remove an existing narrow area in the levee system. Both of these changes

would result in a reduction in Feather River and Yuba River flood stages upstream of the setback area.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative

FRLRP Alternative 3 is the same as Alternative 2 except for modifications to a portion of the setback levee alignment. The same levee repair and strengthening activities described previously would be completed along the existing Feather River left bank levee from PLM 13.3 to PLM 17.1 and from PLM 23.6 to PLM 26.1, and along the Yuba River left bank levee from PLM 0.0 to PLM 0.3 (project Segments 1 and 3 shown in Figure 2). From PLM 17.1 to PLM 23.6 on the Feather River left bank (project Segment 2 in Figure 2) a setback levee would be constructed. The southern one-third of this setback levee alignment would follow the ASB setback levee alignment identified in Alternative 2. However, in the vicinity of Anderson Avenue, the setback levee alignment would shift west several hundred feet. This westward shift in the intermediate setback levee alignment would allow less overall land to be placed in the new floodway and would reduce the number of houses, structures, and other facilities that would be affected by levee construction or would need to be removed from the floodway.

For the portion of the intermediate setback levee that deviates from the ASB setback levee alignment, a specific route has not yet been confirmed and several options are currently being considered. Figure 2 shows two examples of potential intermediate setback levee routes. Considerations for final route selection include the suitability of underlying soil conditions for levee construction and the extent of flood control benefits as the setback levee is moved westward (i.e., less widening of the Feather River high-water channel would result in fewer flood control benefits).

The intermediate setback levee alignment would be approximately 5.5 miles (roughly 29,000 feet) long. The setback levee height would typically range from 20 to 30 feet above existing ground, with an average height of about 25 feet. The levee would average about 170 feet wide at its base and would cover a total of roughly 110 acres. Approximately 2.6 million cubic yards of borrow material would be required to construct the setback levee.

Most of the design, construction, and operational characteristics of the ASB setback levee described for Alternative 2 would also apply to the intermediate setback levee under Alternative 3, including the following:

- A 50-foot-wide access corridor would be maintained along the toe of both sides of the setback levee.
- Borrow material could potentially come from lands on either side of the setback levee alignment, or from the existing levee embankment.
- Because of unfavorable soil conditions, various seepage control measures are anticipated to be needed for the setback levee that could include zoned embankments, slurry cutoff walls, seepage berms, and relief wells.

- Local land side drainage patterns would be changed by the setback levee, necessitating the creation of detention basin(s) to prevent adverse flooding effects on nearby properties.
- Pump Station No. 3 would need to be relocated to the east side of the setback levee.
- The capacity of Pump Station No. 3 may need to be increased to accommodate flows from the operation of new relief wells installed as part of the project.
- Land uses in the levee setback area could consist of agricultural operations and/or habitat restoration activities that would not impede the flood flow function of the setback area. (There are no specific plans for habitat restoration in the setback area at this time, although this is considered a potential future use.)
- Lands in the floodway would be contoured and managed to prevent fish stranding after high flows recede.

Approximately 1,300 acres of land would become part of the new floodway/setback area. This area contains several residences (although somewhat fewer residences than under Alternative 2) and approximately 30 other structures that would need to be removed. Removal or protection of utilities and wells in the levee setback area would also be required. Appropriate compensation would be negotiated with landowners affected by the setback levee footprint, the access corridor along the levee toe, and the expansion of the Feather River floodway.

Type of EIR

The FRLRP EIR is a project EIR. The Y-FSFCP EIR evaluated the environmental effects of an ASB setback levee similar to the levee setback considered under Alternatives 2 and 3 of the FRLRP. Therefore, much of the information in the Y-FSFCP EIR is applicable to the FRLRP impact analysis, and the appropriate portions of the Y-FSFCP EIR will be incorporated by reference into the FRLRP EIR.

Issues to Be Addressed in the EIR

The FRLRP EIR will describe the adverse and beneficial environmental effects of implementing the proposed project. The document will also evaluate any indirect effects of the proposed project, such as potential growth-inducing effects, and the cumulative effects of implementing the proposed project in conjunction with other related past, present, and reasonably foreseeable future projects. All three project alternatives described above will be analyzed at an equal level of detail in the FRLRP EIR.

The EIR will also evaluate a No Project Alternative. In addition, the EIR will describe the alternatives selection process and discuss other alternatives considered but not carried forward for detailed analysis.

On the basis of preliminary consideration of the project, TRLIA has determined that one or more of the proposed project alternatives could result in significant and potentially significant environmental impacts in the following resource areas:

- Land Use (including agriculture)
- Geology and Soils
- Water Resources and Geomorphology
- Fisheries
- Terrestrial Biological Resources
- Recreation
- Aesthetic Resources
- Cultural Resources
- Air Quality
- Noise
- Transportation and Circulation
- Public Services, Utilities, and Service Systems
- Paleontological Resources

On the basis of the preliminary consideration of the project elements, no environmental impacts are anticipated for the following resource areas: Mineral Resources and Population and Housing. There are no known mineral resources in the project area, and the project would not directly result in substantial population growth or create the need for a substantial amount of new housing. Therefore, these topics will not be analyzed in detail in the EIR. However, as described above, the EIR will include analysis of various additional topics required by CEQA, such as cumulative impacts and growth-inducing effects.

Project Scoping and Agency Roles/Responsibilities

Project Scoping

Scoping is an important initial component of the CEQA review process for the proposed project. Scoping will help to identify the final range of project actions, site design options, impact mechanisms considered, mitigation measures, and other elements of the EIR review. The scoping process may also help eliminate from detailed study those issues that are not critical to the decision at hand. It is also an effective way to bring together and resolve the concerns of interested federal, state, and local agencies; specific stakeholder groups; and the general public.

Role of TRLIA

As the lead agency under CEQA for the FRLRP EIR, TRLIA will continue to coordinate with responsible and trustee agencies (as defined by CEQA), relevant federal agencies, and other interested parties. TRLIA will be principally responsible for conducting the environmental review process, including scoping, preparing appropriate environmental documentation, deciding whether to certify the EIR, and selecting and approving a preferred alternative. If the project moves forward, TRLIA would coordinate with the Corps, DWR, and The Reclamation Board to implement the project.

Other Agency Roles

The following other public agencies may have jurisdiction over elements of the FRLRP or have responsibility for resources that could be affected by the project:

- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- National Marine Fisheries Service
- California Department of Water Resources
- The Reclamation Board
- California Department of Fish and Game (Region 2)
- California Environmental Protection Agency
- Central Valley Regional Water Quality Control Board (Region 5)
- California State Lands Commission
- California State Office of Historic Preservation
- California Department of Transportation
- Yuba County
- Yuba County Water Agency
- Reclamation District 784
- Feather River Air Quality Management District

Compliance with the National Environmental Policy Act (NEPA) is also necessary when there is federal participation in a project; a federal discretionary permit, entitlement, authorization, or federal funding is required; or the project would occur on federal lands. Because the proposed project involves the modification of federal levees, it is expected to involve some level federal permitting, authorizations, and/or funding. Project elements are also expected to require Corps permitting under Section 404 of the Clean Water Act. The project is therefore expected to require NEPA compliance. NEPA compliance would be undertaken separately from the CEQA review process.

Scoping Meeting

A public scoping meeting for the proposed Feather River Levee Repair Project will be held from 5:30 to 7:30 p.m. on Thursday, June 29, 2006, at at the Yuba County Government Center, 915 Eighth Street, Marysville, CA 95901.

The objectives of the meeting will be to:

- brief interested parties on the current status of flood control studies and flood control projects that have been completed or are under way,

- provide background information on the proposed Feather River Levee Repair Project and the alternatives being considered, and

- obtain the views of agency representatives and the public on the scope and content of the proposed EIR.

An informational presentation will be held in conjunction with the scoping meeting. This presentation will provide updates on the various flood control projects being undertaken

by TRLIA and will offer an opportunity to ask questions on projects other than the FRLRP.

The scoping meeting will be accessible to persons with disabilities. Individuals needing special services will be accommodated to the fullest extent possible. For more information, contact Danielle Wilson at (916) 737-3000 (e-mail dwilson@jsanet.com) at least 48 hours prior to the meeting.

Providing Comments on the NOP

Interested parties are invited to provide comments in response to this NOP at the scoping meeting described above and may also provide TRLIA with written comments. Because of time limits mandated by state law, written comments should be provided to TRLIA no later than 5:00 p.m. on July 14, 2006. Agencies that will need to use the EIR when considering permits or other approvals for the proposed project should provide TRLIA with the name of the staff contact person. Please send all written comments to:

Paul Brunner
Attn: Three Rivers Levee Improvement Authority
Government Center
915 Eighth Street, Suite 115
Marysville, CA 95901-5273
Telephone: (530) 749-5679
Fax: (530) 749-7312

Document Details Report
State Clearinghouse Data Base

SCH# 2006062071
Project Title Feather River Levee Repair Project
Lead Agency Three Rivers Levee Improvement Authority

Type NOP Notice of Preparation

Description TRLIA is proposing the Feather River Levee Repair Project, an element of the Yuba-Feather Supplemental Flood Control Project, to increase flood protection in the Reclamation District (RD) 784 area of Yuba County. RD 784 is bounded by the Yuba River on the north, the Feather River on the west, the Bear River on the south, and the Western Pacific Interceptor Canal on the east. The project would address identified deficiencies in the Feather River levee, and would make related improvements to the Yuba River levee near its confluence with the Feather River. It would entail strengthening the existing Feather River left (east) bank levee from Project Levee Mile (PLM) 13.3 to PLM 17.1 and from PLM 23.6 to PLM 26.1, and strengthening the existing Yuba River left (south) bank levee from the confluence with the Feather River (PLM 0.0) upstream to PLM 0.3. The segment of the Feather River left bank levee between PLM 17.1 and PLM 23.6 would be either strengthened in its current location or set back following one of two possible alignment scenarios.

Lead Agency Contact

Name Paul Brunner
Agency Three Rivers Levee Improvement Authority
Phone (530) 749-5679 **Fax**
email
Address Government Center
915 8th Street, Suite 115
City Marysville **State** CA **Zip** 95901-5273

Project Location

County Yuba
City Marysville, Yuba City
Region
Cross Streets State Route 70 / Feather River Boulevard
Parcel No.
Township 13-15N **Range** 3E, 4E **Section** Multip **Base** MDBM

Proximity to:

Highways 70
Airports Yuba County Airport
Railways Western Pacific
Waterways Yuba and Feather Rivers
Schools Alicia Intermediate and Notre Dame HS
Land Use Valley Agriculture, Exclusive Agricultural

Project Issues Aesthetic/Visual; Agricultural Land; Air Quality; Archaeologic-Historic; Biological Resources; Cumulative Effects; Drainage/Absorption; Flood Plain/Flooding; Geologic/Seismic; Growth Inducing; Landuse; Noise; Public Services; Recreation/Parks; Soil Erosion/Compaction/Grading; Toxic/Hazardous; Traffic/Circulation; Vegetation; Water Quality; Wetland/Riparian; Wildlife

Reviewing Agencies Resources Agency; Regional Water Quality Control Bd., Region 5 (Sacramento); Department of Parks and Recreation; Native American Heritage Commission; Reclamation Board; Office of Historic Preservation; Department of Fish and Game, Region 2; Department of Water Resources; California Highway Patrol; Caltrans, District 3; State Lands Commission

Date Received 06/14/2006 **Start of Review** 06/14/2006 **End of Review** 07/13/2006

Note: Blanks in data fields result from insufficient information provided by lead agency.

NOP Distribution List

County: Yuba

SCH# 2006062071

Resources Agency

- ■ **Resources Agency**
  Nadell Gayou
- ☐ **Dept. of Boating & Waterways**
  David Johnson
- ☐ **California Coastal Commission**
  Elizabeth A. Fuchs
- ☐ **Colorado River Board**
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  Allen Robertson
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  Environmental Stewardship Section
- ■ **Reclamation Board**
  DeeDee Jones
- ☐ **S.F. Bay Conservation & Dev't. Comm.**
  Steve McAdam
- ■ **Dept. of Water Resources**
  Resources Agency
  Nadell Gayou
- ☐ _____
  Conservancy

Fish and Game

- ☐ **Depart. of Fish & Game**
  Scott Flint
  Environmental Services Division
- ☐ **Fish & Game Region 1**
  Donald Koch
- ■ **Fish & Game Region 2**
  Banky Curtis
- ☐ **Fish & Game Region 3**
  Robert Floerke
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  Julie Vance
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  Don Chadwick
  Habitat Conservation Program
- ☐ **Fish & Game Region 6**
  Gabrina Gatchel
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- ☐ **Fish & Game Region 6 I/M**
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  Inyo/Mono, Habitat Conservation Program
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  George Isaac
  Marine Region

Other Departments

- ☐ **Food & Agriculture**
  Steve Shaffer
  Dept. of Food and Agriculture
- ☐ **Depart. of General Services**
  Public School Construction
- ☐ **Dept. of General Services**
  Robert Sleppy
  Environmental Services Section
- ☐ **Dept. of Health Services**
  Veronica Malloy
  Dept. of Health/Drinking Water

Independent Commissions,Boards

- ☐ **Delta Protection Commission**
  Debby Eddy
- ☐ **Office of Emergency Services**
  Dennis Castrillo
- ☐ **Governor's Office of Planning & Research**
  State Clearinghouse
- ■ **Native American Heritage Comm.**
  Debbie Treadway
- ☐ **Public Utilities Commission**
  Ken Lewis
- ■ **State Lands Commission**
  Jean Sarino
- ☐ **Tahoe Regional Planning Agency (TRPA)**
  Cherry Jacques

Business, Trans & Housing

- ☐ **Caltrans - Division of Aeronautics**
  Sandy Hesnard
- ☐ **Caltrans - Planning**
  Terri Pencovic
- ■ **California Highway Patrol**
  Shirley Kelly
  Office of Special Projects
- ☐ **Housing & Community Development**
  Lisa Nichols
  Housing Policy Division

Dept. of Transportation

- ☐ **Caltrans, District 1**
  Rex Jackman
- ☐ **Caltrans, District 2**
  Marcelino Gonzalez
- ■ **Caltrans, District 3**
  Jeff Pulverman
- ☐ **Caltrans, District 4**
  Tim Sable
- ☐ **Caltrans, District 5**
  David Murray
- ☐ **Caltrans, District 6**
  Marc Birnbaum
- ☐ **Caltrans, District 7**
  Cheryl J. Powell
- ☐ **Caltrans, District 8**
  Dan Kopulsky
- ☐ **Caltrans, District 9**
  Gayle Rosander
- ☐ **Caltrans, District 10**
  Tom Dumas
- ☐ **Caltrans, District 11**
  Mario Orso
- ☐ **Caltrans, District 12**
  Bob Joseph

Cal EPA

Air Resources Board

- ☐ Airport Projects
  Jim Lerner
  - ☐ Transportation Projects
    Ravi Ramalingam
  - ☐ Industrial Projects
    Mike Tollstrup
- ☐ **California Integrated Waste Management Board**
  Sue O'Leary
- ☐ **State Water Resources Control Board**
  Jim Hockenberry
  Division of Financial Assistance
- ☐ **State Water Resources Control Board**
  Student Intern, 401 Water Quality Certification Unit
  Division of Water Quality
- ☐ **State Water Resouces Control Board**
  Steven Herrera
  Division of Water Rights
- ☐ **Dept. of Toxic Substances Control**
  CEQA Tracking Center
- ☐ **Department of Pesticide Regulation**

Regional Water Quality Control Board (RWQCB)

- ☐ **RWQCB 1**
  Cathleen Hudson
  North Coast Region (1)
- ☐ **RWQCB 2**
  Environmental Document Coordinator
  San Francisco Bay Region (2)
- ☐ **RWQCB 3**
  Central Coast Region (3)
- ☐ **RWQCB 4**
  Teresa Rodgers
  Los Angeles Region (4)
- ■ **RWQCB 5S**
  Central Valley Region (5)
  - ☐ **RWQCB 5F**
    Central Valley Region (5)
    Fresno Branch Office
  - ☐ **RWQCB 5R**
    Central Valley Region (5)
    Redding Branch Office
- ☐ **RWQCB 6**
  Lahontan Region (6)
  - ☐ **RWQCB 6V**
    Lahontan Region (6)
    Victorville Branch Office
- ☐ **RWQCB 7**
  Colorado River Basin Region (7)
- ☐ **RWQCB 8**
  Santa Ana Region (8)
- ☐ **RWQCB 9**
  San Diego Region (9)

☐ **Other** _____

Last Updated on 04/28/06

Sean / Brian

State of California - The Resources Agency
ARNOLD SCHWARZENEGGER, Governor

DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
Sacramento Valley - Central Sierra Region
1701 Nimbus Road, Suite A
Rancho Cordova, CA 95670
(916) 358-2900

June 27, 2006

RECEIVED
JUN 28 2006
DMINISTRATION

Mr. Paul Brunner
Executive Director
Three Rivers Levee Improvement Authority
Government Center
915 8th Street, Suite 115
Marysville, CA 95901-5273

Dear Mr. Brunner:

The Department of Fish and Game (DFG) has reviewed the Notice of Preparation (NOP) of a Draft Environmental Impact Report (DEIR) for the Feather River Levee Repair Project (SCH# 2006062071). The project proposes levee repair or construction as part of the Yuba-Feather Supplemental Flood Control Project along the southern portion of the Yuba River immediately to the south of the City of Marysville and along the east side of the Feather River to the confluence with the Bear River, Yuba County.

Significant natural resources of the plan area include agricultural lands, wetlands, riverine and riparian habitats, and the potential for associated listed and sensitive wildlife species.

The DFG is providing comments in response to the NOP under The California Environmental Quality Act (CEQA) as both a responsible and trustee agency. As trustee for the State's fish and wildlife resources, the DFG has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of such species. In that capacity, the DFG administers the California Endangered Species Act (CESA), the Native Plant Protection Act (NPPA), and other provisions of the California Fish and Game Code that affords protection to the State's fish and wildlife trust resources. The DFG recommends that the DEIR include discussion and evaluation of the following:

1. Analyze and discuss all reasonably foreseeable direct and indirect project-related impacts on biological resources due to project implementation. The analysis should focus, in particular, on the presence of and potential habitats for all state and federal listed species and species of concern and the evaluation of direct, indirect and cumulative project impacts to these

species and their respective habitat. Specifically address issues related to fish passage and fish stranding principally but not solely focused on listed species. This analysis should include discussion of adjacent habitats outside of the project area that support or could support listed species or species of concern and that may be impacted as a result of project implementation or other proposed or potential projects in Yuba or Sutter Counties.

2. Identify and discuss potentially feasible mitigation measures to address all reasonably foreseeable project-related impacts on biological resources. This must include identification of mitigation measures that minimize and fully mitigate all project impacts to state and federally listed species and species of concern. Analysis should include discussion of the ability to conserve natural resources onsite that may be achieved through project design and take avoidance measures and offsite mitigation obtained through acquisition of existing natural resources.

3. Identification of any offsite infrastructure improvements required as part of this project and evaluation of potential project impacts due to these activities. Subsequently, the DEIR should identify and analyze potentially feasible mitigation measures that avoid or substantially lessen, minimize, and fully mitigate all reasonably foreseeable direct and indirect impacts to biological resources.

4. Growth-inducing impacts due to the significantly enhanced flood protection provided by the proposed project. This would constitute land, not including the previously approved Plumas Lake Specific Plan area, which would be provided 200-year flood protection that is currently not afforded such protection.

5. We suggest the development of alternative development/design scenarios for the proposed project that will achieve most of the project objectives, and which will avoid or substantially lessen the project-related impacts on biological resources. The DFG believes such a potentially feasible alternative exists with respect to reduced impacts on biological resources generally and, in the alternative, at a minimum, that such potentially feasible alternative exists with respect to listed species and species of special concern. Accordingly, the DFG believes that such alternatives should comprise part of the reasonable range of alternatives addressed in the DEIR.

6. Specifically develop alternative designs that consider significant expansion of setback levees generally and, specifically, on both the Yuba and Sutter County sides of the Feather River. As noted in the NOP, setback levees can be used to gain flood capacity and provide land available for either agriculture or habitat restoration. We believe that setback levees can provide a necessary mitigation component that is and will be needed for habitat and agricultural impacts associated with current and potential future urban growth in the area.

7. In order to comply with Public Resources Code Section 21081.6, a detailed monitoring program must be developed for all mitigation conditions. The monitoring program should include the following:

   a. Specific criteria to measure the effectiveness of mitigation.

   b. Annual monitoring for a minimum of five years. Annual written reports submitted to the lead agency and the DFG's Sacramento Valley-Central Sierra Region.

   c. Annual monitoring reports, each of which includes corrective recommendations that shall be implemented in order to ensure that mitigation efforts are successful.

The project applicant is advised that Notification to the DFG is required, pursuant to Fish and Game Code Section 1600 et sec., for proposed projects that may:

- Divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake;
- Use material from a streambed; or
- Result in the disposal or deposition of debris, waste, or other material where it may pass into any river, stream, or lake.

The notification requirement applies to any work undertaken in or near a river, stream, or lake that flows at least intermittently through a bed or channel. This includes ephemeral streams and water courses.

Subsequent to notification, if the DFG determines that your proposed project or activity could have substantial adverse effects on fish or wildlife, a Lake or Streambed Alteration Agreement (LSAA) will be required. The resource protection conditions which

are made a part of the LSAA are subject to CEQA review and should be included in the environmental document prepared for your project. These conditions may include, but are not limited to, the following:

1. Protection and maintenance of the riparian, wetland, stream, or lake systems to ensure a "no-net-loss" of habitat value and acreage. Vegetation removal should not exceed the minimum necessary to complete operations.

2. Provisions for the protection of fish and wildlife resources at risk that consider various life stages, maintain migration and dispersal corridors, and protect essential breeding (i.e., spawning, nesting) habitats.

3. Delineation of buffers along streams and wetlands to provide adequate protection to the aquatic resource. No grading or construction activities should be allowed within these buffers.

4. Placement of construction materials, spoils, or fill so that they cannot be washed into a stream or lake.

5. Prevention of downstream sedimentation and pollution. Provisions may include but not be limited to oil/grit separators, detention ponds, buffering filter strips, silt barriers, etc., to prevent downstream sedimentation and pollution.

6. Restoration plans must include performance standards such as the types of vegetation to be used, the timing of implementation, and contingency plans if the replanting is not successful. Restoration of disturbed areas should utilize native vegetation.

Early notification to the DFG is recommended in order to determine the need for a LSAA. Specific conditions in the LSAA may include site-specific conditions for construction activities and timing. Any work subject to the LSAA may not be initiated until certification of the CEQA document and payment of the appropriate fees. Obtaining a LSAA does not satisfy the requirements of either the State or Federal Endangered Species Act. Please contact the Sacramento Valley-Central Sierra Region for a notification packet and fee schedule by calling (916) 358-2932.

Thank you for the opportunity to review this project. If we can be of further assistance, please contact Mr. Jeff Finn, Environmental Scientist, at (530) 477-0308 or Mr. Kent Smith, Acting Assistant Regional Manager, at (916) 358-2382.

Sincerely,

Sandra Morey
Regional Manager

cc: Mr. Kent Smith
Mr. John Nelson
Mr. Jeff Finn
Sacramento Valley-Central Sierra Region 2
1701 Nimbus Road, Suite A
Rancho Cordova, CA 95670

STATE OF CALIFORNIA

Governor's Office of Planning and Research

State Clearinghouse and Planning Unit

Arnold Schwarzenegger
Governor

Sean Walsh
Director

RECEIVED

JUN 19 2006

ADMINISTRATION

Notice of Preparation

June 14, 2006

To: Reviewing Agencies

Re: Feather River Levee Repair Project
SCH# 2006062071

Attached for your review and comment is the Notice of Preparation (NOP) for the Feather River Levee Repair Project draft Environmental Impact Report (EIR).

Responsible agencies must transmit their comments on the scope and content of the NOP, focusing on specific information related to their own statutory responsibility, within 30 days of receipt of the NOP from the Lead Agency. This is a courtesy notice provided by the State Clearinghouse with a reminder for you to comment in a timely manner. We encourage other agencies to also respond to this notice and express their concerns early in the environmental review process.

Please direct your comments to:

Paul Brunner
Three Rivers Levee Improvement Authority
Government Center
915 8th Street, Suite 115
Marysville, CA 95901-5273

with a copy to the State Clearinghouse in the Office of Planning and Research. Please refer to the SCH number noted above in all correspondence concerning this project.

If you have any questions about the environmental document review process, please call the State Clearinghouse at (916) 445-0613.

Sincerely,

Scott Morgan
Project Analyst, State Clearinghouse

Attachments
cc: Lead Agency

1400 TENTH STREET P.O. BOX 3044 SACRAMENTO, CALIFORNIA 95812-3044
TEL (916) 445-0613 FAX (916) 323-3018 www.opr.ca.gov

DEPARTMENT OF TRANSPORTATION
DISTRICT 3
703 B STREET
P. O. BOX 911
MARYSVILLE, CA 95901-0911
PHONE (530) 741-4025
FAX (530) 741-4825
TTY (530) 741-4509

RECEIVED
JUL 13 2006
DMINISTRATION

Flex your power!
Be energy efficient!

July 10, 2006

06YUB0032
03YUB70/PM 00.00 –02.00
NOP SCH #2006062071
Feather River Levee Improvement

Paul Brunner
Three Rivers Levee Improvement Authority
915 8th Street, Ste. 115
Marysville, CA 95901-5273

Dear Mr. Brunner:

Thank you for the opportunity to review and comment on the Notice of Preparation of a Draft Environmental Impact Report (DEIR) for the above mentioned project. The project proposes to increase flood protection in the Reclamation District (RD) 784 area of Yuba County. RD 784 is bounded by the Yuba River on the north, the Feather River on the west, the Bear River on the south, and the Western Pacific Interceptor Canal on the east. The project would address identified deficiencies in the Feather River levee, and would make related improvements to the Yuba River levee near its confluence with the Feather River. Our comments are as follows:

A project of this size is expected to have traffic impacts to the State Highway adjacent to the project. What nearby access points to State Route (SR) 70 will be impacted during construction? How much extra traffic will be generated during construction? What is the construction schedule?

Pages 8 and 9 of the Notice of Preparation mentions that approximately 2.6 – 2.7 million cubic yards of borrow will be required for Alternatives 2 and 3. Will any of this borrow be located off the project site? If so, what is the suggested truck route?

Caltrans should be included in the coordination of truck routes. In addition, Caltrans should also be included in the development of any traffic management plan that may be necessary where state facilities are involved.

The DEIR should discuss the mitigation measures that will be used for all impacts to the State Facility.

If you have questions or need additional information, please contact Susan Zanchi, Yuba and Sutter Counties IGR Coordinator, at (530) 741-4199 or e-mail at Susan_Zanchi@dot.ca.gov.

Sincerely,

WILLIAM A. DAVIS, Chief
Office of Planning - North
cc: Scott Morgan, State Clearinghouse

OFFICE OF THOMAS W. ERES
ATTORNEY AT LAW
4030 Winding Creek Road
Sacramento, CA 95864
Telephone 916.482.4021
Fax No. 916.488.5950

FAX COVER SHEET

FAX NUMBER TRANSMITTED TO: (530) 749-7312

To: Paul Brunner
Of: TRLIA
From: OFFICE OF THOMAS W. ERES
Client/Matter:
Date: July 14, 2006

(4 Pages including cover sheet)

Paul,
Attached comments for NOP for DEIR-FRLRP.
Thanks,
Tom

The information contained in this facsimile message is information protected by attorney-client and/or the attorney/work product privilege. It is intended only for the use of the individual named above and the privileges are not waived by virtue of this having been sent by facsimile. If the person actually receiving this facsimile or any other reader of the facsimile is not the named recipient or the employee or agent responsible to deliver it to the named recipient, any use, dissemination, distribution, or copying of the communication is strictly prohibited. If you have received this communication in error, please immediately notify us by telephone and return the original message to us at the above address via U.S. Postal Service.

OFFICE OF THOMAS W. ERES
ATTORNEY AT LAW
4030 Winding Creek Road
Sacramento, CA 95864
Telephone 916-482-4021
Fax No. 916-488-5950

Via Facsimile: (530) 749-7312

July 14, 2006

Paul Brunner
ATTN: Three Rivers Levee
Improvement Authority
Government Center
915 Eighth Street, Suite 115
Marysville, CA 95901-5273

RE: Comments – NOP
Content and Scope
DEIR – FRLRP

Dear Mr. Brunner:

I represent Hofman Ranch, a California general partnership, Emma Hofman and Frances Hofman. The following comments are offered with respect to the content and scope of the DEIR-FRLRP, as described in the NOP dated June 13, 2006:

- Page 4, BACKGROUND. Indeed, Yuba County has a long history of flooding. The discussion of history should note how significant these flood events were dated back to at least the 1930's (less than 100 years ago!). This broader view will enhance an understanding of the nature of the events and the risks that need to be addressed.

- Page 5, ON-GOING LOCAL AGENCY EFFORTS. This Section should be re-named ON-GOING FEDERAL, STATE, LOCAL AND PRIVATE EFFORTS. It needs to be understood that flood risk, drainage and design, construction, operation and maintenance of flood works is part of an intergovernmental and intragovernmental responsibility to protect the health, safely, and welfare of the people. Consequently, no flood protection project can be viewed nor undertaken in isolation. Flood protection in this region is complex and inextricably interwoven. The FRLRP must be placed in this broader context so that it can be viewed as a component of a huge system. Its impacts must be viewed in a statewide, regional, areawide and local context. Intended, as well as unintended consequences must be understood and evaluated.

- REPAIR/MODIFY. The repair of one side of the Feather River and Yuba River levees impact the other side of the levee. Terms like repair, strengthen, alter, modify, reconstruct (e.g. set-back levee) need to be analyzed with respect to upstream, downstream, surge, peak flow, emergencies (e.g. dam failure or seismic events).

- RE-EVALUATION. The current project to construct a substantial set-back levee on the Bear River needs to be re-addressed in connection with a flood system, not just to validate whether its completion precludes the need to improve a larger portion of FRLRP.

- CONTENT AND SCOPE. TRLIA has been requested on numerous occasions to locate and make available to the public, the source documents that created the initial Sacramento River Flood Control Project, dating back to the California Debris Commission, Sacramento and San Joaquin Drainage District, and the plans, specifications and studies of flood and flood control issues affecting Yuba County, including the Bear River Levee System, Western Pacific Interceptor Canal, Best Slough, Reeds Creek, Hutchison Creek, and other human-made alterations to the natural flow and drainage of the basins in and around Yuba County. Without this historical and factual grounding, it is not possible to provide meaningful public input on the FRLRP.

- PATCHWORK AND PIECEMEAL. The content and scope of the DEIR, once the source documents have been made public, will allow for a broader and more comprehensive understanding of whether the FRLRP is a patchwork or piecemeal approach to addressing a much greater threat and risk to health, safety and welfare. New knowledge of levee vulnerability (e.g. underseepage) as well as post Katrine-New Orleans experiences are challenging the old comfortable analysis of levees that has resulted in recycling old paradigms. FEMA and the U.S. Army Corps of Engineers have the unenviable task to alerting local entities, such as TRLIA, that such things as channel capacity (e.g. CFS, peak flow duration, weight of water, storm surge, global warming, stress failure, and overtopping) are the real world, and micro projects may not provide the flood protection promised to the public.

- OVERRELIANCE ON COMPUTER MODELING. The assumptions programmed into the analysis of the impacts of these alternatives of the FRLRP will dictate the perception of environmental impact. The CEQA process must be integrated with the NEPA process in one document in order to effectively integrate all federal, state, and local agencies, as well as private interests. It is imperative that a thorough "calibrating" session be undertaken with, at a minimum, the entities identified at Pages 11 and 12, at the front end of the review process, to assure best available factual information and assumptions are synthesized before embarking on a path of environmental

review. Comment to a source document as a responder is not as helpful as collaboration with shared responsibility.

- WHEN THE FLOOD EVENT OCCURS. It is not a question of if, but rather when the flood event will occur. It is important that the scope and content of the DEIR inform the public and decision-makers that the FRLRP will only provide a limited amount of protection for a limited amount of time. The DEIR should aggressively address anachronistic notions of 100, 200, or 300 year flood protection, or notion of a 10 year event, 20 year event or 50 year event. These terms have outlived their usefulness and are not meaningful to the public's understanding of actual, measured risk of floods. Frankly, it is more effective to look at and publish photographs of the "rings" in trees!

- FEMA AND THE PMR PROCESS. Efforts to assist development with limited projects such as undertaken by TRLIA, need to integrate with the FEMA PMR process at the beginning of the analysis. Efforts to obtain CLOMAR's and LOMAR's are short sighted. The understanding generated by the re-certification of the Oroville Dam caused a re-awakening of conditions of levees and risks by, among other things, freeboard, erosion, closure devices, penetrations, internal drainage, in addition to underseepage.

Thank you for the opportunity to comment.

Very truly yours,

Thomas W. Eres

cc: Hofman Ranch
Emma Hofman
Frances Hofman

THREE RIVERS LEVEE IMPROVEMENT AUTHORITY

Feather River Comment Card

PLEASE PRINT

Date: 5 July 06

Name: Jeanette Rice

Title (if applicable): Farmer / Owner

Telephone: (530) 742-3575

Fax:

Organization/Business (if applicable): Rice River Ranch

E-Mail: jlrice@sonic.net

Address: 671 Plumas Ave.

City: Marysville

State: CA

Zip: 95901

Thank you for your interest in the Three Rivers Levee Improvement Authority's projects. Your comments are appreciated and encouraged. Please write legibly.

I am in favor of strengthening the existing Feather River levee. I oppose the levee setback due to the following environmental impact of agricultural land uses. The setback levee would be unacceptable, because of unfavorable soil conditions, including local surface drainage patterns would be changed with a setback levee, adding to the costs of new detention basins to prevent adverse flooding on nearby properties, removal of wells on these existing 1600 acres of farmland, and the cost of 1600 acres of lost farmlands. Adverse community impacts include: loss of rural residential and residential properties. These properties would have to be purchased, dramatically increasing the costs of the levee setback project on an already burdened budget. A setback levee would include: a loss of environmental habitat restoration activities, loss of agricultural production, jobs, residences, loss of economic revenue for farming operations, loss of valuable resources of specialty crops: peaches, nectarines, plums, prunes, apricots, pears, apples, citrus, cherries, walnuts, etc. I favor strengthening the existing Feather River Levee and not a setback levee

Please submit your comments to a project representative or fold this form in half, seal with tape and mail to:
Three Rivers Levee Improvement Authority, Attn: Paul Brunner, 915 8th Street, Suite 109, Marysville, CA 95901

(Con't.) page #2

THREE RIVERS LEVEE IMPROVEMENT AUTHORITY

Feather River Comment Card

PLEASE PRINT

Date: 5 July 06

Name: Jeanette Rice Title (if applicable): Farmer/Owner

Telephone: (530) 742-3575 Fax:

Organization/Business (if applicable): Rice River Ranch E-Mail: jlrice@sonic.net

Address: 671 Plumas Ave.

City: Marysville State: CA Zip: 95901

Thank you for your interest in the Three Rivers Levee Improvement Authority's projects. Your comments are appreciated and encouraged. Please write legibly.

...as the most feasible option for levee improvement for the safety for all Yuba County residents.

As a personal note, our family and neighbors suffered devasting losses in 1986 and in 1997. I don't want to be penalized again by losing my income-producing property by a levee setback. I left a good paying civil service position with the federal goverment in 2002 to become a full-time farmer. By moving the Levee it would take my valuable agricultural land resource and I would have no job, no income, no future, and no agricultural products to sell. The Levee setback would ruin me economically.

I have already sacrificed enough by losing my home in 1997! Don't take away my home again in 2006!

* I urge Three Rivers Levee Improvement Authority to make the right choice - to strengthen the existing Feather River Levee, so no one's lives or homes will be sacrificed again.

Please submit your comments to a project representative or fold this form in half, seal with tape and mail to:
Three Rivers Levee Improvement Authority, Attn: Paul Brunner, 915 8th Street, Suite 109, Marysville, CA 95901

Three Rivers Levee Improvement Authority
Open house and Scoping Meeting
Sign-In Sheet
June 29, 2006

Name	Organization	Phone	E-mail
John Pearson		749-2920	
James Pearson		742-5091	jpp@syix.com
Bill Hampton	LD-1	673-2454	LD1@syix.com
ELEANOR HEROLD			
HELEN HEROLD			
Richard Webb		7425609	rwebb@syiccee.net
Jeremy Goulart	Homes by Towne	782-2424	jgoulart@hbtsac.com
Larry Cummings		674-0148	
Michael [illegible]	Riverside Restor Ctr.	742-4673	
Don Witter	Appeal Democrat	749-4712	dwitter@appeal-democrat.com
Phil HENDRIX	PLUMAS LAKE ESD	870-6933	phendrix@plusd.org

Three Rivers Levee Improvement Authority
Open house and Scoping Meeting
Sign-In Sheet
June 29, 2006

Name	Organization	Phone	E-mail
THOMAS RICE	RICE RIVER RANCH	742 3575	tar@sonic.net
Peter Sutherlin	Consultant	432-9585	Petherlingemsn
Jerry R Rogers	Citizen	916-257-6894	
Cleo S. Ledbetter		530-701-7560	
Tom Engler	KB Home	916-576-5899	tengler@kbhome.com
Tania Ramirez	Hofman Ranch	530-713-6801	
Walter Wheeler	CITIZEN	530-743-8381	
Seth Marantz	Plumas Lake Owners Group	916 443 3900	smarantz@
VINCE ROSELLINI	PLUMAS LAKE RESIDENT	530-749-9287	STARENTZ@COMCAST.NET
Tej Maan	Yuba County E.H	749-5475	
John Taylor	Self	530-743-1942	jptaylor@comcast.net
Ron M Nelson			
DON L. Graham	EA 784	742-6074	
Alberto Pujol	GES	510-350-2908	apujol@geiconsultants.com
BLAKE JOHNSON	HDR	916-817-4700	blake.johnson@hdrinc.com
Al McKinney	HDR	530-749-0629	alfred.mckinney@hdrinc.com

THREE RIVERS LEVEE IMPROVEMENT AUTHORITY

Feather River Comment Card

Date: June 29, 2006

PLEASE PRINT

Name: Don L. Gadhem Title (if applicable) :

Telephone: 530-742-6074 Fax:

Organization/Business (if applicable): Bd. member RD784 E-Mail:

Address: 1049 Anderson Ave.

City: Marysville State: CA Zip: 95901

Thank you for your interest in the Three Rivers Levee Improvement Authority's projects. Your comments are appreciated and encouraged. Please write legibly.

While I do not like to see the farm land lost next to the left bank of the Feather, that levee is a "leaky leaky" the only way to permanently solve the boil and flow problems around Ramp 113 is to set the levee back. Get on the the decision and planning.

Please submit your comments to a project representative or fold this form in half, seal with tape and mail to:
Three Rivers Levee Improvement Authority, Attn: Paul Brunner, 915 8th Street, Suite 109, Marysville, CA 95901

THREE RIVERS LEVEE IMPROVEMENT AUTHORITY

Yuba River Comment Card

PLEASE PRINT

Date: June 29, 2006

Name: DON L. Graham Title (if applicable) :

Telephone: 530-742-6074 Fax:

Organization/Business (if applicable): E-Mail:

Address: 1049 Anderson Ave.

City: Marysville State: CA Zip: 95901

Thank you for your interest in the Three Rivers Levee Improvement Authority's projects. Your comments are appreciated and encouraged. Please write legibly.

Strengthening of the Yuba left bank levee is essential. Continue with the upgrade proposals. If the Yuba breaches the water runs into the populated areas of Elicia & Olivehurst lake. Stop the flows before they begin.

Please submit your comments to a project representative or fold this form in half, seal with tape and mail to:
Three Rivers Levee Improvement Authority, Attn: Paul Brunner, 915 8th Street, Suite 109, Marysville, CA 95901

1
2
3
4 SOUTH YUBA COUNTY LEVEE REPAIRS
5 BEAR RIVER, WESTERN PACIFIC INTERCEPTOR CANAL,
6 YUBA RIVER & FEATHER RIVER
7
8
9
10
11 OPEN HOUSE
12 &
13 FEATHER RIVER LEVEE REPAIR SCOPING MEETING
14
15
16
17 Thursday, June 29, 2006
18 Reported by: Stacey M. Gates, CSR #9255
19
20
21 Presenters: PAUL BRUNNER
RIC REINHARDT
22 SEAN BECHTA
23
24
25

MARYSVILLE, CALIFORNIA, JUNE 29, 2006
--o0o--
MR. BRUNNER: Good evening and welcome to the Feather River meeting and also the overall project meeting that we have for the entire Three Rivers project. I'm Paul Brunner the executive director for Three Rivers. I appreciate you -- you can't hear. It's not on.
(Brief interruption.)
MR. BRUNNER: I'm Paul Brunner the new executive director for Three Rivers, and I really appreciate you coming tonight to hear what we have to say about the levee project, see our poster boards and engage with us.
Tonight we're going to have the scoping meeting for the Feather River environmental impact report. What that means is a chance to interact with us and share your concepts and thoughts about what we're doing on the Feather River. We're also going to describe for you briefly the other types of levee improvement that we have on the Yuba along the Western Pacific Interceptor Canal and also the Bear.
So I'll be doing a couple briefings here. Ric Reinhardt my program manager will also be here working with me and then we have scattered staff

throughout, and they'll answer questions for you, too, throughout the evening. Sean Bechta will be giving something on the Feather River, a briefing himself, a little bit later in the program tonight.
Let me orient you to what we have in the room here. Back in the back are the poster boards. That's where you can go and ask questions while people man the booths for interaction, for comments, so you can do that.
I'll be wandering around along with Ric Reinhardt. You might stand up so they can see who you are. Ric is our lead engineer. He's the man who knows everything about the project as to its working so far.
We also have over to the right where the computer is sitting there is a reporter that will be taking an opportunity for people to go over, particularly on the Feather River, and let her know your comments, if you have a comment, so she can record it down.
We have multiple opportunities for you to record down your comments tonight. We also have these cards that you have right here, and they're available in the back for you to write down your comments and they are color coded by river. The blue is on the

Western Pacific Interceptor Canal. The purple, which is one of my favorite colors because I'm a big Kings fan, is on the Bear River. The green is the Feather River comment and then we also have the Yuba River which is kind of like a beige color. If you feel comfortable doing that, fill these out on the project as to if you have comments or questions about the particular project that we have.
On the environmental impact report if you have a general comment and you don't feel comfortable asking it, write it down here also and we can then answer you back by telephone or respond to your comments. If you don't feel comfortable turning anything in here, you also have the opportunity of taking one of the comment cards, writing it at home and then mailing it to us, and we'll get back to you on your comment.
Did I leave something out?
UNKNOWN SPEAKER: Perfect.
MR. BRUNNER: Okay. I would also at this time like to introduce some of the folks that have come that you also have a chance to interact with during the evening. We have Don Schrader, the Board of Supervisors chair right there. Mary Jane Griego who has two areas. She's on the Board of Supervisors

and also on the Three Rivers Board. She's right there. We have Richard Webb who has a dual hat, too. He's on the Three Rivers Board. I'll explain that a little bit more in detail in a second. He's the chair of that and he's also an RD 784. That's the people that do the operations and maintenance on the levees. He's on that particular board. Where are you at, Richard? Right over here. And then we have Don Graham also on the RD 784 Board. Where are you at? Right there. Welcome.
So during the evening if you have questions and comments, they're here. Feel free to approach them and interact with them at that time, too.
Okay. All right. What I'd like to do here for you is I'm going to go through and use the Power Point slide presentation here and kind of just give you some background about 784 -- not 784. Maybe a little bit on 784, but on Three Rivers, and then we'll describe for you about the project, what the scope of work is and then we'll go into the Feather River discussion.
You know who I am, so let's go to the next slide.
All right. Many of you probably already know what Three Rivers is, but Three Rivers is the

1 Three Rivers Levee Improvement Authority. It was
2 created in 2004 as a joint powers authority which
3 means we're a combination of many different things.
4 We do link between 784 which does the operations and
5 maintenance and also with the County of Sacramento --
6 or forgive me, County of Yuba to form this joint
7 powers authority.
8 So as the director I am really somewhat an
9 economist, but I do report somewhat to the County, but
10 most importantly I report to the Three Rivers Board.
11 I introduced to you a couple people here Richard Webb
12 and Maryann -- Mary Jane Griego who is on that Board.
13 They're the ones who give me direction as to what we
14 should be doing for the levee work. There is two
15 other people on the board, Dan Logue, who is a Board
16 of Supervisor and also Rick Brown, who is on the Board
17 from RD 784. They're not here tonight, but if there
18 is an interaction with that, there is an opportunity
19 to talk to them also.
20 One of the things that I'd like to point out
21 and all the efforts that we have for our improvements
22 on the levees that makes it really pretty exciting for
23 me as I've come on board is that there is a
24 relationship with Three Rivers and with the developers
25 where we're working with them to help under -- to help

1 fund the improvement of our levees.
2 We currently have in the Plumas Lake area
3 and the South Yuba Basin about 30,000 people that
4 already live there that potentially could get flooded.
5 In fact, they've been flooded before. I personally
6 relate to that because in 1995 my home where I live
7 was flooded, and I'm going to do everything I can to
8 prevent that from happening to the residents here.
9 You don't want to be flooded at all.
10 So what has transpired here starting in 2004
11 is this relationship between the County, 784, creation
12 of Three Rivers and now with the developers to help
13 underwrite and bring funding to the table that allows
14 us to improve the levees in the area to protect the
15 residents there. By 2008 when we hope to be done or
16 plan to be done, there would be about 40,000 people
17 living there.
18 If we do not do this levee project to
19 improve them and describing it for you, it might take
20 somewhere between 15 to 20 to 30 years to get funding
21 to improve the levees. So what we've done is
22 compressed the effort to improve the levees from a
23 longer period of time waiting for state funds, waiting
24 for federal funds, to a very short period of time to
25 get the people protected, and that's really a main

1 focus of this effort.
2 And I also have a web site now with Three
3 Rivers. If you go to that web site, listed on that
4 site are all the various minutes, meetings, brochures,
5 information. I know at least one member in the
6 community has come forward. I know Walt out there has
7 come to me several times and has used it, and I
8 encourage you to go there. It has a contact point in
9 there. You can send me e-mails. I will respond to
10 you and interact with you as to what's going on.
11 And one of the things I was talking to one
12 of the members of the community about recently is is
13 this going to be the only open house and different
14 things that we do, and I don't think so. I think we
15 should be out there talking. A few weeks ago I was
16 with Mary Jane at the Plumas Lake Homeowners
17 Association giving a talk and explaining what we're
18 doing, and I think we have a responsibility to do that
19 and interact and provide the information of where
20 we're going. There is a direct link with FEMA and
21 flood hazards and protection and the public, and we
22 should share what we're doing. So it's all related.
23 While I do this transition here and give you
24 an update, Ric, I think the next one is where I'll be
25 turning to you.

1 We do have a goal to complete all of the
2 levee work that we'll be describing for you by 2008,
3 and the magnitude of that is we do have four phases.
4 We started in 2004, and we've been working hard to
5 improve these 29 miles of levees that protect the
6 South Yuba Basin. There is approximately 40 percent
7 that is under construction, 10 percent is done now,
8 and we would project that the remaining work to be
9 done mostly on the Feather in 2007 and 2008 and
10 repeating it on the Feather. What we're here tonight
11 mainly for, other than sharing with the other
12 projects, is for you to have a chance on the
13 environmental document to make your comments on the
14 Feather River project.
15 The Phase 1 through 3 costs is about 110
16 million dollars and about half so far have been paid
17 by the developers, and what's important about that is,
18 like I was saying before, they have provided up-front
19 money to do this improvement, and that allows us to
20 move forward to start building on the levees and
21 improve them in a very rapid pace. If we did not have
22 this money coming forward, we wouldn't be able to be
23 doing what we're doing. And they've also committed to
24 us as we work through this arrangement another 130
25 million on what we call Phase 4 which is predominantly

on the Feather River. Phase 4 does have a connection to the Yuba that we hope to be building this year and we'll be describing for you in a second as to what we're doing.

So with that up-front money we can then move forward. There are some matching funds that we get back from grants from the state, but you can't get that money from the state until you spend money. So there is a connection there and that we work there, so I think it's a very good relationship that we developed with the landowners in the area.

And you'll probably hear throughout the timing, if you're involved in meetings, that we are very heavily involved in going through other types of finance agreements right now for Phase 4, and I'm going to come back to that slide after I have Ric go through the schedule here of what we're doing on the project. That kind of gives you an outline as to what we have done recently and the State Reclamation Board. You may have read in the paper about what has happened and what's been approved.

So I'm going to let Ric talk to this slide.

MR. REINHARDT: We've broken the construction of the Three Rivers program up into four phases. The first phase was Phase 1, and it was a

slurry wall in the Yuba River levee from Highway 70 up to about the '86 break. We felt that was a very critical site, and from a public safety standpoint we wanted to get out there quickly. That work was completed in October of 2004.

In approximately September of 2005 we initiated construction on Phase 2 of the program which was a seepage berm in the same vicinity from Highway 70 up to the Union Pacific Railroad and worked to deal with underseepage and freeboard issues on the Western Pacific Interceptor Canal and the upper Bear, and we started foundation work for Phase 3 which is a setback levee on the Bear River. The Phase 2 activities are going to be -- are underway now and they're going to be completed in October of 2006.

We've constructed --

(Brief interruption.)

MR. REINHARDT: The foundation of the setback levee was completed. The Bear River was completed in I think it was November or December of 2005, and we're about a third of the way constructed on the new setback levee. We're going to be going to the Reclamation Board on July 10th to ask their permission to be integrating the existing Bear River levee.

The final phase of our program is Phase 4 and that's looking at the entire Feather River levee and then the Yuba River levee upstream of the Union Pacific Railroad.

On the Feather River levee we're looking at strengthening it in place and then we're looking at an alternative that would set back approximately six miles of that levee.

On the Yuba River levee we have a component that we're trying to accelerate this year of Phase 4 and we'll go to construction in August of this year. That job is out for bid right now and the CEQA document is out for public review. The public review period on that document is going to close July 10th. If you'd like a copy of that document, Nancy Haley is in the back. She's raising her hand right now. She'll take down your name and get you a copy of that report.

The last remaining work that we need to do on the Yuba River levee is upstream towards the goldfields. There is a ditch where we had some erosion problems in the 1997 flood, and we'll be looking to fill that ditch some time in 2007.

Our current schedule is to complete all construction activities on Yuba and Feather River

levees in 2008, and we'll certify those levees meeting the minimum FEMA certification requirements, but we've also designed them so the entire Reclamation District 784 levees that protect the community of East Linda, Linda, Olivehurst and Plumas Lake will be the only community in the central valley that will have a two-levee protection.

So, Paul, that's all I've got on this program slide.

MR. BRUNNER: Okay. Leave that one on.

If you leave with no other handout, you should at least pick up this particular brochure that we have. Nancy back there is holding it up, too. They're available there. They're available over there. It's really this map in color, and it also has a schedule of work on the right-hand side here that lays out what we're doing on the phases of the project. We have a version of this that was a little bit older. This one was actually made up-to-date for currency on what we're doing, so you should at least pick this up and take that home with you, and I think it's a good reference material for you.

Is the pointer up here still? Is that this?

MR. BECHTA: That's it. Top button in the middle.

MR. BRUNNER: I want to kind of elaborate a little bit on what Ric was talking about. I'm not going to repeat what he said but to emphasize a couple things.

As far as timing goes, Phase 1 is up here in the Yuba. The phases are based upon priority of risk, and the highest risk that we had on all the levee work was right up in here where we had the break before. That was done in 2004 and moving forward, Phase 1. In 2005-2006 we're now working in Phase 2 and working down here in the WPIC, Bear River, this area in through here. Phase 4 deals with the Yuba which we hope to have under contract this year, this particular construction season, and then this blue area through here on the Feather is 2007-2008.

Again, the Feather is what you're here for, the environmental document that we're looking at right now to make a determination for. We are looking at different alternatives on the Feather which really the biggest issue runs right in through here and is the blue line. In the back is what we call the setback levee.

That's not a decision that's been made at all, but whenever you have alternatives on design and a major action that costs money to do, you do an

environmental review and the State of California environmental impact report. Let's look at the alternatives, what are the environmental impacts and to do that sufficiently you have to look at all the alternatives and make a determination of what is the impact from that.

So when you look at that document, there isn't any decision that's been made, but you have to get the right information for the decisionmakers to make the right decision in which way to go. So when you're commenting, keep that in mind as to what's going on on the alternatives on the project.

All right. I'm going to transition to something that came up, and I think it's still worthwhile to go over with you to at least give you some high points for the project.

Back on April 21st and then on May 16th we went to the State Reclamation Board, and the importance about this is this is the group that we go to to get permission to work on the levees and proceed forward. We ended up making six commitments to them of which the Rec Board then granted the developers, the landowners in that area and the County of Yuba to go ahead and potentially lift the building restrictions.

Now, those buildings restrictions have not been lifted, but they will be lifted if we do these items that are here. So they do have some authority still not to do this, but our goal is to do all these things and put it in place very soon so that we can go forward and then have that capital finance come in, the 135 million, or up to that so we can move forward and complete the levee projects and the schedules that we have and achieve that in that time frame.

So the six areas that we are committed to is that we make our best efforts to get this project done, and it isn't just the County of Yuba. It's Three Rivers, it's RD 784, it's the developers all pulling together in this big train that's going down the tracks to all make it happen, and it's not easy, but we are all committed to making it happen. I know the Board of Supervisors are, the Three Rivers Board are, I am. It's really a Herculean effort to get here, but we're committed to doing that, and I think the efforts that I just got done describing along with Ric will demonstrate that where else in the State of California are we doing something like this of locally funding a project and making this happen for the County of Yuba? You all should really be proud of that effort from my perspective in what we're doing in

pulling together to make this happen.

The second commitment is by the landowners for a comprehensive financing plan to fund the Phase 4, and I referenced before that's what we're doing right now. The month of July will be a very busy month. We plan to try to award Phase 4 in the Yuba this month. Our plans for that financing agreement needs to be in place for us to make that award, and there is a lot of details to work out to make that happen, and the group is committed. It's spent many hours in the last few days working. Hopefully we won't be working on the 4th. That's kind of a comment to Seth in the audience that works very much with us on that to pull that together. So that is being worked on.

The third commitment is remedies available to the Reclamation Board in the event that these commitments aren't made. Part of the agreement when we went down to them even though the building permit could get lifted is that if we don't do these things, they could say stop, and there is a set of criteria of four different levels, but it reaches down to the crescendo to say don't go any farther. We don't want to get there on that, but they're not powerless in this process as we move forward.

There is also a commitment with the landowners to provide, at no cost to all the residents affecting the area, flood insurance to project completion which hopefully is at the end of 2008 or soon thereafter or up to 2010, whichever occurs first.

I know I spoke at the Plumas Lake Group and there was some comments about that, I took the action to get back, about where does that fit for the people that may have bought out there before we had these commitments being made and how that works through. I'm still gathering the facts working with the landowners to do that, and I'm still committed to putting that out.

We're going to have newsletters from Three Rivers that will start to be published out to the residents, and one of the very first stories I'm going to put in that newsletter and also on our web site is that information about where we are at with flood insurance for the people in the area and what's going on so you know what's happening.

If I can, again, relating back to my flooding experience, flood insurance is very important. If you don't have it, it is a major impact on your family. So you need to have that. And the landowners here have committed to doing that for the

folks in the development areas.

Then there is also a commitment by Three Rivers to continue to make reports to the Reclamation Board on the progress. If you're interested in that, if you see them come up on our web site, I go down there usually -- I think it's the third Friday of the month and do a presentation as to where we are on our progress on our project and give them that update.

The sixth commitment is by Yuba County to continue to use reasonable diligence to inform residents within the 784 district, which essentially -- I don't have the map here, but on your map it's there. It's pretty close although not exact. I'm sure Richard Webb can explain that further for you if you have great detail on the map, but pretty much the levee area on this map here represents 784, and again 784 is the group that maintains the levee operations and maintenance to make sure that they're in place.

Three Rivers currently is the construction agency that is working for the short period of time starting in 2004 and potentially going out of existence by 2008, maybe as soon as certification of the levees. That could take a little longer as it goes away which means in a few years I'll be out of a

job. That's okay.

I recently retired from the United States Air Force working a whole bunch of different efforts, major construction projects, environmental programs nationally for the United States Air Force retired and I was approached to come here to work for you all in this project, and I thought it was really pretty exciting so I said, okay, I'll come and do that over here and see this to the end and make it happen.

But the thing on here is that we really do -- part of our commitment to the Reclamation Board is on the FEMA and flood hazard aspect, and I know Pat Beauchamp is here. Pat, you might raise your hand, too. Pat is our OES, Office of Emergency Services, person for Yuba County. It's a commitment to get out and know about how you evacuate if there was a flood, if something breaks between now and 2008, and it could happen during that time period, so there is some risk there. There is risk there even if we don't do the levee project on it. So if something does happen or if something happens even if we get the levees done for some reason, there is really an importance that we have the right evacuation routes, people know what to do and those systems are in place, and we have the need to let you know what's going on, and that's what

Pat does and her group and works with us here.

So we have a station back there available if there is a question about that for you to interact with that, and they'll come up at other meetings, too. I know Pat was at the Plumas Lake Homeowners Association visit that we had.

So those are the six items that we committed to. If we don't do any of those, the Reclamation Board could say, "Kings X, don't go there" on the building permit limitations and what we're doing. So I think they have quite a bit of hammer, and there is a lot of commitment from all those players I talked about before to make it happen on the project.

We're on the transition now. Ask Sean Bechta to come up, and he's going to give you a briefing specifically on the Feather River project for us. So, Sean.

MR. BECHTA: Let me set this up here.

I'm Sean Bechta. I'm with EDAW. I'm the project manager for preparation of the environmental impact report for the Feather River repair levee project and for tonight a very poor temporary microphone, lighting and IT person.

As Paul talked about, this meeting has two components to it. There is really an informational

1 meeting about a lot of the activities going on related
2 to the work that the Three Rivers Levee Improvement
3 Authority is doing, but a big part of the meeting is
4 specifically related to the environmental impact
5 report for the Feather River levee repair project and
6 complying with the California Environmental Quality
7 Act or CEQA's process for the preparation of that EIR.
8 So for this component of the meeting related
9 to the EIR there is two things I would like to do.
10 One, is to provide an overview of the proposed project
11 and the alternatives we're considering in the EIR, and
12 the second purpose is to seek public agency work on
13 the scope and content of the EIR as the project
14 elements and alternatives and environmental effects
15 and mitigation, and I'll explain more of that as we go
16 along.
17 So as an overview of the project, the
18 purpose of this particular element of the flood
19 improvement is to correct deficiencies in the Feather
20 and Yuba River and Bear River levees and consequently
21 to improve flood protection for the RD 784 area of
22 Yuba County. And when I say "levee deficiencies,"
23 what I'm talking about for these particular levees are
24 related to underseepage and through seepage and also
25 correcting some areas that have been identified along

1 the water side of the levee that have been shown to
2 either experience erosion or be susceptible to
3 erosion.
4 And the project area, and I've heard some
5 justified critiques on the map here, and these maps
6 get better. Just to show you quickly, it starts down
7 near the confluence with the Bear River, continues up
8 the Feather River up to the confluence with the Yuba
9 River and then goes three-tenths of a mile officially
10 up the Yuba River levee which basically is the
11 railroad line that goes across the Yuba River right
12 next to Highway 70.
13 The design objectives of this particular
14 project are to provide 200-year flood protection so
15 these levees could be certified as providing 200-year
16 flood protection, to help secure FEMA certification
17 for these levees and to avoid increasing downstream
18 flows. With any levee improvement project there is a
19 potential that if you change the hydrology of the
20 system, you may affect flood concerns either upstream
21 or downstream if you were altering the location of the
22 levees, and so that's one of the design elements of
23 this project.
24 To achieve these objectives as soon as
25 possible, as Paul mentioned, the Three Rivers Levee

1 Improvement Authority have a limited time frame and
2 there is a definite motivation to accelerate this and
3 move these projects forward, and I think we've been
4 very successful so far and also for this particular
5 project to incorporate environmental mitigation as
6 appropriate. There is not a specific environmental
7 mitigation component for this project as there was for
8 the Bear River, but it's something that may be
9 considered.
10 Back to some of the past work that's been
11 done. This project, the Feather River levee
12 improvement or levee repair project, a portion of it
13 I'll talk about in a bit, corresponds to the above
14 Star Bend levee setback that was initially evaluated
15 in 2003-2004 related to the Yuba/Feather River
16 supplemental flood control project. That project was
17 in 2003-4 and looked at the potential for a setback
18 levee above Star Bend, another setback levee below
19 Star Bend and also some changes to the management of
20 Bullards Bar Reservoir. The project goes back to the
21 above Star Bend component of that. You'll see on some
22 of the exhibits the acronym "ASB." That's above Star
23 Bend, and it evaluates that particular setback levee
24 as an alternative in this project.
25 The below Star Bend setback levee is not

1 part of this project and actually is no longer needed
2 based on the improvements that are going on on the
3 confluence at the Bear and Feather rivers. So the
4 project area is divided into three segments.
5 I'll talk about now the EIR. The EIR is
6 going to evaluate three alternatives to the project.
7 First segment, project segment one, is the southern
8 segment. The term "PLM" is "project levee miles."
9 It's just a way to designate the distance along the
10 levees. It goes from PLM 13.3 to 17.1. So go down
11 here to Star Bend. So below the existing pump station
12 number two to Star Bend.
13 The activity being considered here is
14 strengthening of the existing levee. Strengthening
15 could include slurry cutoff walls, could potentially
16 include stability berms or relief wells, and final
17 determination of what methods will be used and where
18 they'll be placed will be done during the specific
19 project design. Right now we have a preliminary
20 design that we're using to evaluate the EIR, and it's
21 perfectly appropriate for the environmental impact
22 report process required by CEQA.
23 I mentioned the three alternatives. For all
24 three alternatives it would be the same activity in
25 this segment. It would be levee strengthening through

this segment. I'm going to jump up to project segment three at the north end, and you'll see why in a bit.

This particular north segment goes from Feather River PLM 23.6 up to 26.1 and includes that short segment of what's officially considered the Yuba River levee, so from mile 0.0 to 0.3 which is at the railroad crossing there by Highway 70.

Again, the activity being evaluated here is purely levee strengthening, correcting the deficiency in the existing levee in place, using those three potential same methods of slurry walls or other cutoff walls, relief wells or stability berms. And, again, under all three alternatives it would be the same approach being analyzed for this particular levee segment.

Project segment two starts down at Star Bend at PLM 15.1 and goes north to PLM 23.6. This is where we have the variability amongst the three alternatives being evaluated in the EIR alternative.

One involves levee strengthening. Just like the other levee strengthening alternatives or segments, it would be the three methods that I talked about: Slurry walls, seepage berms, relief wells. That would be determined during detailed design. So if that alternative was selected, it would be the

existing levee all the way from the bottom all the way to the top would stay in existing location and would be strengthened and the issues would be corrected.

On this particular segment there are five areas that have been identified that are either susceptible to erosion or have experienced erosion during flood events in the past. So part of this alternative, because that levee segment remains in place, is those erosion areas would be corrected which would involve taking out some of the existing soil, putting in some cobble or riprap and then shoring that up with soil again is the approach that we're evaluating in the EIR.

Alternative two is a setback levee alternative. We're calling it the ASB setback levee. As I said, that's above Star Bend. This is a variation to the -- small variation to the ASB setback levee alignment evaluated back in 2003-2004. It follows this alignment here.

So in this case a new levee would be constructed approximately following this alignment. During detail design the actual levee location may shift east or west based on soil conditions, engineering and other factors, and then the existing levee, various portions of it would be taken out and

so when flood events happen, this would then be the new floodway and this would be then the new levee protecting the areas to the east.

Alternative three is another setback levee option, and this one follows the same ASB alignment here and then would move the alignment some distance to the west and these are some various options being considered. And again, looking at detail design, engineering, soil, other factors, the EIR will ultimately look at this area, but again, during detail design, specific alignment will be determined.

For both of these because the existing levee portions of it will be removed and it would no longer provide any flood protection benefit, there would be no need to do the correction of the erosion areas on that levee, so that is not part of these two projects.

You'll see on here we've got these two potential soil areas. This one would be a soil borrow area that would be to get soil to build the new levee to get appropriate soils that have a good mix of impervious material so that the levee provides much better protection, the existing levees, and is not susceptible to through seepage and underseepage.

Another area being considered -- again, these are areas being considered for borrow areas and

all or a portion of that may be used.

Another area to be considered is down here. This area is also being considered for a detention basin. If this levee -- if a setback levee is constructed, the flow of storm water towards the river would be altered and so there would be a need for a temporary detention basin to hold storm water in the area, and this is the area being considered for that potential basin.

Additional project components. I talked about the borrow areas and detention basins. The project would also involve replacing and relocating pump station number three down here. This is an area that's currently experiencing through seepage and underseepage, and there is a desire to move that pump station out of there and correct those concerns there.

If alternative one were selected and the levee were retained in place, the pump station would be moved somewhere to the east to an area with more stable soil conditions. If either of the setbacks were selected, the pump station would be moved to the land side of the setback levee.

One issue in the setback area is land use planning. If you are involved with the Feather/Bear project at all, they have a fairly detailed land

1 management plan for the setback area. In this case,
2 as is said in the NOP, that's gone, and I'll talk
3 about that for a bit. We don't know -- at least in
4 the EIR we don't know what the land uses are going to
5 be in the setback area if a setback alternative is
6 selected. We're saying it could be ongoing
7 agriculture, it could be habitat restoration, it could
8 be a mix of both, it could be all of one or all of the
9 other. We just don't know at this point.
10 The approximate construction schedule for
11 segments one and three for levee strengthening design
12 and permitting is scheduled to happen 2006 through
13 2007 with construction beginning later in 2007 after
14 all the environmental permits have been received.
15 Segment two, whether it is a setback levee or levee
16 strengthening design, specific design and permitting
17 would go from 2007 through 2008 with construction
18 scheduled in 2008.
19 So from the project description going to the
20 EIR and scope progress. What is an environmental
21 impact report? It's a document that describes the
22 proposed project alternatives. It tells the public,
23 the agencies and the decisionmakers the environmental
24 effects of the project. It identifies mitigation
25 measures to correct or compensate or reduce

1 significant adverse environmental effects to try to
2 get them to a less-than-significant level and
3 identifies effects that cannot be mitigated or
4 avoided.
5 Again, EIRs are driven by the California
6 Environmental Quality Act, CEQA, which has specific
7 guidelines in how the EIR is prepared and how the
8 process for an EIR goes through public involvement
9 which is part of why we're here and the content of the
10 EIR.
11 What's scoping? According to the CEQA
12 process, this is a scoping meeting. Before an EIR is
13 prepared, there is guidance to go out to the public,
14 to go to the agencies and get input on the scope and
15 content of the EIR. We're not doing this analysis in
16 a vacuum. Scoping is intended to inform the public
17 and agencies of the project, to receive public and
18 agency input and that input is specifically looking
19 towards helping to refine the description of the
20 project to be studied, to help to refine the range of
21 alternatives and environmental effects to be evaluated
22 in the EIR, to help identify impact assessment methods
23 and if there is a specific concern or issue as far as
24 what environmental impacts might be expected, we are
25 anxious to receive input on that and to identify

1 issues that are not applicable to the project.
2 So, for example, this particular project, in
3 our initial analysis we've identified that it's not
4 going to have an adverse effect on the ability to
5 extract mineral resources, which under CEQA that's
6 something you're supposed to look at. That's not an
7 issue here, so that won't be evaluated further in the
8 EIR so we can take input on that.
9 In this particular EIR, as Paul said, none
10 of these alternatives has been selected as a preferred
11 alternative. Traditionally in an EIR you will have a
12 preferred alternative that's selected that will be
13 evaluated in detail and then you'll have other
14 alternatives that will be evaluated in less detail and
15 kind of at a comparative level which is a typical CEQA
16 process, and CEQA allows for that.
17 In this particular case TRLIA is going to be
18 using this EIR as part of the decision process on
19 which alternatives to select. So we are looking at
20 all three alternatives at an equal level of detail.
21 They will all have the same impact analysis, the same
22 inclusion of mitigation measures and will all be
23 addressed at an equal level in the EIR.
24 The EIR also, as is required by CEQA, will
25 look at a no-project alternative, and that will follow

1 the traditional approach of having more of a
2 comparative level of analysis.
3 The EIR process to date and in the future.
4 The notice of preparation, which you may have received
5 in the mail or heard about. The NOP was issued June
6 13th. That is the notice of preparation. It is just
7 what the name says. It's a notice that an EIR is
8 being prepared, gives a brief description of the
9 project, gives some information on how to provide
10 input and scoping.
11 We have the scoping meeting tonight. The
12 scoping period started June 13th when the NOP went out
13 and will end July 14th, so comments on the scope and
14 content of the EIR can be received through July 14th.
15 Our schedule has us releasing a draft EIR on
16 August 7th. That opens up another public comment
17 period, a 45-day period, from August 7th to September
18 14th where we can receive comments on the draft EIR,
19 and then a final EIR and project decision is expected
20 by the end of October.
21 So we're in scoping. We've got the EIR
22 being prepared. How can the public and the agencies
23 participate? You have multiple opportunities, as Paul
24 said, to provide your input tonight. You can provide
25 written comments on comment cards either here at the

table, over there or mailed in later. We have a laptop computer set up if you would like to type in comments. We have a court reporter here. You can sit down with her and dictate comments to her if you would like, and we'll get those.

Written comments, whether on the comment cards or on a letter, can be provided to Paul at the address there. That address is also provided on the notice of preparation which we have extra copies of here. If anyone would like those, we can copy them in the back.

And then also outside of the CEQA process we have the open house format set up here. This really is an opportunity to talk to the technical specialists, talk to me, talk to other members of the EIR team engineers and get your questions answered in an informal manner.

If after talking to people and getting the information you felt that you want to provide something official on the record that's part of the CEQA process for this particular project, we encourage you to provide comments on any of those methods that we identified there. Then, as I said, the draft EIR is scheduled to go out August 7th and that provides another opportunity to provide comments specific to

the EIR.

We talked about scoping which has set parameters in CEQA which is why we're here tonight for this project. So really what we're looking for for this Feather River levee project is to get input on the project elements and alternatives, the environmental effects and mitigation and analysis methodology, all items related to the scope and content of the EIR. So that finishes that up.

Paul, if you want to have some closing comments.

MR. BRUNNER: Yeah. Thank you, Sean.

I'm going to emphasize a point that Sean was talking about at the end, and that is this whole process, particularly the environmental document for the Feather, one of the main reasons why we're here tonight is so you'll have multiple opportunities to provide comments on the document. I did respond to an inquiry tonight that came in to me about timing and getting a chance to share comments.

So tonight is really a chance for folks to provide input as to what the review would be as they go through. Sean was talking about there will be opportunities to provide your comments on how we're doing on the documents as they come up for public

review. So you'll get a chance to make a comment again. This will not be your last time to make a comment as to what we're doing on that. So take advantage of the opportunities to do that so we have the best document we can and make the best decision that we can.

I've also been asked -- I realize that I've been moving around from different offices as I've been here, I see a smile from the audience there, and sometimes people have trouble finding me in the building, but I am right now in administrative services right down here. The intent is for eventually Three Rivers to have an office outside this building of which I'm looking to find that space. So hopefully that will happen soon as we work through that.

In the meantime I came to realize that people don't have my phone number. So if you're interested in that, I have some business cards, too, that I'll -- I'll just make that comment. I get enough messages already, but I'll give it out. It's (530) 749-5679. That's again (530) 749-5679. So if you do have a question, a comment or where we are, give me a call. I may not be there to answer right away, but I'll get back to you on it. It's also on

the back of the brochure. Okay. People are waving at me back there.

So with that, that really does conclude the formal presentation that we have tonight. I would like for you to really take the opportunity -- we did invest time and energy to put the posters together. We'll be using them again for other opportunities, but we do have folks here to interact with you. I'll be here, Ric will be here and Sean will be here and other folks at the poster boards will be glad to interact with you and answer questions.

Please, if you have comments, use your cards, turn them in, wander on over to the court reporter as she types and give her your verbal input. She'll type it down for you and save you from writing. If you don't feel comfortable with those, go ahead and take those home and send them to us. I would really appreciate your feedback.

So at that I'll call this part of the meeting to the end and let's have the interaction. Thank you.

Richard.

MR. WEBB: Yeah. One question I think I discussed with you is an issue about West Linda. At least some people are concerned about a 50-foot

investigation area from the levee. Can you explain that a little bit more fully for these people?

MR. BRUNNER: I'm actually drawing a little bit of a blank on that one, Richard, on the 50 feet that we're talking about. You're talking about along the Yuba?

MR. WEBB: Some people in the West Linda area have -- I think as a result of receiving this initial notification there is something about a 50-foot area, and that was explained to me as being an area in which they are making an investigation or could make an investigation of potential EIR hazard or hazardous materials that would be there, but it does not in any way imply that you would -- there would be 50 feet of your property taken to help accommodate the levee repairs, and is there any -- can you fully explain this because -- or can somebody?

MR. BRUNNER: We're not currently looking at any property acquisition on the Yuba River.

MR. BECHTA: Feather.

MR. WEBB: West Linda.

MR. BECHTA: Right now we're scoping and looking at alternatives. We haven't defined anything. That will be included in the EIR, a full description of what's proposed, and we would be interested in

public input on those activities.

MR. BRUNNER: If there is a question about that, we'll interact with you, Richard, as we go through that. I actually did draw a blank. I still do somewhat as to the point, but if there is a question we can't -- well, I'll commit to you if there is a question during the interaction here that we can't answer, I'm not going to give you an answer that's wrong. I'll take it and come back and get back to you and give you the right answer for where we're going to go.

So with that, why don't we go ahead and break. Enjoy the cookies and let's provide the input and start answering the questions and interact with you. Thank you. Thanks for coming.

(End of presentation.)

(The following are comments made by spectators.)

CLEO LEADBETTER: My concern is they're focusing on maintaining the pressure of the water within the levees. They don't seem to be concerned with reducing the pressure of the water against the levee. They're trying to harness the pressure of the water instead of reducing the pressure of the water within the levees.

THOMAS RICE: I'm Thomas Rice. I'm the owner of Rice River Ranch. I'm an engineer as well as a farmer. I understand and support the need for the improvements as my family was hit by the last two floods.

Most of the alternatives seem reasonable with the exception of the full ASB option. This one is too extensive and too destructive of the community, land and environmental livelihood for no real advantage. You do not protect the community and environment by destroying it.

I will support and actively work with and for any of the other options and vigorously oppose the full ASB approach. Even minor reductions to the scope of the full ASB approach could also remove any objections. I know that one particular area proposed for the full ASB route is over highly-porous soil and that would mandate moving the line significantly westward. Making such a decision quickly would gain my support. Thank you.

(Proceedings concluded.)

--o0o--

REPORTER'S CERTIFICATE

STATE OF CALIFORNIA)
)
COUNTY OF YUBA)

I do hereby certify that the foregoing transcript, consisting of 41 pages hereof, was taken by me in shorthand at the time of the proceedings, and that the foregoing is a full, true and correct transcription of the proceedings held at said time.

DATED: July 17, 2006.

STACEY M. GATES,
Certified Shorthand Reporter #9255

--o0o--

APPENDIX B

Hydraulic and Hydrologic Analysis

Hydraulic and Hydrologic Analysis of the Three Rivers Levee Improvement Authority's Phase IV Project

Feather River Levee Repair Project

July 2006

Prepared by

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1. Background

This document explains the hydraulic analysis of the proposed alternatives for the Reclamation District No. 784 (RD 784) Feather River Levee Repair Project (FRLRP) that is proposed by the Three Rivers Levee Improvement Authority (TRLIA) under the Phase IV program. Included in this document are:

- Background on the hydraulic model used for the analysis.
- A description of the hydrology.
- Description of the existing condition that was modeled.
- Description of the alternatives that were modeled.
- Water surface profiles derived from the modeling analysis.

2. Hydraulic Model

2.1 Description

MBK Engineers was provided a copy of the Feather River HEC-RAS model, dated Jan. 12, 2004 that was developed by the U.S. Army Corps of Engineers, Sacramento District (Corps) for the Lower Feather River Floodplain Mapping Study. This model was the basis for the results displayed in this report. Included with the model were the calibration analysis and synthetic hydrology for the 1-in-2, 1-in-10, 1-in-25, 1-in-50, 1-in-100, 1-in-200, and 1-in-500 annual exceedence probabilities (AEP) for two hydrologic centerings: Feather River at Shanghai with Yuba River emphasis (Shanghai-Yuba) and Bear River.

The model represents the Feather River and its tributaries from the major reservoirs within the basin to its confluence with the Sacramento River. Specifically, the major upstream boundaries of the model are:

- Feather River at Oroville.
- Yuba River about 2 miles upstream of Daguerre Point Dam.
- Bear River at Wheatland Gage.
- Sutter Bypass upstream of Feather River.
- Sacramento River upstream of Fremont Weir.

The model also includes the following minor tributaries:

- Honcut Creek (Feather River) – modeled reach, 0.8 miles long.
- Jack-Simmerly Slough – modeled reach, 6.25 miles long.
- Dry Creek (Yuba River) – lateral inflow.
- Deer Creek (Yuba River) – lateral inflow.
- Yankee Slough (Bear River) – modeled reach, 6.2 miles long.
- Dry Creek (Bear River) – modeled reach, 4.4 miles long.
- WP Interceptor (Bear River) – modeled reach, 4.9 miles long.
- Best Slough (WP Interceptor) – modeled reach, 1 mile long.
- Natomas Cross Canal (Sacramento River) – modeled reach, 6.2 miles long.

The model has two downstream boundaries: Sacramento River at Verona Gage and Yolo Bypass at Woodland Gage. The downstream boundary conditions are represented by rating curves at these locations. The cross-section and reach geometry in this model comes primarily from the Sacramento-San Joaquin Rivers Comprehensive Study (Comp Study) Sacramento Basin UNET model. Figure 1 shows the geographic extent of the model and the waterways contained in the model.

2.2 Corps of Engineers Calibration

The HEC-RAS model was calibrated by the Corps to the January 1997 flood event. For reference, the estimated AEP of the January 1997 flood one-day volume is summarized in Table 1 for locations within the model study area.

Table 1. January 1997 Flood – Annual Exceedence Probabilities, 1-day Duration

Location	Annual Exceedence Probability
Feather River at Oroville	1-in-100
Yuba River at Marysville	1-in-100[1]
Bear River at Wheatland	1-in-33
Latitude of Verona	1-in-91

Source: Sacramento and San Joaquin River Basins Comprehensive Study
[1] Estimated by MBK Engineers

The following is an excerpt from the model description that accompanied the model when provided by the Corps, which explains the Corps' calibration methodology. Additional information on the Corps calibration is documented in *"Lower Feather River Floodplain Mapping Study; Army Corps of Engineers, Sacramento District, February 17, 2005."*

> *Manning's n values, flow roughness factors, and weir coefficients were adjusted to best fit the rising limb of the computed hydrographs with the observed hydrographs at seven stream gage locations. These locations are:*
>
> 1. *Feather River: Yuba City gage.*
> 2. *Feather River: Nicolaus gage.*
> 3. *Yuba River: "Near Marysville" gage.*
> 4. *Bear River: Wheatland gage.*
> 5. *Bear River: Forty Mile Road gage.*
> 6. *Sacramento River: Verona gage.*
> 7. *Sacramento River: Upstream end of Fremont Weir.*
>
> *The model has not been calibrated upstream of the Yuba City gage.*

The gages within the study area for which observed data were available for the calibration event are summarized in Table 2, and a comparison of observed and computed peak stages and flows at the gages for the calibration event is provided in Table 3.

Table 2. Calibration Analysis – Available Data at Gages in Study Area

Gage	Agency	Stage Data (source)	Flow Data (source)
Feather River near Gridley	USGS 11407150	Hourly (CDEC) Peak (USGS)	Hourly (Corps data file) Peak (USGS) Mean Daily (USGS)
Feather River at Yuba City	Ca. DWR	Hourly (CDEC)	N/A
Feather River at Nicolaus	Ca. DWR	Hourly (CDEC)	N/A
Yuba River near Marysville	USGS 11421000	Hourly (Corps data file) Peak (USGS)	Peak (USGS) Mean Daily (USGS
Bear River near Wheatland	USGS 11424000	15 min. (Corps data file) Peak (USGS) Measured (USGS) 12/31/96 15:20 1/1/97 14:55 1/2/97 12:30	15 min. (Corps data file) Peak (USGS) Measured (USGS) 12/31/96 15:20 1/1/97 14:55 1/2/97 12:30 Mean Daily (USGS)
Bear River at Forty Mile Road (Pleasant Grove Road)	Unknown	15 min. (Corps data file)	N/A
Sacramento River at Fremont Weir	Ca. DWR	Hourly (CDEC)	N/A
Sacramento River at Verona	USGS 11425500	Hourly (CDEC) Peak (USGS) Measured (USGS) 1/2/97 11:30	Hourly (CDEC) Peak (USGS) Measured (USGS) 1/2/97 11:30 Mean Daily (USGS)
Yolo Bypass near Woodland	USGS 11453000	10 min. (Corps data file) Peak (USGS) Measured (USGS) 1/3/97 09:30 1/3/97 11:30	Peak (USGS) Measured (USGS) 1/3/97 09:30 1/3/97 11:30 Mean Daily (USGS)

Table 3. Corps of Engineers Calibration Study Results – Peak Stages and Flows at Gages

Gage	Peak Stage (ft.-NGVD)			Peak Flow (cfs)		
	Observed	Computed	Difference (ft.)	Observed	Computed	% Diff
Feather River						
Near Gridley	97.51	99.15	+1.64	163,000	157,740	-3.2%
at Yuba City	75.23	75.51	+0.28	N/A		
at Nicolaus	47.20	47.34	+0.14	N/A		
Yuba River						
Near Marysville	88.69	88.71	+0.02	161,000	172,510	+7.1%
Bear River						
Near Wheatland	95.65	95.68	+0.03	34,900	34,360	-1.5%
at 40 Mile Rd.	70.78	70.99	+0.21	N/A		
Sacramento River						
at Fremont Weir	39.47	38.97	-0.50	N/A		
at Verona	39.09	38.75	-0.34	102,000	101,780	-0.2%
Yolo Bypass						
Near Woodland	31.43	30.81	-0.62	357,000	404,670	+13.4%

2.3 MBK Engineers Re-Calibration for Phase IV Project

MBK Engineers refined and re-calibrated the Corps HEC-RAS model for use in designing the levee improvements under the TRLIA Phase II program. Those levee improvements consisted of work on the Western Pacific Interceptor Canal, Bear River, Yuba River, and Olivehurst Detention Pond. The refinements made to the Corps HEC-RAS model and the re-calibration results are documented in *"Hydraulic and Hydrologic Analysis for Three Rivers Levee Improvement Authority's Phase 2 Project, Basis of Design for the Bear River, Western Pacific Interceptor Canal, Yuba River Levee Improvements and Olivehurst Detention Basin Project (Revision 1); MBK Engineers, March 2006"* (HEC-RAS Phase II model).

Phase IV of the TRLIA project includes levee strengthening on the Feather River and evaluates levee setback alternatives on the Feather River reach river mile (RM) 17 to 24 (Figure 37). It also addresses freeboard issues on the Yuba River levee. The HEC-RAS model developed by the Corps of Engineers and re-calibrated by MBK Engineers for Phase II, included flow roughness factors in the reach of the Feather and Yuba Rivers. These flow roughness factors increased the Manning's n value as the flow increased and were assigned to cross sections on the Feather River from RM 17 to 29.25 and Yuba River from RM 1.6 to 8.34. The TRLIA Phase IV project is evaluating a setback levee which could potentially include habitat enhancement projects along the project reach. Habitat enhancement projects typically consist of re-vegetation which would require simulation of the project condition vegetation types. This is typically done by changing the Manning's n value to represent the change in vegetation type due to the project. The complex nature of the flow roughness factor makes this type of analysis difficult and uncertain; therefore, the HEC-RAS Phase II model was refined and re-calibrated to remove the flow roughness factors. Following are the changes made to the HEC-RAS Phase II model for the current Phase IV analysis:

1. The flow roughness factors in the following reaches were eliminated
    a. Feather River – Yuba River to Bear River, RM 17 to 24.25.
    b. Feather River – Yuba River to Bear River, RM 24.5 to 27.0.
    c. Feather River – Jack Sough. to Yuba River, RM 27.25 to 29.25.
    d. Yuba River (upper) – RM 1.6 to 8.34.

2. For the Feather River reach in item 1.a. above, the Manning's n value from the HEC-RAS Phase II model for the January 1997 calibration, corresponding to the maximum water surface elevation, was used as a single Manning's n value at each of the cross sections in the reach.

3. For the reaches in items 1.b., 1.c. and 1.d., the flow roughness factor in the HEC-RAS Phase II model were converted to a vertical variation of Manning's n value for each cross section. This was done by assigning an elevation to each break point in the flow roughness factor. The Manning's n value at each break point was calculated using the flow roughness factor and the original geometry Manning's n value in the HEC-RAS Phase II model. The output water surface elevations and flows from HEC-RAS Phase II model were then used to assign the elevation at each break point. Minor modifications were made to the Manning's n value to calibrate to the stage gage at Yuba City and Marysville. A vertical variation Manning's n value is needed in these reaches to better match the rising and falling limb of the stage hydrographs at Feather River at Yuba City and Yuba River near Marysville. Using a single Manning's n value for the cross sections matched the peak well at those gage locations but resulted in higher stages on the rising and falling limbs for the January 1997 calibration.

2.4 Results of the Phase IV Re-Calibration

Results of the model re-calibration made by MBK Engineers are presented in Figures 2 through 19. Figures 2 through 5 show the computed maximum water surface profile versus the surveyed high water marks for the Bear, Feather and Yuba Rivers. Figures 6 through 19 show stage and flow hydrographs at available gage locations in the study area. The following descriptions are included to further identify some of the data used to create these figures:

a.) Observed (Corps): from data files compiled by Corps ("1997_event_input.dss" from Lower Feather river HEC-RAS study and "sac97.dss" from Comprehensive Study).

b.) Observed – CDEC (datum adjusted): gage height from CDEC adjusted to NGVD 1929 datum.

c.) Observed (CDEC – adj.): gage height from CDEC adjusted to NGVD 1929 datum.

d.) Observed, est. (Corps): from data files compiled by Corps ("1997_event_input.dss" from Lower Feather river HEC-RAS study and "sac97.dss" from Comprehensive Study).

e.) Observed (Corps data file): from data files compiled by Corps ("1997_event_input.dss" from Lower Feather river HEC-RAS study and "sac97.dss" from Comprehensive Study).

f.) Computed Mean Daily Peak (MBK): mean daily flow from MBK simulated hourly.

Table 4 provides a summary of observed and computed stages and flows at the gage locations in the study area.

Table 4. MBK Engineers Re-Calibration Study Results – Peak Stages and Flows at Gages

Gage	Peak Stage (ft.-NGVD)			Peak Flow (cfs)		
	Observed	Computed	Difference (ft.)	Observed	Computed	% Diff
Feather River						
Near Gridley	97.51	99.14	+1.63	163,000	157,779	-3.2%
at Yuba City	75.23	75.15	-0.08	N/A		
at Nicolaus	47.20	46.6	-0.60	N/A		
Yuba River						
Near Marysville	88.69	87.9	-0.79	161,000	161,655	+0.4%
Bear River						
Near Wheatland	95.65	Boundary Condition		34,900	Boundary Condition	
at 40 Mile Rd.	70.78	70.99	+0.21	N/A		
Sacramento River						
at Fremont Weir	39.47	39.24	-0.23	N/A		
at Verona	39.09	38.92	-0.17	102,000	102,638	+0.6%
Yolo Bypass						
Near Woodland	31.43	31.34	-0.09	357,000	354,755	-0.6%

3. Hydrology

The hydrology used for the analysis of the project alternatives is based on the model inflows developed by the Corps for two storm centerings:

1. Feather River at Shanghai with Yuba River emphasis (SHY).
2. Bear River (BR).

Studies were made for two annual exceedence probabilities: 1-in-100 and 1-in-200 AEP. Table 5 shows the peak flow rate at the upstream boundary of each major reach for each of the combinations of these centerings and frequencies. From Table 5, the SHY centering produces greater flows for all frequencies on the Yuba and Feather Rivers and in the Sutter Bypass. The BR centering has greater flows on the Bear River. The peak flows from the two centerings are comparable on the Sacramento River.

Table 5. Summary of Major River Peak Flow Rates at Upstream Model Boundaries for Feather River at Shanghai with Yuba River Emphasis (SHY) and Bear River (BR) Storm Centerings and Analyzed Frequencies (values are 1,000 cfs).

AEP	Feather River		Yuba River		Bear River		Sutter Bypass		Sacramento R.	
	SHY	BR	SHY	BR	SHY	BR	SHY	BR	SHY	BR
1-in-100	150	150	141	122	41	44	193	173	37	34
1-in-200	174	150	211	135	48	49	232	213	40	38

The study alternatives were simulated with each of the two centerings and two AEP floods. For a given AEP flood, the results presented in this report are for the composite water surface, defined as the maximum of the two water surface elevations for the respective centerings at each model cross-section.

4. Levee Performance Assumptions

An important assumption in performing hydraulic simulations of leveed systems on a regional basis is defining if, when, and how levee failures will occur. The analysis as presented herein assumes that levees would not fail before and after overtopping. Top of levee profiles were compared to 1-in-200 water surface profiles to determine low spots where levee overtopping may occur. The locations were defined in the HEC-RAS model for the without project. Table 6 documents the locations.

Table 6. Potential Levee Overtopping Locations

River	Model River Mile	Side
Bear River	6.49	right
Bear River	5.49	right
Bear River	4.99	left
Bear River	3.855	left
Bear River	3.21	left
Cross Canal	3.99	right
Cross Canal	3.98	left
Dry Creek	2.85	right
Feather River	40.1	right
Feather River	40	left
Feather River	28.9	right
Feather River	24.74	left
Feather River	24.24	right
Feather River	16.49	left
Feather River	14.74	right
Sutter Bypass	66	right

River	Model River Mile	Side
UP Intercept	3.49	left
UP Intercept	1.24	left
Yankee Slough	1.84	right
Yankee Slough	1.81	left
Yuba Overbank	0.42	right
Yuba Overbank	4.57	left
Yuba Overbank	2.82	right
Yuba Overbank	2.487	left
Yuba Overbank	1.787	left

Note: The model also contains potential levee overtopping locations on both banks of the upper Yuba River, Sacramento River, and Sutter Bypass which were not listed individually here due to their volume.

5. Study Alternatives

The following describe each one of the alternatives that were analyzed as part of the work. Three alternatives were analyzed which consisted of levee improvements along the Feather River. For all alternatives, it assumes the existing flood control system with the addition of the Bear River setback as part of TRLIA Phase III program. Also, in a few locations along the Bear River and Yankee Slough in Sutter County where the levees are below the 1957 design criteria, as shown in Figure 20, the existing condition was represented by the 1957 design profile levee elevation (1957 design water surface + 3 feet for freeboard). In other words, top of levee elevations that are below design specifications were elevated to original specified design elevations. This is necessary because the work to raise the low spots in the levee will not be accomplished under the Yuba-Feather Supplemental Flood Control Program (Y-FSFCP) and benefits from such work should not be credited to the Y-FSFCP.

5.1 Alternative 1 – Levee Strengthening Alternative

Under this alternative, levee repair and strengthening activities would be completed along the existing Feather River left bank levee from Project Levee Mile (PLM) 13.3 to PLM 26.1 and along the Yuba River left bank levee from PLM 0.0 to PLM 0.3 (Figure 21). Levee repairs/strengthening would consists of various activities, including installation of cutoff walls and relief wells and placement of buried cobble in areas where erosion of the levee embankment has been identified as a problem.

5.2 Alternative 2 – Levee Strengthening and ASB Setback Levee

Under this alternative, levee repair and strengthening activities would be completed along the existing Feather River left bank levee from PLM 13.3 to PLM 17.1 and PLM 23.6 to PLM 26.1 and along the Yuba River left bank levee from PLM 0.0 to PLM 0.3 (Figure 21). Levee repair and strengthening activities along these segments would be the same as for Alternative 1. From

PLM 17.1 to PLM 23.6 on the Feather River left bank, a setback levee would be constructed roughly following the Above Star Bend (ASB) setback levee alignment identified in the Y-FSFCP EIR. Portions of the existing levee along the setback alignment would be removed to allow water to flow into the new floodway/setback area (i.e., the area between the existing levee and the setback levee) during high river stages.

The setback levee alternative was modeled by modifying the cross sections in the HEC-RAS model to reflect the ASB setback levee alignment and modifying the Manning's roughness value to reflect the land use in the setback area (Figure 22). The land use between the existing levee and new levee was assumed to be habitat restoration. Agricultural operations may occur in this area as the alternative further progresses through planning and design. It is likely that habitat restoration land use would have the higher of the two water surface elevations thus was chosen to be simulated. Habitat restoration land use was simulated using a Manning's roughness value of 0.1. For the area between the riverbank and the existing levee, it was assumed no land use changes thus the Manning's roughness value remained unchanged.

5.3 Alternative 3 – Levee Strengthening and Intermediate Setback Levee

FRLRP Alternative 3 is the same as Alternative 2 except for modifications to a portion of the setback levee alignment. The same levee repair and strengthening activities described previously would be completed along the existing Feather River left bank levee from PLM 13.3 to PLM 17.1 and from PLM 23.6 to PLM 26.1, and along the Yuba River left bank levee from PLM 0.0 to PLM 0.3 (Figure 22). From PLM 17.1 to PLM 23.6 on the Feather River left bank a setback levee would be constructed. The southern one-third of this setback levee alignment would follow the ASB setback levee alignment identified in Alternative 2. However, in the vicinity of Anderson Road, the setback levee alignment would shift west several hundred feet. This westward shift in the intermediate setback levee alignment allows less overall land to be placed in the new floodway and reduces the number of houses, structures, and other facilities that would be affected by levee construction or would need to be removed from the floodway.

The setback levee alternative was modeled by modifying the cross sections in the HEC-RAS model to reflect the intermediate setback levee alignment and modifying the Manning's roughness value to reflect the land use in the setback area (Figure 23). The land use between the existing levee and new levee was assumed to be habitat restoration. Agricultural operations may occur in this area as the alternative further progresses through planning and design. It is likely that habitat restoration land use would have the higher of the two water surface elevations thus was chosen to be simulated. Habitat restoration land use was simulated using a Manning's roughness value of 0.1. For the area between the riverbank and the existing levee, it was assumed no land use changes thus the Manning's roughness value remained unchanged.

6. Results

The hydraulic modeling results of each of the three alternatives are presented in this report in terms of location-stage for each hydrologic frequency analyzed. This data is presented in Tables 7 and 8. Figure 24 shows the location of the index points. Alternative 1 is considered the "Existing Condition" for which impacts will be compared to. Impacts to flows on the Feather River from river mile 9 to 27 are tabulated in Tables 9 and 10 for each of the frequency analyzed.

Water surface profiles for the 1-in-100 and 1-in-200 AEP water surface profiles are also included in the report for the Feather River (Figure 25 to 36). The figures include the water surface profiles and top of levee.

Table 7, Hydraulic Impacts to Maximum Stage, 1-in-100 AEP

				Alternative 1	**Alternative 2**		**Alternative 3**	
Impact Area	**Description**	**River**	**Model River Mile**	**Maximum Stage (ft-NGVD)**	**Maximum Stage (ft-NGVD)**	**Impact (ft.)**	**Maximum Stage (ft-NGVD)**	**Impact (ft.)**
RD 784	RD 784	Bear	1.75R	53.46	53.47	0.01	53.47	0.01
SAC30	RD 1001	Bear	3.86L	57.07	57.08	0.01	57.08	0.01
SAC30	RD 1001	Feather	7.17L	47.51	47.54	0.03	47.54	0.03
SAC24	LD 1	Feather	9.0R	49.55	49.58	0.03	49.57	0.02
RD 784	RD 784	Feather	19.0L	61.49	60.67	-0.82	60.66	-0.83
RD 784	RD 784	Feather	26.0L	71.02	69.29	-1.73	69.68	-1.34
SAC25	Yuba City	Feather	29.0R	74.48	73.35	-1.13	73.60	-0.88
RD 784	RD 784	Interceptor Canal	2.44R	57.71	57.71	0.00	57.71	0.00
	Verona Gage	Sacramento	78.75R	39.72	39.74	0.02	39.74	0.02
SAC34	RD 1500	Sacramento	86.5L	40.40	40.43	0.03	40.42	0.02
RD 784	RD 784	Yuba	1.14L	73.34	72.24	-1.10	72.48	-0.86
	YR 3	Yuba	1.48L	73.71	72.63	-1.08	72.86	-0.85
Marysville		Yuba	2.6R	74.41	73.64	-0.77	73.80	-0.61

Table 8, Hydraulic Impacts to Maximum Stage, 1-in-200 AEP

				Alternative 1	Alternative 2		Alternative 3	
Impact Area	**Description**	**River**	**Model River Mile**	**Maximum Stage (ft-NGVD)**	**Maximum Stage (ft-NGVD)**	**Impact (ft.)**	**Maximum Stage (ft-NGVD)**	**Impact (ft.)**
RD 784	RD 784	Bear	1.75R	55.95	56.01	0.06	56.00	0.05
SAC30	RD 1001	Bear	3.86L	58.42	58.44	0.02	58.43	0.01
SAC30	RD 1001	Feather	7.17L	49.48	49.52	0.04	49.51	0.03
SAC24	LD 1	Feather	9.0R	51.72	51.77	0.05	51.76	0.04
RD 784	RD 784	Feather	19.0L	64.94	64.11	-0.83	64.11	-0.83
RD 784	RD 784	Feather	26.0L	74.85	72.86	-1.99	73.29	-1.56
SAC25	Yuba City	Feather	29.0R	77.87	76.61	-1.26	76.87	-1.00
RD 784	RD 784	Interceptor Canal	2.44R	58.94	58.96	0.02	58.95	0.01
	Verona Gage	Sacramento	78.75R	40.99	41.02	0.03	41.01	0.02
SAC34	RD 1500	Sacramento	86.5L	41.61	41.63	0.02	41.63	0.02
RD 784	RD 784	Yuba	1.14L	77.41	76.03	-1.38	76.33	-1.08
	YR 3	Yuba	1.48L	78.05	76.70	-1.35	76.99	-1.06
Marysville		Yuba	2.6R	78.42	77.22	-1.20	77.47	-0.95

Table 9: Hydraulic Impacts to Flow, 1-in-100 AEP

			Flow (cfs) [1]		Difference (cfs)		% Difference	
Model River Mile	**Description**	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 2**	**Alternative 3**	**Alternative 2**	**Alternative 3**
27	Yuba River	274,480	275,343	275,117	863	637	0.31%	0.23%
26		274,355	275,215	274,993	860	638	0.31%	0.23%
25		274,263	275,098	274,891	835	628	0.30%	0.23%
24		274,177	274,924	274,770	748	594	0.27%	0.22%
23		274,113	274,742	274,628	630	515	0.23%	0.19%
22		274,025	274,471	274,399	446	375	0.16%	0.14%
21		273,857	274,108	274,014	251	157	0.09%	0.06%
20		273,642	273,918	273,806	277	164	0.10%	0.06%
19		273,554	273,781	273,679	226	124	0.08%	0.05%
18	Star Bend	273,391	273,677	273,573	286	182	0.10%	0.07%
17		273,209	273,541	273,434	332	225	0.12%	0.08%
16		273,047	273,385	273,285	338	238	0.12%	0.09%
15		272,735	273,113	272,998	379	264	0.14%	0.10%
14		272,360	272,773	272,652	414	292	0.15%	0.11%
13		271,938	272,406	272,262	468	324	0.17%	0.12%
12	Bear River	319,986	320,209	320,145	224	160	0.07%	0.05%
11		319,210	319,472	319,378	261	168	0.08%	0.05%
10		317,751	317,960	317,893	209	142	0.07%	0.04%
9	Nicolaus	314,018	313,966	314,144	-51	126	-0.02%	0.04%

Note: [1] Flow at maximum water surface.

Table 10: Hydraulic Impacts to Flow, 1-in-200 AEP

			Flow (cfs) [1]		Difference (cfs)		% Difference	
Model River Mile	**Description**	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 2**	**Alternative 3**	**Alternative 2**	**Alternative 3**
27	Yuba River	353,413	356,948	356,343	3,535	2,930	1.00%	0.83%
26		353,177	356,451	355,955	3,274	2,778	0.93%	0.79%
25		352,999	355,955	355,600	2,957	2,602	0.84%	0.74%
24		352,805	355,356	355,140	2,552	2,335	0.72%	0.66%
23		352,665	354,870	354,751	2,206	2,086	0.63%	0.59%
22		352,405	354,218	354,151	1,813	1,745	0.51%	0.50%
21		352,010	353,587	353,395	1,577	1,384	0.45%	0.39%
20		351,563	353,160	353,019	1,597	1,456	0.45%	0.41%
19		351,404	352,955	352,764	1,552	1,360	0.44%	0.39%
18	Star Bend	351,070	352,735	352,544	1,665	1,474	0.47%	0.42%
17		350,707	352,445	352,253	1,738	1,546	0.50%	0.44%
16		350,328	352,063	351,868	1,736	1,541	0.50%	0.44%
15		349,473	351,216	351,016	1,743	1,543	0.50%	0.44%
14		348,256	350,207	349,885	1,951	1,629	0.56%	0.47%
13		347,031	348,879	348,624	1,848	1,593	0.53%	0.46%
12	Bear River	399,555	401,246	401,030	1,691	1,475	0.42%	0.37%
11		398,576	400,320	400,032	1,743	1,456	0.44%	0.37%
10		396,429	398,883	398,786	2,454	2,357	0.62%	0.59%
9	Nicolaus	391,598	393,279	393,085	1,680	1,487	0.43%	0.38%

Note: [1] Flow at maximum water surface.

Figures

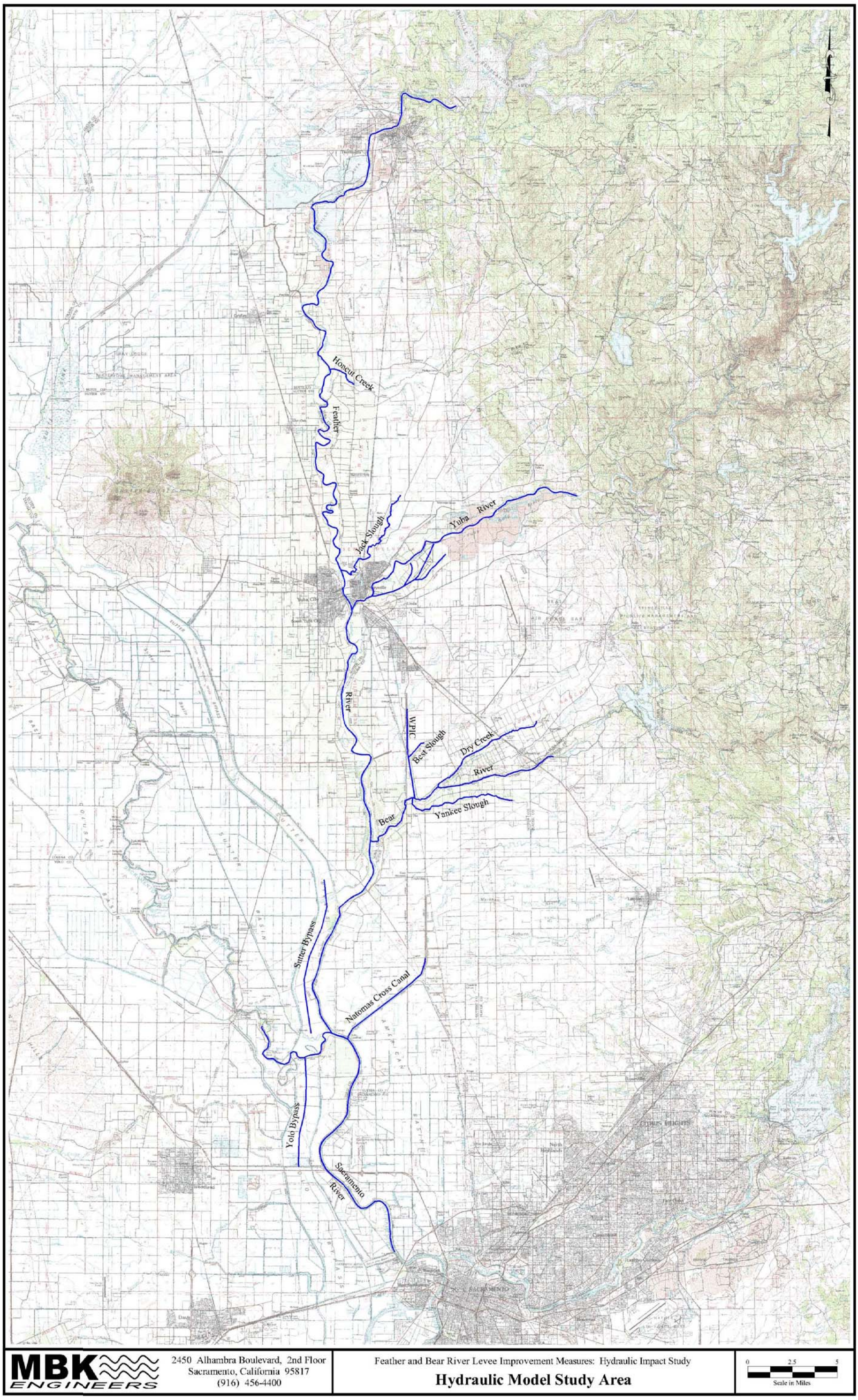

Honcut Creek
Feather
Jack Slough
Yuba River
River
WPIC
Best Slough
Dry Creek
River
Yankee Slough
Bear
Sutter Bypass
Natomas Cross Canal
Yolo Bypass
Sacramento
River
MBK ENGINEERS
2450 Alhambra Boulevard, 2nd Floor
Sacramento, California 95817
(916) 456-4400
Feather and Bear River Levee Improvement Measures: Hydraulic Impact Study
Hydraulic Model Study Area
0 2.5 5
Scale in Miles

FIGURE 1

FIGURE 2

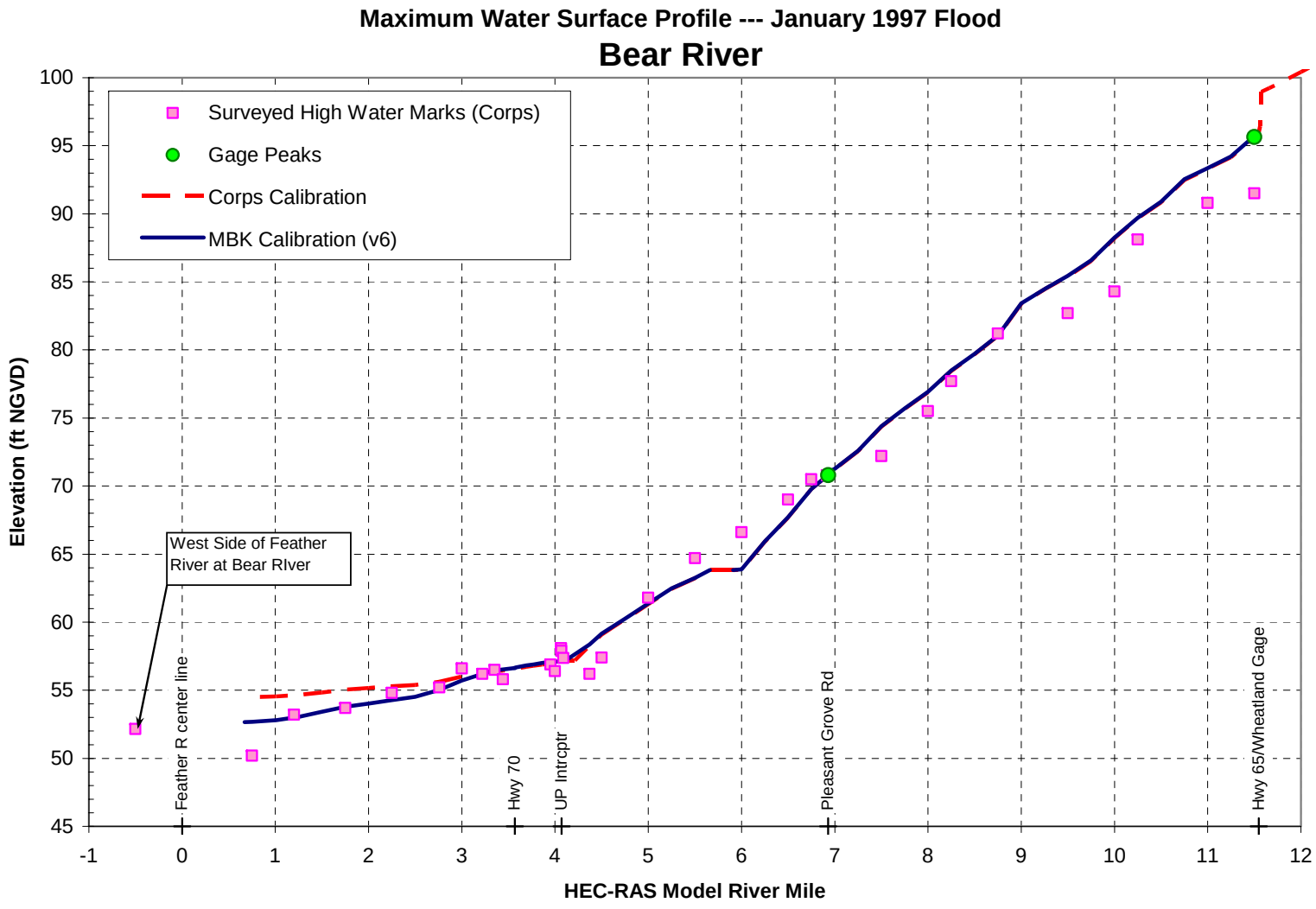

Maximum Water Surface Profile --- January 1997 Flood
Bear River
Surveyed High Water Marks (Corps)
Gage Peaks
Corps Calibration
MBK Calibration (v6)
West Side of Feather River at Bear RIver
Feather R center line
Hwy 70
UP Intrcptr
Pleasant Grove Rd
Hwy 65/Wheatland Gage
Elevation (ft NGVD)
HEC-RAS Model River Mile
100
95
90
85
80
75
70
65
60
55
50
45
-1
0
1
2
3
4
5
6
7
8
9
10
11
12

FIGURE 3

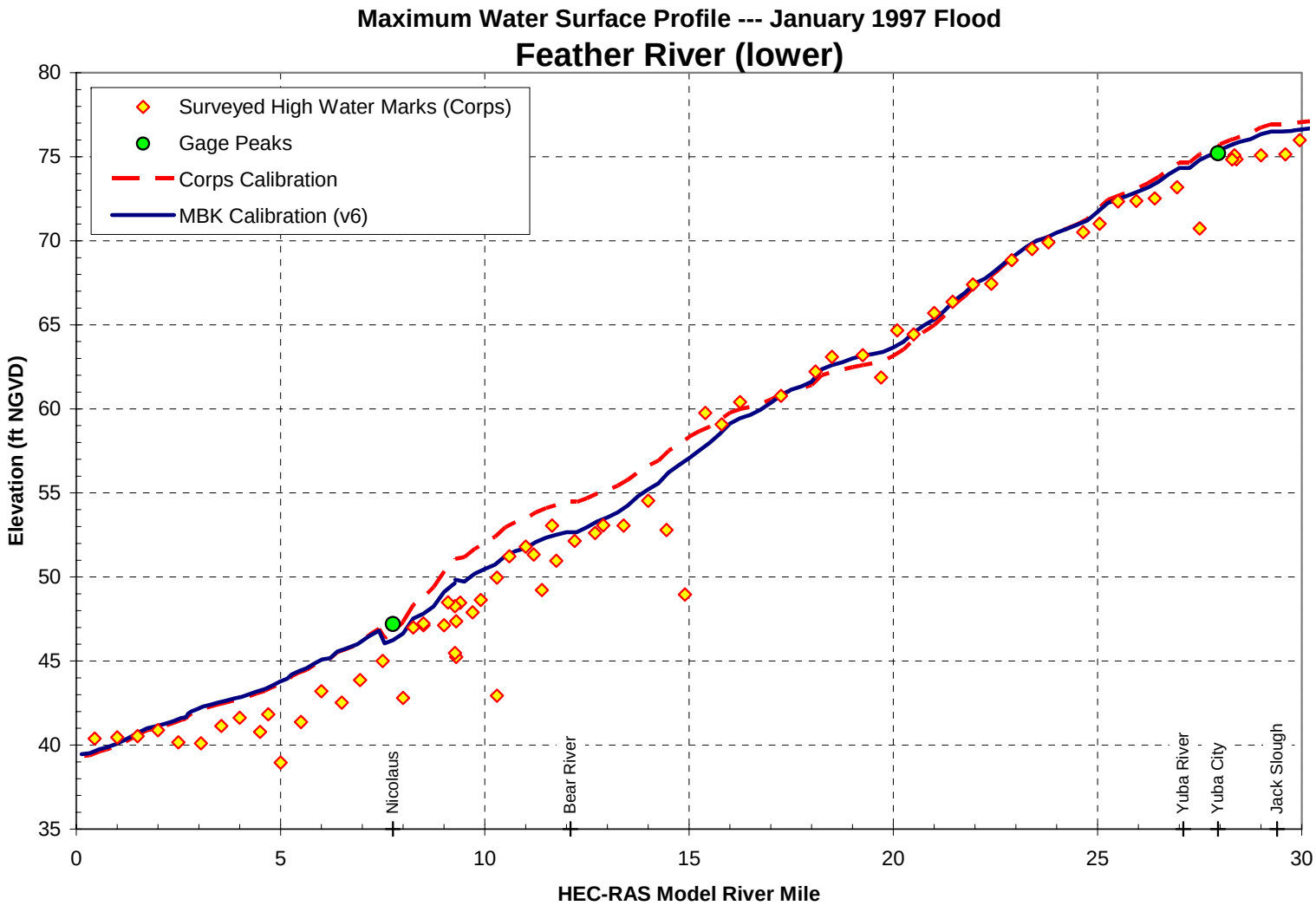

Maximum Water Surface Profile --- January 1997 Flood
Feather River (lower)
Surveyed High Water Marks (Corps)
Gage Peaks
Corps Calibration
MBK Calibration (v6)
Elevation (ft NGVD)
80
75
70
65
60
55
50
45
40
35
0
5
10
15
20
25
30
HEC-RAS Model River Mile
Nicolaus
Bear River
Yuba River
Yuba City
Jack Slough

FIGURE 4

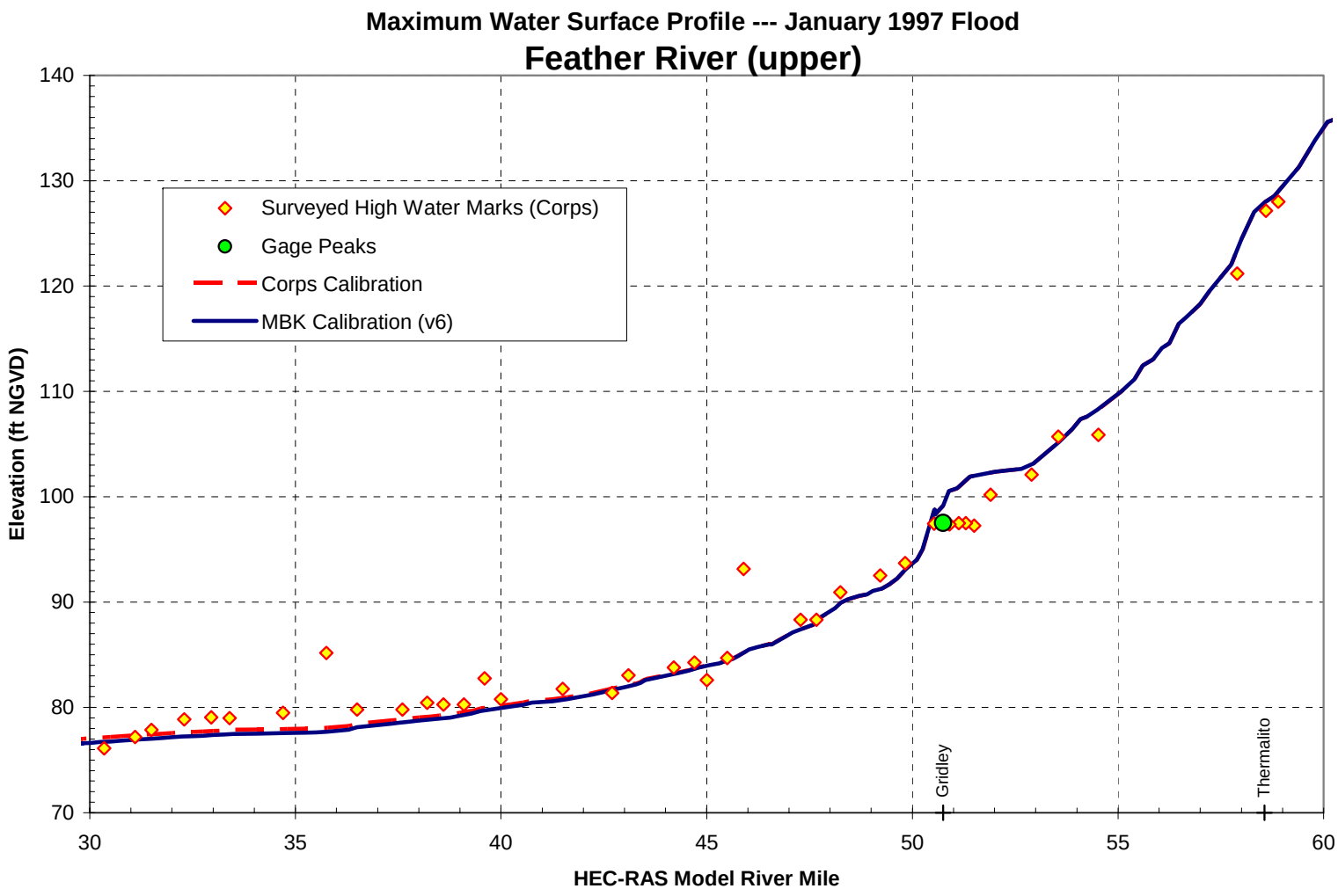

Maximum Water Surface Profile --- January 1997 Flood
Feather River (upper)
Surveyed High Water Marks (Corps)
Gage Peaks
Corps Calibration
MBK Calibration (v6)
Elevation (ft NGVD)
140
130
120
110
100
90
80
70
30
35
40
45
50
55
60
HEC-RAS Model River Mile
Gridley
Thermalito

FIGURE 5

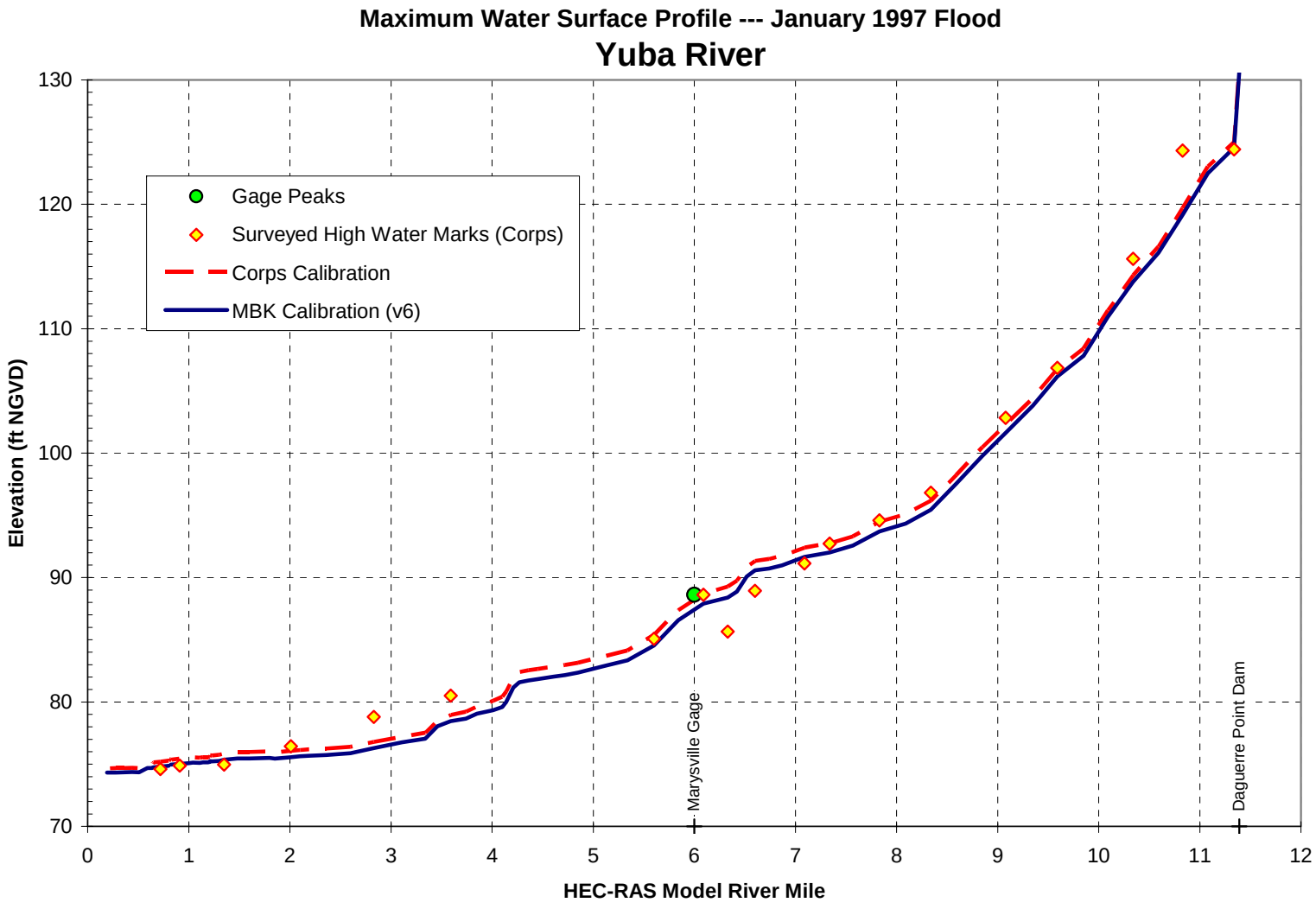

Maximum Water Surface Profile --- January 1997 Flood
Yuba River
Gage Peaks
Surveyed High Water Marks (Corps)
Corps Calibration
MBK Calibration (v6)
Elevation (ft NGVD)
130
120
110
100
90
80
70
0
1
2
3
4
5
6
7
8
9
10
11
12
HEC-RAS Model River Mile
Marysville Gage
Daguerre Point Dam

FIGURE 6

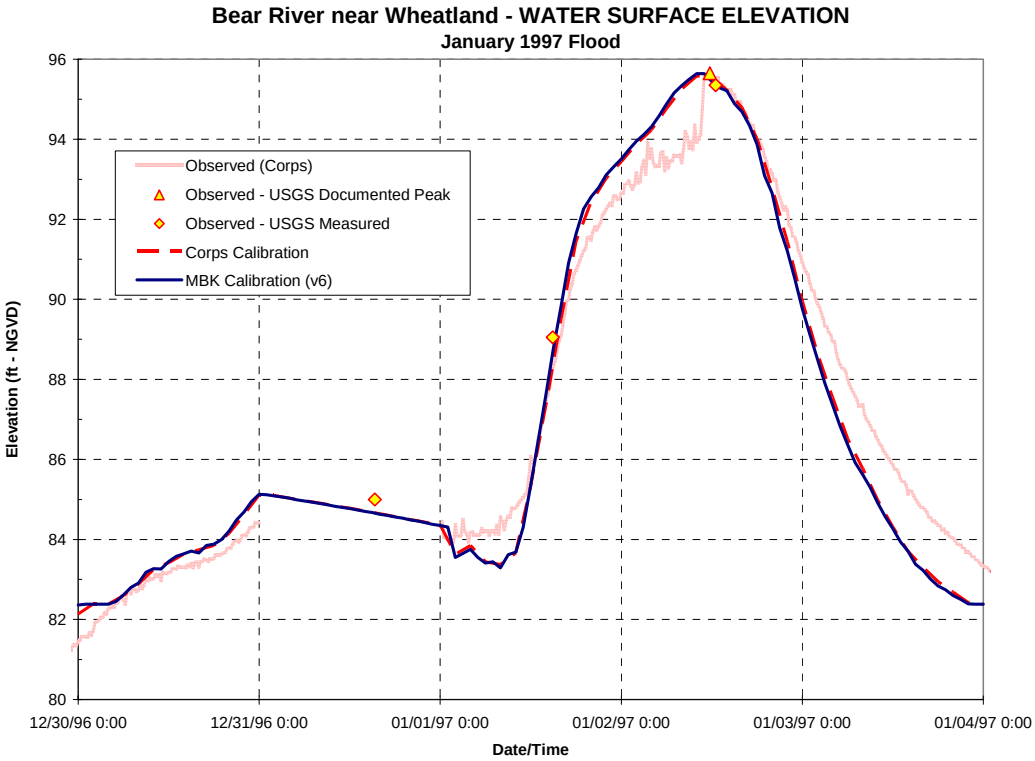


FIGURE 7

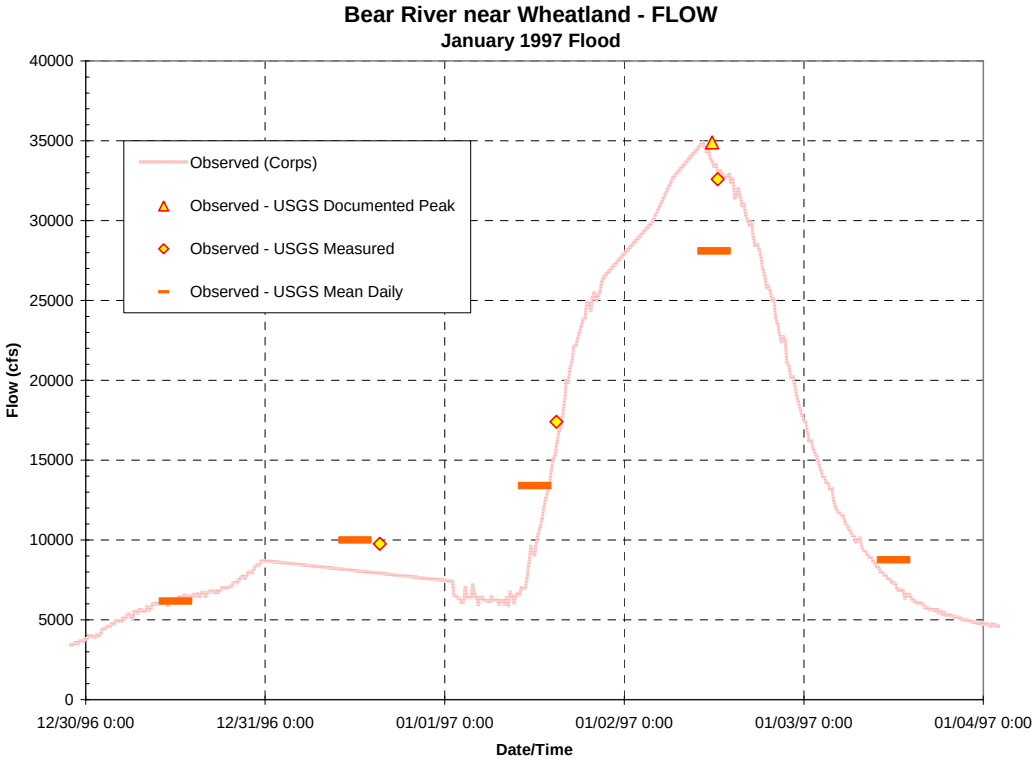


FIGURE 8

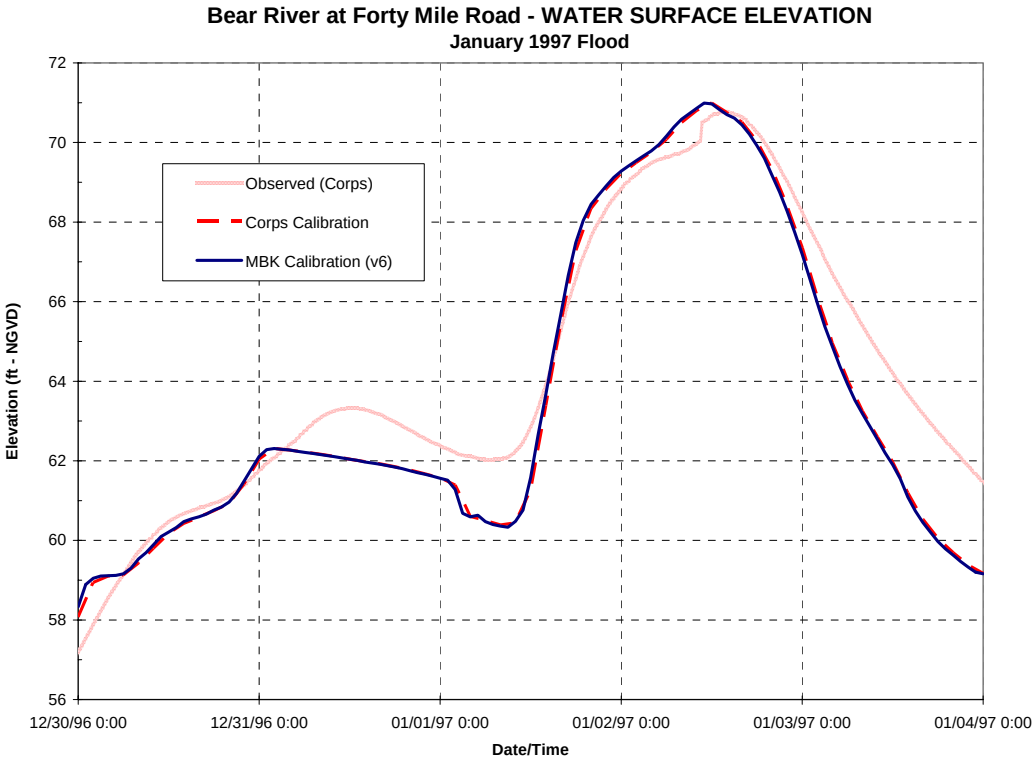


FIGURE 9

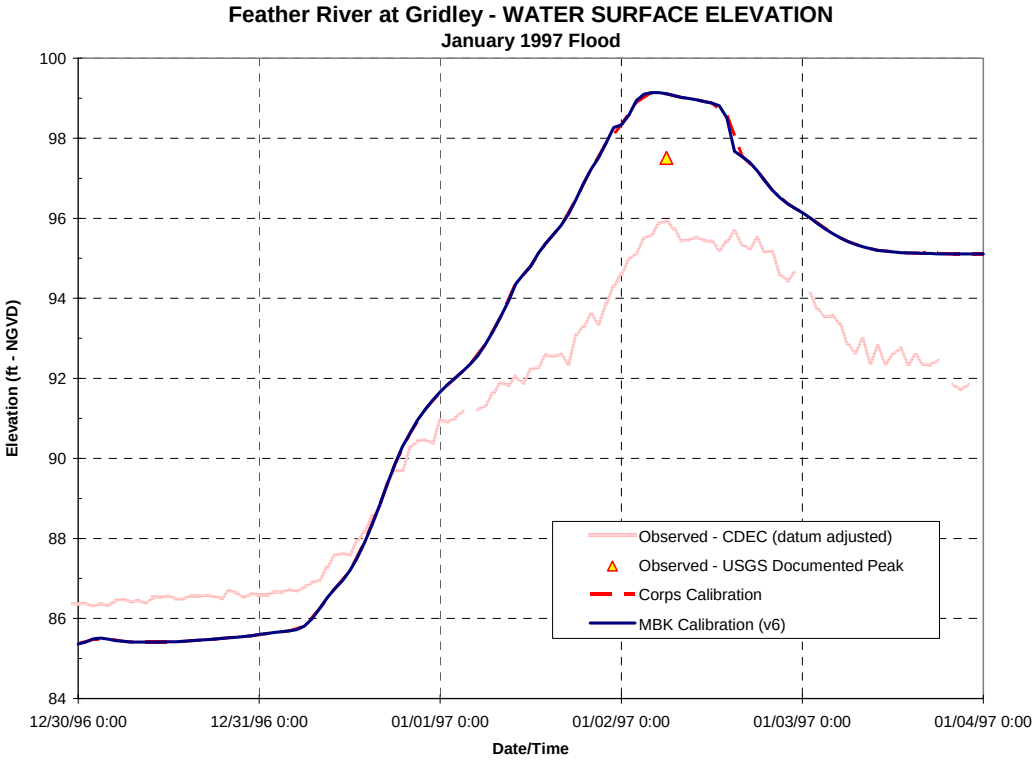
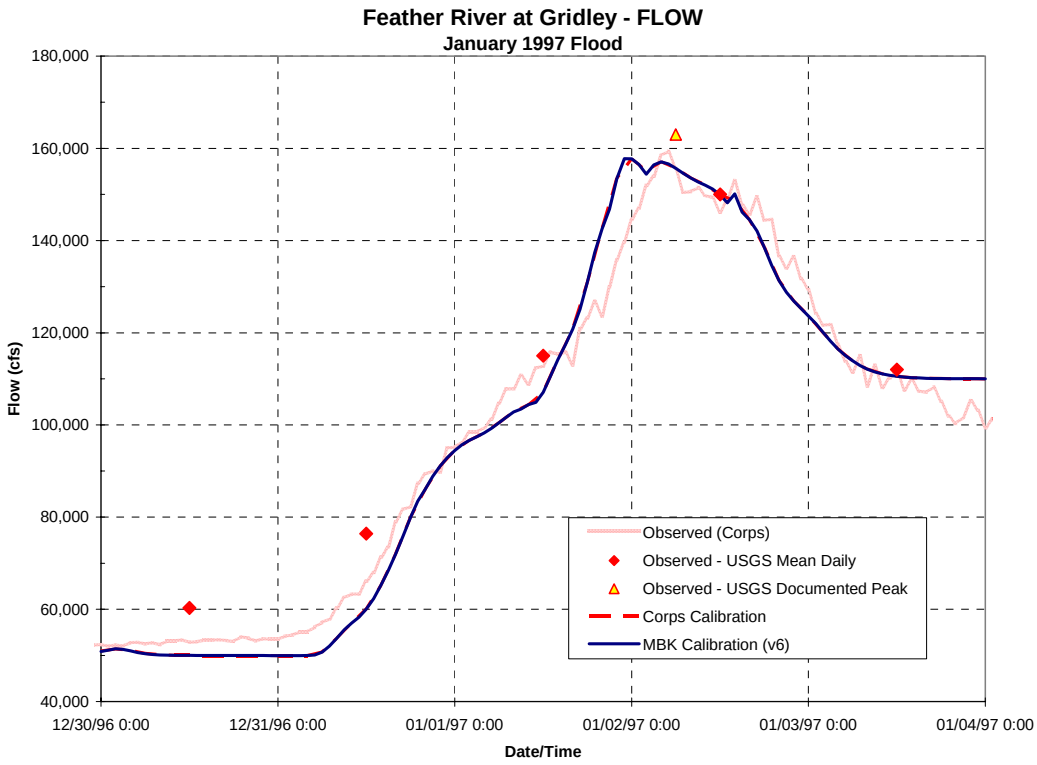


FIGURE 10



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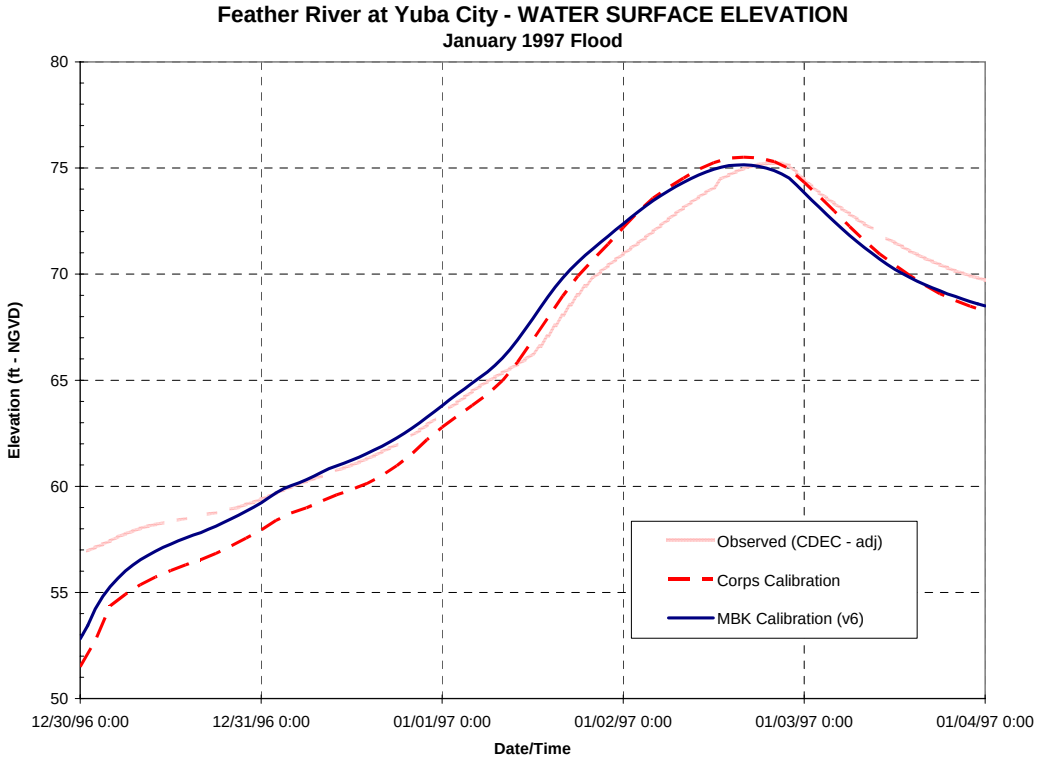


FIGURE 12

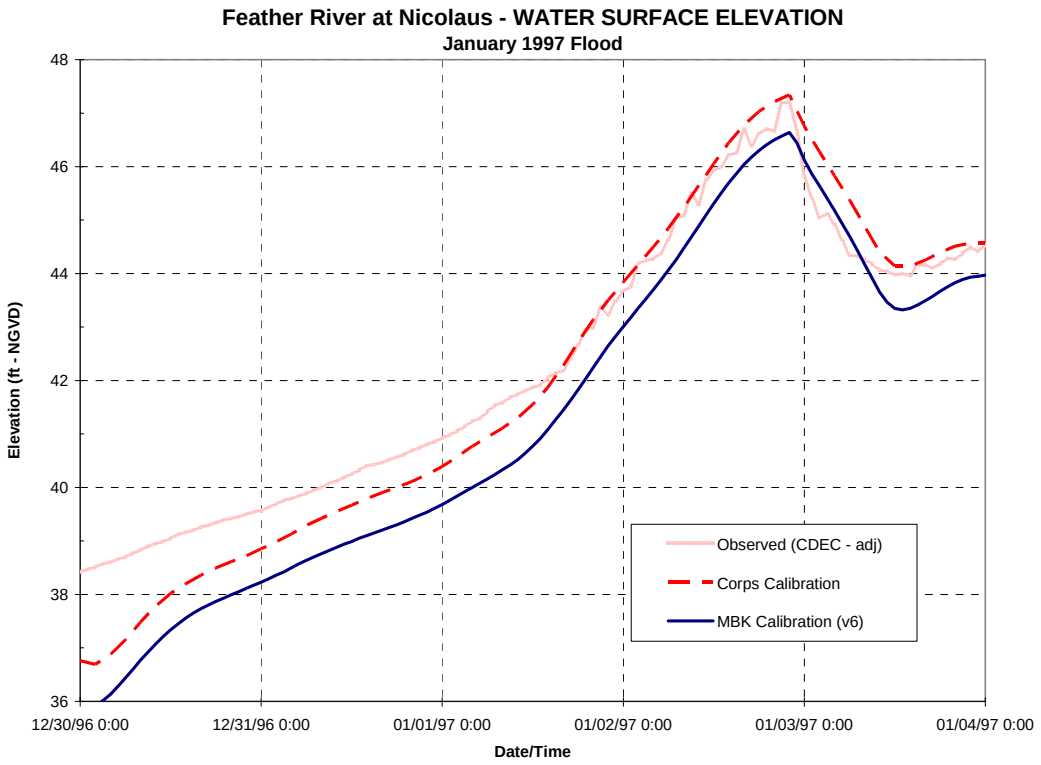


FIGURE 13

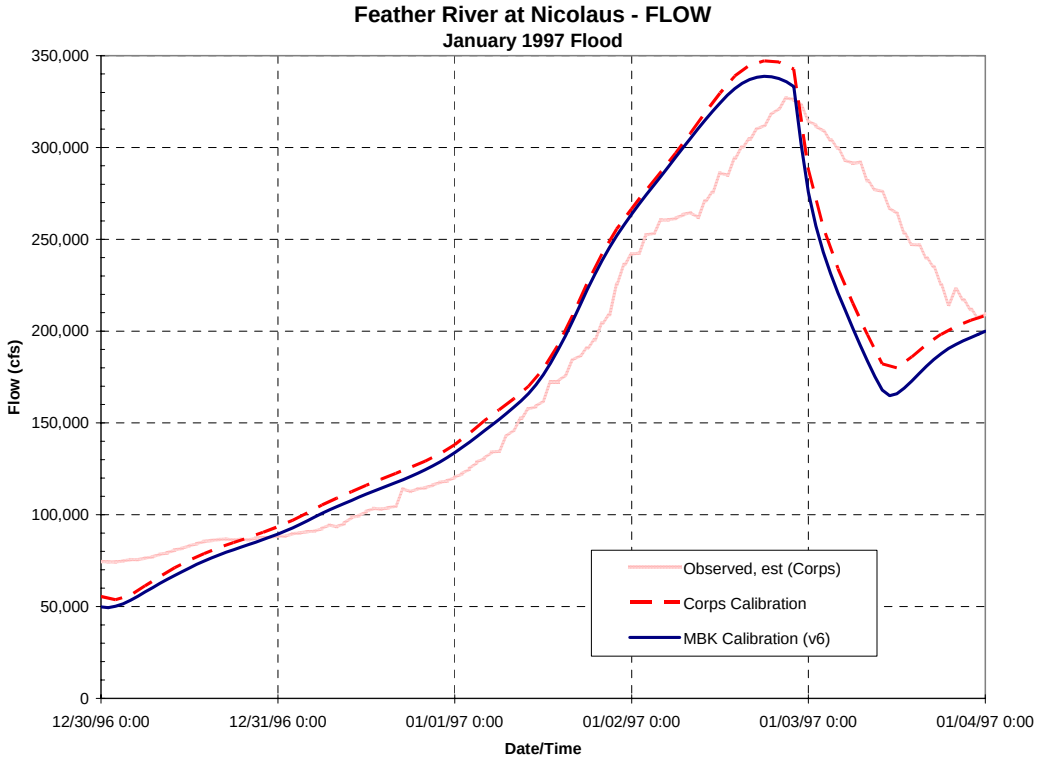


FIGURE 14

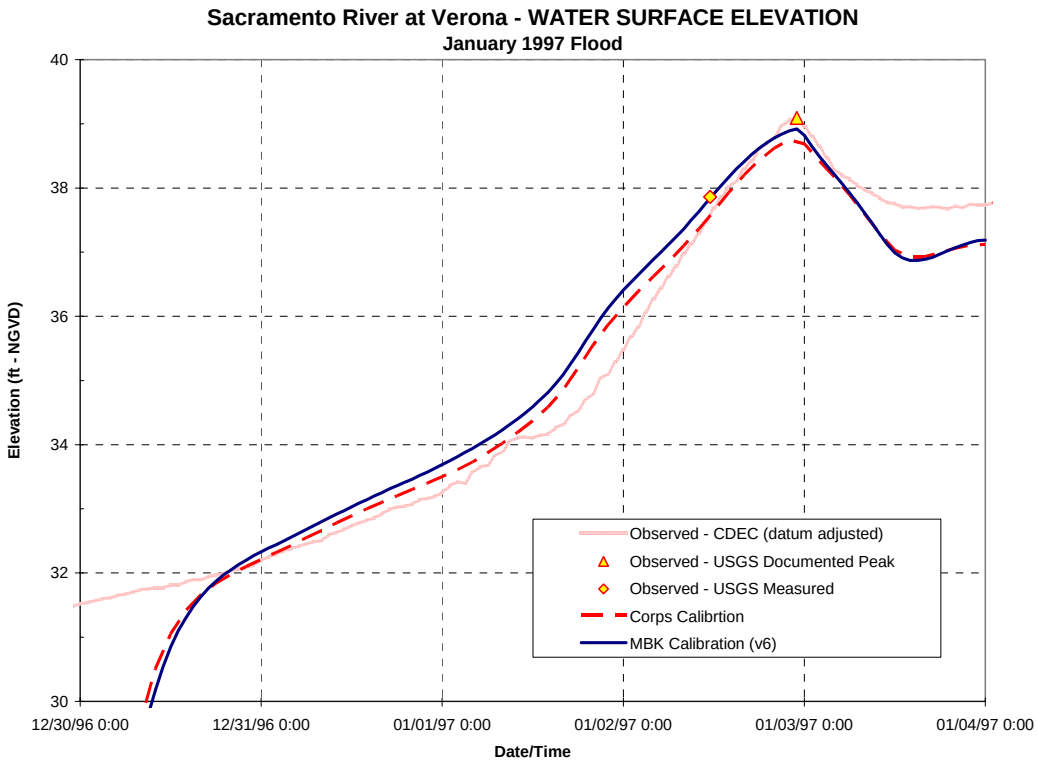


FIGURE 15

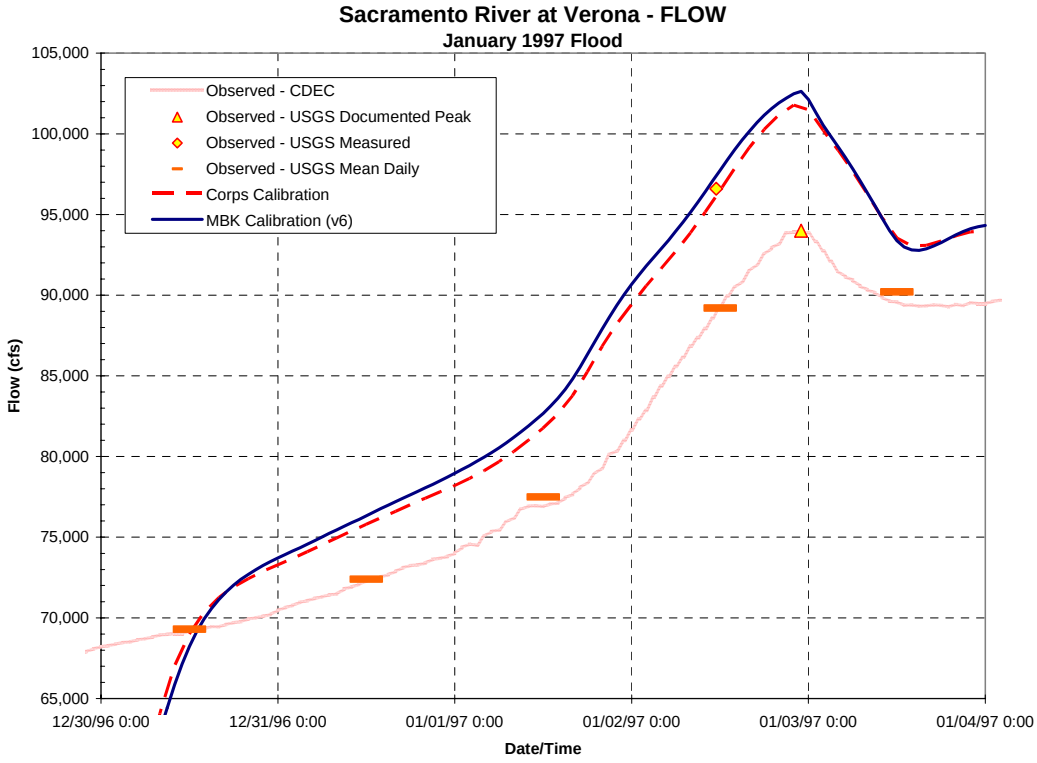


FIGURE 16

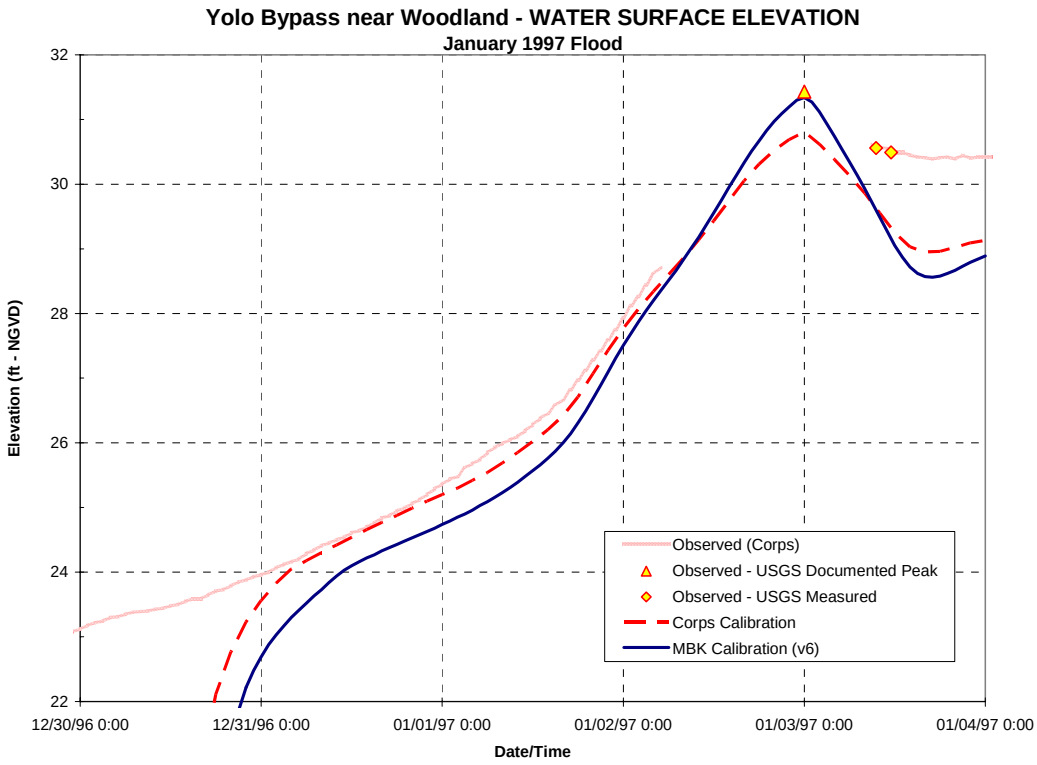
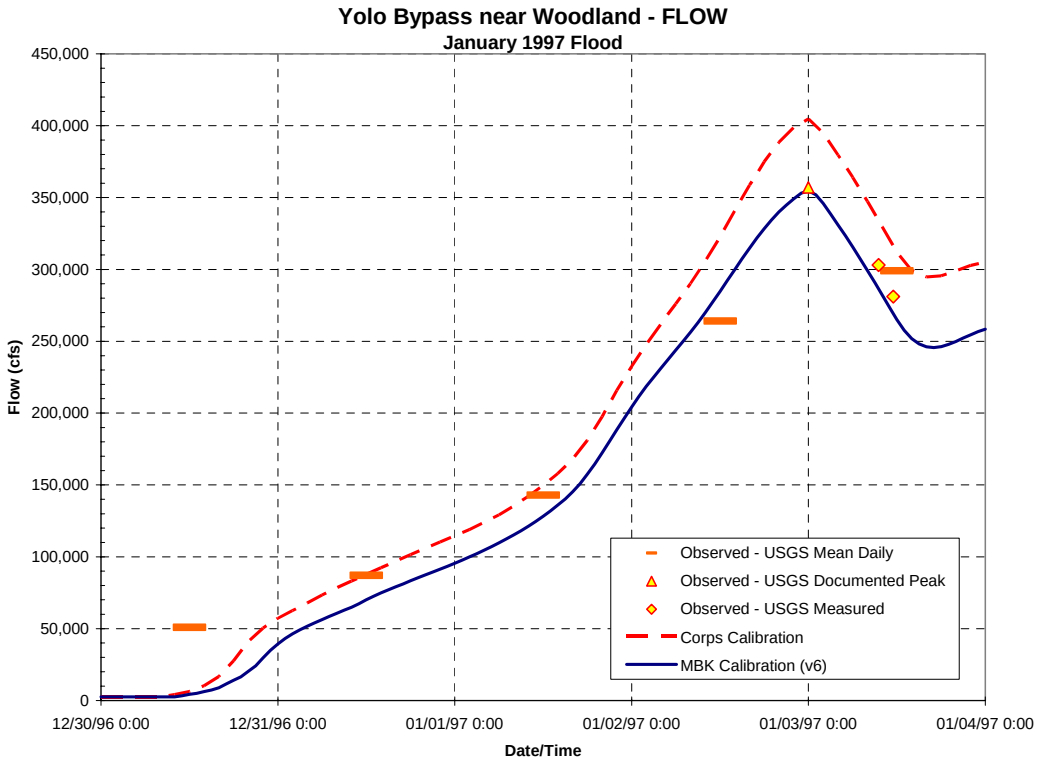


FIGURE 17



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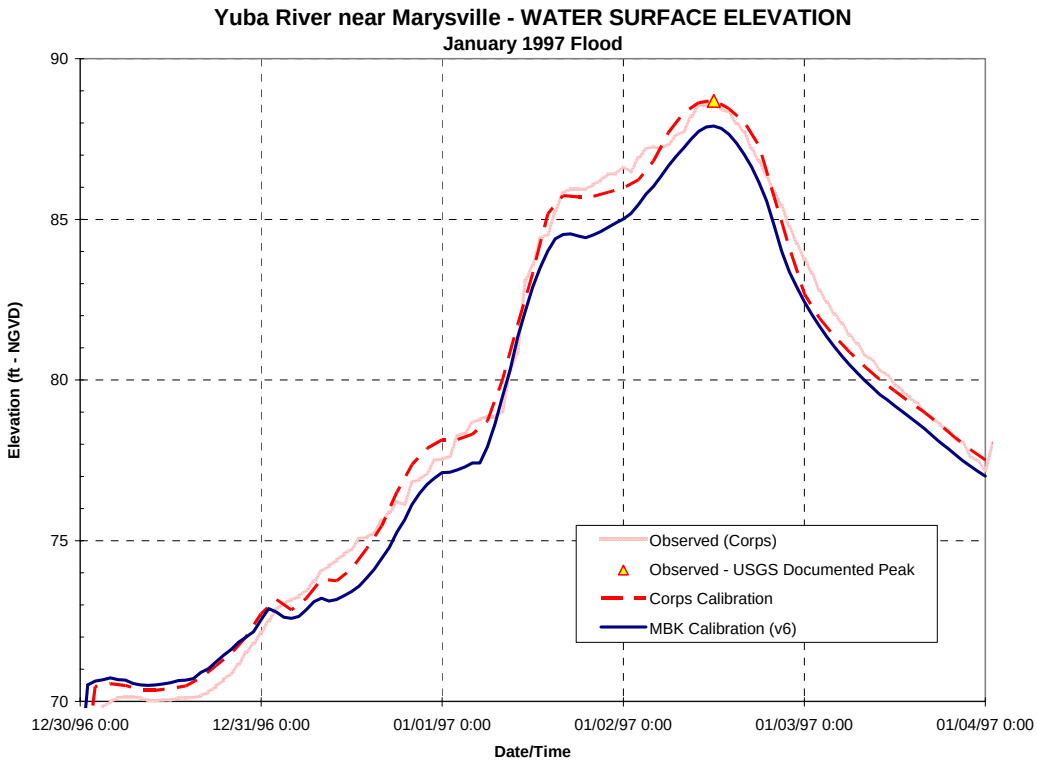


FIGURE 19

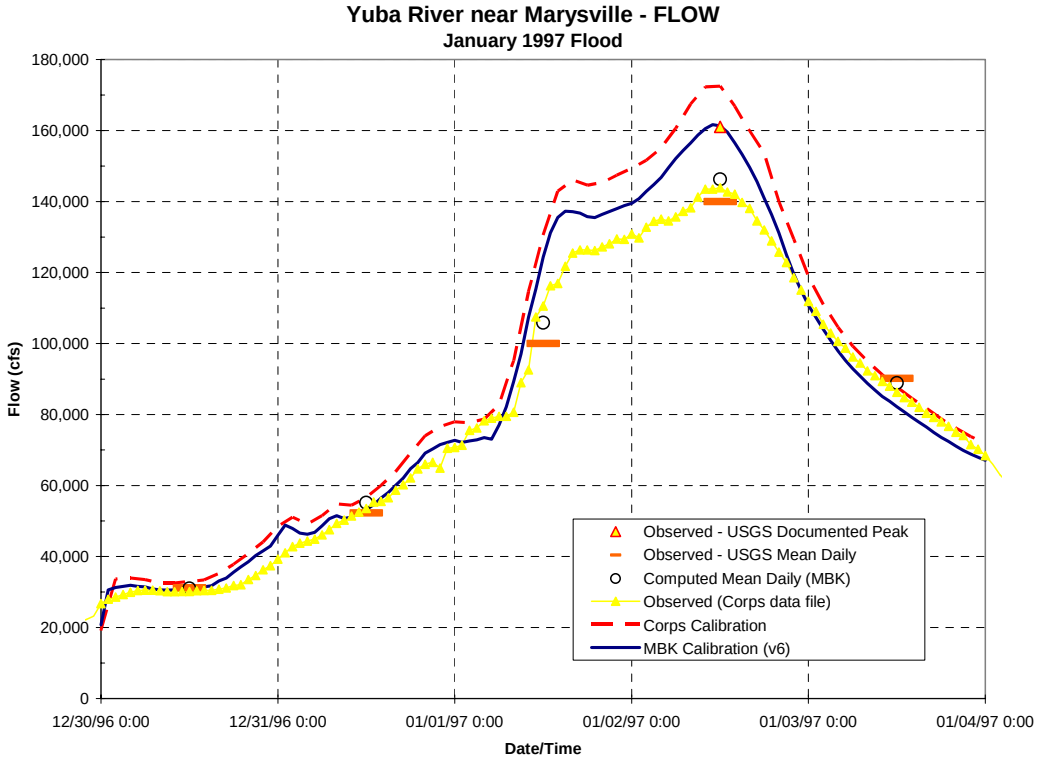
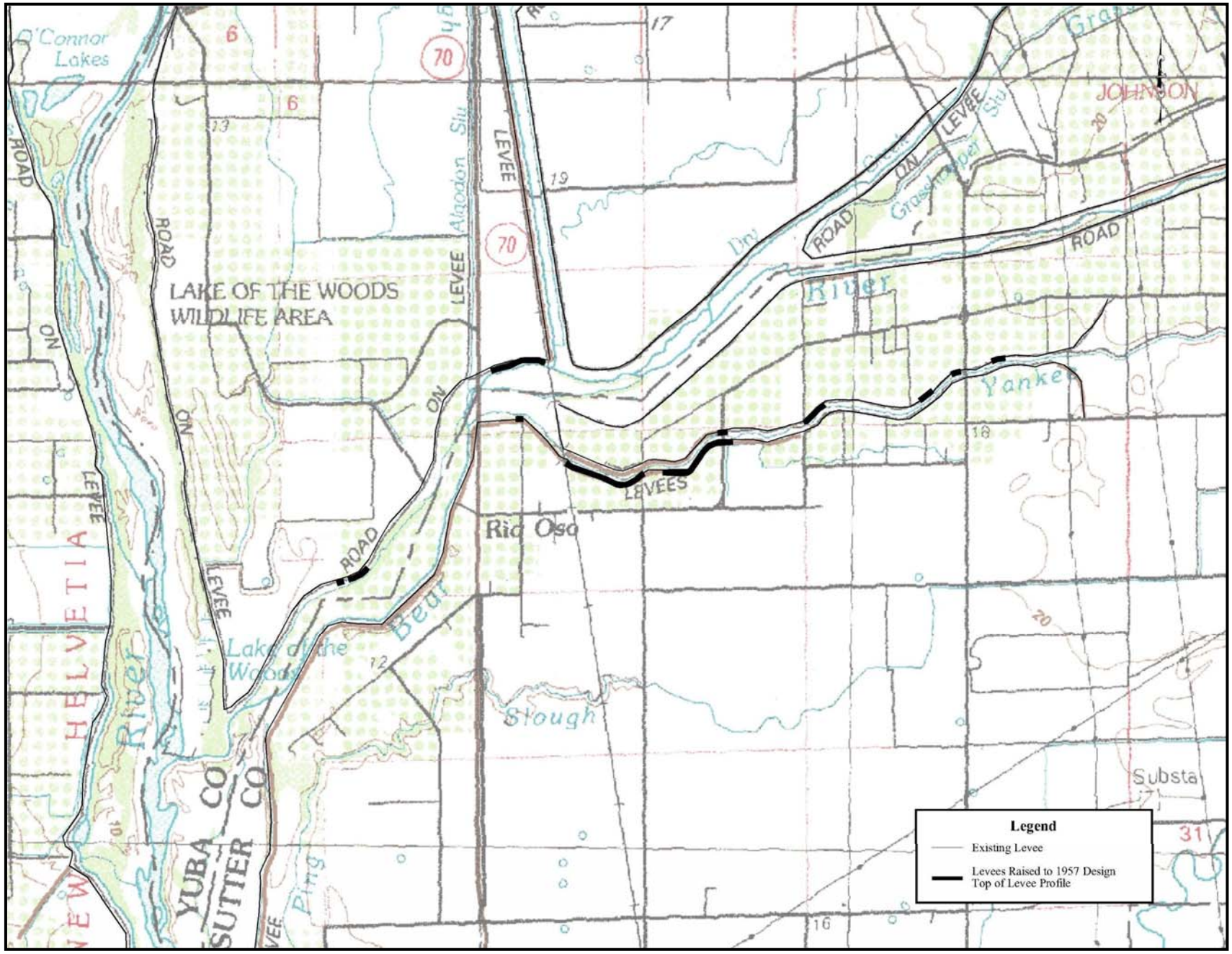
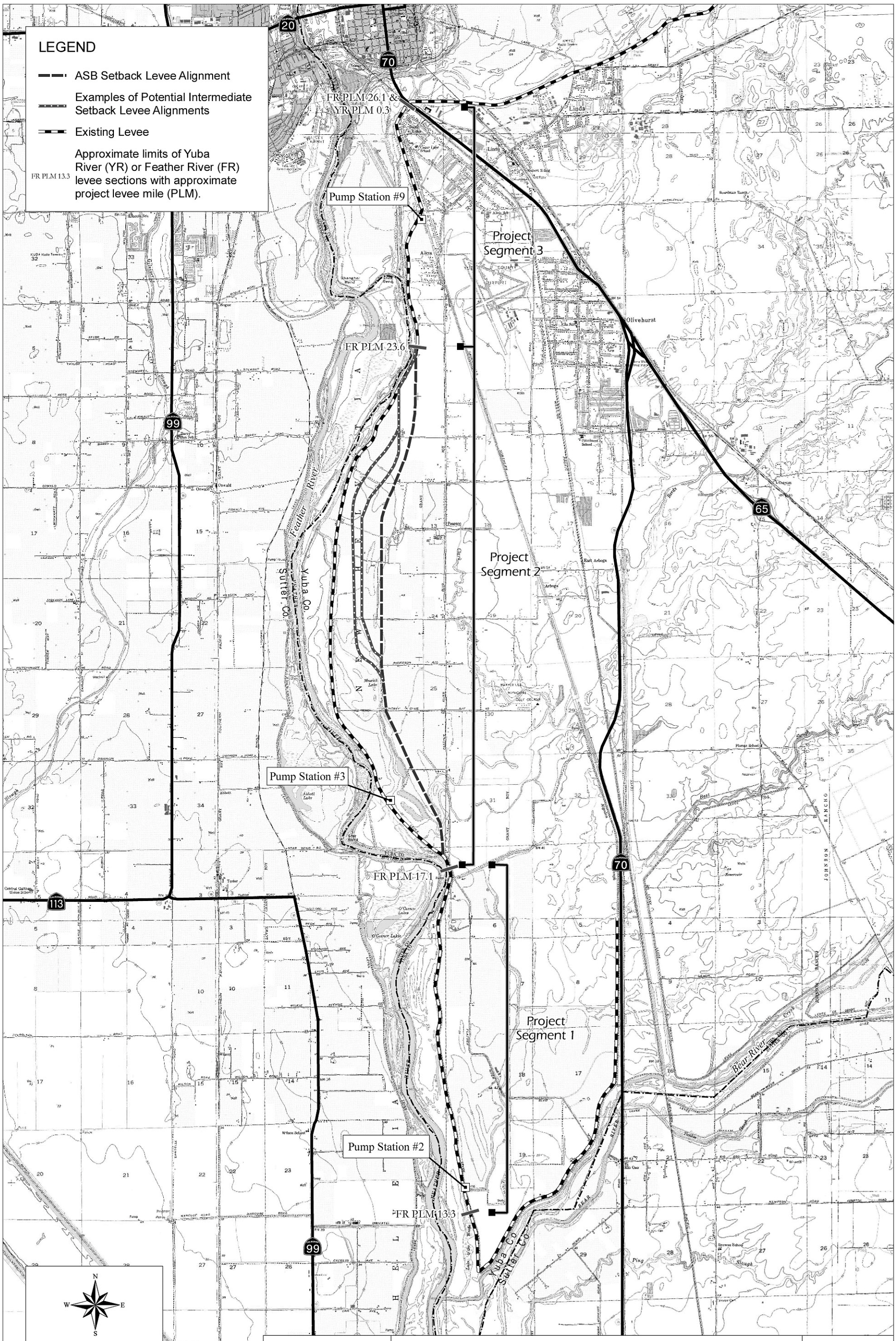


FIGURE 20
Levees Reaches Below 1957 Design Elevation





Bookman-Edmonston
A Division of GEI Consultants

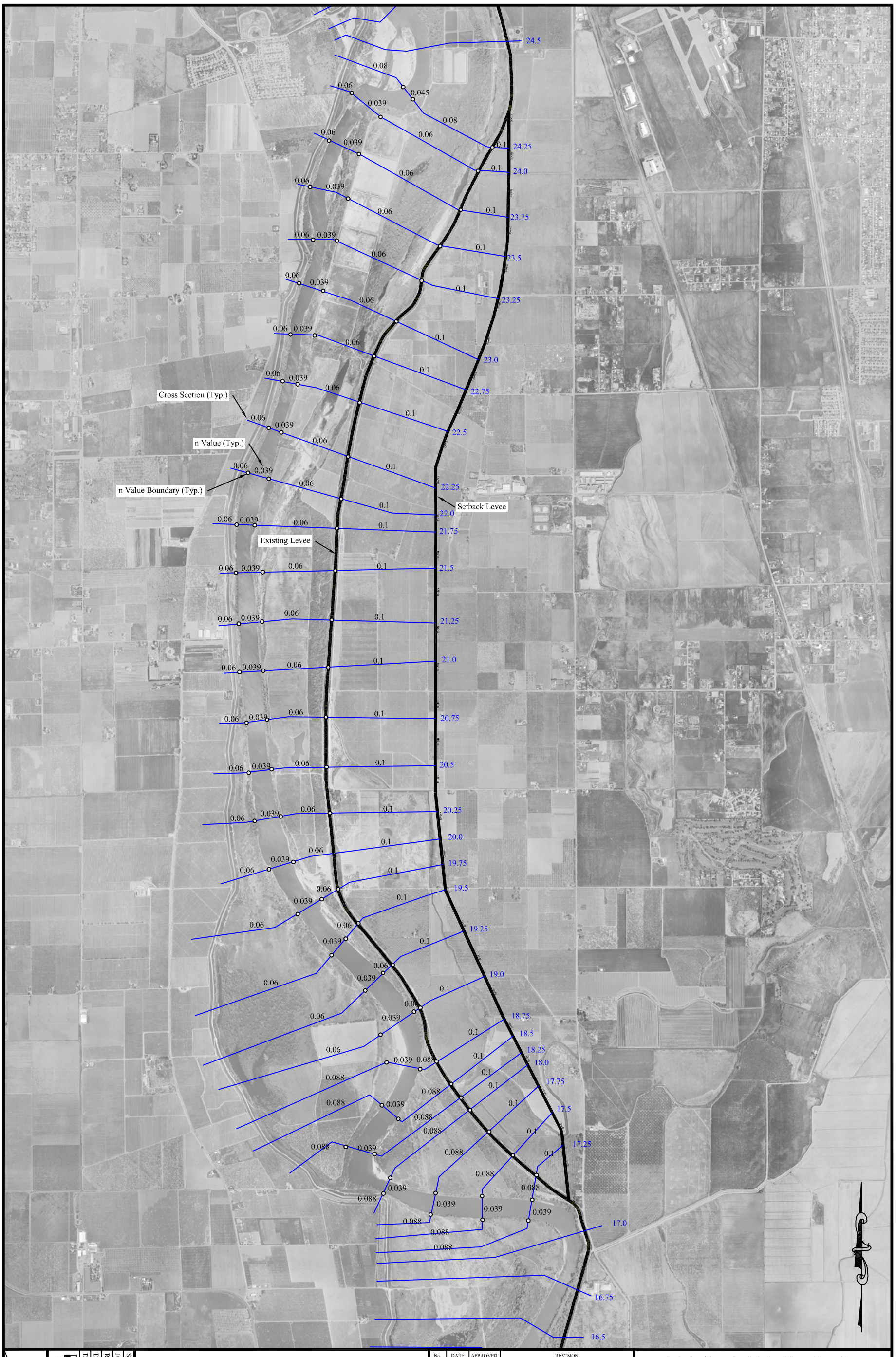
FEATHER RIVER LEVEE REPAIR PROJECT

Project Features

Reclamation District No. 784, Yuba County, California

Sources: EDAW 2004; GEI Consultants, Inc. 2004; Topo baseman provided by GEI Consultants, Inc.

FIGURE 21



Three Rivers Levee Improvement Authority
Phase IV

Alternative 2 Project Features

No.	DATE	APPROVED	REVISION

SCALE: 1" = 2500'
JOB NUMBER: 5141
REQUESTED BY: DT
DRAWN BY: DT
DATE: May 2006

Bar Length On Original Drawing Equals One Inch. Adjust Scale Accordingly.

SHEET 1 OF 1 SHEETS

MBK ENGINEERS
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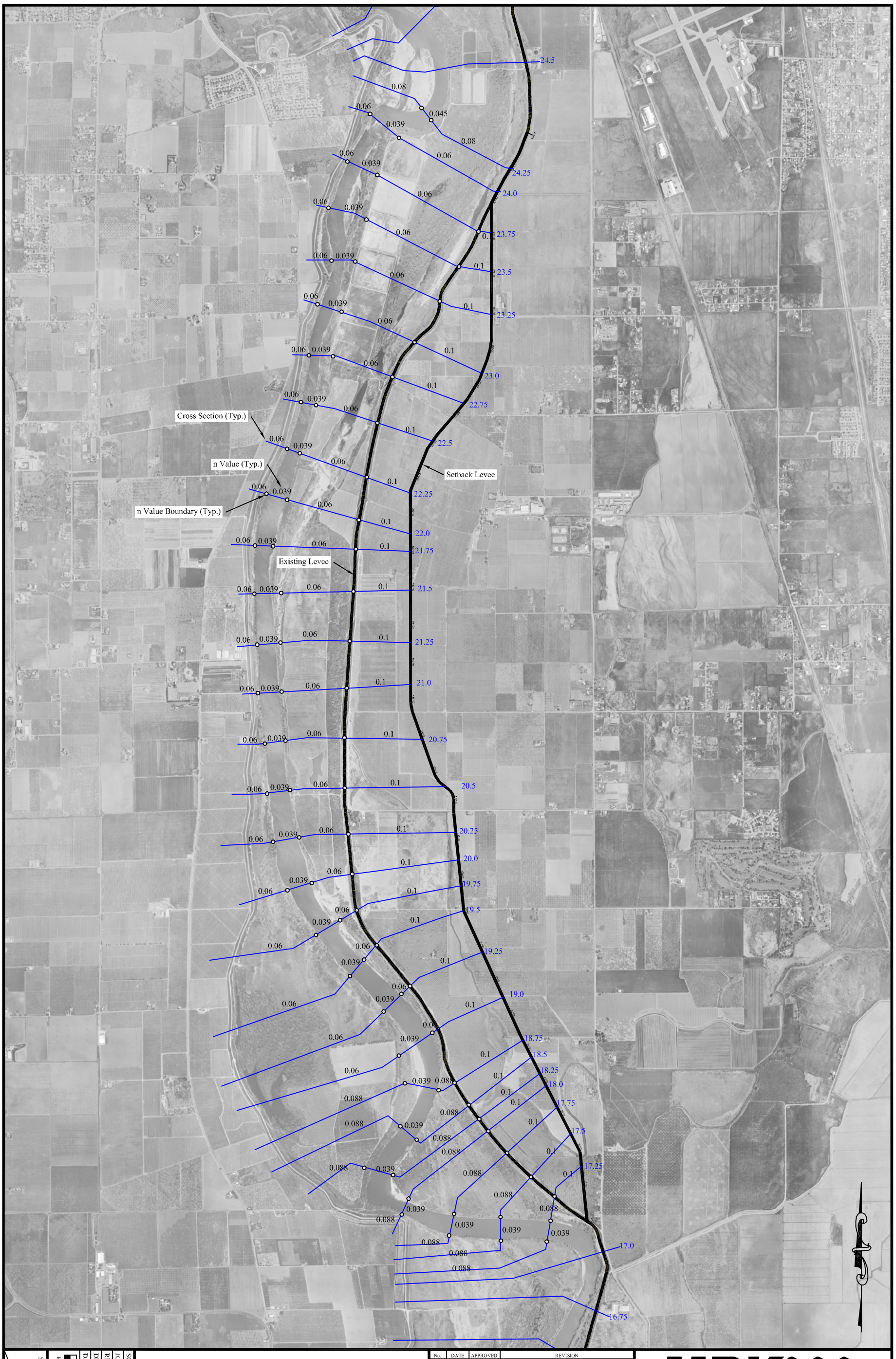
FIGURE 22



Three Rivers Levee Improvement Authority
Phase IV

Alternative 3 Project Features

No.	DATE	APPROVED	REVISION

SCALE: 1" = 2500'
JOB NUMBER: 5141
REQUESTED BY: DT
DRAWN BY: DT
DATE: May 2006

Bar Length On Original Drawing Equals One Inch. Adjust Scale Accordingly

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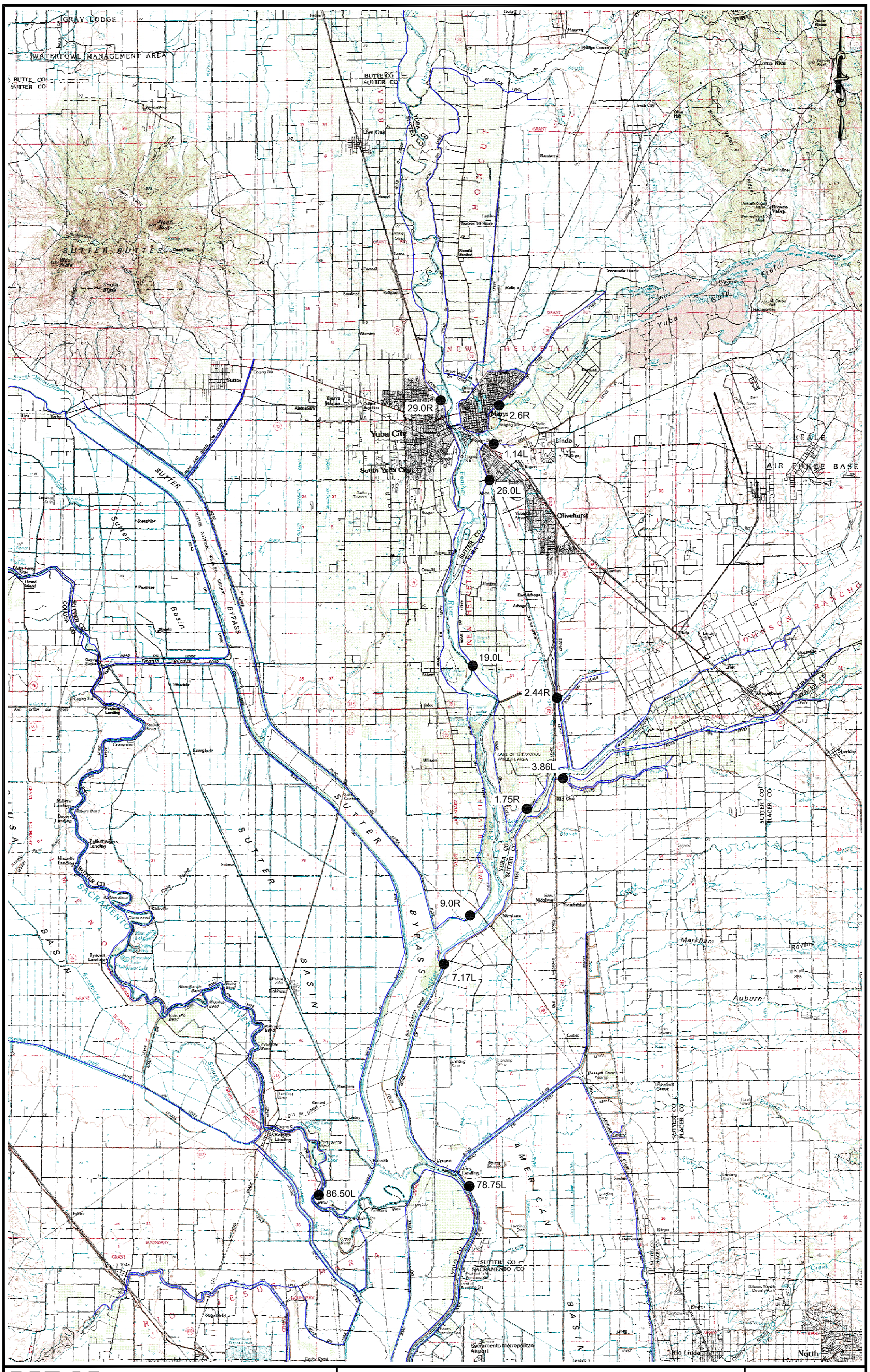
FIGURE 23



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Feather River Levee Repair Project

Flood Impact Index Points

0 1.5 3
Scale in Miles

FIGURE 24

FIGURE 25

Feather River (RM 6 to 22)
1-in-100 AEP Water Surface Profile for Alternative 2

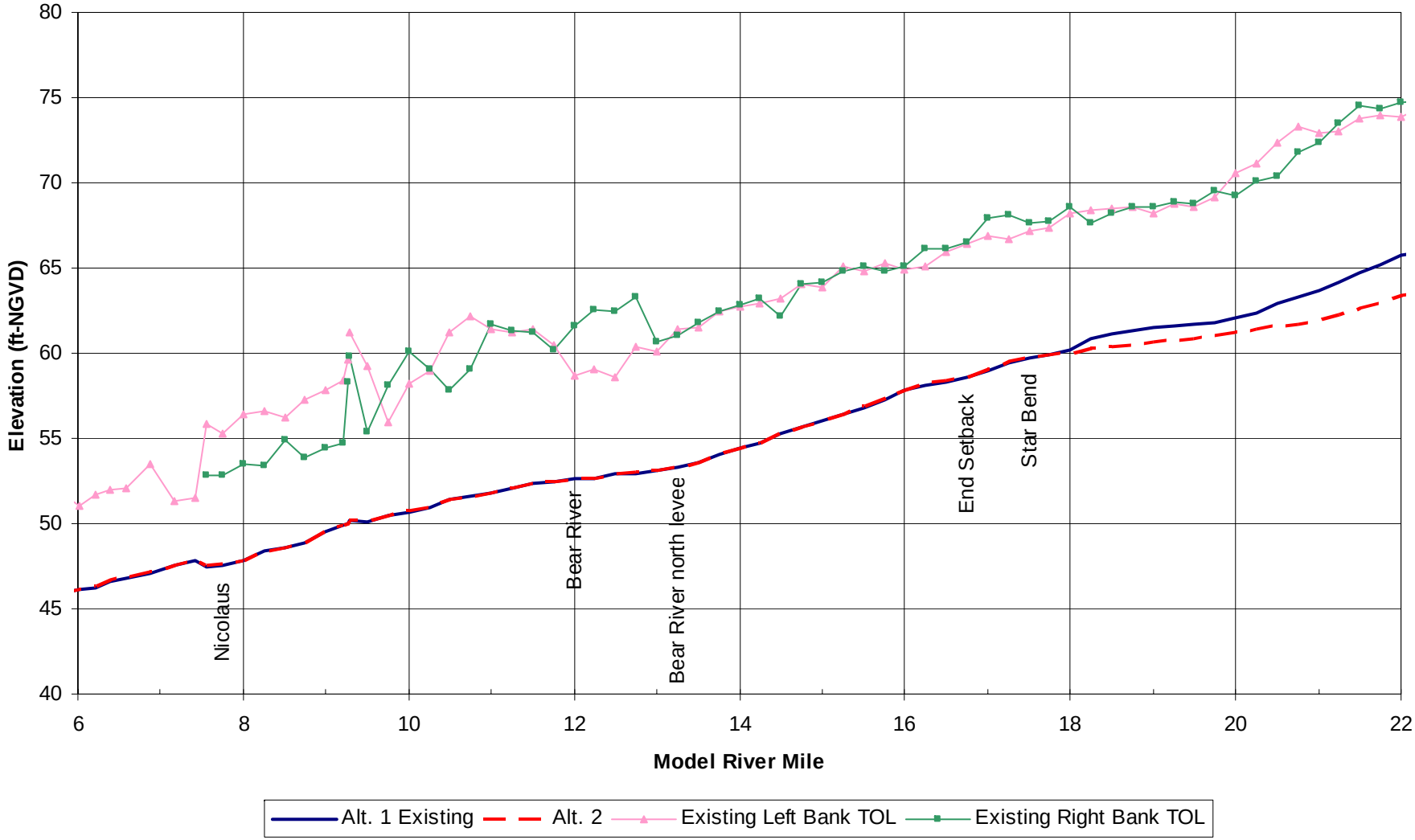


FIGURE 26

Feather River (RM 20 to 36)
1-in-100 AEP Water Surface Profile for Alternative 2

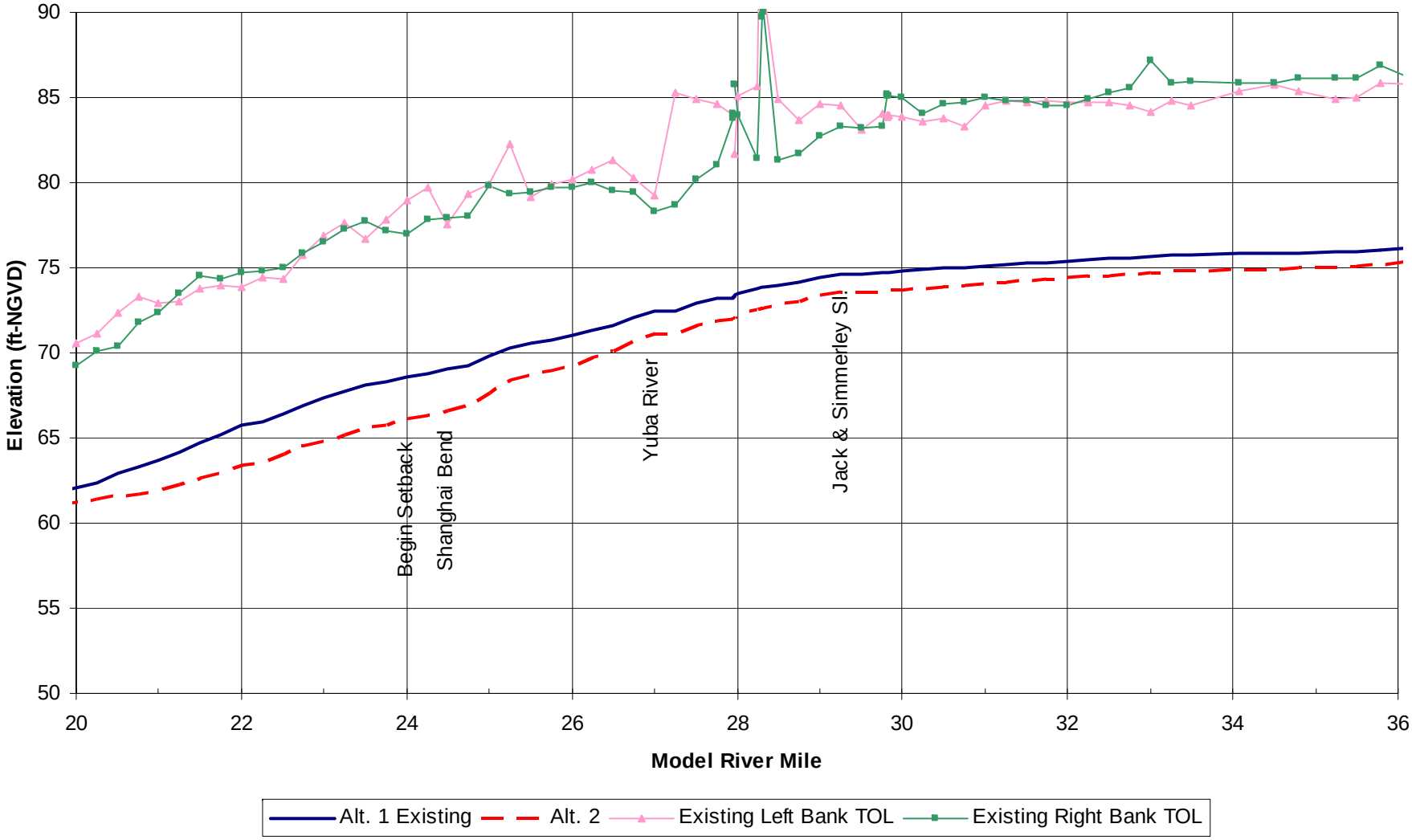


FIGURE 27

Feather River RM (34 to 50)
1-in-100 AEP Water Surface Profile for Alternative 2

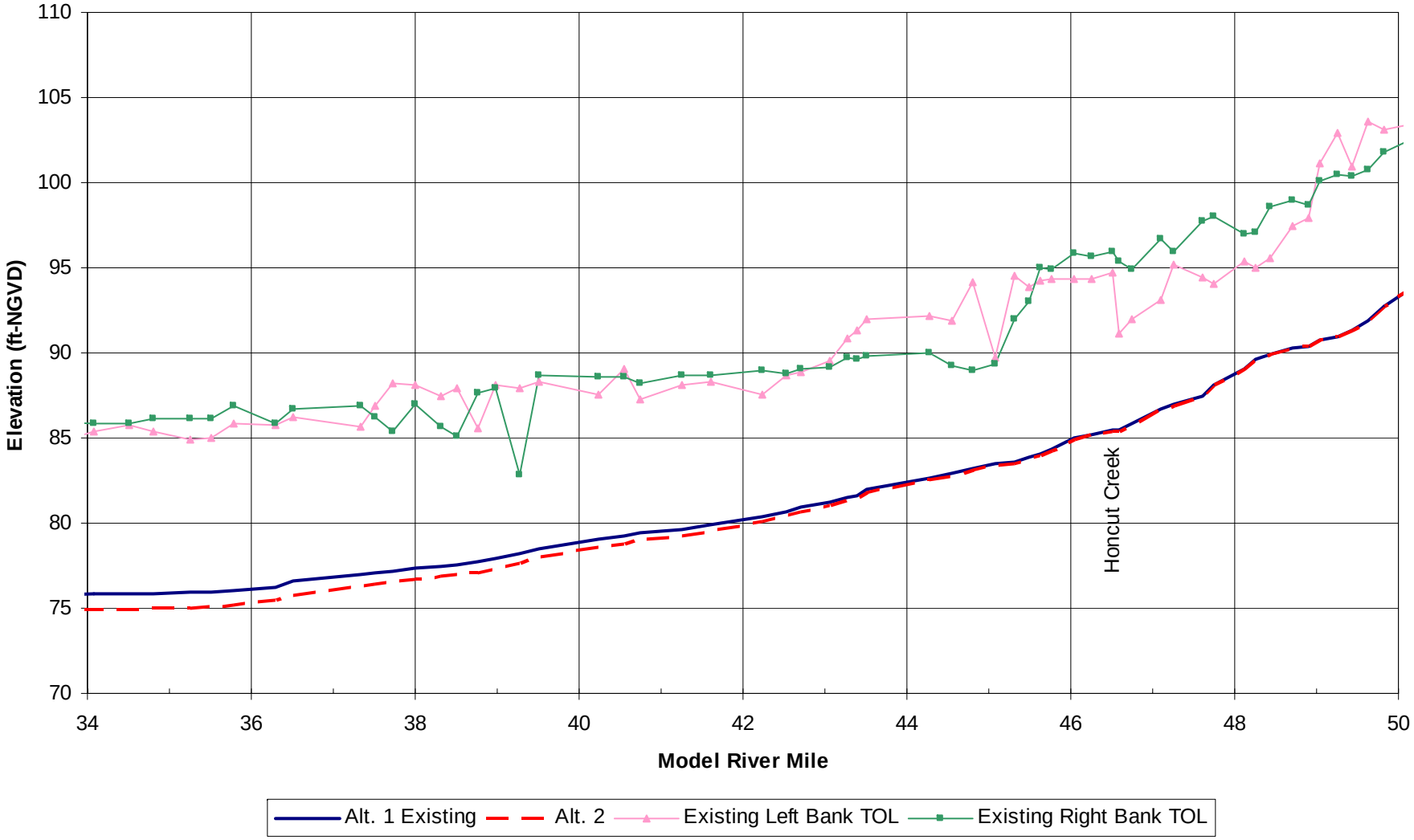


FIGURE 28

Feather River (RM 6 to 22)
1-in-200 AEP Water Surface Profile for Alternative 2

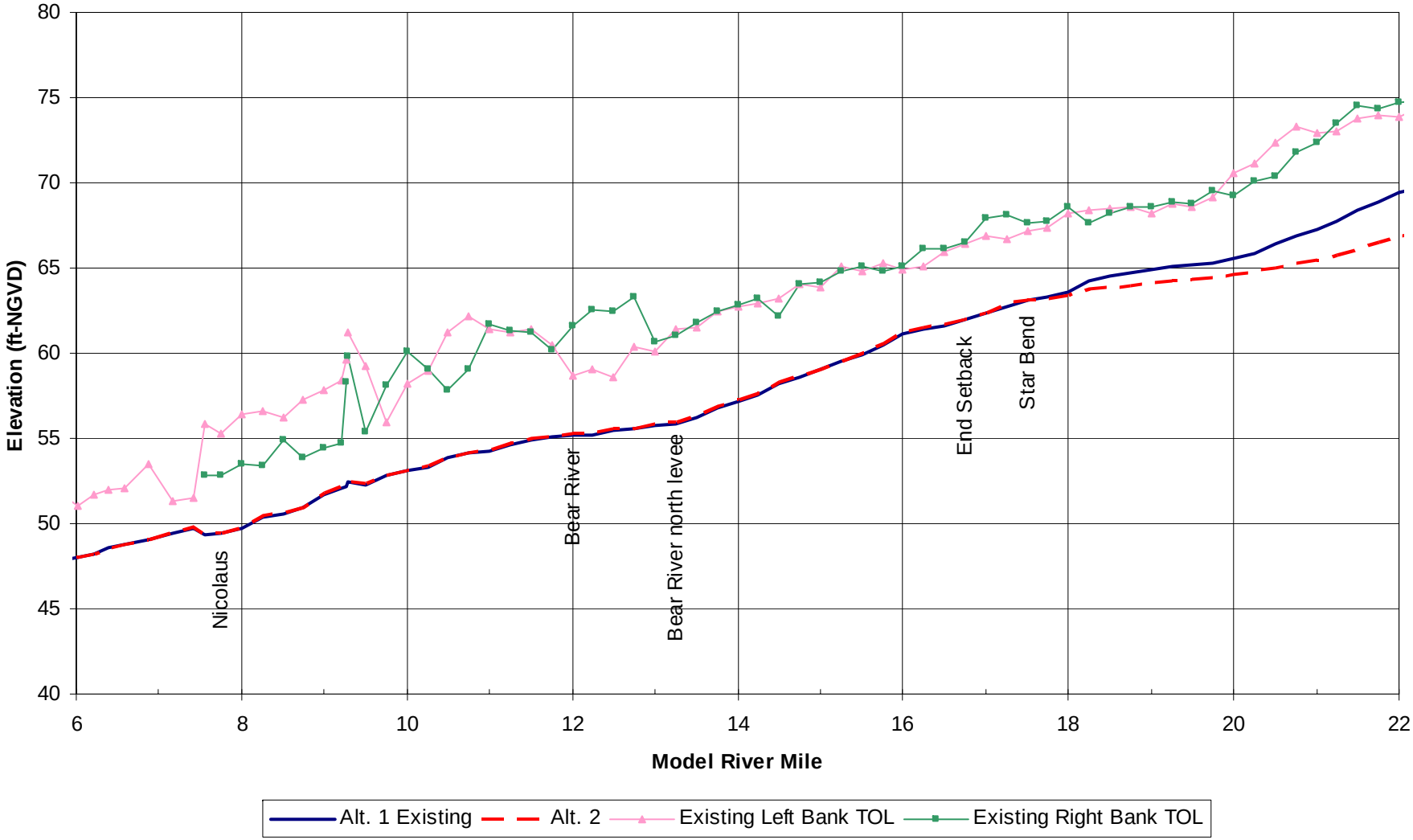


FIGURE 29

Feather River (RM 20 to 36)
1-in-200 AEP Water Surface Profile for Alternative 2

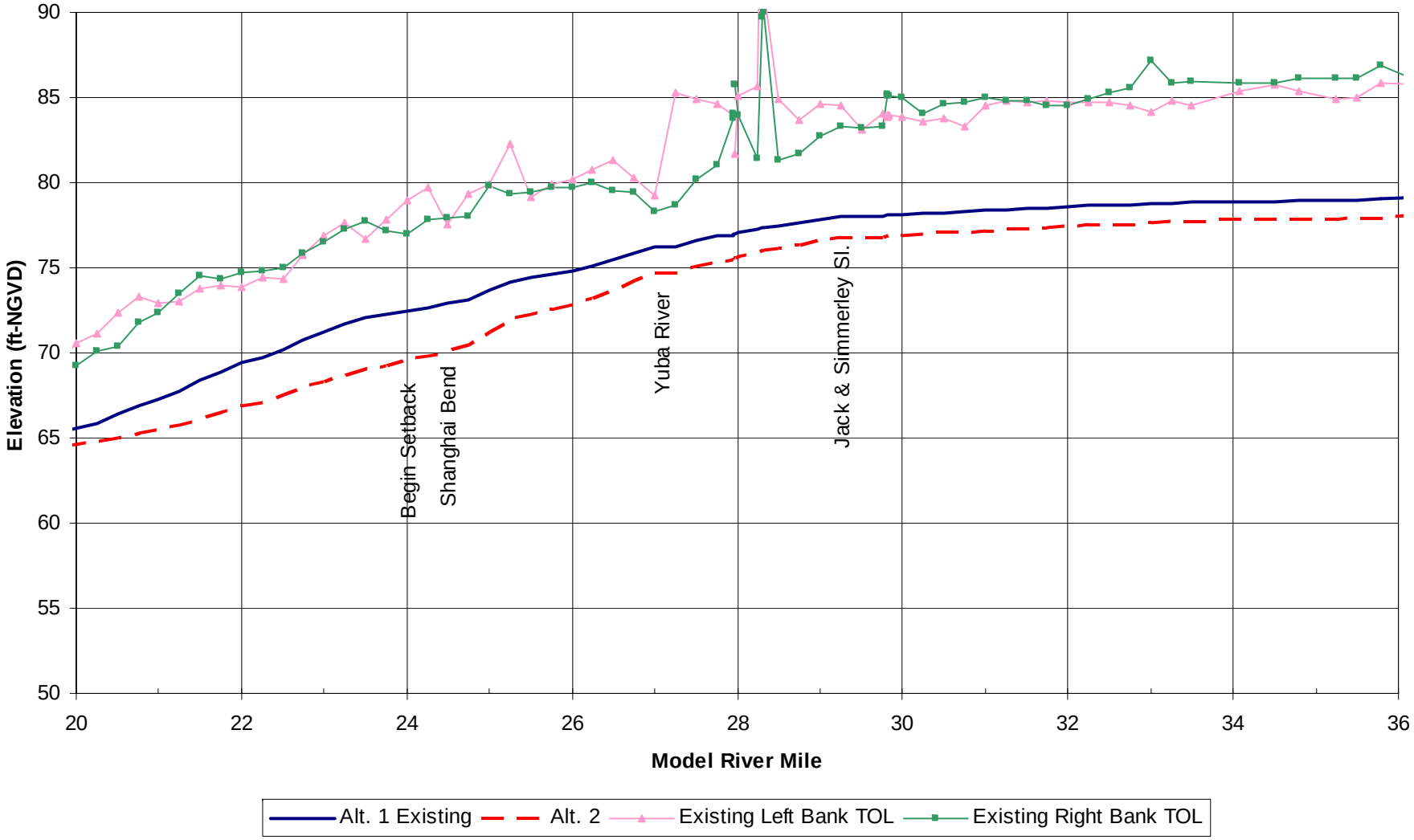


FIGURE 30

Feather River RM (34 to 50)
1-in-200 AEP Water Surface Profile for Alternative 2

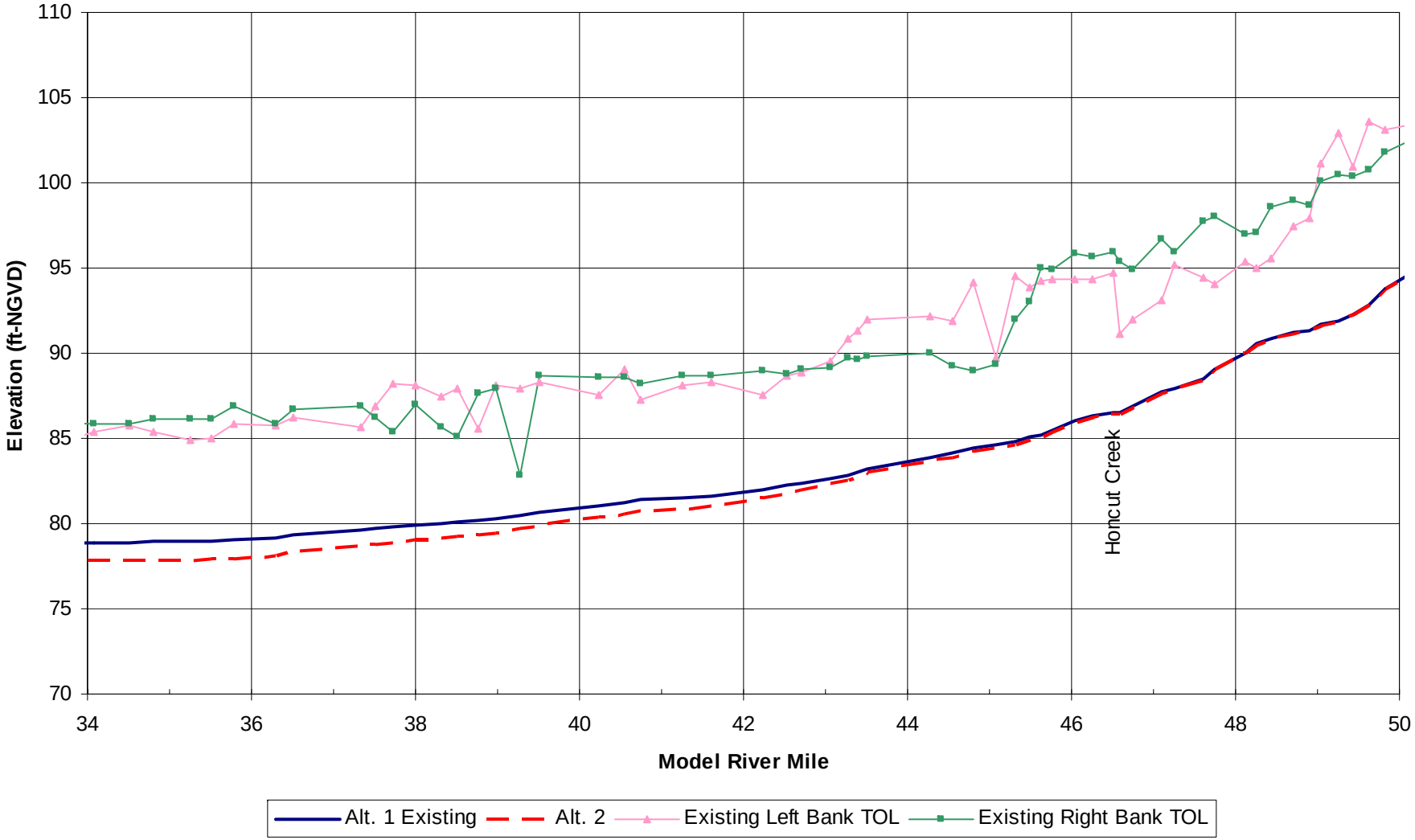


FIGURE 31

Feather River (RM 6 to 22)
1-in-100 AEP Water Surface Profile for Alternative 3

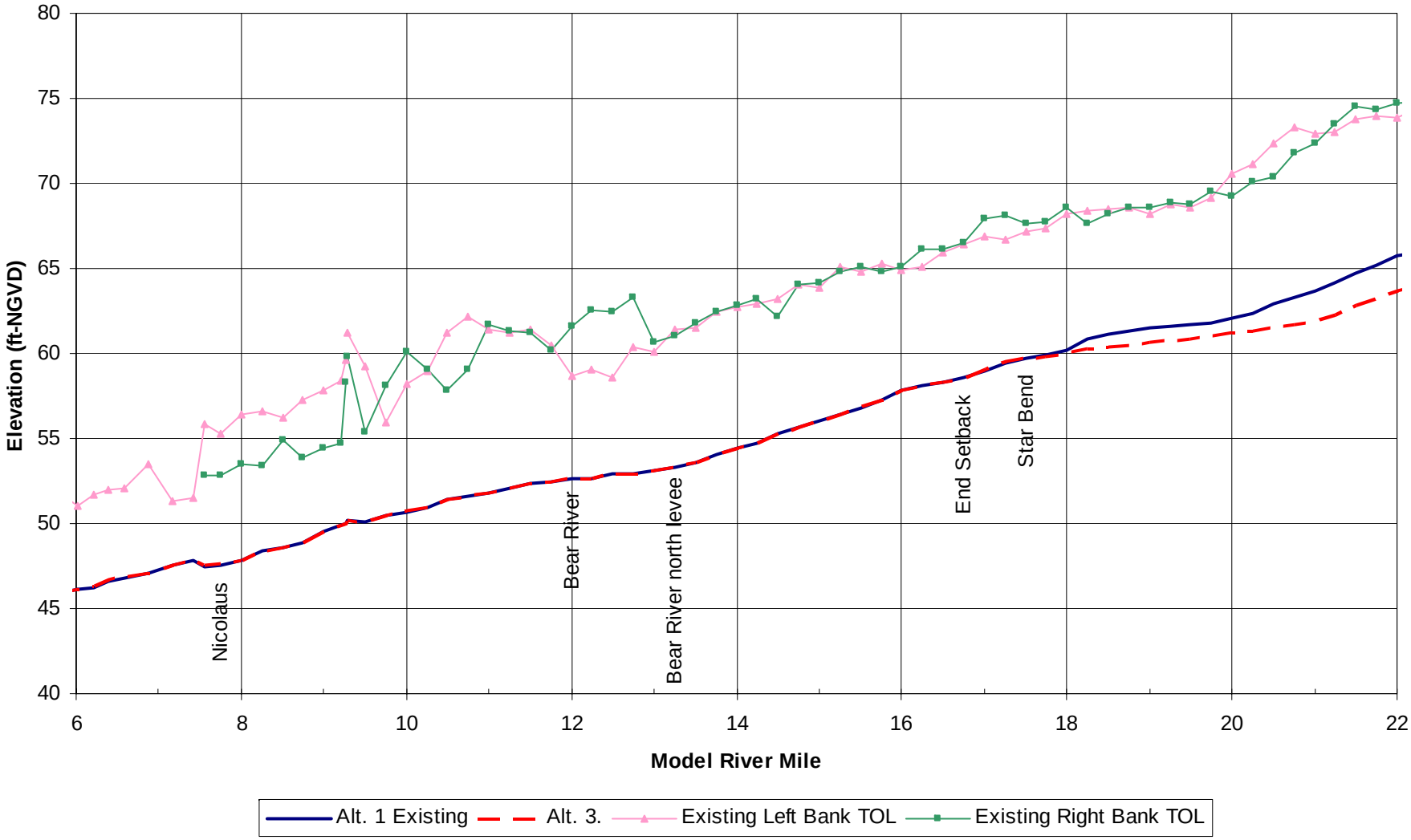


FIGURE 32

Feather River (RM 20 to 36)
1-in-100 AEP Water Surface Profile for Alternative 3

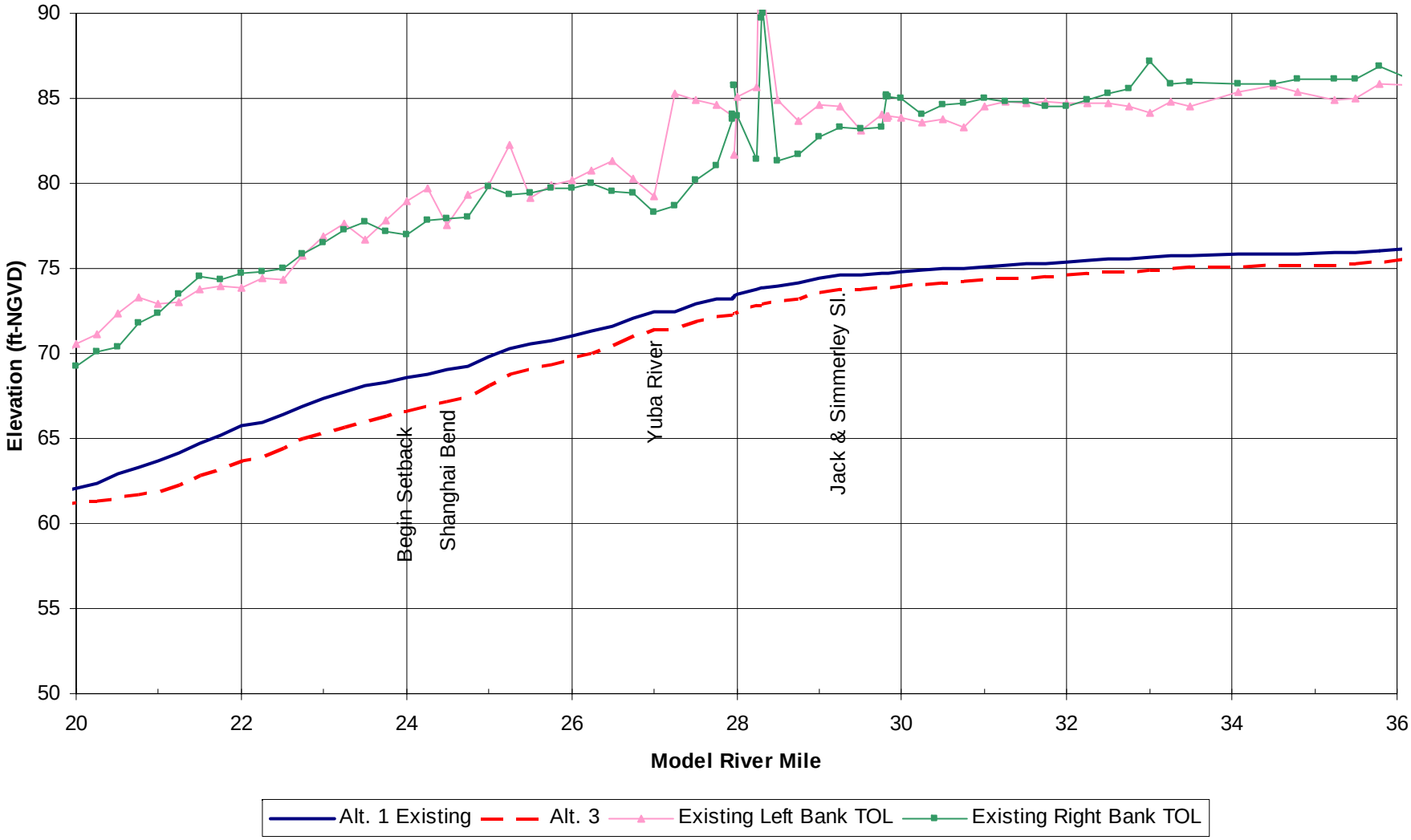


FIGURE 33

Feather River RM (34 to 50)
1-in-100 AEP Water Surface Profile for Alternative 3

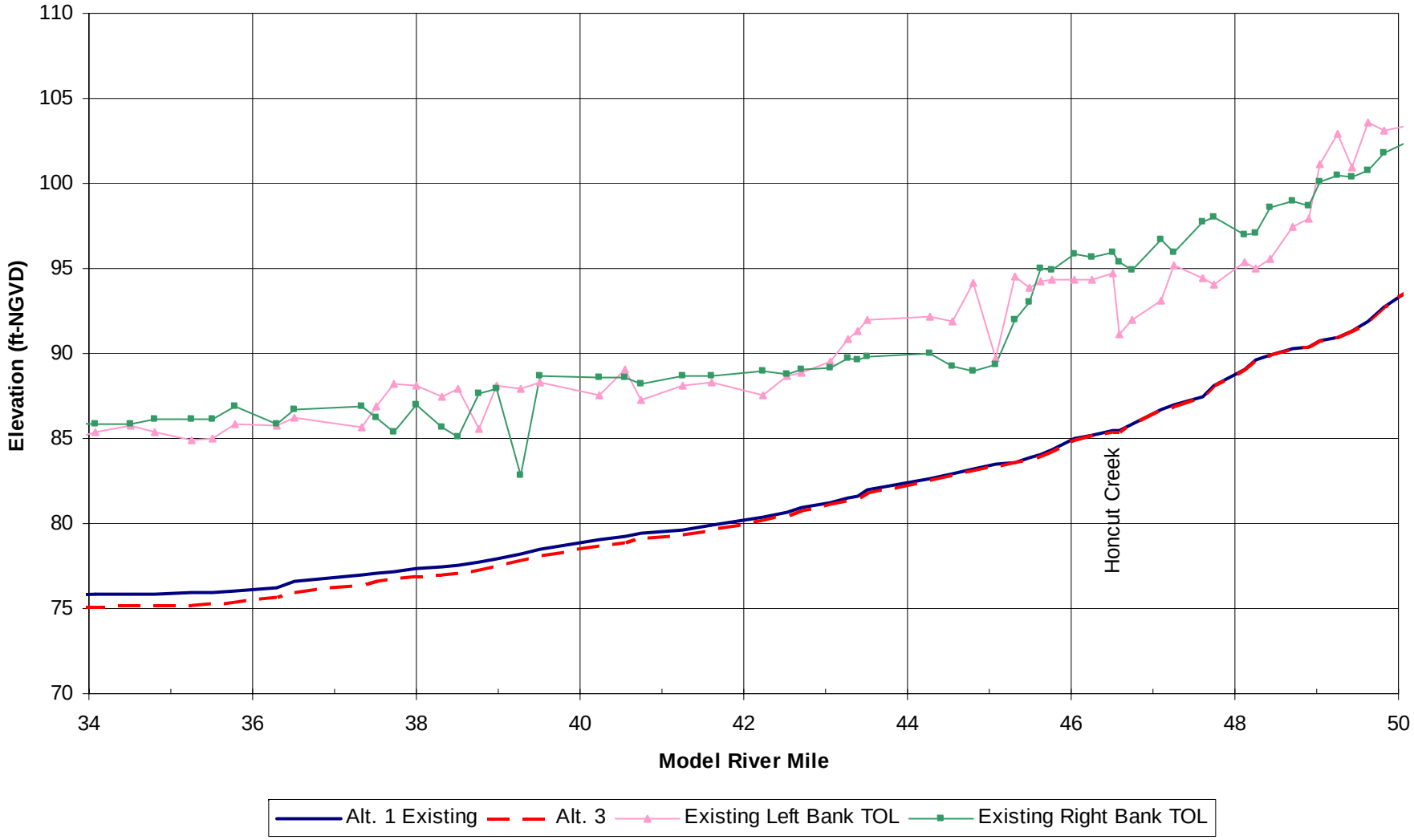


FIGURE 34

Feather River (RM 6 to 22)
1-in-200 AEP Water Surface Profile for Alternative 3

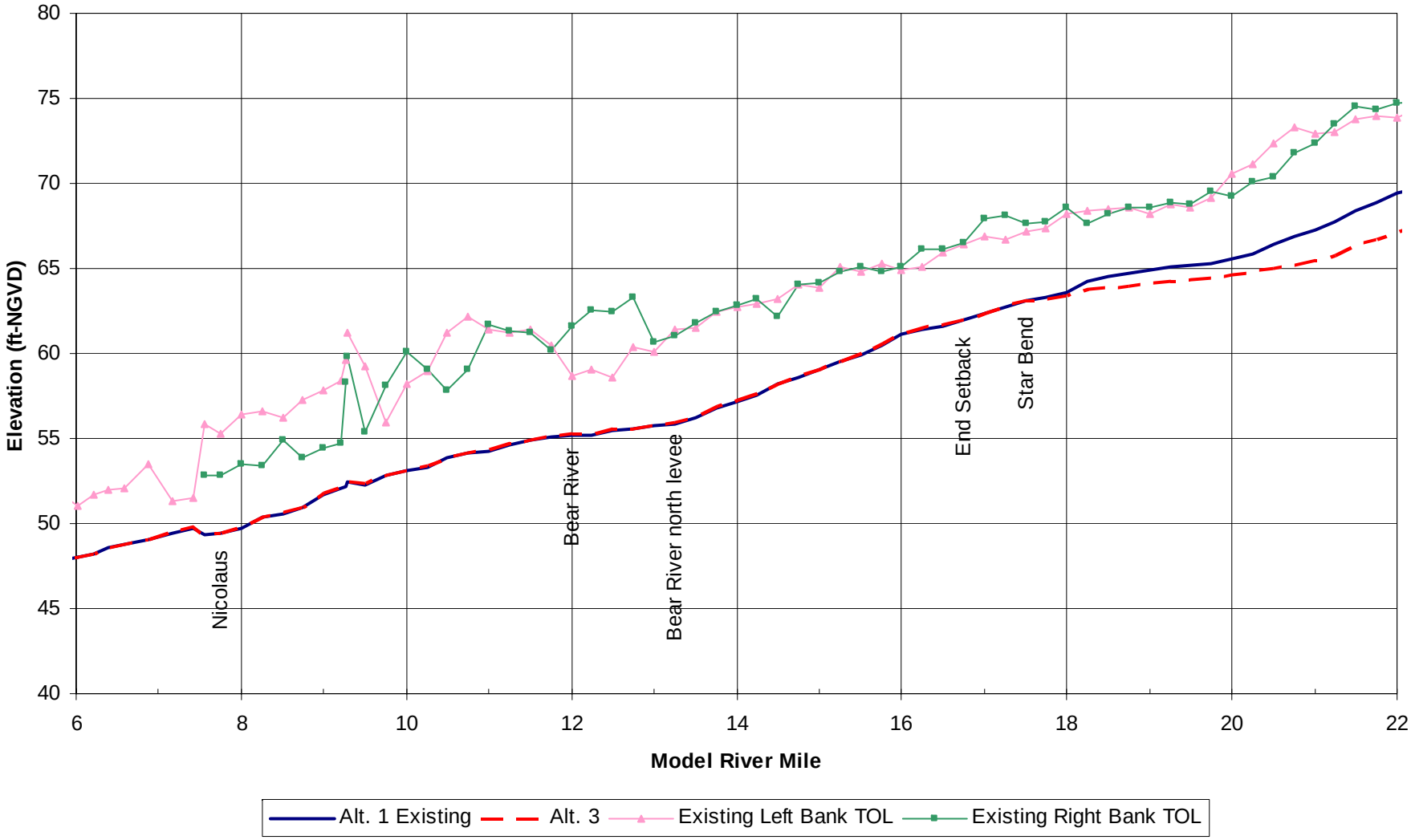


FIGURE 35

Feather River (RM 20 to 36)
1-in-200 AEP Water Surface Profile for Alternative 3

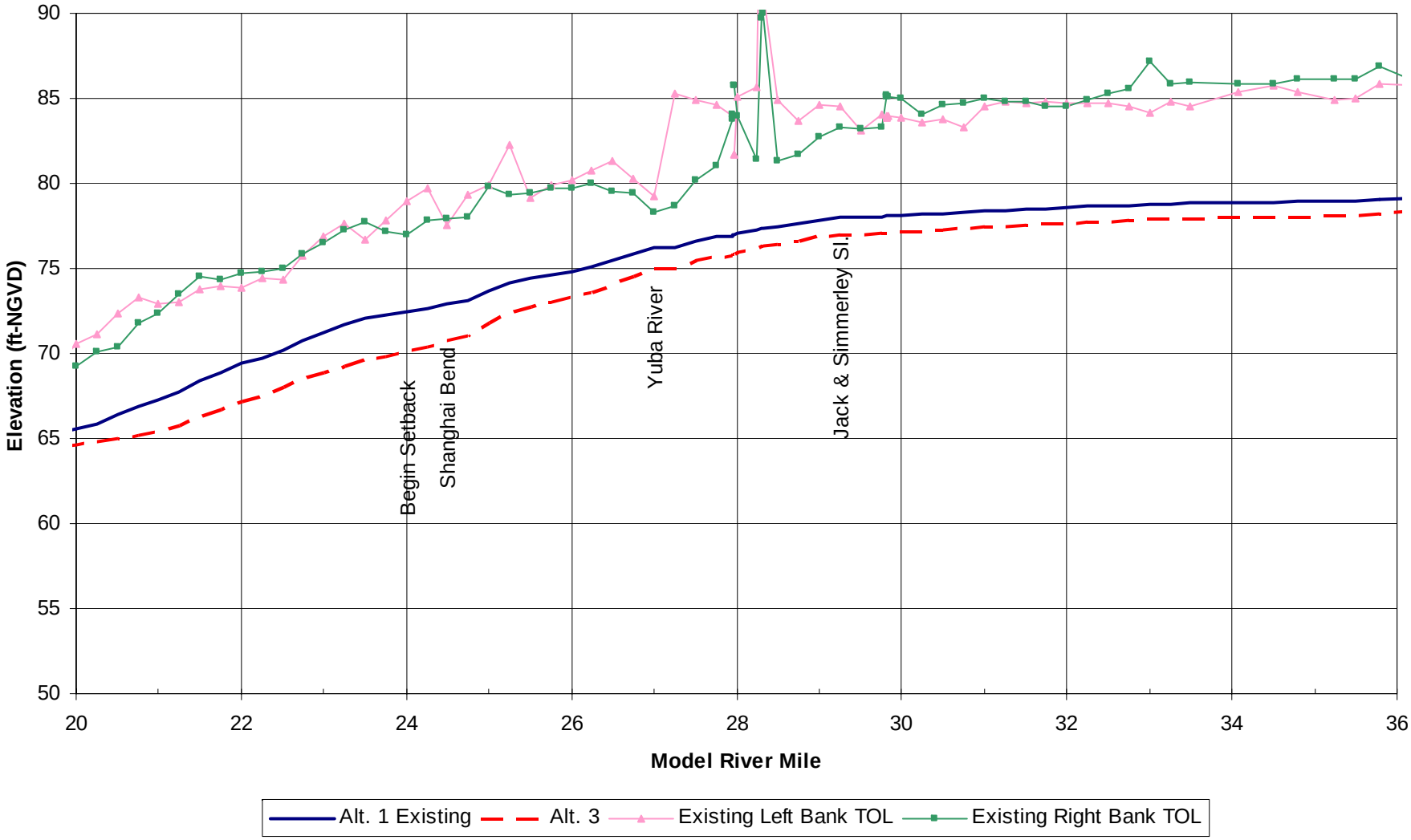
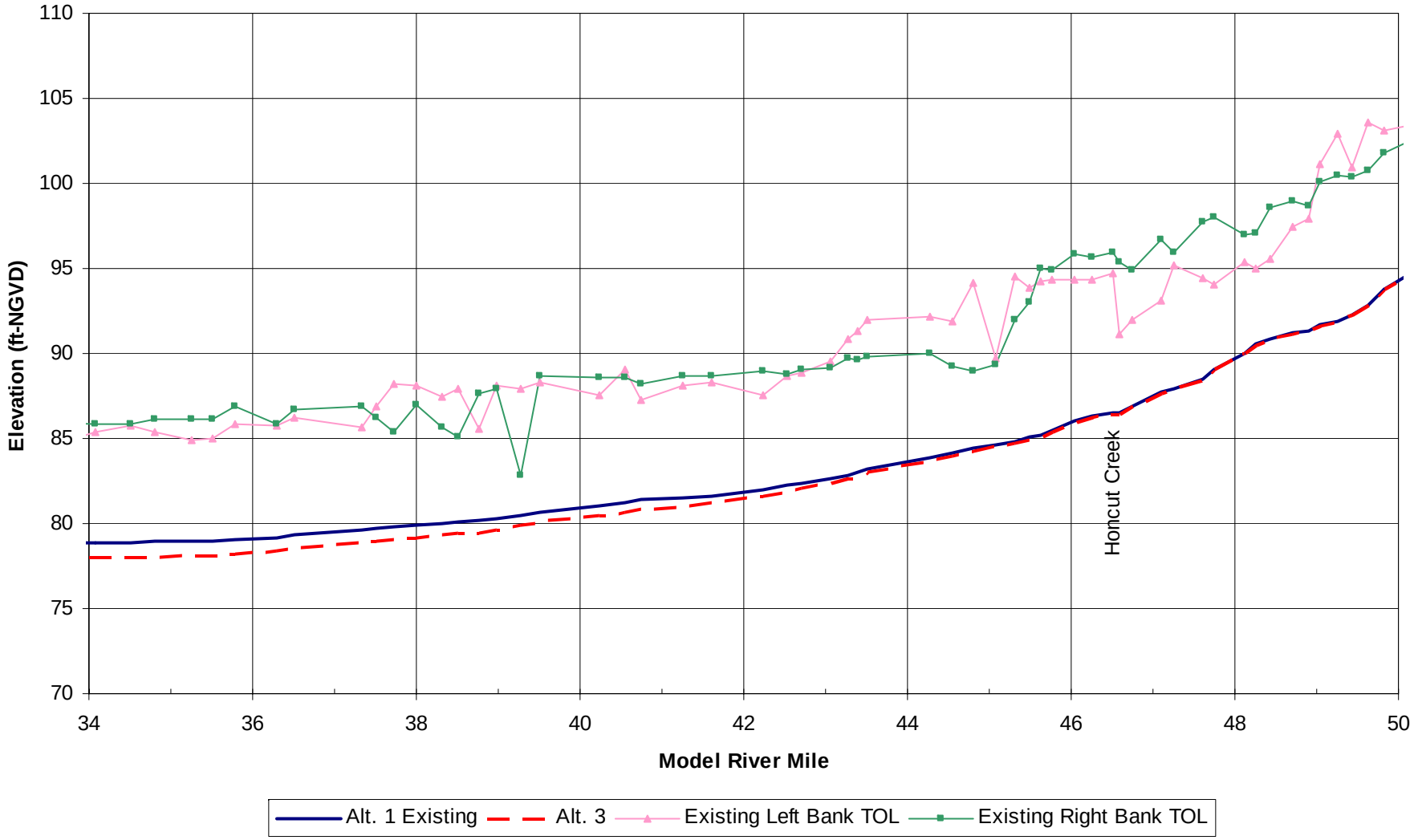
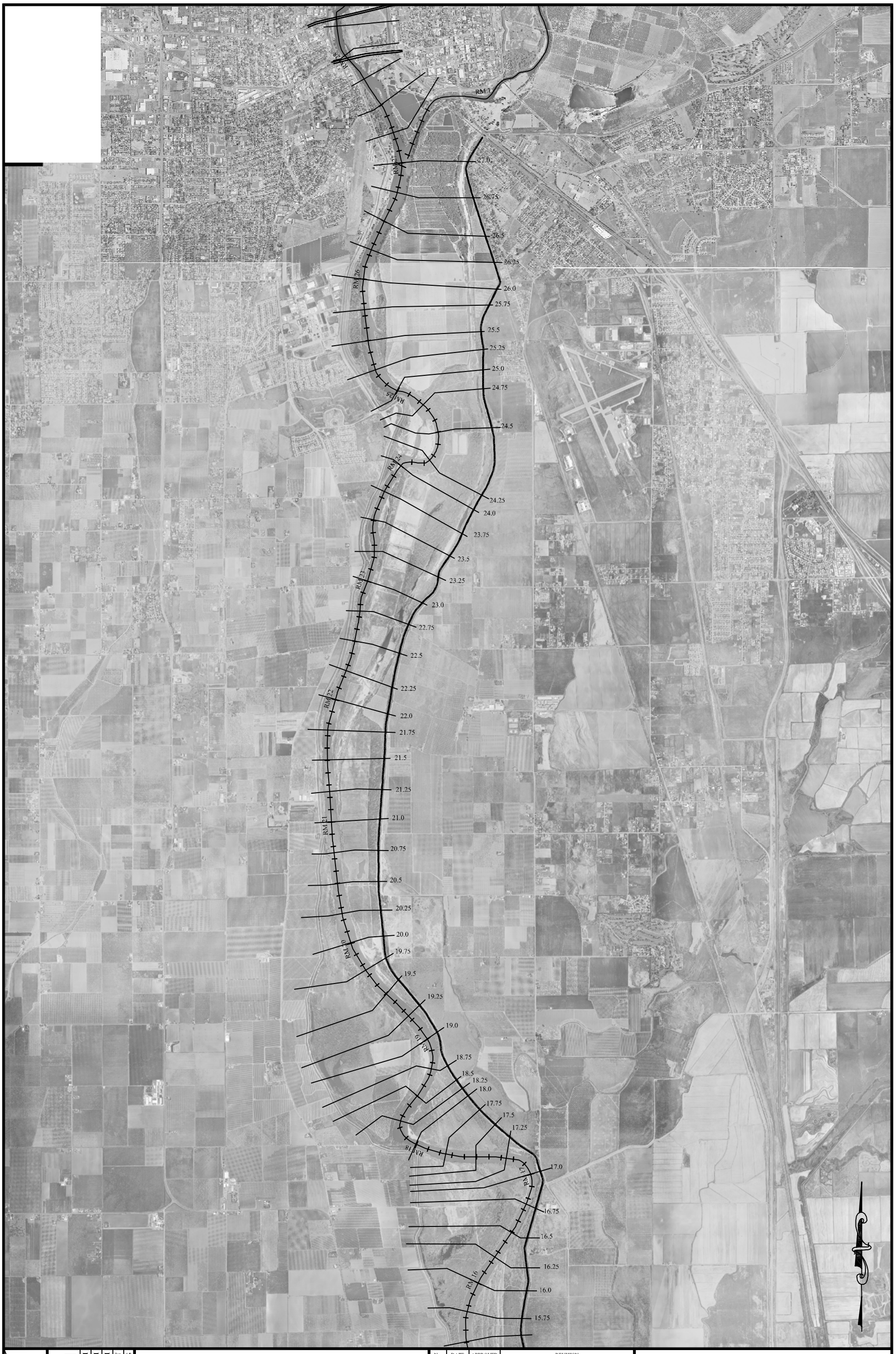


FIGURE 36

Feather River RM (34 to 50)
1-in-200 AEP Water Surface Profile for Alternative 3





Three Rivers Levee Improvement Authority
Phase IV

Feather River Cross Section Locations

No.	DATE	APPROVED	REVISION

MBK ENGINEERS
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Sacramento, California 95817
Phone: (916) 456-4400 • Fax: (916) 456-0253

SCALE: 1" = 4000'
JOB NUMBER: 5141
REQUESTED BY: DT
DRAWN BY: DT
DATE: May 2006

Bar Length On Original Drawing Equals One Inch. Adjust Scale Accordingly.

SHEET 1 OF 1 SHEETS

FIGURE 37

APPENDIX C

Geomorphic Analysis

Draft Report

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Geomorphic Assessment of Project Alternatives for Feather River Levee Improvements Between the Bear and Yuba Rivers

Prepared for

Bookman Edmonston - GEI

and

Three Rivers Levee Improvement Authority

Prepared by

Philip Williams & Associates, Ltd.

JULY 28, 2006

PWA REF. # 1833

Services provided pursuant to this Agreement are intended solely for the use and benefit of the Bookman Edmonston – GEI and Three Rivers Levee Improvement Authority. No other person or entity shall be entitled to rely on the services, opinions, recommendations, plans or specifications provided pursuant to this agreement without the express written consent of Philip Williams & Associates, Ltd., 720 California Street, 6th Floor, San Francisco, CA 94108.

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1. SUMMARY AND CONCLUSIONS

1.1 BACKGROUND

TRILIA is planning to improve levees on the east bank of the Feather River between Project Levee Mile (PLM) 13.3 and 26.1 along the east bank of the Feather River and from PLM 0.0 to 0.3 along the south bank of the Yuba River (Figure 1-1). The levee improvements are planned to strengthen flood protection in a constricted reach of the Feather River where there are erosion concerns and which constitutes a flow constriction. Three project alternatives have been proposed:

Alternative 1. Strengthen the existing levees in their current location.

Alternative 2. Strengthen the existing levees and set back the levees between River Mile (RM) 25 and RM 17.75 along an alignment that is maximum of approximately 2,500 feet east of the present alignment (the "ASB setback levee" alternative).

Alternative 3. Strengthen the existing levees and set back the levees between River Mile (RM) 25 and RM 17.75 along an alignment that is a maximum of approximately 1,500 feet east of the present alignment (the "intermediate setback levee" alternative).

PWA performed an assessment as part of the CEQA environmental review process including the following tasks:

1. Review of existing sediment and geomorphic studies including the WET Report (1991), Ayres and Associates Report (1997), Feather River Levee EIR (2003), and Oroville Relicensing Report (DWR, 2004).
2. Review of historic data on channel migration rates and locations.
3. Geomorphic reconnaissance of the project area by boat.
4. Comparison of hydraulic model (HEC-RAS) output produced by MBK Engineers with published values for bank erosion thresholds (Fischenich, 2001).
5. Comparison of with- and without-project shear stresses using data from MBK Engineers.
6. Development of a shear stress index to compare with- and without-project erosion potential accounting for the cumulative effects of both high and low frequency flood events.
7. Qualitative assessment of the likely effects of the three alternatives on erosion and sedimentation rates and patterns in the Feather River.

1.2 CONCLUSIONS

1. Comparison of historic maps shows that the Feather River has had a consistent channel configuration since the start of the 20th century. However, within that overall configuration the WET report (WET, 1991) reveals that the area around Star Bend has undergone migration of approximately 1.6 feet per year and Shanghai Bend has migrated by approximately 10.3 feet per year. The bend below Shanghai Bend has migrated by 22.7 feet per year.

2. Between the 1850s and 1912 the Feather River aggraded by approximately 20 feet in the project area in response to the deposition of hydraulic mining debris transported from goldfields along the Yuba River, and as a result, lost sinuosity. Between 1912 and 1992 the river incised by between 4 and 20 feet through the sediment as damming and the cessation of hydraulic mining lowered sediment inputs, with most lowering occurring before the 1960s (Ayres, 1997). There is still a pronounced knick zone and headcut at RM 24.6 which has been observed to slowly migrate upstream over time.

3. PWA conducted a geomorphic reconnaissance and found areas of accelerated or active erosion concentrated in three river bank locations: around the north bank of the Yuba River near the confluence with the Feather River, in a reach from RM 24 to RM 26 encompassing Star Bend and the knick zone, and around Shanghai Bend from RM 17 to RM 19.

4. Alternative 1 (*levee strengthening in place*) is expected to have less than significant geomorphic impacts on the Feather River. Since the levee width, height and hydraulic roughness will be very similar to existing conditions there should not be any significant change in hydraulic characteristics or in the resulting sediment erosion and transport characteristics of the Feather River. Local erosion and sediment control (BMPs and revegetation) will be required during and after construction work on the levee and its surroundings to prevent erosion and sediment from being generated by grading and newly exposed bare earth surfaces.

5. Alternative 2 (*ASB setback levee*) is expected to increase the width of flood flows and decrease the depth and velocity of flood flows in the setback area, while leaving the roughness of the floodplain similar to existing conditions. (The latter assumption could change if environmental enhancement is carried out in the setback area. This scenario was not assessed.) Overall Alternative 2 is expected to have less than significant impacts.

   5.1. Alternative 2 will have the same need for local erosion and sediment control on newly graded surfaces as Alternative 1. Provided that standard BMPs and revegetation are carried out, there are not expected to be significant geomorphic impacts from construction and grading.

   5.2. Alternative 2 is expected to have no significant effect between the lower boundary of the project (RM 12.5 at the Bear River confluence) and RM 17.

5.3. Alternative 2 between RM 17 and RM 23 (encompassing Star Bend) will lower average boundary shear stresses during flows higher than the 5-year flood and will reduce the risk of bank and levee erosion compared with existing conditions. The estimated reduction in shear stress index (an estimate of the cumulative impacts of flood events) at Star Bend under Alternative 2 is 3% for the channel and 14% for the overbank area (including the levees).

5.4. Alternative 2 between RM 24.25 and the upstream project boundaries is estimated to slightly change shear stresses during flows equal to or greater than the 5-year flood. This reach includes Shanghai Bend and the knick zone downstream. Shear stress index in the vicinity of Shanghai Bend and the knick zone is estimated to increase by 5 to 8% for the channel and to vary by a decrease of 4% to an increase of 8% in the overbank area (including the levees). In the Feather and Yuba Rivers upstream of the setback levee the increase in shear stress index is 3 to 6% for both the channel and the overbank areas.

5.5. It is possible that Alternative 2 could slightly accelerate the rate of channel bank erosion in some locations upstream of the levee setback area unless shear stresses are mitigated by bank protection. Existing and predicted stresses are high enough to erode bare, non-cohesive and weakly cohesive alluvial sediments but are within the range that can be mitigated by vegetation covers or rock protection. There is also potential for Alternative 2 to slightly accelerate the headward migration of the knick zone upstream, contributing to channel bank erosion in the bend downstream of Shanghai Bend (east bank). However, the cumulative increase in shear stress over a 100-year period is small in the context of natural variations in erosion forces, and the impact on the channel banks is less than significant.

5.6. Alternative 2 will slightly increase shear stresses along the levees upstream of the setback area. However, the increase is very slight in the context of natural variations in erosion forces, the magnitude of erosive stresses is within the resistance tolerance of levee materials, and the impact on the levees is less than significant.

6. Alternative 3 (*intermediate setback*) is expected to increase the width of flood flows and decrease the depth and velocity of flood flows in the setback area, while leaving the roughness of the floodplain similar to existing conditions. (The latter assumption could change if environmental enhancement is carried out in the setback area. This scenario was not assessed.) Overall Alternative 3 is expected to have less than significant impacts.

6.1. Alternative 3 will have the same need for local erosion and sediment control on newly graded surfaces as Alternatives 1 and 2. Provided that standard BMPs and revegetation are carried out there are not expected to be significant geomorphic impacts from construction and grading.

6.2. Alternative 3 is expected to have no significant effect between the lower boundary of the project (RM 12.5 at the Bear River confluence) and RM 17.

6.3. Alternative 3 between RM 17 and RM 23 (encompassing Star Bend) will lower average boundary shear stresses during flows higher than the 5-year flood and will reduce the risk of bank and levee erosion compared with existing conditions. The estimated reduction in shear stress index at Star Bend under Alternative 3 is 3% for the channel and 14% for the overbank area (including the levees).

6.4. Alternative 3 between RM 24.25 and the upstream project boundaries is estimated to slightly increase shear stresses during flows equal to or greater than the 5-year flood. This reach includes Shanghai Bend and the knick zone downstream. Shear stress index in the vicinity of Shanghai Bend and the knick zone is estimated to increase by 5 to 7% for the channel and to vary from neutrality to an increase of 7% in the overbank area (including the levees). In the Feather and Yuba Rivers upstream of the setback levee the increase in shear stress index is 2 to 4% for the channel and the overbank areas.

6.5. It is possible that Alternative 3 could slightly accelerate the rate of channel bank erosion in some locations upstream of the levee setback area unless shear stresses are mitigated by bank protection. Existing and predicted stresses are high enough to erode bare, non-cohesive and weakly cohesive alluvial sediments but are within the range that can be mitigated by vegetation covers or rock protection. There is also potential for Alternative 3 to slightly accelerate the headward migration of the knick zone upstream, contributing to channel bank erosion in the bend downstream of Shanghai Bend (east bank). However, the cumulative increase in shear stress over a 100-year period is small in the context of natural variations in erosion forces, and the impact on the channel banks is less than significant.

6.6. Alternative 3 will slightly increase shear stresses along the levees upstream of the setback area. However, the increase is very slight in the context of natural variations in erosion forces, the magnitude of erosive stresses is within the resistance tolerance of levee materials, and the impact on the levees is less than significant.

7. Ayres, (1997) raises the possibility that reductions in sediment delivery to the Feather River could trigger channel asymmetry and subsequently greater rates of lateral channel migration. This hypothesis was not directly tested and no sediment transport assessment was carried out as part of this study. The reduction in boundary shear stress between RM 24 and RM 17 under Alternatives 2 and 3 could result in an increase in sediment trapping, and thus a reduction in sediment delivery downstream of RM 17. However, increased sediment trapping in the setback reach is likely to be partially balanced by increased erosion upstream, so there may be little net change in sediment delivery to the downstream reach. In addition, the downstream reach is relatively wide and has a densely vegetated riparian corridor between the banks and the levee, so it is less sensitive to an increase in lateral migration tendency than other reaches. It is therefore unlikely that Alternatives 2 or 3 will have a significant effect on channel stability downstream of RM 17.

8. The area of land that would be reconnected to the Feather River under Alternatives 2 and 3 has a high restoration potential. Preliminary comparisons of elevation at the site compared with the Bear – Feather River confluence suggests that the setback area would be inundated on an annual or bi-annual basis and would provide for physical and biological processes that would be highly conducive for floodplain habitat restoration

2. DESCRIPTION OF PROPOSED PROJECT (EDAW, 2005)

Studies by the DWR, Corps, and TRLIA indicate that several reaches of the left (east) Feather River levee between the mouth of the Yuba River and the Reclamation District No. 784 (RD 784) Pump Station No. 2 do not satisfy geotechnical criteria for seepage at the 100-year water surface (EDAW, 2006). In addition, constrictions in the Feather and Bear Rivers create backwater effects that raise the flood stage at upstream locations. Most of the levee system in Yuba County was constructed during the 1920s using construction practices of that era. This EIR evaluates three alternative levee improvement projects (shown in Figure 2-1):

- Alternative 1 – Strengthen the existing Feather River left bank levee from Project Levee Mile (PLM) 13.3 to 26.1, and the Yuba River left bank levee from PLM 0.0 to 0.3 (Pump Station No. 2 to the mouth of the Yuba River). This alternate is referred to as *Levee Strengthening* in subsequent sections.

- Alternative 2 - Strengthen the existing Feather River left bank levee from PLM 13.3 to 17.1 and PLM 23.6 to 26.1, and the Yuba River left bank levee from PLM 0.0 to 0.3 (below Star Bend and from approximately the private road east of the Yuba County Airport to the Yuba River), and construct a new setback levee along approximately the 2003 Above-Star-Bend (ASB) setback levee alignment (ASB Setback Levee) between approximately Feather River levee PLM 17.1 and 23.6. This alternate is referred to as *ASB Setback Levee* in subsequent sections.

- Alternative 3 - Strengthen the existing Feather River left bank levee from PLM 13.3 to 17.1 and PLM 23.6 to 26.1, and the Yuba River left bank levee from PLM 0.0 to 0.3 (below Star Bend and from approximately the private road east of the Yuba County Airport to the Yuba River), and construct a new setback levee along an intermediate setback levee alignment (Intermediate Setback Levee) between approximately Feather River levee PLM 17.1 and 23.6. This alternate is referred to as *Intermediate Setback Levee* in subsequent sections.

The subject levee is divided into three segments as follows:

- Segment 1 - Existing Feather River left bank levee from PLM 13.3 to 17.1 (Pump Station No. 2 to Star Bend). Repairs to this segment of the levee are identical for each alternative and would consist of strengthening the existing levee in place to improve seepage and/or stability deficiencies.

- Segment 2 - Existing Feather River left bank levee from approximately PLM 17.1 and 23.6 (Star Bend to approximately west of the Yuba County Airport). This component is different for each alternative and is briefly described below.
  - Alternative 1 - strengthen the existing levee in place to improve seepage and/or stability deficiencies.
  - Alternative 2 – replace the existing levee with a new setback levee approximately along the ASB Setback Levee alignment studied as part of the 2003 feasibility report (ASB Setback Levee).
  - Alternative 3 – replace the existing levee with a new setback levee with an alignment mostly west of the 2003 ASB Setback Levee (Intermediate Setback Levee).
  - Relocation and replacement of the existing RD 784 Pump Station No. 3 is also included with Segment 2. The work would be similar for each alternative, although the location of the new pump station would depend on the alternative.
- Segment 3 - Existing Feather River left bank levee from PLM 23.6 to 26.1, and the Yuba River left bank levee from PLM 0.0 to 0.3 (west of the Yuba County Airport to the railroad crossing at the Highway 70 Bridge). Repairs to this segment of the levee are identical for each alternative and would consist of strengthening the existing levee in place to improve seepage and/or stability deficiencies.

3. PROJECT GEOMORPHIC SETTING AND HISTORY

3.1 PHYSICAL SETTING

The Feather River watershed is a subbasin within the Sacramento River Basin and lies along the western portion of the Sierra Nevada mountain range (Figure 3-1). It includes parts of Plumas, Sierra, Butte, Nevada, Placer, Lassen, Shasta, and Yuba Counties. The watershed has a Mediterranean climate with wet winters and dry summers. Average precipitation ranges from 75 inches in the upper watershed to 30 inches in the lower watershed. Flow in both the Feather and Yuba Rivers is affected by several large flood control facilities. Oroville Reservoir controls flows on the Feather River while Englebright and New Bullards Bar Reservoirs control flows on the Yuba River. The lower Feather River is affected by transferred flows from the Sacramento River that pass through the Sutter Bypass into the Feather River 3 miles downstream of the Bear River confluence. These modifications reduce flood peaks on the Feather River, while reducing coarse sediment load and creating backwater conditions in the lower reaches.

The upper portion of the watershed is characterized by high mountain valleys and contains streams with low to moderate slopes. The North Fork originates in the Cascade Range whereas the Middle Fork Feather River flows northwesterly along the crest of the Sierra Nevada. The North Fork and Middle Fork Feather Rivers comprise 3,222 square miles and the smaller South Fork and West Branch comprise the additional 389 square miles.

The watershed above Oroville Reservoir is bounded on the northwest and north by volcanic ridges and mountains, including Mt. Lassen, which constitute the southern portion of the Cascade Range geomorphic province. It is bounded on the east and northeast by prominent, east-facing fault scarps, including the Honey Lake escarpment of the Basin and Range geomorphic province. This roughly corresponds to the northern and eastern boundary of the Sierra Nevada geomorphic province. The Sacramento Valley geomorphic province bounds the western edge of the watershed.

3.2 HISTORIC CHANGES IN THE PHYSICAL SETTING

The pattern of sediment transport and channel erosion in the project area is intimately linked to the history of the watershed. Hydraulic mining in the Yuba, Bear and Feather River watersheds significantly changed the geomorphic characteristics of the entire basin. Between 1848 and 1909, approximately 18.5 billion cubic feet of hydraulic mining debris was washed into the Yuba River, while another 2.7 and 6.8 billion cubic feet was washed into the upper Feather and Bear Rivers (Hagwood, 1981). The lower Feather River within the project area has been significantly altered by all three sources, but most significantly by the Yuba River.

Mining-derived sediment led to massive channel aggradation and a significant loss in channel capacity, which in turn led to extensive flooding and overbank deposition onto urban and agricultural lands within the lower Feather River. By the late 1860's, aggradation was so extensive that the beds of the Yuba and Feather Rivers were higher than the city streets in Marysville. In the mid 1870's levees were breached by flood flows in Marysville and a large section of the city was buried by hydraulic mining sediment. As a result of this and other damage, the courts acted and the Sawyer decision of 1884 halted the disposal of tailings into drainages by hydraulic mining operators.

Table 3-1 displays a timetable of events that are relevant to the current geomorphic character of the lower Feather River (WET, 1991). The main sediment influx occurred between 1853 and 1884, but maximum aggradation on the Yuba River at Marysville was delayed until 1905, where a total of nearly 20 feet of aggradation was observed. After mining ceased the sediment supply was dramatically reduced and the Feather River began to incise into the deposited hydraulic mining sediment. Incision continued until the 1960's when the bed began to rest upon pre-hydraulic material that was more resistant to erosion. As a result of the rapid aggradation and subsequent incision, the banks of the Feather River are principally composed of hydraulic mining material. The lowest mining deposits (called slickens) are relatively resistant to erosion while the upper mining deposits are less cohesive and more erodible. Beneath the mining deposits the upper native alluvial materials are relatively resistant to erosion, but are underlain by less erosion resistant sediments. Thus, the depth of incision of the river is critical to bank stability, depending on whether more or less erosion resistant sediments are exposed. It has been hypothesized that either incision through the erosion resistant layer, or aggradation that raises the bed above the erosion resistant layer could trigger more rapid lateral bank migration.

Table 3-1. Historical Events that Have Affected the Feather River (WET 1991)

Date	Event
1848	James Marshall discovers gold on the American River.
1853	Edward Matteson employs hydraulic mining techniques on American Hill.
1861	Invention of crinole hole: water pressure tripled. Blasting used for first time in hydraulic mining.
1862	Major flood resulting in loss of agricultural lands: followed by levee construction.
1868	Channel beds of Feather and Yuba rivers higher than streets of Marysville. Additional levee construction.
1875	Major flood results in levee breakage and burying of parts of Marysville.
1884	Sawyer decision prohibits tailing disposal into drainages.
1891	Onset of erosion of upper drainage.
1893	Caminetti Act results in formation of the California Debris Commission which allows mining after construction of approved tailings impoundment.
1934	Caminetti Act amended to allow for construction of high dams.
1940	Englebright Dam on Yuba River constructed.
1967	Completion of Oroville Dam on the Feather River.

3.3 CHANGES IN CHANNEL MORPHOLOGY

Understanding past and present rates of channel morphological change is valuable in predicting how the river will respond to future changes. We reviewed several existing reports of channel erosion and migration rates to produce the synthesis below.

3.3.1 Summary of Previous Geomorphic Studies

WET (1991) assessed channel migration rates along the Feather River and estimated the time before the channel eroded to within 30 feet of the levees using historic data. In the project area the three principal areas of concern were Star Bend (west bank), Shanghai Bend (west bank) and the bend immediately downstream of Shanghai Bend (east bank). At Star Bend the annual migration rate was found to be 1.6 feet per year, but the 80-foot distance to the levee resulted in an estimated 50-year time span before the levee was endangered. At Shanghai Bend the erosion rate is much higher (10.3 feet/year) but is partially offset by the distance of 335 feet to the levee, resulting in 33 year expectancy. The fastest rate of bank retreat (22.7 feet/year) is on the bank below Shanghai Bend (RM 25 opposite the ponds) although the levee in this location is 2,145 feet from the river and is therefore not threatened in the foreseeable future. The treatment ponds, however, are 280 feet from the eroding bank, and we would estimate that the channel could migrate to the proximity of the treatment ponds (30 feet) in 11 years.

Ayres Associates (1997) conducted a major geomorphic and sediment transport study of the Feather River for the USACE that included comparison of historic cross sections and thalweg profiles (see cross sections on Figures 3-1 to 3-13 and thalwegs on Figures 3-14 to 3-15). They concluded that the main phase of channel incision through the hydraulic mining-derived sediment on the Feather River had occurred by the mid-1960s, although the knickpoint continues to migrate upstream to this day. Although the Feather River has eroded through the hydraulic mining debris into the pre-mining floodplain sediments, as yet there has been little mass bank failure that could lead to lateral migration of the channel, and therefore, threaten the stability of the levees. Ayres argued that further large-scale degradation of the Feather River was unlikely, at least within an engineering timeframe, because base level for the channel is controlled by sediment deposition in the lower reaches. This in turn was controlled by influxes of sediment from the Bear River, backwater effects from the Sacramento River, and deposition due to loss of conveyance as water from the Feather River escapes into the Sutter Bypass during large flows. However, the Ayres report warns of potential serious consequences if the knickpoint migrated through Shanghai Bend, since channel incision here could expose less resistant sediment beneath the slickens and the upper, cohesive native sediments, allowing the channel to migrate much more rapidly.

Ayres also hypothesize that the influx of sediment from the Yuba and Bear Rivers is crucial to maintaining a symmetrical channel cross section, and a symmetrical cross section in turn prevents

accelerated channel lateral migration that could endanger the levees. They point out that the Feather River has a very low sinuosity for a river of its size and type, and that the present condition should be considered a historic anomaly that will eventually be reversed as sediment delivery from the Yuba and Bear Rivers fall; reductions in sediment delivery will likely trigger lateral migration.

California Department of Water Resources (DWR, 2004) carried out a geomorphic study and a FLUVIAL-12 sediment transport study of the Feather River as part of the FERC relicensing of Oroville Dam. They found that the average rate of channel migration on the Feather River has decreased since dam construction from 2.3 to 1.7 feet/year. This rate is low when compared to the Sacramento River (6 to 14 feet per year). DWR monitored bank migration rates at Shanghai Bend and found that the right bank upstream of the rip-rapped portion has eroded at a maximum average rate of 7.4 feet/year (their definition of the term 'maximum average' is unclear). At Shanghai Bend the left bank is eroding at a maximum average rate of 9.5 feet/year. Below Shanghai Bend the right bank is eroding at a maximum average rate of 9.3 feet/year, with 200 feet of floodplain remaining between the bank and the levee. DWR's investigation found that about 8 percent of the banks from are rip-rapped in the 28 mile stretch from Yuba City to Verona. DWR also found that the present day sinuosity was not substantially different from that of the 1920's. Because of the entrenchment of the Feather River into hydraulic mining debris and the flood control functions of the Oroville Project, DWR expects that the sinuosity will not change substantially in the next fifty years.

4. EXISTING CHANNEL CONDITIONS

PWA conducted a geomorphic reconnaissance of the project area by boat on May 10th 2006. The reconnaissance focused on visually identifying areas of channel bank erosion and deposition along the project area to assess relative erosion levels. Erosion was qualitatively classified into low, medium and high categories based on estimated bank height, bank angle, vegetation cover and visual evidence for erosion or repair work. Note that the classification was for the banks as viewed from a boat, and did not cover the levees, which were generally hidden from view. The assessment should be considered a reconnaissance level only. Flows were relatively high for May conditions, with a flood elevation of 44 feet at Yuba City (discharge of approximately 26,000 cfs).

4.1 REACH CHARACTERIZATION

The project area on the Feather River between the Yuba and Bear Rivers can be divided into five geomorphic reaches based on observed erosion patterns, with additional upstream reaches on the Feather between the Yuba River confluence and the Southern Pacific Railroad Bridge and on the Yuba River between the confluence and the Southern Pacific Railroad Bridge (see Figure 4-1). The reaches are discussed from upstream to downstream.

4.1.1 Reach 1. Yuba River between Southern Pacific Railroad Bridge and Confluence with Feather River

This reach is characterized by ‘moderate’ to ‘high’ levels of bank erosion on the outside bank (river right, looking downstream, to the north), and deposition of gravel and cobbles on the left bank (south). There are several areas where riprap has been placed to protect the banks from erosion, and in general the north bank is at a steep angle. All 1.2 miles of the north bank is characterized as moderately to highly eroded, while all the inside bend is classified as having low levels of erosion.

4.1.2 Reach 2. Feather River between River Mile 30 and Confluence with Yuba River (RM 27.5)

This reach is characterized by ‘moderate’ levels of bank erosion on outside bends and ‘low’ levels of erosion on inside bends. There are small areas of bank stabilization using riprap, and some very high, steep banks in the upstream part of the reach.

4.1.3 Reach 3. Feather River from the Yuba River Confluence (RM 27.5) to Upstream of Shanghai Bend (RM 26.25)

This reach is relatively stable, with 'low' to 'medium' levels of bank erosion relative to the rest of the project reach. Many areas of the banks are well vegetated with relatively well established cottonwood trees. In many areas there is a small bank toe or terrace that provides some protection to the banks. Erosion is concentrated on outside bends, where there are steep to vertical sections of approximately 8-10 feet.

4.1.4 Reach 4. Feather River from River Mile 26.25 (Shanghai Bend) to River Mile 23

This reach has the greatest continuous extent of erosion of the project reach, and is dominated by three geomorphic features: Shanghai Bend, the knick zone downstream, and a confined reach downstream of the knick zone. The outside banks of Shanghai Bend (west bank) and the unnamed bend downstream (east bank) are actively eroding, while there is also some erosion on inside bend and straight sections. Erosion on Shanghai Bend is intense but very localized in extent while the bend downstream has a more extensive area of erosion and a hotspot of high erosion close to the ponds. The banks on both sides of the knick zone are actively eroding, with high steep to vertical banks and falling trees. Downstream of the knick zone, between RM 24.25 and RM 23.5, the channel becomes very confined with vertical 15 foot high banks and evidence of severe erosion. From RM 23.5 to RM 23 erosion is moderate. In total Reach 4 has 1.8 miles of highly-eroded bank on the west and 1.4 miles of highly eroded bank on the east, with most of the remaining bank classified as 'medium' erosion level.

4.1.5 Reach 5. Feather River from River Mile 23 to River Mile 19

This reach is relatively stable, with low to medium levels of bank erosion. In most of this reach the channel is not as confined as in Reach 4, and most of the banks have good riparian cover and areas of natural protection. There is some local moderate bank erosion on the east bank where the channel runs alongside the levee upstream of Star Bend. It appears that the wider area of floodplain around Abbots Lake has relieved some of the shear stresses in this reach, reducing overall bank erosion. The majority of this reach is classified as having low erosion levels (3.3 miles versus 0.7 miles of medium erosion on the west bank, and 2.8 miles of 'low' versus 0.4 miles of medium erosion on the east bank).

4.1.6 Reach 6. Feather River from River Mile 19 to River Mile 17 (Including Star Bend)

Reach 6 is dominated by Star Bend (eroding the west bank) and an unnamed bend downstream. This reach is characterized by locally severe erosion on the outside banks of the bends where the levee is in close proximity, but in general the reach is less erosive than conditions upstream, potentially because of the wide floodplain in most parts of the reach. A total of 0.4 miles of the

west bank are highly eroded around Star Bend, while 0.6 miles of the east bank downstream of Star Bend are highly eroded.

4.1.7 Reach 7. Feather River from River Mile 17 to the Confluence with the Bear River (RM 12.5)

Reach 7 is the most stable reach in the project area, with no areas of highly eroded bank. This section of the river has low, well vegetated banks and appears to be geomorphically-stable to slightly depositional. There is floodplain between the river and the levees along the entire reach, contributing to stability.

5. POTENTIAL GEOMORPHIC IMPACTS OF THE PROJECT ALTERNATIVES

PWA assessed the potential impacts of the project by comparing predicted with- and without-project shear stresses and overlaying them on the existing conditions map of the river. CEQA provides two potential thresholds of significance that are relevant to this report. The first defines increases in erosion risk as significant if they "expose people and structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam". The second definition relates to erosion that "substantially alters the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on- or off-site". For the purposes of this report we consider changes in shear stress greater than 20% to be potentially significant impacts. It is important to note the assumptions made in the analysis.

- The analysis is based on peak flow data extracted from a one-dimensional unsteady state hydrodynamic model. Changes in peak flow timing may increase or reduce the actual shear stress by creating backwater effects or locally steeper gradients.
- Shear stresses used in the analysis are average one-dimensional boundary shear stresses from the channel and overbank portion of the HEC-RAS model. It should be recognized that instantaneous and local shear stresses along outside meander bends will likely be higher than average boundary shear stress.
- The estimates reported below do not include a factor of safety.

5.1 COMPARISON OF WITH- AND WITHOUT-PROJECT SHEAR STRESSES

Average boundary shear stresses for the channel and overbank area were estimated by MBK Engineers using the HEC-RAS one-dimensional hydraulic model. The events simulated were the 2-, 5-, 10-, 100- and 200-year flood. Three runs were performed using identical flows and boundary conditions but three varied cross section geometries: existing conditions geometry (assumed to be the same for Existing Conditions and Alternative 1), ASB setback levee geometry (Alternative 2) and intermediate setback levee geometry (Alternative 3). The project area was divided into eight reaches based on geomorphic characteristics; Marysville along the Yuba River (RM 0 – 1.48), Yuba City along the Feather River (RM 27 – 35), Shanghai Bend along the west bank (RM 23.75 – 25.25), east bank downstream of Shanghai bend (RM 23.5 – 19.25), knickzone where incision on the Feather River has currently held up on a cohesive layer (RM 23.75 – 24.25), levee setback reach (RM 24.25 – 17.25), Star Bend along the west bank (RM 19.25 – 15.75) and downstream of Star Bend (RM 15.5 – 12.25). For each reach the maximum shear stress was identified and is reported in Table 5-1, shown graphically in Figures 5-1 to 5-10. In addition, a shear stress index was developed to allow comparison of the project effects taking into account the recurrence frequencies of different flow events. The use of an index enables us to compare the effect of a change in shear stress during a large but infrequent event with a change in

shear stress for a smaller but more frequent event, and is based on the geomorphic principal of dominant discharge. Dominant discharge refers to the observation that moderate, frequent flows such as the 2-year flood do more geomorphic work than larger but less frequent events. The index takes the maximum shear stress associated with an event in one reach and multiplies it by the frequency with which that event occurs in a one hundred year period. The shear stresses of all events are then summed and divided by 100. For the project alternatives we assessed the difference between the shear stress index for the alternative and the index for the existing condition/Alternative 1, and reported it in Table 5-1 as a percentage increase or decrease. Shear stresses can be compared with the list of allowable shear stresses for stream channel materials shown in Table 5-2.

5.1.1 Existing Conditions

Under existing conditions the estimated average boundary shear stresses through the project reach of the Feather River are highest between Shanghai Bend and Star Bend (the proposed levee setback area in Alternatives 2 and 3). Maximum channel stresses are 0.69 lb/square foot during the 2-year flood and increase to 1.25 lb/square foot during the 200-year flood. Maximum shear stresses along the levee range from 0.23 lb/square foot during the 2-year flood to 0.62 lb/square foot in the 200-year flood. High shear stresses in Star and Shanghai Bends exceed the shear resistance of most unvegetated alluvial materials and correlate well with observed areas of bank instability. The reach between RM 21 and RM 23 was classified as having only ‘medium’ levels of erosion, and it is likely that the straight course limits the effects of erosion as there are no impinging bank flows or accelerated outside bend flows. Channel shear stresses under the 100- and 200-year events are mostly greater than those that can be resisted by alluvial silt (similar in composition to the material making up the upper bank sections in most of the project reach) but are mostly less than the critical shear stress for grass- or tree-covered banks, and markedly less than the critical shear stress for riprap. Shear stresses in the overbank area during are higher than most unvegetated alluvial materials can withstand but are well within the range of values that can be overcome by grass covers or coarse gravel.

5.1.2 Alternative 1 (Strengthen Levees in Existing Location)

Alternative 1 does not have any effect on estimated boundary shear strength since the levee alignment, height and roughness are unchanged over existing conditions.

Table 5-1. Shear Stress Comparisons

Reach location	River Mile	Channel - Max Shear Stress (lb/sq ft) - Existing Conditions						Change in stress index
		2 yr flow	5 yr flow	10 yr flow	100 yr flow	200 yr flow	shear stress index	
Marysville - Yuba River (both banks)	0 - 1.48	0.11	0.07	0.36	0.61	0.72	0.11	~
Yuba City (both banks)	27 - 35	0.32	0.32	0.54	0.7	0.83	0.29	~
Shanghai Bend (west bank)	23.75 - 25.25	0.46	0.63	0.73	0.84	0.87	0.44	~
Below Shanghai Bend (east bank)	23.5 - 19.25	0.69	0.54	0.72	0.87	1.03	0.54	~
Knickpoint	23.75 - 24.25	0.34	0.33	0.38	0.41	0.46	0.28	~
Levee Setback (east bank)	24.25 - 17.25	0.69	0.66	0.89	1.06	1.25	0.58	~
Star Bend (west bank)	19.25 - 15.75	0.54	0.77	0.89	1.06	1.25	0.53	~
Below Star Bend (both banks)	15.5 - 12.25	0.4	0.45	0.67	0.81	0.99	0.37	~

Reach location	River Mile	Channel - Max Shear Stress (lb/sq ft) - 2003 ASB Setback						Change in stress index
		2 yr flow	5 yr flow	10 yr flow	100 yr flow	200 yr flow	shear stress index	
Marysville - Yuba River (both banks)	0 - 1.48	0.11	0.07	0.41	0.69	0.85	0.12	6%
Yuba City (both banks)	27 - 35	0.32	0.34	0.58	0.79	0.96	0.30	3%
Shanghai Bend (west bank)	23.75 - 25.25	0.45	0.72	0.9	1.07	1.18	0.48	8%
Below Shanghai Bend (east bank)	23.5 - 19.25	0.68	0.69	0.75	0.8	0.87	0.57	5%
Knickpoint	23.75 - 24.25	0.33	0.41	0.46	0.48	0.52	0.30	7%
Levee Setback (east bank)	24.25 - 17.25	0.68	0.69	0.75	0.8	0.87	0.57	-3%
Star Bend (west bank)	19.25 - 15.75	0.53	0.77	0.84	0.83	0.99	0.52	-3%
Below Star Bend (both banks)	15.5 - 12.25	0.39	0.45	0.67	0.81	0.99	0.37	-1%

Reach location	River Mile	Channel - Max Shear Stress (lb/sq ft) – Intermediate Setback						Change in stress index
		2 yr flow	5 yr flow	10 yr flow	100 yr flow	200 yr flow	shear stress index	
Marysville - Yuba River (both banks)	0 - 1.48	0.11	0.07	0.4	0.67	0.82	0.12	4%
Yuba City (both banks)	27 - 35	0.32	0.34	0.57	0.77	0.93	0.30	3%
Shanghai Bend (west bank)	23.75 - 25.25	0.46	0.7	0.86	1.02	1.1	0.47	7%
Below Shanghai Bend (east bank)	23.5 - 19.25	0.68	0.68	0.78	0.87	0.97	0.57	5%
Knickpoint	23.75 - 24.25	0.33	0.4	0.47	0.51	0.56	0.30	7%
Levee Setback (east bank)	24.25 - 17.25	0.68	0.68	0.78	0.87	0.97	0.57	-3%
Star Bend (west bank)	19.25 - 15.75	0.53	0.77	0.84	0.83	0.99	0.52	-3%
Below Star Bend (both banks)	15.5 - 12.25	0.39	0.45	0.67	0.81	0.99	0.37	-1%

Note: stress index is cumulative stress of events divided by duration of events

Reach location	River Mile	Overbank - Max Shear Stress (lb/sq ft) - Existing Conditions						Change in stress index
		2 yr flow	5 yr flow	10 yr flow	100 yr flow	200 yr flow	shear stress index	
Marysville - Yuba River (both banks)	0 - 1.48	0.04	0.03	0.13	0.28	0.36	0.04	~
Yuba City (both banks)	27 - 35	0.1	0.15	0.13	0.34	0.33	0.10	~
Shanghai Bend (west bank)	23.75 - 25.25	0.03	0.11	0.25	0.38	0.44	0.07	~
Below Shanghai Bend (east bank)	23.5 - 19.25	0.23	0.19	0.33	0.47	0.59	0.19	~
Knickpoint	23.75 - 24.25	0.03	0.1	0.16	0.23	0.29	0.05	~
Levee Setback (east bank)	24.25 - 17.25	0.23	0.21	0.33	0.48	0.62	0.20	~
Star Bend (west bank)	19.25 - 15.75	0.12	0.21	0.33	0.48	0.62	0.14	~
Below Star Bend (both banks)	15.5 - 12.25	0.13	0.17	0.3	0.38	0.5	0.14	~

Reach location	River Mile	Overbank - Max Shear Stress (lb/sq ft) - 2003 ASB Setback						Change in stress index
		2 yr flow	5 yr flow	10 yr flow	100 yr flow	200 yr flow	shear stress index	
Marysville - Yuba River (both banks)	0 - 1.48	0.04	0.03	0.15	0.3	0.41	0.05	6%
Yuba City (both banks)	27 - 35	0.1	0.16	0.13	0.38	0.36	0.10	3%
Shanghai Bend (west bank)	23.75 - 25.25	0.03	0.12	0.27	0.44	0.56	0.07	8%
Below Shanghai Bend (east bank)	23.5 - 19.25	0.23	0.23	0.30	0.33	0.4	0.20	1%
Knickpoint	23.75 - 24.25	0.03	0.08	0.17	0.25	0.36	0.05	-4%
Levee Setback (east bank)	24.25 - 17.25	0.23	0.23	0.3	0.33	0.4	0.20	-1%
Star Bend (west bank)	19.25 - 15.75	0.12	0.15	0.27	0.36	0.44	0.12	-14%
Below Star Bend (both banks)	15.5 - 12.25	0.13	0.17	0.3	0.39	0.51	0.14	0%

Reach location	River Mile	Overbank - Max Shear Stress (lb/sq ft) - Intermediate Setback						Change in stress index
		2 yr flow	5 yr flow	10 yr flow	100 yr flow	200 yr flow	shear stress index	
Marysville - Yuba River (both banks)	0 - 1.48	0.04	0.03	0.14	0.29	0.4	0.04	3%
Yuba City (both banks)	27 - 35	0.1	0.16	0.13	0.37	0.36	0.10	2%
Shanghai Bend (west bank)	23.75 - 25.25	0.03	0.12	0.27	0.43	0.53	0.07	7%
Below Shanghai Bend (east bank)	23.5 - 19.25	0.23	0.22	0.29	0.37	0.46	0.19	0%
Knickpoint	23.75 - 24.25	0.03	0.09	0.18	0.25	0.34	0.06	1%
Levee Setback (east bank)	24.25 - 17.25	0.23	0.22	0.29	0.37	0.46	0.19	-2%
Star Bend (west bank)	19.25 - 15.75	0.12	0.15	0.27	0.36	0.44	0.12	-14%
Below Star Bend (both banks)	15.5 - 12.25	0.13	0.17	0.3	0.38	0.51	0.14	0%

Note: stress index is cumulative stress of events divided by duration of events

Table 5-2. Allowable Velocities and Shear Stresses for Streambank Materials (Fischenich, 2001)[1]

Boundary Category	Boundary Type	Permissible Shear Stress (lb/sq ft)	Permissible Velocity (ft/sec)	Citation(s)
Soils	Fine colloidal sand	0.02 - 0.03	1.5	A
	Sandy loam (noncolloidal)	0.03 - 0.04	1.75	A
	Alluvial silt (noncolloidal)	0.045 - 0.05	2	A
	Silty loam (noncolloidal)	0.045 - 0.05	1.75 – 2.25	A
	Firm loam	0.075	2.5	A
	Fine gravels	0.075	2.5	A
	Stiff clay	0.26	3 – 4.5	A, F
	Alluvial silt (colloidal)	0.26	3.75	A
	Graded loam to cobbles	0.38	3.75	A
	Graded silts to cobbles	0.43	4	A
	Shales and hardpan	0.67	6	A
Gravel/Cobble	1-in.	0.33	2.5 – 5	A
	2-in.	0.67	3 – 6	A
	6-in.	2.0	4 – 7.5	A
	12-in.	4.0	5.5 – 12	A
Vegetation	Class A turf	3.7	6 – 8	E, N
	Class B turf	2.1	4 - 7	E, N
	Class C turf	1.0	3.5	E, N
	Long native grasses	1.2 – 1.7	4 – 6	G, H, L, N
	Short native and bunch grass	0.7 - 0.95	3 – 4	G, H, L, N
	Reed plantings	0.1-0.6	N/A	E, N
	Hardwood tree plantings	0.41-2.5	N/A	E, N
Temporary Degradable RECPs	Jute net	0.45	1 – 2.5	E, H, M
	Straw with net	1.5 – 1.65	1 – 3	E, H, M
	Coconut fiber with net	2.25	3 – 4	E, M
	Fiberglass roving	2.00	2.5 – 7	E, H, M
Non-Degradable RECPs	Unvegetated	3.00	5 – 7	E, G, M
	Partially established	4.0-6.0	7.5 – 15	E, G, M
	Fully vegetated	8.00	8 – 21	F, L, M
Riprap	6 – in. d_{50}	2.5	5 – 10	H
	9 – in. d_{50}	3.8	7 – 11	H
	12 – in. d_{50}	5.1	10 – 13	H
	18 – in. d_{50}	7.6	12 – 16	H
	24 – in. d_{50}	10.1	14 – 18	E
Soil Bioengineering	Wattles	0.2 – 1.0	3	C, I, J, N
	Reed fascine	0.6-1.25	5	E
	Coir roll	3 - 5	8	E, M, N
	Vegetated coir mat	4 - 8	9.5	E, M, N
	Live brush mattress (initial)	0.4 – 4.1	4	B, E, I
	Live brush mattress (grown)	3.80-9.2	12	B, C, E, I, N
	Brush layering (initial/grown)	0.4 – 6.25	12	E, I, N
	Live fascine	1.25-3.10	6 – 8	C, E, I, J
	Live willow stakes	2.10-3.10	3 – 10	E, N, O
Hard Surfacing	Gabions	10	14 – 19	D
	Concrete	12.5	>18	H

[1] Ranges of values generally reflect multiple sources of data or different testing conditions.

A. Chang, H.H. (1988).
B. Florineth. (1982)
C. Gerstgraser, C. (1998).
D. Goff, K. (1999).
E. Gray, D.H., and Sotir, R.B. (1996).
F. Julien, P.Y. (1995).
G. Kouwen, N.; Li, R. M.; and Simons, D.B., (1980).
H. Norman, J. N. (1975).
I. Schiechtl, H. M. and R. Stern. (1996).
J. Schoklitsch, A. (1937).
K. Sprague, C.J. (1999).
L. Temple, D.M. (1980).
M. TXDOT (1999)
N. Data from Author (2001)
O. USACE (1997).

[1] Allowable and permissable in this context refer to the velocities and shear stresses for the referenced materials before erosion will start to occur.

5.1.3 Alternative 2 (Strengthen Levees with ASB Levee Setback)

Alternative 2 is expected to increase the width of flood flows and decrease the depth and velocity of flood flows in the setback area, while leaving the roughness of the floodplain similar to existing conditions. (The latter assumption could change if riparian vegetation is replanted or allowed to re-establish in the setback area.) The change in water surface elevation translates into three zones of differing response within the project area:

- Downstream of the proposed setback between the Bear River confluence (RM 12.5) and O'Connor Lakes (RM 17) there is a very small predicted decrease in shear stress index, equivalent to 1% in the channel and 0% in the overbank area.
- From O'Connor Lakes (RM 17) to a point half a mile downstream of the start of the setback (RM 24) Alternative 2 is predicted to lower the water surface elevation and the water surface gradient for all the flood events simulated, resulting in a 3% reduction in shear stress index along the channel at Star Bend and a 14% reduction in shear stress index in the overbank area.
- For most of the river upstream of the setback (from RM 24 to above the upstream project boundary) the setback is predicted to increase water surface gradient and slightly increase shear stresses at flows equal to or greater than the 5-year flood, as water responds to the lower base level downstream. The increase in shear stress index at the channel is predicted to be 7% at the knickpoint, 5% at the bend downstream of Shanghai Bend (east bank) and 8% at Shanghai Bend (west bank). For the overbank areas the respective changes are -4% opposite the knickpoint, 1% in the bend below Shanghai Bend and 8% for Shanghai Bend. Continuing upstream the increase in both channel and overbank shear stress index at Yuba City are 3% while at Marysville the increases are 6%.

5.1.4 Alternative 3 (Strengthen Levees with Intermediate Setback)

Alternative 3 is expected to have the same distribution of impacts as Alternative 2, but a slightly lower magnitude of impacts (both beneficial and adverse) due to the smaller hydraulic effect of the intermediate levee setback.

- Downstream of the proposed setback between the Bear River confluence (RM 12.5) and O'Connor Lakes (RM 17) there is a very small predicted decrease in shear stress index, equivalent to 1% in the channel and 0% in the overbank area.
- From O'Connor Lakes (RM 17) to a point half a mile downstream of the start of the setback (RM 24) Alternative 2 is predicted to lower the water surface elevation and the water surface gradient for all the flood events simulated, resulting in a 3% reduction in shear stress index along the channel at Star Bend and a 14% reduction in shear stress index in the overbank area.

- For most of the river upstream of the setback (from RM 24 to above the upstream project boundary) the setback is predicted to increase water surface gradient and slightly increase shear stresses at flows equal to or greater than the 5-year flood, as water responds to the lower base level downstream. The increase in shear stress index at the channel is predicted to be 7% at the knickpoint, 5% at the bend downstream of Shanghai Bend (east bank) and 7% at Shanghai Bend (west bank). For the overbank areas the respective changes are 1% opposite the knickpoint, 0% in the bend below Shanghai Bend and 7% for Shanghai Bend. Continuing upstream the increase in shear stress index at Yuba City is 2% while at Marysville the increase is 4%. For the overbank areas the increases are 2% and 3% respectively.

5.2 EFFECT OF THE ALTERNATIVES ON GEOMORPHIC PROCESSES IN THE PROJECT AREA

Based on the shear stress comparison and a qualitative understanding of geomorphic processes the alternatives are expected to have the following effects:

5.2.1 Predicted Geomorphic Effects of Alternative 1 (Strengthen Levee in Existing Location)

Alternative 1 is expected to have less than significant geomorphic impacts on the Feather River. Since the levee width, height and hydraulic roughness will be very similar to existing conditions there should not be any significant change in hydraulic characteristics or in the resulting sediment erosion and transport characteristics of the Feather River. As with existing conditions, Alternative 1 shear stresses under high flow events are mostly greater than those that can be resisted by alluvial silt (similar in composition to the material making up the upper bank sections in most of the project reach) but are mostly less than the critical shear stress for grass- or tree-covered banks, and significantly less than the critical shear stress for riprap.

The main potential for erosion will be associated with the grading involved in the levee upgrades. This is expected to generate temporary areas of bare earth that will be treated with erosion control BMPs such as revegetation, mulching and the use of erosion control fabrics. Such BMPs will be required to avoid localized erosion and runoff of sediment during rainfall and flow events. Because of the relatively high shear stresses exerted by the Feather River under high flow conditions it will be necessary to ensure that a grass cover is established on newly graded areas as soon as practical after construction, to maximize the cover before winter flood events occur.

5.2.2 Predicted Geomorphic Effects of Alternative 2 (Strengthen Levees with ASB Levee Setback)

We do not expect there to be significant geomorphic impacts in the lower project reach from RM 12.5 to RM 17. This reach appears to be stable to depositional under current conditions, and

potential increases in erosion in the upstream reach (above RM 24) are likely to be balanced by reductions in the middle reach (RM 17 to 24).

In the middle reach (RM 17 to RM 24) shear stresses along both the banks and levees will be reduced compared to existing conditions. The alternative will reduce shear stresses in the area that currently has the highest shear stresses. We expect the setback alternative to result in a slight reduction in bank and levee erosion risk in this area, including the Star Bend meanders. We may expect this reach to experience a minor increase in deposition in response to both the reduction in shear stress and the anticipated slight increase in erosion upstream.

In the reach above the setback area (RM 24 – upstream project boundary) shear stresses will slightly increase. We expect Alternative 2 to slightly increase bank and bed erosion potential in unvegetated or unprotected sections of the channel upstream of the setback levee during large flood events, especially on the outside of Shanghai Bend and the unnamed bend downstream, and through the knick zone. There is also potential for Alternative 2 to slightly increase the rate of headward migration of the knick zone upstream, slightly accelerated bank erosion in Shanghai Bend. There is very slight potential for increases in erosion on the north bank of the Yuba near Marysville and along the Feather River upstream of the 10th Street Bridge.

5.2.3 Predicted Geomorphic Effects of Alternative 3 (Strengthen Levees with Intermediate Setback)

Alternative 3 has the same distribution of impacts as Alternative 2, but very slightly different magnitudes in places. The greatest difference in shear stress index between Alternatives 2 and 3 is 2% in the channel and 3% in the overbank area.

We do not expect there to be significant geomorphic impacts in the lower project reach from RM 12.5 to RM 17. This reach appears to be stable to depositional under current conditions, and potential increases in erosion in the upstream reach (above RM 24) are likely to be balanced by reductions in the middle reach (RM 17 to 24).

In the middle reach (RM 17 to RM 24) shear stresses along both the banks and levees will be reduced compared to existing conditions. The alternative will reduce shear stresses in the area that currently has the highest shear stresses. We expect Alternative 3 to result in a slight reduction in bank and levee erosion risk in this area, including the Star Bend meanders. We may expect this reach to experience a minor increase in deposition in response to both the reduction in shear stress and the anticipated slight increase in erosion upstream.

In the reach above the setback area (RM 24 – upstream project boundary) shear stresses will slightly increase. We expect Alternative 3 to slightly increase bank and bed erosion potential in unvegetated or unprotected sections of the channel upstream of the setback levee during large flood events, especially on the outside of Shanghai Bend and the unnamed bend downstream, and

through the knick zone. There is also potential for Alternative 3 to slightly increase the rate of headward migration of the knick zone upstream, slightly accelerated bank erosion in Shanghai Bend. There is very slight potential for increases in erosion on the north bank of the Yuba near Marysville and along the Feather River upstream of the 10th Street Bridge.

6. PRELIMINARY GEOMORPHIC EVALUATION OF SETBACK AREA RESTORATION AND MITIGATION

PWA conducted a reconnaissance-level assessment of the geomorphic potential for restoration in the proposed setback area (Alternatives 2 and 3). Under Alternative 2 the setback would add approximately 1,350 acres of floodplain, while under Alternative 3 the setback would add approximately 1,100 acres (Figure 6-1).

Floodplains that are regularly inundated for extended periods are important for their high production of organic matter and invertebrates as well as for the provision of seasonal spawning and/or rearing habitat for native fishes. A recent CALFED-sponsored study identified criteria for the flow associated with such floodplains, the "floodplain activation flow" or FAF. The FAF was defined as a flow that inundates a floodplain area for a minimum of a week during the spring in two years out of three. The study hypothesized that there is very little remaining FAF floodplain in the Central Valley, because of a combination of flow regulation, channel incision and levee construction. As a result of development on floodplains, there may be few areas where FAF floodplains can readily be restored without either dramatic changes in reservoir management, levee setbacks or floodplain lowering. Those areas where FAF floodplains can be restored should be high priorities for the restoration community since they offer floodplain function benefits across a broad range of flood magnitudes and support essential ecosystem functions and anadromous fish habitat.

The consultant team has carried out hydraulic analyses that identified the confluence of the Bear and Feather Rivers as one such site. We have not conducted a hydraulic analysis of flood frequency for the potential Feather River levee setback, but can extrapolate some of our findings from the Bear – Feather River confluence to that site. The majority of the setback floodplain area at the Bear – Feather River confluence is inundated every one to two years, with a large proportion of this area meeting FAF criteria. It is located at an average elevation of 30-35 feet above sea level. Alternatives 2 and 3 would create setback areas that were mostly between 35 and 45 feet above sea level, with some higher ground adjacent to the river bank where out of bank deposition has been highest. Since the channel thalweg rises by approximately 7 feet in the intervening 10 miles, the floodplain in the Alternative 2 and 3 setback areas should be inundated with a similar frequency to the floodplain in the Bear – Feather River confluence. Though additional hydraulic analysis would be required to confirm this, it suggests that the newly created floodplain areas would be frequently inundated and would have a high restoration value. Because the topography is highest closest to the river and decreases with distance away from the banks, the ASB levee setback alignment would create much more frequently inundated floodplain than the intermediate levee setback.

7. REFERENCES

Ayres and Associates, 1997. Yuba River Basin, California Project: Geomorphic, Sediment Engineering and Channel Stability Analysis. For USACE Sacramento District, Contract No. DACW005-92-C-0077.

Department of Water Resources (DWR), 2004. SP-G2: Effects of project operations on geomorphic processes downstream of Oroville dam. Task 6 – Channel meanders and bank erosion monitoring. Oroville Facilities Relicensing FERC Project No. 2100.

Chang, H.H., 1988. Fluvial Processes in River Engineering, John Wiley and Sons, New York, citing Fortier, S. and Scobey, F.C., 1926. "Permissible canal velocities," Transactions of the ASCE, 89:940-984.

Fischenich, C., 2001. Stability thresholds for stream restoration materials. EMRRP Technical Notes Collection (ERDC TN-EMRRP-SR-29), U.S. Army Engineer Research and Development Center, Vicksburg, MS.

Water Engineering & Technology, Inc. (WET), 1991. Geomorphic analysis and bank protection alternative report for Sacramento River (RM (0-78), Feather River (RM 28-61), Yuba River (RM 0-11), Bear River (RM 0-17), American River (RM 0-23), and portions of Three Mil, Steamboat, Sutter, Miner, Georgian, Elk, and Cache Soughs: prepared for Sacramento District, Corps of Engineers, Contract DACW05-88-D-0044, 334 p

8. LIST OF PREPARERS

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Andrew Collison, PhD – Project Manager
John Stofleth, MS – Project Hydrologist
Elizabeth Andrews, P.E. – QA and Technical Support

9. FIGURES

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Figure 2-1a&b. Project Alternatives

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Figure 3-3. Historic Cross Sections – RM 15.1

Figure 3-4. Historic Cross Sections – RM 16.4

Figure 3-5. Historic Cross Sections – RM 17.5

Figure 3-6. Historic Cross Sections – RM 18.3

Figure 3-7. Historic Cross Sections – RM 19.5

Figure 3-8. Historic Cross Sections – RM 20.4

Figure 3-9. Historic Cross Sections – RM 21.75

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Figure 5-2. Channel Shear Stress, 5-year Flood

Figure 5-3. Channel Shear Stress, 10-year Flood

Figure 5-4. Channel Shear Stress, 100-year Flood

Figure 5-5. Channel Shear Stress, 200-year Flood

Figure 5-6. Overbank Shear Stress, 2-year Flood

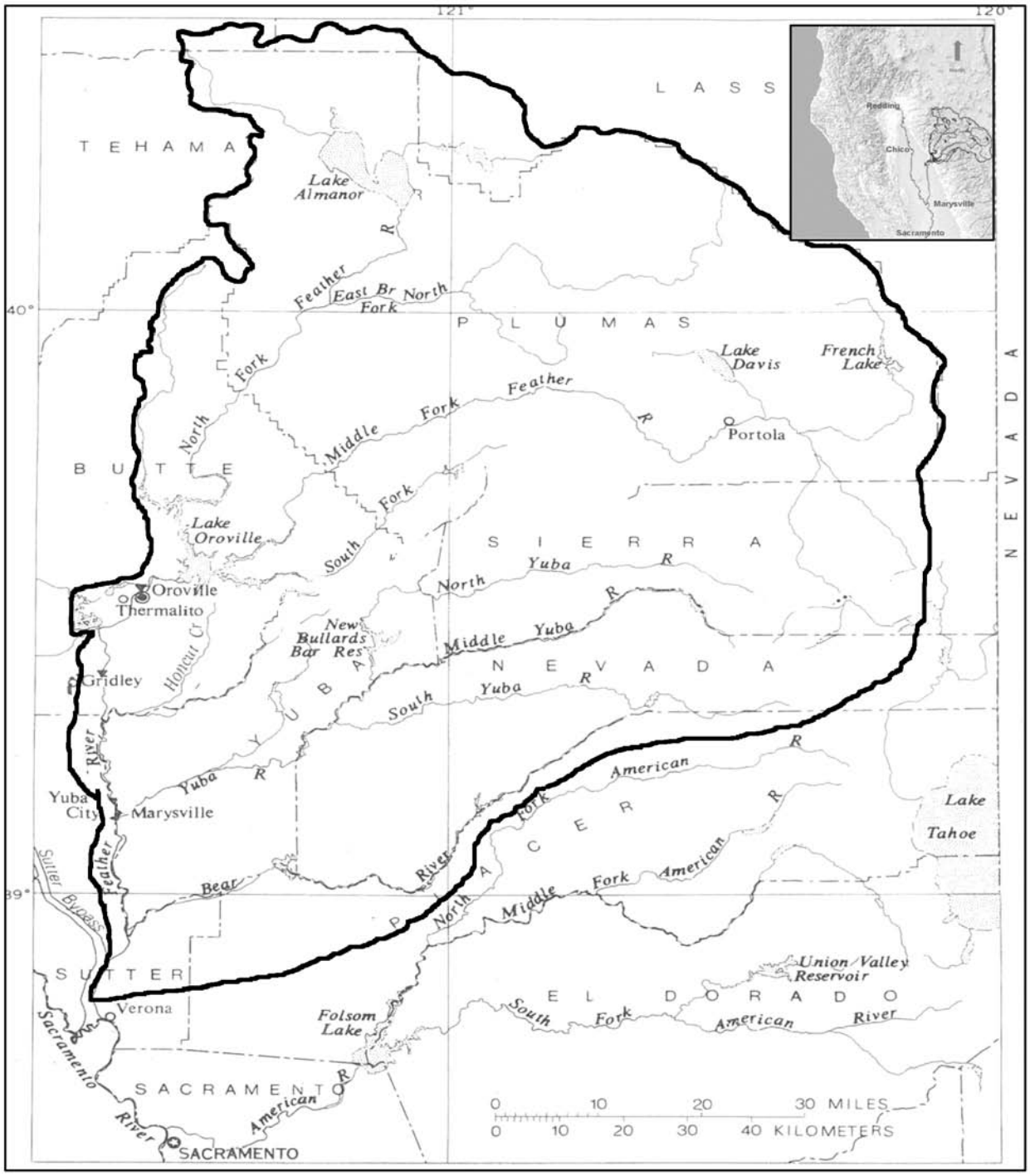
Figure 5-7. Overbank Shear Stress, 5-year Flood

Figure 5-8. Overbank Shear Stress, 10-year Flood

Figure 5-9. Overbank Shear Stress, 100-year Flood

Figure 5-10. Overbank Shear Stress, 200-year Flood

Figure 6-1. Elevation within Setback



Source: DWR 2004
Notes:

figure 1-1
Feather River Levee Setback

Feather River Watershed

PWA Ref# 1833

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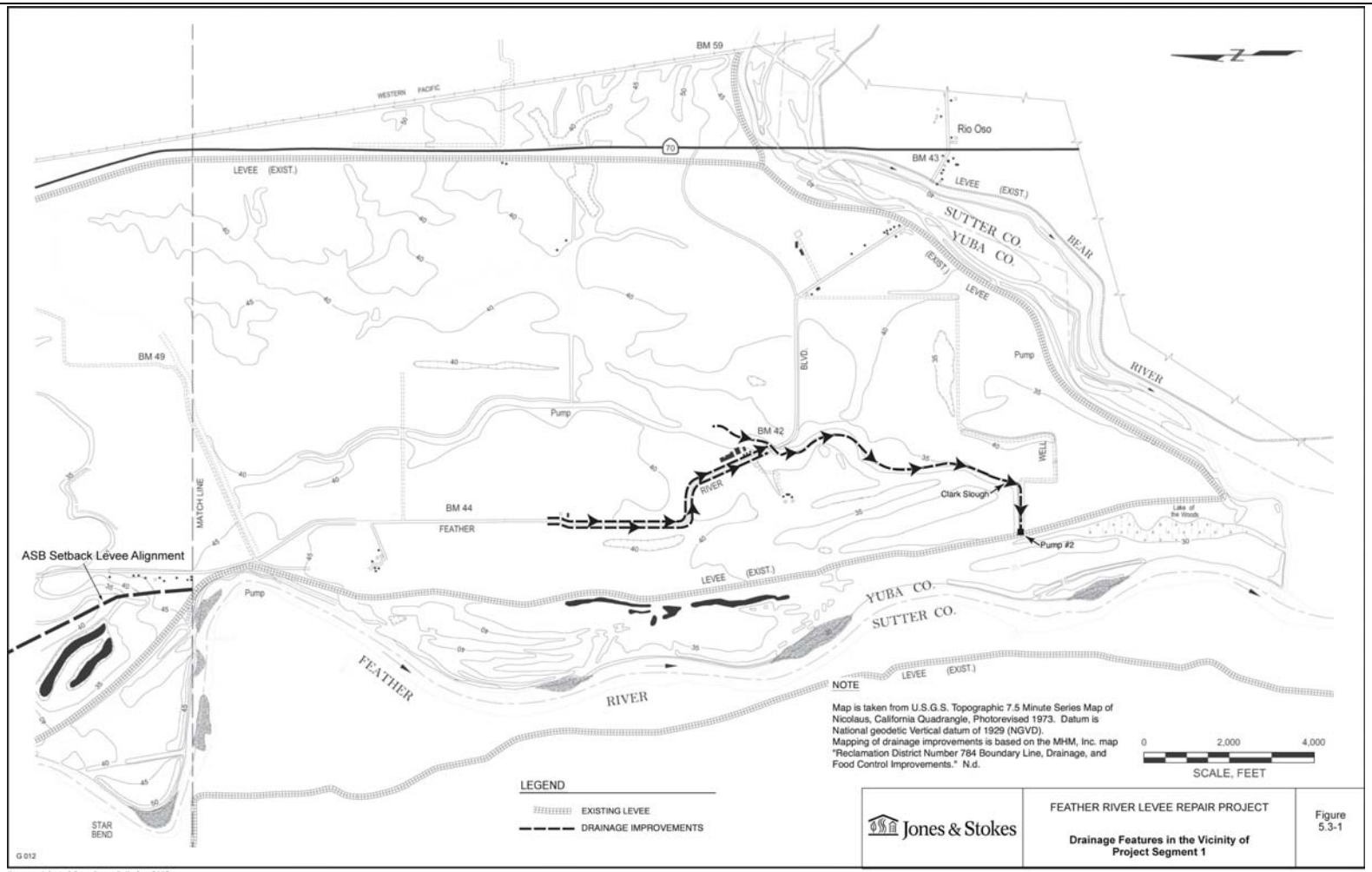

Source: Adapted from Jones & Stokes 2002

Source: Jones and Stokes, 2002

figure 2-1a
Feather River Levee Assessment

Project Alternatives

PWA Ref# 1833

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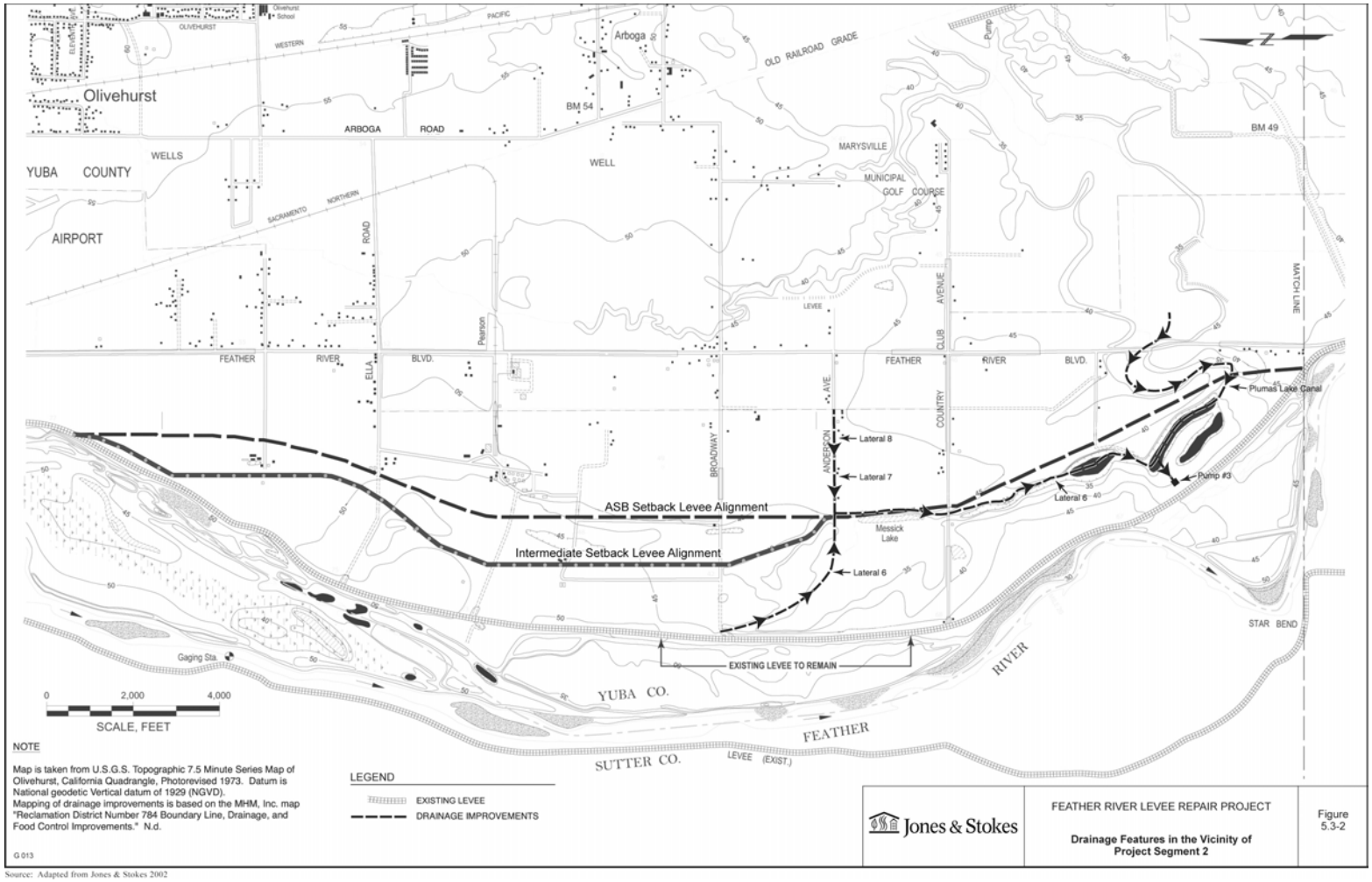

Source: Jones and Stokes, 2002

figure 2-1b
Feather River Levee Assessment

Project Alternatives

PWA Ref# 1833

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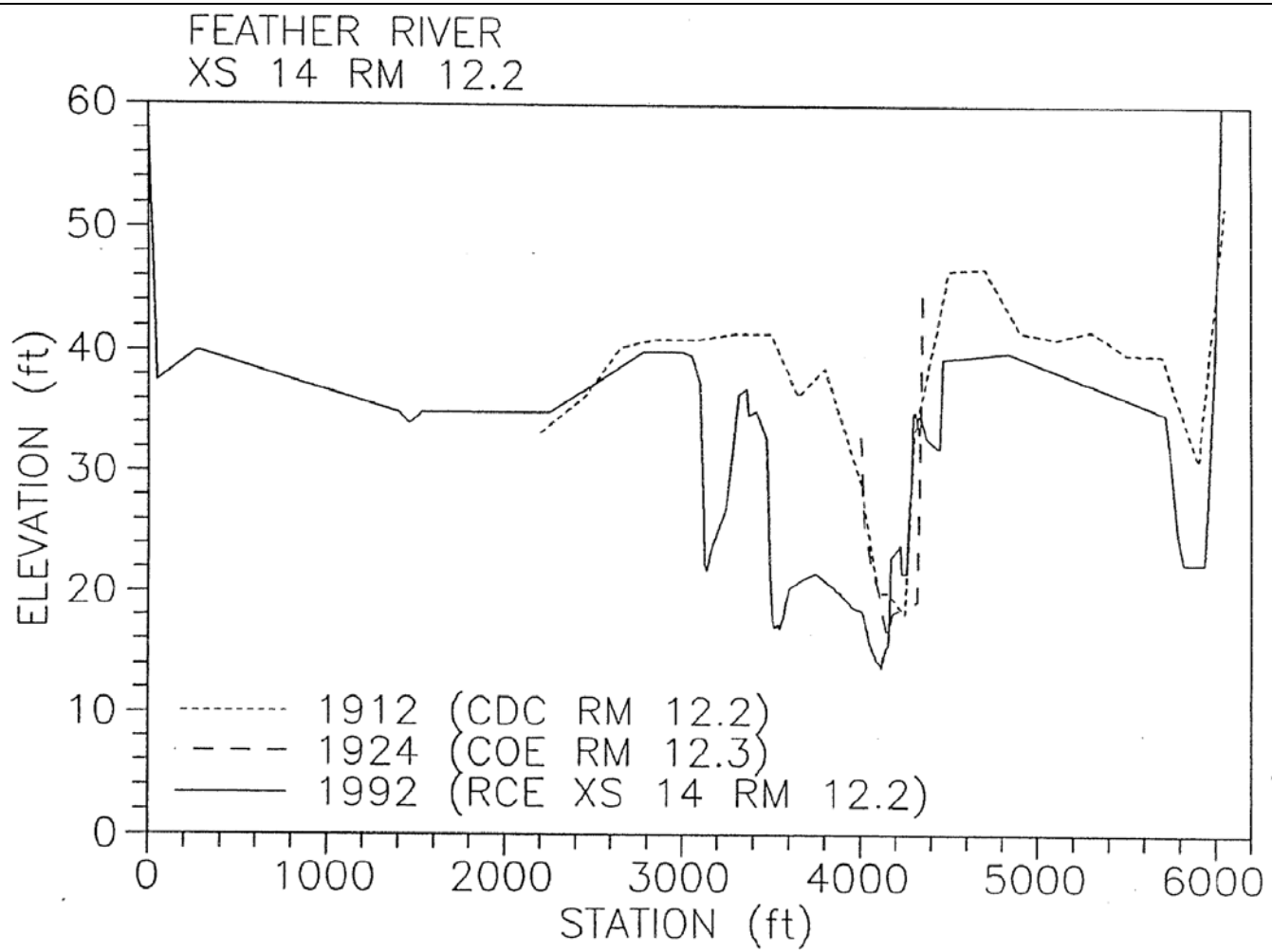

Source: Ayres, 1997
Notes:

figure 3-1
Feather River Levee Setback

Historic Cross Sections – RM 12.2

PWA Ref# 1833

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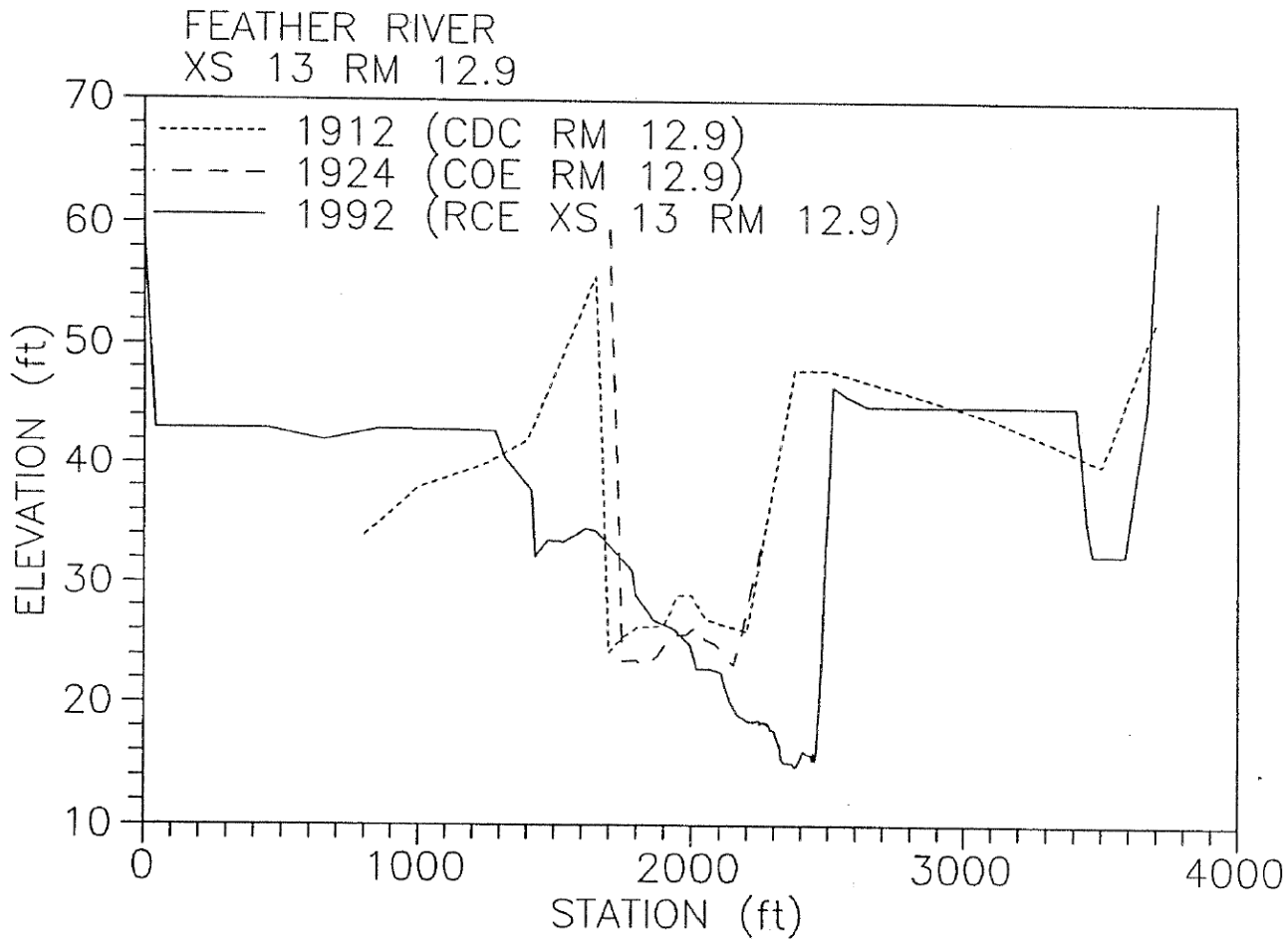

Source: Ayres, 1997
Notes:

figure 3-2
Feather River Levee Setback

Historic Cross Sections RM 12.9

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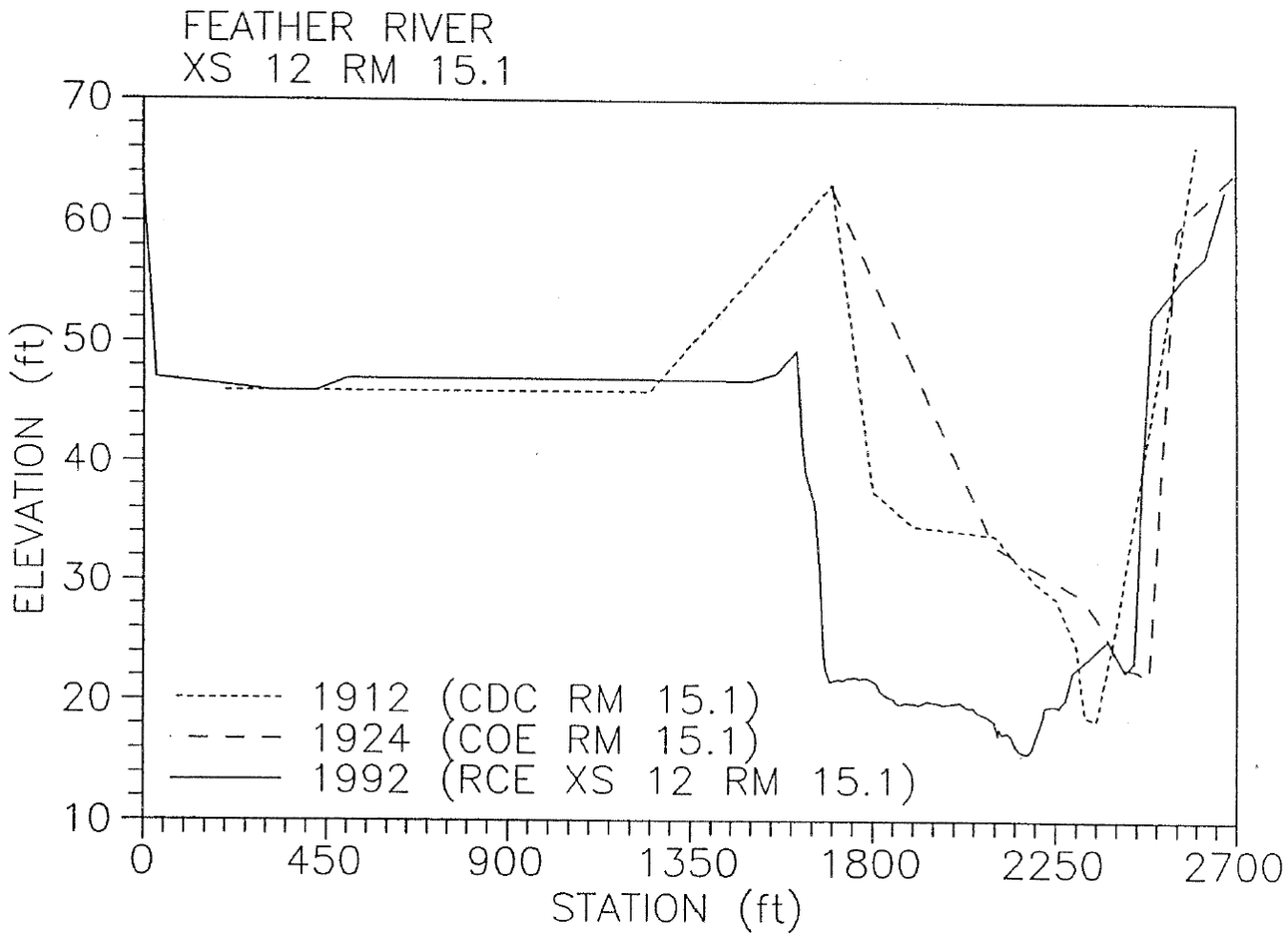

Source: Ayres, 1997
Notes:

figure 3-3
Feather River Levee Setback

Historic Cross Sections – RM 15.1

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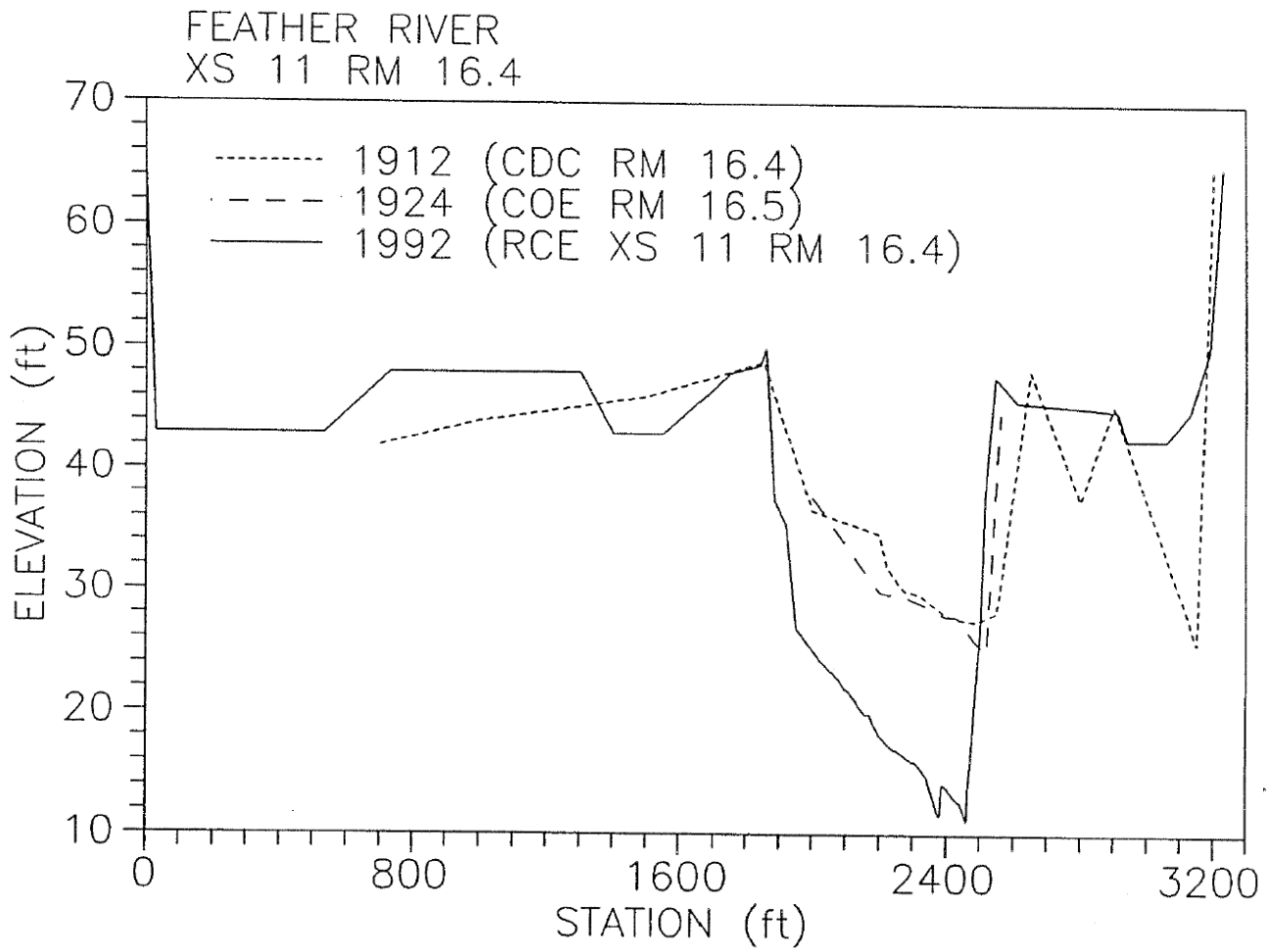

Source: Ayres, 1997
Notes:

figure 3-4
Feather River Levee Setback

Historic Cross Sections – RM 16.4

PWA Ref# 1833

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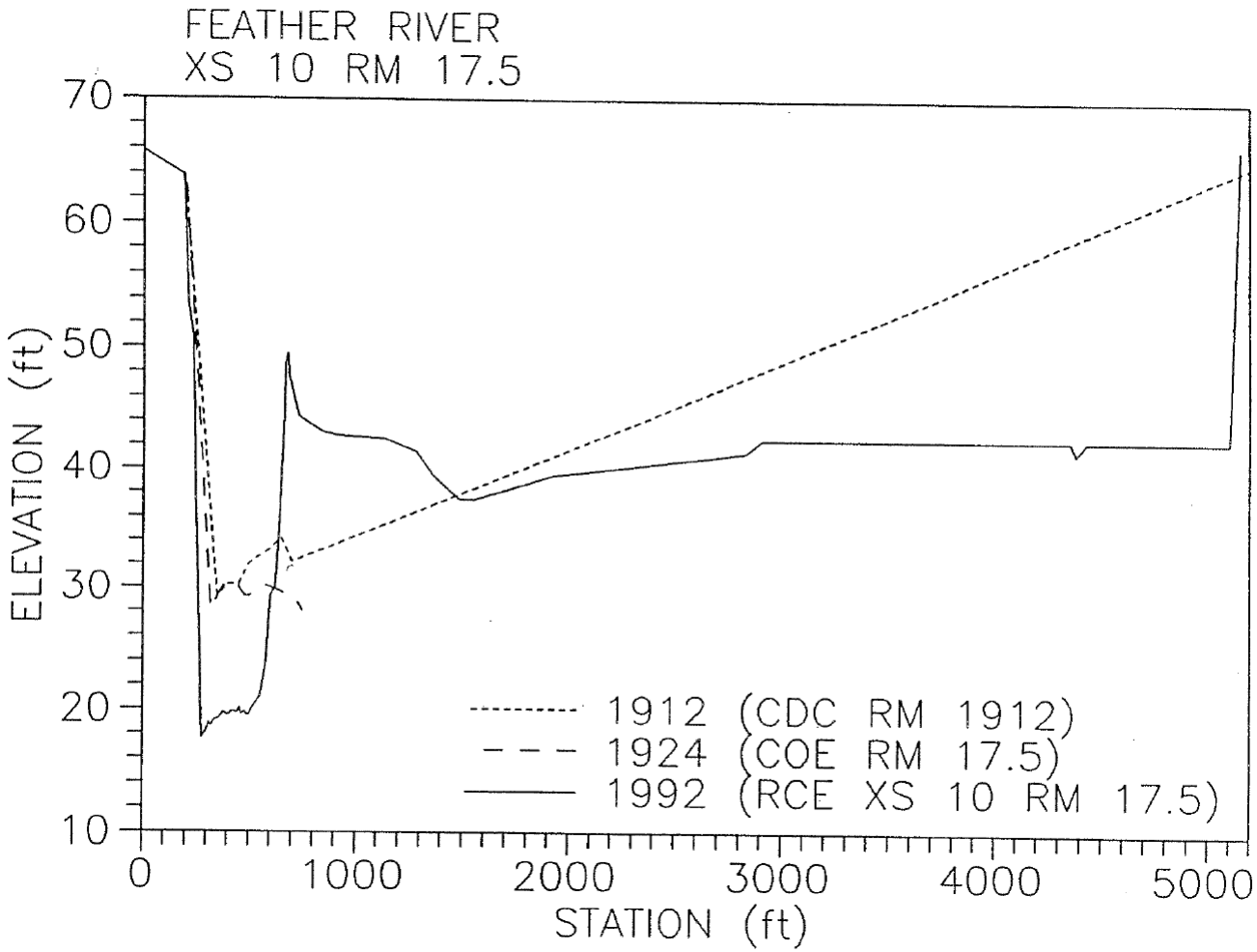

Source: Ayres, 1997
Notes:

figure 3-5
Feather River Levee Setback

Historic Cross Sections – RM 17.5

PWA Ref# 1833

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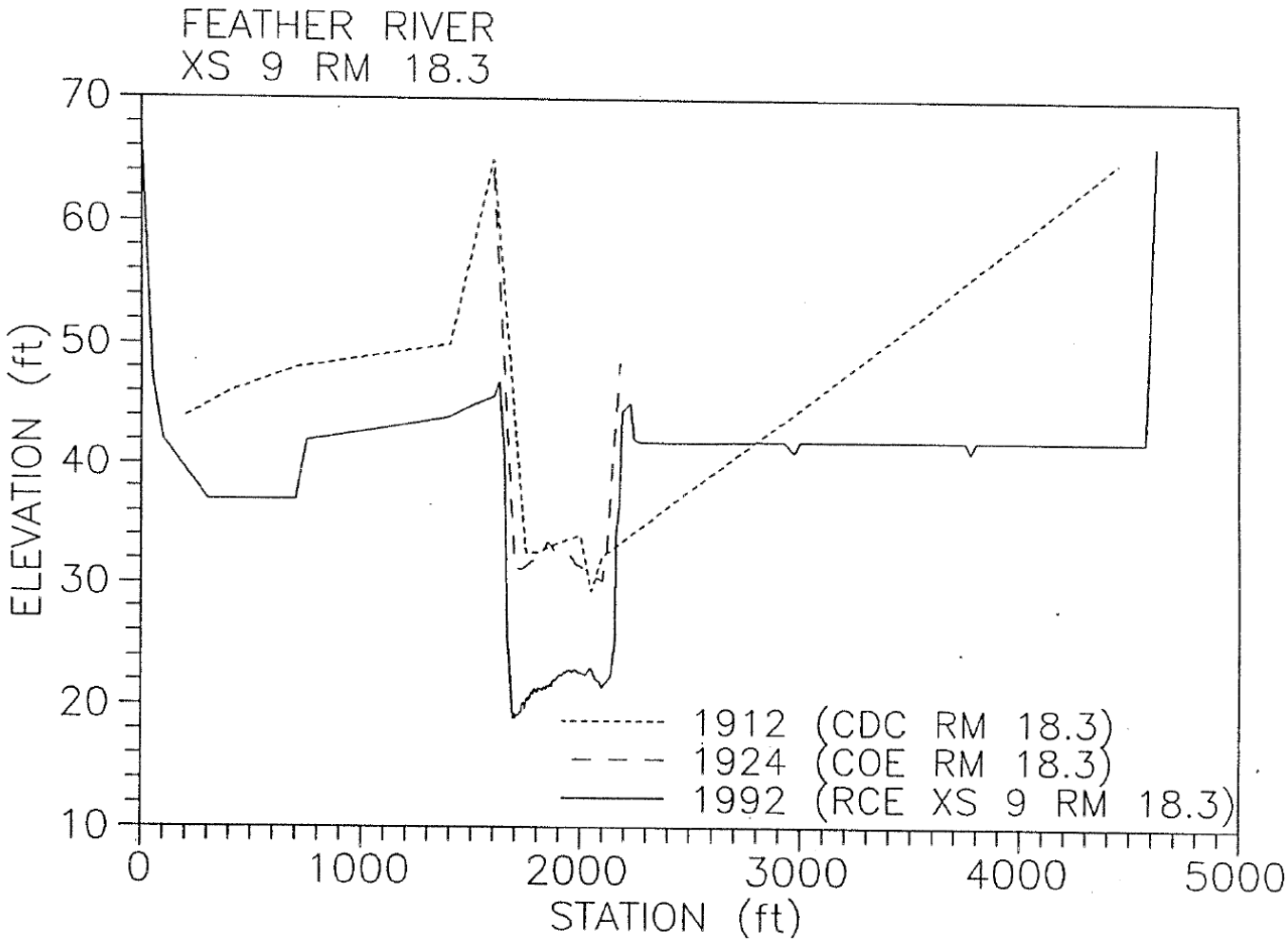

Source: Ayres, 1997
Notes:

figure 3-6
Feather River Levee Setback

Historic Cross Sections – RM 18.3

PWA Ref# 1833

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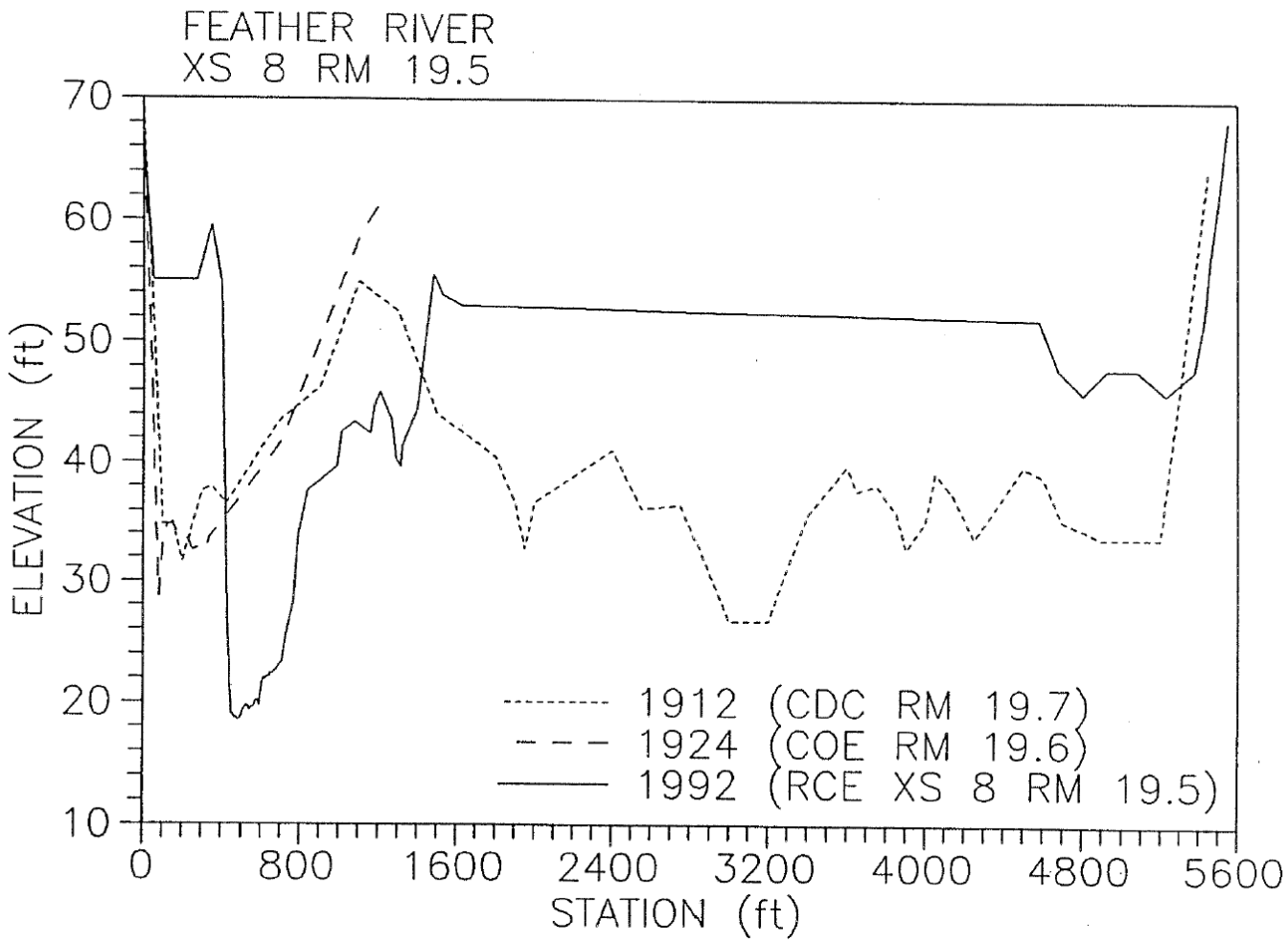

Source: Ayres, 1997
Notes:

figure 3-7
Feather River Levee Setback

Historic Cross Sections – RM 19.5

PWA Ref# 1833

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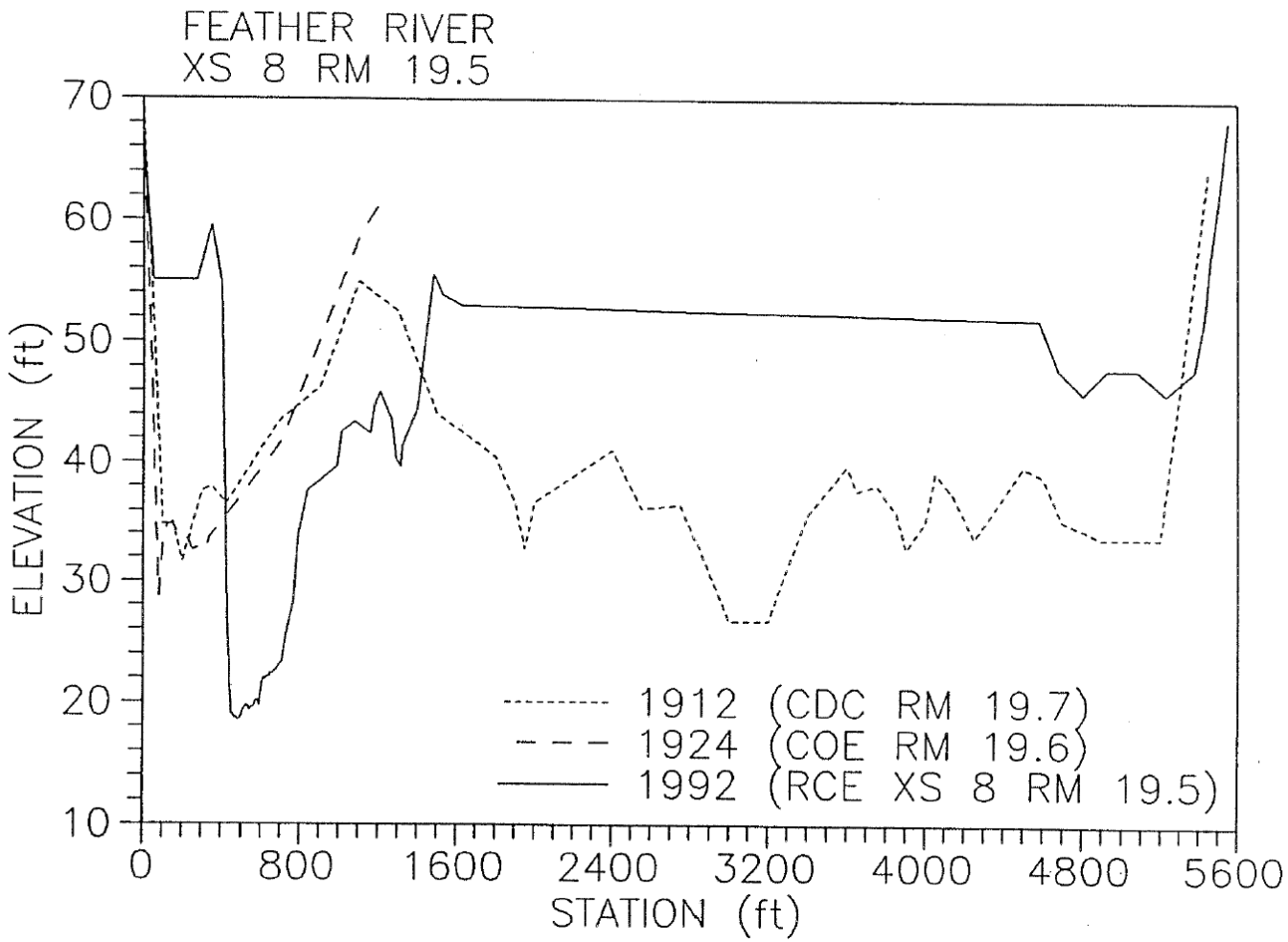

Source: Ayres, 1997
Notes:

figure 3-8
Feather River Levee Setback

Historic Cross Sections – RM 20.4

PWA Ref# 1833

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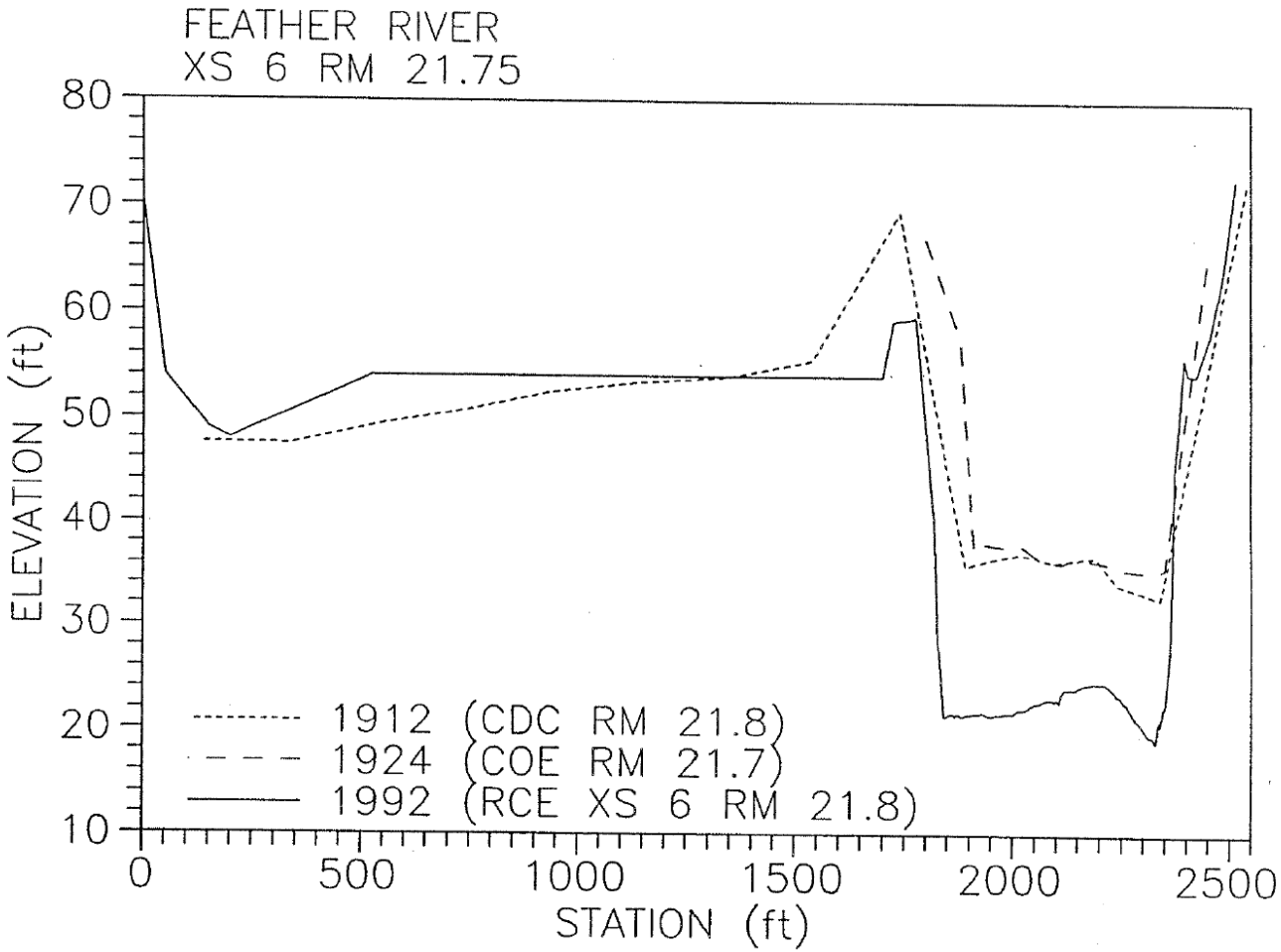

Source: Ayres, 1997
Notes:

figure 3-9
Feather River Levee Setback

Historic Cross Sections – RM 21.75

PWA Ref# 1833

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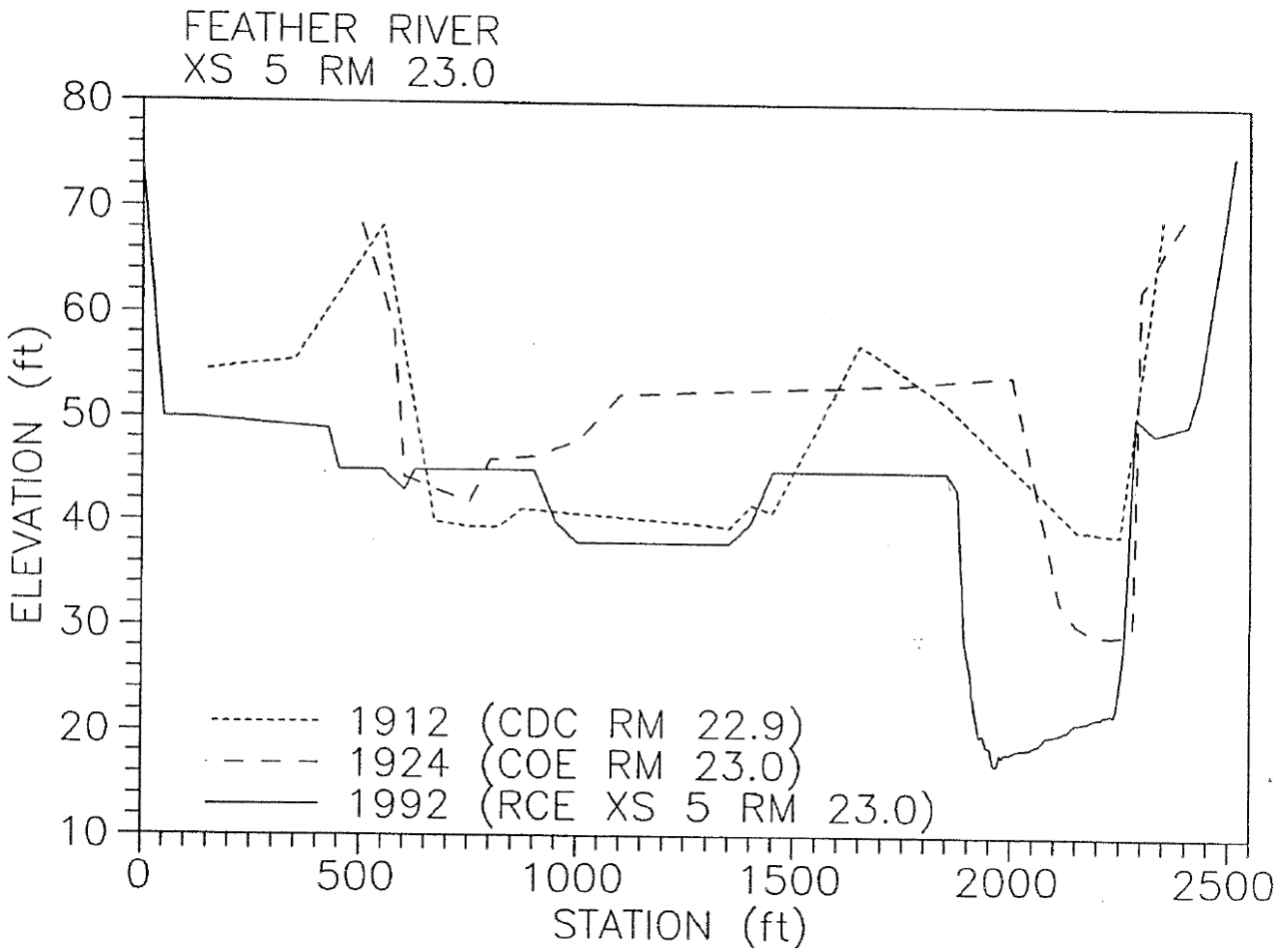

Source: Ayres, 1997
Notes:

figure 3-10
Feather River Levee Setback

Historic Cross Sections – RM 23.0

PWA Ref# 1833

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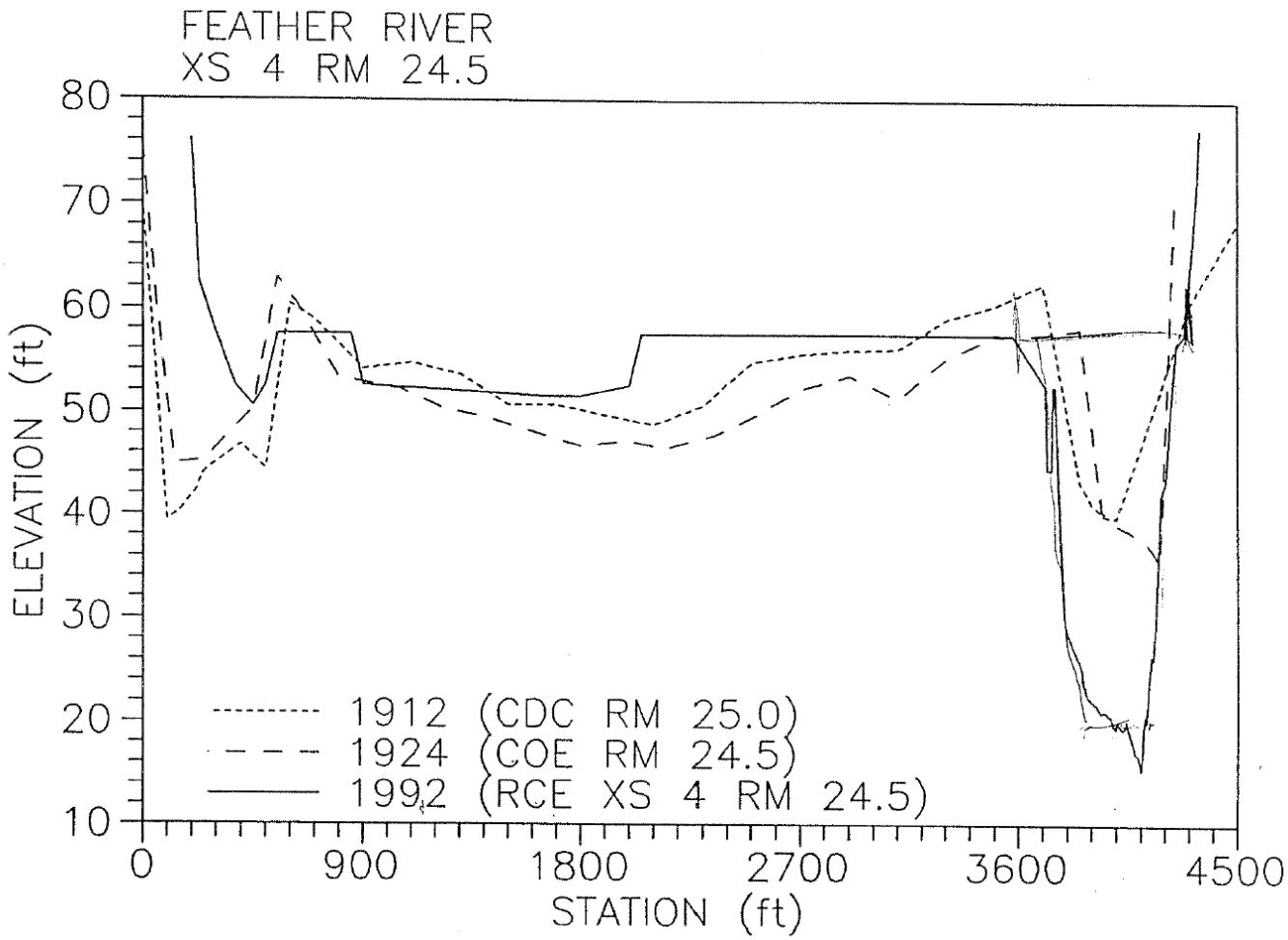

Source: Ayres, 1997
Notes:

figure 3-11
Feather River Levee Setback

Historic Cross Sections – RM 24.5

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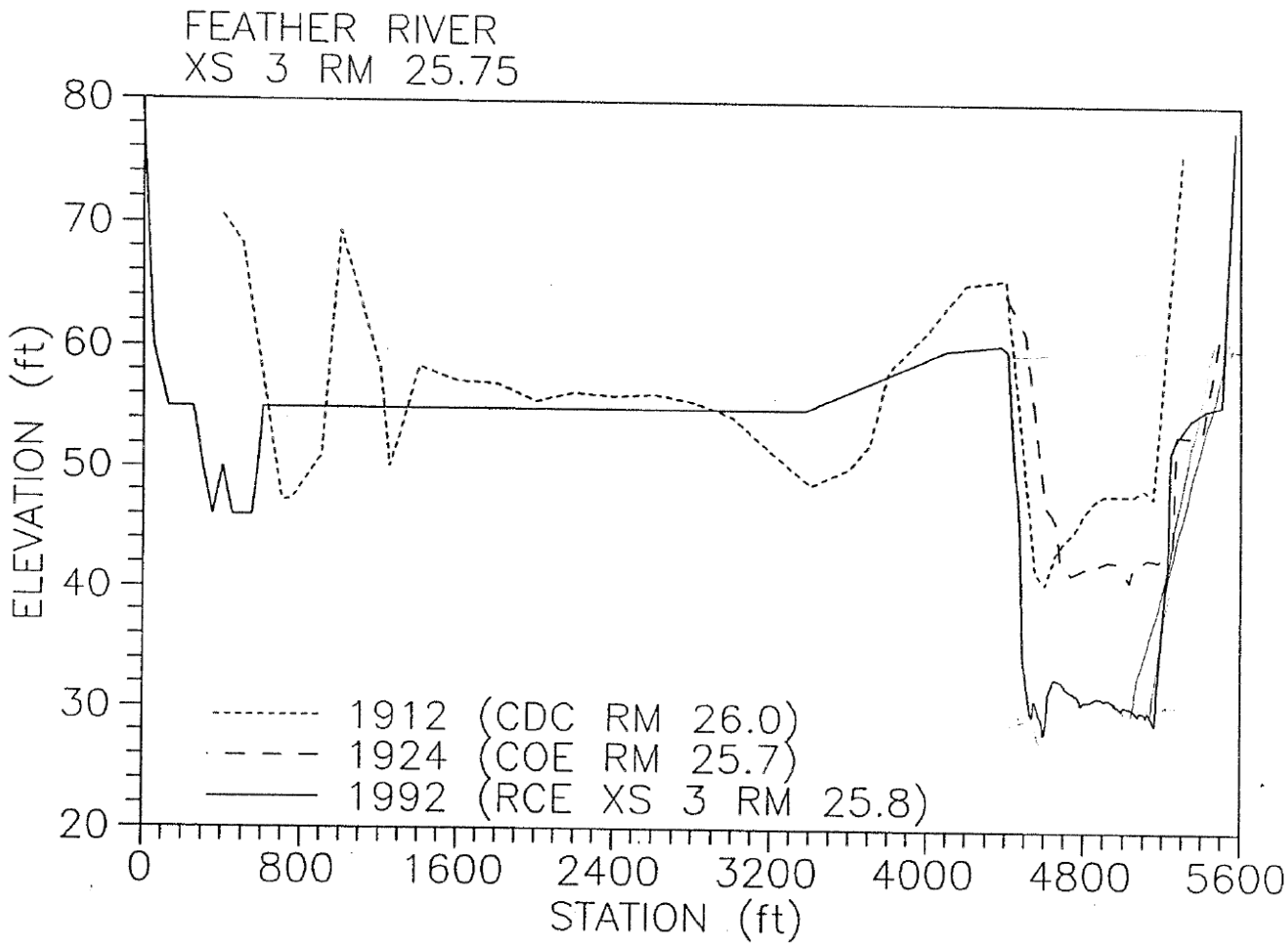

Source: Ayres, 1997
Notes:

figure 3-12
Feather River Levee Setback

Historic Cross Sections – RM 25.75

PWA Ref# 1833

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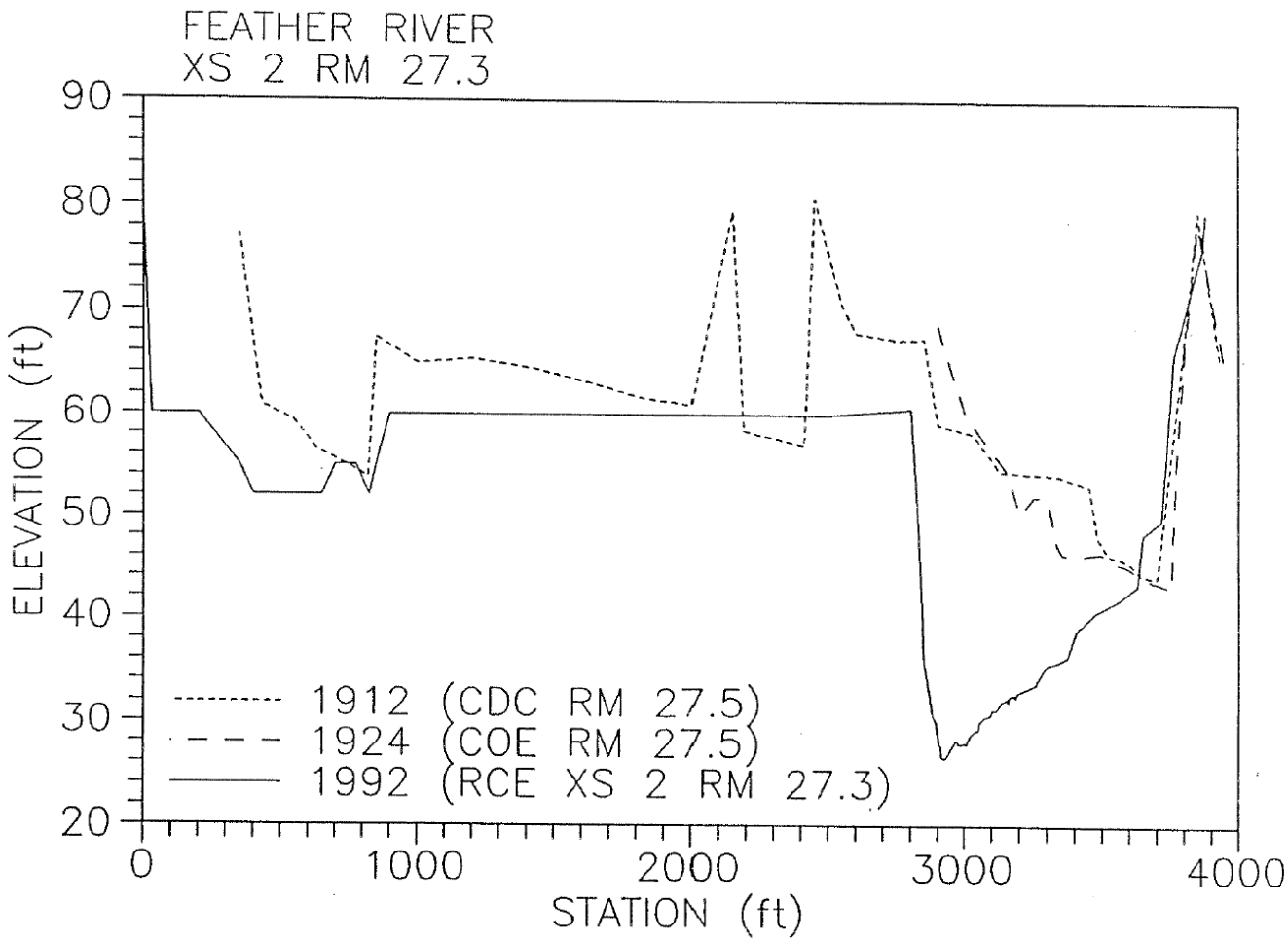

Source: Ayres, 1997
Notes:

figure 3-13
Feather River Levee Setback

Historic Cross Sections – RM 27.3

PWA Ref# 1833

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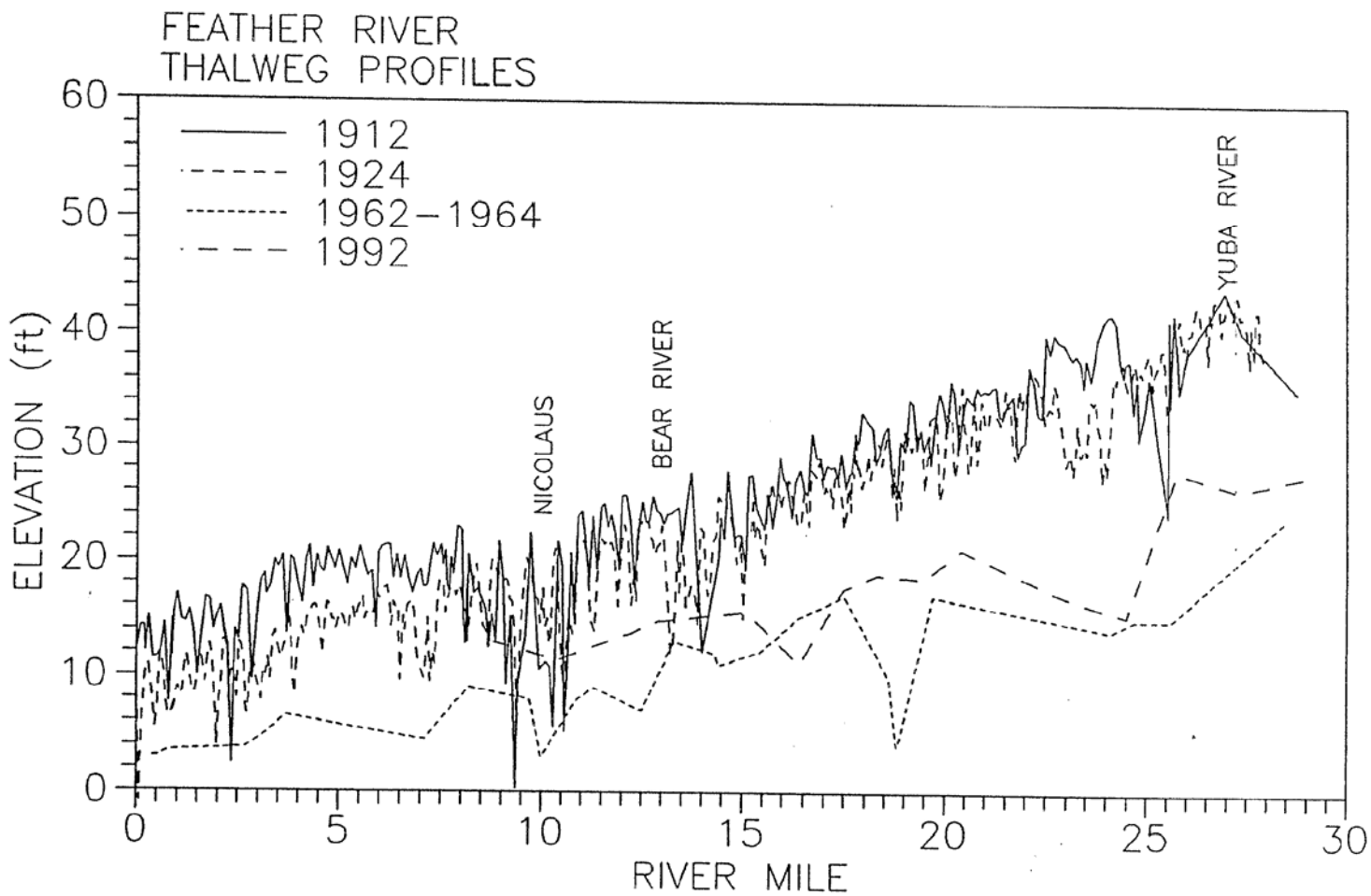

Source: Ayres, 1997
Notes:

Figure ***3-14***
Feather River Levee Setback

Thalweg Profiles 1912 – 1992

PWA Ref# 1833

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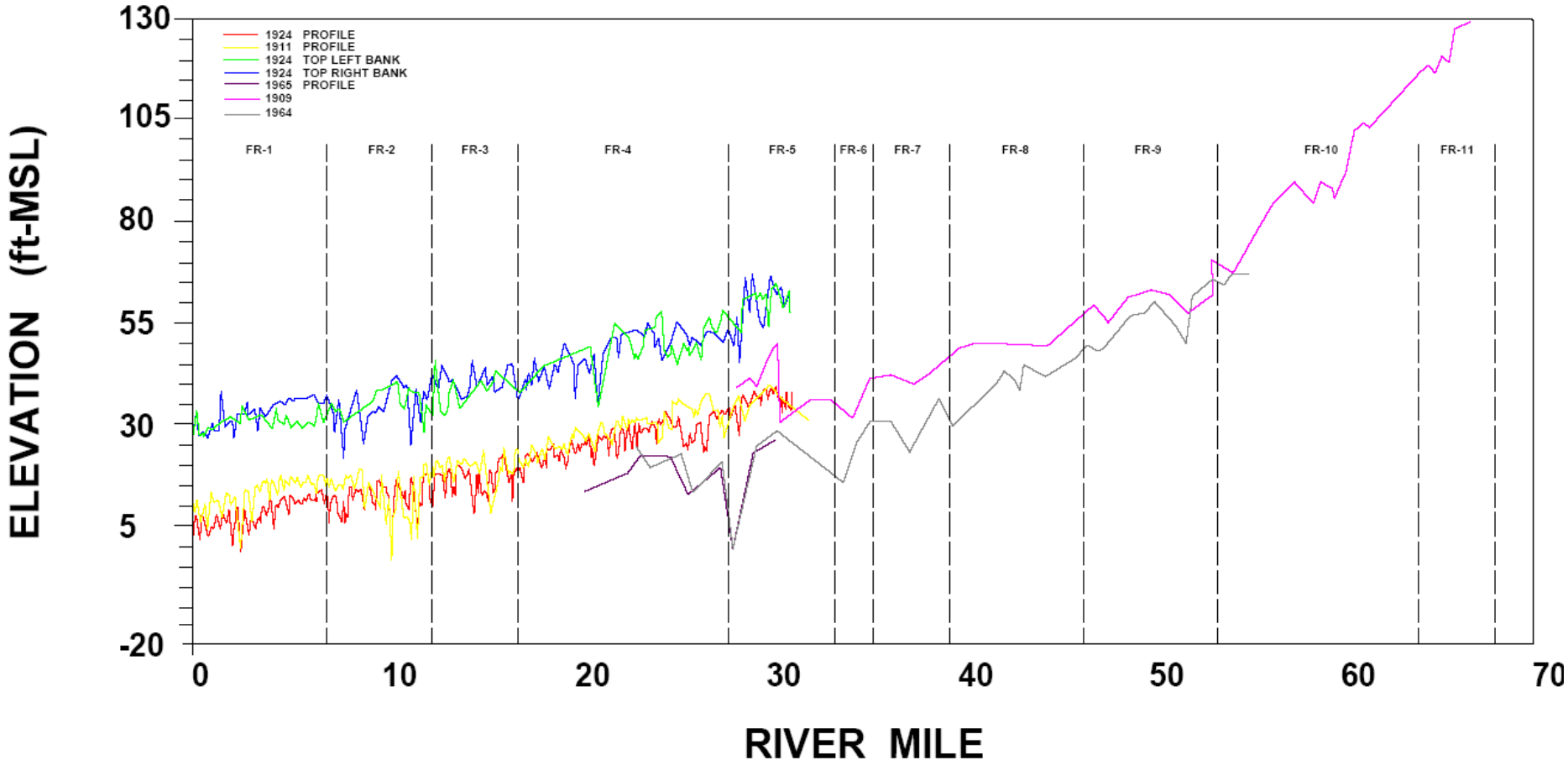

Source: Ayres, 1997
Notes:

figure 3-15
Feather River Levee Setback

Thalweg Profiles 1909, 1964

PWA Ref# 1833

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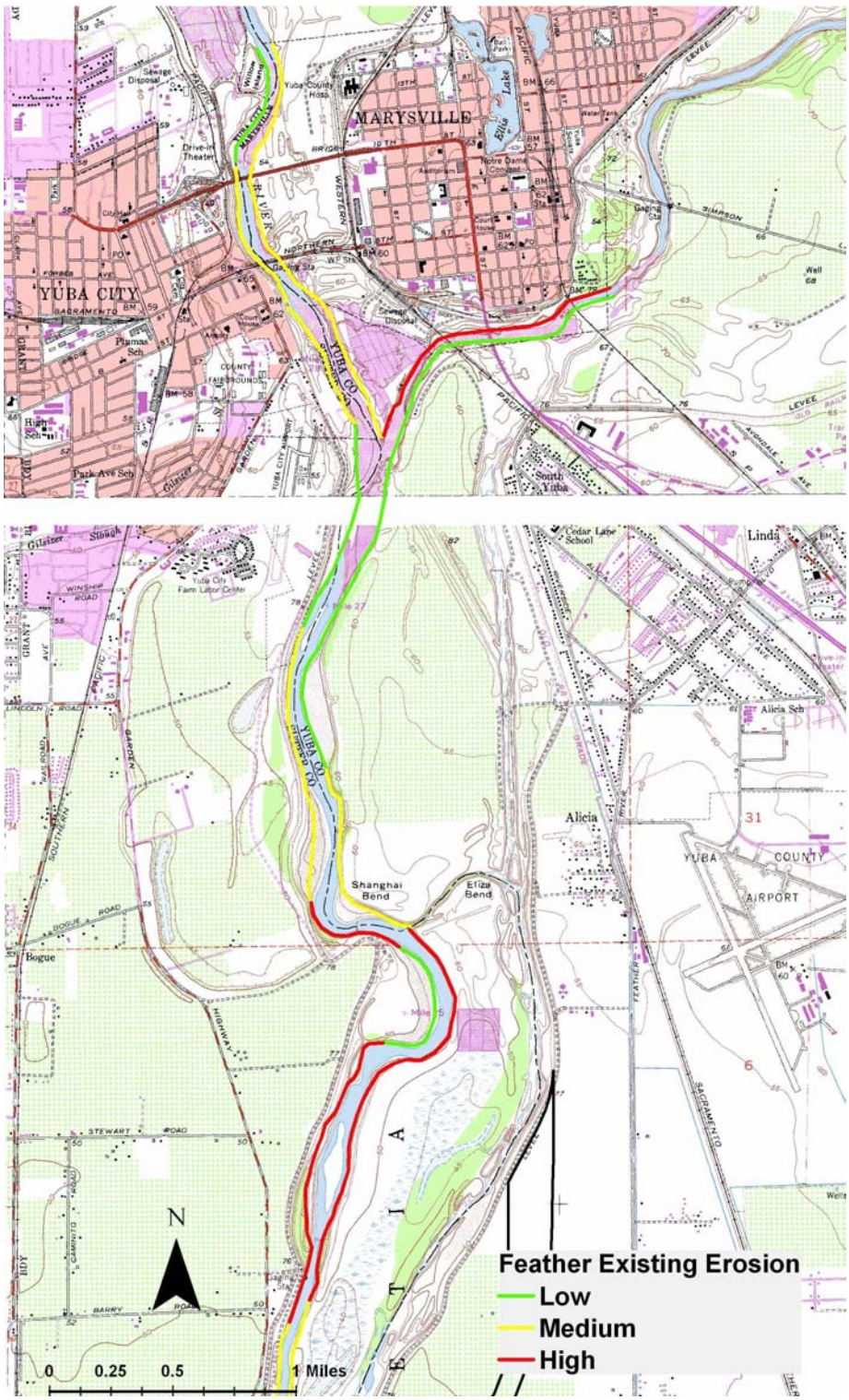

Source:
Notes: Erosion status based on observations from field reconnaissance on 5/10/2006.

figure 4-1a
Feather River Levee Setback

Existing Channel Bank Erosion Conditions

PWA Ref# 1833

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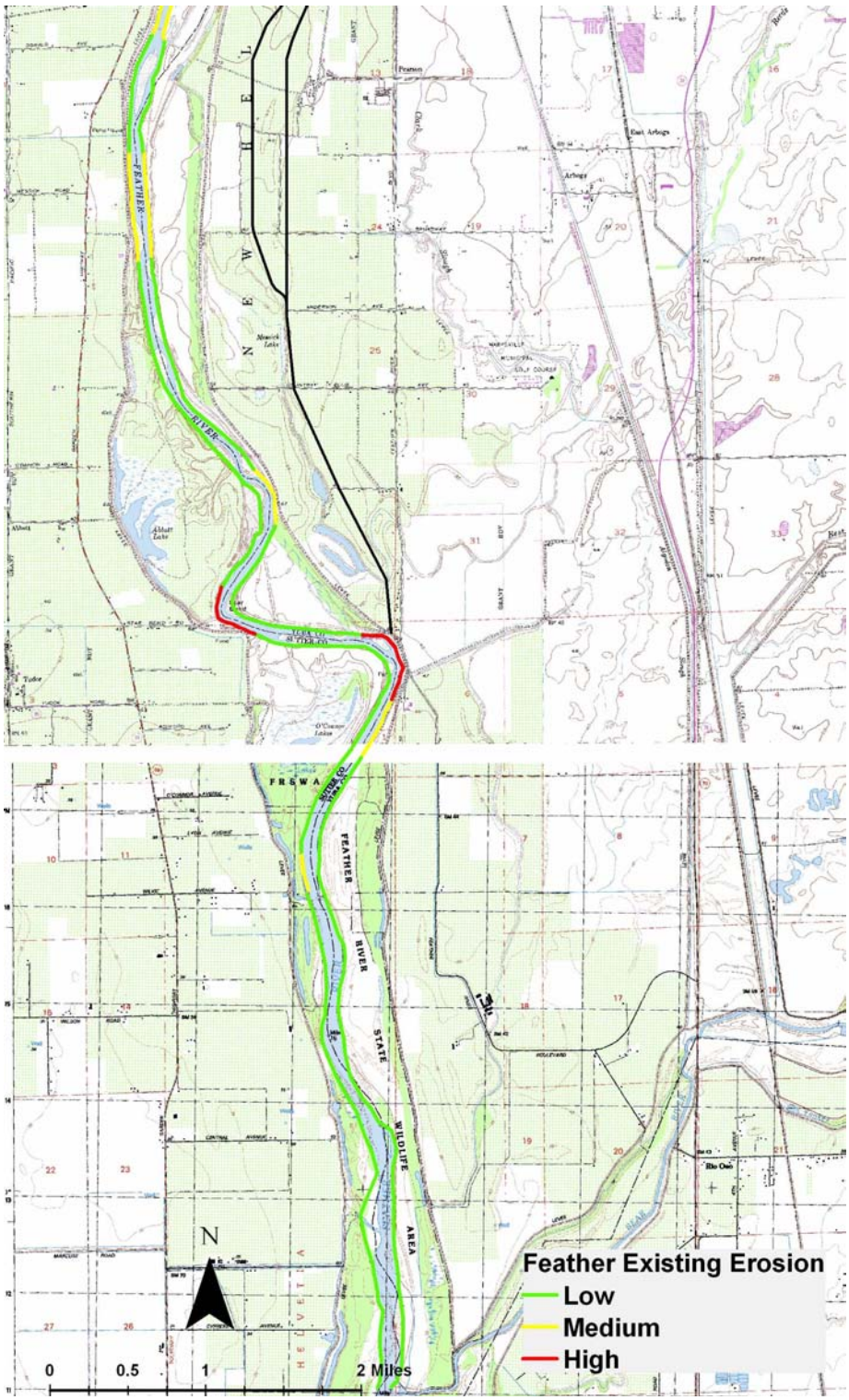


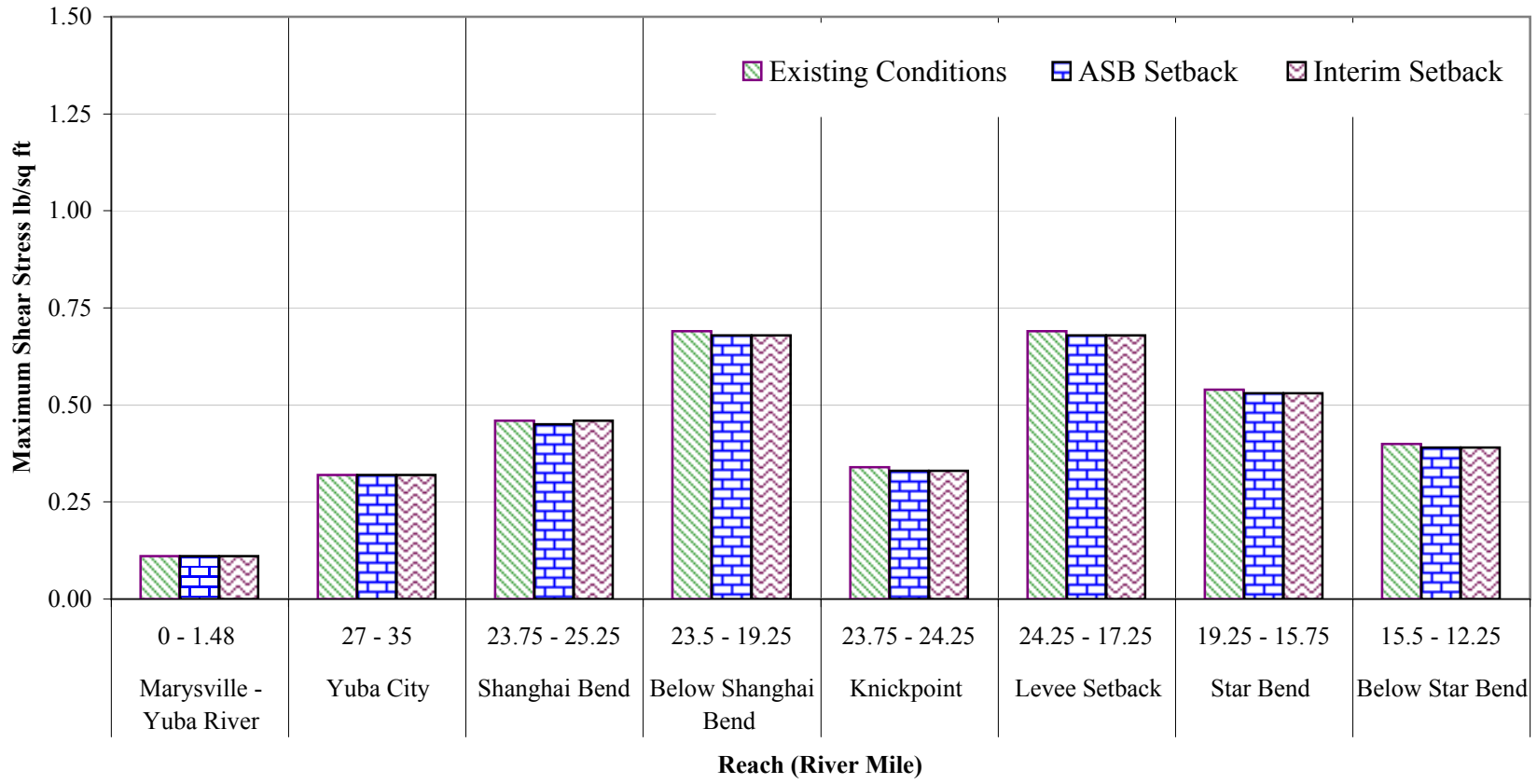
Source:
Notes: Erosion status based on observations from field reconnaissance on 5/10/2006.

figure 4-1b
Feather River Levee Setback

Existing Channel Bank Erosion Conditions

PWA Ref# 1833

PWA



Source: Hydraulic data from MBK Engineers
Notes: Average boundary shear stress for the channel area

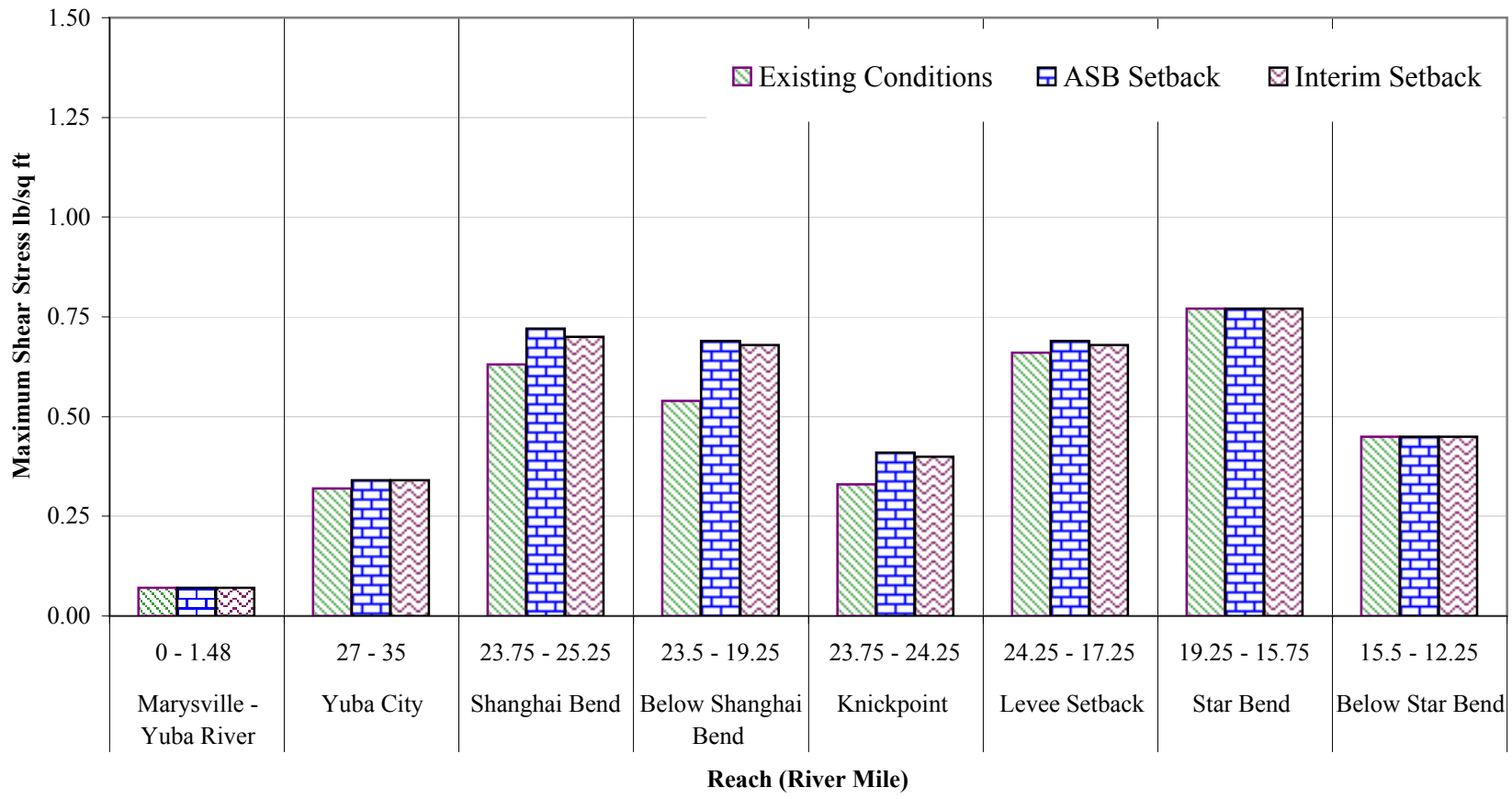
figure 5-1

Feather River Levee Setback

Channel Shear Stress, 2-year Flood

PWA Ref. # 1833

PWA



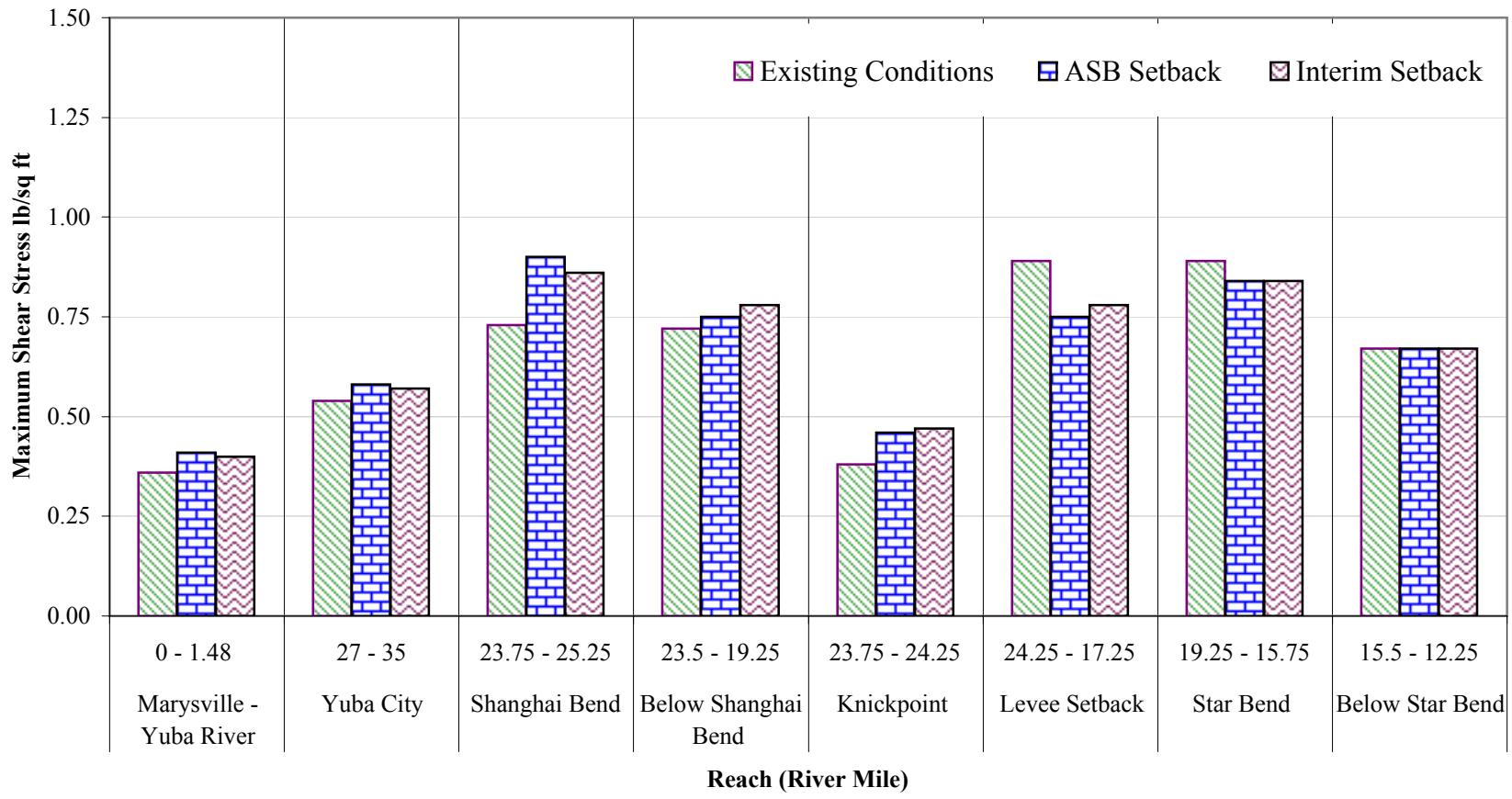
Source: Hydraulic data from MBK Engineers
Notes: Average boundary shear stress for the channel area

figure 5-2
Feather River Levee Setback

Channel Shear Stress, 5-year Flood

PWA Ref. # 1833

PWA



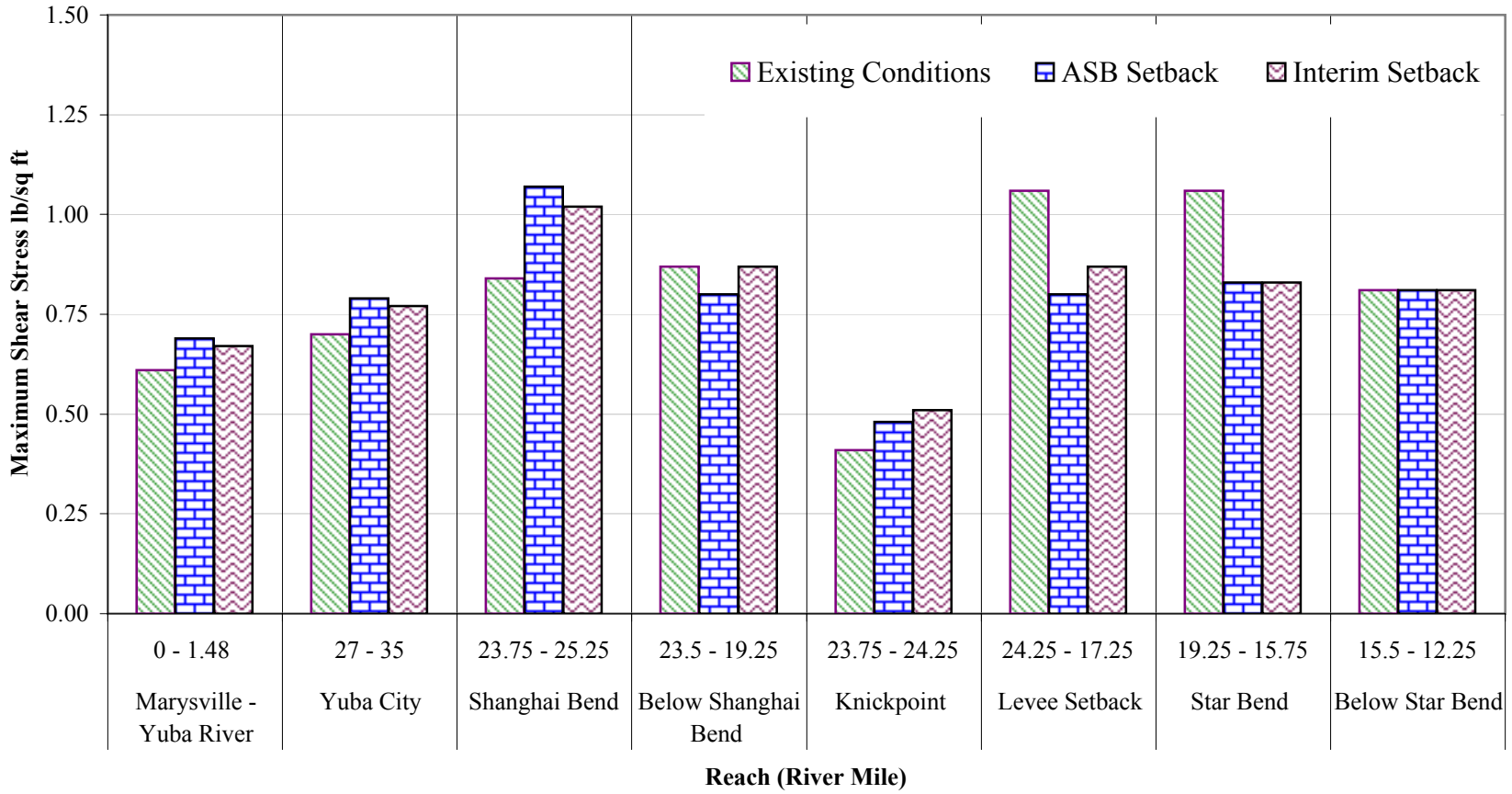
Source: Hydraulic data from MBK Engineers
Notes: Average boundary shear stress for the channel area

figure 5-3
Feather River Levee Setback

Channel Shear Stress, 10-year Flood

PWA Ref. # 1833

PWA



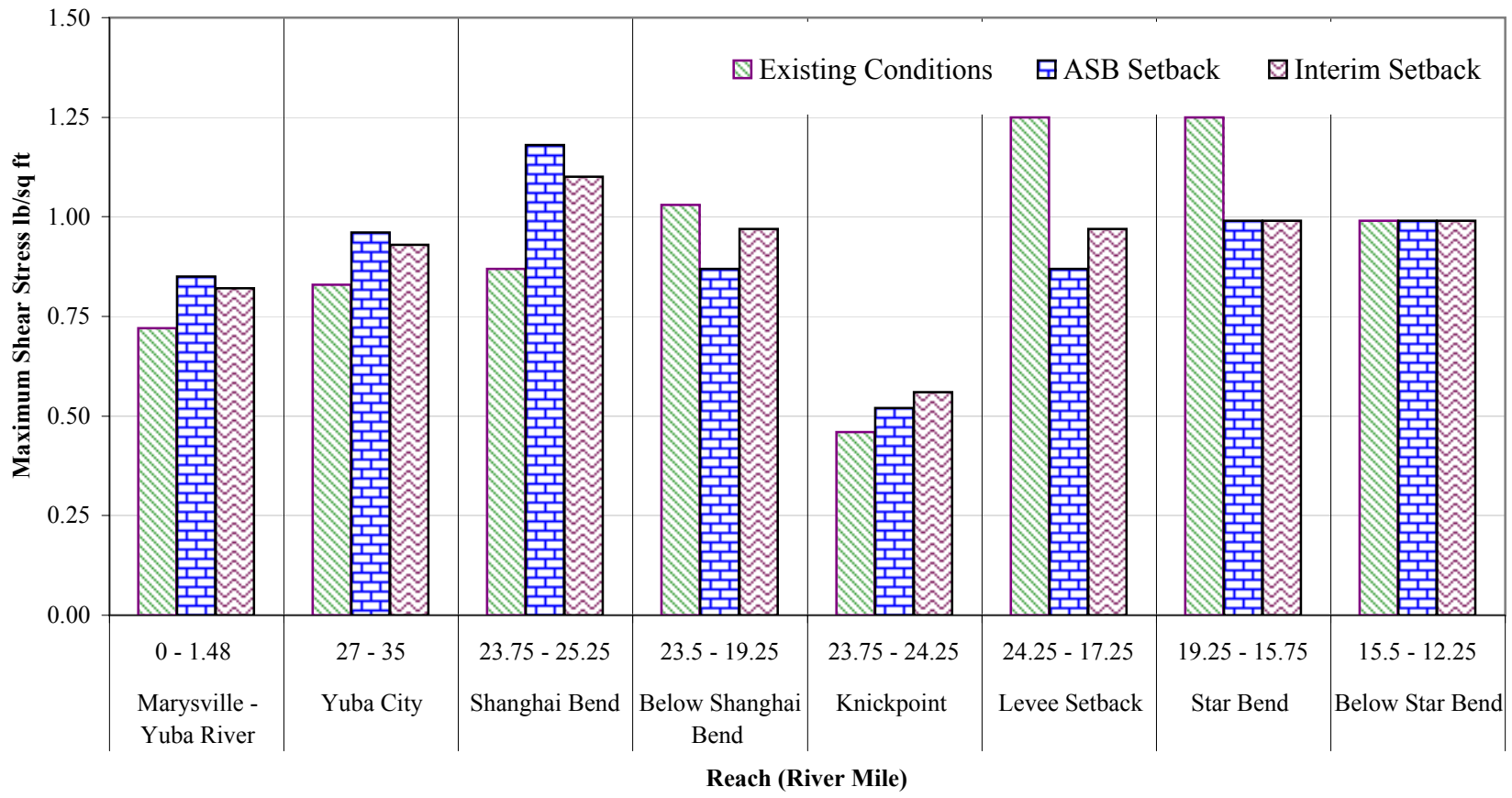
Source: Hydraulic data from MBK Engineers
Notes: Average boundary shear stress for the channel area

figure 5-4
Feather River Levee Setback

Channel Shear Stress, 100-year Flood

PWA Ref. # 1833

PWA



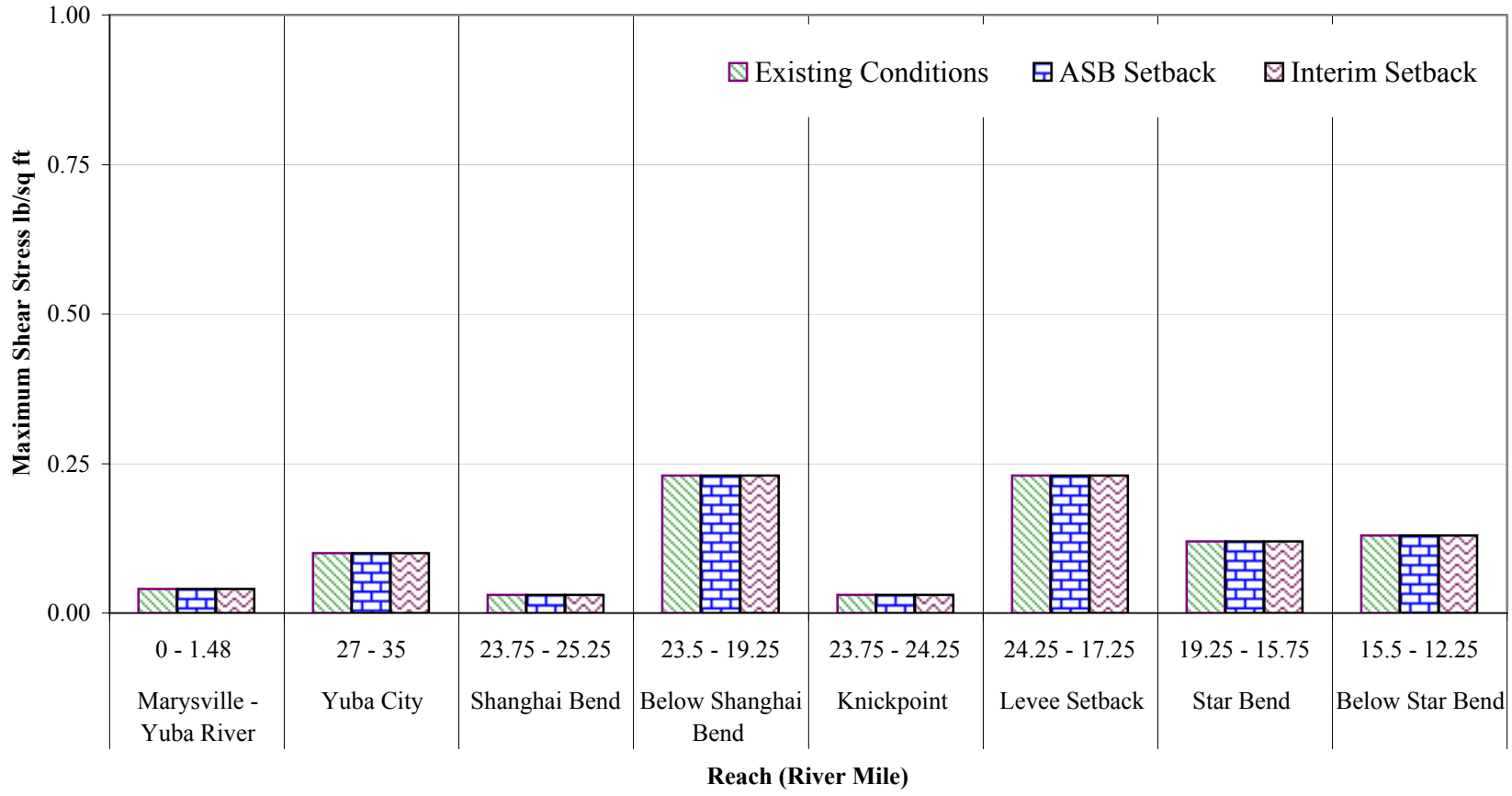
Source: Hydraulic data from MBK Engineers
Notes: Average boundary shear stress for the channel area

figure 5-5
Feather River Levee Setback

Channel Shear Stress, 200-year Flood

PWA Ref. # 1833

PWA



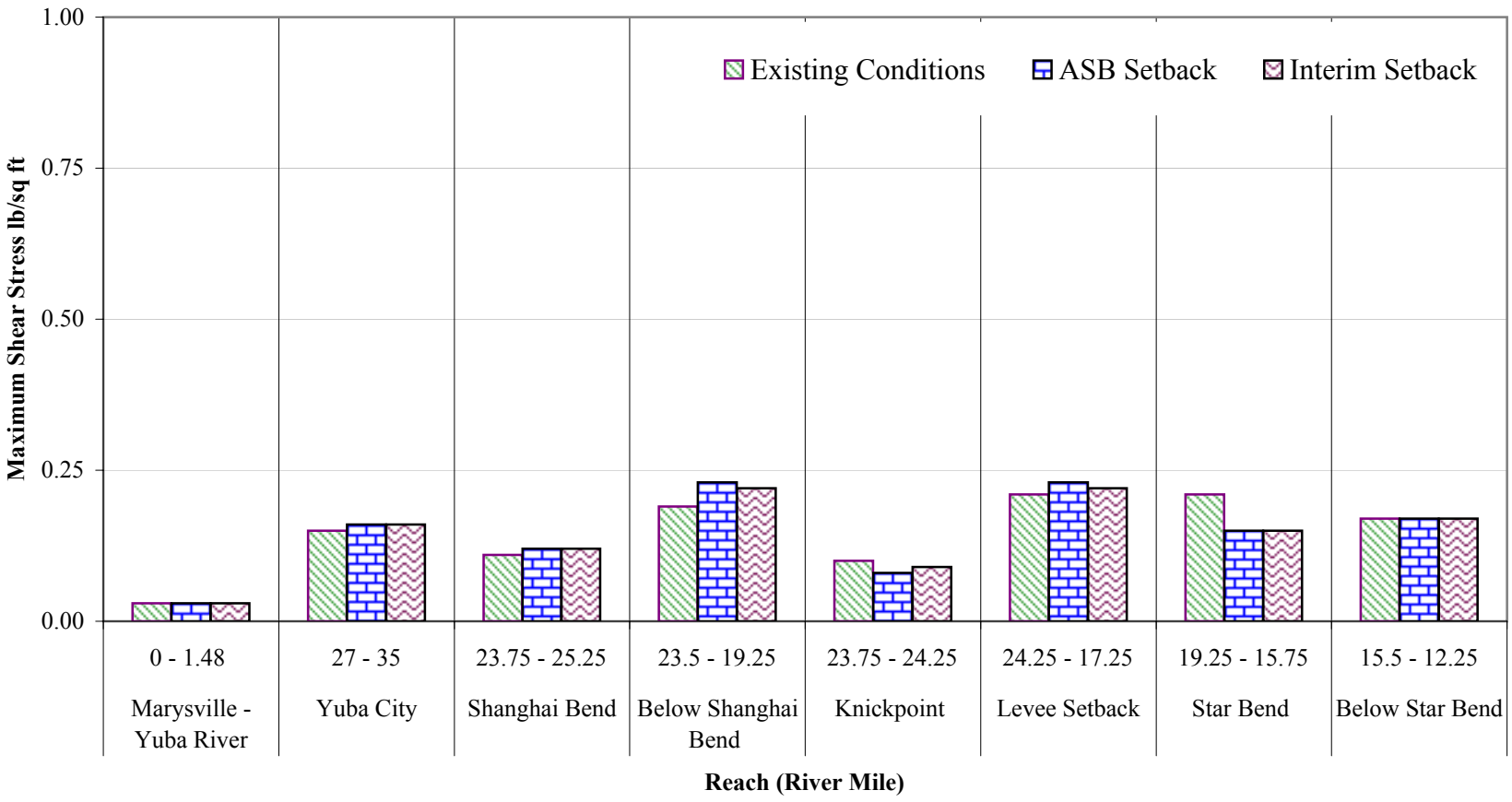
Source: Hydraulic data from MBK Engineers
Notes: Average boundary shear stress for the overbank area

figure 5-6
Feather River Levee Setback

Overbank Shear Stress, 2-year Flood

PWA Ref. # 1833

PWA



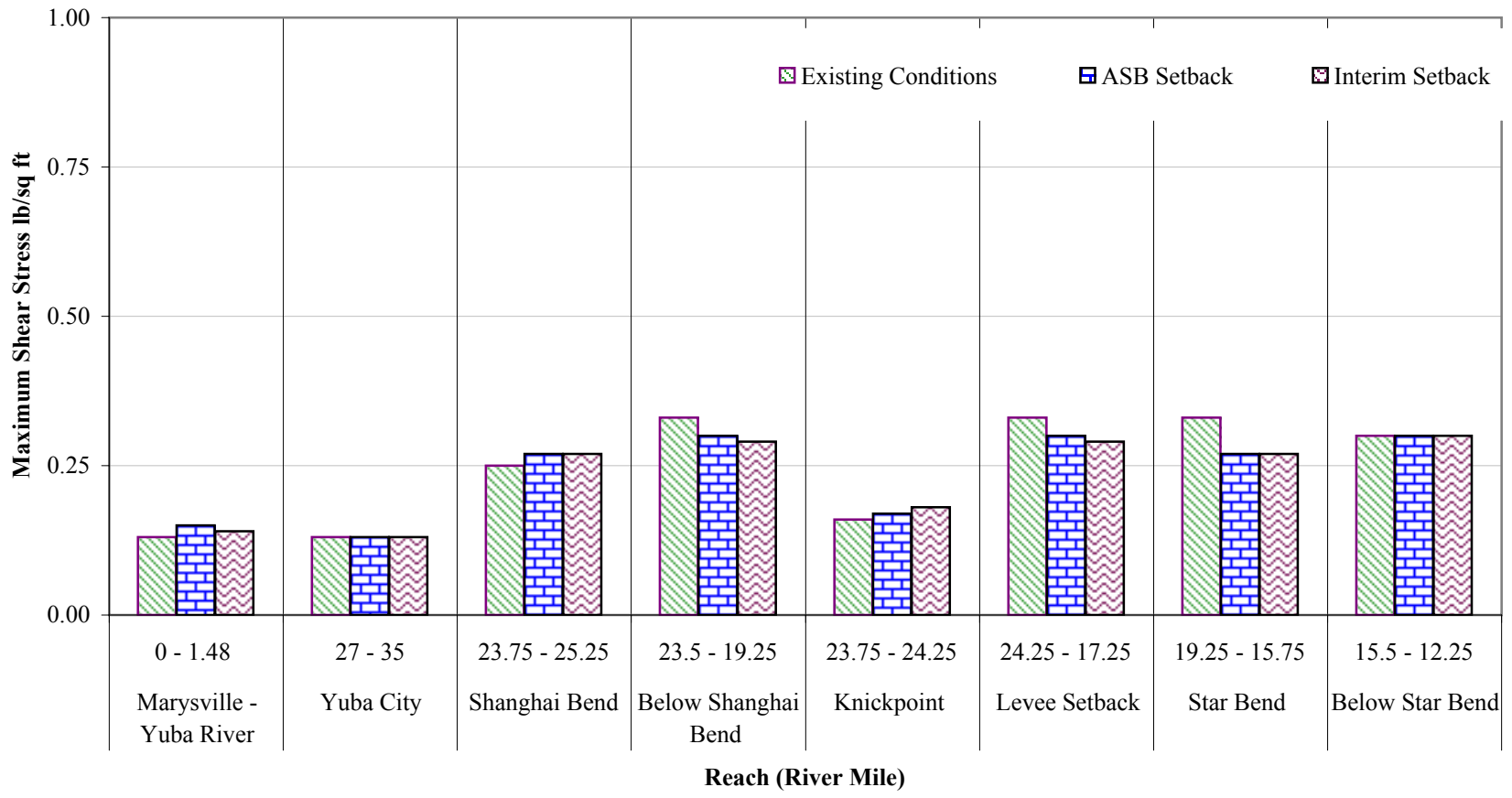
Source: Hydraulic data from MBK Engineers
Notes: Average boundary shear stress for the overbank area

figure 5-7
Feather River Levee Setback

Overbank Shear Stress, 5-year Flood

PWA Ref. # 1833

PWA



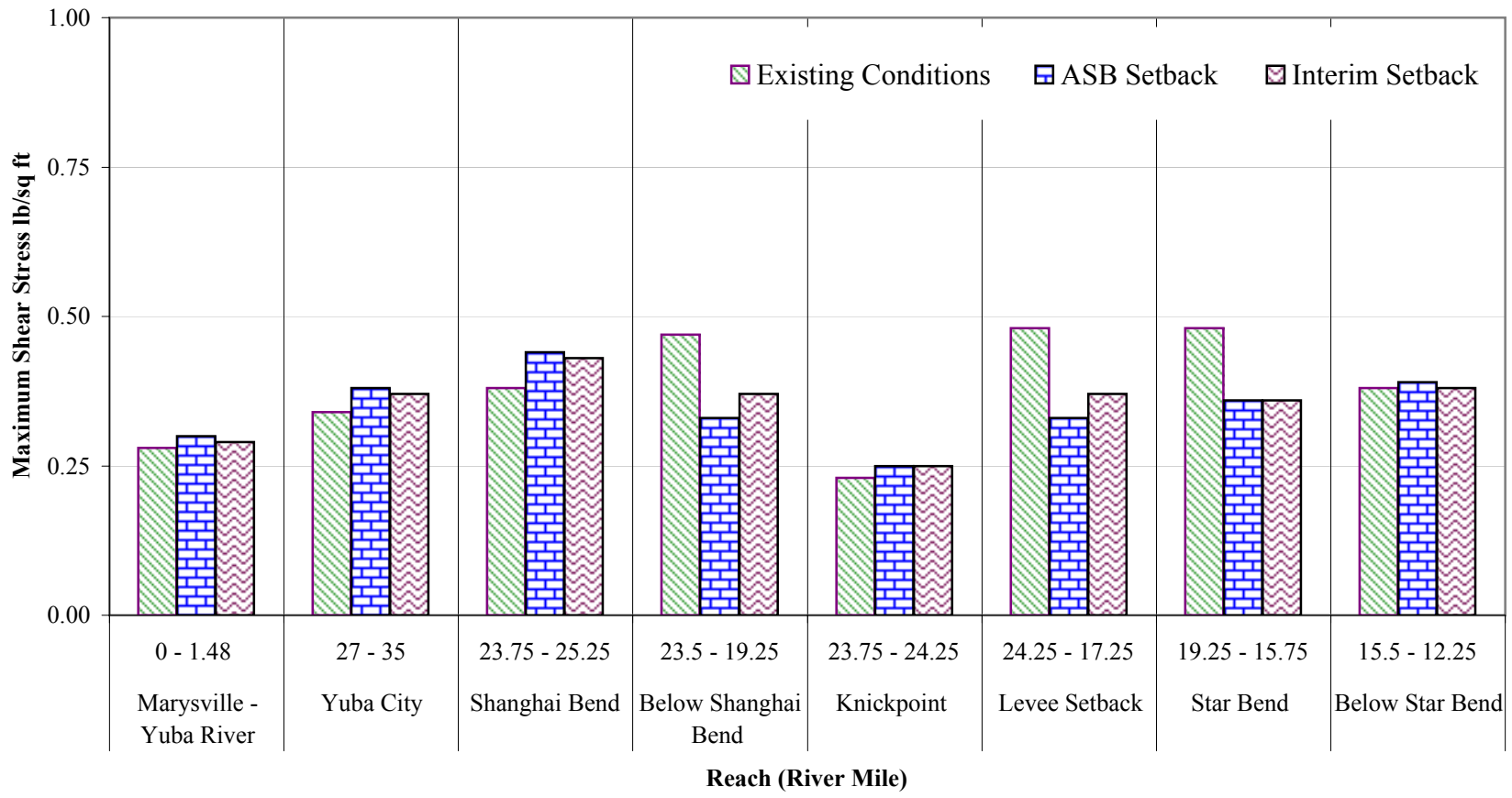
Source: Hydraulic data from MBK Engineers
Notes: Average boundary shear stress for the overbank area

figure 5-8
Feather River Levee Setback

Overbank Shear Stress, 10-year Flood

PWA Ref. # 1833

PWA



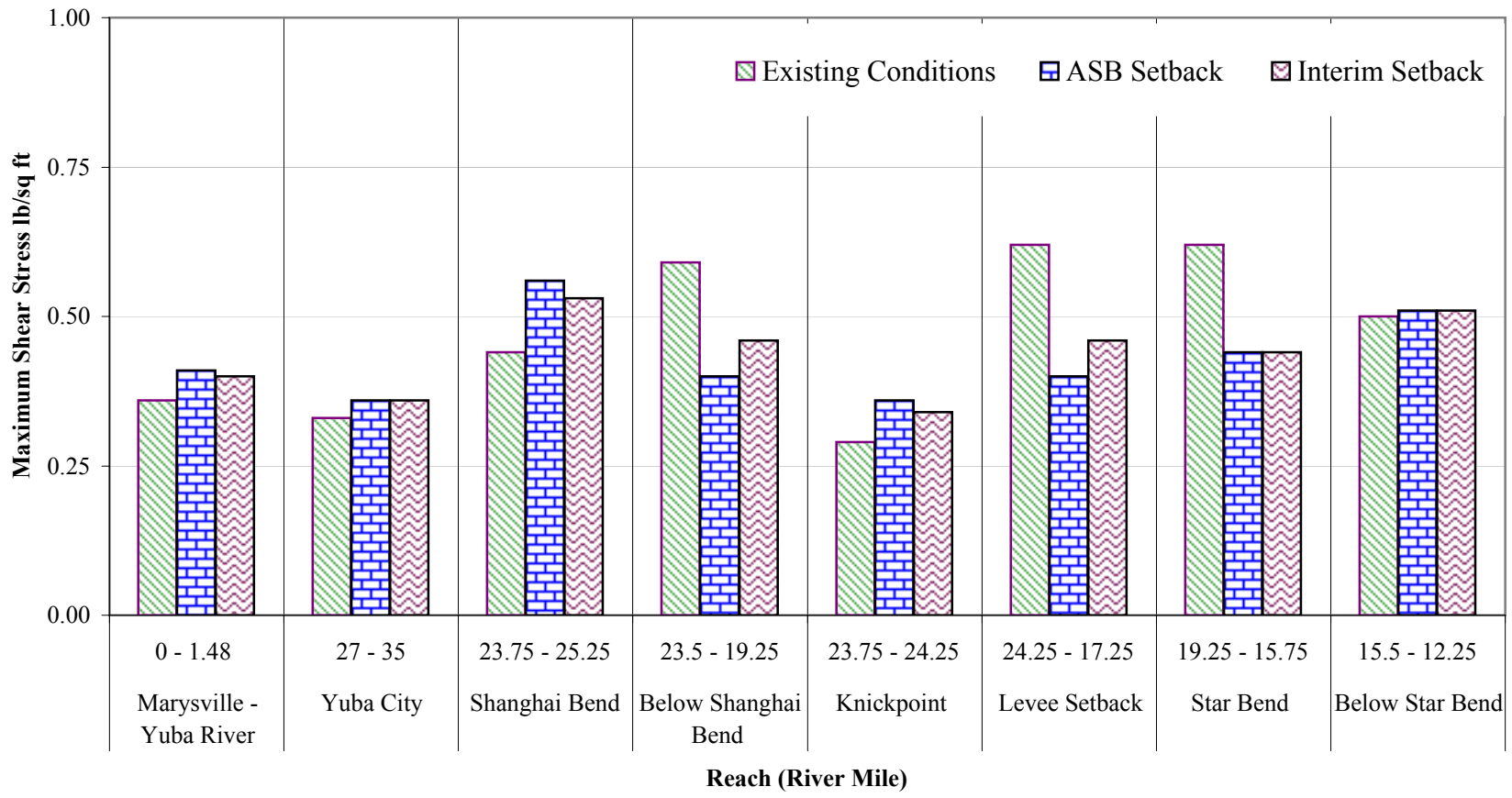
Source: Hydraulic data from MBK Engineers
Notes: Average boundary shear stress for the overbank area

figure 5-9
Feather River Levee Setback

Overbank Shear Stress, 100-year Flood

PWA Ref. # 1833

PWA



Source: Hydraulic data from MBK Engineers
Notes: Average boundary shear stress for the overbank area

figure 5-10
Feather River Levee Setback

Overbank Shear Stress, 200-year Flood

PWA Ref. # 1833

PWA

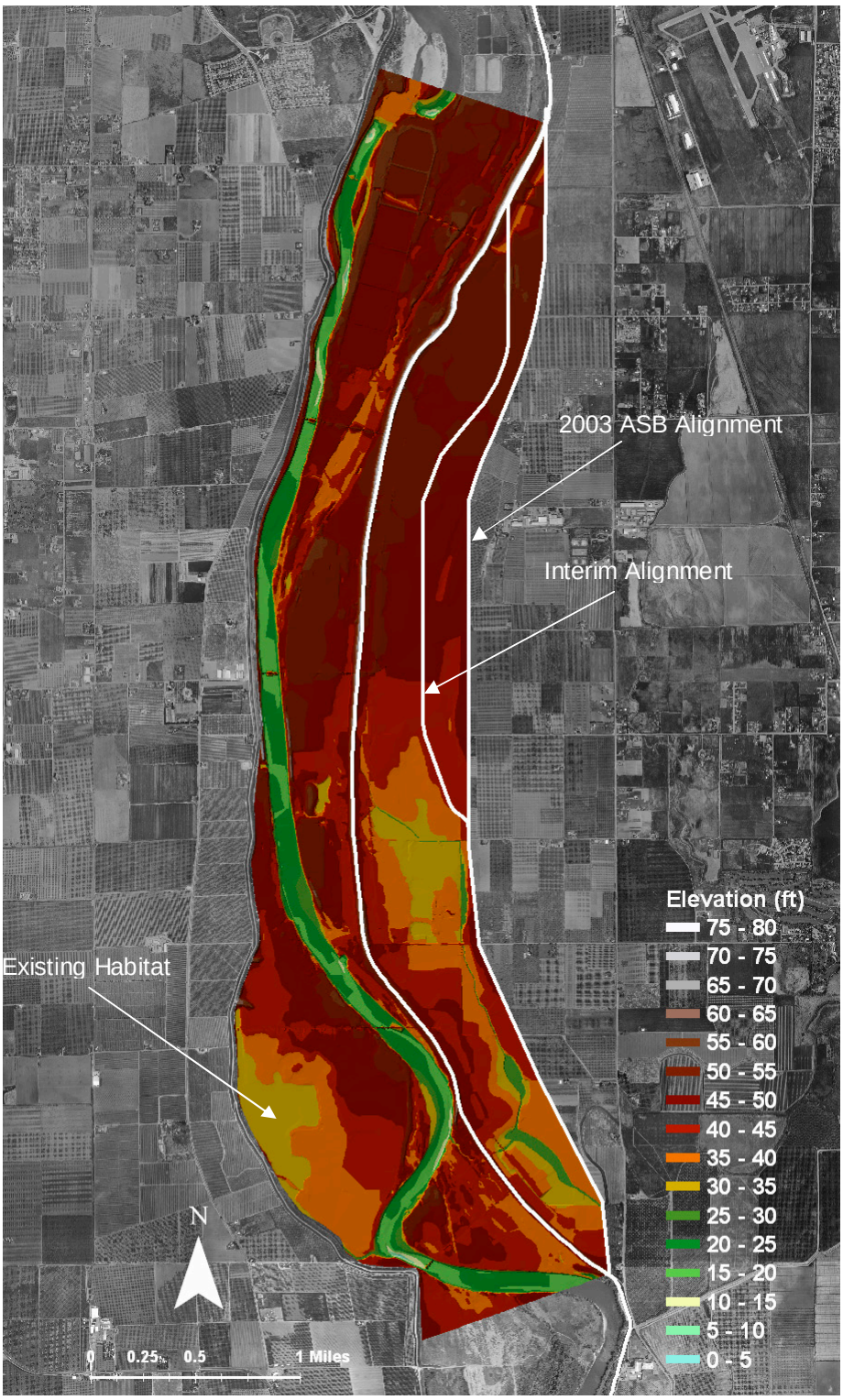


figure 6-1
Feather River Levee Setback

Elevation within Setback

PWA Ref# 1833

PWA

APPENDIX D

Native American Consultation

EDAW

EDAW INC

2022 J STREET

SACRAMENTO CALIFORNIA

95814

TEL 916 414 5800

FAX 916 414 5850

www.edaw.com

July 19, 2006

Debbie Pilas-Treadway
Native American Heritage Commission
915 Capitol Mall, Room 364
Sacramento, Ca 95814

Subject: Cultural Resource Investigations for the Proposed Feather River Levee Setback Project, Yuba County, California

Dear Ms. Treadway

The Three Rivers Levee Improvement Authority is assessing three alternatives to correct deficiencies on the existing left (east) levee of the Feather River and the left (south) levee of the Yuba River, a project which will require approval from the U.S. Army Corps of Engineers. As outlined by the Advisory Council on Historic Preservation (ACHP) in regulations implementing Section 106 of the National Historic Preservation Act (NHPA) (36 CFR Section 800.2(c)(2), federal agencies, are required to consult with Indian tribes that attach religious and traditional significance to historic properties that may be affected by an undertaking [Section 101(d)(6)(A)]. Moreover, historic properties of religious and cultural significance to Indian tribes may be eligible for listing in the National Register, and Section 101(d)(6)(B). On behalf of the Army Corps of Engineers we are bringing this project to your attention in order to solicit input and concerns

Three alternatives are being assessed for the project. The first would consist of strengthening the existing levees in areas which are highlighted on the attached maps. Alternatives 2 and 3 would consist of strengthening portions of the existing levee as well as replacement of a portion with a new levee, setback to the east, and depicted by the red and green alignments depicted on the attached maps. The Area of Potential Affects (APE) for this undertaking consists of the existing levee, 300 foot rights-of-way for the proposed new levees, lands between the existing levee and proposed realignments which would be subjected to seasonal flooding, and as yet to be defined borrow pit locations. Construction will involve excavations up to 10 meters in depth and grading using heavy equipment.

Preliminary records search information indicates the location of one site adjacent to the easternmost proposed levee realignment, and two others in the vicinity. All three sites are known to contain human remains within an occupational matrix, and indicate the potential for other cultural sensitive locales to be present.

We would appreciate any additional information you can provide regarding prehistoric, historic, or ethnographic Native American land use, and contemporary Native American values that may be present near or within the project area. We would also like to request a search of the NAHC Sacred Land files.

Please send via mail or facsimile a listing of local Native American groups or representatives at your earliest convenience, so that we may contact appropriate

EDAW

individuals and include their concerns and any additional information in the planning process.

If you have any questions or comments feel free to contact me at my office. I can be reached by email at deisr@edaw.com, or by phone at 916-414-5878. I look forward to hearing from you soon.

Sincerely,

Richard W. Deis
Project Archaeologist

Enclosures: Copies of Nicholas and Olivehurst Quad Maps

STATE OF CALIFORNIA Arnold Schwarzenegger, Governor

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-4082
Fax (916) 657-5390
Web Site www.nahc.ca.gov

May 26, 2006

Richard W. Deis
Project Archaeologist
EDAW

Sent by Fax: 916-414-5850
Number of Pages : 2

Re: Proposed Feather River Levee Setback project, Yuba County.

Dear Mr. Deis:

A record search of the sacred land file has failed to indicate the presence of Native American cultural resources in the immediate project area. The absence of specific site information in the sacred lands file does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Enclosed is a list of Native Americans individuals/organizations who may have knowledge of cultural resources in the project area. The Commission makes no recommendation or preference of a single individual, or group over another. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated, if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe or group. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from any of these individuals or groups, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact me at (916) 653-4038.

Sincerely,

Debbie Pilas-Treadway
Environmental Specialist III

Native American Contacts
Yuba County
May 25, 2006

Butte Tribal Council
Ren Reynolds
1693 Mt. Ida Road Maidu
Oroville , CA 95966
(530) 589-1571

Strawberry Valley Rancheria
Calvine Rose, Chairperson
PO Box 667 Maidu
Marysville , CA 95901 Miwok
redfoxcornish@saber.net
530-478-8833
530-653-2760

Enterprise Rancheria of Maidu Indians
Frank Watson, Vice Chairperson
1940 Feather River Blvd., Suite B Maidu
Oroville , CA 95965
eranch@cncnet.com
(530) 532-9214
(530) 532-1768 FAX

Strawberry Valley Rancheria
Robert Kerfoot
PO Box 667 Maidu
Marysville , CA 95901 Miwok
robert_kerfoot@yahoo.com
530-478-8833
530-653-2760

Enterprise Rancheria of Maidu Indians
Glenda Nelson, Chairperson
1940 Feather River Blvd., Suite B Maidu
Oroville , CA 95965
eranch@cncnet.com
(530) 532-9214
(530) 532-1768 FAX

Maidu Nation
Clara LeCompte
P.O Box 204 Maidu
Susanville , CA 96130
(530) 257-9691

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural for the proposed * Feather River Levee Setback project, Yuba County.

APPENDIX E

Construction-Related Emissions Calculations and Fugitive Dust Control Requirements

Short-Term Construction Emissions (Alternative 1 - Levee Strengthening Alternative)

				ROG	NOx	PM10	
Light Duty Trk (grams/mile)				0.24	0.44	0.04	
HH Trk Diesel (grams/mile)				0.65	7.23	0.24	

Assumptions: EMFAC2002 emission factors for 2007 conditions based on an average trip speed of 30 mph, 60%/40% cold/hot start, and 75 degrees Fahrenheit.

Mobile Source Emissions (Levee and Slurry Wall)

Equipment	Number			ROG	NOx	PM10	
Excavator	8.00			29.44	103.52	5.44	
Other Construction	4.00			16.64	75.44	4.16	
Rubber Tired Dozer	6.00			43.56	258.60	13.44	
Cranes	1.00			2.88	12.32	0.68	
Grader	3.00			7.20	58.38	3.18	
Off-Highway Trucks	2.00			14.40	55.92	2.88	
Roller	3.00			3.54	26.82	1.44	
Scraper	6.00			43.68	191.52	10.20	
Loader	1.00			1.34	9.08	0.76	
Subtotal				**162.68**	**791.60**	**42.18**	lbs/day

Assumptions: Emission factors from the Road Construction Emissions Model, Version 5.1 (Sacramento Metropolitan Air Quality Management District 2004), which assumes equipment operates for 16 hrs/day, and equipment usage information from preliminary design information.

	Total Trips/Day	Miles/Trip	Total Miles/Day				
Con. Employee Trips	200.00	10.00	2000.00	**1.06**	**1.94**	**0.17**	lbs/day

Assumptions: Based on a maximum of 100 employees (2 trips/day/employee) with an average trip length of 10.0 miles and EMFAC2002 emission factors for 2007 conditions based on an average trip speed of 30 mph, 60%/40% cold/hot start, and 75 degrees Fahrenheit.

Haul Truck Trips Onsite and Offsite (Transport of Fill)	181.80	2.00	363.60	**0.52**	**5.80**	**0.19**	lbs/day
Haul Truck Trips Offsite (Aggregate base, Concrete, Drain Rock)	126.67	5.50	696.69	**1.00**	**11.10**	**0.37**	lbs/day
Haul Truck Trips Offsite (Materials Delivery)	4.40	80.00	352.00	**0.50**	**5.61**	**0.19**	lbs/day

Assumptions: Transportation of 1,600,000 yd^3 of fill 2 miles and 38,000 y^3 of aggregate base and other material 5.5 miles, 658 truck loads for transport of misc. material (dry bentonite, geotextile fabric, concrete, demolition debris, etc.) from Marysville, 440 (22 days/month for 20 months) work days from 2007-2008, truck capacity of 20 yd^3, and EMFAC2002 emission factors for 2007 conditions based on an average trip speed of 30 mph, 60%/40% cold/hot start, and 75 degrees Fahrenheit.

Fugitive Dust Source Emissions

	(acre)						
Disturbance Area	0.88					**53.42**	lbs/day

Assumptions: SMAQMD emission factor of 60.71 lbs/acre/day (Sacramento Metropolitan Air Quality Management District 1994) for a total daily disturbance of 0.88 acres.

	Total Cubic Yards	Duration(Days)	Tons/Cubic Yards	Total Tons/Day			
Scraper (Loading)	1600000.00	440.00	1.25	**4545.45**		**263.64**	lbs/day
Scraper (Batch Unloading)	1600000.00	440.00	1.25	**4545.45**		**181.82**	lbs/day

Scraper (Travel Mode)

E(lbs/VMT)=(6.2) (10)^-6 (s)^1.4 (W)^2.5 (0.60)

Where:

W=Weight of Scraper:	50	(tons)
s=Silt Content of Material:	10	(percent)
	1.65	lbs/VMT

	Total Trips/Day	Miles/Trip	Total Miles/Day				
	121.21	0.75	90.91			**150.16**	lbs/day

Assumptions: Transportation of 1,600,000 yd^3 of fill .75 mile onsite, 440 work days from 2007-08, load capacity of 30 yd^3, and AP-42 emission factors (U.S. Environmental Protection Agency 1995).

	ROG	NOx	PM10	
Total Mobile Equipment	164.70	814.11	42.93	
Total Employee	1.06	1.94	0.17	
Total Fugitive Dust			649.04	
Total (Total Construction North)-unmitigated	**165.76**	**816.05**	**692.14**	**lbs/day**
Total (Total Construction North)-mitigated	**157.53**	**653.23**	**186.04**	**lbs/day**

Short-Term Construction Emissions (Alternatives 2 & 3 - ASB and ISL Alternatives)

				ROG	NOx	PM10	
Light Duty Trk (grams/mile)				0.24	0.44	0.04	
HH Trk Diesel (grams/mile)				0.65	7.23	0.24	

Assumptions: EMFAC2002 emission factors for 2007 conditions based on an average trip speed of 30 mph, 60%/40% cold/hot start, and 75 degrees Fahrenheit.

Mobile Source Emissions (Slurry Wall and Levee)

Equipment	Number			ROG	NOx	PM10	
Excavator	6.00			22.08	77.64	4.08	
Other Construction	3.00			12.48	56.58	3.12	
Rubber Tired Dozer	6.00			43.56	258.60	13.44	
Cranes	1.00			2.88	12.32	0.68	
Grader	4.00			9.60	77.84	4.24	
Off-Highway Trucks	2.00			14.40	55.92	2.88	
Roller	4.00			4.72	35.76	1.92	
Scraper	10.00			72.80	319.20	17.00	
Loader	1.00			1.34	9.08	0.76	
Subtotal				**183.86**	**902.94**	**48.12**	lbs/day

Assumptions: Emission factors from the Road Construction Emissions Model, Version 5.1 (Sacramento Metropolitan Air Quality Management District 2004), which assumes equipment operates for 16 hrs/day, and equipment usage information from preliminary design information.

	Total Trips/Day	Miles/Trip	Total Miles/Day				
Con. Employee Trips	200.00	10.00	2000.00	**1.06**	**1.94**	**0.17**	lbs/day

Assumptions: Based on a maximum of 100 employees (2 trips/day/employee) with an average trip length of 10.0 miles and EMFAC2002 emission factors for 2007 conditions based on an average trip speed of 30 mph, 60%/40% cold/hot start, and 75 degrees Fahrenheit

Haul Truck Trips Onsite and Offsite (Transport of Fill)	375.00	2.00	750.00	**1.07**	**11.95**	**0.40**	lbs/day
Haul Truck Trips Offsite (Aggregate base, Concrete, Drain Rock)	56.00	5.50	308.00	**0.44**	**4.91**	**0.16**	lbs/day
Haul Truck Trips Offsite (Materials Delivery)	13.00	80.00	1040.00	**1.49**	**16.58**	**0.55**	lbs/day

Assumptions: Transportation of 3,300,000 yd^3 of fill 2 miles and 17,000 y^3 of aggregate base and other material 5.5 miles, 2,700 truck loads for transport of misc. material (dry bentonite, geotextile fabric, concrete, demolition debris, etc.) from Marysville, 440 (22 days/month for 20 months) work days from 2007-2008, truck capacity of 20 yd^3, and EMFAC2002 emission factors for 2007 conditions based on an average trip speed of 30 mph, 60%/40% cold/hot start, and 75 degrees Fahrenheit.

Fugitive Dust Source Emissions

	(acre)						
Disturbance Area	2.80					**169.99**	lbs/day

Assumptions: SMAQMD emission factor of 60.71 lbs/acre/day (Sacramento Metropolitan Air Quality Management District 1994) for a total daily disturbance of 2.8 acres.

	Total Cubic Yards	Duration(Days)	Tons/Cubic Yards	Total Tons/Day			
Scraper (Loading)	3300000.00	440.00	1.25	**9375.00**		**543.75**	lbs/day
Scraper (Batch Unloading)	3300000.00	440.00	1.25	**9375.00**		**375.00**	lbs/day

Scraper (Travel Mode)

E(lbs/VMT)=(6.2) (10)^-6 (s)^1.4 (W)^2.5 (0.60)

Where:

W=Weight of Scraper:	50	(tons)
s=Silt Content of Material:	10	(percent)
	1.65	lbs/VMT

	Total Trips/Day	Miles/Trip	Total Miles/Day				
	250.00	0.75	187.50			**309.72**	lbs/day

Assumptions: Transportation of 3,300,000 yd^3 of fill .75 mile onsite, 440 work days from 2007-08, load capacity of 30 yd^3, and AP-42 emission factors (U.S. Environmental Protection Agency 1995).

	ROG	NOx	PM10	
Total Mobile Equipment	186.87	936.38	49.23	
Total Employee	1.06	1.94	0.17	
Total Fugitive Dust			1398.46	
Total (Total Construction North)-unmitigated	**187.92**	**938.32**	**1447.86**	**lbs/day**
Total (Total Construction North)-mitigated	**178.58**	**751.04**	**376.86**	**lbs/day**

FEATHER RIVER AIR QUALITY MANAGEMENT DISTRICT

Serving the Counties of Yuba and Sutter
938 14th Street, Marysville, CA 95901
(530) 634-7659 FAX: (530) 634-7660 Burn Information: (530) 741-6299
Email: fraqmd@fraqmd.org Web Site: http://www.fraqmd.org

Steven A. Speckert
Air Pollution Control Officer

REQUIREMENTS FOR THE CONTROL OF FUGITIVE DUST EMISSIONS

Introduction

The Feather River Air Quality Management District (FRAQMD) is designated nonattainment for the California PM10 health standard (particulate matter less than 10 microns in size; also referred to in this document as respirable particulate matter and fugitive dust). This means that Yuba and Sutter Counties violate the state PM10 air quality health standard. Construction activities, agricultural operations, unpaved roads, and windblown dust contribute heavily to these emissions. According to the U.S. EPA, exposure to high concentrations of particulate matter, including airborne dust, affects breathing, aggravates existing respiratory and cardiovascular disease, and alters the body's defenses against foreign materials, lung damage, skin cancer and premature death. Further studies have linked respirable particulate matter with health problems like asthma and chronic bronchitis.

This document serves to address the aforementioned health concerns by informing the public of applicable state laws and local rules and regulations governing fugitive dust emissions and the capacity for the air district to issue violations (refer to Attachment A). Also attached to this document are a list of approved mitigation measures (refer to Attachment B) and a fugitive dust control plan to be submitted by the project proponent for FRAQMD approval (refer to Attachment C).

Discussion

Frequent nuisance complaints are received at the air district in regard to construction site fugitive dust emissions. Standard CEQA mitigation recommendations approved for the project are not always implemented by the project proponent. Appropriate emphasis on the need for fugitive dust controls and the potential impacts of air district enforcement actions need to be stressed.

In accordance with California Health and Safety Code (H&S) section 42400 et seq., the FRAQMD can assess civil and criminal penalties for violations of the FRAQMD Rules and Regulations and the H&S. Violations are misdemeanors and can carry potential penalties from $1,000 to $1,000,000 per day per violation and/or imprisonment in the county jail.

This document cites applicable air pollution regulations, defines performance criteria and acceptable control strategies to implement, and specifies emission levels and standards not to exceed in order to prevent a violation (refer to Attachment A). The project proponent should have a thorough understanding of these regulations. If additional information is required please contact the District at the location provided above.

Prevention

Fugitive dust control strategies are composed of a balance of available dust mitigation techniques applied on an as needed basis by construction site supervision to

- prevent dust from exiting the property,
- prevent visible emissions from exceeding opacity regulations, and
- prevent public nuisance.

This implies the use of adequate measures during the appropriate evolution of each construction activity and may include wind breaks and barriers, frequent water applications, application of soil additives, control of vehicle access, vehicle speed restrictions, covering of piles, use of gravel at site exit points to remove caked on dirt from tires and tracks, washing of equipment at the end of each work day and prior to site removal, wet sweeping of public thoroughfares, and work stoppage (refer to Attachment B).

Site-Specific Considerations

Time of year, length of project, and acres per day undergoing vegetative removal, excavation, backfilling, hauling and grading should be the primary focus for implementation of dust control measures. The plan must also consider dust emissions associated with construction activities after completion of grading activities including installation of infrastructure (including water, electric, roads, sidewalks, and sewer), digging of building foundations, site vehicle traffic, and landscaping activities.

Knowledge of soil types may be important to understand the free silt content and the ability to hold moisture. Some soils are hydrophobic – repel water - and may require the addition of surfactants during water applications to facilitate penetration and achieve appropriate moisture adsorption. Surfactants may also be used to reduce the amount of water needed.

Activities occurring near sensitive receptors should receive a higher level of preventative planning. Sensitive receptors include school-aged children (schools, daycare, playgrounds), the elderly (retirement community, nursing homes), the infirm (medical facilities/offices), and those who exercise outdoors regularly (public and private exercise facilities, parks).

Other Regulatory Requirements

The project proponent should evaluate water quality, flora and fauna and other environmental impacts (e.g. wildlife, drinking water, stormwater runoff, and surface water impacts) prior to the use of water/soil additives including binders, tackifiers, surfactants, and other materials and methods. All additives at a minimum must meet Regional Water Quality Control Board (RWQCB) requirements and all applicable federal, state, and local environmental regulations regarding the use of the material.

Fugitive Dust Control Plan Submittal

Complete and sign Attachment C, Fugitive Dust Control Plan, and submit to FRAQMD prior to start of work.

ORIGINAL SIGNED

Larry D. Matlock
Senior Air Quality Planner

Note: This document may be downloaded from our web site at
http:// www.fraqmd.org/Downloads/FugitiveDustControlPlan.doc or
http:// www.fraqmd.org/Downloads/FugitiveDustControlPlan.pdf

FugitiveDustControlPlan09_09_03.doc

LOCAL AND STATE REGULATIONS APPLICABLE TO FUGITIVE DUST

I. FRAQMD Rules and Regulations

Note: The following District Rules and Regulations are enforced for each project regardless of lead agency or Board approved project CEQA mitigation requirements.

FRAQMD RULE 3.0 - VISIBLE EMISSIONS *(Adopted 6/91)*

As provided by Section 41701 of the California Health and Safety Code, a person shall not discharge into the atmosphere from any single source of emissions whatsoever, any air contaminants for a period or periods aggregating more than three minutes in any one hour which is:

a. As dark or darker in shade as that designated as No. 2 on the Ringlemen Chart, as published by the United States Bureau of Mines; or

b. Of such opacity as to obscure an observer's view to a degree equal to or greater than does smoke described in Subsection 'a' above.

Enforcement: The District has trained staff capable of performing a Visible Emissions Evaluation (VEE). VEE courses are offered to regulators and the regulated community (for a fee) at regular intervals by staff of the California Air Resources Board.

FRAQMD RULE 3.16 - FUGITIVE DUST EMISSIONS *(Adopted 4/11/94)*

A. PURPOSE
The purpose of this Rule is to reasonably regulate operations which periodically may cause fugitive dust emissions into the atmosphere.

B. DEFINITION
For the purpose of this Rule, the following definitions shall apply:

B.1 Fugitive Dust: Solid airborne matter emitted from any non-combustion source.
B.2 Emergency: Any act of God, but only if the owner of the property from which fugitive dust emissions originate establishes for the Feather River Air Quality Management District, by a preponderance of evidence, that he or she took reasonable precautions in light of the relevant facts and circumstances to minimize emissions.
B.3 Property Line: Adjacent properties which are owned by the same person shall be considered the same property for the purpose of determining the property line.

C. REQUIREMENTS
A person shall take every reasonable precaution not to cause or allow the emissions of fugitive dust from being airborne beyond the property line from which the emission originates, from any construction, handling or storage activity, or any wrecking, excavation, grading, clearing of land or solid waste disposal operation.

Reasonable precautions shall include, but are not limited to:

C.1 use, where possible, of water or chemicals for control of dust in the demolition of existing buildings or structures, construction operations, construction of roadways, or the clearing of land;
C.2 application of asphalt, oil, water, or suitable chemical on dirt roads, material stockpiles, and other surfaces which can give rise to airborne dusts;
C.3 other means approved by the Air Pollution Control Officer.

D. EXEMPTIONS
The provisions of this Rule shall not apply to the following:

D.1 Agricultural Operations
D.2 Currently unworked land designated as reclaimed for agriculture
D.3 An Emergency
D.4 Unpaved roads open to public travel (this inclusion shall not apply to industrial or commercial facilities).

II. State Laws

California Health and Safety Code

Section 41700. Except as otherwise provided in Section 41705, no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.

Section 41701. Except as otherwise provided in Section 41704, or Article 2 (commencing with Section 41800) of this chapter other than Section 41812, or Article 2 (commencing with Section 42350) of Chapter 4, no person shall discharge into the atmosphere from any source whatsoever any air contaminant, other than uncombined water vapor, for a period or periods aggregating more than three minutes in any one hour which is: (a) As dark or darker in shade as that designated as No. 2 on the Ringelmann Chart, as published by the United States Bureau of Mines, or (b) Of such opacity as to obscure an observer's view to a degree equal to or greater than does smoke described in subdivision (a).

California Vehicle Code

Section 23114 requires: No vehicle shall transport any aggregate material upon a highway unless the material is covered. Exception 23114(e)(4): Vehicles transporting loads of aggregate materials shall not be required to cover their loads if the load, where it contacts the sides, front, and back of the cargo container area, remains six inches from the upper edge of the container area, and if the load does not extend, at its peak, above any part of the upper edge of the cargo container area. For purposes of this section, "aggregate material" means rock fragments, pebbles, sand, dirt, gravel, cobbles, crushed base, asphalt, and other similar materials.

FRAQMD - FUGITIVE DUST CONTROL MITIGATION MEASURES

Sources: FRAQMD Indirect Source Review Guidelines and Best Available Mitigation Measures compiled by the air districts of the Greater Sacramento Region and approved for implementation by the FRAQMD Board of Directors.

All grading operations on a project should be suspended when winds exceed 20 miles per hour or when winds carry dust beyond the property line despite implementation of all feasible dust control measures.

Construction sites shall be watered as directed by the Department of Public Works or Air Quality Management District and as necessary to prevent fugitive dust violations.

An operational water truck should be onsite at all times. Apply water to control dust as needed to prevent visible emissions violations and offsite dust impacts.

Onsite dirt piles or other stockpiled particulate matter should be covered, wind breaks installed, and water and/or soil stabilizers employed to reduce wind blown dust emissions. Incorporate the use of approved non-toxic soil stabilizers according to manufacturer's specifications to all inactive construction areas.

All transfer processes involving a free fall of soil or other particulate matter shall be operated in such a manner as to minimize the free fall distance and fugitive dust emissions.

Apply approved chemical soil stabilizers according to the manufacturers' specifications, to all-inactive construction areas (previously graded areas that remain inactive for 96 hours) including unpaved roads and employee/equipment parking areas.

To prevent track-out, wheel washers should be installed where project vehicles and/or equipment exit onto paved streets from unpaved roads. Vehicles and/or equipment shall be washed prior to each trip. Alternatively, a gravel bed may be installed as appropriate at vehicle/equipment site exit points to effectively remove soil buildup on tires and tracks to prevent/diminish track-out.

Paved streets shall be swept frequently (water sweeper with reclaimed water recommended; wet broom) if soil material has been carried onto adjacent paved, public thoroughfares from the project site.

Provide temporary traffic control as needed during all phases of construction to improve traffic flow, as deemed appropriate by the Department of Public Works and/or Caltrans and to reduce vehicle dust emissions. An effective measure is to enforce vehicle traffic speeds at or below 15 mph.

Reduce traffic speeds on all unpaved surfaces to 15 miles per hour or less and reduce unnecessary vehicle traffic by restricting access. Provide appropriate training, onsite enforcement, and signage.

Reestablish ground cover on the construction site as soon as possible and prior to final occupancy, through seeding and watering.

Disposal by Burning: Open burning is yet another source of fugitive gas and particulate emissions and shall be prohibited at the project site. No open burning of vegetative waste (natural plant growth wastes) or other legal or illegal burn materials (trash, demolition debris, et. al.) may be conducted at the project site. Vegetative wastes should be chipped or delivered to waste to energy facilities (permitted biomass facilities), mulched, composted, or used for firewood. It is unlawful to haul waste materials offsite for disposal by open burning.

ATTACHMENT C

Fugitive Dust Control Plan

This plan, upon signature and submittal to the FRAQMD, will serve as an approved Fugitive Dust Control Plan to be implemented at the designated site. This plan must be submitted by the project proponent and received at the air district prior to start of work.

The approved plan serves as an acknowledgment by the project proponent of their duty to address state and local laws governing fugitive dust emissions and the potential for first offense issuance of a Notice of Violation by the air district where violations are substantiated by District staff.

- Site Location: _____
- Project Type (circle all that apply): Residential Commercial Industrial Transportation
- List of responsible persons:

  Office (name, title, address, phone): _____

  _____

  Field (name, title, phone): _____
- Projected Start and End Dates: _____

Project Proponent: _____ _____
Printed Name Company/Phone

Signature: _____ Title: _____

By signing this document I acknowledge that I have read the accompanying literature regarding state and local fugitive dust emission laws and understand that it is my responsibility as the project proponent to ensure that appropriate materials and instructions are available to site employees to implement fugitive dust mitigation measures (Attachment B) appropriate for each development phase of this project.

I further acknowledge that it is my responsibility to ensure that site employees are made formally aware of fugitive dust control laws, requirements, and available mitigation techniques, and that appropriate measures are to be implemented at the site as necessary to prevent fugitive dust violations.

Please Submit to: FRAQMD, 938 14th Street, Marysville, CA 95901 Attn: Planning
Phone: 530-634-7659 x202 FAX: 530-634-7660 Email: lmatlock@fraqmd.org

APPENDIX F

Traffic Noise Measurements and Construction Noise Calculations

FHWA MODEL OUTPUT - EXISTING CONDITIONS (YEAR 2005)

```
      TRAFFIC DISTRIBUTION PERCENTAGES
      DAY        EVENING    NIGHT
      ---        -------    -----
AUTOS
      68.70      11.21       8.50
M-TRUCKS
       7.30       1.19       0.90
H-TRUCKS
       1.71       0.28       0.21

   RUN NAME: SR 70 (BETW YUBA CO LINE AND FEATHER RIVER BLVD)
RUN DATE: 090206

ADT:  16300      SPEED:  55      ACTIVE HALF WIDTH (FT):  24
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  72.46
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  104.8      221.1      473.9     1019.9

   RUN NAME: SR 70 (BETW FEATHER RIVER BLVD AND MC GOWAN RD)
RUN DATE: 090206

ADT:  13300      SPEED:  55      ACTIVE HALF WIDTH (FT):  24
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  71.57
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
   92.3      193.4      414.0      890.6

   RUN NAME: SR 70 (BETW MC GOWAN RD AND JCT RT 65)
RUN DATE: 090206

ADT:  23800      SPEED:  55      ACTIVE HALF WIDTH (FT):  24
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  74.10
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  133.5      283.8      609.7     1312.4
```

RUN NAME: SR 70 (BETW JCT RT 65 AND OLIVEHURST AVE)
RUN DATE: 090206

ADT: 39500 SPEED: 55 ACTIVE HALF WIDTH (FT): 24
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 76.30
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *

70 CNEL	65 CNEL	60 CNEL	55 CNEL
185.6	397.2	854.3	1839.6

RUN NAME: SR 70 (BETW OLIVEHURST AVE AND ERLE RD)
RUN DATE: 090206

ADT: 45000 SPEED: 55 ACTIVE HALF WIDTH (FT): 24
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 76.87
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *

70 CNEL	65 CNEL	60 CNEL	55 CNEL
202.2	433.1	931.8	2006.6

RUN NAME: SR 70 (BETW ERLE RD AND FEATHER RIVER BLVD)
RUN DATE: 090206

ADT: 45500 SPEED: 55 ACTIVE HALF WIDTH (FT): 24
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 76.91
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *

70 CNEL	65 CNEL	60 CNEL	55 CNEL
203.7	436.3	938.7	2021.4

RUN NAME: SR 70 (BETW FEATHER RIVER BLVD AND N BEALE RD)
RUN DATE: 090206

ADT: 60000 SPEED: 55 ACTIVE HALF WIDTH (FT): 24
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 78.11
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *

70 CNEL	65 CNEL	60 CNEL	55 CNEL
244.4	524.4	1128.7	2430.7

Feather River			
Levee Strengthening/Alternative 1			
Projected Construction Noise Level at 50 feet	**Without Noise Control**	**With Feasible Noise Control**	
excavator	88	80	
excavator	88	80	
dozer	80	75	
dozer	80	75	
grader	85	75	
roller	74	74	
roller	74	74	
truck	91	75	
truck	91	75	
truck	91	75	
truck	91	75	
truck	91	75	
truck	91	75	
loader	85	75	
crane	83	75	
TOTAL	99.96	87.77	
NOISE DROP OFF CALCULATION			
(feet)	(dB)		
50	99.96	87.77	
180	88.83	76.64	
1988	67.97	55.78	
6536	57.63	45.44	
Assumptions: Equipment usage information from GEI Consultants.			
Source: FTA 1995; U.S. EPA 1971			
Slurry Wall			
Projected Construction Noise Level at 50 feet	**Without Noise Control**	**With Feasible Noise Control**	
excavator	88	80	
excavator	88	80	
excavator	88	80	
dozer	80	75	
dozer	80	75	
dozer	80	75	
excavator	88	80	
excavator	88	80	
excavator	88	80	
truck/tool carrier	91	75	
truck/tool carrier	91	75	
truck/tool carrier	91	75	
TOTAL	98.59	88.39	
NOISE DROP OFF CALCULATION			
(feet)	(dB)		
50	98.59	88.39	
180	87.47	77.26	
200	86.55	76.35	
500	78.59	68.39	
1988	66.60	56.40	
6536	56.27	46.06	
Levee Strengthening/Slurry Wall			
Projected Construction Noise Level at 50 feet	**Without Noise Control**	**With Feasible Noise Control**	
levee strengthening	99.96	87.77	
slurry wall	98.59	88.39	
TOTAL	102.34	91.10	
NOISE DROP OFF CALCULATION			
(feet)	(dB)		
50	102.34	91.10	
180	91.21	79.97	
200	90.30	79.06	
500	82.34	71.10	
1988	70.35	59.11	
6536	60.01	48.77	

Levee Setback/Alternatives 2 and 3			
Projected Construction Noise Level at 50 feet	**Without Noise Control**	**With Feasible Noise Control**	
excavator	88	80	
excavator	88	80	
scraper	88	80	
scraper	88	80	
scraper	88	80	
scraper	88	80	
scraper	88	80	
scraper	88	80	
scraper	88	80	
scraper	88	80	
scraper	88	80	
scraper	88	80	
dozer	80	75	
dozer	80	75	
dozer	80	75	
dozer	80	75	
grader	85	75	
grader	85	75	
grader	85	75	
grader	85	75	
roller	74	74	
roller	74	74	
roller	74	74	
roller	74	74	
truck	91	75	
truck	91	75	
truck	91	75	
truck	91	75	
truck	91	75	
truck	91	75	
loader	91	75	
crane	91	75	
TOTAL	102.88	92.57	
NOISE DROP OFF CALCULATION			
(feet)	(dB)		
50	102.88	92.57	
180	91.75	81.44	
1988	70.89	60.58	
6536	60.55	50.24	
Assumptions: Equipment usage information from GEI Consultants.			
Source: FTA 1995; U.S. EPA 1971			
Slurry Wall			
Projected Construction Noise Level at 50 feet	**Without Noise Control**	**With Feasible Noise Control**	
excavator	88	80	
excavator	88	80	
dozer	80	75	
dozer	80	75	
excavator	88	80	
excavator	88	80	
truck/tool carrier	91	75	
truck/tool carrier	91	75	
TOTAL	97.19	87.21	
NOISE DROP OFF CALCULATION			
(feet)	(dB)		
50	97.19	87.21	
180	86.07	76.09	
200	85.15	75.17	
500	77.19	67.21	
1988	65.21	55.22	
6536	54.87	44.89	

Levee Setback/Slurry Wall			
Projected Construction Noise Level at 50 feet	**Without Noise Control**	**With Feasible Noise Control**	
levee setback	102.88	92.57	
slurry wall	97.19	87.21	
TOTAL	103.92	93.68	
NOISE DROP OFF CALCULATION			
(feet)	(dB)		
50	103.92	93.68	
180	92.79	82.55	
200	91.88	81.64	
500	83.92	73.68	
1988	71.93	61.69	
6536	61.59	51.35	

PROJECTED AVERAGE DAILY NOISE LEVELS

Need to add penalty into evening/nighttime hours. Penalty is not included in the formula

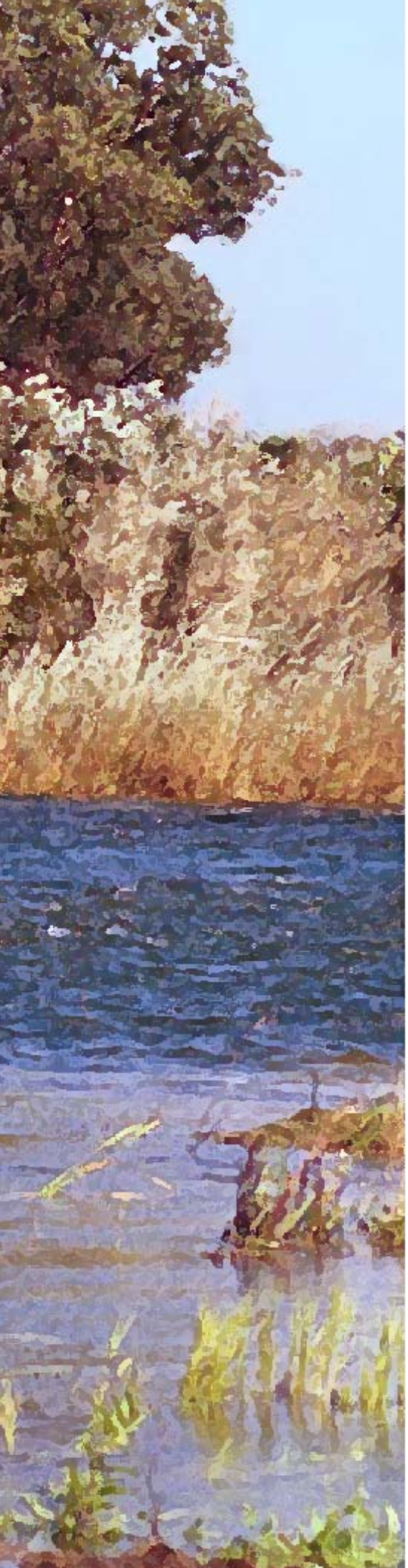
1	50	65	50	50	50	50
2	50	65	50	50	50	50
3	50	65	50	50	50	50
4	50	65	50	50	50	50
5	50	65	50	50	50	50
6	50	65	50	50	50	
7	77	55	73	71	70	
8	77	55	73	71	70	
9	77	55	73	71	70	
10	77	55	73	71	70	
11	77	55	73	71	70	
12	77	55	73	71	70	
13	77	55	73	71	70	
14	77	55	73	71	70	
15	77	55	73	71	70	
16	77	55	73	71	70	
17	77	55	50	50	50	
18	77	55	50	50	50	
19	77	55	50	50	50	
20	55	55	50	50	50	
21	55	55	50	50	50	
22	50	65	50	50	50	
23	50	65	50	50	50	
24	50	65	50	50	50	
	74.35	61.41	69.23	67.25	66.26	

Petaluma Substation

	OCTAVE CENTER FREQUENCY		CONVERSION TO A-WEIGHTED SCALE
Band 1	31.5	55	16
Band 2	63	57	31
Band 3	125	63	47
Band 4	250	63	54
Band 5	500	49	46
Band 6	1000	53	53
Band 7	2000	48	49
Band 8	4000	43	44
Band 9	8000	25	24
TOTAL:		67.14	58.11 dBA

NOISE DROP OFF CALCULATION

(feet)	(dB)
3	67.14
75	39.18
200	30.66
320	26.57
375	25.20
475	23.14
700	19.78



FINAL ENVIRONMENTAL IMPACT REPORT

FOR THE FEATHER RIVER LEVEE REPAIR PROJECT

AN ELEMENT OF THE YUBA-FEATHER SUPPLEMENTAL FLOOD CONTROL PROJECT

STATE CLEARINGHOUSE NO. 2006062071

PREPARED FOR

THREE RIVERS LEVEE IMPROVEMENT AUTHORITY

PREPARED BY

EDAW
FLOOD CONTROL STUDY TEAM

November 2006

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APPENDIX

A DEIR Public Meeting

CHAPTER 1 INTRODUCTION

1.1 PURPOSE OF THIS DOCUMENT AND OVERVIEW OF THE DEIR PUBLIC REVIEW PROCESS

On August 4, 2006, the Three Rivers Levee Improvement Authority (TRLIA) distributed to public agencies and the general public the draft environmental impact report (DEIR) on the Feather River Levee Repair Project (FRLRP). The DEIR was prepared on behalf of TRLIA in accordance with the requirements of the California Environmental Quality Act (CEQA) Statutes (Public Resources Code [PRC] Sections 21000 et seq.) and the State CEQA Guidelines (Title 14, Section 15000 et seq. of the California Code of Regulations). TRLIA is the lead agency for CEQA compliance. TRLIA is a joint powers authority composed of Yuba County and Reclamation District (RD) 784 that was formed to address funding and implementation of levee repairs for the RD 784 area.

In accordance with the CEQA Statutes (PRC Section 21092) and Section 15087 of the State CEQA Guidelines, public notice of the DEIR and the beginning of the public review period was provided by TRLIA through publication of an announcement in the Marysville Appeal-Democrat in the August 3, 2006 edition of its daily newspaper. In accordance with Section 15105(a) of the State CEQA Guidelines, TRLIA provided a 45-day public review period for the DEIR, ending on September 18, 2006.

The public notice published in the Marysville Appeal-Democrat included details on how to obtain copies of the DEIR, how to provide comments on the document, and announced the public meeting for the DEIR, which was held on September 6, 2006 at the Yuba County Government Center in Marysville. Additional notification methods were also used, including mailing of approximately 100 copies of the Notice of Availability (NOA) to potentially affected landowners, posting of the NOA at the Yuba County clerk's office, mailing over 150 copies of the DEIR on compact disc (CD) with a paper copy of the executive summary to various agencies and individuals, and mailing approximately 10 copies of the full DEIR in paper copy to various agencies and individuals. The NOA included information on how to obtain and comment on the DEIR, as well as an announcement of the DEIR public meeting. The DEIR itself includes a description of the public review process in Chapter 2, "Introduction," which provides an announcement of the September 6 public meeting. As a courtesy to the public, a second public meeting announcement was published in the Sunday, August 27, 2006, edition of the Marysville Appeal-Democrat.

At the public meeting on the DEIR, TRLIA and members of the project team presented an overview of the project alternatives, conclusions of the DEIR, and ways to provide comments on the DEIR. Project team members were available following the presentation to answer questions and provide additional information on the project. Various methods for providing comments on the DEIR, either verbally or in writing, were available to participants at the meeting. Appendix A, "DEIR Public Meeting," includes a transcript of the meeting.

According to State CEQA Guidelines Section 15088, a lead agency must evaluate comments on environmental issues that it receives from persons who reviewed a DEIR on a project and must

prepare written responses to comments that raise significant environmental issues. The written response must describe the disposition of significant environmental issues raised, and there must be good faith, reasoned analysis in the responses. TRLIA received five comment letters on the DEIR during the 45-day public comment period and two additional letters after the close of the comment period. All seven comment letters are addressed in this final EIR (FEIR).

This FEIR has been prepared to respond to the comments received by TRLIA that address significant environmental issues related to the DEIR, in accordance with Sections 15088 and 15132 of the State CEQA Guidelines. According to State CEQA Guidelines Section 15089, the lead agency must prepare a FEIR prior to approving a project. The contents of an FEIR are specified in Section 15132 of the State CEQA Guidelines.

This document consists of the following chapters:

- Chapter 1, "Introduction," describes the purpose of this document, provides an overview of the public review process, summarizes the project background purpose and alternatives, provides the anticipated project timeline, and summarizes operation and maintenance actions.

- Chapter 2, "Comments and Responses to Comments on the Draft EIR," reproduces the comment letters received by TRLIA on the DEIR and provides responses to those comments.

- Chapter 3, "Corrections and Updates to the Draft EIR," lists modifications to the DEIR made in response to the comments received. These modifications do not change any of the impact conclusions stated in the DEIR.

- Chapter 4, "References," lists the sources cited in this document.

- Chapter 5, "Document Preparers," lists the individuals who contributed to the preparation of this document.

This document and the DEIR together constitute the FEIR for the FRLRP. The DEIR is hereby incorporated into this document by reference.

1.2 PROJECT BACKGROUND AND DEVELOPMENT

Catastrophic floods have occurred in Yuba County since the mid-1800s. In response to the most recent severe flood event in 1997, the Yuba County Water Agency (YCWA) initiated a seven-phase program of flood control studies to identify methods to achieve a higher level of protection, particularly for the areas in RD 784 that had been subject to flooding several times in the past. The goal of this effort was to substantially improve the flood protection that would be provided by other major related flood control efforts by the U.S. Army Corps of Engineers (Corps), the California Department of Water Resources (DWR), and YCWA. As part of this effort, YCWA identified and evaluated 33 potential methods for Yuba County to meet all or a portion of its identified flood protection objectives. These methods represent a comprehensive range of available technology.

Following the passage of the Costa-Machado Water Act of 2000 (Water Act of 2000) by California voters, YCWA's flood control study team turned the focus of its seven-phase study to those measures that could be achieved within the budget provisions of the Water Act of 2000, which provided for a total of $90 million in bond funds targeted for the Yuba-Feather River basin. This effort, funded through Water Act of 2000 grant monies, is the Yuba-Feather Supplemental Flood Control Project (Y-FSFCP). Of the $90 million, $70 million was targeted for planning, design, and construction work and $20 million was targeted for environmental mitigation and enhancement. As part of the Y-FSFCP studies, YCWA prepared a feasibility study and a DEIR, which was released in October 2003 (Yuba County Water Agency 2003a and 2003b). The feasibility study evaluated combinations of three primary flood control elements, including a setback of the left (east) bank levee of the Feather River between Shanghai Bend and the Bear River.

The Y-FSFCP Feather River levee setback was proposed for two segments, which were referred to as the Above Star Bend (ASB) and Below Star Bend (BSB) levee setbacks. The ASB levee setback was proposed to extend approximately 5.2 miles along the Feather River, from southwest of the Yuba County Airport to 1 mile downstream of Star Bend. The BSB levee setback was proposed to extend approximately 3.4 miles, from 1 mile downstream of the ASB levee setback to 2,000 feet upstream of the confluence with the Bear River. It was assumed that the levee setbacks evaluated in the Y-FSFCP would include a habitat restoration component in the expanded floodway area, combined with some continuing agricultural uses. The FEIR for the Y-FSFCP was certified and the program of elements approved by the YCWA Board in March 2004. The levee setback component of the project that is the subject of the DEIR prepared for this project—the FRLRP—is a modification of the ASB levee setback that was previously proposed and evaluated in the Y-FSFCP EIR. The Y-FSFCP program EIR and this EIR on the FRLRP support the 2003 feasibility study discussed above.

1.3 SUMMARY DESCRIPTION OF THE PROJECT PURPOSE AND OBJECTIVES

The purpose of the proposed FRLRP is to correct deficiencies in the left (east) bank levees of the Feather and lower Yuba Rivers, and consequently to improve flood protection for the RD 784 area in Yuba County. The overall objectives of the project are:

- to secure flood protection for at least a flood event with a 0.5% (or 1-in-200) annual chance of exceedance,
- to help secure Federal Emergency Management Agency (FEMA) accreditation of the subject reaches of levee,
- to avoid increasing downstream flow and stage during peak-flow conditions,
- to achieve these objectives as soon as possible, and
- to incorporate environmental mitigation as appropriate.

These objectives are consistent with the requirements in Section 15124(b) of the State CEQA Guidelines and were used in the development and assessment of project alternatives.

1.4 SUMMARY DESCRIPTION OF THE PROJECT ALTERNATIVES

The proposed FRLRP is an element of the Y-FSFCP that would address identified deficiencies in the left bank levees of the Yuba and Feather Rivers, and consequently would improve flood protection for the RD 784 area of Yuba County. Ongoing engineering and technical feasibility studies have resulted in development of three project alternatives to meet the project objectives:

- Alternative 1—The Levee Strengthening Alternative. Under this alternative, levee repair and strengthening activities would be completed along the entire length of FRLRP project Segments 1, 2, and 3 (Figure 2-3 in Chapter 2, "Introduction" of the FRLRP DEIR). Establishment of soil borrow areas and construction of a detention basin would be required. Implementation of Alternative 1 would involve removing existing RD 784 Pump Station No. 3 and installing a new pump station farther east of the Feather River levee, which would correct seepage deficiencies related to the existing pump station.

- Alternative 2—The Levee Strengthening and ASB Setback Levee Alternative. Under this alternative, levee repair and strengthening activities would be completed along project Segments 1 and 3. Repair and strengthening activities in these segments would be the same as for Alternative 1. In project Segment 2, a setback levee would be constructed roughly following the ASB setback levee alignment identified in the Y-FSFCP EIR. Establishment of soil borrow areas and construction of a detention basin would be required. A pump station to replace Pump Station No. 3 would be installed on the east side of the new setback levee.

- Alternative 3—The Levee Strengthening and Intermediate Setback Levee Alternative. Under this alternative, the same levee repair and strengthening activities described for Alternatives 1 and 2 would be conducted in project Segments 1 and 3. In Segment 2 a modified setback levee alignment would be used with a portion of the setback levee located farther to the west than the ASB setback levee alignment. This alignment would allow less land to be placed in the new floodway than under Alternative 2. The general design, construction, and operational characteristics of an intermediate setback levee under Alternative 3 would be same as for the ASB setback levee under Alternative 2. A pump station to replace Pump Station No. 3 would be installed on the east side of the new setback levee.

The proposed FRLRP consists of implementation of one of these three potential alternatives, each evaluated at an equal level of detail in the DEIR. These alternatives are described in detail in Chapter 4, "Description of the Proposed Project," of the FRLRP DEIR.

Land uses in the levee setback area under Alternatives 2 and 3 could consist of agricultural operations and/or habitat restoration activities that would be compatible with flood control objectives. However, no specific plans for habitat restoration in the setback area are proposed at this time.

The FRLRP DEIR also evaluated the No-Project Alternative, in accordance with the requirements of Section 15126.6(e) of the State CEQA Guidelines.

The State CEQA Guidelines call for identification of an environmentally superior alternative and specify that "if the environmentally superior alternative is the 'no project' alternative, the EIR shall also identify an environmentally superior alternative among other alternatives." However, there are a number of interconnected as well as opposing factors to consider when evaluating the various FRLRP alternatives, which result in no clear environmentally superior alternative. These factors include:

- minimizing environmental effects,
- providing flood protection to the RD 784 area,
- the potential for providing more regional flood protection benefits,
- effects on lands and landowners that might be included in a levee setback area, and
- potential beneficial environmental effects associated with creating a levee setback area.

As part of the process to select a preferred alternative, TRLIA will ultimately weigh such things as the various gradients of flood protection and associated increased or decreased risks to life and property against the variety of types and extents of environmental effects associated with each alternative.

1.5 TIMELINE FOR PROJECT IMPLEMENTATION

The TRLIA Board of Directors is expected to make a decision on certifying the EIR and approving a project alternative at its meeting on November 14, 2006. If TRLIA decides to approve the project, it will request a permit from The Reclamation Board later in November or in December 2006. Bonds would be sold after this date to finance the local share of the project costs. TRLIA anticipates that negotiations with landowners for land acquisition would begin in 2006 and would be finalized by fall 2007.

Assuming that the project is approved, completion of project-level environmental compliance, detailed engineering design, equipment procurement, permitting, design review and approval, and construction for the three project segments are anticipated to take place over 3 years, ending in winter 2008. The anticipated activities and their durations are summarized below. The information provided below applies to all project alternatives unless otherwise noted.

Sufficient detailed engineering to allow the start of construction in project Segments 1 and 3 is expected to be completed in early 2007, while sufficient detailed engineering to allow the start of construction in Segment 2 is expected to be completed in late 2007. It is assumed that federal, state, and local permitting and National Environmental Policy Act reviews would be completed concurrently with detailed design activities (see Chapter 2, "Introduction," of the FRLRP DEIR for a list of the permits and authorizations that are likely to be required).

It is assumed that contractor selection would take place soon after the approval of final detailed design packages (i.e., one set of detailed designs for Segments 1 and 3 and a second set of detailed designs for Segment 2). It is also expected that acquisition of right-of-way (e.g., temporary construction rights-of-way, right-of-way for a setback levee if Alternatives 2 or 3 are selected) would begin after certification of all CEQA documents for the project and could take up to approximately 15 months in some locations. Acquisition could proceed concurrent with the completion and approval of the final detailed design and contractor selection.

Completion of these preconstruction activities for all project segments is expected to take a total of approximately 20 months, although preconstruction activities for Segments 1 and 3 could be completed well before such activities for project Segment 2.

For project Segments 1 and 3, a construction period of about 6 months is anticipated for levee repair and strengthening under the three project alternatives, beginning in May 2007. Schedule highlights would include workforce and equipment mobilization and setting up construction sites, installation of a slurry cutoff wall, construction of seepage/stability berms, relocation of utilities as necessary, and installation of relief wells. For project Segment 2, a construction period of about 8 months is anticipated for levee repair and strengthening under Alternative 1 (no setback levee), beginning in March 2008. The extended construction period within project Segment 2 reflects the added construction component of correcting erosion sites along the existing levee. Otherwise, the schedule highlights would be similar to those described for project Segments 1 and 3.

Selection of either Alternative 2 or 3 would involve construction of a setback levee in project Segment 2. The construction sequence for either the ASB setback levee or the intermediate setback levee would be similar, and construction would occur over two seasons beginning in August 2007 and ending in winter 2008. Most construction activities would take place in the spring, summer, and fall months. Schedule highlights in project Segment 2 for either Alternative 2 or 3 would include preparation of a setback levee foundation and construction of a setback levee embankment. The location of the setback levee would vary depending on the alternative selected. Installation of a slurry cutoff wall would be necessary following preparation of the new setback levee foundation.

1.6 OPERATION AND MAINTENANCE

The ASB setback levee under Alternative 2 or the intermediate setback levee under Alternative 3 would entirely replace the corresponding existing Feather River levee as a project levee in the Sacramento River Flood Control Project. The State of California, through the Sacramento–San Joaquin Drainage District, would obtain an easement that would allow the construction, operation, and maintenance of the setback levee. Existing levee segments that would be repaired under the FRLRP would remain under the existing easements for operation and maintenance.

As is the current practice, landowners would be assessed fees for levee operation and maintenance, which would be performed by RD 784 under the supervision of DWR. The only substantial difference between the operation and maintenance of the repaired levee segments and/or the new setback levee and current practice would be that the proposed preliminary design for each alternative includes the use of relief wells. It is assumed that seepage from the wells would be removed by the relocated Pump Station No. 3. RD 784 could contract out the well maintenance or perform it with its own forces.

If Alternative 2 or Alternative 3 is implemented, TRLIA may acquire land through fee-title or obtain flowage easements. Ownership of properties in the levee setback area that are acquired by TRLIA for project implementation and are not part of the setback levee footprint could be transferred to a resource agency or land conservancy for future management. Special operations and maintenance plans would need to be prepared and implemented to ensure the long-term

maintenance of any habitat areas, and to ensure they do not conflict with the flood control function of the levee setback area. Similarly, if lands in the levee setback area are retained in agricultural production, agricultural operation plans would need to be developed and implemented to ensure that ongoing agricultural activities do not conflict with the flood control function of the levee setback area.

CHAPTER 2 COMMENTS AND RESPONSES TO COMMENTS ON THE DRAFT EIR

TRLIA received several comment letters on the draft environmental impact report (DEIR) during the public comment period. The following table lists the commenters and the dates of the letters. Each letter and individual comment has been assigned a letter/number designation for cross-referencing. No comments were received at the public meeting on September 6, 2006. Appendix A, "DEIR Public Meeting," includes a transcript of the meeting.

The comment letters received on the DEIR, and the responses to the significant environmental issues raised, follow the table. Also included at the end of this chapter are two letters from the State Clearinghouse. The first letter acknowledges that TRLIA has complied with the State Clearinghouse DEIR review requirements. The second letter transmits comment letters received following the close of the comment period on September 18, 2006. All comment letters received, including those received after the close of the comment period, are addressed in this FEIR.

List of Commenters/Letters

Designation	Commenter	Date of Letter	Comment Number
A	Alessandro Amaglio, Environmental Officer, Federal Emergency Management Agency	September 8, 2006	A-1 through A-4
B	Kevin Roukey, Chief, Central California/Nevada Section, U.S. Army Corps of Engineers	September 25, 2006	B-1 and B-2
C	William A. Davis, Chief, Office of Planning – North, California Department of Transportation	September 5, 2006	C-1 and C-2
D	Al Vargas, Staff Environmental Scientist, Floodway Protection Section, California Department of Water Resources	September 1, 2006	D-1
E	Mike Mirmazaheri, Chief, Floodway Protection Section, California Department of Water Resources	September 20, 2006	E-1
F	Dennis O'Bryant, Program Manager – Williamson Act Program, California Department of Conservation	September 1, 2006	F-1 through F-4
G	Thomas W. Eres, Attorney at Law	September 18, 2006	G-1 through G-15

A

U.S. Department of Homeland Security
1111 Broadway, Suite 1200
Oakland, CA 94607-4052

FEMA

September 8, 2006

Paul G. Brunner, P.E.
Executive Director
Three Rivers Levee Improvement Authority
915 Eight Street, Suite 115
Marysville, CA 95901

Re: August 2006 Draft Environmental Impact Report (DEIR) for the Feather River Levee Repair Project

Dear Mr. Brunner:

This is in response to your request for comments on the above referenced document you recently submitted to the Federal Emergency Management Agency (FEMA) for review.

In order to better understand the following comments, please note that on August 4, 2006, FEMA provided Yuba County (unincorporated areas) with a preliminary Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS) proposing base flood elevations and wider Special Flood Hazard Areas (SFHAs), which are mapped high hazard areas that would be inundated by flooding having a 1% chance of being equaled or exceeded in a given year.

The wider high hazard areas are based on a study performed along portions of the Feather River and its tributaries by the U.S. Army Corps of Engineers, Sacramento District, under contract to the California Department of Water Resources. They determined that the levee systems along the restudied reaches do not meet the mapping criteria found in Title 44 of the Code of Federal Regulations, Section 65.10. Therefore, floodprone areas landward of the levee systems are proposed to be included as SFHAs. A-1

FEMA held mapping coordination meetings with Yuba County and the California Department of Water Resources in Marysville, Calif., on April 27, 2006, and August 14, 2006, to discuss and answer questions on the ongoing revision to the county's FIRM and FIS. In this regard, those interested in discussing with FEMA the preliminary FIRM or FIS for Yuba County can contact Mr. Eric Simmons, Map Modernization Engineer for FEMA Region IX, at (510) 627-7029.

The project itself is to establish a higher level of flood protection for areas behind the levees and to have that protection recognized by FEMA on future Flood Insurance Rate Maps for Yuba County.

www.fema.gov

A general concern upon first reading of the DEIR is a lack of discussion of the FEMA map revision process and the responsibilities of communities that participate in the National Flood Insurance Program. Participating communities must provide technical flood hazard data to FEMA when development in the floodplain causes changes to Base (1% annual chance) Flood Elevations (BFEs). The DEIR contains a list of Federal regulatory agencies that will have a role in the project, and FEMA is not listed. Please refer back to my initial paragraph which summarizes the map revision process in progress. While FEMA is not a regulatory agency, the flood map revision is playing a key role in the project. A-2

Chapter 5.3, Draft EIR, Water Resources and River Geomorphology, ASB Impacts 5-3-c and 5-3-d, discuss changes in hydrology due to the project, both upstream and downstream of the project area. Effects of the proposed project may not impact existing conditions (1% annual chance flood elevations) and therefore may not require a map revision. The purpose of the project is to protect areas behind the levees, which are currently showing Zone C in Yuba County, but now is proposed to be a Zone A due to flooding from the Feather River. A Letter of Map Revision (LOMR) or a Physical Map Revision (PMR) may be required because there will be BFEs published along the Feather River. This chapter in the Draft EIR does refer to hydrology analyses and flow rates.

The documentation submitted to FEMA in support of the LOMR or PMR due to development in the floodplain must take into account the effects of the proposed project upon the upstream and downstream levees on <u>both sides of the river</u>. To facilitate the LOMR or PMR process, communities often request a conditional LOMR from FEMA. A conditional LOMR is a letter from FEMA commenting on whether a proposed project would meet minimum NFIP standards. A conditional LOMR also describes the changes in 1% annual chance water-surface elevations due to a proposed project. A-3

The DEIR documentation discusses effects to the Yuba County (left) side of the Feather River and concludes that the effects are either beneficial, or less than significant. The Three Rivers Levee Improvement Authority (TRLIA) must understand that any development done on this project has a potential effect on the Sutter County (right) side of the river also. There is no indication that the effects of this project on the Sutter County side have been studied.

While it is not FEMA's responsibility to dissect a California Environmental Quality Act (CEQA) document, we request that you edit the entire document in accordance with our comments, the actual flood hazards in the affected area, and FEMA's specific role in the process to avoid misconceptions and false expectations. Following are two editing examples: A-4

1. Draft EIR, Executive Summary, Ch.1 Summary, 1.2 Description of the Project Alternatives:

Change the bullet point from: "*To help secure FEMA <u>certification</u> of the subject reaches of the levee*," to "*To help secure FEMA accreditation of the subject reaches of the levee.*"

With the explanation that FEMA **does not certify levees**, FEMA accredits levees that are recognized in flood hazard mapping activities. The builder or operator of a levee can certify that it meets the FEMA mapping criteria of 44 Code of Federal Regulations (CFR) Section 65.10.

2. Draft EIR, Purpose-Need, 3.2.3. second paragraph et sequitur:

"In 1993, following the initiation of the System Evaluation Project and the Yuba River Basin Project, and before the most recent devastating flood (in 1997), Yuba County had approved the Plumas Lake Specific Plan, which provides for a 12,000-home development on 5,200 acres in the southern portion of the RD 784 area. Development was initiated in the Plumas Lake Specific Plan area in 2002. The results of the 2003 Corps floodplain mapping study indicate that the people and property in the RD 784 area, including homes that had already been built in the Plumas Lake Specific Plan area before the release of the Corps study, are subject to a much higher flood risk than previously believed. Without levee improvements that ~~meet FEMA criteria~~ FEMA can accredit as providing protection against the one percent (1%) annual chance flood, FEMA may ~~issue~~ publish new Flood Insurance Rate Maps (FIRMs) panels for the RD 784 area. Once the FIRM panels are ~~issued~~ published, flood insurance rates for the area ~~would~~ may increase and carrying flood insurance would become mandatory. The ongoing economic development of the county could be jeopardized.

To avoid having RD 784 mapped into the FEMA 100-year floodplain, ~~the RD 784 levees will need to be certified as meeting current FEMA criteria~~ the district will need to submit to FEMA data showing that the levees meet the criteria for mapping behind levee areas which is found in Vol. 44, Code of Federal Regulations § 65.10. Consequently, YCWA, RD 784, and Yuba County, in consultation with many landowners and developers in the south county, elected to move aggressively on a program for evaluating options for achieving FEMA certification of the RD 784 levees. One step was the formation of the Three Rivers Levee Improvement Authority (TRLIA), a joint powers authority composed of Yuba County and RD 784 that was formed to address funding and implementation of levee repairs for the RD 784 area."

A-4 Cont'd

I will be glad to offer my comments to a new Draft or an interim document if you deem appropriate. If you should require any additional clarification or desire to discuss these comments in more detail, please feel free to contact me at (510) 627-7284 or by email at Alessandro.Amaglio@dhs.gov.

Sincerely,

Alessandro Amaglio
Environmental Officer

COMMENTER A

ALESSANDRO AMAGLIO, FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA)

Response A-1

TRLIA concurs with the summary of past events provided in the comment letter.

Response A-2

Chapter 2, "Introduction," of the DEIR has been revised to include text that further describes the role of FEMA in the project. See the DEIR text modifications in Chapter 3 of this document, "Corrections and Updates to the Draft EIR."

Response A-3

TRLIA and/or Reclamation District 784 (RD 784) will coordinate with FEMA as appropriate regarding a Letter of Map Revision (LOMR), a conditional LOMR, and/or a Physical Map Revision (PMR). Note that these federal authorization processes do not have a nexus with project approval under CEQA, and the comment as it relates to LOMRs and PMRs does not refer to the analysis or conclusions in the DEIR.

The commenter questions whether the DEIR evaluates the effects of the proposed project on levees on the Sutter County side (right or west side) of the Feather River. Impacts ASB-5.3-c and IS-5.3-c from the DEIR evaluate the effects of reduced flood stage elevations upstream of the Above Star Bend (ASB) Setback Levee and Intermediate Setback Levee alternatives respectively. In both cases, the beneficial effects of reduced upstream flood-stage elevations resulting from construction of a setback levee would benefit both sides of the river. By default, if flood stage elevations are reduced in a river, those reductions occur along both river shorelines (whether natural shorelines or levees). There is not a need in the DEIR to expressly identify that this benefit applies to levees on both the left and right sides of the river.

Similarly, the slight increases in flood stage elevations downstream of the setback levee identified under Impacts ASB-5.3-d and IS-5.3-d must occur on both sides of the river. There is not a need to expressly identify that these increases occur on both the Yuba County side of the Feather River and the Sutter County side. As identified in the DEIR, increases in downstream flood stage elevation associated with the two setback levee alternatives would range from 0.02 foot (0.24 inch) to 0.08 foot (0.96 inch) depending on the alternative and severity of the flood event (1-in-100 annual exceedance probability [AEP] or 1-in-200 AEP). These increases would only occur in the Feather River segment between the downstream end of the setback levee and the Bear River. Below the Bear River there would be no measurable increase in flood stage elevation.

As identified in the DEIR, the stage for the design flow would remain below the project design stage (1957 profile) for the entire Feather River reach downstream of the setback levee, even with the increases identified by the hydraulic modeling. Again, this implicitly applies to both sides of the river. In addition, implementation of the planned Forecast-Coordinated Operations

(F-CO) of Lake Oroville and New Bullards Bar Reservoirs included as part of the Yuba-Feather Supplemental Flood Control Project (Y-FSFCP) would further reduce the minor increases in downstream flood-stage elevations identified in the hydraulic modeling. For these reasons, under the two setback levee alternatives, the potential impact on flood hydrology associated with the anticipated minor increases in downstream flood-stage elevations is considered less than significant. This conclusion applies to both the Yuba County and Sutter County sides of the Feather River.

Impacts ASB-5.3-j and IS-5.3-j evaluate the potential for alterations in water velocities, depths, and geomorphic processes resulting from the levee setback alternatives to adversely affect levees upstream, downstream, and within the setback area. The impact analysis is based on the results of the *Geomorphic Assessment of Project Alternatives for Feather River Levee Improvements Between the Bear and Yuba Rivers*, prepared by PWA Associates Ltd. (PWA) and included in Appendix C of the DEIR. As identified in the PWA report and the discussions of Impacts ASB-5.3-j and IS-5.3-j, both the right and left banks of the Feather River are considered in the analysis. Therefore, the potential for alterations in water velocities, depths, and geomorphic processes resulting from the levee setback alternatives to affect levees on the Sutter County side of the Feather River is evaluated in the DEIR.

Alternative 1, The Levee Strengthening Alternative, does not alter the location of existing levees and therefore would not change flood stage elevations, water velocities, water depths, or geomorphic process relative to existing conditions. Therefore, this alternative would not have the potential to affect Feather River levees on either side of the river via these mechanisms.

Response A-4

The text edits suggested by the commenter have been incorporated into the EIR. See the DEIR text modifications in Chapter 3 of this document, “Corrections and Updates to the Draft EIR.”

B

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA 95814-2922

RECEIVED
SEP 29 2006
TRLIA

REPLY TO
ATTENTION OF

September 25, 2006

Regulatory Branch (200600693)

Paul Brunner
Three Rivers Levee Improvement Authority
915 8th Street, Suite 115
Marysville, California 95901-5273

Dear Mr. Brunner:

We are responding to your August 3, 2006 request for comments on the Yuba-Feather Supplemental Flood Control Project. This project is located at Latitude 038° 58′ 47.2″, Longitude 121° 35′ 12.4″, in the New Helvetia Land Grant, near Olivehurst, in Yuba County, California. B-1

The objective of the Yuba-Feather Supplemental Flood Control Project is to provide 200-year flood protection to southern Yuba County. This level of flood protection could not be achieved without providing 165 year flood protection to the same area through the construction of the Feather-Bear WPIC Levee Improvement Project. We believe that the Yuba-Feather Supplemental Flood Control Project and Feather-Bear-WPIC Levee Improvement Project together may have significant impacts to the aquatic environment, food and fiber production, agricultural lands, and dramatically increase development pressure in southern Yuba County. Therefore, there is a potential that an environmental impact statement (EIS) may be required to adequately address the cumulative impacts and affects to public interest factors associated with the Yuba-Feather Supplemental Flood Control Project and Feather Bear-WPIC Levee Improvement Project. B-2

Please refer to identification number 200600693 in any correspondence concerning this project. If you have any questions, please contact Andrea Jones at our Sacramento Valley Office, 1325 J Street, Room 1480, Sacramento, California 95814-2922, email *Andrea.J.Jones@usace.army.mil*, or telephone 916-557-7745. You may also use our website: *www.spk.usace.army.mil/regulatory.html*.

Sincerely,

Kevin Roukey
Chief, Central California/Nevada Section

COMMENTER B

KEVIN ROUKEY, U.S. ARMY CORPS OF ENGINEERS

Response B-1

It is noted that the letter from the U.S. Army Corps of Engineers (Corps) refers to the Yuba-Feather Supplemental Flood Control Project (Y-FSFCP), which was subject to an environmental review process that included preparation of a DEIR in October 2003. The final EIR (FEIR) for the Y-FSFCP was certified and the program of elements approved by the Yuba County Water Agency (YCWA) Board in March 2004. The project that is the subject of this current EIR—the FRLRP—is an element of the Y-FSFCP.

Although various flood control projects are referenced in the comment letter, the FRLRP is not mentioned. However, because the letter states it is "responding to your August 3, 2006 request for comments…," and the release date for the FRLRP DEIR was August 3, 2006, it is assumed that the comments submitted by the Corps are intended to apply to the FRLRP DEIR. Also, it is noted that the September 25, 2006, letter from the Corps was submitted following the close of the DEIR comment period, which ended on September 18.

Response B-2

It is noted that the commenter seems to be referring to three flood control projects that have previously undergone environmental review and approval:

- **Y-FSFCP** – The EIR for this project addressed a program of flood control elements, as discussed above.
- **Bear River and Western Pacific Interceptor Canal (WPIC) Levee Improvements Project** – This project as approved entails repairs and improvements to the upper Bear River, Yuba River, and WPIC levees, and completion of various related improvements to provide protection from a 200-year flood event (not to achieve 165-year flood protection, as the commenter suggests).
- **Feather-Bear Rivers Levee Setback Project (F-BRLSP)** – This project as approved involves setting back the right bank levee of the lower Bear River from the confluence with the Feather River, where the alignment ties in with the existing Feather River levee below RD 784 Pump Station No. 2, to approximately 1,400 feet southwest of State Route (SR) 70.

The various projects undertaken by TRLIA in the RD 784 area, including the FRLRP, are being planned, designed, and implemented to achieve a 200-year level of flood protection, which is expected to result in FEMA accreditation of the subject reaches of levee and to avoid having the RD 784 area mapped in the 100-year floodplain.

The EIRs prepared for the projects listed above, and the present EIR prepared for the FRLRP, have addressed potentially significant impacts on the aquatic environment and agricultural lands

(and therefore indirectly, food and fiber production), which are discussed throughout the applicable sections of the respective EIRs. Implementation of all feasible mitigation measures is required to reduce the severity of significant impacts. Furthermore, growth-inducing impacts, which address development pressure, have been addressed in accordance with the requirements of CEQA. (Refer to Section 7.1 of the FRLRP DEIR, "Growth-Inducing Effects.")

Due to the potential for significant impacts in these areas, the commenter suggests there is potential that an environmental impact statement (EIS), pursuant to the National Environmental Policy Act (NEPA), may be required "to adequately address the cumulative impacts and affects to public interest factors associated with the Yuba-Feather Supplemental Flood Control Project and Feather Bear-WPIC Levee Improvement Project." Many of the elements associated with the Y-FSFCP, the Bear River and WPIC Levee Improvements Project, and the F-BRLSP are either complete or under construction, and to date, the Corps has not determined that an EIS is required. Whether an EIS is needed to support necessary authorizations from the Corps for the FRLRP is not a CEQA issue and is not pertinent to the analysis or conclusions in the FRLRP DEIR. Ultimately, as federal lead agency, the Corps has authority to determine whether an EIS is needed to support Corps authorizations for the FRLRP. However, it is the position of TRLIA that because the only Corps actions would involve the issuance of resource-oriented regulatory permits of a rather limited scale and "certification" of the adequacy of levee design, an EIS for the FRLRP is not merited nor should it be required. In addition, an EIS has not been needed for past YCWA and TRLIA projects with similar types and intensities of impacts.

If the Corps determines that an EIS is required, it is important to note that the current EIR prepared for the FRLRP was prepared using a format that could be used extensively to support EIS preparation. The FRLRP EIR evaluates three alternatives at an equal level of detail, an approach similar to that required for preparation of an EIS. Furthermore, the analysis prepared for the present FRLRP EIR is based on a comprehensive project description, which is designed to achieve the project objectives as presented in the introductory chapters of the EIR. The comprehensive project description provides the basis for an equally comprehensive analysis of project effects that generally exceeds the requirements of NEPA. The current EIR also includes a thorough analysis of cumulative and growth-inducing impacts that could also be applied to a NEPA evaluation. Thus, while TRLIA contends that an EIS should not be required for the FRLRP, most of the information that would otherwise be contained in an EIS is available for review in the present EIR.

DEPARTMENT OF TRANSPORTATION
DISTRICT 3
703 B STREET
P. O. BOX 911
MARYSVILLE, CA 95901-0911
PHONE (530) 741-4025
FAX (530) 741-4825
TTY (530) 741-4509

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Be energy efficient!

C

September 5, 2006

06YUB0040
03YUB70/PM 00.00 –02.00
ND DEIR SCH #2006062071
Feather River Levee Improvement

Paul Brunner, Executive Director
Three Rivers Levee Improvement Authority
915 8th Street, Ste. 115
Marysville, CA 95901-5273

Dear Mr. Brunner:

Thank you for the opportunity to review and comment on the Negative Declaration Draft Environmental Impact Report (DEIR) for the above mentioned project. The project proposes to increase flood protection in the Reclamation District (RD) 784 area of Yuba County. RD 784 is bounded by the Yuba River on the north, the Feather River on the west, the Bear River on the south, and the Western Pacific Interceptor Canal on the east. The project would address identified deficiencies in the Feather River levee, and would make related improvements to the Yuba River levee near its confluence with the Feather River. Our comments are as follows:

A project of this size is expected to have traffic impacts to the State Highway adjacent to the project. Of primary concern is the Plumas-Arboga at-grade intersection which is the closest access to the construction site off SR 70 for segment 2. Currently, during the AM peak, the northbound left turn lane into Plumas-Arboga Road stacks up. With the additional trucks generated by the Levee repair, it may become a safety concern, especially with traffic coming down the vertical crest just south of the intersection. The eastbound left turn movement onto Northbound State Route 70 may generate safety concerns as well. Due to a heavy southbound through movement during the PM peak, it may cause impatient drivers to take unnecessary risks to cross the intersection. We strongly recommend that construction truck traffic be rerouted to either the Feather River Blvd at-grade intersection, south of the Plumas-Arboga Road intersection, or the Feather River Blvd Interchange, north of the Plumas-Arboga Road intersection. C-1

Caltrans should be included in the coordination of truck routes as well as the coordination of a traffic safety plan. This safety plan must be approved by Caltrans prior to initiation of the C-2

"Caltrans improves mobility across California"

construction related activities. In addition, Caltrans should also be included in the development of any traffic management plan that may be necessary where state facilities are involved. C-2 Cont'd

If you have questions or need additional information, please contact Susan Zanchi, Yuba and Sutter Counties IGR Coordinator, at (530) 741-4199 or e-mail at Susan_Zanchi@dot.ca.gov.

Sincerely,

WILLIAM A. DAVIS, Chief
Office of Planning - North

cc: Scott Morgan, State Clearinghouse
Kevin Mallen, Yuba County Public Works Department
Mike Lee, Yuba County Public Works Department

"Caltrans improves mobility across California"

COMMENTER C

WILLIAM A. DAVIS, CALIFORNIA DEPARTMENT OF TRANSPORTATION

Response C-1

Section 5.11 of the DEIR, "Transportation and Circulation," includes Mitigation Measure LS-5.11-b, which addresses limiting the potential for construction-related traffic hazards on Feather River Boulevard and other local roadways. Part "a" of Mitigation Measure LS-5.11-b specifically addresses development and implementation of a traffic safety plan by TRLIA and its construction contractor in coordination with the County and Caltrans. This process would address measures to avoid creation of traffic hazards on local roadways and along SR 70, including the intersection of Plumas-Arboga Road and SR 70. During coordination with Caltrans as part of development of the traffic safety plan, TRLIA shall ensure the construction contractor specifically discusses with Caltrans methods to minimize potential safety hazards at the Plumas-Arboga road/SR 70 at-grade intersection, including limiting construction traffic (time and/or volume of use, types of vehicles using the intersection) and routing construction traffic to avoid the intersection.

Note that the requirements of Mitigation Measure LS-5.11-b are repeated in Mitigation Measures ASB-5.11-b and IS-5.11-b. Therefore, the same mitigation actions would be implemented under any of the project alternatives.

Response C-2

As discussed under Response C-1, Mitigation Measure LS-5.11-b (and consequently Mitigation Measures ASB-5.11-b and IS-5.11-b) requires coordination with Caltrans during preparation of the traffic safety plan. TRLIA shall ensure that the construction contractor specifically addresses identification of truck routes during coordination with Caltrans. There shall also be coordination with Caltrans if additional plans (e.g., traffic management plan) are developed involving state facilities where Caltrans has jurisdiction. TRLIA and/or the construction contractor shall seek approval from Caltrans on plans and activities where Caltrans has authority to provide such approval.

D

STATE OF CALIFORNIA - THE RESOURCES AGENCY

ARNOLD SCHWARZENEGGER, Governor

DEPARTMENT OF WATER RESOURCES

1416 NINTH STREET, P.O. BOX 942836
SACRAMENTO, CA 94236-0001
(916) 653-5791

RECEIVED

SEP 05 2006

TRLIA

SEP 1 2006

Paul Brunner
Attn: Three Rivers Levee Improvement Authority
Government Center
915 Eighth Street, Suite 115
Marysville, California 95901-5273

Notice of Preparation of a Draft Environmental Impact Report on the Feather River Levee Repair Project
State Clearinghouse (SCH) Number: 2006062071

The project corresponding to the subject SCH identification number has come to our attention. The limited project description suggests a potential encroachment on an Adopted Plan of Flood Control. If indeed your project encroaches on an adopted food control plan, you will need to obtain an encroachment permit from the Reclamation Board prior to initiating any activities. The enclosed Fact Sheet explains the permitting process. Please note that the permitting process may take as much as 45 to 60 days to process. Also note that a condition of the permit requires the securing all of the appropriate additional permits before initiating work. This information is provided so that you may plan accordingly. D-1

If after careful evaluation, it is your assessment that your project is not within the authority of the Reclamation Board, you may disregard this notice. For further information, please contact me at (916) 574-1249.

Sincerely,

Al Vargas

Al Vargas
Staff Environmental Scientist
Floodway Protection Section

cc: Governor's Office of Planning and Research
State Clearinghouse
1400 Tenth Street, Room 121
Sacramento, CA 95814

Enclosure

Fact Sheet

Reclamation Board Encroachment Permit Application Process

Authority
State law (Water Code Sections 8534, 8608, 8609, and 8710 – 8723) tasks the Reclamation Board with enforcing appropriate standards for the construction, maintenance, and protection of adopted flood control plans. Regulations implementing these directives are found in California Code of Regulations (CCR) Title 23, Division 1.

Reclamation Board Jurisdiction
The adopted plan of flood control under the jurisdiction and authority of the Reclamation Board includes the Sacramento and San Joaquin Rivers and their tributaries and distributaries and the designated floodways.

Streams regulated by the Reclamation Board can be found in Title 23 Section 112. Information on designated floodways can be found on the Reclamation Board's website at http://recbd.ca.gov/designated_floodway/ and CCR Title 23 Sections 101 - 107.

Regulatory Process
The Reclamation Board ensures the integrity of the flood control system through a permit process (Water Code Section 8710). A permit must be obtained prior to initiating any activity, including excavation and construction, removal or planting of landscaping within floodways, levees, and 10 feet landward of the landside levee toes. Additionally, activities located outside of the adopted plan of flood control but which may foreseeable interfere with the functioning or operation of the plan of flood control is also subject to a permit of the Reclamation Board [CCR Title 23 Section 6(c)].

Details regarding the permitting process and the regulations can be found on the Reclamation Board's website at http://recbd.ca.gov/ under "Frequently Asked Questions" and "Regulations," respectively. The application form and the accompanying environmental questionnaire can be found on the Reclamation Board's website at http://recbd.ca.gov/forms.cfm.

Application Review Process
Applications when deemed complete will undergo technical and environmental review by Reclamation Board and/or Department of Water Resources staff.

Technical Review
A technical review is conducted of the application to ensure consistency with the regulatory standards designed to ensure the function and structural integrity of the adopted plan of flood control for the protection of public welfare and safety. Standards and permitted uses of designated floodways are found in CCR Title 23 Sections 107 and Article 8 (Sections 111 to 137). The permit contains 12 standard conditions and additional special conditions may be placed on the permit as the situation warrants. Special conditions, for example, may include mitigation for the hydraulic impacts of the project by reducing or eliminating the

August 25, 2006

additional flood risk to third parties that may caused by the project.

Additional information may be requested in support of the technical review of your application pursuant to CCR Title 23 Section 8(b)(4). This information may include but not limited to geotechnical exploration, soil testing, hydraulic or sediment transport studies, and other analyses may be required at any time prior to a determination on the application.

Environmental Review

A determination on an encroachment application is a discretionary action by the Reclamation Board and its staff and subject to the provisions of the California Environmental Quality Act (CEQA) (Public Resources Code 21000 et seq.). Additional environmental considerations are placed on the issuance of the encroachment permit by Water Code Section 8608 and the corresponding implementing regulations (California Code of Regulations – CCR Title 23 Sections 10 and 16).

In most cases, the Reclamation Board will be assuming the role of a "responsible agency" within the meaning of CEQA. In these situations, the application must include a certified CEQA document by the "lead agency" [CCR Title 23 Section 8(b)(2)]. We emphasize that such a document must include within its project description and environmental assessment the activities for which are being considered under the permit.

Encroachment applications will also undergo a review by an interagency Environmental Review Committee (ERC) pursuant to CCR Title 23 Section 10. Review of your application will be facilitated by providing as much additional environmental information as pertinent and available to the applicant at the time of submission of the encroachment application.

These additional documentations may include the following documentation:

- California Department of Fish and Game Streambed Alteration Notification (http://www.dfg.ca.gov/1600/),
- Clean Water Act Section 404 applications, and Rivers and Harbors Section 10 application (US Army Corp of Engineers),
- Clean Water Act Section 401 Water Quality Certification, and
- corresponding determinations by the respective regulatory agencies to the aforementioned applications, including Biological Opinions, if available at the time of submission of your application.

The submission of this information, if pertinent to your application, will expedite review and prevent overlapping requirements. This information should be made available as a supplement to your application as it becomes available. Transmittal information should reference the application number provided by the Reclamation Board.

August 25, 2006

In some limited situations, such as for minor projects, there may be no other agency with approval authority over the project, other than the encroachment permit by Reclamation Board. In these limited instances, the Reclamation Board may choose to serve as the "lead agency" within the meaning of CEQA and in most cases the projects are of such a nature that a categorical or statutory exemption will apply. The Reclamation Board cannot invest staff resources to prepare complex environmental documentation.

Additional information may be requested in support of the environmental review of your application pursuant to CCR Title 23 Section 8(b)(4). This information may include biological surveys or other environmental surveys and may be required at anytime prior to a determination on the application.

August 25, 2006

COMMENTER D

AL VARGAS, CALIFORNIA DEPARTMENT OF WATER RESOURCES, FLOODWAY PROTECTION SECTION

Response D-1

It is noted that the subject line of the comment letter refers to the Notice of Preparation (NOP) for the FRLRP EIR, which was issued on June 13, 2006. The end of the EIR scoping period associated with the NOP was July 14, 2006. Because the comment letter was received by TRLIA within the comment period for the DEIR (received on September 5, 2006), it is assumed to be applicable to the DEIR.

The commenter refers to the "limited project description." The project description provided in the DEIR is complete and comprehensive, comprised of over 40 pages of text and five figures. The content and level of detail in the project description is in accordance with the requirements of Section 15124 of the State CEQA Guidelines. It is true that the project description provided in the NOP was a condensed version of the project description that was subsequently presented in the DEIR. However, as stated above, it is assumed that the comment letter is in reference to the DEIR and not the NOP.

The commenter describes the requirement to obtain an encroachment permit from The Reclamation Board prior to initiation of a project that could encroach on the flood management system or an adopted flood control plan. A full range of permitting and consultation requirements that are anticipated prior to commencement of work on the project are identified in the DEIR in Section 2.7.2, "Responsible Agencies." An encroachment permit from The Reclamation Board is specifically identified in this section. The role of the California Department of Water Resources (DWR) and The Reclamation Board in regulating the construction, maintenance, protection, and modification flood control facilities is further described in Section 5.3, "Water Resources and Geomorphology."

Implementation of any of the three project alternatives evaluated in the DEIR would involve excavation and construction activities within areas that are under the jurisdiction of The Reclamation Board. The TRLIA Board of Directors is expected to make a decision on certifying the FRLRP EIR and approving a project alternative at its meeting on November 14, 2006. If TRLIA decides to approve the project, it will begin coordination with The Reclamation Board staff regarding specific permit requirements later in November.

E

STATE OF CALIFORNIA – THE RESOURCES AGENCY

ARNOLD SCHWARZENEGGER, Governor

DEPARTMENT OF WATER RESOURCES
1416 NINTH STREET, P.O. BOX 942836
SACRAMENTO, CA 942360001
(916) 653-5791

RECEIVED
SEP 27 2006
STATE CLEARING HOUSE

September 20, 2006

Paul Brunner
Three Rivers Levee Improvement Authority (TRLIA)
Government Center
915 8th Street, Suite 115
Marysville, California 95901-5273

Feather River Levee Repair Project
State Clearinghouse (SCH) Number: 2006062071

The project corresponding to the subject SCH identification number has come to our attention. The limited project description suggests a potential encroachment on an Adopted Plan of Flood Control. If indeed your project encroaches on an adopted food control plan, you will need to obtain an encroachment permit from the Reclamation Board prior to initiating any activities. The attached Fact Sheet explains the permitting process. Please note that the permitting process may take as much as 45 to 60 days to process. Also note that a condition of the permit requires the securing all of the appropriate additional permits before initiating work. This information is provided so that you may plan accordingly. E-1

If after careful evaluation, it is your assessment that your project is not within the authority of the Reclamation Board, you may disregard this notice. For further information, please contact Sam Brandon of my staff at (916) 574-0651.

Sincerely,

Mike Mirmazaheri, Chief
Floodway Protection Section

cc: Governor's Office of Planning and Research
State Clearinghouse
1400 Tenth Street, Room 121
Sacramento, CA 95814

COMMENTER E

MIKE MIRMAZAHERI, CALIFORNIA DEPARTMENT OF WATER RESOURCES, FLOODWAY PROTECTION SECTION

Response E-1

The comments presented in this letter from DWR (Letter E) duplicate those presented in the letter dated September 1, 2006 by DWR (Letter D). Refer to Response D-1 above. No new information is presented in Letter E; therefore, no additional response is necessary. Also, it is noted that this comment letter is dated September 20, 2006, following the close of the DEIR comment period on September 18.

DEPARTMENT OF CONSERVATION

DIVISION OF LAND RESOURCE PROTECTION

801 K STREET • MS 18-01 • SACRAMENTO, CALIFORNIA 95814

PHONE 916 / 324-0850 • FAX 916 / 327-3430 • TDD 916 / 324-2555 • WEBSITE conservation.ca.gov

F

RECEIVED

SEP 11 2006

September 1, 2006

VIA FACSIMILE (530) 749-7312
Mr. Pat Brunner
Three Rivers Levee Improvement Authority
Government Center
915 5th Street, Ste. 115
Marysville, CA 95901

Subject: SCH#2006062071 – Draft Environmental Impact Report for the Feather River Levee Repair Project, Yuba County

Dear Mr. Brunner:

The Department of Conservation's Division of Land Resource Protection (Division) monitors farmland conversion on a statewide basis and administers the California Land Conservation (Williamson) Act, California Farmland Conservancy Program, and other agricultural land conservation programs.

The Three Rivers Levee Improvement Authority (TRLIA) is a joint powers authority composed of Yuba County and Reclamation District 784. A draft environmental impact report (DEIR) has been prepared on the TRLIA's behalf so that improvements to the levees along the Feather River can be implemented. The project is comprised of three areas on the east side of the river in need of repair: two sites located upstream and downstream of Star Bend, and one site extending from the Yuba County Airport heading upstream to the railroad crossing adjacent to the State Route 70 bridge. Three alternatives are evaluated within the scope of the DEIR. Construction of a detention basin would be required for each alternative. Two alternatives involve construction of setback levees, establishment of borrow sites and replacement of pumps. One alternative would be limited to levee strengthening.

In all of the alternatives, conversion of agricultural land is involved. Acreages vary with each Alternative. Alternative 1 would convert approximately 180 acres of farmland, while Alternative 2 would convert 1,600 acres, and Alternative 3 would convert up to 1,300 acres. These acreages are privately owned and are currently under cultivation. The document indicates that continued farming operations might be feasible in many parts of the setback areas. It further indicates that although no specific plans for habitat restoration are proposed at this time, the potential for restoring habitat is not excluded from consideration. Special operations and maintenance plans would need to be prepared and implemented to ensure the

The Department of Conservation's mission is to protect Californians and their environment by. Protecting lives and property from earthquakes and landslides; Ensuring safe mining and oil and gas drilling; Conserving California's farmland; and Saving energy and resources through recycling.

long-term maintenance of any agricultural and/or habitat areas and to ensure that such areas would not conflict with the flood control function of the setback levee area.

We offer the following comments:

The document briefly mentions use of the Land Evaluation Site Assessment (LESA) model. Was the model used to determine level of significance of impacts to agricultural resources? If the model was used, please include the analysis in the Appendices. If the model was not used, please note that we encourage its use. The model provides a consistent tool for determining level of significance of impacts associated with projects affecting agricultural resources. F-1

The possibility or (undetermined) feasibility of continued agricultural practices as presented in the document does not directly address the necessity to mitigate for the potential loss of farmland. We suggest that a more definitive discussion be included that clearly indicates whether agricultural practices would be continued, or if the setback areas currently under cultivation are to be converted to habitat. If the setback areas are to be in wildlife-friendly agriculture, it should be stated as such. A description of how the land within the setback areas will be managed and monitored should be included in the final document as well. F-2

The document alludes to the possibility of establishing an agricultural easement to mitigate for the conversion. The Department encourages the establishment of an agricultural easement, and we would be pleased to assist in this effort. Mitigation using agricultural conservation easements can be implemented by at least two alternative approaches: the outright purchase of easements or the donation of mitigation fees to a local, regional or statewide organization or agency whose purpose includes the acquisition and stewardship of agricultural land conservation easements. These organizations include land trusts and conservancies. Information on agricultural conservation easements is available on the Department's website at: http://www.consrv.ca.gov/dlrp/CFCP/index.htm. F-3

The document does not contain a discussion pertaining to the potential for growth-inducing impacts that may be associated with the proposed project. The final document should provide a discussion that addresses the potential for urban development once the proposed level of flood protection is accomplished. F-4

We understand and support the necessity of providing adequate structural and nonstructural flood protection to farmlands and communities, and we thank you for the opportunity to provide comment. Please do not hesitate to contact Jeannie Blakeslee at (916) 323-4943 if you need assistance or have questions regarding this comment letter.

Sincerely,

Dennis O'Bryant
Program Manager
Williamson Act Program

COMMENTER F

DENNIS O'BRYANT, CALIFORNIA DEPARTMENT OF CONSERVATION, DIVISION OF LAND RESOURCE PROTECTION

Response F-1

The Land Evaluation and Site Assessment (LESA) model was not used to determine the level of significance of impacts on agricultural resources from implementation of the FRLRP. As discussed in Section 5.1 of the DEIR, "Land Use," the analysis of impacts on farmland is based on the Farmland Mapping and Monitoring Program (FMMP), which is administered by the Division of Land Resource Protection of the California Department of Conservation (DOC). Data collected and maintained for the program are used to rate agricultural land according to soil quality and irrigation status. The severity of the impact on agricultural resources that would result from conversion of agricultural land was determined in the DEIR based on the relative acreage of Important Farmland (i.e., Prime Farmland, Unique Farmland, or Farmland of Statewide Importance) that would be affected. This approach provides a consistent and quantifiable method for evaluating impacts on farmland for a variety of types of projects in California, including the FRLRP. Appendix G of the State CEQA Guidelines also includes impact assessment criteria related to the conversion of Important Farmland:

> "Would the project convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?"

Given the fact that large amounts of Important Farmland are actively cultivated in the project area, use of the LESA model to characterize impacts on agricultural resources would not change the impact conclusions already provided in the DEIR. Conversion of agricultural land in the project area to nonagricultural uses would still be a significant impact.

Response F-2

The commenter asks for a more definitive discussion that clearly indicates whether agricultural practices would be continued within the levee setback area or whether the portions of the setback area currently under cultivation would be converted to habitat. It is noted that this comment pertains only to Alternatives 2 and 3, as Alternative 1 does not include a levee setback area. The DEIR states that land uses in the levee setback area under Alternatives 2 and 3 could consist of agricultural operations and/or habitat restoration activities that would be compatible with flood control objectives.

Provision of the specific details requested by the commenter regarding potential future land uses in the Alternative 2/Alternative 3 levee setback areas is not necessary to adequately assess potential impacts on the environment under CEQA. Habitat restoration in the setback area is not identified as a method to mitigate project impacts on biological resources. Therefore, there is no need to describe the extent, type, or feasibility of habitat restoration activities to ensure compliance with mitigation requirements. Moreover, to ensure that potential project impacts on

agricultural resources are not underestimated, the DEIR conservatively assumes that the entire levee setback area would be restored to native habitat. Thus, the DEIR provides a conservative analysis of potential impacts. If agricultural operations were to continue in the setback area, the magnitude of impacts on agricultural land would be less than presented in the DEIR. However, the impact would remain significant because some Important Farmland would still be lost under the footprint of the setback levee and in the proposed detention basin.

The DEIR proposes mitigation for the potential conversion of Important Farmland to other uses. Mitigation measures (ASB-5.1-b and IS-5.1-b) are proposed that would preserve the agricultural productivity of Important Farmland to the extent feasible if Alternative 2 or Alternative 3 is selected, thus minimizing the environmental impact. These mitigation measures would reduce potential impacts of a levee setback on Important Farmland, including indirect effects that may lead to the discontinuation of farming on some lands; however, they would not reduce the impact of converting Important Farmland to a levee and detention basin, and of the possible loss of farming opportunities on other farmland acreage, to a less-than-significant level. Further discussion regarding mitigation for the conversion of Important Farmland to other uses is provided in Response F-3 below.

The DEIR also indicates that the increased flood protection provided by the proposed project would benefit existing farmland in the RD 784 area by reducing the likelihood of flooding and the associated adverse effects on farming operations during and after flood events. However, this benefit is not specifically identified as a mitigation measure in the DEIR, as it is simply a positive outcome of the proposed project.

To determine with specificity the type and extent of agricultural and habitat restoration activities that might ultimately occur in the levee setback area under Alternatives 2 and 3 would require dedication of a significant amount of time and resources. For example:

- Various studies and coordination with existing landowners and potential agricultural operators would be required to determine the type and location of ongoing agricultural activities that would be physically and economically feasible in the setback area.

- Detailed assessments of existing land and soil conditions and modeling of projected future conditions would be required to determine locations suitable for habitat restoration and to develop successful habitat restoration plans.

- Funding sources for habitat restoration would need to be identified. The extent of available funding would be one of the factors determining the acreage where habitat restoration might be considered.

A preferred alternative has not yet been selected for the FRLRP. The TRLIA Board of Directors could ultimately approve any of the described alternatives, including Alternative 1 – The Levee Strengthening Alternative, which does not include a setback levee. Because of this uncertainty, it would be inappropriate at this time to devote the resources necessary to determine the location and extent of agricultural and habitat restoration activities that might take place in a setback area created by either Alternative 2 or Alternative 3. To determine with specificity the type and extent of agricultural and habitat restoration activities that might ultimately occur in the levee setback

area under Alternatives 2 and 3 would essentially require final project design and completion of negotiations with landowners, which is inappropriate before completion of environmental review, selection of an alternative, and project approval. For these same reasons, it would not be appropriate at this time to fulfill the commenter's requests to clearly indicate whether agricultural practices would continue in the levee setback area, and whether lands in the setback area would be restored to native habitat; to identify whether the setback area would be in wildlife-friendly agriculture; or to describe how the lands in the setback area would be managed and monitored. Instead, the DEIR assumes a worst-case scenario of total conversion of Important Farmland within the setback area, and identifies mitigation to reduce the effects of conversion where feasible. Under the significance thresholds set forth in Appendix G of the State CEQA Guidelines and adopted in the DEIR, the loss of any Important Farmland is significant; therefore, the DEIR correctly identifies the impact as significant and unavoidable.

Response F-3

The commenter suggests at the beginning of this comment that the DEIR alludes to the possibility of establishing an agricultural easement to mitigate the conversion of agricultural land. In fact, no mention of this possibility is made in Section 5.1 of the DEIR, "Land Use," or elsewhere in the document.

The comment encourages the establishment of agricultural conservation easements as a method to mitigate the impact of conversion of agricultural land. This mitigation approach is premised on the assumption that conversion of agricultural land to other uses can be compensated for by setting aside other agricultural land at another location and ensuring that development of such land will not be allowed. However, the establishment of agricultural conservation easements does not have a strong correlation to the nature of the impact in question, which is the conversion of agricultural land.

The conversion of agricultural land to other uses takes the agricultural land out of production. The establishment of an agricultural conservation easement does not create new farmland, does not put new farmland into production, and does not increase the productivity of existing farmland. Agricultural conservation easements may also be placed on lands that are not exposed to development pressure and would continue in agricultural production regardless of whether the easement were in place, thereby providing little benefit related to the protection of farmland. An agricultural conservation easement also may not ensure that farmland under the easement stays in production. Lands under the easement could lie fallow indefinitely. The agricultural easement simply ensures that existing cultivated farmland is not converted to another use. Therefore, the impact of conversion of agricultural land in one location is not avoided, minimized, rectified, or reduced by establishment of agricultural conservation easements elsewhere (see Section 15370 of the State CEQA Guidelines for discussion of these terms as they apply to the definition of mitigation). It can be argued that establishing agricultural easements achieves a slight mitigation benefit by compensating for the impact, but the mitigation benefit is not sufficient to reduce a significant impact to a less-than-significant level.

The concept of establishing agricultural conservation easements to mitigate conversion of agricultural land is applied at times to conversions of agricultural land to developed land. In these cases, the affected lands are considered permanently converted to some other use, with no realistic

potential for reuse as agricultural lands in the foreseeable future. The application of urban development materials to the land and the loss of air and rain exposure to the soil is known to physically change the qualities of the soil that make it useful for agricultural purposes. These types of effects could potentially be attributed to the conversion of approximately 245 acres of Important Farmland to setback levee under FRLRP Alternatives 2 and 3. Construction of the setback levee would require modification of the soil for the levee foundation and installation of slurry cutoff walls where needed. Placing the levee embankment over the modified foundation soils could have similar effects on agricultural soils as urban development. However, the vast majority of the Important Farmland that could be "converted" under Alternatives 2 and 3 (up to approximately 1,045 acres under Alternative 2 and up to approximately 720 acres under Alternative 3) would remain undeveloped, as habitat or fallow lands within the levee setback area created by these alternatives.

Adoption of Alternative 2 or Alternative 3 does not require the restoration of habitat in the levee setback area. If Alternative 2 or Alternative 3 is approved and implemented, determinations regarding if/where habitat restoration might occur will be made at a later date (see Response F-2 above). The habitat that might be restored in the setback area is not tied to mitigation commitments or other factors that might require protection of the land in perpetuity as habitat. Therefore, it is conceivable that at least a portion of the land in the levee setback area that might be converted to habitat (either intentionally or as a result of lying fallow for an extended period) could be made available for agricultural production again some time in the future. Thus, there is a limited nexus between the vast majority of potential impacts on Important Farmland under Alternatives 2 and 3 and a requirement for acquisition of agricultural conservation easements. Furthermore, it would seem disproportionate to require permanent easements to offset what may be temporary effects on agricultural productivity in the levee setback area.

In determining whether a mitigation measure is feasible, a lead agency weighs various factors, including among them economic and environmental costs and benefits. In contrast to the limited compensatory benefit created by the potential establishment of agricultural easements, in the case of the FRLRP, the acquisition of such easements could be very costly. Although TRLIA has not developed cost estimates for acquiring agricultural easements, it is certain that purchase of agricultural conservation easements would cost several thousand dollars per acre. Taking a "worst-case" approach, the FRLRP DEIR estimates conversion of Important Farmland ranging from 180 acres (Alternative 1) to more than 1,300 acres (assuming the maximum potential impact under Alternative 2). Costs associated with the purchase of conservation easements at a 1:1 ratio (1 acre of easement for each acre of conversion) for these impacts would range in the millions of dollars. TRLIA is a public agency formed and financed exclusively for the purpose of providing flood protection in Yuba County. The cost of flood protection in the project area, including all elements of the FRLRP, will exceed $200 million, the majority of which is being paid for by the development community, which is passing such costs on to existing and future residents of Yuba County. Purchase of agricultural conservation easements by TRLIA would create a financial burden that would divert funds from the agency's primary purpose of providing flood protection.

Given the conditions described above, TRLIA does not believe that it is appropriate or necessary to acquire agricultural conservation easements to mitigate impacts on Important Farmland identified in the FRLRP EIR. First, there is not a significant nexus between the nature of the impact (potential change in use of Important Farmland with a relatively limited conversion of Important

Farmland for flood control facilities) and the limited compensatory benefits associated with establishing agricultural conservation easements. Second, given the relatively high cost of acquiring agricultural conservation easements and the limited benefit, the use of agricultural easements as a mitigation measure does not meet standards for rough proportionality (see Section 15126.4[a][4][B] of the State CEQA Guidelines). Although establishing an agricultural easement may be a potential mechanism to partially mitigate impacts on farmland from certain development projects, TRLIA does not consider it a viable, cost effective, or feasible method of mitigating agricultural impacts related to the FRLRP.

Mitigation Measures LS-5.1-b, ASB-5.1-b, and IS-5.1-b in the DEIR provide detailed actions to minimize losses of farmland or to preserve agricultural productivity on existing farmland to the extent feasible. These measures reduce the magnitude of the effects on farmland in a manner that is roughly proportionate to the level of impact that could occur, consistent with the guidance provided under Section 15126.4(a)(4) of the State CEQA Guidelines. In addition, as stated above in Response F-2, implementation of the FRLRP would benefit existing farmland in the RD 784 area by reducing the incidence of flooding and the associated adverse effects on farming operations during and after flood events. In the long term, this benefit would increase the overall productivity of agricultural lands in south Yuba County by minimizing crop losses from flooding. However, this benefit is not specifically identified as a mitigation measure in the DEIR, as it is simply a positive outcome of the proposed project. The increased flood protection provided by the project would likely do more to benefit agricultural lands in the region than would establishment of agricultural conservation easements in a limited area.

Response F-4

The commenter states that the DEIR does not contain a discussion of growth-inducing impacts. A detailed discussion of potential growth-inducing effects of the project is provided in Chapter 7, “Other CEQA-Required Sections,” under Section 7.1, “Growth-Inducing Effects.” This section of the document provides a description of how the flood control projects in this part of Yuba County, including the FRLRP, would remove an obstacle to growth once completed, and summarizes the nature of the environmental effects that are directly related to planned development projects in the area. In addition, Chapter 6 of the DEIR, “Cumulative Impacts,” describes the combined effects of past, current, and reasonably foreseeable future projects in the area. This chapter of the DEIR includes planned future projects that could move forward as a result, in part, of the successful completion of the FRLRP and other flood control projects in the region.

G

OFFICE OF THOMAS W. ERES
ATTORNEY AT LAW
4030 Winding Creek Road
Sacramento, CA 95864
Telephone 916-482-4021
Fax No. 916-488-5950

Via Facsimile: (530) 749-7312

September 18, 2006

Paul Brunner
ATTN: Three Rivers Levee
Improvement Authority
Government Center
915 Eighth Street, Suite 115
Marysville, CA 95901-5273

RE: Comments
DEIR-FRLRP

Dear Mr. Brunner:

I represent Hofman Ranch, a California general partnership, Emma Hofman and Frances Hofman. Please incorporate the comments in my letter of July 14, 2006, relating to the NOP, as part of the present comments regarding the DEIR-FRLRP.

1. The FRLRP is inextricably tied to the U. S. Army Corps of Engineers jurisdiction. Consequently, this DEIR should be processed in conjunction with NEPA as a combined EIR/EIS. As stated at Page 2-15, the proposed project involves the modification of a federal levee, and specifically will entail the requirement for a Section 408 permit. The Section 408 permit process is not discussed in this DEIR. Failure to integrate the CEQA/NEPA process at this time will likely result in wasted efforts/resources and a piecemeal evaluation. G-1

2. If the notion is that a set-back levee might be constructed as a virtual permanent "back-up levee," if no federal project is undertaken, then it should be analyzed as a separate Alternative. G-2

3. The DEIR needs to address the entire flood control system designed as part of the Sacramento River Flood Control Project. The FRLRP needs to be placed in the context of an integrated flood control/protection system to ensure impacts are analyzed in proper context for statewide, regional, sub-regional, and areawide perspective. Chapter 3 needs to be expanded and encompass how the purpose, need, and development will fit in a comprehensive flood control/protection system. This project is bigger than RD 784. Once again, G-3

request is made for a copy of the Sacramento River Flood Control Project, including the Bear River Levee System, in order to more adequately respond to this DEIR. G-3 Cont'd

4. FEMA released a Flood Insurance Study, Yuba County, California, including new preliminary 100-year flood-plain maps, dated August 4, 2006. This information needs to be evaluated in the DEIR. Additionally, the issue of "100" and "200" year protection impacts on health and safety needs to be adequately discussed and analyzed. G-4

5. The U. S. Army Corps of Engineers and the California Department of Water Resources have re-energized their respective levee inspection programs. The most recent inspection criteria and reports of those agencies should be included in the DEIR. G-5

6. The subject of levee performance issues is not adequately addressed. Questions of underseepage and through seepage risks need to be broadened and issues of freeboard, erosion, closure devices, levee penetrations, internal drainage, and operations and maintenance need to be expanded. G-6

7. The impact of the Bear River and Dry Creek modifications need to be addressed in the context of the modifications to the WPIC, Bear River set-back and Olivehurst Detention Basin. Have the impacts of high peak flow, storm event duration, channel capacity, cubic feet per second and weight been adequately reviewed in the context of the confluence of the Yuba on the Feather and the Bear relating to significant back flow? Of particular concern are the storm event impacts on tributaries such as Reeds Creek, Hutchison Creek, Best Slough, Dry Creek, Yankee Slough, and the WPIC. G-7

8. The Level of Design Detail and Preliminary Geotechnical Evaluation Sections (Pg. 4-7 and 4-8) need to be more adequately addressed in the context of the Project DEIR. There is too much deferral throughout the DEIR of the environmental impact to a later "detailed design process." G-8

9. Is a "2D" model reliable for purposes of the this DEIR? G-9

10. The summary statements at Pg. 5.3-28 and 5.3-29 are too vague and over-broad relating to assumptions as to who, what, when, and where will state and local districts address "these project deficiencies." G-10

11. The summary statements at Pg. 5.3-33 and 5.3-34 are too vague and over-broad relating to impacts on local drainage. Of critical concern is the issue of the direction and volume of flows from drainage with respect to local flooding from normal surface run-off and storm-water runoff. G-11

12. The issue of land development - creation of impervious surfaces needs to be expanded. No reference is made to Wheatland and its Updated General Plan that will directly impact surface run-off and storm run-off. Detention and/or retention basins have pumps that will directly impact the duration of peak flows and adversely impact both upstream and downstream properties, including impact on back-flow. G-12

13. Of major concern is the impact of improving only one side of a levee. The issue of impacts whether by "sheer stresses," shifting currents/scouring effect, or other components of pushing underseepage, through seepage, or erosion onto the opposite levee needs to be addressed as part of a "system impact" analysis. G-13

14. The RD 784 boundaries, with Yuba River to the north, Feather River to the west, Bear River to the south, and WPIC to the east, creates a significant issue of emergency evacuation routes in the event of levee failure or overtopping. This issue should be analyzed as part of the evaluation of alternatives. G-14

15. Much of the properties relating to Alternatives 2 and 3 are in private ownership. Between 1200 acres and 1600 acres will be impacted. The issue of feasibility of alternatives in the context of eminent domain need to be addressed. The potential adoption of a "Resolution of Necessity" may impact the analysis of alternatives. G-15

Thank you for the opportunity to comment.

Very truly yours,

Thomas W. Eres

cc: Hofman Ranch
Emma Hofman
Frances Hofman

COMMENTER G

THOMAS W. ERES, ATTORNEY AT LAW

Response G-1

Contrary to the statements in the comment, the DEIR acknowledges in several locations the role of the Corps in project authorization and implementation. In particular see pages 2-6, 2-9, 2-13, and 2-14 in Chapter 2, "Introduction," and pages 4-5, 4-23, and 4-24 in Chapter 4, "Description of the Proposed Project."

Regarding the potential need for a joint EIR/EIS, federal agencies with a role in funding, authorizing, and/or permitting the project, including the Corps, will decide the form for any potential future NEPA compliance documentation. As federal lead agency, the Corps has authority to determine whether an EIS or another form of NEPA compliance is needed to support Corps authorization for the FRLRP. However, TRLIA anticipates that the Corps will determine that an EIS is not required. For example, several flood control projects in the RD 784 area are either complete or under construction, and to date, the Corps has not required the preparation of an EIS. These projects have had environmental impacts of similar type and intensity as those associated with the FRLRP. It is the position of TRLIA that because the only Corps actions involve the issuance of resource oriented regulatory permits of a rather limited scale, as well as "certification" of the adequacy of the levee design, an EIS for the FRLRP is not merited, nor should it be required.

The current EIR does not limit a federal lead agency's discretion in preparing an EIS or other NEPA documentation (e.g., an environmental assessment [EA] and/or finding of no significant impact [FONSI]). However, if the Corps or another federal agency determines that an EIS is required, the current EIR prepared for the FRLRP was prepared using a format that could be used extensively to support EIS preparation. The FRLRP EIR evaluates three alternatives at an equal level of detail, an approach similar to that required for preparation of an EIS. Furthermore, the analysis prepared for the present FRLRP EIR is based on a comprehensive project description, which is designed to achieve the project objectives as presented in the introductory chapters of the EIR. The comprehensive project description provides the basis for an equally comprehensive analysis of project effects that generally exceeds the requirements of NEPA. The current EIR also includes a thorough analysis of cumulative and growth-inducing impacts that could also be applied to a NEPA evaluation. Thus, while TRLIA contends that and EIS should not be required for the FRLRP, most of the information that would otherwise be contained in an EIS is available for review in the present EIR.

Response G-2

The concept of a "backup levee" is described on page 4-5 of the DEIR. As stated in this discussion, "Until Corps authorization to remove the existing levee is received, it is possible that the existing levee in Segment 2 could be *temporarily retained* [emphasis added] in its current condition in addition to a setback levee being constructed. In this case, the setback levee would more appropriately be described as a "backup levee," as it would provide a second level of flood

protection behind the existing levee." As identified in the DEIR, TRLIA does not intend a setback levee to serve as a permanent backup levee. The discussion on page 4-5 only describes a potential temporary circumstance that would be dependant on the timing of state and federal authorizations for project activities. Evaluating the "backup levee" concept as a separate CEQA alternative is not warranted, in part because it would have all of the environmental effects of the proposed setback levee alignments without creating the hydrological benefits of a setback levee.

Response G-3

The commenter generally suggests that the proposed FRLRP is being designed and evaluated without consideration for its place in the planning and regulatory framework that encompasses the regional flood control system, which has been formed over decades by the Corps, DWR, The Reclamation Board, and at the local level by entities such as the Yuba County Water Agency and RD 784. To the contrary, the FRLRP has been designed based on careful study of the regional flood control system, and the subject EIR has been subject to review by federal and state agencies with direct roles in permitting the project.

The discussion under Section 2.4 of the FRLRP DEIR, "Project Consistency with Regional Flood and Floodplain Management Efforts," summarizes two major efforts over the past several years that have produced recommendations for regional flood and floodplain management activities in California. In 2002, efforts by the California Floodplain Management Task Force resulted in preparation of a report recommending implementation of floodplain management strategies designed to reduce flood losses and maximize the benefits of floodplains (California Floodplain Management Task Force 2002). Also in 2002, the Corps and The Reclamation Board prepared a comprehensive study that proposed a set of guiding principles to govern implementation of projects that would result in modifications to the Sacramento or San Joaquin River flood control systems (U.S. Army Corps of Engineers and State of California Reclamation Board 2002). The FRLRP has been designed to be consistent with these federal and state regional flood management efforts.

Section 5.3 of the DEIR, "Water Resources and River Geomorphology," includes a discussion of regulatory requirements for flood safety. Section 5.3.1 describes the Sacramento River Flood Control Project (SRFCP), which is a joint federal-state project that included development of a flood control plan for the Feather and Yuba Rivers. As described on pages 5.3-1 and 5.3-2 of the DEIR, "project" levees in California must meet standards for design and construction specified by the Corps in Engineering Manual 1110-2-1913 (U.S. Army Corps of Engineers 2000). The Reclamation Board enforces standards for the construction, maintenance, and protection of flood control facilities in the Central Valley. DWR oversees levee operation and maintenance. The FRLRP has been designed to be in compliance with all applicable standards, programs, and practices of the local, state, and federal agencies with responsibilities related to the SRFCP. Furthermore, federal and state agencies have reviewed the EIR and will be responsible for overseeing the permitting and certifying this flood control project.

The FRLRP has also been subject to review and scrutiny of numerous stakeholder groups, as discussed under Section 2.4.3, "Project Consistency." Refer also to Chapter 9 of the DEIR, "Consultation and Coordination," for a discussion of ongoing efforts by TRLIA (and previously

by YCWA) to engage the local community, stakeholders, and federal, state, and local agencies with interests and responsibilities in identifying solutions to flooding in the RD 784 area.

As discussed under Response B-1, the FRLRP is an element of the Y-FSFCP, which was subject to an environmental review process that included preparation of a programmatic DEIR in October 2003. The FEIR for the Y-FSFCP was certified and the program of elements approved by the YCWA Board in March 2004. The roles of agencies and entities that share responsibilities for flood control in the Yuba-Feather River system are described in further detail in the Y-FSFCP programmatic DEIR (Yuba County Water Agency 2003b).

Response G-4

Section 3.2.3 of the DEIR, "Flood Risks Along the Bear River and Western Pacific Interceptor Canal" describes the potential for FEMA to issue new Flood Insurance Rate Maps for the RD 784 area (see page 3-4). The potential for having the RD 784 area mapped in the 100-year floodplain is part of the motivation for implementation of the FRLRP and various YCWA, RD 784, and TRLIA projects in the RD 784 area. As stated on page 3-4 of the DEIR:

> "To avoid having RD 784 mapped into the FEMA 100-year floodplain, the RD 784 levees will need to be certified [note that the term "certified" has been changed to "accredited" in response to Comment Letter A from FEMA] as meeting current FEMA criteria. Consequently, YCWA, RD 784, and Yuba County, in consultation with many landowners and developers in the south county, elected to move aggressively on a program for evaluating options for achieving FEMA certification [note that the term "certification" has been changed to "accreditation" in response to Comment Letter A from FEMA] of RD 784 levees. One step was the formation of the Three Rivers Levee Improvement Authority (TRLIA), a joint powers authority composed of Yuba County and RD 784 that was formed to address funding and implementation of levee repairs for RD 784."

As identified in Section 3.1 of the DEIR, "Project Purpose and Objectives," one of the overall FRLRP project objectives is "to help secure FEMA certification [term changed to accreditation based in response to Comment Letter A] of the subject levee reaches." The release of the preliminary 100-year floodplain maps by FEMA, referenced by the commenter, only further verifies the need for the FRLRP anticipated in the DEIR. These preliminary maps do not alter the analysis or conclusions in the DEIR.

The commenter states in the last sentence of the comment that "Additionally, the issue of '100' and '200' year protection impacts on health and safety needs to be adequately discussed and analyzed." However, the comment does not identify where the analysis in the DEIR might be deficient or provide evidence that existing analyses related to health and safety are inadequate. Various health and safety issues are addressed throughout the DEIR, including Section 5.2, "Geology, Soils, and Mineral Resources" (seismic safety); Section 5.3, "Water Resources and River Geomorphology" (flood safety, hazardous materials); Section 5.11, "Transportation" (emergency vehicle access); and Section 5.12, "Public Services, Utilities, and Service Systems" (emergency vehicle access).

The DEIR does not address differences in project effects if 100-year flood protection were provided rather than 200-year protection because the TRLIA Board has established that providing 200-year flood protection is one of the overall project objectives for the FRLRP. As identified on page 3-1 of the DEIR, an objective of the FRLRP is "to secure flood protection for at least a flood event with a 0.5% (or 1-in-200) annual chance of exceedance." This project objective was adopted, in part, because of an expectation of The Reclamation Board, identified based on extensive coordination with the Board, that flood control projects in the RD 784 area would provide 200-year flood protection. A modified project, or project alternative, providing 100-year flood protection would neither meet the project objective specifically identified in the DEIR or the expectations of The Reclamation Board. In addition, if the FRLRP alternative were designed to provide 100-year flood protection, the physical project features would not differ substantially from the proposed project other than including levees with slightly different dimensions or design characteristics (e.g., depth and extent of slurry cutoff walls, size and number of stability berms, number of relief wells). Providing 100-year flood protection rather than 200-year protection would not avoid any significant impacts identified in the DEIR for the proposed project alternatives.

Response G-5

The commenter suggests that the most recent levee inspection criteria and reports from the Corps and DWR should be included in the DEIR. However, the commenter does not identify what the most recent criteria and reports might be, or identify references to older or out of date criteria or reports in the DEIR. Contrary to the comment, the most recent and applicable levee inspection criteria and reports are referenced in the DEIR.

As discussed in Section 4.1.2 of the DEIR, "General Levee Design Criteria," levees addressed in the FRLRP would be designed and constructed in accordance with standards and guidelines required by The Reclamation Board and the Corps. These standards and guidelines address inspection issues such as patrol road characteristics, inspection trenches, and access/inspection easements. As stated in Section 4.6.3 of the DEIR, "Operation and Maintenance," levee operation and maintenance "would be performed by RD 784 under the supervision of DWR."

Design, construction, operation, and maintenance of FRLRP levees will be conducted in close coordination with DWR, The Reclamation Board, and the Corps. Any applicable agency regulations, guidelines, or criteria in affect at the time the levees are designed and subjected to approval and certification/accreditation would be implemented. Any recent updates to existing agency inspection criteria or reports would not alter the analysis or conclusions in the FRLRP EIR.

Response G-6

The commenter suggests that levee performance issues are not adequately addressed in the DEIR, but gives no indication of where the information provided in the DEIR is inadequate.

Section 4.1.2 beginning on page 4-5 of the DEIR, "General Levee Design Criteria," describes state and federal standards and criteria that are applicable to levee design in general. The first paragraph under Section 4.1.2 describes applicable regulatory standards for the Corps and The

Reclamation Board for levee design and construction. Additional prescriptive standards are described for minimum levee cross-sectional dimensions, construction material types, and compaction levels. The second paragraph under Section 4.1.2 states:

> "These requirements provide the basis for the design of the setback levee in FRLRP Segment 2 included in project Alternatives 2 and 3 (i.e., the ASB setback levee alignment and the intermediate setback levee alignment). Where these requirements can be applied to the existing Feather River and Yuba River levees in the project area, compliance or noncompliance with these requirements forms the basis for identifying needed repairs to levee segments to be improved in place under project Alternatives 1, 2, and 3."

It is important to note that the FRLRP is being designed to be consistent with applicable state and federal laws, regulations, and guidelines for levee design and construction. These include laws, regulations, and guidelines pertinent to underseepage, through-seepage, freeboard, erosion, closure devices, levee penetrations, internal drainage, operations, and maintenance. Levees included in any of the three FRLRP alternatives would meet performance standards required by the Corps, DWR, The Reclamation Board, RD 784, and other agencies with jurisdiction over the design, construction, operation, and maintenance of the levees.

Section 4.1.3 of the DEIR, "Level of Design Detail," includes the following statements: "The general levee design criteria described above form the basis of the preliminary project design." "The structural features of the proposed levee repairs and of the setback levee included in Alternatives 2 and 3 have been developed to a level of detail sufficient for a complete 'project-level' environmental analysis." This approach is consistent with Section 15124 of the State CEQA Guidelines addressing requirements for a complete and adequate project description. Also see Response G-8 below.

Further discussion under Section 4.1.3 of the DEIR acknowledges that the preliminary design concepts are based on conservative assumptions pending collection and analysis of additional data. Section 4.1.3 also includes this statement: "Additional field data would be obtained during detailed design, which would include review by a Board of Senior Consultants (BOSC)." (See the full discussions under Sections 4.1.2, 4.1.3, and 4.1.4 on pages 4-5, 4-6, 4-7, and 4-8 of the DEIR.) See also the discussion at the beginning of Section 5.3 of the DEIR, "Water Resources and River Geomorphology," which addresses the responsibilities of agencies for the system of "project" levees within the SRFCP, including those that are the subject of this EIR. Also see Response G-3 above.

The impact analyses throughout the DEIR are based on a complete and comprehensive project description. The corresponding mitigation measures for potentially-significant impacts are conservative to account for the preliminary nature of geotechnical data for the project. The mitigation measures are also designed to be flexible enough to encompass a range of conditions.

Response G-7

A hydraulic and hydrologic analysis was prepared by MBK Engineers to assess the effects of each of the FRLRP alternatives on upstream and downstream flow volumes and water surface profiles during flood events. This analysis is reproduced in Appendix B of the DEIR and was

used to support the assessment of hydraulic and hydrologic impacts in the DEIR. As described on page 1 and shown in Figure 1 of the analysis (to be identified in the remainder of this response as "Appendix B"), the hydraulic model encompasses the Feather River between Oroville Dam to the north and the confluence with the Sacramento River in the south, a portion of the Sacramento River, and tributaries feeding the Feather River including Honcut Creek, the Yuba River, and the Bear River. Tributaries to the Bear River, including Dry Creek, Yankee Slough, and the WPIC, are also included. Storm event parameters used in the model are based on model inflows developed by the Corps (see page 6 of Appendix B).

Although modeling results were generated for a variety of flood events, the hydraulic and hydrologic analysis in Appendix B focuses on project effects during the 1-in-100 and 1-in-200 AEP events. During these peak flows, data are provided on flow volumes and elevations of the post-project flood stage. As identified on page 10 of Appendix B and page 5.3-29 of the DEIR, FRLRP Alternative 1 retains the existing levee configuration in the project area, and in effect, represents a continuation of existing conditions. Therefore, implementation of Alternative 1 would not alter existing conditions relative to hydraulics, hydrology, flood stage elevations, flood stage flow volumes, weight of water passing through waterways, channel capacity, or other factors.

Impacts ASB-5.3-c and IS-5.3-c in the DEIR evaluate the effects on flood hydrology upstream of the ASB Setback Levee (Alternative 2) and Intermediate Setback Levee (Alternative 3) respectively. In both cases, the presence of a setback levee results in reduced flood stage elevations upstream of Star Bend in the range of 1.0 to 1.6 feet depending on the severity of the flood event (1-in-100 AEP or 1-in-200 AEP) and the project alternative. These reductions in flood stage elevations would result in a beneficial effect relative to hydraulics, hydrology, flood stage flow volumes, weight of water passing through waterways, channel capacity, and other factors. These benefits extend to the confluence with the Yuba River and upstream into the Yuba River channel (see Tables 7 and 8 in Appendix B).

Impacts ASB-5.3-d and IS-5.3-d, addressing Alternative 2 and Alternative 3 respectively, evaluate the effects of these alternatives on flood hydrology downstream of the setback area. As identified in the DEIR, increases in downstream flood stage elevation associated with the two setback levee alternatives would range from 0.02 foot (0.24 inch) to 0.08 foot (0.96 inch) depending on the alternative and severity of the flood event (1-in-100 AEP or 1-in-200 AEP). These increases would only occur in the Feather River segment between the downstream end of the setback levee and the Bear River. Below the Bear River there would be no measurable increase in flood stage elevation. As shown in Tables 9 and 10 in Appendix B, increases in downstream flood flow volumes would range from 0.02% to 0.62% depending on the alternative and severity of the flood event.

As identified in the DEIR, the stage for the design flow would remain below the project design stage (1957 profile) for the entire Feather River reach downstream of the setback levee, even with the increases identified by the hydraulic modeling. In addition, implementation of the planned F-CO of Lake Oroville and New Bullards Bar Reservoirs included as part of the Y-FSFCP would further reduce the minor increases in downstream flood-stage elevations identified in the hydraulic modeling. For these reasons, under the two setback levee alternatives, the potential impact on flood hydrology associated with the anticipated minor increases in

downstream flood-stage elevations is considered less than significant. This less-than-significant conclusion would apply to all areas related to flood stage elevations, including weight of water on levees and potential to generate backflow where rivers converge.

Response G-8

Section 15124 of the State CEQA Guidelines addresses the required contents for a project description in an EIR, and this section of the guidelines opens with the statement: "The description of the project shall contain the following information but should not supply extensive detail beyond that needed for evaluation and review of the environmental impact." The guidelines further specify that a project description shall contain: "A general description of the project's technical, economic, and environmental characteristics, considering the principal engineering proposals if any and supporting public service facilities." (State CEQA Guidelines Section 15124[c]).

The "general description" requirement is consistent with other CEQA mandates to make an EIR a user-friendly document. Section 15004 of the State CEQA Guidelines addresses the importance of determining the right time to address CEQA compliance for a project, and provides that an EIR should be prepared as early as feasible in the planning process to enable environmental considerations to be integrated into project conceptualization, design, and planning (State CEQA Guidelines Section 15004[b]). In other words, the State CEQA Guidelines allow for some flexibility in the content and scope of a project description, so that the process for evaluating the environmental effects of the project can influence detailed project design and planning necessary for project implementation. The primary requirement is that the level of detail in a project description in an EIR provides sufficient information to understand the significant adverse environmental impacts of the project.

To balance the above principles with the goal of providing sufficient information in an EIR to understand and control significant adverse impacts, CEQA provides that mitigation measures tailored to the general details of a project may specify performance standards that would mitigate the significant effect of the project and that may be accomplished in more than one specified way (State CEQA Guidelines Section 15126.4[a][1][B]). As long as performance standards are enforceable (e.g., through implementation of a Mitigation Monitoring and Reporting Program), CEQA recognizes that mitigation measures may encompass a range of actions. In other words, CEQA acknowledges and expects that all the details of a project may not be available when an EIR is prepared. Therefore, mitigation measures do not need to focus exclusively on specific modifications to the project description, but can be based on general performance standards that can be applied across a range of potential specific project implementation approaches.

Where appropriate, the FRLRP DEIR has been prepared consistent with this approach. For example, Section 5.5 of the DEIR, "Terrestrial Biological Resources," specifies thresholds of significance and mitigation measures that are based, in part, on performance standards of the California Department of Fish and Game and the U.S. Fish and Wildlife Service. Particular mitigation measures are designed to avoid, minimize, or reduce potential impacts to sensitive habitats and special-status plants, and to protect wildlife species that are expected to occur in the project area. These mitigation measures would be applicable throughout implementation of the

FRLRP, and the adequacy or applicability of these measures is not contingent upon the final engineering design specifications of this project.

The commenter states that, "There is too much deferral throughout the DEIR of the *environmental impact* [emphasis added] to a later detailed design process." It is important to note that no impact conclusion presented in the FRLRP DEIR was deferred to a later time. On the contrary, the discussions of impacts throughout the document carefully describe the anticipated impacts based on current engineering design criteria, hydrologic data, and geotechnical studies. Furthermore, the mitigation measures that are proposed to reduce the effects of significant environmental impacts are detailed, comprehensive, in compliance with current agency requirements and standards, and provide enforceable performance standards.

Based on this information, the conclusion in Section 4.1.3 of the DEIR, "Preliminary Geotechnical Evaluation" stating "The structural features of the proposed levee repairs and of the setback levee included in Alternatives 2 and 3 have been developed to a level of detail sufficient for a complete 'project-level' environmental analysis," is considered correct and accurate.

Response G-9

Hydraulic effects of the ASB setback levee and intermediate setback levee alignments proposed for project Segment 2 of the FRLRP were evaluated based on modeling results of the Hydrologic Engineering Center-River Analysis System (HEC-RAS) model, which was developed by the Corps for the Lower Feather River Floodplain Mapping Study and calibrated by the Corps to the January 1997 flood event. HEC-RAS is capable of modeling subcritical, supercritical, and mixed-flow regime water-surface profiles. The basic computational procedure is based on the solution of the one-dimensional energy equation. The HEC-RAS model was refined and re-calibrated by MBK Engineers to better reflect anticipated FRLRP project conditions for Alternative 2 or Alternative 3. Refer to Appendix B of the DEIR, "Hydraulic and Hydrologic Analysis," for further explanation. HEC-RAS is considered to be a state-of-the-art model that has provided a reliable basis for the analysis of impacts contained in the FRLRP EIR. An appropriate 2D model, calibrated to local conditions, could similarly function as a reliable model for purposes of the DEIR.

Response G-10

The comment relates to a description of the hydraulic modeling "Without Project" condition provided at the bottom of page 5.3-28 and the top of page 5.3-29 in the DEIR. In the modeling, the flood control system was assumed to match existing conditions, with the exception of "a few locations along the Bear River and Yankee Slough where data show that the levees are below the 1957 design criteria." It was assumed in the hydraulic modeling that in these locations the levees met the 1957 design profile (although at this time they do not) because by law the state and local districts responsible for these levees must restore them to the specified design elevations. A similar description of this assumption methodology is provided on page 8 of Appendix B.

This approach to the existing condition was used to ensure that simulations of hydraulic impacts from the FRLRP project were not underestimated. The hydraulic model assumes levee failure only by overtopping. This is a conservative approach in that it ensures maximum water volumes

remain in the river channels during flood events. In reality, levees in some areas could potentially breach before being overtopped, allowing flood waters to leave the river system and reducing flood stage elevations downstream. If portions of the Bear River and Yankee Slough levees that do not meet 1957 design profiles were assumed to remain in this state in the hydraulic model, they would be more prone to overtopping and levee failure in the model. Therefore, the hydraulic model could produce artificially low flood stage elevations downstream of these areas, and impacts attributable to the FRLRP could be underrepresented.

However, because by law the state and local districts responsible for the levee segments in question must restore them to the specified design elevations, it is reasonable to assume that restoration of these levee segments will occur within the life of the FRLRP. Therefore, it is appropriate for the hydraulic model to incorporate this condition into assumptions regarding the existing condition. This approach ensures that the hydraulic model includes maximum flows in the flood control system, and therefore is more sensitive to any potential increases in flows that might be attributable the FRLRP.

Response G-11

The commenter refers to the discussion of Impact ASB-5.3-b on pages 5.3-33 and 5.3-34 of the DEIR. This discussion relates to the potential impact the ASB Setback Levee alternative would have on local surface water and stormwater runoff patterns. The commenter characterizes this discussion as "summary statements." This characterization is incorrect. The discussion of Impact ASB-5.3-b provides a description of the alternative's potential affects on local drainage that sufficiently explains the nature of the impact, assesses the severity of the impact, and complies with the requirements of Sections 15126 and 15126.2 of the State CEQA Guidelines relating to the consideration and discussion of environmental impacts.

Impact ASB-5.3-b identifies that as part of this alternative "relocating drainage features and modifying the direction or volume of flows in parts of the drainage system could cause or exacerbate local flooding from normal surface runoff or stormwater runoff, this impact would be significant." This conclusion appears to be consistent with the concerns expressed by the commenter. Because the impact is considered significant in the DEIR, the addition of more detailed information further describing the project effects would not alter the impact conclusion.

Mitigation Measure ASB-5.3-b provides performance criteria to ensure the ASB setback levee does not adversely affect local drainage conditions. The mitigation measure calls for relocation or modification of existing drainage facilities "and construction of new facilities, as needed, to ensure *equivalent functioning of the system* [emphasis added] during and after construction of the setback levee." The mitigation measure also requires that TRLIA "consider the continuing and proposed uses of the levee setback area and shall incorporate appropriate drainage requirements for those uses to *prevent any unintended flooding from stormwater runoff* [emphasis added]." Section 15097 of the State CEQA Guidelines requires TRLIA to adopt and implement a Mitigation Monitoring and Reporting Program (MMRP) to ensure that mitigation measures identified in the DEIR are implemented. If a setback levee alternative is adopted by TRLIA, the commenter's concerns regarding local flooding from surface runoff and stormwater runoff would be addressed via implementation of mitigation measures included in the DEIR and assurances regarding implementation of these measures included in CEQA's requirement for an MMRP.

Response G-12

The commenter suggests that the cumulative impacts analysis for the FRLRP did not consider the combined effects of surface runoff and stormwater runoff from nearby communities that contribute to stormwater flows in the Yuba River basin. In particular, the commenter states that the FRLRP EIR did not address the impacts of anticipated surface water runoff from planned development in the City of Wheatland General Plan (City of Wheatland 2006). It is important to note that local jurisdictions are required to address the impacts of development on storm drainage and flood control systems to avoid effects that could lead to localized flooding or that could contribute to regional flood effects during severe storm events. For example, the City of Wheatland General Plan includes several policies that address stormwater management:

- **Policy 5.E.1.** The City shall prepare a Storm Drainage Master Plan and Flood Protection Master Plan to assure adequate protection for residents and property.

- **Policy 5.E.2.** The City shall encourage project designs that minimize drainage concentrations and impervious coverage.

- **Policy 5.E.3.** The City shall prohibit grading activities during the rainy season, unless adequately mitigated, to avoid sedimentation of storm drainage facilities.

- **Policy 5.E.5.** The City shall require projects that have significant impacts on the quantity and quality of surface water runoff to incorporate mitigation measures for impacts related to urban runoff.

- **Policy 5.E.9.** The City shall require detention storage with measured release to ensure that the capacity of downstream creeks and sloughs will not be exceeded. To ensure downstream capacity is not exceeded, the following measures will be applied:

    a. outflow to creeks and sloughs shall be monitored and controlled to avoid exceeding downstream channel capacities, and

    b. storage facilities shall be coordinated and managed to prevent problems caused by timing of storage outflows.

- **Policy 5.E.10.** The City shall require the preparation of watershed drainage plans for proposed developments. These plans shall define needed drainage improvements and estimate construction costs for these improvements.

The General Plan identifies Implementation Program 5.9, which requires the City of Wheatland to "prepare and adopt a Stormwater and Flood Protection Ordinance to implement the updated Storm Drainage and Flood Protection Master Plan to address stormwater runoff and flood protection." This implementation measure is targeted for the current year, 2006–2007 (City of Wheatland 2006).

These policies in the Wheatland General Plan support the cumulative impact conclusion on page 6-27 in the DEIR regarding increased runoff due to increased impervious surfaces from development.

> "However, these developments are required to mitigate these increases in runoff through the construction and operation of detention basins. Any increase in runoff volumes from these developments that reaches the surrounding rivers during storm events would be a minor incremental contribution to river flows and would not result in a significant cumulative impact."

Therefore, although regional development may result in a cumulative increase in impervious surface, and a related increase in stormwater runoff potential, mitigation requirements for individual projects would prevent a substantial cumulative increase in stormwater flows into the nearby river systems. No significant cumulative adverse effect on flood control systems would occur. This conclusion is supported by information included in Section 5.3 of the DEIR, "Water Resources and River Geomorphology." The SRFCP includes Corps-specified design capacities for channels in the project area (page 5.3-13 of the DEIR). During severe storm events, the contribution of runoff to the Yuba River basin from pumping and other uncontrolled runoff is negligible when compared to the volume of water that the system is designed to handle. Therefore, not only are local jurisdictions required to mitigate the impacts of development on storm drainage and flood control systems, the effects of pumping during severe storm events do not result in cumulatively considerable contributions to the system.

Response G-13

The commenter questions whether the DEIR evaluates the effects of the proposed project on levees on the Sutter County side (right or west side) of the Feather River. Impacts ASB-5.3-c and IS-5.3-c evaluate the effects of reduced flood stage elevations upstream of the ASB Setback Levee and Intermediate Setback Levee alternatives respectively. In both cases, the beneficial effects of reduced upstream flood stage elevations resulting from construction of a setback levee would benefit both sides of the river. By default, if flood stage elevations are reduced in a river, those reductions occur along both river shorelines (whether natural shorelines or levees). There is not a need in the DEIR to expressly identify that this benefit applies to levees on both the left and right sides of the river.

Similarly, the slight increases in flood stage elevations downstream of the setback levee identified under Impacts ASB-5.3-d and IS-5.3-d must occur on both sides of the river. There is not a need to expressly identify that these increases occur on both the Yuba County side of the Feather River and the Sutter County side. As identified in the DEIR, increases in downstream flood-stage elevation associated with the two setback levee alternatives would range from 0.02 foot (0.24 inch) to 0.08 foot (0.96 inch) depending on the alternative and severity of the flood event (1-in-100 AEP or 1-in-200 AEP). These increases would only occur in the Feather River segment between the downstream end of the setback levee and the Bear River. Below the Bear River there would be no measurable increase in flood stage elevation.

As identified in the DEIR, the stage for the design flow would remain below the project design stage (1957 profile) for the entire Feather River reach downstream of the setback levee, even with the increases identified by the hydraulic modeling. Again, this implicitly applies to both sides of the river. In addition, implementation of the planned F-CO of Lake Oroville and New Bullards Bar Reservoirs included as part of the Y-FSFCP would further reduce the minor increases in downstream flood stage elevations identified in the hydraulic modeling. For these

reasons, under the two setback levee alternatives, the potential impact on flood hydrology associated with the anticipated minor increases in downstream flood-stage elevations is considered less than significant. This conclusion applies to both the Yuba County and Sutter County sides of the Feather River. Any minor increases in flood stage elevations associated with Alternatives 2 and 3 also would not be sufficient to alter underseepage or through-seepage on Feather River levees on either the Yuba County or Sutter County sides of the river.

Impacts ASB-5.3-j and IS-5.3-j evaluate the potential for alterations in water velocities, depths, currents, sheer stresses, and geomorphic processes (e.g., scouring effects, erosion) resulting from the levee setback alternatives to adversely affect levees upstream, downstream, and within the setback area. The impact analysis is based on the results of the *Geomorphic Assessment of Project Alternatives for Feather River Levee Improvements Between the Bear and Yuba Rivers*, prepared by PWA Associates Ltd. (PWA) and included in Appendix C of the DEIR. As identified in the PWA report and the discussions of Impacts ASB-5.3-j and IS-5.3-j, both the right and left banks of the Feather River are considered in the analysis. Therefore, the potential for alterations in water velocities, depths, currents, sheer stresses, and geomorphic processes (e.g., scouring effects, erosion) resulting from the levee setback alternatives to affect levees on the Sutter County side of the Feather River is evaluated in the DEIR.

Alternative 1, The Levee Strengthening Alternative, does not alter the location of existing levees and therefore would not change flood stage elevations, water velocities, water depths, currents, sheer stresses, or geomorphic process relative to existing conditions. Therefore, this alternative would not have the potential to affect Feather River levees on either side of the river via these mechanisms.

Response G-14

None of the FRLRP alternatives would alter or impede any established emergency evacuation routes used in the event of levee failure or overtopping. Residents or businesses on the river side of the setback levee under Alternatives 2 and 3 would be relocated out of the setback area. Therefore, the setback levee would not create an impediment to evacuation of people in the setback area. None of the FRLRP alternatives include development of any residents, businesses, or other facilities that would place additional people in the RD 784 area. Therefore, the project would not result in additional people that might require emergency evacuation. All FRLRP alternatives would improve flood protection in the RD 784 area. Therefore, the project would reduce the frequency of flood events and minimize the need to utilize emergency evacuation routes in the event of a levee failure or overtopping. Consideration of emergency evacuation routes would not affect the evaluation of alternatives in the DEIR and does not need to be addressed further.

Response G-15

CEQA Guidelines Section 15126.6(a) states that an EIR “must consider a reasonable range of potentially feasible alternatives that will foster informed decision making and public participation.” Note that the guidelines call for “potentially feasible alternatives.” CEQA does not require an unequivocal confirmation that each alternative considered in an EIR could be

feasibly implemented; in fact, it is common that all aspects of an alternative that relate to the determination of feasibility are not known until after completion of the EIR..

The commenter identifies eminent domain and a "Resolution of Necessity" as issues that should be considered regarding the feasibility of the Alternatives 2 and 3, both of which involve the construction of a setback levee. If Alternative 2 or Alternative 3 were selected by TRLIA, appropriate compensation would be negotiated with landowners affected by the setback levee and the placement of lands in the setback area. Where appropriate compensation could not be negotiated, eminent domain could be used as a means to allow TRLIA to acquire lands necessary for project implementation.

Use of eminent domain requires a Resolution of Necessity. A Resolution of Necessity must include a declaration that the governing body of the public entity (in this case the TRLIA Board) has found and determined that the proposed project is planned and located in a manner that will be most compatible with the greatest public good and the least private injury (California Code of Civil Procedure Section 1245.230[c]). Alternatives 2 and 3 provide regional flood control benefits by reducing upstream flood stage elevations in the Feather and Yuba Rivers, including portions of the rivers passing through the urbanized Marysville/Yuba City area (see Section 5.3 of the DEIR, "Water Resources and River Geomorphology"). These benefits are not provided by Alternative 1, which does not include a setback levee. Therefore, a reasonable argument can be made that Alternatives 2 and 3 provide the greatest public good with the least private injury, and land acquisition via eminent domain could be achieved if necessary.

Looking strictly at feasibility of these alternatives relative to eminent domain and a Resolution of Necessity, these alternatives would be considered "potentially feasible" per the requirements of CEQA. Although further evaluation may ultimately identify one or both of these alternatives as infeasible based on cost, effects of land acquisition on schedule, or other factors, there is no indication at this time that these alternatives should not continue to be considered in the FRLRP EIR.

STATE OF CALIFORNIA

Governor's Office of Planning and Research

State Clearinghouse and Planning Unit

Arnold Schwarzenegger
Governor

Sean Walsh
Director

September 19, 2006

RECEIVED

SEP 25 2006

TRLIA

Paul Brunner
Three Rivers Levee Improvement Authority
Government Center
915 8th Street, Suite 115
Marysville, CA 95901-5273

Subject: Feather River Levee Repair Project
SCH#: 2006062071

Dear Paul Brunner:

The State Clearinghouse submitted the above named Draft EIR to selected state agencies for review. On the enclosed Document Details Report please note that the Clearinghouse has listed the state agencies that reviewed your document. The review period closed on September 18, 2006, and the comments from the responding agency (ies) is (are) enclosed. If this comment package is not in order, please notify the State Clearinghouse immediately. Please refer to the project's ten-digit State Clearinghouse number in future correspondence so that we may respond promptly.

Please note that Section 21104(c) of the California Public Resources Code states that:

> "A responsible or other public agency shall only make substantive comments regarding those activities involved in a project which are within an area of expertise of the agency or which are required to be carried out or approved by the agency. Those comments shall be supported by specific documentation."

These comments are forwarded for use in preparing your final environmental document. Should you need more information or clarification of the enclosed comments, we recommend that you contact the commenting agency directly.

This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act. Please contact the State Clearinghouse at (916) 445-0613 if you have any questions regarding the environmental review process.

Sincerely,

Terry Roberts

Terry Roberts
Director, State Clearinghouse

Enclosures
cc: Resources Agency

1400 TENTH STREET P.O. BOX 3044 SACRAMENTO, CALIFORNIA 95812-3044
TEL (916) 445-0613 FAX (916) 323-3018 www.opr.ca.gov

STATE OF CALIFORNIA

Governor's Office of Planning and Research

State Clearinghouse and Planning Unit

Arnold Schwarzenegger
Governor

Sean Walsh
Director

RECEIVED

SEP 29 2006

TRLIA

September 28, 2006

Paul Brunner
Three Rivers Levee Improvement Authority
Government Center
915 8th Street, Suite 115
Marysville, CA 95901-5273

Subject: Feather River Levee Repair Project
SCH#: 2006062071

Dear Paul Brunner:

The enclosed comment (s) on your Draft EIR was (were) received by the State Clearinghouse after the end of the state review period, which closed on September 18, 2006. We are forwarding these comments to you because they provide information or raise issues that should be addressed in your final environmental document.

The California Environmental Quality Act does not require Lead Agencies to respond to late comments. However, we encourage you to incorporate these additional comments into your final environmental document and to consider them prior to taking final action on the proposed project.

Please contact the State Clearinghouse at (916) 445-0613 if you have any questions concerning the environmental review process. If you have a question regarding the above-named project, please refer to the ten-digit State Clearinghouse number (2006062071) when contacting this office.

Sincerely,

Terry Roberts

Terry Roberts
Director, State Clearinghouse

Enclosures
cc: Resources Agency

1400 TENTH STREET P.O. BOX 3044 SACRAMENTO, CALIFORNIA 95812-3044
TEL (916) 445-0613 FAX (916) 323-3018 www.opr.ca.gov

California Home Thursday, N

Feather River Levee Repair Project

SCH Number: 2006062071

Type: EIR - Draft EIR

Project Description

TRLIA is proposing the Feather River Levee Repair Project, an element of the Yuba-Feather Supplemental Flood Control Project, to i protection in the Reclamation District (RD) 784 area of Yuba County. RD 784 is bounded by the Yuba River on the north, the Feather west, the Bear River on the south, and the Western Pacific Interceptor Canal on the east. The project would address identified deficie Feather River levee, and would make related improvements to the Yuba River levee near its confluence with the Feather River. It wou strengthening the existing Feather River left (east) bank levee from Project Levee Mile (PLM) 13.3 to PLM 17.1 and from PLM 23.6 to strengthening the existing Yuba River left (south) bank levee from the confluence with the Feather River (PLM 0.0) upstream to PLM (of the Feather River left bank levee between PLM 17.1 and PLM 23.6 would be either strengthened in its current location or set back t two possible alignment scenarios.

Project Lead Agency

Three Rivers Levee Improvement Authority

Contact Information

Primary Contact:
Paul Brunner
Three Rivers Levee Improvement Authority
(530) 749-5679
Government Center
915 8th Street, Suite 115
Marysville, CA 95901-5273

Project Location

County: Yuba
City: Marysville, Yuba City
Region:
Cross Streets: State Route 70 / Feather River Boulevard
Parcel No:
Township: 13-15N
Range: 3E, 4E
Section: Multip
Base: MDBM
Other Location Info:

Proximity To

Highways: 70
Airports: Yuba County Airport
Railways: Western Pacific
Waterways: Yuba and Feather Rivers
Schools: Alicia Intermediate and Notre Dame HS
Land Use: Valley Agriculture, Exclusive Agricultural

Development Type

Other

Local Action

Other Action

Project Issues

Agricultural Land, Air Quality, Archaeologic-Historic, Biological Resources, Cumulative Effects, Drainage/Absorption, Flood Plain/Floo Geologic/Seismic, Growth Inducing, Landuse, Noise, Public Services, Recreation/Parks, Soil Erosion/Compaction/Grading, Toxic/Haz Traffic/Circulation, Vegetation, Water Quality, Wetland/Riparian, Wildlife, Aesthetic/Visual

---

Reviewing Agencies (Agencies in **Bold Type** submitted comment letters to the State Clearinghouse)

Resources Agency; Regional Water Quality Control Bd., Region 5 (Sacramento); Department of Parks and Recreation; Native Americ Commission; Office of Historic Preservation; Office of Emergency Services; Department of Fish and Game, Region 2; **Department of Resources**; Department of Conservation; California Highway Patrol; **Caltrans, District 3**; Caltrans, Division of Aeronautics; Reclama Lands Commission

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Date Received: 8/3/2006 **Start of Review:** 8/4/2006 **End of Review:** 9/18/2006

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CHAPTER 3 CORRECTIONS AND UPDATES TO THE DRAFT EIR

This chapter lists editorial text corrections to the draft environmental impact report (DEIR). The listed changes are being made in response to comments on the DEIR. These changes do not alter any of the analysis or conclusions presented in the DEIR. Text deletions are shown with ~~strikethrough~~, and additions are shown with double underline.

3.1 CHANGES TO THE DEIR IN RESPONSE TO COMMENTS FROM FEMA – COMMENT LETTER A

Chapter 2 of the DEIR, "Introduction," provides listings and descriptions of agency roles and responsibilities for the project. In the comment letter submitted by FEMA, the agency commented that FEMA was not listed as one of the agencies that have a role in the project. In response to Comment A-2, Section 2.7.3 near the bottom of page 2-14 has been revised to describe the role of FEMA:

2.7.3 FEDERAL AGENCIES WITH PERMITTING/APPROVAL AUTHORITY

- U.S. Army Corps of Engineers: Permitting under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act for discharge of fill into waters of the United States or work in, on, or under navigable waters of the United States; approval of project levee modifications/setback and setback levee design; federal lead agency for the Yuba River Basin Project, which could incorporate the FRLRP as an element

- U.S. Fish and Wildlife Service: Federal Endangered Species Act (ESA) consultation and incidental take authorization

- National Marine Fisheries Service: ESA consultation and possible incidental take authorization

- Federal Emergency Management Agency: accreditation of FRLRP levees as providing protection against the 1% annual chance flood as part of flood hazard mapping activities. Refer to Chapter 3, "Project Purpose, Need, and Development," for further discussion of FEMA's participation in flood hazard mapping activities, and the process followed by local jurisdictions to meet FEMA mapping criteria, in accordance with Title 44 of the Code of Federal Regulations (CFR) Section 65.10.

In the comment letter submitted by FEMA, the agency clarified that FEMA does not certify levees, rather, FEMA accredits levees that are recognized in flood hazard mapping activities. In response to Comment A-4, several changes have been made to various chapters and sections of the DEIR to correctly reflect FEMA's floodplain management responsibilities:

The second bulleted point under Section 1.2 on page 1-1 in Chapter 1, "Summary," is modified as follows:

> The purpose of the proposed FRLRP is to correct deficiencies in the left (east) bank levees of the Feather and lower Yuba Rivers, and consequently to improve flood protection for the RD 784 area in Yuba County. The overall objectives of the project are:
>
> - to secure flood protection for at least a flood event with a 0.5% (or 1-in-200) annual chance of exceedance,
> - to help secure Federal Emergency Management Agency (FEMA) ~~certification~~accreditation of the subject reaches of levee,
> - to avoid increasing downstream flow and stage during peak-flow conditions,
> - to achieve these objectives as soon as possible, and
> - to incorporate environmental mitigation as appropriate.

The fourth and fifth paragraphs under Section 2.2 on page 2-2 in Chapter 2, "Introduction," are modified as follows:

> In 2003, while YCWA was finishing its first level of Y-FSFCP studies of a select group of flood control elements, the U.S. Army Corps of Engineers (Corps) in a separate effort identified several deficiencies in the Bear River and WPIC levees that prevent these levees from meeting the Federal Emergency Management Agency (FEMA) requirements for accreditation ~~criteria~~ for the purpose of providing protection from a 100-year flood event. In addition, it was found that a 2,800-foot stretch of the Yuba River levee on the upstream side of State Route (SR) 70 does not meet slope stability requirements.
>
> Since 2003, various studies have been completed by Reclamation District (RD) 784, YCWA, TRLIA, the Corps, and others to determine necessary actions for RD 784 levees to meet current FEMA ~~criteria~~accreditation requirements. Based on the results of these studies, flood control improvements were planned to be implemented in several phases. Priority was given to implementing improvements to the Yuba River levee above SR 70 (Phase 1); improvements to the upper Bear River, WPIC, and Yuba River levees, and the Olivehurst detention basin (Phase 2); and construction of a setback levee along the lower Bear River, tying into the Feather River levee just below Clark Slough (Phase 3). These projects are either completed or under construction. In November 2004, the EIR for the Feather-Bear Rivers Levee Setback Project (F-BRLSP) (Phase 3) was certified and construction was initiated in 2005. This project precludes the need to improve the Feather River left bank levee below Pump Station No. 2.

The second paragraph and the second bulleted point under Section 3.1 on page 3-1 in Chapter 3, "Project Purpose, Need, and Development," are modified as follows:

> The primary purpose of the proposed project is to correct identified deficiencies in the left bank levees of the Feather and Yuba Rivers, and consequently to improve flood

protection for the RD 784 area of Yuba County. To a large extent, levee deficiencies in the project area relate to the potential for water to seep under (underseepage) and through (through-seepage) the levee soils during flood events, potentially leading to levee failure. The project design objectives focus on measures to bring the levees into compliance with Federal Emergency Management Agency (FEMA) geotechnical ~~certification~~ requirements for underseepage or through-seepage, as well as engineering and design standards of the State of California Reclamation Board (The Reclamation Board) and the U.S. Army Corps of Engineers (Corps). The proposed project is also intended to address areas along the Feather River levee where erosion of the levee is a concern. These specific project design objectives are consistent with the following overall project objectives:

- ▸ to secure flood protection for at least a flood event with a 0.5% (or 1-in-200) annual chance of exceedance,
- ▸ to help secure FEMA ~~certification~~accreditation of the subject reaches of levee,
- ▸ to avoid increasing downstream flow and stage during peak-flow conditions,
- ▸ to achieve these objectives as soon as possible, and
- ▸ to incorporate environmental mitigation as appropriate.

The four paragraphs under Section 3.2.3 beginning at the bottom of page 3-3 and continuing on page 3-4 in Chapter 3 are modified as follows:

In May 2003, while YCWA was completing this first level of Y-FSFCP studies, the Corps, in a separate draft floodplain mapping study for DWR on the Feather River and its tributaries, identified several deficiencies in freeboard on the Bear River and WPIC levees that prevent these levees from meeting the FEMA ~~criteria~~accreditation requirements for protecting RD 784 from a "100-year" flood event. (The top of the levee must be at least 3 feet higher than the 100-year event.) This information was unexpected by Yuba County officials because the 1998 Corps Yuba River Basin study did not recommend any work for the Bear River and WPIC levees to achieve a 200-year level of protection for the RD 784 area. In addition, it was found that a 2,800-foot stretch of the Yuba River levee on the upstream side of State Route (SR) 70 did not meet slope stability requirements. These issues were seen as a major setback to the long-term plan to increase the level of flood protection to a 200-year and eventually greater level of protection.

In 1993, following the initiation of the System Evaluation Project and the Yuba River Basin Project, and before the most recent devastating flood (in 1997), Yuba County had approved the Plumas Lake Specific Plan, which provides for a 12,000-home development on 5,200 acres in the southern portion of the RD 784 area. Development was initiated in the Plumas Lake Specific Plan area in 2002. The results of the 2003 Corps floodplain mapping study indicate that the people and property in the RD 784 area, including homes that had already been built in the Plumas Lake Specific Plan area before the release of the Corps study, are subject to a much higher flood risk than previously believed. Without levee improvements that ~~meet~~ FEMA ~~criteria~~can accredit as providing protection against

the 1% annual chance flood, FEMA may ~~issue~~publish new Flood Insurance Rate Map~~s~~ (FIRM~~s~~) panels for the RD 784 area. Once the FIRM~~s~~ panels are ~~issued~~published, flood insurance rates for the area ~~would~~may increase and carrying flood insurance would become mandatory. The ongoing economic development of the county could be jeopardized.

To avoid having RD 784 mapped into the FEMA 100-year floodplain, the ~~RD 784 levees~~district will need to ~~be certified as meeting current~~submit to FEMA ~~criteria~~data showing that the levees meet the criteria for mapping behind levee areas, in accordance with the requirements contained in 44 CFR 65.10. Consequently, YCWA, RD 784, and Yuba County, in consultation with many landowners and developers in the south county, elected to move aggressively on a program for evaluating options for achieving FEMA certification of the RD 784 levees. One step was the formation of the Three Rivers Levee Improvement Authority (TRLIA), a joint powers authority composed of Yuba County and RD 784 that was formed to address funding and implementation of levee repairs for the RD 784 area.

RD 784 first completed a Problem Identification Study to determine the magnitude of the repair effort necessary to achieve FEMA certification and a higher level of protection on the WPIC and Bear River levees. A geotechnical engineering report was prepared in November 2003 that identified significant geotechnical problems with the levee foundations along most of the Bear River levee and several reaches of the WPIC levee. Areas of concern with regard to erosion were also identified. Subsequently, a more in-depth engineering study was initiated to develop design alternatives to meet the study objectives and develop plans and specifications for some of the selected construction elements that compose the resulting FEMA ~~certification~~levee accreditation program. These construction elements—which are in different stages of planning and implementation—have been addressed in ongoing studies completed by RD 784, TRLIA, and others. Priority was given to these construction elements, which are all part of the Y-FSFCP:

The second paragraph under Section 4.1.1 on page 4-1 in Chapter 4, "Description of the Proposed Project," is modified as follows:

An analysis of the Feather River levee was performed by Kleinfelder and is described in *Problem Identification Report, TRLIA Phase 4 Feather River and Yuba River Left Bank Levees, Reclamation District No. 784* (PIR) (Kleinfelder 2006). The PIR addresses the Feather River left (east) bank levee from approximately Project Levee Mile (PLM) 13.3 near RD 784 Pump Station No. 2 to the beginning of the Yuba River left (south) bank levee at approximately PLM 26.1, and the Yuba River left bank levee from PLM 0.0 to PLM 0.3 (Figure 4-1, "FRLRP Project Features"). The purpose of the analysis described in the PIR was to perform a feasibility-level evaluation of subsurface geotechnical conditions and levee conditions in accordance with Federal Emergency Management Agency (FEMA) requirements. The conclusions of the PIR indicate that portions of the subject levee do not currently meet FEMA geotechnical ~~certification~~ requirements for through-seepage or underseepage.

The first paragraph under Section 4.2.2 on page 4-9 in Chapter 4 is modified as follows:

> An analysis of the Feather and Yuba River levees was performed by Kleinfelder and is described in the PIR (Kleinfelder 2006). The PIR addresses the Feather River left bank levee from approximately PLM 13.3 (near Pump Station No. 2) to the beginning of the Yuba River left bank levee at approximately PLM 26.1, and the Yuba River left bank levee from PLM 0.0 to PLM 0.3. The purpose of the analysis described in the PIR was to perform a feasibility-level evaluation of subsurface geotechnical conditions and levee conditions in accordance with FEMA requirements. The PIR indicates that portions of the subject levee do not currently meet FEMA geotechnical ~~certification~~ requirements for through-seepage or underseepage.

The paragraph under the subsection, "Levee Standards and Maintenance," at the bottom of page 5.2-1 in Section 5.2, "Geology, Soils, and Mineral Resources," is modified as follows:

> The Federal Emergency Management Agency (FEMA) also has oversight over flood control levees through the agency's levee ~~certification~~accreditation program. For levees to be ~~certified~~accredited by FEMA as providing 100-year protection, evidence must be provided that adequate design and operation and maintenance systems are in place to provide reasonable assurance that protection exists from a base flood (1% or 100-year flood). Specific requirements pertaining to the amount of freeboard, closure devices, embankment protection from floods, embankment and foundation stability, settlement, interior drainage, operation plans, and maintenance plans are contained in 44 CFR 65.10.

The two paragraphs under the subsection, "Overview of Flood Protection Efforts and Planned Development in the RD 784 Area," at the top of page 7-3 in Chapter 7, "Other CEQA-Required Sections," are modified as follows:

> In 1993, following the initiation of the System Evaluation Project and the Yuba River Basin Project, and before the floods of 1997, Yuba County (County) had approved the Plumas Lake Specific Plan, which provides for a 12,000-home development on 5,200 acres in the southern portion of the RD 784 area. A few years before, the County had also approved the smaller East Linda Specific Plan adjacent to Yuba Community College, north of Olivehurst. Construction of the Plumas Lake and East Linda developments began in 2002. However, the results of a Corps floodplain mapping study completed in 2003 indicates that the people and property in the RD 784 area, including homes that had already been built in the Plumas Lake Specific Plan area before the release of the Corps study, are subject to a much higher flood risk than previously believed. Without levee improvements that meet Federal Emergency Management Agency (FEMA) ~~criteria~~accreditation requirements, FEMA could ~~issue~~publish new Flood Insurance Rate Map~~s~~ (FIRM) panels for the RD 784 area.
>
> To avoid having RD 784 mapped into the FEMA 100-year floodplain, YCWA, RD 784, and the County, in consultation with many landowners and developers in the south county, elected to move aggressively on a program for achieving FEMA ~~certification~~accreditation of the RD 784 levees. As a result of this program, various levee

repair/improvement projects and other flood protection projects have been completed, are under way, or are being studied in the RD 784 area, including the FRLRP.

The first full paragraph on page 8-4 under Section 8.2.2 in Chapter 8, "Alternatives," is modified as follows:

More recently, a Problem Identification Report (PIR) prepared for TRLIA (Kleinfelder 2006) addressed the condition of the Feather River left bank levee from Project Levee Mile (PLM) 13.3 (just south of Pump Station No. 2) to the beginning of the Yuba River left bank levee at PLM 26.1, and the Yuba River left bank levee from PLM 0.0 (beginning of the levee) to PLM 0.3, and from PLM 2.2 to PLM 6.1. The purpose of the PIR was to perform a feasibility-level evaluation of subsurface geotechnical conditions and levee conditions in accordance with the requirements of the Federal Emergency Management Agency (FEMA). The PIR concluded that portions of the subject levees do not currently meet FEMA's geotechnical ~~certification~~ requirements for through-seepage (water seeping through levee soils) and underseepage (water seeping under levee soils) during flood events.

The third full paragraph and the second bulleted point on page 8-4 under Section 8.2.2 are modified as follows:

Development of the FRLRP was initiated in response to levee deficiencies identified in the various available studies. The primary purpose of the FRLRP is to correct identified deficiencies in the left bank levees of the Feather and Yuba Rivers, and consequently to improve flood protection for the RD 784 area of Yuba County. The project design objectives focus on measures to bring the levees into compliance with FEMA's geotechnical ~~certification~~ requirements for underseepage and through-seepage, as well as engineering standards for the State of California Reclamation Board (The Reclamation Board) and the Corps. The objectives of the FRLRP, as identified previously in Section 3.1, "Project Purpose and Objectives," are:

- to secure flood protection for at least a flood event with a 0.5% (or 1-in-200) annual chance of exceedance,
- to help secure FEMA ~~certification~~accreditation of the subject reaches of levee,
- to avoid increasing downstream flow and stage during peak-flow conditions,
- to achieve these objectives as soon as possible, and
- to incorporate environmental mitigation as appropriate.

The first paragraph at the top of page 8-18 under Section 8.5 is modified as follows:

From the perspective of purely minimizing effects on the existing environment, the No-Project Alternative would be the superior alternative because it would result in no changes in the existing condition. However, the No-Project Alternative would result in no improvements to flood protection facilities in the project area and would perpetuate the

existing risks for levee failure, flooding, and related adverse effects on the environment, people, and property. The No- Project Alternative would not meet key project objectives of securing flood protection for at least the 1-in-200 year event and securing FEMA ~~certification~~accreditation of the subject levee reaches (see Section 8.2.2, "Feather River Levee Repair Project"). This alternative would have no direct effects on property owners in the area, but also would not provide them the flood protection benefits inherent in Alternatives 1, 2, and 3. The No-Project Alternative also would not provide potential beneficial effects related to fisheries, biological resources, water resources, and air quality associated with Alternatives 2 and 3.

CHAPTER 4 REFERENCES

California Floodplain Management Task Force. 2002 (December). *California Floodplain Management Task Force Final Recommendations Report.* Sacramento, CA.

Kleinfelder, Inc. 2006 (February 20). *Problem Identification Report, TRLIA Phase 4 Feather River and Yuba River Left Bank Levees, Reclamation District No. 784.* Sacramento, CA.

U.S. Army Corps of Engineers. 2000 (April 30). *Engineering and Design—Design and Construction of Levees.* Engineering Manual EM 1110-2-1913. Washington, DC.

U.S. Army Corps of Engineers and State of California Reclamation Board. 2002 (December 20). *Interim Report, Sacramento and San Joaquin River Basins Comprehensive Study.* Sacramento, CA.

Wheatland, City of. 2006 (July 11). *Wheatland General Plan Policy Document, Part II*. Prepared by Mintier & Associates et al. Sacramento, CA.

Yuba County Water Agency. 2003a (May). *Report on Feasibility, Yuba-Feather Supplemental Flood Control Project.* Marysville, CA. Prepared by Flood Control Study Team.

Yuba County Water Agency. 2003b (October). *Draft Environmental Impact Report for the Yuba-Feather Supplemental Flood Control Project.* Marysville, CA. State Clearinghouse #2001072062. Prepared by EDAW, Jones & Stokes, and Flood Control Study Team.

CHAPTER 5 DOCUMENT PREPARERS

The draft environmental impact report (DEIR) and final EIR (FEIR) for the Feather River Levee Repair Project were prepared by EDAW in cooperation with the other members of the flood control study team. See Chapter 11 of the DEIR for a list of contributors to that document. The following individuals contributed to this FEIR:

EDAW TECHNICAL TEAM

Principal-in-Charge – Phil Dunn

Program Manager, TRLIA Projects – Roberta Childers

Project Manager – Sean Bechta

Assistant Project Manager – Jeanine Hinde

Senior Editor – Julie Nichols

Editor – Christy Seifert

Document Production – Amber Martin, Gayiety Lane, Debby Jew

THREE RIVERS LEVEE IMPROVEMENT AUTHORITY (LEAD AGENCY)

Paul Brunner – Executive Director

Ric Reinhardt, MBK Engineers – Program Director

Brian Boxer, EIP Associates – Environmental Manager

Larry Dacus, MBK Engineers – Engineering Manager

OTHER FLOOD CONTROL STUDY TEAM MEMBERS AND ROLES

GEI Consultants (engineering design) – Dan Wanket, Alberto Pujol

MBK Engineers (hydrology and flood operations) – Don Trieu

APPENDIX A

DEIR Public Meeting

THREE RIVERS LEVEE IMPROVEMENT AUTHORITY

Public Meeting on the Draft EIR for the Feather River Levee Repair Project
Sign-In Sheet
Wednesday, September 6, 2006
6:30–8:30 p.m.

Please list your name, any agency or organization you represent, mailing address, and telephone number or e-mail address.

Name	Organization	Mailing Address	Telephone Number or E-Mail Address
Richard E. Webb	TRLIA & RD784	256 Anderson Ave Marysville, CA 95901	5307425609 rwebb@succeed.net
PAUL BRUNNER	TRLIA		530-749-5679 pbrunner@co.yuba.ca.us

THREE RIVERS LEVEE IMPROVEMENT AUTHORITY

Public Meeting on the Draft EIR for the Feather River Levee Repair Project
Sign-In Sheet
Wednesday, September 6, 2006
6:30–8:30 p.m.

Please list your name, any agency or organization you represent, mailing address, and telephone number or e-mail address.

Name	Organization	Mailing Address	Telephone Number or E-Mail Address
WALT WHITENTON	—	5923 COHN AVE MARYSVILLE	530-743-8381

Feather River Levee Repair Project

Draft EIR Public Meeting

Three Rivers Levee Improvement Authority

Wednesday, September 6th, 2006

6:30 P.M. CONDENSED TRANSCRIPT

Yuba County Government Center

915 8th Street, Suite 109

Marysville, CA 95901

SPEAKERS: PAUL BRUNNER - Executive Director TRLIA

RIC REINHARDT - Program Manager

SEAN BECHTA - Senior Project Manager EDAW, INC.

Meeting Reported by:

SHERYL DIRKS, CSR NO. 3513

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MR. BRUNNER: Okay. Let's go ahead and start. We definitely have seating so, you know, you might want to pull forward. I think that screen works a little bit better than this screen for focusing.

I'd like to welcome everyone here. I'm Paul Brunner the Executive Director of Three Rivers and tonight we have the draft EIR public meeting where we're going to have a chance to describe what the project is and then move forward and have forms to get comments from the public and there is an opportunity for that.

So I already went kind of through the purpose of the meeting is to do the overview of the project. We'll summarize the findings and then receive comments from the public.

I do want to introduce at least one person in the audience, Richard Webb who is the Chair of the Three Rivers Levee Improvement Authority and also the Chair of RD 784. So Richard. (Applause)

All right. Let me talk a little bit about our project and put it in context for what we have done so far. This is a map of our area for Three Rivers and we're right up here in Marysville right now for the public meeting. The area that Three Rivers and RD 784 really focuses on is down in the South Yuba County area in here. Plumas Lake is right around in this area in here. Olivehurst is right there.

Linda is there.

We have a four-phase project that we're working on, started on 2004 and our goal is to complete the four phases by 2008.

The work has been done in the very first phase is here in the Yuba. Where we did the little red line in here first. That was where we had a break in the levee in the '80s that we have fixed. We're now working on Phase 2 to improve the Yuba through here which is also essentially done now on the Yuba. A little bit more on the seepage berm that we have to do in the Caltrans area. Working on the Western Pacific Interceptor Canal through here this summer. A lot of work going on along here on Highway 70. The Bear River right through here is really a fantastic story where we're building a setback levee, a brand new levee. Hopefully, we'll have a ribbon cutting for that in the October time frame, early October with dignitaries coming out and celebrating that levee being completed.

There is like a 600-acre environmental restoration project that's going to begin in the early September time period in this area and then extend over a year or two to complete that. That's also a very good story from our perspective.

This levee in purple, the Bear River the green areas here and here should be completed this construction season

which ends in the end of October time period. We just started the project up here on the Yuba River. The work started last Friday and working full bore to complete that levee work this construction season, too, hopefully.

The purpose why we're here tonight is to talk about the stretch of levee from the Yuba down to the Bear along through here which is the Feather River Project. And that's about a 12-13 mile reach of river levees that we'll be improving over the next couple of years.

There is a couple alternatives that we're looking at. The two ends in here will be strengthened in place, the current existing levee; but this area right in through here there is a couple options that we're looking at, either strengthening in place the levee here or building what we call a setback levee that will pull a brand new levee back or build a brand new levee back and get rid of this levee here to allow the river to flow wider and freer and has many different types of improvements associated with it. Does include acquiring land and is more expensive. So the decision on that is still pending. That's really, the Feather River is what we're focusing on tonight.

And the types of things that we're looking at for the project is to correct deficiencies in the Feather and Yuba River, particularly the left bank and, consequently, to improve the flood protection of the RD 784 area of Yuba

County.

Then you can see the project objectives that we have here. Providing 200-year flood protection. Help secure FEMA which is important for Yuba County. And then you can read the other things that are listed here on the project.

What I'm going to do now for the sake of the evening is to turn the meeting over to Ric Reinhardt who will talk about the project overview, and then right after Ric I think Sean Bechta is coming up to talk about the project and explain how we're going to obtain public comments and move forward.

So Ric.

MR. REINHARDT: The project area is the Feather River from Highway 70 down to the Bear River. So here it is the reach of the Feather on the upstream end and then when we just completed the Bear River setback levee on the southern end. The project levee has been broken up into three segments for study purposes. Segment one is from the downstream end to Star Bend. Segment two is from Star Bend to just downstream of Shanghai Bend, and then segment three is upstream to Highway 70.

There are three alternatives evaluated in the draft EIR. Levee repairs in segment one and three are strengthen in place type alternatives, and then the alternatives vary in project segment two as we looked at two forms for two

different alignments for a setback levee and then an alternative to strengthen the existing levee in place.

The alternatives we looked at for repair for strengthen in place are a slurry wall through the top of the levee or a stability or seepage berm on the landside toe with relief wells.

Project segment number two we looked at strengthening the existing levee in place and then we looked at the above, what we call the ASB is the above Star Bend setback and then the intermediate setback which is -- starts at the same upstream location. I'm sorry. At -- it takes less of a footprint. It's a smaller setback.

Setback levee design would be an embankment section with an inspection trench; or if we have foundation problems, it would include a slurry wall through the foundation of the levee.

We're looking at the potential land uses in the project area. The area could be remained in agriculture or it could be a mix of habitat and habitat restoration depending on how the project is funded and what the input we receive from the landowners are. We don't have a specific proposal for the land use at this time.

From a construction schedule perspective, our goal is to go to construction on segments one and three in 2007. We're in the process of design currently. For segment two

we'll be doing design and permitting in 2007 and early 2008 and then construction 2008.

With that I'll turn it over to Sean to talk about the EIR.

MR. BECHTA: Thank you. Thank you, Ric. I'm going to go through a quick summary of the EIR findings as the main purpose of this meeting is to allow an opportunity to provide comments on the EIR.

First a general EIR CEQA overview. The purposes of an Environmental Impact Report are to evaluate a project, inform the public and the decision-makers of the project's environmental effects, identify mitigation measures to minimize those effects so it can clear significant. Also identify impacts that cannot be mitigated or avoided.

Quick summary on what a significant impact the key elements are it's a substantial effect. It's an adverse effect and it's an effect on the physical environment.

In the EIR, typically in an EIR one preferred alternative is looked at at a high level of detail and then the remaining alternatives are looked at in a more comparative level. In this particular instance we looked at all three of the alternatives that Ric and Paul talked about at an equal level of detail. This will allow the TRLIA board at some point after the EIR is complete to take the information in the EIR and information from other sources

and select a preferred alternative, and this EIR can support adoption of any one of the three alternatives.

In our alternatives analysis I talk about a more qualitative level of analysis. CEQA requires that we also look at a no project alternative which we did which is basically doing nothing, and that will come up in discussion a little bit later.

We really looked at a full range of environmental issue areas in the EIR. There was very little that was taken out or wouldn't, didn't apply to this project amongst the areas that we normally see in an EIR. These are all listed here ranging from land use to terrestrial biological resources to paleontological resources, fossils and such.

Amongst these issue areas that we evaluated all except three of them had some level of significant impact. So some impact that exceeded the significance criteria and it was considered substantial adverse effect on the environment.

Of those areas that have a significant impact after mitigation there were only three remaining areas that had impacts that could not be reduced to a less-than-significant level. In these areas land use had two issues, one related to the conversion of important farmland under all the alternatives whether that be under a setback levee or associated with a detention basin or seepage berms in a --

on levee strengthening. There was some level of farmland conversion to non-agricultural use which was considered a significant and unavoidable impact.

The second one, the zoning inconsistency was really just a paper impact. We took a pretty conservative approach to how we looked at impacts. In this case potentially for a period if a setback levee is built, the County zoning would allow construction of structures there. Obviously, you couldn't have structures built in the setback areas so that conflict could go on for a certain amount of time until the County changes its zoning code. It's a very conservative approach and even though it's a paper impact, we identified in the EIR.

Air quality construction emissions are going to exceed the Air Quality Management District de minimis standards or their standards for what's significant in handling a project of this size and scope, not earth moving but there is not a way to minimize that. And the noise there is going to be construction noise. We wanted to leave the option open if there is a need under extreme circumstances for nighttime construction which could violate noise ordinance standards, we identified that as a significant and unavoidable impact.

This slide has a lot of numbers but really the key point that I wanted to identify in this slide is that there

was not one clearly environmentally superior alternative. CEQA requires to identify an environmentally superior alternative. This looks at the numbers of the impacts. As you can see, alternative 1 has 16 significant impacts, three that are significant and unavoidable. Those are less than under alternatives 2 and 3 which really have the same impacts. That difference is primarily related to the fact alternative 1 doesn't have a setback levee.

When you construct a setback levee and you have that setback area you end up with some impacts that you wouldn't otherwise, such as potential for fish stranding. It would not flood and some other biological resources impacts. And then the significance and unavoidable the extra one is related to that inconsistency between the County zoning allowing developer buildings in the setback area and that not being a feasible flood control activity.

So the alternatives 2 and 3 really the impacts aren't that different, little bit higher than alternative 1. But in the EIR the conclusion that we came down to is depending on what your priorities are, there is a great difference in these. There could be a great difference in these alternatives as far as what's environmentally superior. If you want to maximize your regional flood control benefits by having the largest setback area possible, alternative 2 would be superior. If you wanted to

increase flood protection but minimize changes in the existing land uses, alternative 1 might be superior. If you wanted to have the minimal effect on the environment and the minimal change from existing conditions, you would select the no project alternative, but then you gain no flood control benefits and the RD 784 area remains under the same flood risks that it's under today.

So depending on your priorities, some of the alternatives are far superior to others, clearly superior but from a pure environmental perspective we didn't identify one environmentally superior alternative.

Going over the public review steps up to this point and in the future there was a notice of preparation issued in June. And after that a public scoping meeting later in June. They released the draft EIR last month in the beginning of August. Tonight is the public comment meeting on the draft EIR. The public comment period closes September 18th. The standard 45-day public comment period from release of the draft EIR.

After that period ends we'll begin responding to comments and preparing the final EIR which will go into the fall, and then also sometime in the fall we'll complete the final EIR, send that out for review and a decision on approval of the project and selection of an alternative will be made.

So we're here tonight to provide comments on the EIR. This small prestigious group. How to do that. We have several options available tonight. You can provide oral comments directly to the court reporter after this presentation is done. You can come up here and talk to the reporter; or if you prefer to talk to her someplace else, we can move to wherever you feel is most appropriate. You can either talk directly to her or we can transcribe a conversation if you'd like to have a conversation with any member of the project team here and have that transcribed into the record.

You can provide written comments on comment cards that we have at the back table and we have over at this table over here. We also have a laptop set up there if you prefer to type in comments rather than write them here. You can also mail in comments. The address is there to Paul Brunner. It's the same address that's in the draft EIR. Mail or fax those in or e-mail any comments. If you do e-mail in those comments, we ask you provide them in a Word format. There is some directions there. We can go over those later if you like.

Providing comments tonight doesn't preclude also providing additional comments in a letter later on just as long as all the comments are received by end of day September 18th.

As far as suggestions on providing comments, what we're really looking for is information on the analysis and conclusions in the draft EIR. What any comments you have on the analysis methods that we used, our conclusions, the way we did the analysis. Anything having to do with the draft EIR and that will be -- those types of comments will be responded to in the final EIR in writing.

So whether you provide the comments to the court reporter, provide them in writing here, provide them in writing later, comments related to the draft EIR will be responded to in the final EIR.

There is an additional area where comments are appreciated. This isn't a typical CEQA issue but we'd like information on the merits of the various project alternatives. Those aren't necessarily something we would respond to in the final EIR. Not a requirement of CEQA. But since the opportunity is there that we can look at three alternatives at an equal level of detail and the EIR can be used to support the TRLIA decision to adopt any one of those alternatives. Any information that you provide on preferences would be considered by TRLIA when making that decision.

So that's it for the presentation. Also I see many members of the project team are here. If you have any questions or would like to have any discussions with any

member of the project team, we're available to do that. Those discussions, I will just say, would not be part of a CEQA EIR record, would not necessarily be responded to in the EIR. Those for record-keeping purposes we need to have come in through the court reporter or written through one of the mechanisms provided. Thank you very much.

(pause in proceedings)

MR. BECHTA: Paul Brunner directly asked the two members of the public present whether they would like to provide comments at the meeting and both declined. Public comment meeting was closed.

(Meeting concluded at 7:36 p.m.)

REPORTER'S CERTIFICATE

STATE OF CALIFORNIA)
COUNTY OF YUBA)

I do hereby certify that the foregoing transcript, consisting of _____ pages hereof, was taken by me in shorthand at the time of the proceedings in the above-entitled matter, and that the foregoing is a full, true and correct transcription of the proceedings held at said time.

Dated _____, 2006.

_____
SHERYL DIRKS,
Certified Shorthand Reporter
CSR No. 3513

D. Statement of Overriding Considerations

1. Impacts That Remain Significant

As listed in Exhibit A, the following impacts of the FRLRP remain significant following adoption and implementation of the mitigation measures described in the Final EIR:

Number	Impact	Alt. 1	Alt. 2	Alt. 3
5.1-a	Conflicts with Land Use Planning and Policies Resulting from Levee Repairs and the Levee Setback.	LTS	SU	SU
5.1-b	Conversion of Important Farmland to Nonagricultural Uses Resulting from Levee Repairs and Strengthening.	SU	SU	SU
5.9-a	Temporary Emissions of ROG, NO_X, and PM_{10} during Construction.	SU	SU	SU
5.10-a	Temporary Increase in Noise Levels during Construction.	SU	SU	SU

2. Overriding Considerations Justifying Approval of Alternative 2

In accordance with CEQA Guidelines Section 15093, the Board has, in determining whether or not to approve the FRLRP, balanced the economic, social, technological and other benefits of the FRLRP against its unavoidable environmental risks, and has found that the benefits of the FRLRP outweigh the significant adverse environmental effects that are not mitigated to less-than-significant levels, for the reasons set forth below. This statement of overriding considerations is based on the Board's review of the Final EIR and other information in the administrative record.

The project is needed to help resolve the existing risk of flooding impacts in the identified area, as demonstrated by recent catastrophic flood events. Removing the potential for property and natural resource damage and destruction, personal injury and death, supports strong public, social and economic interests. The project would also address the deficiencies in the Feather River levee that have led to uncertainty and controversy surrounding planned and

ongoing development in the area, which is subject to a higher flood risk than previously believed. The continuing evolution of flood control knowledge over time suggests that the higher level of protection under Alternative 2 is warranted to protect existing and planned communities and as a precautionary measure in case new information or changing circumstances reveals new risks in the future. The additional flood protection will yield economic benefits in the form of reduced costs associated with flood insurance and flood-related property damage. Flood protection also results in an increased sense of security in the community, particularly among owners of property that has flooded in the past or has been in danger of flooding.

Two of the four significant unavoidable impacts of Alternative 2 are temporary: construction emissions of ROG, NO_X, and PM_{10} (Impact ASB-5.9-a) and construction-related increases in noise levels (Impact ASB-5.9-b). Alternative 2 would potentially result in long-term beneficial changes to air quality. (Draft EIR, pp. 5.9-25 to 5.9-26.) The Board has determined to adopt mitigation measures that will reduce these impacts to the extent feasible. (Mitigation Measures ASB-5.9-1, ASB-5.10-a.) The Board finds that the short-term air quality and noise impacts would be significant and unavoidable under all Alternatives, and that the flood protection and other long-term benefits provided by Alternative 2 outweigh these temporary impacts.

The remaining significant unavoidable impacts are the related impacts of conflicts with land use plans and policies (Impact ASB-5.1-a) and conversion of agricultural land to nonagricultural uses (Impact ASB-5.1-b). In part, conflicts with land use plans and policies are outside the jurisdiction of TRLIA, as described above and in the EIR. (Mitigation Measure ASB-5.1-a.)

The EIR concludes that the conversion of agricultural land is significant and unavoidable for any of the three alternatives. Alternative 1 could result in the conversion of up to 180 acres of farmland due to the construction of seepage/stability berms and a detention basin. (Draft EIR, pp. 5.1-12 to 5.1-13.) Alternatives 2 and 3 could result in the conversion of and/or loss of access to up to 1,045 acres or 720 acres, respectively, due to the construction of setback levees, although most of that conversion would not result in the same open space, soil, water, and other impacts that is typically associated with permanent conversion to developed uses. (Draft EIR, pp. 5.1-15, 5.1-19.) Implementation of any of the Alternatives would include compensating agricultural operators for temporary disturbance and/or permanent loss of agricultural lands. (Draft EIR, pp. 5.1-12, 5.1-14, 5.1-18.) In addition, improvements to the flood control system will provide increased flood protection to thousands of acres of valuable farmland in the project vicinity. (*Id.*)

Both Alternatives 1 and 3 would result in some conversion of agricultural land, however, in all instances the impact remains significant and unavoidable. Although Alternatives 1 and 3 would convert a relatively smaller amount of land than Alternative 2, TRLIA has concluded that the benefits of Alternative 2 implicate a stronger public interest as compared to those environmental gains. The continuing evolution of flood control knowledge over time

suggests that the higher level of protection under Alternative 2 is warranted to protect existing and planned communities and as a precautionary measure in case new information or changing circumstances reveals new risks in the future. Moreover, of the acreage affected by Alternative 2, conversion impacts are not the same as those associated with conversion to developed urban uses; the vast majority of the Important Farmland that could be "converted" under Alternative 2 (up to approximately 1,045 acres) would remain in an undeveloped condition, as habitat or fallow lands within the levee setback area created by these alternatives. (Final EIR, Response F.) It is anticipated that a substantial portion could continue to be cultivated and, as noted, that acreage would benefit in the long-term from increased flood protection. (*E.g.*, Draft EIR, pp. 5.1-14.) TRLIA has proposed, and the Board herein adopts, mitigation measures that will preserve the productivity of Important Farmland to the extent feasible by, for example, minimizing fragmentation, retaining contiguous parcels where practical, addressing access issues, providing productive topsoil, and addressing protection of existing utilities, strategically siting laydown and staging areas, and using existing roads for access. (Mitigation Measure ASB-5.1-b.)

The displacement of a small number of residences and other structures in the setback area under Alternative 2 may result in economic and social effects, as described in the EIR. (Draft EIR, pp. 5.1-17.) To the extent these are considered relevant to physical impacts under CEQA, the Board concludes that these effects are not significant. (*Id.*) TRLIA has committed to pay compensation to relocated landowners and relocation assistance for eligible homeowners, tenants, businesses and farm operations under federal and state relocation statutes. (Draft EIR, pp. 5.1-16 to 5.1-17.)

In short, implementation of Alternative 2 will result in additional flood protection, which in turn will yield economic benefits in the form of reduced costs associated with flood insurance and flood-related property damage. Flood protection also results in an increased sense of security in the community, particularly among owners of property that has flooded in the past or has been in danger of flooding. The Board finds that these social and economic benefits outweigh the impacts that cannot be reduced to less than significant levels, and warrant approval of Alternative 2 in spite of those remaining impacts. The Board finds that under all of the circumstances, the flood control benefits of Alternative 2 outweigh its environmental costs.

RESOLUTION NO. 2007-04

A RESOLUTION BY THE BOARD OF THREE RIVERS LEVEE IMPROVEMENT AUTHORITY IN REGARD TO CERTIFICATION OF THE FEATHER RIVER LEVEE REPAIR PROJECT FINAL EIR; ADOPTION OF CALIFORNIA ENVIRONMENTAL QUALITY ACT FINDINGS, MITIGATION MEASURES, MITIGATION MONITORING PROGRAM AND STATEMENT OF OVERRIDING CONSIDERATIONS; AND APPROVAL OF THE FEATHER RIVER LEVEE REPAIR PROJECT

I. CERTIFICATION OF THE FINAL EIR

Three Rivers Levee Improvement Authority ("TRLIA"), as lead agency, has completed the Final Environmental Impact Report ("Final EIR") for Feather River Levee Repair Project ("Proposed Project" or "FRLRP"). The Final EIR comprises a project-level analysis of the Proposed Project, and has State Clearinghouse No. 2006062071.

A Draft Environmental Impact Report ("Draft EIR") was released for public agency review on August 4, 2006. Volume 1 of the Draft EIR assesses the potential environmental effects of implementation of the Proposed Project, identifies means to eliminate or reduce potential adverse impacts, and evaluates a reasonable range of alternatives to the Proposed Project. Volume 2 of the Draft EIR consists of Appendices referred to in Volume I. The Final EIR is comprised of the Draft EIR together with one additional volume that includes the comments on the Draft EIR submitted by interested public agencies, organizations and members of the public, written responses to the environmental issues raised in those comments, revisions to the text of the Draft EIR reflecting changes made in response to comments and other information, and other minor changes to the text of the Draft EIR. The Final EIR is hereby incorporated into this document by reference.

The Board of Directors of the Three Rivers Levee Improvement Authority ("the Board") certifies that it has been presented with the Final EIR and that it has reviewed and considered the information contained in the Final EIR prior to making the following certifications and the findings in Section II and the approvals in Section III, below.

Pursuant to CEQA Guidelines Section 15090 (Title 14 of the California Code of Regulations, Section 15090) the Board certifies that the Final EIR has been completed in compliance with the California Environmental Quality Act, Public Resources Code Sections 21000 *et seq.* ("CEQA") and the CEQA Guidelines, Title 14 of the California Code of Regulations, Sections 15000 *et seq.* The Board certifies the Final EIR for the actions described in these findings and in the Final EIR, *i.e.*, the Feather River Levee Repair Project

The Board further certifies that the Final EIR reflects its independent judgment and analysis.

II. FINDINGS

The Board is adopting these findings for the entirety of the actions described in these findings and in the Final EIR and for each individual action.

Having received, reviewed and considered the Final EIR and other information in the record of proceedings, the Board hereby adopts the following findings in compliance with CEQA and the CEQA Guidelines:

Part A: Findings regarding the environmental review process and the contents of the Final EIR.

Part B: Findings regarding the environmental impacts of the FRLRP and the mitigation measures for those impacts identified in the Final EIR and adopted as conditions of approval.

Part C: Findings regarding the environmental impacts of the FRLRP and mitigation measures for those impacts identified in the Final EIR and adopted as conditions of approvals relating to development of the FRLRP.

Part D: Findings regarding alternatives and the reasons that such alternatives are rejected.

Part E: Statement of Overriding Considerations determining that the benefits of implementing the FRLRP outweigh the significant unavoidable environmental impacts that will result and therefore justify approval of the FRLRP despite such impacts.

The Board certifies that these findings are based on full appraisal of all viewpoints, including all comments received up to the date of adoption of these findings, concerning the environmental issues identified and discussed in the Final EIR. The Board adopts the findings and the statements in Parts A through E for the approvals that are set forth in Section III, below.

A. Environmental Review Process

1. Development of the Feather River Levee Repair Project

Since the flood events that occurred in 1997, studies have been underway to develop a FRLRP for a higher level of protection to supplement flood protection system for Yuba County. In 2004, Yuba County Water Agency certified a program-level EIR for the Yuba-Feather Supplemental Flood Control Project ("Y-FSFCP"), which evaluated three flood control elements including a setback of the east bank of the Feather River below the Yuba River in two segments. The FRLRP is a modified version of the Above Star Bend ("ASB") levee setback

project segment evaluated in the Y-FSFCP EIR and consists of repairing and strengthening the Feather River left bank levee as well as a small portion of the left (south) bank levee of the lower Yuba River. An alternative approach to simply repairing and strengthening the existing levee is constructing a setback levee in the central portion of the project area following a modified version of the ASB levee setback alignment. The FRLRP Draft EIR evaluated three equal-weight project alternatives reflecting combinations of repair, strengthening, and setback levee components. (Draft EIR, pp. 2-2 to 2-5.)

2. Preparation of the EIR

On June 14, 2006, TRLIA issued a Notice of Preparation announcing the intended preparation of the Draft EIR and describing its proposed scope. A public scoping meeting was held on June 29, 2006. Comments received in response to the Notice of Preparation and the scoping meeting are included in Appendix A to the Draft EIR. Comments pertinent to the scope and content of the EIR are reflected in the Draft EIR.

TRLIA completed the Draft EIR on August 3, 2006 and circulated the Draft EIR for public review and comment for a period of 45 days ending September 18, 2006. Approximately five letters commenting on the Draft EIR were received during the comment period, and two letters (from the California Department of Water Resources and the U.S. Army Corps of Engineers) were received after the close of the comment period. No comments were received at the public meeting on September 6, 2006. (Final EIR, p. 2-1.)

The Final EIR was completed and made available for review by public agencies and members of the public on November 2, 2006.

The Final EIR contains all of the comments received during the public comment period, as well as the two letters received after the close of the comment period, together with written responses to those comments which were prepared in accordance with CEQA and the CEQA Guidelines.

The Board finds and determines that the Final EIR provides adequate, good faith and reasoned responses to all comments that raised significant environmental issues.

3. Absence of Significant New Information

CEQA Guidelines Section 15088.5 requires a lead agency to recirculate an EIR for further review and comment when significant new information is added to the EIR after public notice is given of the availability of the draft EIR but before certification of the Final EIR. New information added to an EIR is not "significant" unless the EIR is changed in a way that deprives the public of a meaningful opportunity to comment upon a substantial adverse environmental effect of the project or a feasible way to mitigate or avoid such an effect that the

project proponent declines to implement. The CEQA Guidelines provide examples of significant new information under this standard. Recirculation is not required where the new information added to the EIR merely clarifies or amplifies or makes insignificant modifications in an adequate EIR.

The Board recognizes that the Final EIR incorporates information obtained by TRLIA since the Draft EIR was completed, and contains clarifications or other non-substantive changes. With respect to this information, the Board finds as follows:

Minor Changes. Various minor changes and edits have been made to the the Draft EIR, as set forth in the Final EIR. These changes are generally of an administrative nature such as correcting typographical errors, making minor adjustments, and adding or changing certain phrases to improve readability. The Board finds that these changes are of a minor, non-substantive nature and do not require recirculation of the EIR.

EIR Table 1.3. The Board further finds that there are no changes to the Draft EIR, Table 1.3 for purposes of certification of the Final EIR, attached as Exhibit A to these Findings. The Board finds that the mitigations proposed are identified in Exhibit A, Table 1.3 and more fully described in the Mitigation Monitoring and Reporting Program attached as Exhibit B to these Findings. The Board finds that any differences between Exhibit A and Exhibit B are minor and clerical in nature, and do not cause any new or more severe environmental impacts than previously revealed. Therefore, in accordance with CEQA and the CEQA Guidelines, no recirculation of the EIR is necessary based on Exhibits A and B.

In addition to the changes and corrections described above, the Final EIR and the February 6, 2007 staff report provide additional information in response to comments and questions from agencies and the public. The Board finds that this additional information does not constitute significant new information requiring recirculation, but rather that the additional information merely clarifies or amplifies or makes insignificant modifications in an adequate EIR. Specifically, the Board finds that the additional information including the changes described above, does not show that:

(1) A new significant environmental impact would result from the project or from a new mitigation measure proposed to be implemented.

(2) A substantial increase in the severity of an environmental impact would result unless mitigation measures are adopted that reduce the impact to a level of insignificance.

(3) A feasible project alternative or mitigation measure considerably different from others previously analyzed would clearly lessen the significant environmental impacts of the project, but the project's proponents decline to adopt it.

(4) The Draft EIR was so fundamentally and basically inadequate and conclusory in nature that meaningful public review and comment were precluded.

Based on the foregoing, and having reviewed the information contained in the Final EIR and in the record of TRLIA's proceedings, including the comments on the Draft EIR and the responses thereto, and the above-described information, the Board hereby finds that no significant new information has been added to the Final EIR since public notice was given of the availability of the Draft EIR that would require recirculation of the EIR.

4. Differences of Opinion Regarding the Impacts of the Project

In making its determination to certify the Final EIR and to approve the Proposed Project, the Board recognizes that the Proposed Project implicates a number of complex environmental issues and that a range of technical and scientific opinion exists with respect to those issues. The Board has acquired an understanding of the range of this technical and scientific opinion by its review of the Draft EIR, the comments received on the Draft EIR and the responses to those comments in the Final EIR, as well as testimony, letters and reports regarding the Final EIR. The Board has reviewed and considered, as a whole, the evidence and analysis presented in the Draft EIR, the evidence and analysis presented in the comments on the Draft EIR, the evidence and analysis presented in the Final EIR, the information submitted on the Final EIR, and the reports prepared by the experts who prepared the EIR, TRLIA's consultants, and by staff, addressing those comments. The Board has gained a comprehensive and well-rounded understanding of the environmental issues presented by the Proposed Project. In turn, this understanding has enabled the Board to make its decisions after weighing and considering the various viewpoints on these important issues. The Board accordingly certifies that its findings are based on full appraisal of all of the evidence contained in the Final EIR, as well as the evidence and other information in the record addressing the Final EIR.

B. <u>Impacts and Mitigation Measures: The Feather River Levee Repair Project</u>

1. Impacts and Mitigation Measures

These findings provide the written analysis and conclusions of the Board regarding the environmental impacts of the Proposed Project and the mitigation measures proposed by the Final EIR and adopted by the Board as conditions of approval for the FRLRP.

In making these findings, the Board has considered the opinions of other agencies and members of the public disagreeing with some of the significance thresholds used in the EIR. The Board finds that the determination of significance thresholds is a judgment decision within the discretion of the Board; the significance thresholds used in the EIR are supported by substantial evidence in the record, including the expert opinion of the EIR preparers and TRLIA

staff; and the significance thresholds used in the EIR provide reasonable and appropriate means of assessing the significance of the adverse environmental effects of the Proposed Project.

Exhibit A attached to these Findings and incorporated herein by reference summarizes the environmental determinations of the Final EIR about the FRLRP's impacts before and after mitigation. This Exhibit does not attempt to describe the full analysis of each environmental impact contained in the Final EIR. Instead, Exhibit A provides a summary description of each impact, describes the applicable mitigation measures identified in the Final EIR and adopted by the Board, and states the Board's findings on the significance of each impact after imposition of the adopted mitigation measures. A full explanation of these environmental findings and conclusions can be found in the Final EIR and these findings hereby incorporate by reference the discussion and analysis in the Final EIR supporting the Final EIR's determinations regarding the FRLRP's impacts and mitigation measures designed to address those impacts. In making these findings, the Board ratifies, adopts and incorporates the analysis and explanation in the Final EIR in these findings, and ratifies, adopts and incorporates in these findings the determinations and conclusions of the Final EIR relating to environmental impacts and mitigation measures, except to the extent any such determinations and conclusions are specifically and expressly modified by these findings. In addition, the February 6, 2007 staff report further explains the TRLIA environmental findings and conclusions and these findings hereby incorporate by reference the discussion and analysis in the February 6, 2007 staff report supporting the Final EIR's determinations regarding the FRLRP's impacts and mitigation measures designed to address these impacts. In making these findings, the Board ratifies and adopts the analysis and explanation in the February 6, 2007 staff report and adopts the recommendations of the staff report regarding mitigation measures.

As set forth in Part III, below, the Board adopts, and incorporates as conditions of approval, the mitigation measures set forth in Exhibits A and B to reduce or avoid the potentially significant and significant impacts of the FRLRP, as well as certain less-than-significant impacts. In adopting these mitigation measures, the Board intends to adopt each of the mitigation measures proposed in the Final EIR together with such supplemental mitigation measures as have been recommended by the February 6, 2007 staff report. Accordingly, in the event a mitigation measure recommended in the Final EIR has inadvertently been omitted from Exhibit A or B, such mitigation measure is hereby adopted and incorporated in the findings below by reference.

Exhibit A is based on Table 1.3 of the Final EIR and with Exhibit B includes the full text of all mitigation measures. It also includes supplemental mitigation measures and enhancements to some mitigation measures identified in the Final EIR compiled by TRLIA's staff after the Final EIR was completed that are also adopted by this Board.

In several comments on the Draft EIR, various measures were suggested by commenters as proposed additional mitigation measures or modifications to the mitigation measures identified by the EIR. Several of the EIR's mitigation measures were modified in

response to such comments, and other mitigation measures were added to the Final EIR in response to such comments. Other comments requested minor modifications in mitigation measures identified in the Draft EIR, requested mitigation measures for impacts that were less than significant, or requested additional mitigation measures for impacts as to which the Draft EIR identified mitigation measures that would reduce the identified impact to a less than significant level; these requests are declined as unnecessary.

With respect to the additional measures suggested by commenters that were not added to the Final EIR or February 6, 2007 staff report, the Board hereby adopts and incorporates by reference the reasons set forth in the response to comments contained in the Final EIR and February 6, 2007 staff report as its grounds for rejecting adoption of these mitigation measures.

2. Further Findings Regarding Proposed Mitigation Measures

In addition to the reasoning contained in the responses to comments contained in the Final EIR, the Board provides the following additional explanation regarding its grounds for rejecting several mitigation measures proposed by commenter's during the EIR comment period or at various meetings:

Proposed Mitigation for Potential Conversion of Agricultural Acreage. The California Department of Conservation, Division of Land Resource Protection, encouraged the TRLIA to consider mitigating for conversion of agricultural land with an agricultural conservation easement in the form of an outright purchase or payment of a mitigation fee to an organization or agency that takes responsibility for agricultural conservation easements. As discussed in the responses to comments contained in the Final EIR, the purchase of conservation easements or payment of mitigation fees are neither necessary nor economically sound for this project. The establishment of agricultural conservation easements does not create new farmland, put new farmland into production, or increase productivity of existing farmland, but rather only ensures that existing farmland is not converted to a different use. Thus, the impact of conversion in one location is not avoided, minimized, rectified, or reduced by establishment of agricultural conservation easement elsewhere. (Final EIR, Response F-3.)

Furthermore, agricultural conservation easements are most commonly established where a project is permanently converting agricultural land to a non-open space use, such as residential, commercial, or industrial development. In those instances, there is no realistic potential for the land to be returned to agricultural use. For the FRLRP, however, most of the agricultural land that may be "converted" in the levee setback areas under Alternative 2 or 3 will remain in an undeveloped condition, as habitat or fallow lands. There is no requirement to commit to any particular scheme of habitat preservation for lands within the levee setback area. Thus, it is possible that some or all of the land, even if temporarily converted, could be returned to agricultural use in the future. (Final EIR, Response F-3; see also Draft EIR, pp. 5.1-15 to 5.1-16, 5.1-19 to 5.1-20.)

Alternative 1 could result in the conversion of up to 180 acres of farmland due to the construction of seepage/stability berms and a detention basin. (Draft EIR, pp. 5.1-12 to 5.1-13.) Alternatives 2 and 3 could result in the conversion of and/or loss of access to up to 1,045 acres or 720 acres, respectively, due to the construction of setback levees. (Draft EIR, pp. 5.1-15, 5.1-19.) Implementation of any of the alternatives would include compensating agricultural operators for temporary disturbance and/or permanent loss of agricultural lands associated with the project. (Draft EIR, pp. 5.1-12, 5.1-14, 5.1-18.) In addition, improvements to the flood control system will provide increased flood protection to thousands of acres of valuable farmland in the project vicinity. (*Id.*) For each alternative, the Draft EIR includes mitigation to minimize losses of farmland where it occurs, consistent with the nature and extent of the loss, and to preserve the productivity of existing farmland to the extent feasible. (Draft EIR, pp. 5.1-20 to 5.1-23; Final EIR, Response F-3.) The Board finds that these measures mitigate the loss of farmland in a manner that is proportionate to the nature and level of anticipated impact from the project.

In addition, there are limited funding sources available to accomplish TRLIA's flood protection goals. Particularly in light of the limited effectiveness of agricultural conservation easements in this context, the Board concludes that the purchase of easements or credits is not sound economic policy. Thus, the Board finds that after balancing environmental and economic factors, the purchase of agricultural conservation easements or mitigation credits, as proposed by the commenter's, is not feasible and declines to adopt the proposed mitigation.

3. Mitigation Measures Within The Jurisdiction And Control Of Other Agencies.

The Board has adopted all of the mitigation measures identified in Exhibit A. Some of the measures identified in Exhibit A are also within the jurisdiction and control of other agencies. To the extent any of the mitigation measures are within the jurisdiction of other agencies, the Board finds those agencies can and should implement those measures within their jurisdiction and control.

Mitigation measures within the control of other agencies include the following:

Mitigation Measure ASB-5.1-a: Resolve Inconsistencies between Proposed Uses of the Levee Setback Area and Yuba County Zoning. Mitigation Measure ASB-5.1-a provides that upon adoption of Alternative 2, TRLIA will coordinate with the Yuba County Planning Department to apply for general plan amendments and/or rezoning or other measures if necessary to ensure the consistency of proposed land uses with County Zoning. Any necessary modifications will require approval by the County Planning Commission and Board of Supervisors pursuant to County ordinances.

Mitigation Measure IS-5.1-a: Resolve Inconsistencies between Proposed Uses of the Levee Setback Area and Yuba County Zoning. If TRLIA adopts Alternative 3,

Mitigation Measure IS-5.1-a provides that TRLIA will coordinate with the Yuba County Planning Department to apply for general plan amendments and/or rezoning or other measures if necessary to ensure the consistency of proposed land uses with County Zoning. Any necessary modifications will require approval by the County Planning Commission and Board of Supervisors pursuant to County ordinances.

C. Basis for the Board's Decision to Approve the Proposed Project Rather Than An Alternative to the Proposed Project

1. Summary of discussion of alternatives in the Final EIR.

The Proposed Project consists of implementing one of three potential alternatives, each evaluated at an equal level of detail in the Draft EIR. The Draft EIR examines and compares the environmental impacts of each alternative and the relative ability of each alternative to satisfy Project Objectives.

The Draft EIR also summarizes the criteria used to identify a range of reasonable alternatives for review in the EIR and describes proposals that TRLIA concluded did not merit additional more detailed review either because they did not present feasible alternatives to the Proposed Project or are variations on the alternatives that are evaluated in detail. (Draft EIR, pp. 8-2 to 8-7.)

The discussion and analysis of alternatives in the Draft EIR is augmented by a further discussion of alternatives in the Responses to Comments section of the Final EIR. That discussion provides additional information about the range of alternatives examined in the EIR, provides further detail on proposals that did not merit more detailed evaluation in the EIR, further describes the relationship between alternatives examined in the EIR and project objectives, and addresses several variations on the alternatives that were suggested in comments on the Draft EIR.

2. The Board's Findings Relating to Alternatives.

In making these findings, the Board certifies that it has independently reviewed and considered the information on alternatives provided in the Final EIR, including the information provided in comments on the Draft EIR that proposed other options for flood protection improvements and the responses to those comments in the Final EIR. The Final EIR's discussion and analysis of these alternatives is not repeated in these findings, but the discussion and analysis of the alternatives in the Final EIR is incorporated in these findings by reference.

The Final EIR describes and evaluates three equal weight alternatives. Implementation of one of these alternatives comprises the Proposed Project. Each of these alternatives includes actions implicating each of the three project segments used to define the project area. Each alternative results in somewhat varying impacts on and benefits to the physical environment. For any of the alternatives, as set forth in section *II*.B above, the EIR

contains and the Board could adopt mitigation measures that substantially mitigate the significant environmental effects of the alternative. As explained in section II.D of these findings, while these mitigation measures will not mitigate all project impacts to a less-than-significant level, the measures will mitigate those impacts to a level that the Board finds is acceptable. Furthermore, the Board finds that each alternative satisfies the project objectives in varying degrees; accordingly, the Board considers the potential to achieve some or all of the project objectives alongside the impacts of each alternative and/or beneficial effect on the environment. The Board finds that, on balance, Alternative 1 has environmental advantages over Alternatives 2 and 3 that make Alternative 1 the "Environmentally Superior" Alternative. Alternatives 2 and 3, in turn have critical hydrologic and ecological benefits.

The Board has determined to approve Alternative 2. In making this determination, the Board finds that when compared to the other alternatives described and evaluated in the Final EIR, Alternative 2, as mitigated, provides a reasonable balance between implementation of the Project Objectives and reducing potential environmental impacts to an acceptable level. The Board further finds and determines that the environmental gains available under other alternatives are less compelling when compared with the benefits of Alternative 2, for the reasons set forth below.

a. Description of Project Objectives.

The overall goal of the Proposed Project is to correct deficiencies in the left (east) bank levees of the Feather and lower Yuba Rivers, and consequently to improve flood protection of the Reclamation District (RD) 784 area in Yuba County, and to achieve the following Project Objectives:

- To secure flood protection for at least a flood event with a 0.5% (or 1-in-200) annual chance of exceedance;
- To help secure Federal Emergency Management Agency (FEMA) accreditation of the subject reaches of levee;
- To avoid increasing downstream flow and stage during peak-flow conditions;
- To achieve those objectives as soon as possible; and
- To incorporate environmental mitigation as appropriate.

(Final EIR, p. 3-2.)

b. Discussion and Findings Relating to the Alternatives Evaluated In The Draft EIR

No Project Alternative. Under CEQA, a "No Project Alternative" compares the impacts of proceeding with a proposed project with the impacts of not proceeding with the proposed project. A No Project Alternative describes the environmental conditions in existence at the time the Notice of Preparation was published, along with a discussion of what would be reasonably expected to occur at the site in the foreseeable future, based on current plans and consistent with available infrastructure and community services. Other than the FRLRP, there are no other near-term plans to comprehensively repair or improve the subject levees. Therefore, under the No-Project Alternative, no levee repair or strengthening would be implemented, and the river bank levees would be left in their current condition. (Draft EIR, p. 8-9.)

The No Project Alternative would not result in any adverse environmental effects from levee repair and strengthening activities or the construction of a setback levee. The No-Project Alternative, however, would not result in any beneficial effects in the form of increased flood protection and other benefits that would occur with implementation of Alternative 1, 2, or 3. (Draft EIR, pp. 8-10 to 8-12.)

Alternative 1 – The Levee Strengthening Alternative. Under Alternative 1, levee repair and strengthening activities, including installation of slurry cutoff walls, relief wells, and seepage/stability berms, would be completed along the entire length of project segments 1, 2, and 3. Pump Station No. 3 would be removed under this alternative, and a new pump station would be constructed farther east of the levee bank. Alternative 1 would also include construction of a detention basin to hold peak flows. (Draft EIR, p. 8-8.)

Alternative 1 has the fewest impacts that remain significant and unavoidable after mitigation. As discussed in section II.D below, of the remaining significant and unavoidable impacts of Alternative 1, two are temporary (construction air quality and noise impacts). (Draft EIR, p. 8-13.) The only non-temporary significant and unavoidable impact is the conversion of farmland to non-agricultural uses, and Alternative 1 results in the smallest acreage to be converted of the three alternatives that are evaluated in equal detail in the EIR (although, as noted above, most of the "conversion" associated with the other alternatives does not necessarily result in the same open space, soil, water and other impacts as does conversion to developed uses). (Draft EIR, pp. 5.1-12 to 5.1-13, 5.1-15, 5.1-19.) On balance, although the Draft EIR does not identify it as such, Alternative 1 should be considered to be the "Environmentally Superior Alternative" for the project under CEQA. Alternative 1 would meet the project objectives related to increasing flood protection, and unlike Alternatives 2 and 3, would not affect residences and other structures that could be affected by construction of a setback levee. Notwithstanding the consideration of Alternative 1 as the Environmentally Superior, some important environmental benefits associated with construction of a setback levee, such as changes in local flood hydrology upstream and downstream of the project area that would

provide higher levels of flood protection, would not occur with Alternative 1. (Draft EIR, pp. 8-12 to 8-18.)

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative. Alternative 2 includes the levee repair and strengthening activities of Alternative 1 but adds a setback levee in project segment 2 roughly in the same alignment as the ASB levee identified in the Y-FSFCP EIR. The setback area would occupy approximately 1,600 acres, and would require the removal of several residences and other structures, as well as the relocation of those residents. (Draft EIR, p. 8-8.) The use of the setback area as a floodway would conflict with existing land use designation and zoning of the setback area acreage, and thus, Alternative 2 results in an additional significant and unavoidable impact in the area of Land Use Conflicts, as compared to Alternative 1. (Draft EIR, pp. 5.1-14 to 5.1-15, 8-12, 8-15.)

However, Alternative 2 would provide the greatest degree of flood protection benefits of all of the Alternatives. As identified in Table 1-2, Alternative 2 would result in the greatest reductions in water surface elevations in the Feather River at the upper end of the levee setback area and at the confluence of the Feather and Yuba Rivers than Alternatives 1 or 3. (Draft EIR, pp. 1-4.) Another favorable factor is that, as identified in Table 1-2, Alternative 2 would result in the same or slightly higher water surface elevations downstream of the levee setback area than Alternatives 1 or 3, which minimizes downstream impacts. (*Id.*)

At the same time, due to the size of the setback area Alterative 2 would have a relatively higher magnitude of environmental impacts, and impacts to residences and other structures, than either Alternatives 1 or 3. (Draft EIR, pp. 8-12 to 8-19.) More precisely, Alternatives 2 and 3 have the same number of impacts that remain significant and unavoidable after mitigation, but the magnitude of the impacts would be relatively higher under Alternative 2 because the acreage of the setback area under Alternative 2 is larger than under Alternative 3. At the same time, of the acreage affected by Alternative 2, it is anticipated that a substantial portion could continue to be cultivated and that acreage would benefit in the long-term from increased flood protection. (Draft EIR, pp. 5.1-14.)

The flood protection benefits of Alternative 2 are highly desirable, and the balance of impacts to benefits suggests that approval of this Alternative would be appropriate, as described in the February 6, 2007 staff report. With the passage of State Proposition 1E and DWR's favorable response to TRLIA Feather River Setback Proposition 1E funding request, TRLIA has sufficient funding to implement Alternative 2. Alternative 2 meets the primary objective of achieving the designated level of flood protection as soon as possible.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative. Alternative 3 involves the same levee repair and strengthening activities as Alternative 1, and a setback levee in project segment 2 similar to that proposed under Alternative 2. The setback levee follows a different alignment, however, that results in a setback area of approximately 1,300 acres. Thus, fewer houses, structures, and other facilities would be affected

or need to be removed from the setback area under Alternative 3 than under Alternative 2. (Draft EIR, p. 8-9.) Nonetheless, as with Alternative 2, the use of the setback area as a floodway would conflict with existing land use designation and zoning of the setback area acreage results in an additional significant and unavoidable impact in the area of Land Use Conflicts, as compared to Alternative 1. (Draft EIR, pp. 5.1-18 to 5.1-19, 8-12, 8-15.)

Alternatives 2 and 3 have the same number of impacts that remain significant and unavoidable after mitigation. The acreage of the setback area under Alternative 3, however, is smaller than under Alternative 2. Thus, while both Alternative 2 and 3 have more significant and unavoidable impacts than Alternative 1, the magnitude of certain impacts (which ones, plus residences/structures) of Alternative 3 is slightly smaller than under Alternative 2. However, Alternative 3 would provide a lower degree of flood protection benefit than Alternative 2. (Draft EIR, pp. 1-4; 8-12 to 8-19.) Moreover, of the acreage affected by Alternative 2, it is anticipated that a significant portion could continue to be cultivated. (Draft EIR, pp. 5.1-14.)

Summary of Findings Regarding Alternatives. For all of the foregoing reasons, given the nature and type of environmental impacts when viewed in light of the benefits of each Alternative, the record indicates that the Board could reasonably choose to approve any one of the Alternatives. Given the imperative for the highest degree of flood control protection and the availability of funding, the Board finds that on balance, after considering environmental, economic, social, technological and other feasibility considerations, the highest public interest supports approval of Alternative 2 instead of the other Alternatives.

Under Alternative 2, the setback levee footprint and levee easements identified in Segment 2 would cover approximately 240-250 acres of agricultural land, and setting back the levee could indirectly result in the removal of more land from agricultural production by dividing land parcels and allowing periodic flooding of agricultural land. Construction of a detention basin would be required to prevent adverse flooding effects on area properties, and this would like occur on several hundred acres of agricultural land. These uses would conflict without County land use policies regarding the preservation of agricultural land and would be inconsistent with current land use and zoning designations for the area.

This is the only impact that could be mitigated from significant and unavoidable to less than significant levels through selection of another project alternative (Alternative 1). However, TRLIA has concluded that the benefits of Alternative 2 outweigh any environmental gain in this resource category that might be incurred by selecting Alternative 1 over Alternative 2. Alternative 1 also results in some impacts in this resource category. (Draft EIR, pp. 5.1-11 to p. 5.1-12.) Both Alternatives 1 and 3 would result in some conversion of agricultural land, however, in all instances the impact remains significant and unavoidable. Although Alternatives 1 and 3 would convert a relatively smaller amount of land than Alternative 2, TRLIA has concluded that the benefits of Alternative 2 implicate a stronger public interest as compared to those environmental gains. The continuing evolution of flood control knowledge over time suggests that the higher level of protection under Alternative 2 is warranted to protect existing

and planned communities and as a precautionary measure in case new information or changing circumstances reveals new risks in the future. Moreover, of the acreage affected by Alternative 2, conversion impacts are not the same as those associated with conversion to developed urban uses; the vast majority of the Important Farmland that could be "converted" under Alternative 2 (up to approximately 1,045 acres) would remain in an undeveloped condition, as habitat or fallow lands within the levee setback area created by these alternatives. (Final EIR, Response F.) It is anticipated that a substantial portion could continue to be cultivated and that acreage would benefit in the long-term from increased flood protection. (Draft EIR, pp. 5.1-14.)

c. Findings Regarding Suggestions for Modifying the Proposed Project and Variations On The Alternatives.

In addition to the reasoning contained in the responses to comments contained in the Final EIR, the Board provides the following additional explanation regarding commenter's' suggestions for analysis of alternatives:

Eminent Domain Implications for Discussion of Alternatives. Attorney Thomas Eres submitted comments on behalf of Hofman Ranch, in which he opined that "the potential adoption of a 'Resolution of Necessity' may impact the analysis of alternatives" and that "the issue of feasibility of alternatives in the context of eminent domain need [sic] to be addressed." Referring to Alternatives 2 and 3, the commenter seemed to be referring to the private ownership of the acreage that would be inside of a setback levee, if one were approved. As discussed in the responses to comments in the Final EIR, eminent domain proceedings and the accompanying Resolution of Necessity would only be needed if the landowners and TRLIA could not agree upon appropriate compensation for any private property that may be needed to accomplish the objectives of the project or that would otherwise require compensation. (Final EIR, Response G-15.)

Should TRLIA pursue eminent domain proceedings, a Resolution of Necessity would be required which would contain a finding that "the proposed project is planned or located in the manner that will be most compatible with the greatest public good and the least private injury." (Code Civ. Proc. § 1245.230(c)(2); *see also* § 1240.030(b).) As explained in the responses to comments in the Final EIR, there is a strong imperative for local flood control. Alternatives 2 and 3 provide greater flood control benefits than Alternative 1. Thus, although any of the three Alternatives would meet the requirements for eminent domain, if eminent domain proceedings were required, Alternative 2 would most easily meet the requirements.

The relocation of residents in a setback area may result in economic and social effects, as described in the EIR. TRLIA has determined that these effects are not significant, directly or indirectly. TRLIA has committed to pay compensation to relocated landowners and relocation assistance for eligible homeowners, tenants, businesses and farm operations under federal and state relocation statutes. (Draft EIR, pp. 5.1-16 to 5.1-17.) The Draft EIR reports

that as of the 2000 Census, there were 2,101 vacant housing units in Yuba County, with 312 of those units in the Marysville area. (Draft EIR, p. 5.1-17.) According to the U.S. Census Bureau, these numbers represent a 9.3% vacancy rate in Yuba County, and a 6.2% vacancy rate in Marysville. (US Census Bureau 2006.) Thus, the available data indicates there are sufficient existing housing units available in the project area to accommodate displaced residents under Alternative 2. (Draft EIR, p. 5.1-17.)

D. Statement of Overriding Considerations

1. Impacts That Remain Significant

As listed in Exhibit A, the following impacts of the FRLRP remain significant following adoption and implementation of the mitigation measures described in the Final EIR:

Number	Impact	Alt. 1	Alt. 2	Alt. 3
5.1-a	Conflicts with Land Use Planning and Policies Resulting from Levee Repairs and the Levee Setback.	LTS	SU	SU
5.1-b	Conversion of Important Farmland to Nonagricultural Uses Resulting from Levee Repairs and Strengthening.	SU	SU	SU
5.9-a	Temporary Emissions of ROG, NO_X, and PM_{10} during Construction.	SU	SU	SU
5.10-a	Temporary Increase in Noise Levels during Construction.	SU	SU	SU

2. Overriding Considerations Justifying Approval of Alternative 2

In accordance with CEQA Guidelines Section 15093, the Board has, in determining whether or not to approve the FRLRP, balanced the economic, social, technological and other benefits of the FRLRP against its unavoidable environmental risks, and has found that the benefits of the FRLRP outweigh the significant adverse environmental effects that are not mitigated to less-than-significant levels, for the reasons set forth below. This statement of overriding considerations is based on the Board's review of the Final EIR and other information in the administrative record.

The project is needed to help resolve the existing risk of flooding impacts in the identified area, as demonstrated by recent catastrophic flood events. Removing the potential for property and natural resource damage and destruction, personal injury and death, supports strong public, social and economic interests. The project would also address the deficiencies in the Feather River levee that have led to uncertainty and controversy surrounding planned and

ongoing development in the area, which is subject to a higher flood risk than previously believed. The continuing evolution of flood control knowledge over time suggests that the higher level of protection under Alternative 2 is warranted to protect existing and planned communities and as a precautionary measure in case new information or changing circumstances reveals new risks in the future. The additional flood protection will yield economic benefits in the form of reduced costs associated with flood insurance and flood-related property damage. Flood protection also results in an increased sense of security in the community, particularly among owners of property that has flooded in the past or has been in danger of flooding.

Two of the four significant unavoidable impacts of Alternative 2 are temporary: construction emissions of ROG, NO_X, and PM_{10} (Impact ASB-5.9-a) and construction-related increases in noise levels (Impact ASB-5.9-b). Alternative 2 would potentially result in long-term beneficial changes to air quality. (Draft EIR, pp. 5.9-25 to 5.9-26.) The Board has determined to adopt mitigation measures that will reduce these impacts to the extent feasible. (Mitigation Measures ASB-5.9-1, ASB-5.10-a.) The Board finds that the short-term air quality and noise impacts would be significant and unavoidable under all Alternatives, and that the flood protection and other long-term benefits provided by Alternative 2 outweigh these temporary impacts.

The remaining significant unavoidable impacts are the related impacts of conflicts with land use plans and policies (Impact ASB-5.1-a) and conversion of agricultural land to nonagricultural uses (Impact ASB-5.1-b). In part, conflicts with land use plans and policies are outside the jurisdiction of TRLIA, as described above and in the EIR. (Mitigation Measure ASB-5.1-a.)

The EIR concludes that the conversion of agricultural land is significant and unavoidable for any of the three alternatives. Alternative 1 could result in the conversion of up to 180 acres of farmland due to the construction of seepage/stability berms and a detention basin. (Draft EIR, pp. 5.1-12 to 5.1-13.) Alternatives 2 and 3 could result in the conversion of and/or loss of access to up to 1,045 acres or 720 acres, respectively, due to the construction of setback levees, although most of that conversion would not result in the same open space, soil, water, and other impacts that is typically associated with permanent conversion to developed uses. (Draft EIR, pp. 5.1-15, 5.1-19.) Implementation of any of the Alternatives would include compensating agricultural operators for temporary disturbance and/or permanent loss of agricultural lands. (Draft EIR, pp. 5.1-12, 5.1-14, 5.1-18.) In addition, improvements to the flood control system will provide increased flood protection to thousands of acres of valuable farmland in the project vicinity. (*Id.*)

Both Alternatives 1 and 3 would result in some conversion of agricultural land, however, in all instances the impact remains significant and unavoidable. Although Alternatives 1 and 3 would convert a relatively smaller amount of land than Alternative 2, TRLIA has concluded that the benefits of Alternative 2 implicate a stronger public interest as compared to those environmental gains. The continuing evolution of flood control knowledge over time

suggests that the higher level of protection under Alternative 2 is warranted to protect existing and planned communities and as a precautionary measure in case new information or changing circumstances reveals new risks in the future. Moreover, of the acreage affected by Alternative 2, conversion impacts are not the same as those associated with conversion to developed urban uses; the vast majority of the Important Farmland that could be "converted" under Alternative 2 (up to approximately 1,045 acres) would remain in an undeveloped condition, as habitat or fallow lands within the levee setback area created by these alternatives. (Final EIR, Response F.) It is anticipated that a substantial portion could continue to be cultivated and, as noted, that acreage would benefit in the long-term from increased flood protection. (*E.g.,* Draft EIR, pp. 5.1-14.) TRLIA has proposed, and the Board herein adopts, mitigation measures that will preserve the productivity of Important Farmland to the extent feasible by, for example, minimizing fragmentation, retaining contiguous parcels where practical, addressing access issues, providing productive topsoil, and addressing protection of existing utilities, strategically siting laydown and staging areas, and using existing roads for access. (Mitigation Measure ASB-5.1-b.)

The displacement of a small number of residences and other structures in the setback area under Alternative 2 may result in economic and social effects, as described in the EIR. (Draft EIR, pp. 5.1-17.) To the extent these are considered relevant to physical impacts under CEQA, the Board concludes that these effects are not significant. (*Id.*) TRLIA has committed to pay compensation to relocated landowners and relocation assistance for eligible homeowners, tenants, businesses and farm operations under federal and state relocation statutes. (Draft EIR, pp. 5.1-16 to 5.1-17.)

In short, implementation of Alternative 2 will result in additional flood protection, which in turn will yield economic benefits in the form of reduced costs associated with flood insurance and flood-related property damage. Flood protection also results in an increased sense of security in the community, particularly among owners of property that has flooded in the past or has been in danger of flooding. The Board finds that these social and economic benefits outweigh the impacts that cannot be reduced to less than significant levels, and warrant approval of Alternative 2 in spite of those remaining impacts. The Board finds that under all of the circumstances, the flood control benefits of Alternative 2 outweigh its environmental costs.

E. Record of Proceedings

Various documents and other materials constitute the record upon which the Board bases these findings and the approvals contained herein. The location and custodian of these documents and materials is Paul G. Brunner at Three Rivers Levee Improvement Authority.

F. Mitigation Monitoring and Reporting Program

In accordance with CEQA and the CEQA Guidelines, the Board must adopt a mitigation monitoring and reporting program to ensure that the mitigation measures adopted

herein are implemented in the implementation of the Proposed Project. The Board hereby adopts the Mitigation Monitoring Program for the Project attached to these Findings as Exhibit B.

G. Summary

1. Based on the foregoing findings and the information contained in the administrative record, the Board has made one or more of the following findings with respect to each of the significant environmental effects of the Proposed Project identified in the Final EIR:

a. Changes or alterations have been required in, or incorporated into, the Proposed Project which avoid or substantially lessen the significant environmental effects on the environment.

b. Those changes or alterations that are wholly or partially within the responsibility and jurisdiction of another public agency have been, or can and should be, adopted by that other public agency.

c. Specific economic, social, technological, or other considerations make infeasible the mitigation measures or alternatives identified in the Final EIR that would otherwise avoid or substantially lessen the identified significant environmental effects of the Proposed Project.

2. Based on the foregoing findings and information contained in the record, it is hereby determined that:

a. All significant effects on the environment due to approval of the Proposed Project have been eliminated or substantially lessened where feasible.

b. Any remaining significant effects on the environment found unavoidable are acceptable due to the factors described in the Statement of Overriding Considerations in Section II.D above.

III. RESOLUTION OF APPROVAL

NOW, THEREFORE, BE IT RESOLVED THAT:

The Board hereby takes the following actions and makes the following approvals:

A. The Board has certified the Final EIR in Section I, above.

B. The Board hereby adopts as conditions of approval all mitigation measures within the responsibility and jurisdiction of Three Rivers Levee Improvement Authority as set forth in Section II.B of the Findings, above.

C. The Board hereby adopts the Mitigation Monitoring Program for the Proposed Project as set forth in Exhibit B and discussed in Section II.F of the Findings, above.

D. The Board hereby adopts these Findings in their entirety as its findings for these actions and approvals.

E. The Board hereby adopts the statement of overriding considerations set forth herein.

F. Having certified the Final EIR, independently reviewed and analyzed the Final EIR, incorporated mitigation measures into the Proposed Project, and adopted Findings and a statement of overriding considerations, the Board hereby approves Alternative 2 set forth in the EIR as the Feather River Levee Repair Project. The Board also directs staff to file a Notice of Determination pursuant to CEQA Guidelines Section 15094, and to take other necessary and appropriate actions to implement this approval.

PASSED AND ADOPTED this 6th day of February 2007,

by the Board of Directors of Three Rivers Levee Improvement Authority, by the following vote:

AYES: Directors Brown, Crippen, Griego, Logue

NOES: None

ABSENT: Director Webb

ABSTAIN: None

Dan Logue

Vice Chairman

ATTEST:

DONNA STOTTLEMEYER

Secretary

APPROVED AS TO FORM:

Scott Shapiro

TRLIA Special Counsel

Exhibit A

Table 1-3b

SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
5.1 Land Use			
ASB-5.1-a: Conflicts with Land Use Planning and Policies Resulting from Levee Repairs and the Levee Setback. Levee repair and strengthening of the existing levee in Segments 1 and 3 would result in removal of small areas of agricultural land from production associated with installation of seepage/stability berms and other structures. The setback levee footprint and levee easements in Segment 2 would cover approximately 240–250 acres of agricultural land, and setting back the levee could indirectly result in the removal of more land from agricultural production by dividing land parcels and allowing periodic flooding of agricultural land. Construction of a detention basin would be required to prevent adverse flooding effects on area properties, and this would likely occur on several hundred acres of existing agricultural land. These uses would conflict with County land use policies regarding the preservation of agricultural land and would be inconsistent with the current land use and zoning designations for the area. Because of these inconsistencies, this impact would be **significant**.	S	**Resolve Inconsistencies between Proposed Uses of the Levee Setback Area and Yuba County Zoning.** TRLIA shall coordinate with the County Planning Department to appropriately address inconsistencies between proposed land uses and County-planned land uses and zoning designations. Before permanent changes in allowable land uses in the levee setback area need to be established (i.e., before degradation of the existing levee at the latest), TRLIA shall apply for a general plan amendment if necessary and for appropriate rezoning, a zoning amendment, or other measures determined by the Planning Department to be necessary to ensure the consistency of proposed land uses with zoning. Consistency is defined as land uses and activities permitted by the County in the levee setback area, as reflected by zoning and other land use guidelines, that do not conflict with the flood control function of the levee setback area. The approach to resolving any land use planning inconsistencies shall be determined by, and conducted in coordination with, the County Planning Department. Any necessary modifications of general plan land use designations or of zoning, or placement of restrictions on existing zoning, will be determined by the Planning Department and approved by the County Planning Commission and Board of Supervisors as appropriate.	SU
ASB-5.1-b: Conversion of Important Farmland to Nonagricultural Uses Resulting from Levee Repairs and the Levee Setback. Levee repair and strengthening activities in project Segments 1 and 3 could permanently remove up to approximately 10 acres of Prime Farmland from production. Relocation of Pump Station No. 3 could potentially	S	**Preserve the Agricultural Productivity of Important Farmland to the Extent Feasible.** It is not known at this time whether lands in the levee setback area would be retained in agricultural production, converted to habitat, or a mixture of both land uses. If lands classified as Important Farmland in the levee setback area are to be retained in agricultural production, the following measures would apply to these lands.	SU

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
convert up to 1 acre of Prime Farmland in Segment 2 to nonagricultural use. The levee setback footprint and levee easements in Segment 2 would permanently convert approximately 210 acres of Prime Farmland, 35 acres of Farmland of Statewide Importance, and 2 acres of Unique Farmland to nonagricultural uses, and would potentially convert several hundred additional acres of Important Farmland for the proposed detention basin. The ASB levee setback could potentially result in the conversion of up to approximately 1,025 acres of Prime Farmland, 10 acres of Farmland of Statewide Importance, and 10 acres of Unique Farmland to nonagricultural uses. Implementation of the levee setback also may indirectly lead to the conversion of additional Important Farmland to nonagricultural uses because some properties would be divided by the setback levee, which could make continued farming of some crops, or on some parcels, impractical. This impact would be **significant**.		To support the continued productive use of Important Farmland in the levee setback area in project Segment 2, TRLIA shall ensure that the following measures are implemented, to the extent feasible and practicable, in the design and implementation of the levee setback: (a) When selecting sites for borrow excavation, minimize the fragmentation of lands that are to remain in agricultural use. Where practical, retain contiguous parcels of agricultural land of sufficient size to support their efficient use for continued agricultural production. (b) Where the setback levee would transect agricultural properties and the continuation of agricultural use on the portions within the levee setback area would occur, ensure convenience of access to the levee setback properties sufficient to support ongoing agricultural operations. (c) Make the most productive salvaged topsoil from the levee footprint available to landowners with less productive agricultural lands in the vicinity of, but outside the levee setback area that could benefit from the introduction of good-quality soil. By agreement between TRLIA or landowners of affected properties and the recipient(s) of the topsoil, the recipient(s) would be required to work the topsoil into the agricultural lands where it is delivered. (d) Ensure that utilities currently in the levee setback area that are needed for ongoing agricultural uses, including wells, pipelines, and power lines, are appropriately relocated, replaced, or retrofitted to withstand flooding. Ensure that these systems and drainage systems are functioning as necessary after the project is in place so that agricultural uses are not unduly disrupted. In addition, TRLIA shall ensure that the following measures are	

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		implemented, to the extent feasible and practical, inside and/or outside the levee setback area: (a) Minimize the disturbance of Important Farmland and continuing agricultural operations during construction by locating construction laydown and staging areas on sites that are fallow, that are already developed or disturbed, or that are to be discontinued for use as agricultural land, and by using existing roads to access construction areas to the extent possible. (b) When selecting the site and configuration of the detention basin, minimize the fragmentation of agricultural lands and retain contiguous parcels of agricultural land of sufficient size to support their efficient use for continued agricultural production.	
ASB-5.1-c: Displacement of Existing Housing in the Levee Setback Area. Implementation of the ASB levee setback would result in the removal of five to 10 residences from the levee setback area. There are sufficient available residences in the area to accommodate these households; therefore, project implementation would not necessitate the construction of replacement housing elsewhere. Although CEQA does not require that economic and social effects be evaluated or considered significant impacts, it is acknowledged that displacement of five to 10 residences would have both economic and social effects on the occupants of these residences (finding replacement housing, moving to a new residence). However, appropriate compensation would be negotiated with landowners displaced by the project. In addition, eligible homeowners,	LTS	No mitigation is required.	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
renters/tenants, businesses, and farm operations would receive relocation assistance consistent with the Federal Uniform Relocation Act and the California Relocation Assistance Law. This impact would be **less than significant.**			
5.2 Geology, Soils, and Mineral Resources			
ASB-5.2-a: Risk of Geologic Hazards to the Levees. Characteristics of the soils along the proposed ASB setback levee alignment could lead to structural deficiencies or levee failure if not addressed in construction design. Although no active faults are in the vicinity of the existing levees or the setback levee alignment, some ground shaking is possible from distant sites. Effects on the stability of the proposed ASB setback levee would be no greater than effects on the existing levee. Construction according to design recommendations by the geotechnical engineers, independent reviews of the project design and construction by a Board of Senior Consultants (BOSC), and engineering review and approval by the Corps and The Reclamation Board would ensure the incorporation of appropriate features to address any potential structural instability of the levee. The setback levee would be engineered and constructed to modern standards with appropriate seepage control features and, therefore, would be more stable than the existing levee and unlikely to fail. This would be a **beneficial** effect.	B	No mitigation is required.	B
ASB-5.2-b: Soil Erosion Hazards Associated with Construction of the ASB Setback Levee. Although	LTS	No mitigation is required.	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES

THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
construction activities associated with levee repair and strengthening and installation of the ASB setback levee would disturb earth, thereby potentially accelerating erosion, construction disturbance would be temporary and soils in disturbed areas would be vegetated or otherwise stabilized after construction is complete. In addition, the levee setback area is nearly level and is well drained, and the risk of erosion and associated hazards is slight. Levee repair and strengthening activities and construction of the ASB setback levee would not expose persons or property to erosion hazards. This impact would be **less than significant**.			
ASB-5.2-c: Soil Erosion Hazards Associated with Flood Operations with the ASB Setback Levee. Floodwaters passing through the levee setback area could erode soil that is not currently subjected to flood flows on a frequent basis. However, levee construction would increase the width and decrease the depth and velocity of flood flows in the levee setback area, minimizing erosive forces. In addition, vegetative cover in the levee setback area (agriculture or habitat) would reduce the potential for erosion. This impact would be **less than significant.**	LTS	No mitigation is required.	LTS
5.3 Water Resources and River Geomorphology			
ASB-5.3-a: Temporary Effects on Water Quality Associated with Levee Repair and Strengthening Activities and Setback Levee Construction. Ground-disturbing activities associated with repairs and strengthening of the existing levees and	PS	**(1): Prepare a SWPPP, File an NOI, and Comply with the NPDES Stormwater Permit for Project Construction Activities.** This measure is identical to Mitigation Measure LS-5.3-a(1) above.	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
construction of the ASB setback levee could cause soil erosion and sedimentation of local drainages and the Feather and Yuba River channels. Construction activities could also discharge waste petroleum products or other construction-related substances that could enter these waterways in runoff. Because the release of soil or other materials into these waterways could adversely affect river water quality, this impact would be **potentially significant.**		**(2): Obtain a Use Permit from Yuba County and Comply with Permit Conditions for Erosion Control.** This measure is identical to Mitigation Measure LS-5.3-a(2) above.	
ASB-5.3-b: Disruption of Local Drainage Systems by the Levee Setback. The ASB setback levee would cross existing drainage infrastructure and sever parts of the drainage system for the local area. Drainage patterns within the levee setback area could be changed by project implementation as well. Because interruption of drainage patterns could cause or exacerbate local flooding, this impact would be **significant.**	S	**Coordinate with RD 784 to Modify Drainage Facilities that Would Be Affected by the Levee Setback and Ensure Appropriate Functioning of the Local Drainage System.** TRLIA or its primary construction contractor shall coordinate with RD 784 to evaluate local drainage needs before and after construction of the setback levee and shall prepare and implement a plan for modification of the portion of the drainage system that would be affected by the levee setback. A drainage study shall be prepared that evaluates the effects on local drainage that would result from the levee setback and any proposed changes in land uses in the levee setback area. The study shall consider the design flows of the existing facilities that cross the proposed setback levee footprint (e.g., Lateral 7/8 and the Plumas Lake Canal). It shall develop appropriate plans for relocation or other modification of these facilities and construction of new facilities, as needed, to ensure equivalent functioning of the system during and after construction of the setback levee. Facility modification will include relocating Pump Station No. 3, and may include removing, filling, and/or rerouting drainage canals and culverts; regrading drainage alignments to redirect drainage; constructing new ditches and	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		canals; and installing new culverts. The plan shall also consider the continuing and proposed uses of the levee setback area and shall incorporate appropriate drainage requirements for those uses to prevent any unintended flooding from stormwater runoff. The plan shall integrate environmental mitigation requirements and drainage of restored borrow sites to the extent feasible and practical. The final plan shall be approved by RD 784. TRLIA and its construction contractor(s) shall ensure that the necessary modifications are implemented without interruption of the adequate functioning of the drainage system. TRLIA shall also ensure that any necessary environmental review requirements have been met before the drainage modifications are implemented.	
ASB-5.3-c: Changes in Local Flood Hydrology Resulting from the Levee Setback. Setting back the left bank Feather River levee along the ASB setback levee alignment would decrease flood stages on the river. The levee setback would also provide a well-designed, well-constructed levee that would be more reliable and less subject to seepage than the existing levee. These changes would improve local flood protection. This effect would be **beneficial.**	B	No mitigation is required.	B
ASB-5.3-d: Changes in Flood Hydrology Downstream of the Setback Levee. The ASB levee setback would lower water levels upstream of the levee setback area, which could increase flows downstream of project Segment 2. This condition could lead to increased flooding downstream of Segment 2 if flood events should occur. However,	LTS	No mitigation is required.	LTS

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THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
the passage of floodwaters downstream to the Feather River would increase floodwater elevation within adequately sized levees, and the increased potential for levee failure and flooding downstream would be very slight. In addition, the implementation of Forecast-Coordinated Operations of Lake Oroville and New Bullards Bar Reservoir would reduce peak flows in the Feather-Yuba River system, and hence downstream of the levee setback area. Therefore, this impact would be **less than significant.**			
ASB-5.3-e: Change in Water Demand and Available Water Supply Resulting from the ASB Levee Setback. Implementation of the ASB levee setback would remove approximately 240–1,300 acres of land from irrigated agricultural use along the proposed setback levee footprint and in the setback area. Alternative uses (e.g., levee, habitat restoration) are not expected to increase demand for water supply but, rather, are expected to decrease water use. This would be a **beneficial** effect.	B	No mitigation is required.	B
ASB-5.3-f: Changes in Groundwater Levels Resulting from Installation of Slurry Cutoff Walls and the Levee Setback. Slurry cutoff walls that would be installed to control seepage in the existing Feather River and Yuba River levees in project Segments 1 and 3 and in the ASB setback levee in Segment 2 could restrict groundwater flow and affect groundwater levels. Potential consequences are localized changes in well water levels and/or high groundwater levels east of the	LTS	No mitigation is required.	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES

THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
setback levee and east and south of the locations where slurry cutoff walls are installed in Segments 1 and 3. Such changes are not expected to substantially affect water supply or adversely affect land uses. This impact would be **less than significant.**			

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
ASB-5.3-g: Long-Term Effects on Water Quality Resulting from the Levee Setback. Potentially hazardous materials related to agricultural activities could be transported downstream when the levee setback area becomes inundated during flood events. These materials could contaminate floodwater and adversely affect river water quality. Because of the potential for adverse effects on water quality in the Feather River, this impact would be **potentially significant.** Public Safety?	PS	**(1): Conduct a Phase I Environmental Site Assessment for the Levee Setback Area and Implement Recommendations.** Before the start of any ground-disturbing construction activity, TRLIA or its primary construction contractor shall have a qualified hazardous waste specialist perform a Phase I Environmental Site Assessment of the levee setback area to identify potential sources of surface and buried contaminants, and provide a report of assessment findings. The assessment shall include the following: ▪ review of available information on property history, including, as appropriate, historical and current topographic maps, aerial photographs, property title and permit information, interviews of environmental regulatory agency and Yuba County personnel, and interviews of current occupants and landowners regarding the current and past uses of the land; ▪ review of federal, state, and county governmental records and databases to determine whether any sites in the area are listed as hazardous waste sites; and ▪ reconnaissance-level surveys to observe visual evidence of hazardous materials use. A written report on the findings of the assessment, including recommendations for the disposition of any identified hazardous waste sites or potential hazardous waste sites, shall be provided to TRLIA. TRLIA or its construction contractor(s) shall implement recommendations made in the Phase I report. If hazardous materials or wastes are identified, recommendations could include, but would not be limited to, a Phase II assessment or cleanup of known identified hazardous waste sites. Presence of hazardous wastes would be determined using waste classification	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		protocols described in CCR Title 22. **(2): Evaluate Levee Borrow Material for Potential Contaminants in Coordination with the RWQCB.** Before the start of construction, TRLIA or its primary construction contractor shall have a qualified hazardous materials specialist collect and evaluate representative soil samples from the existing levee sections that would be used as sources of borrow, and from potential borrow sites. The soil samples shall be evaluated for contaminant residues (e.g., trace metals, organochlorine pesticides, polychlorinated biphenyls) that may be encountered in excavation and grading activities. This evaluation shall be conducted to address any requirements of the Central Valley RWQCB as part of the RWQCB's permitting and approval process for the project (e.g., Section 401 certification). Wastes that are encountered at hazardous levels shall be treated in accordance with CCR Title 22 procedures for hazardous materials reporting and disposal. Where the evaluation of soil samples detects the presence of wastes that are not present at hazardous levels, the results of the evaluation shall be reported to the RWQCB for classification in the RWQCB's designated waste classification program, and the RWQCB will determine the acceptability of the material for levee construction based on the potential of the waste to impair water quality and public health. Borrow material used for construction of the waterside levee face or other features with soil exposure to the aquatic environment (e.g., new drainage channels) that is deemed unacceptable by the RWQCB shall be properly disposed of in a landfill or made available for other approved uses. **(3): Remove Nonhazardous Waste and Debris from the Levee Setback Area.** Before the beginning of the first season of potential flood operations with the setback levee in place, TRLIA	

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		or its primary construction contractor shall ensure the removal from the levee setback area of all large slash and wood piles, nonhazardous waste dumps, and other nonhazardous debris that could adversely affect water quality or create a hazard if carried downriver in flood flows. All removed materials shall be properly disposed of in approved off-site landfills.	
ASB-5.3-h: Changes in Floodplain Sediment Deposition Associated with the Levee Setback. Inundation of the ASB levee setback area would result in the transport and deposition of sediments in the setback area that may contain elevated concentrations of trace metals and/or organic constituents. Because it is unlikely that the sediment constituent concentrations resulting from inundation would be any higher than existing concentrations in the levee setback area, this impact would be **less than significant.**	LTS	No mitigation is required.	LTS
ASB-5.3-i: Changes in Geomorphic Processes Along the River Channels Resulting from the Levee Setback. Increasing the conveyance area of the Feather River floodway along the ASB setback levee alignment would alter water velocities and depths in the existing river channel and floodway in this area and upstream during flood events large enough to inundate the levee setback area (greater than an approximately a 3-year flow). These changes in velocities and depths could lead to decreased shear stresses from Star Bend to just below Shanghai Bend (project Segment 2) and slightly increased shear stresses at Shanghai Bend (Segment 3) and some distance upstream on both	LTS	No mitigation is required.	LTS

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THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
the Feather River and the Yuba River. Shear stresses would not change downstream of the levee setback area. Portions of the riverbanks and channel bed along the Feather and Yuba Rivers where shear stresses increase could experience minor increases in erosive forces. However, any increases would not be sufficient to result in a substantial increase in the mobilization and/or deposition of sediments. This impact would be **less than significant.**			
ASB-5.3-j: Changes in Geomorphic Processes Along the Project Levees Resulting from the ASB Levee Setback. Increasing the conveyance area of the Feather River floodway along the ASB setback levee alignment would alter water velocities and depths in the existing floodway in this area and upstream during flood events large enough to inundate the levee setback area (greater than an approximately a 3-year flow). These changes in velocities and depths would lead to decreased shear stresses along the right and left bank Feather River levees from Star Bend to just below Shanghai Bend (project Segment 2) and increased shear stresses along the levees at Shanghai Bend (Segment 3) and some distance upstream on both the Feather River and the Yuba River. Shear stresses along the levees would not change downstream of the levee setback area. Portions of the levee area along the Feather and Yuba Rivers where shear stresses increase could experience minor increases in erosive forces. Any increases in shear stresses would not be sufficient to result in a substantial increase in the mobilization	LTS	No mitigation is required.	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
and/or deposition of sediments or increase exposure of persons or private property to flood hazards (i.e., through damage to the levees). This impact would be **less than significant.**			
5.4 Fisheries			
ASB-5.4-a: Loss of Fish Habitat during Levee Repair and Strengthening Activities and Setback Levee Construction. Construction-related increases in sediments, turbidity, and contaminants could adversely affect fish habitats immediately adjacent to and downstream of project construction activities, possibly resulting in adverse effects on fish species listed or proposed for listing as threatened or endangered under ESA. This impact would be **potentially significant.**	PS	**(1): Prepare a SWPPP, File an NOI, and Comply with the NPDES Stormwater Permit for Project Construction Activities.** This measure is identical to Mitigation Measure LS-5.3-a(1) in Section 5.3, "Water Resources and River Geomorphology." **(2): Obtain a Use Permit from Yuba County and Comply with Permit Conditions for Erosion Control.** This measure is identical to Mitigation Measure LS-5.3-a(2) in Section 5.3, "Water Resources and River Geomorphology." **(3): Obtain and Comply with Terms and Conditions of a Streambed Alteration Agreement for Construction Activities Associated with the Setback Levee.** Three Rivers Levee Improvement Authority (TRLIA) or its representative shall consult with DFG regarding potential disturbance to fish habitat as part of the process for obtaining a streambed alteration agreement, pursuant to Section 1602 of the California Fish and Game Code, for construction work associated with the setback levee. TRLIA shall comply with conditions set forth in the streambed alteration agreement to protect fish habitat.	LTS
ASB-5.4-b: Loss of Overhead Cover and Instream Woody Material Associated with Setback Levee Construction. In project Segment 2, vegetation may need to be removed to allow drainage from the levee setback area to the river channel, or it may be cleared at the waterside toe of	LTS	No mitigation is required.	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
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Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
the existing levee to accommodate levee removal. The loss in overhead cover for fish would be limited and temporary, however, and revegetation would occur over time. Therefore, this impact would be **less than significant.**			
ASB-5.4-c: Effects on Habitat from Contaminants in Borrow Material. If contaminants are present in soil in the levee setback area or in borrow material used for the setback levee, they could be released when the area is inundated during flood events, resulting in harm to sensitive fish and habitat. This impact would be **potentially significant**.	PS	**(1): Conduct a Phase I Environmental Site Assessment for the Levee Setback Area and Implement Recommendations.** This measure is identical to Mitigation Measure ASB-5.3-g(1) in Section 5.3, "Water Resources and River Geomorphology." **(2): Evaluate Levee Borrow Material for Potential Contaminants in Coordination with the RWQCB.** This measure is identical to Mitigation Measure ASB-5.3-g(2) in Section 5.3, "Water Resources and River Geomorphology." **(3): Remove Nonhazardous Waste and Debris from the Levee Setback Area.** This measure is identical to Mitigation Measure ASB-5.3-g(3) in Section 5.3, "Water Resources and River Geomorphology."	LTS
ASB-5.4-d: Fish Stranding Following Flooding of the Levee Setback Area. Following construction of the setback levee, the levee setback area may contain depressions where water could pond following inundation and fish could become trapped as floodwaters recede to the main river channel. Stranded fish, particularly juvenile chinook salmon and steelhead, would be exposed to predators and increasing water temperatures; with no means to return to the river, they would inevitably die. This impact would be **significant.**	S	**Develop and Implement a Drainage and Grading Plan that Minimizes Loss or Incidental Loss of Fish from Stranding.** TRLIA and its primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize the potential for fish stranding in the levee setback area: (a) Plan and implement drainage improvements. TRLIA or its designated construction contractors, through a combination of grading and drainage improvements, shall minimize the potential for floodwater to pond in the levee setback area in such a way that substantial numbers of fish become stranded and consequently become exposed to hostile environments (warm water temperatures and increased predation).	LTS

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THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		As part of the development of the final design for the levee setback area, TRLIA or its representatives shall determine the specific topographic and hydrologic characteristics of the levee setback area and shall define the anticipated flooding regime (depth, duration, and extent of flooding), drainage patterns, and potential for fish stranding risks there. The final project design shall include recontouring as necessary to ensure complete drainage and provide fish passage back to the main river channel as floodflows recede from the levee setback area. Features with substantial stranding risk shall be identified for filling and/or grading. Complete drainage is important to reduce the risk of stranding; however, maintaining some seasonal aquatic habitat in the levee setback area and/or hydrologic connectivity to the Feather River may also be important features if enhancement of fish habitat and production is selected as a management activity in the levee setback area. Before the design of the setback levee and levee setback area is finalized, TRLIA or its representatives shall obtain the approval of DFG and NMFS indicating that the planned drainage and grading features are sufficient to address concerns about fish stranding potential, similar to the process used for the Feather-Bear Rivers Levee Setback Project currently under construction downstream. The features of the setback levee and levee setback area shall be constructed in accordance with the approved final design. (b) <u>Monitor the success of the drainage features and adjust if necessary</u>. A long-term mitigation monitoring plan shall be developed by a qualified biologist on behalf of TRLIA and shall be approved by DFG and NMFS before implementation of the levee setback. This monitoring plan	

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THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		shall evaluate the effectiveness of the grading and drainage features in the levee setback area in reducing the risk of fish stranding and the stability of the drainage features and shall determine the need for maintenance or modification. The monitoring plan shall include provisions for remediation should the design of the levee setback area prove to be unsuccessful in preventing fish stranding. These measures shall include, as appropriate, such activities as regrading or filling depressions in the levee setback area. The recommended monitoring scheme shall include annual monitoring for a period of 5 years following the removal of any part of the existing levee. Additional monitoring may be required for areas where remediation is necessary. Monitoring is recommended to include the following actions: ▪ Visual assessment of the levee setback area by a qualified biologist before the flood season (i.e., by October 31). This assessment should note any substantial changes in the overall structure since implementation of the final design for the area, including reestablishment of vegetation and the presence of "holes" or pits. ▪ A visual survey by a qualified biologist at the end of each event that floods the levee setback area (i.e., after the recession of waters that inundate the floodplain). This survey should identify whether there is any ponding that would result in fish stranding, or whether channels have formed that flow through completely to the low-flow channel of the Feather River. Following each flood season (i.e., after April 16), a letter report shall be submitted to NMFS and DFG summarizing	

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		the overall condition of the floodplain area and any changes that have occurred from the previous year(s). If any remediation measures are required, they shall be outlined in the letter report, along with a schedule specifying when the remediation activities will occur. Appropriate remediation measures shall be implemented as soon as is practicable to minimize the potential for fish stranding while maintaining the desired habitat values (if habitat enhancement is included in the floodplain area) and hydraulic characteristics of the area. The performance of the mitigation measure shall be considered successful if there is no isolated standing water and/or barriers to fish passage capable of resulting in substantial fish stranding following a flood event that inundates the levee setback area.	
ASB-5.4-e: Increased Aquatic and Riparian Habitat in the Levee Setback Area. Setting back the Feather River levee in project Segment 2 could allow the expansion of the available aquatic and riparian habitat corridor and could improve the success of fish species that use the area. This effect would be **potentially beneficial.**	PB	No mitigation is required.	PB
5.5 Terrestrial Biological Resources			
ASB-5.5-a: Effects on General Biological Resources. Levee repair and strengthening activities in project Segments 1 and 3 would temporarily disturb ruderal habitat on the levee slopes and adjacent riparian and agricultural land. Construction of the ASB setback levee in Segment 2 would result in loss of primarily agricultural land. Agricultural	LTS	No mitigation is required.	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
lands could also be lost at potential borrow and detention basin sites. These temporary impacts and potential permanent land use changes would affect habitat for many common plant and wildlife species. Although local populations would be reduced by these activities, these species are locally and regionally abundant. This impact would be **less than significant.**			
ASB-5.5-b: Effects on Sensitive Habitats. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities would result in disturbance and/or loss of sensitive habitats, including jurisdictional wetlands, other waters of the United States, and riparian habitats. This impact would be **significant.**	S	**Avoid Disturbance of Sensitive Habitat to the Extent Feasible and Comply with Corps and DFG Processes to Mitigate Unavoidable Effects.** This measure is identical to Mitigation Measure LS-5.5-b above.	LTS
ASB-5.5-c: Loss of Special-Status Plants. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities could result in the loss of rose mallow and Wright's trichocoronis if they are present in areas that would be disturbed during these activities. This impact would be **potentially significant.**	PS	**Conduct Detailed Special-Status Plant Surveys and Establish Construction Buffers as Necessary to Minimize Effects on Special-Status Plants.** This measure is identical to Mitigation Measure LS-5.5-c above.	LTS
ASB-5.5-d: Effects on Valley Elderberry Longhorn Beetle. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities could result in loss of blue elderberry shrubs that are occupied by valley elderberry longhorn beetles. This impact would be **potentially significant.**	PS	**Conduct Protocol-Level Surveys, Establish Buffers, and Implement a Mitigation Plan as Necessary to Minimize Effects on Valley Elderberry Longhorn Beetle.** This measure is identical to Mitigation Measure LS-5.5-d above.	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
ASB-5.5-e: Effects on Northwestern Pond Turtle. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities would result in disturbance and/or loss of suitable aquatic habitat for northwestern pond turtle and could result in direct loss of individuals. This impact would be **potentially significant.**	PS	**Conduct Surveys as Part of Dewatering Activities and Minimize Effects on Northwestern Pond Turtle.** This measure is identical to Mitigation Measure LS-5.5-e above.	LTS
ASB-5.5-f: Effects on Giant Garter Snake. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities would result in disturbance and/or loss of suitable aquatic and upland habitat for giant garter snake. Construction activities also have potential to result in direct take of individuals. This impact would be **significant.**	S	**Implement Applicable Take Minimization Measures and a Mitigation Plan as Necessary for Giant Garter Snake.** This measure is identical to Mitigation Measure LS-5.5-f above.	LTS
ASB-5.5-g: Effects on Swainson's Hawk and Other Nesting Raptors. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities would result in disturbance and/or loss of suitable nesting and/or foraging habitat for Swainson's hawk and other raptors and could result in loss of active nests. This impact would be **potentially significant.**	PS	**(1): Conduct Preconstruction Surveys and Protect Active Nests to Minimize Effects on Swainson's Hawk.** This measure is identical to Mitigation Measure LS-5.5-g(1) above. **(2): Conduct Preconstruction Surveys, Protect Occupied Burrows, and Relocate Individuals as Necessary to Minimize Effects on Burrowing Owl.** This measure is identical to Mitigation Measure LS-5.5-g(2) above. **(3): Conduct Preconstruction Surveys and Protect Active Nests to Minimize Effects on Other Nesting Raptors.** This measure is identical to Mitigation Measure LS-5.5-g(3) above.	LTS
ASB-5.5-h: Effects on Other Special-status Birds. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities would result in disturbance and/or loss of potential nesting and/or foraging habitat for several	LTS	No mitigation is required.	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
special-status bird species. Special-status species are unlikely to nest in areas that would be affected, and large areas of nesting and foraging habitat of equal or higher quality are available elsewhere in the project area. Therefore, this impact would be **less than significant.**			
ASB-5.5-i: Effects on Pacific Western Big-Eared Bat. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities would not affect suitability of foraging habitat or result in loss of important roost or maternity sites. This impact would be **less than significant.**	LTS	No mitigation is required.	LTS
ASB-5.5-j: Effects on Wildlife Corridors. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities would result in limited temporary disturbance of the Feather River and Yuba River habitat corridors and minor corridors associated with canals and ditches in the levee setback area. However, such disturbance is not expected to affect overall use of these corridors by wildlife. This impact would be **less than significant.**	LTS	No mitigation is required.	LTS
5.6 Recreation			
ASB-5.6-a: Temporary Changes in Recreational Opportunities during Levee Repairs and Setback Levee Construction. Construction noise could disrupt recreational uses in the project area, particularly in areas adjacent to the existing levee. Some wildlife species present in or inhabiting	LTS	No mitigation is required.	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
natural areas are likely to be disturbed by noise and by the presence of project construction crews and equipment. Portions of the Feather River State Wildlife Area in project Segment 1 may need to be closed temporarily to hunting and other recreational activities for safety reasons while adjacent sections of the existing Feather River levee are being repaired. There would be no public access to the Star Bend Boat Launch and Fishing Access for several days while levee repairs were conducted in this area. Although these temporary disturbances may affect the recreation experience for bird-watchers, hunters, boaters, and other recreational users, displaced recreational uses could be accommodated by other nearby facilities (Whitmore, pers. comm., 2006). For this reason, and because of the temporary nature of this effect, this impact would be **less than significant**.			
ASB-5.6-b: Long-Term Changes in Recreational Opportunities Resulting from Levee Repairs and Setback Levee Construction. Implementing levee repairs along project Segments 1 and 3 would have little or no effect on recreational uses in the Lake of the Woods Management Unit or along the Feather River channel in these project segments. Implementing the levee setback in Segment 2 would slightly modify Feather River flood stage elevations in the project vicinity during high flows, possibly affecting recreational uses, and could affect survival rates of wildlife following high-flow periods, which could temporarily affect associated wildlife-related	LTS	No mitigation is required.	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
recreation. The changes in Feather River flood stage elevations that would result from expansion of the Feather River floodway in Segment 2, however, would be infrequent, of short duration, and during periods when river stage is already high; therefore, no new effects on recreational uses are expected. Sections of the existing Feather River levee would be left in place as part of the proposed project, which would minimize losses of wildlife that could adversely affect long-term recreational activities. This impact would be less than significant.			

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
5.7 Aesthetic Resources			
ASB-5.7-a: Temporary Changes in Visual Resources Associated with Levee Repairs and Setback Levee Construction. Levee repair and strengthening activities and construction of the ASB setback levee would temporarily reduce the aesthetic qualities of views by introducing earthmoving equipment and other construction equipment, materials, and work crews into the viewshed of recreationists, motorists on SR 70 and Feather River Boulevard, workers in nearby farming areas, and residents of the area. However, the construction areas would typically be distant from and/or screened from most viewers. Where residents would be near the construction area (e.g., in project Segment 3), construction would pass by these areas relatively quickly and changes in aesthetic conditions would be short term and temporary. For these reasons, this impact would be **less than significant.**	LTS	No mitigation is required.	LTS
ASB-5.7-b: Changes in Light and Glare. There would be no substantial sources of light or glare associated with levee repairs or with the long-term presence of the ASB setback levee and detention basin. However, equipment staging areas may be temporarily lit at night during construction, and portions of the construction areas may also need to be lit at night. Although such nighttime lighting may be visible from various residences, particularly in project Segment 3, in most locations views of the construction areas would be largely shielded by	LTS	No mitigation is required.	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
orchards, other vegetation, and structures. Where lit construction areas are visible, lighting would be short term and temporary. For these reasons, this impact would be **less than significant.**			
ASB-5.7-c: Long-Term Modifications of Views from Levee Repairs and Installation of the Setback Levee. Levee repair and strengthening activities would not dramatically change the appearance of project Segments 1 and 3. Construction of the ASB setback levee would change the appearance of Segment 2. However, all three project segments are of low to moderate aesthetic value, there would be no substantial adverse effect on any scenic vista, and these changes would not substantially alter the general character of views of the area. This impact would be **less than significant.**	LTS	No mitigation is required.	LTS
5.8 Cultural Resources			
ASB-5.8-a: Damage to or Destruction of Prehistoric Archaeological Site CA-Yub-5. Prehistoric archaeological site CA-Yub-5, which may be eligible for listing in the CRHR and NRHP, could be damaged or destroyed by construction activities or by inundation or scouring when flood flows pass through the levee setback area. Because this site may be a significant cultural resource, this impact would be **potentially significant**.	PS	**Evaluate the Significance of Archaeological Site CA-Yub-5 and, If Determined to Be Significant, Protect the Site from Damage and/or Conduct Data Recovery Excavation.** TRLIA shall have a qualified archaeologist evaluate the extent and significance/eligibility for NRHP and CRHR listing of site CA-Yub-5 through test excavations and analysis of the site's stratigraphy and artifactual constituents. If the site is determined to lack eligibility for NRHP and CRHR listing and is not found to be a significant cultural resource under CEQA, the archaeologist shall report these findings in a site investigation report and ensure that all remains discovered at the site are recorded and reported in accordance with professional practices, and no further protective	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		measures will be necessary. If intact stratigraphy, features, additional human remains, or artifacts indicate that the site may be eligible for NRHP or CRHR listing and therefore a significant historical resource according to CEQA criteria, TRLIA shall implement one or both of the measures described below in consultation with a professional archaeologist familiar with CA-Yub-5 to ensure that no significant cultural resources are damaged there. Two basic approaches are described: protecting the site from damage and conducting data recovery at the site. All site testing shall be conducted in consultation with appropriate Native American representatives designated by the NAHC, and a Native American monitor shall be present for monitoring during any excavation. <u>Option 1: Protect CA-Yub-5 from Damage</u> CA-Yub-5 can be protected from direct construction damage if the setback levee is realigned such that the site is beyond the footprint of ground-disturbing levee construction activity. This would require moving the levee alignment to the east of the site boundaries, thus placing the entire site within the levee setback area. It would be highly impractical to move the alignment to the west to place the site outside the project site and thereby avoid damaging it. Based on characteristics observed during archaeological field surveys, it is estimated that the setback levee would need to be constructed approximately 500 feet west of the proposed alignment in the area of CA-Yub-5 to ensure complete avoidance of the site. Geotechnical considerations render such a western shift of the alignment unrealistic because it would place this portion of the levee on a far less stable foundation (old riverbed) than under the proposed alignment. Once situated within the levee setback area (i.e., the expanded floodway), the site should be protected from future erosion and	

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		scour from surface flows, as well as human disturbance, through the use of engineered features and/or strategic plantings. In addition, sufficient site data should be collected and analyzed to establish the important archaeological characteristics of the site. One of the most potentially significant characteristics of CA-Yub-5 is the presence of at least 12 inches of midden soil, which can be a source of information regarding the age of the site (through radiocarbon dating) and prehistoric diets and paleoenvironmental reconstruction (through microconstituent and chemical analyses). Because floodwaters passing through the levee setback area could alter the soil properties that permit accurate radiometric dating or hasten the degradation of macrobotanical and microbotanical remains, scientific data would need to be collected, recorded, and reported before the site is subjected to inundation. It has been previously suggested that the site may be protected from future damage by use of a protective covering that is impermeable to water, which is also termed "capping." However, "capping" CA-Yub-5 to protect it from water damage would be very impractical, if not impossible. It would be necessary to have a clear definition of the horizontal and vertical boundaries of CA-Yub-5, and the site would need to be completely encased in the covering so that it would be protected from saturation from all sides, including rising groundwater from below. <u>Option 2: Conduct Data Recovery at CA-Yub-5</u> Data recovery through destructive excavation is considered an acceptable mitigation measure for damage to archaeological sites if other mitigation measures are less feasible or wholly infeasible. The purpose of data recovery is to obtain scientifically consequential information from an archaeological site that would be partially or completely destroyed. Although much of the work	

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		required for data recovery is similar to that conducted during test excavations, the requirements for data recovery call for more extensive manual and perhaps mechanical excavation. Recovered materials shall be subjected to laboratory analysis (e.g., stone tool analysis, faunal analysis, radiocarbon assays, and obsidian hydration studies), and a report and interpretive material shall be prepared that documents the site investigation and findings.	
ASB-5.8-b: Damage to or Destruction of Resources Associated with Prehistoric Archaeological Sites CA-Yub-13 and CA-Yub-14. This impact would be the same as Impact LS-5.8-a, described under Alternative 1 above. For the same reasons as described above, this impact would be **potentially significant**.	PS	**(1): Conduct Further Evaluation and Subsurface Testing to Determine Whether Proposed Levee Improvements Could Damage Significant Resources Associated with Prehistoric Archaeological Sites CA-Yub-13 and CA-Yub-14.** This measure is identical to Mitigation Measure LS-5.8-a(1) above. **(2): Monitor Ground-Disturbing Activities in the Vicinity of Prehistoric Archaeological Sites CA-Yub-13 and CA-Yub-14.** This measure is identical to Mitigation Measure LS-5.8-a(2) above.	LTS
ASB-5.8-c: Damage to or Destruction of Cultural Resources in Unsurveyed Areas. Portions of the project area could not be surveyed for cultural resources because of ground conditions and lack of site access, and potential borrow or staging areas also have not been surveyed. Significant cultural resources could be present in these areas, and could be damaged by project-related ground-disturbing activities. This impact would be **potentially significant**.	PS	**Survey Unexamined Areas before Project Ground-Disturbing Activities and Implement Further Mitigation As Necessary.** This measure is identical to Mitigation Measure LS-5.8-b above.	LTS
ASB-5.8-d: Damage to or Destruction of Undocumented Buried Archaeological Resources during Construction. This impact would be similar to Impact LS-5.8-c, described under Alternative 1	PS	**Stop Work and Implement Measures to Protect Archaeological Resources If Discovered during Ground-Disturbing Activities.** This measure is identical to Mitigation Measure LS-5.8-c above.	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
above. In addition, ground-disturbing activities associated with the proposed levee setback in project Segment 2, such as construction of the slurry cutoff wall and the setback levee foundation, have the potential to damage or destroy previously unidentified archaeological resources in the setback levee construction area. For the same reasons as described for Alternative 1, this impact would be **potentially significant**.			
ASB-5.8-e: Damage to or Destruction of Undocumented Human Remains during Construction. This impact would be similar to Impact LS-5.8-d, described under Alternative 1 above. In addition, ground-disturbing activities associated with the proposed levee setback in project Segment 2, such as construction of the slurry cutoff wall and the setback levee foundation, have the potential to damage or destroy undocumented human remains in the setback levee construction area. For the same reasons as described for Alternative 1, this impact would be **potentially significant**.	PS	**If Human Remains are Discovered during Ground-Disturbing Activities, Stop Work and Comply with State Laws Pertaining to the Discovery of Human Remains.** This measure is identical to Mitigation Measure LS-5.8-d above.	LTS
5.9 Air Quality			
ASB-5.9-a: Temporary Emissions of ROG, NO_X, and PM_{10} during Construction. Maximum daily emissions of ROG, NO_X, and PM_{10} associated with levee repair and strengthening activities in project Segments 1 and 3 and construction of the Above Star Bend (ASB) setback levee in Segment 2 would exceed FRAQMD's recommended significance thresholds and contribute to existing nonattainment	S	**Implement FRAQMD Pollution-Control Measures to Minimize Temporary Emissions of ROG, NO_X, and PM_{10} during Construction.** This measure is identical to Mitigation Measure LS-5.9-a above.	SU

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
conditions for ozone and PM_{10} in the NSVAB. This impact would be **significant**.			
ASB-5.9-b: Long-Term Changes in Emissions of ROG, NO_X, and PM_{10} Associated with Levee Repairs and Strengthening and the Levee Setback. The proposed levee repairs and strengthening in project Segments 1 and 3 and the ASB levee setback in Segment 2 would be expected to contribute only minimally, if at all, to long-term emissions of pollutants through vehicle trips related to occasional maintenance activities. The potential cessation of agricultural uses on some lands in the levee setback area could result in a decrease in long-term pollutant emissions in this area, particularly PM_{10} emissions associated with agricultural land disturbance and burning operations. Such a reduction would be a small **potentially beneficial** effect on air quality.	PB	No mitigation is required.	PB
ASB-5.9-c: Exposure of Sensitive Receptors to Toxic Air Emissions. Emissions of TACs associated with construction or operations under Alternative 2 would not result in exposure of receptors to concentrations of TACs in excess of applicable thresholds. This impact would be **less than significant.**	LTS	No mitigation is required.	LTS
5.10 Noise			
ASB-5.10-a: Temporary Increase in Noise Levels during Construction. Noise levels associated with construction activities could exceed the maximum permissible noise limits at residences. Construction	S	**Limit Generation of Noise by Equipment during Project Construction.** This measure is identical to Mitigation Measure LS-5.10-a above.	SU

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SUMMARY OF IMPACTS AND MITIGATION MEASURES

THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
equipment may operate between the hours of 10 p.m. and 7 a.m. and could operate within 500 feet of a residential zone during these hours. Therefore, construction activities occurring between 10 p.m. and 7 a.m. could result in annoyance and/or sleep disruption of certain receptors within the project area. In addition, construction operations may result in a noticeable temporary increase (3 dBA or more) in ambient noise levels at these residences. This impact would be significant.			
ASB-5.10-b: Exposure of Sensitive Receptors to Excessive Groundborne Vibration During Construction. This impact would be the same as Impact LS-5.10-b, described under Alternative 1 above. Construction processes under Alternative 2 would not occur any closer to sensitive land uses than discussed under Alternative 1, and no new construction equipment or processes that would generate additional groundborne vibration would be used. For the same reasons as described above, this impact would be less than significant.	LTS	No mitigation is required.	LTS
5.11 Transportation and Circulation			
ASB-5.11-a: Increase in Traffic on Local Roadways near the Existing Levee and Setback Levee Alignment during Construction. During the anticipated 20-month construction period, commute trips and haul truck trips associated with levee repair and strengthening activities and setback levee construction would increase traffic on Feather River Boulevard, SR 70, and local roadways that provide	LTS	No mitigation is required.	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
access to the project alignment (e.g., Anderson Avenue, Country Club Avenue, Riverside Drive). However, construction-related trips would not exceed the thresholds established by ITE for temporary traffic increases and would not represent a substantial increase in traffic levels on these roadways or other local roads. This impact would be **less than significant.**			
ASB-5.11-b: Increase in Traffic Hazards on Local Roadways near the Existing Levee and Setback Levee Alignment during Construction. Construction-related traffic could track mud and gravel onto local roadways, and haul truck traffic could interfere with the flow of traffic on these roads. These conditions could pose hazards for travelers on local roadways. This impact would be **potentially significant.**	PS	**Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways.** This measure is identical to Mitigation Measure LS-5.11-b above.	LTS
5.12 Public Services, Utilities, and Service Systems			
ASB-5.12-a: Damage of Public Utility Infrastructure and Disruption of Service in the Levee Repair and ASB Levee Setback Areas. Impacts related to utilities in project Segments 1 and 3 and the area considered for a detention basin/soil borrow site would be the same as those described above in Impact LS-5.12-a under Alternative 1. Most of the public utilities in the proposed ASB levee setback area in Segment 2 would no longer be needed and would be removed. However, a PG&E transmission line and two PG&E distribution lines cross this area and would remain in place under project implementation, and floodwaters could	PS	**Coordinate with Utility Providers to Remove, Reinforce, and Modify Public Utility Infrastructure in the ASB Levee Setback Area and Prevent Damage of Facilities.** TRLIA, the design engineers, or the primary construction contractor for the levee setback, as appropriate, shall implement the following measures before the beginning of construction to ensure that the levee setback does not adversely affect public utility infrastructure or result in interruption of utility service: (a) Coordinate with PG&E to protect electrical lines that cross the levee setback area. To maintain PG&E electrical service through the Bogue Loop 115-kV high-power transmission line and the two standard electrical lines that run along Ella	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
threaten the stability of the steel towers and wooden poles that support these lines. In addition, buried utilities could be present in locations that have not been identified in preliminary surveys and contact with service providers. Utilities infrastructure remaining in the levee setback area could be damaged by levee construction, by a proposed soil borrow area, or by floodwaters passing through the setback area, possibly resulting in interruption of service. This impact would be **potentially significant.**		Avenue and Country Club Avenue, TRLIA or its representative shall coordinate with PG&E to raise, relocate, or reinforce the steel towers and wood poles that stand in the proposed bypass area. (b) Ensure that all utility lines in the setback area have been identified and removed or reinforced as necessary. TRLIA or its representative shall ensure that any electrical, telephone, gas, and cable television lines within the levee setback area have been identified before the initiation of any ground-disturbing construction activity. Before the beginning of any construction-related ground disturbance, TRLIA or its representative shall coordinate with all potential service providers known to have, or potentially having, utility infrastructure in the levee setback area, including but not limited to PG&E, AT&T, Comcast, OPUD, and RD 784, to ensure that the utility lines are removed or reinforced as appropriate.	
ASB-5.12-b: Damage of Water Supply and Drainage Facilities and Interference with Service in the Levee Repair and ASB Levee Setback Areas. Impacts on water supply and drainage facilities in project Segments 1 and 3 and the area considered for a detention basin/soil borrow site would be the same as those described above in Impact LS-5.12-b under Alternative 1. Implementation of the levee setback would cut off local drainage systems and could damage privately owned water supply systems that serve agricultural uses. The preliminary design for the setback levee includes conceptual plans for abandoning, relocating, and modifying these systems. Three	LTS	No mitigation is required.	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Rivers Levee Improvement Authority (TRLIA) and its design engineers would coordinate with RD 784 and local landowners to relocate pumps and replace wells and irrigation systems as necessary, as determined in final design. Effects of the levee setback on the drainage system are addressed in Section 5.3, "Water Resources and River Geomorphology." The impact on water supply and drainage facilities would be **less than significant.**			
ASB-5.12-c: Potential for Conflicts with Emergency Response Vehicles during Construction. This impact would be similar to Impact LS-5.12-a described under Alternative 1 above. However, construction traffic on Feather River Boulevard would potentially be greater under Alternative 2 because of the greater number of truck haul trips associated with construction of the setback levee. For the same reasons as described above, this impact would be **potentially significant.**	PS	**Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways.** This measure is identical to Mitigation Measure LS-5.11-b, "Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways," in Section 5.11, "Transportation and Circulation."	LTS
5.13 Paleontological Resources			
ASB-5.13-a: Disturbance of Unknown Paleontological Resources during Earthmoving Activities. Portions of the project area and immediate vicinity are underlain by the Modesto and Riverbank Formations, which are paleontologically sensitive rock formations. Construction activities in the Modesto and Riverbank Formations associated with proposed levee strengthening (e.g., slurry cutoff walls, relief wells), construction of the ASB setback levee, use of the soil borrow area/detention basin location, and	PS	**Conduct Training for Construction Personnel, Cease Work if Paleontological Resources are Encountered, and Implement an Appropriate Mitigation Strategy.** This measure is identical to Mitigation Measure LS-5.13-a.	LTS

Exhibit A

Table 1-3b

SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
related activities (e.g., relocation of Pump Station No. 3) could adversely affect unknown subsurface paleontological resources. This impact would be **potentially significant.**			
Cumulative Impacts			
Alternative 2, The Levee Strengthening and ASB Setback Levee Alternative, would also contribute to significant cumulative impacts related to conversion of Important Farmland to nonagricultural uses; emissions of ROG, NO_X, and PM_{10} during construction; and potentially noise during construction. The mitigation described above would not reduce the project's contributions to these impacts to less-than-significant levels.			

B = Beneficial effect
PB = Potentially beneficial effect
NI = No impact

LTS = Less than significant
PS = Potentially significant
S = Significant

Exhibit B

MITIGATION MONITORING AND REPORTING PROGRAM FOR THE FEATHER RIVER LEVEE REPAIR PROJECT

Section 21081.6 of the California Environmental Quality Act (CEQA) Statutes and Section 15097 of the State CEQA Guidelines require that a public agency adopt a monitoring and reporting program for conditions of approval when approving a project for which an environmental impact report (EIR) has been prepared. The program is intended to serve as the framework for implementation of the various conditions of approval imposed on the project to reduce the severity of its environmental impacts. These conditions are referred to as mitigation measures.

The Three Rivers Levee Improvement Authority (TRLIA) directed the preparation of an EIR for the Feather River Levee Repair Project (FRLRP) in accordance with the requirements of CEQA. TRLIA compared the three project alternatives that were analyzed at an equal level of detail in the EIR, and selected Alternative 2—The ASB Setback Levee Alternative for implementation. This mitigation monitoring and reporting program for Alternative 2 has been prepared in conformance with Section 21081.6 of CEQA Statute and Section 15097 of the State CEQA Guidelines to guide in the implementation of the mitigation measures identified in the EIR and to verify that implementation has been completed.

The mitigation monitoring and reporting program is presented in tabular format. The table columns contain the following information:

- **Mitigation Measure:** Lists the text of each mitigation measure that is a condition of project approval.
- **Initiation of Mitigation:** Indicates when the measure is first to be initiated.
- **Monitoring Frequency:** Specifies the frequency/duration of implementation of the measure and when monitoring should be conducted.
- **Responsibility for Verification of Compliance:** Identifies the entity or entities responsible for ensuring that implementation of the measure is completed. This is not intended to represent the agencies involved in facilitating compliance—either through review and approval processes or through other jurisdictional authorities—although in some instances they may be the same as the entity responsible for verification.
- **Performance Criteria:** Establishes the steps necessary to illustrate that the requirements of the measure have been satisfied.
- **Date Compliance Completed:** To be used by TRLIA staff and its designated contractors to indicate that implementation of the measure has been satisfied.

I (1) certify that I have reviewed this mitigation monitoring and reporting program prepared for the FRLRP and find it to be in compliance with the requirements of CEQA, (2) adopt the program on behalf of TRLIA, and (3) agree to implement the program in the design and construction of the project.

_____ _____

Paul G. Brunner, P.E., Executive Director
Three Rivers Levee Improvement Authority

Date

Exhibit B: Mitigation Monitoring and Reporting Program for the Feather River Levee Repair Project
Alternative 2 – The ASB Setback Levee Alternative

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
ASB-5.1-a: Resolve Inconsistencies between Proposed Uses of the Levee Setback Area and Yuba County Zoning. TRLIA shall coordinate with the County Planning Department to appropriately address inconsistencies between proposed land uses and County-planned land uses and zoning designations. Before permanent changes in allowable land uses in the levee setback area need to be established (i.e., before degradation of the existing levee at the latest), TRLIA shall apply for a general plan amendment if necessary and for appropriate rezoning, a zoning amendment, or other measures determined by the Planning Department to be necessary to ensure the consistency of proposed land uses with zoning. Consistency is defined as land uses and activities permitted by the County in the levee setback area, as reflected by zoning and other land use guidelines, that do not conflict with the flood control function of the levee setback area. The approach to resolving any land use planning inconsistencies shall be determined by, and conducted in coordination with, the County Planning Department. Any necessary modifications of general plan land use designations or of zoning, or placement of restrictions on existing zoning, will be determined by the Planning Department and approved by the County Planning Commission and Board of Supervisors as appropriate.	Before beginning any construction or ground-disturbing activities	During activities identified under "Initiation of Mitigation"	Lead agency and Yuba County	Any necessary zoning modifications are approved by the Board of Supervisors and Planning Commission	
ASB-5.1-b: Preserve the Agricultural Productivity of Important Farmland to the Extent Feasible. It is not known at this time whether lands in the levee setback area would be retained in agricultural production, converted to habitat, or a mixture of both land uses. If lands classified as Important Farmland in the levee setback area are to be retained in agricultural production, the following measures would apply to these lands. To support the continued productive use of Important Farmland in the levee setback area in project Segment 2, TRLIA shall ensure that the following measures are	During engineering design phases, before beginning any construction or ground-disturbing activity, and during construction	During activities identified under "Initiation of Mitigation"	Lead agency	The entities involved in final design of the project components, construction mobilization and staging, and construction implementation agree that effects on agricultural operations are minimized to the extent practicable	

Exhibit B: Mitigation Monitoring and Reporting Program for the Feather River Levee Repair Project Alternative 2 – The ASB Setback Levee Alternative					
Mitigation Measure	**Initiation of Mitigation**	**Monitoring Frequency**	**Responsibility for Verification of Compliance**	**Performance Criteria**	**Date Compliance Completed**
implemented, to the extent feasible and practicable, in the design and implementation of the levee setback: (a) When selecting sites for borrow excavation, minimize the fragmentation of lands that are to remain in agricultural use. Where practical, retain contiguous parcels of agricultural land of sufficient size to support their efficient use for continued agricultural production. (b) Where the setback levee would transect agricultural properties and the continuation of agricultural use on the portions within the levee setback area would occur, ensure convenience of access to the levee setback properties sufficient to support ongoing agricultural operations. (c) Make the most productive salvaged topsoil from the levee footprint available to landowners with less productive agricultural lands in the vicinity of, but outside the levee setback area that could benefit from the introduction of good-quality soil. By agreement between TRLIA or landowners of affected properties and the recipient(s) of the topsoil, the recipient(s) would be required to work the topsoil into the agricultural lands where it is delivered. (d) Ensure that utilities currently in the levee setback area that are needed for ongoing agricultural uses, including wells, pipelines, and power lines, are appropriately relocated, replaced, or retrofitted to withstand flooding. Ensure that these systems and drainage systems are functioning as necessary after the project is in place so that agricultural uses are not unduly disrupted. In addition, TRLIA shall ensure that the following measures are implemented, to the extent feasible and practical, inside and/or outside the levee setback area: (a) Minimize the disturbance of Important Farmland and continuing agricultural operations during construction by locating construction laydown and staging areas on sites					

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
that are fallow, that are already developed or disturbed, or that are to be discontinued for use as agricultural land, and by using existing roads to access construction areas to the extent possible. (b) When selecting the site and configuration of the detention basin, minimize the fragmentation of agricultural lands and retain contiguous parcels of agricultural land of sufficient size to support their efficient use for continued agricultural production.					
ASB-5.3-a(1): Prepare a SWPPP, File an NOI, and Comply with the NPDES Stormwater Permit for Project Construction Activities. Before the start of any project construction work, site grading, or excavation, TRLIA or its primary construction contractor shall prepare a SWPPP detailing measures to control soil erosion and waste discharges from construction areas and shall submit an NOI to the Central Valley RWQCB for stormwater discharges associated with general construction activity. TRLIA shall require all contractors conducting construction-related work to implement the SWPPP to control soil erosion and waste discharges of other construction-related contaminants. The general contractor(s) and subcontractor(s) conducting the work shall be responsible for constructing or implementing, regularly inspecting, and maintaining the measures in good working order. The SWPPP shall identify the grading and erosion control BMPs and specifications that are necessary to avoid and minimize water quality impacts to the extent practicable. Standard erosion control measures (e.g., management, structural, and vegetative controls) shall be implemented for all construction activities that expose soil. Grading operations shall be conducted to eliminate direct routes for conveying potentially contaminated runoff to drainage channels. Erosion control barriers such as silt fences and mulching material shall be installed, and disturbed areas shall be reseeded with grass or other plants where	Before beginning any construction or ground-disturbing activity	Throughout construction period	Lead agency and primary construction contractor	BMPs are implemented and maintained such that contaminants are isolated from drainages to the extent practicable	

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
necessary. The SWPPP shall contain specific measures for stabilizing soils at construction-related sites before the onset of the winter rainfall season. These standard erosion control measures shall be designed to reduce the potential for soil erosion and sedimentation of drainage channels. The following specific BMPs are recommended for implementation: ▪ Conduct all work according to site-specific construction plans that identify areas for clearing, grading, and revegetation so that ground disturbance is minimized. ▪ Avoid riparian and wetland vegetation wherever possible and identify vegetation to be retained for habitat maintenance (i.e., as identified through preconstruction biological surveys), cover cleared areas with mulches, install silt fences near riparian areas or streams to control erosion and trap sediment, and reseed cleared areas with native vegetation. ▪ Stabilize disturbed soils at all construction sites (e.g., levee repair areas, borrow areas) and staging areas before the onset of the winter rainfall season. ▪ Stabilize and protect stockpiles from exposure to erosion and flooding. The SWPPP also shall specify appropriate hazardous materials handling, storage, and spill response practices to reduce the possibility of adverse impacts from use or accidental spills or releases of contaminants. Specific measures applicable to the project include, but are not limited to, the following: ▪ Develop and implement strict on-site handling rules to keep construction and maintenance materials out of drainages and waterways. ▪ Conduct all refueling and servicing of equipment with					

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
absorbent material or drip pans underneath to contain spilled fuel. Collect any fluid drained from machinery during servicing in leakproof containers and deliver to an appropriate disposal or recycling facility. ▪ Maintain controlled construction staging, site entrance, concrete washout, and fueling areas at least 100 feet away from stream channels or wetlands to minimize accidental spills and runoff of contaminants in stormwater. ▪ Prevent raw cement; concrete or concrete washings; asphalt, paint, or other coating material; oil or other petroleum products; or any other substances that could be hazardous to aquatic life from contaminating the soil or entering watercourses. ▪ Maintain spill cleanup equipment in proper working condition. Clean up all spills immediately according to the spill prevention and response plan, and immediately notify DFG and the RWQCB of any spills and cleanup procedures.					
ASB-5.3-a(2): Obtain a Use Permit from Yuba County and Comply with Permit Conditions for Erosion Control. Before the start of any project-related grading, excavation, or fill activity, TRLIA or its primary construction contractor shall obtain a use permit from the Yuba County Planning Department in compliance with the Yuba County Ordinance Code. TRLIA shall require all contractors conducting construction-related work to implement the conditions of the permit. The general contractor(s) and subcontractor(s) conducting the work shall be responsible for constructing or implementing, regularly inspecting, and maintaining the required measures in good working order.	Before beginning any construction or ground-disturbing activity	Throughout construction period	Lead agency and primary construction contractor	Use permit is obtained from Yuba County, and compliance with permit conditions is regularly verified	
ASB-5.3-b: Coordinate with RD 784 to Modify Drainage Facilities that Would Be Affected by the Levee Setback	During engineering design phases, before beginning any	During activities identified under "Initiation of	Lead agency and primary construction contractor	Drainage study is prepared, approved, and implemented	

Exhibit B: Mitigation Monitoring and Reporting Program for the Feather River Levee Repair Project Alternative 2 – The ASB Setback Levee Alternative					
Mitigation Measure	**Initiation of Mitigation**	**Monitoring Frequency**	**Responsibility for Verification of Compliance**	**Performance Criteria**	**Date Compliance Completed**
and Ensure Appropriate Functioning of the Local Drainage System. TRLIA or its primary construction contractor shall coordinate with RD 784 to evaluate local drainage needs before and after construction of the setback levee and shall prepare and implement a plan for modification of the portion of the drainage system that would be affected by the levee setback. A drainage study shall be prepared that evaluates the effects on local drainage that would result from the levee setback and any proposed changes in land uses in the levee setback area. The study shall consider the design flows of the existing facilities that cross the proposed setback levee footprint (e.g., Lateral 7/8 and the Plumas Lake Canal). It shall develop appropriate plans for relocation or other modification of these facilities and construction of new facilities, as needed, to ensure equivalent functioning of the system during and after construction of the setback levee. Facility modification will include relocating Pump Station No. 3, and may include removing, filling, and/or rerouting drainage canals and culverts; regrading drainage alignments to redirect drainage; constructing new ditches and canals; and installing new culverts. The plan shall also consider the continuing and proposed uses of the levee setback area and shall incorporate appropriate drainage requirements for those uses to prevent any unintended flooding from stormwater runoff. The plan shall integrate environmental mitigation requirements and drainage of restored borrow sites to the extent feasible and practical. The final plan shall be approved by RD 784. TRLIA and its construction contractor(s) shall ensure that the necessary modifications are implemented without interruption of the adequate functioning of the drainage system. TRLIA shall also ensure that any necessary environmental review requirements have been met before the drainage modifications are implemented.	construction or ground-disturbing activity, and during and after construction of the setback levee	Mitigation"		based on the specified performance standards	

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
ASB-5.3-g(1): Conduct a Phase I Environmental Site Assessment for the Levee Setback Area and Implement Recommendations. Before the start of any ground-disturbing construction activity, TRLIA or its primary construction contractor shall have a qualified hazardous waste specialist perform a Phase I Environmental Site Assessment of the levee setback area to identify potential sources of surface and buried contaminants, and provide a report of assessment findings. The assessment shall include the following: ▪ review of available information on property history, including, as appropriate, historical and current topographic maps, aerial photographs, property title and permit information, interviews of environmental regulatory agency and Yuba County personnel, and interviews of current occupants and landowners regarding the current and past uses of the land; ▪ review of federal, state, and county governmental records and databases to determine whether any sites in the area are listed as hazardous waste sites; and ▪ reconnaissance-level surveys to observe visual evidence of hazardous materials use. A written report on the findings of the assessment, including recommendations for the disposition of any identified hazardous waste sites or potential hazardous waste sites, shall be provided to TRLIA. TRLIA or its construction contractor(s) shall implement recommendations made in the Phase I report. If hazardous materials or wastes are identified, recommendations could include, but would not be limited to, a Phase II assessment or cleanup of known identified hazardous waste sites. Presence of hazardous wastes would be determined using waste classification protocols described in CCR Title 22.	Before beginning any construction or ground-disturbing activities	During activities identified under "Initiation of Mitigation"	Lead agency and primary construction contractor	Phase I ESA is completed and feasible recommendations are implemented to ensure that hazardous wastes that may be present in the levee setback area are mitigated	
ASB-5.3-g(2): Evaluate Levee Borrow Material for Potential Contaminants in Coordination with the	Before beginning any borrow activities	During activities identified under	Lead agency and primary construction	Applicable RWQCB guidelines for	

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
RWQCB. Before the start of construction, TRLIA or its primary construction contractor shall have a qualified hazardous materials specialist collect and evaluate representative soil samples from the existing levee sections that would be used as sources of borrow, and from potential borrow sites. The soil samples shall be evaluated for contaminant residues (e.g., trace metals, organochlorine pesticides, polychlorinated biphenyls) that may be encountered in excavation and grading activities. This evaluation shall be conducted to address any requirements of the Central Valley RWQCB as part of the RWQCB's permitting and approval process for the project (e.g., Section 401 certification). Wastes that are encountered at hazardous levels shall be treated in accordance with CCR Title 22 procedures for hazardous materials reporting and disposal. Where the evaluation of soil samples detects the presence of wastes that are not present at hazardous levels, the results of the evaluation shall be reported to the RWQCB for classification in the RWQCB's designated waste classification program, and the RWQCB will determine the acceptability of the material for levee construction based on the potential of the waste to impair water quality and public health. Borrow material used for construction of the waterside levee face or other features with soil exposure to the aquatic environment (e.g., new drainage channels) that is deemed unacceptable by the RWQCB shall be properly disposed of in a landfill or made available for other approved uses.		"Initiation of Mitigation"	contractor	detection and treatment of hazardous materials are implemented as needed	
ASB-5.3-g(3): Remove Nonhazardous Waste and Debris from the Levee Setback Area. Before the beginning of the first season of potential flood operations with the setback levee in place, TRLIA or its primary construction contractor shall ensure the removal from the levee setback area of all large slash and wood piles, nonhazardous waste dumps, and other nonhazardous debris that could adversely affect water quality or create a hazard if carried downriver in flood	Before the levee setback area is exposed to river flows	During activities identified under "Initiation of Mitigation"	Lead agency and primary construction contractor	All nonhazardous waste and debris has been removed from levee setback area	

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
flows. All removed materials shall be properly disposed of in approved off-site landfills.					
ASB-5.4-a(1) and ASB-5.4-a(2)	See Mitigation Measure ASB-5.3-a(1), **"Prepare a SWPPP, File an NOI, and Comply with the NPDES Stormwater Permit for Project Construction Activities."** and Mitigation Measure ASB-5.3-a(2), **"Obtain a Use Permit from Yuba County and Comply with Permit Conditions for Erosion Control."** Mitigation Measures ASB-5.4-a(1) and ASB-5.4-a(2) are identical to Mitigation Measure ASB-5.3-a(1) and Mitigation Measure ASB-5.3-a(2).				
ASB-5.4-a(3): Obtain and Comply with Terms and Conditions of a Streambed Alteration Agreement for Construction Activities Associated with the Setback Levee. Three Rivers Levee Improvement Authority (TRLIA) or its representative shall consult with DFG regarding potential disturbance to fish habitat as part of the process for obtaining a streambed alteration agreement, pursuant to Section 1602 of the California Fish and Game Code, for construction work associated with the setback levee. TRLIA shall comply with conditions set forth in the streambed alteration agreement to protect fish habitat.	During final design and development of project components and before beginning any construction or ground-disturbing activity in streambed areas under DFG jurisdiction	Throughout construction period (compliance with conditions of agreement)	Lead agency, design engineer, and primary construction contractor	Streambed Alteration Agreement is received from DFG, and compliance with conditions is achieved	
ASB-5.4-c(1), ASB-5.4-c(2), and ASB-5.4-c(3)	See Mitigation Measure ASB-5.3-g(1), **"Conduct a Phase I Environmental Site Assessment for the Levee Setback Area and Implement Recommendations."**, Mitigation Measure ASB-5.3-g(2), **"Evaluate Levee Borrow Material for Potential Contaminants in Coordination with the RWQCB."**, and Mitigation Measure ASB-5.3-g(3), **" Remove Nonhazardous Waste and Debris from the Levee Setback Area."** Mitigation Measures ASB-5.4-c(1), ASB-5.4-c(2), and ASB-5.4-c(3) are identical to Mitigation Measures ASB-5.3-g(1), ASB-5.3-g(2), and ASB-5.3-g(3).				
ASB-5.4-d: Develop and Implement a Drainage and Grading Plan that Minimizes Loss or Incidental Loss of Fish from Stranding. TRLIA and its primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize the potential for fish stranding in the levee setback area: (a) Plan and implement drainage improvements. TRLIA or its designated construction contractors, through a combination of grading and drainage improvements, shall minimize the potential for floodwater to pond in the levee setback area in such a way that substantial numbers of fish become stranded and consequently become exposed to hostile environments (warm water temperatures and	(a) During engineering design phases, as part of development of final design for the levee setback area	(a) During activities identified under "Initiation of Mitigation"	(a) Lead agency, design engineer, and primary construction contractor	(a) Project design engineer, RD 784, DFG, and NMFS agree on final design of drainage and grading plan, and	

Exhibit B: Mitigation Monitoring and Reporting Program for the Feather River Levee Repair Project Alternative 2 – The ASB Setback Levee Alternative					
Mitigation Measure	**Initiation of Mitigation**	**Monitoring Frequency**	**Responsibility for Verification of Compliance**	**Performance Criteria**	**Date Compliance Completed**
increased predation). As part of the development of the final design for the levee setback area, TRLIA or its representatives shall determine the specific topographic and hydrologic characteristics of the levee setback area and shall define the anticipated flooding regime (depth, duration, and extent of flooding), drainage patterns, and potential for fish stranding risks there. The final project design shall include recontouring as necessary to ensure complete drainage and provide fish passage back to the main river channel as floodflows recede from the levee setback area. Features with substantial stranding risk shall be identified for filling and/or grading. Complete drainage is important to reduce the risk of stranding; however, maintaining some seasonal aquatic habitat in the levee setback area and/or hydrologic connectivity to the Feather River may also be important features if enhancement of fish habitat and production is selected as a management activity in the levee setback area. Before the design of the setback levee and levee setback area is finalized, TRLIA or its representatives shall obtain the approval of DFG and NMFS indicating that the planned drainage and grading features are sufficient to address concerns about fish stranding potential, similar to the process used for the Feather-Bear Rivers Levee Setback Project currently under construction downstream. The features of the setback levee and levee setback area shall be constructed in accordance with the approved final design.				drainage improvements are implemented	
(b) Monitor the success of the drainage features and adjust if necessary. A long-term mitigation monitoring plan shall be developed by a qualified biologist on behalf of TRLIA and shall be approved by DFG and NMFS before implementation of the levee setback. This monitoring plan shall evaluate the effectiveness of the grading and drainage features in the levee setback area in reducing the risk of fish stranding and the stability of the drainage features and shall determine the need for maintenance or modification. The	(b) During development of final design for the levee setback area and before removing the existing levee	(b) Annually for at least 5 years following the removal of any part of the existing levee	(b) Lead agency and design engineer	(b) A qualified biologist concludes that no isolated standing water is present in the setback area, and no barriers to fish passage are evident following any	

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
monitoring plan shall include provisions for remediation should the design of the levee setback area prove to be unsuccessful in preventing fish stranding. These measures shall include, as appropriate, such activities as regrading or filling depressions in the levee setback area. The recommended monitoring scheme shall include annual monitoring for a period of 5 years following the removal of any part of the existing levee. Additional monitoring may be required for areas where remediation is necessary. Monitoring is recommended to include the following actions: ▪ Visual assessment of the levee setback area by a qualified biologist before the flood season (i.e., by October 31). This assessment should note any substantial changes in the overall structure since implementation of the final design for the area, including reestablishment of vegetation and the presence of "holes" or pits. ▪ A visual survey by a qualified biologist at the end of each event that floods the levee setback area (i.e., after the recession of waters that inundate the floodplain). This survey should identify whether there is any ponding that would result in fish stranding, or whether channels have formed that flow through completely to the low-flow channel of the Feather River. Following each flood season (i.e., after April 16), a letter report shall be submitted to NMFS and DFG summarizing the overall condition of the floodplain area and any changes that have occurred from the previous year(s). If any remediation measures are required, they shall be outlined in the letter report, along with a schedule specifying when the remediation activities will occur. Appropriate remediation measures shall be implemented as soon as is practicable to minimize the potential for fish stranding while maintaining the desired habitat values (if habitat enhancement is included in the floodplain area) and hydraulic				flood event that inundates the levee setback area	

Exhibit B: Mitigation Monitoring and Reporting Program for the Feather River Levee Repair Project Alternative 2 – The ASB Setback Levee Alternative					
Mitigation Measure	**Initiation of Mitigation**	**Monitoring Frequency**	**Responsibility for Verification of Compliance**	**Performance Criteria**	**Date Compliance Completed**
characteristics of the area. The performance of the mitigation measure shall be considered successful if there is no isolated standing water and/or barriers to fish passage capable of resulting in substantial fish stranding following a flood event that inundates the levee setback area.					
ASB-5.5-b: Avoid Disturbance of Sensitive Habitats to the Extent Feasible and Comply with Corps and DFG Processes to Mitigate Unavoidable Effects. Three Rivers Levee Improvement Authority (TRLIA) and its primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize potential project effects on sensitive habitats. As noted in the setting and impact discussions above, for purposes of this EIR the potential presence of sensitive habitats was assessed through reconnaissance surveys (where access was allowed) and literature review. The mapping and surveys identified below are intended to supplement and clarify these initial surveys and reviews by providing timely, detailed, and finely tuned biological information within the specific geographical areas subject to impact under the alternative selected for implementation. Each measure is accompanied by one or more performance standards to control the ultimate level of impact: (a) Map potential waters of the United States and riparian habitat in the project area and, to the extent feasible and practicable, plan project features and construction activity to avoid direct effects on these areas. Before the beginning of any ground-disturbing project activities, a qualified biologist shall delineate potential waters of the United States and shall formally map all riparian habitat that could be affected by the proposed project. This activity will be performed following the requirements of a formal delineation of waters of the United States for CWA Section 404 permitting as	(a) Before beginning any construction or ground-disturbing activity	(a) Throughout construction period	(a) Lead agency	(a) Corps verifies mapping, and jurisdictional habitats are protected from disturbance wherever possible	

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
described below. The primary engineering and construction contractors shall ensure, through coordination with the biologist, that the footprints of construction zones, borrow areas, staging areas, and access routes are designed to prevent disturbance of waters of the United States and riparian habitat to the extent feasible and practicable. All avoidable jurisdictional habitats that could potentially be affected by ground-disturbing project activity shall be protected during construction by temporary fencing and/or flagging, as appropriate. Qualified biological monitors shall be present during all construction activities that could potentially affect these protected habitats to ensure that project activity is excluded from these areas.					
(b) Complete the Section 404 permitting process, and mitigate the acreage of affected jurisdictional wetland on a "no-net-loss" basis. Before the initiation of any ground-disturbing project activities in areas that contain potentially jurisdictional wetlands, qualified biologists shall complete a delineation of wetlands and other waters of the United States that would be affected by the proposed project. The findings shall be documented in a detailed report and submitted to the Corps for verification as part of the formal Section 404 wetland delineation process. For all jurisdictional areas that cannot be avoided as described above, TRLIA shall secure authorization for fill of wetlands and alteration of waters of the United States from the Corps through the Section 404 permitting process before project implementation. The acreage of jurisdictional wetland affected shall be mitigated (e.g., through restoration, rehabilitation, enhancement, and/or replacement) on a "no-net-loss" basis in accordance with Corps regulations. Habitat restoration, rehabilitation, and/or replacement shall be at a location	(b) During final design and development of project components and before beginning any construction or ground-disturbing activity in jurisdictional areas	(b) Throughout construction period (compliance with permit terms)	(b) Lead agency, design engineer, and primary construction contractor	(b) Section 404 permit is obtained, and compliance with terms is achieved such that no net less of wetlands occurs	

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
and by feasible methods agreeable to the Corps. TRLIA shall implement the feasible mitigation measures adopted through the permitting process. (c) Obtain a streambed alteration agreement from DFG and mitigate affected riparian habitat on a "no-net-loss" basis. Because project implementation would result in changes to the natural flow and bed and bank of a waterway (e.g., vegetated drainage canal, the Feather River), the project would likely require a Section 1602 streambed alteration agreement from DFG. If complete avoidance of identified riparian habitat is not feasible, the acreage of riparian habitat that would be removed shall be mitigated on a "no-net-loss" basis in accordance with DFG regulations and as specified in the streambed alteration agreement, if needed. Habitat mitigation (e.g., restoration, rehabilitation, and/or replacement) shall be at a location and by methods agreeable to DFG.	(c) During final design and development of project components and before beginning any construction or ground-disturbing activity in streambed areas under DFG jurisdiction	(c) Throughout construction period (compliance with conditions of agreement)	(c) Lead agency, design engineer, and primary construction contractor	(c) Streambed Alteration Agreement is received from DFG, and compliance with conditions is achieved such that no net loss of riparian habitat occurs	
ASB-5.5-c: Conduct Detailed Special-Status Plant Surveys and Establish Construction Buffers as Necessary to Minimize Effects on Special-Status Plants. TRLIA and its primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize potential project effects on special-status plants: (a) Conduct detailed special-status plant surveys and document the results. Before the initiation of any ground-disturbing project activities, a qualified botanist shall conduct detailed/focused surveys for rose mallow and Wright's trichocoronis in appropriate habitat within the project area, in accordance with USFWS and DFG guidelines and at the appropriate time of year when the target species would be in flower or otherwise clearly identifiable (June to September for rose mallow and May to September for Wright's	(a) During the blooming period of the target species before beginning any construction or ground-disturbing activity in potential habitat of the species	(a) During activities identified under "Initiation of Mitigation"	(a) Lead agency	(a) Special-status plant surveys are conducted in accordance with USFWS and DFG guidelines and at the appropriate time of year and findings are documented	

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
trichocoronis). The findings shall be documented in a letter report that is retained by TRLIA. If rose mallow and Wright's trichocoronis are not found during focused surveys, no further action shall be required.					
(b) Establish buffers wherever possible to protect identified special-status plants from construction activity. If special-status plants are found during focused surveys, the primary engineering and construction contractors shall ensure, through coordination with a qualified biologist, that the footprint of project features and construction zones, staging areas, and access routes are designed such that any disturbance of the plants is prevented to the extent feasible and practicable. The botanist shall clearly identify the locations of special-status plant populations in the field by staking or flagging before construction. No project activities shall be allowed within the marked areas.	(b) If special-status plants are found during focused surveys, during project design, prior to initiation of construction activities in the vicinity of the plant population	(b) Prior to and during construction period	(b) Lead agency, design engineer, and primary construction contractor	(b) Disturbance to any special-status plants is prevented to the extent feasible and practicable	
(c) Compensate for losses of special-status plants. If populations or individuals of rose mallow and Wright's trichocoronis are found during implementation of item (a) above, and the individuals or populations cannot be avoided during implementation of item (b), a mitigation and monitoring plan for the affected species shall be developed and implemented. The plan shall be prepared by a qualified biologist. Before disturbance of the individuals or populations of the effected species, the mitigation and monitoring plan shall be submitted to TRLIA for review and approval. The plan shall be submitted concurrently to DFG for review and comment, and TRLIA may consult with DFG before approval of the plan. Possible mitigation for individuals or populations removed during construction includes: ▪ removing and stockpiling topsoil with intact roots, rhizomes, and seed bank in the disturbance area,	(c) If special-status plants are found during focused surveys, prior to disturbance plant population(s)	(c) During implementation of mitigation and monitoring plan	(c) Lead agency	(c) Mitigation and monitoring plan is approved by DFG and TRLIA and implemented following approval	

Exhibit B: Mitigation Monitoring and Reporting Program for the Feather River Levee Repair Project Alternative 2 – The ASB Setback Levee Alternative					
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and either replacing the soil in the same location after construction is complete or placing it in a new area with suitable habitat; or ▪ collecting plants, seeds, or other propogules in the area to be disturbed, and placing propogules or cultivating nursery stock in the disturbed area after construction is complete or in a new area with suitable habitat. Mitigation will be considered successful if populations of the affected species in mitigation areas are sustained for a minimum of 3 years and are of similar size and quality as the affected populations.					
ASB-5.5-d: Conduct Protocol-Level Surveys, Establish Buffers, and Implement a Mitigation Plan as Necessary to Minimize Effects on Valley Elderberry Longhorn Beetle. TRLIA and its primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize potential project effects on valley elderberry longhorn beetles: (a) Conduct protocol-level elderberry shrub surveys in the project area. Before the beginning of ground disturbance within 100 feet of any area that may support elderberry shrubs, a qualified biologist shall conduct an elderberry shrub survey consistent with USFWS protocols for conservation of valley elderberry longhorn beetle (U.S. Fish and Wildlife Service 1999). All elderberry shrubs with potential to be affected by project activities shall be mapped and the number of stems greater than 1 inch in diameter on each shrub that may require removal shall be counted. (Elderberry plants with no stems measuring 1 inch or greater in diameter at ground level are considered unlikely to be habitat for the beetle because of their small size and/or immaturity [U.S. Fish and Wildlife Service 1999].) (b) Protect elderberry shrubs from disturbance. The	(a) Before beginning any construction or ground-disturbing activity in areas where shrubs may be located (b) Before beginning	(a) During activities identified under "Initiation of Mitigation" (b) Throughout	(a) Lead agency (b) Lead agency,	(a) Surveys and mapping are completed in accordance with USFWS protocols (b) Project activities	

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
primary engineering and construction contractors, through coordination with the biologist, shall ensure to the extent feasible and practicable that the footprint of project features and construction zones, staging areas, and access routes are designed to ensure that no project activities would affect an elderberry shrub with stems measuring 1 inch in diameter at ground level. Buffers of at least 100 feet shall be established around all elderberry shrubs with stems greater than 1 inch in diameter at ground level that can be retained undisturbed on-site. The buffer shall be clearly identified in the field by staking or flagging. All project activity shall be prohibited within the buffer areas. If complete avoidance of these buffers is not feasible, consultation with USFWS shall be conducted as described below.	any construction or ground-disturbing activity	construction period (maintenance of buffers)	design engineer, and primary construction contractor	are excluded from all areas within 100 feet of identified potential habitat for valley elderberry longhorn beetle to the extent feasible and practicable, and mitigation of any potential effects is developed and implemented in consultation with USFWS	
(c) <u>If effects on shrubs cannot be avoided, develop and implement a mitigation plan approved by USFWS</u>. If maintaining 100-foot protection buffers or otherwise avoiding construction-related effects on elderberry shrubs with a stem greater than 1 inch in diameter at ground level is not feasible, consultation with USFWS will be required, and an incidental take permit may be required. During this consultation, an appropriate and feasible mitigation plan shall be developed and provided to USFWS for approval. The plan may include, but would not necessarily be limited to, reducing buffers around shrubs that would not be removed; transplanting shrubs to a conservation area; and planting additional seedling or cuttings at a ratio ranging from 1:1 or 1:6, depending on the number of stems greater than or equal to 1 inch in diameter and whether beetle exit holes are found on the shrubs on-site (U.S. Fish and Wildlife Service 1999).	(c) Before beginning any construction or ground-disturbing activity within 100-feet of an elderberry shrub with a stem greater than 1 inch in diameter at ground level	(c) Throughout construction period (implement agency requirements	(c) Lead agency	(c) Mitigation has been performed in accordance with the plan approved by USFWS (if needed)	
ASB-5.5-e: Conduct Surveys as Part of Dewatering	During construction,	Measure must be	Lead agency, design	Qualified biologist	

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
Activities and Minimize Effects on Northwestern Pond Turtle. TRLIA and its primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize potential project effects on northwestern pond turtles: (a) Conduct surveys after dewatering. A qualified biologist shall conduct surveys for northwestern pond turtles in aquatic habitats to be dewatered and/or filled during project construction and grading of aquatic habitat within the setback area. Surveys shall be conducted immediately after any dewatering and before any fill of aquatic habitat. If no pond turtles are found, no further mitigation will be required. (b) Capture and move turtles. If any pond turtles are found, the biologist shall capture them and move them to suitable habitat in the vicinity of the project site.	immediately following dewatering and before filling of any aquatic habitat	repeated any time aquatic habitat could be affected during construction	engineer, and primary construction contractor	verifies absence of turtles where dewatering activities are to be conducted, or has moved turtles to suitable habitat	
ASB-5.5-f: Implement Applicable Take Minimization Measures and a Mitigation Plan as Necessary for Giant Garter Snake. TRLIA and its primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize potential project effects on giant garter snakes: (a) Verify potential habitat in the project area and, to the extent feasible and practicable, plan project features and construction activity to avoid direct effects on these areas. Before the initiation of any ground-disturbing project activities, a qualified biologist approved by USFWS's Sacramento Fish and Wildlife Office shall verify where suitable habitat conditions for giant garter snake occur in areas that could be affected by the proposed project. The primary engineering and construction contractors shall ensure, through coordination with the biologist, that the footprint of project features and construction zones, staging areas,	(a) During development of final design and prior to ground disturbing activities	(a) During reviews of project designs and during construction planning	(a) Lead agency, design engineer, and primary construction contractor	(a) Potential habitat is identified, delineated, and avoided to the extent practicable	

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
and access routes are designed to prevent any disturbance of potential giant garter snake habitat to the extent feasible and practicable.					
(b) Designate areas to be avoided during construction. The primary engineering and construction contractors, through coordination with the biologist, shall designate giant garter snake habitat to be avoided during project construction as Environmentally Sensitive Areas. These areas shall be flagged by the biologist and avoided by all construction personnel.	(b) During development of final design and prior to ground disturbing activities	(b) During reviews of project designs and during construction planning	(b) Lead agency, design engineer, and primary construction contractor	(b) Potential habitat is identified, delineated, and avoided to the extent practicable	
(c) Limit the timing of construction activity within potential habitat. All construction activities that must take place within potential giant garter snake habitat (aquatic habitat and adjacent upland habitat within 200 feet) shall be limited to the period of May 1 to October 1 to the extent feasible.	(c,d) At initiation of construction and continuing throughout construction periods, if habitat cannot be avoided	(c) Throughout construction periods	(c) Lead agency, primary construction contractor	(c) Any construction activity within potential habitat is limited to May 1–October 1 unless otherwise authorized by the regulatory agencies	
(d) Follow guidelines for habitat dewatering. Dewatering of aquatic habitat shall not occur between October 1 and April 15. Any dewatered habitat must remain dry for at least 15 consecutive days after April 15 and before the excavation or filling of the dewatered habitat.	(d) At initiation of construction	(d) Throughout construction periods	(d) Lead agency, primary construction contractor	(d) Dewatering guidelines are followed	
(e) Inspect suitable habitat within 24 hours of beginning construction. Within 24 hours before the initiation of construction activities within suitable habitat, a qualified biologist who is approved by USFWS's Sacramento Fish and Wildlife Office shall conduct preconstruction surveys for giant garter snakes. These areas shall be reinspected whenever a lapse of construction activity within suitable habitat occurs for a period greater than 2 weeks. If a giant garter snake is found, all activity that could result in death or injury of giant garter snake shall be delayed until consultation with USFWS and DFG has been completed and authorization to proceed has been received from those	(e) A day prior to initiation of construction	(e) Repeat surveys throughout construction periods as needed	(e) Lead agency, primary construction contractor	(e) Absence of giant garter snakes is confirmed or, if any giant garter snakes are found, USFWS and DFG have authorized construction to proceed	

Exhibit B: Mitigation Monitoring and Reporting Program for the Feather River Levee Repair Project Alternative 2 – The ASB Setback Levee Alternative					
Mitigation Measure	**Initiation of Mitigation**	**Monitoring Frequency**	**Responsibility for Verification of Compliance**	**Performance Criteria**	**Date Compliance Completed**
agencies.					
(f) Minimize clearing of wetland vegetation. Clearing of wetland vegetation shall be confined to the minimum area necessary. Excavation of channel banks shall be accomplished by using equipment located on and operated from the top of the bank, with the least interference practical for emergent vegetation that would not be affected by the project.	(f) At initiation of construction and continuing throughout construction periods	(f) Throughout construction periods	(f) Lead agency, primary construction contractor	(f) Wetland vegetation is retained to the extent practicable	
(g) Restrict movement of equipment. Movement of heavy equipment to and from the project site shall be restricted to areas outside the identified suitable habitat, unless the equipment is being moved on established roadways or in areas that have been inspected by a qualified biologist.	(g) At initiation of construction and continuing throughout construction periods	(g) Throughout construction periods	(g) Lead agency, primary construction contractor	(g) Equipment movement is restricted as specified	
(h) Participate in environmental awareness program. Construction personnel shall participate in a USFWS-approved worker environmental awareness program. Under this program, workers shall be informed about the presence of giant garter snakes and habitat associated with the species and that unlawful take of the animal or destruction of its habitat is a violation of ESA.	(h) Before beginning any construction or ground-disturbing activity	(h) Beginning of each construction phase where significant new staff are on-site	(h) Lead agency, primary construction contractor	(h) All construction personnel have completed training	
(i) Restore disturbed areas. After completion of construction activities, any construction debris shall be removed and disturbed areas within potential giant garter snake habitat shall be restored to preproject conditions.	(i) Following project construction	(i) Whenever construction is completed in a particular area	(i) Lead agency, primary construction contractor	(i) Potential habitat that has been temporarily disturbed is restored to pre-project conditions	
(j) If impacts cannot be avoided, develop and implement a feasible mitigation plan approved by USFWS. Consultation with USFWS and DFG shall be required for impacts that cannot be avoided, and an incidental take permit may be required. During this consultation, an appropriate and feasible mitigation plan shall be developed and provided to USFWS and DFG for approval. The mitigation plan may include, but would	(j) During development of final design	(j) Throughout construction periods and as specified in permit terms, if permit is required	(j) Lead agency, primary construction contractor	(j) USFWS guidelines are implemented such that take is avoided, or feasible mitigation is developed in consultation with USFWS and DFG and is implemented such	

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
not necessarily be limited to, applicable take minimization measures outlined above, or modifications of those measures, and compensation for unavoidable impacts through replacement of habitat. Compensation ratios may range from 1:1 to 3:1 (replaced aquatic habitat to affected habitat), depending on the amount of habitat lost and the duration of the impact. Replacement habitat shall include both upland and aquatic habitat components at a ratio of 2:1 upland habitat to aquatic habitat.				that appropriate compensation for impacts is achieved	
ASB-5.5-g(1): Conduct Preconstruction Surveys and Protect Active Nests to Minimize Effects on Swainson's Hawk. TRLIA and its primary construction contractor shall ensure that the following measures are implemented to minimize potential project effects on Swainson's hawk: (a) Conduct preconstruction surveys. Because project construction activity would occur during the Swainson's hawk breeding season (March 1 to September 15), a qualified biologist shall conduct preconstruction surveys to identify active nests in the nonorchard trees within ½ mile of construction areas (including staging and borrow areas). Because of the mostly linear nature of project construction, preconstruction surveys may be phased to accommodate construction activities; suitable nesting habitat shall be surveyed only when construction activities would encroach within ½ mile of unsurveyed areas. Surveys shall be conducted no less than 14 days and no more than 30 days before construction activities may encroach within ½ mile of unsurveyed areas. To the extent feasible, guidelines provided in *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (Swainson's Hawk Technical Advisory Committee 2000) shall be followed.	(a,b) 14–30 days before beginning any construction or ground-disturbing activity between March 1 and September 15 within ½ mile of non-orchard trees	(a,b) Throughout construction periods	(a,b) Lead agency and primary construction contractor, DFG	(a,b) Qualified biologist verifies absence of occupied nests for each construction segment as construction progresses, or, if active nests are located, nest disturbance is avoided unless otherwise authorized by the regulatory agencies	

Exhibit B: Mitigation Monitoring and Reporting Program for the Feather River Levee Repair Project Alternative 2 – The ASB Setback Levee Alternative					
Mitigation Measure	**Initiation of Mitigation**	**Monitoring Frequency**	**Responsibility for Verification of Compliance**	**Performance Criteria**	**Date Compliance Completed**
(b) Establish protective buffers around active nests. If an active nest is found, an appropriate buffer to avoid impacts shall be determined by a qualified biologist. No project activities shall commence within the buffer area until a qualified biologist confirms that the nest is no longer active. The size of the buffer may vary, depending on the nest location, nest stage, and construction activity. Monitoring of the nest by a qualified biologist may be required if the activity could adversely affect the nest.					
ASB-5.5-g(2): Conduct Preconstruction Surveys, Protect Occupied Burrows, and Relocate Individuals as Necessary to Minimize Effects on Burrowing Owl. TRLIA and its primary construction contractor shall ensure that the following measures are implemented to minimize potential project effects on burrowing owl:					
(a) Conduct preconstruction surveys. Before project-related activities in the project area, a qualified biologist shall conduct focused surveys for burrowing owls within 250 feet of construction areas (including staging and borrow areas). Surveys shall be conducted no less than 14 days and no more than 30 days prior to initiation of project activities, and surveys shall be conducted in accordance with DFG protocol (California Department of Fish and Game 1995).	(a) 14–30 days before beginning any construction or ground-disturbing activity	(a) Whenever construction is initiated in a new area	(a) Lead agency	(a) Qualified biologist completes surveys in accordance with DFG protocols	
(b) Establish protective buffers around occupied burrows. If occupied burrows are found, an appropriate buffer shall be established to avoid impacts on the burrows. A buffer of 165 feet would be required during the nonbreeding season (September 1 through January 31), and a buffer of 250 feet would be required during the breeding season (February 1 through August 31). To the extent feasible, project activity shall be excluded from within the buffer areas.	(b,c) Before beginning any activity within 250 feet of an occupied burrow	(b,c) Throughout construction periods (maintenance of buffers as needed)	(b,c) Lead agency and primary construction contractor	(b,c) If occupied burrows are found, owls are protected from disturbance by the establishment of buffers or are relocated as appropriate	

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
(c) Relocate owls if necessary. If impacts on occupied burrows are unavoidable, on-site passive relocation techniques approved by DFG shall be used to encourage owls to move to alternative burrows outside the impact area. However, no occupied burrows shall be disturbed during the nesting season unless a qualified biologist verifies through noninvasive methods that the burrow is no longer occupied.					
ASB-5.5-g(3): Conduct Preconstruction Surveys and Protect Active Nests to Minimize Effects on Other Nesting Raptors. TRLIA and its primary construction contractor shall ensure that the following measures are implemented to minimize potential project effects on other nesting raptors:					
(a) Conduct preconstruction surveys. Because project construction activity would occur during the raptor breeding season (February 15 to September 15), a qualified biologist shall conduct preconstruction surveys to identify active nests in the nonorchard trees within 500 feet of potential construction areas (including staging and borrow areas). Because of the linear nature of project construction, preconstruction surveys may be phased to accommodate construction activities; suitable nesting habitat shall be surveyed only when construction activities would encroach within 500 feet of unsurveyed areas. Surveys shall be conducted no less than 14 days and no more than 30 days before construction encroaches within 500 feet of unsurveyed areas. If no active nests are found, no further mitigation shall be required.	(a,b) 14–30 days before beginning any construction or ground-disturbing activities between February 15 and September 15 within 500 feet of non-orchard trees	(a,b) Throughout construction periods	(a,b) Lead agency and primary construction contractor	(a,b) Qualified biologist verifies absence of occupied nests for each construction segment as construction progresses, or, if active nests are located, nest disturbance is avoided unless otherwise authorized by the regulatory agencies	
(b) Establish protective buffers around active nests. If an active nest is found, an appropriate buffer to avoid impacts shall be determined by a qualified biologist. No project activities shall commence within the buffer area until a qualified biologist confirms that the nest is					

Exhibit B: Mitigation Monitoring and Reporting Program for the Feather River Levee Repair Project Alternative 2 – The ASB Setback Levee Alternative					
Mitigation Measure	**Initiation of Mitigation**	**Monitoring Frequency**	**Responsibility for Verification of Compliance**	**Performance Criteria**	**Date Compliance Completed**
no longer active. The size of the buffer may vary, depending on the nest location, nest stage, and construction activity. Monitoring of the nest by a qualified biologist may be required if an activity could adversely affect the nest.					
ASB-5.8-a: Evaluate the Significance of Archaeological Site CA-Yub-5 and, If Determined to Be Significant, Protect the Site from Damage and/or Conduct Data Recovery Excavation. TRLIA shall have a qualified archaeologist evaluate the extent and significance/eligibility for NRHP and CRHR listing of site CA-Yub-5 through test excavations and analysis of the site's stratigraphy and artifactual constituents. If the site is determined to lack eligibility for NRHP and CRHR listing and is not found to be a significant cultural resource under CEQA, the archaeologist shall report these findings in a site investigation report and ensure that all remains discovered at the site are recorded and reported in accordance with professional practices, and no further protective measures will be necessary. If intact stratigraphy, features, additional human remains, or artifacts indicate that the site may be eligible for NRHP or CRHR listing and therefore a significant historical resource according to CEQA criteria, TRLIA shall implement one or both of the measures described below in consultation with a professional archaeologist familiar with CA-Yub-5 to ensure that no significant cultural resources are damaged there. Two basic approaches are described: protecting the site from damage and conducting data recovery at the site. All site testing shall be conducted in consultation with appropriate Native American representatives designated by the NAHC, and a Native American monitor shall be present for monitoring during any excavation. Option 1: Protect CA-Yub-5 from Damage	Before beginning any construction or ground-disturbing activity in the vicinity of either CA-Yub-5	When construction is planned to be initiated in the vicinity of CA-Yub-5. If Option 1 is selected, additional monitoring would be required during project construction, prior to inundation of the setback area. If Option 2 is selected, monitoring would occur during construction planning	Lead agency and primary construction contractor	Qualified archaeologist evaluates the site and recommends appropriate mitigation measures; recommended measures are implemented such that activity does not disturb onsite cultural resources, or, if resources cannot be avoided, data recovery of the site is conducted in accordance with professional practices	

Exhibit 1: Mitigation Monitoring and Reporting Program for the Feather River Levee Repair Project
Alternative 2 – The ASB Setback Levee Alternative

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
CA-Yub-5 can be protected from direct construction damage if the setback levee is realigned such that the site is beyond the footprint of ground-disturbing levee construction activity. This would require moving the levee alignment to the east of the site boundaries, thus placing the entire site within the levee setback area. It would be highly impractical to move the alignment to the west to place the site outside the project site and thereby avoid damaging it. Based on characteristics observed during archaeological field surveys, it is estimated that the setback levee would need to be constructed approximately 500 feet west of the proposed alignment in the area of CA-Yub-5 to ensure complete avoidance of the site. Geotechnical considerations render such a western shift of the alignment unrealistic because it would place this portion of the levee on a far less stable foundation (old riverbed) than under the proposed alignment. Once situated within the levee setback area (i.e., the expanded floodway), the site should be protected from future erosion and scour from surface flows, as well as human disturbance, through the use of engineered features and/or strategic plantings. In addition, sufficient site data should be collected and analyzed to establish the important archaeological characteristics of the site. One of the most potentially significant characteristics of CA-Yub-5 is the presence of at least 12 inches of midden soil, which can be a source of information regarding the age of the site (through radiocarbon dating) and prehistoric diets and paleoenvironmental reconstruction (through microconstituent and chemical analyses). Because floodwaters passing through the levee setback area could alter the soil properties that permit accurate radiometric dating or hasten the degradation of macrobotanical and microbotanical remains, scientific data would need to be collected, recorded, and reported before the site is subjected to inundation.					

Exhibit B: Mitigation Monitoring and Reporting Program for the Feather River Levee Repair Project Alternative 2 – The ASB Setback Levee Alternative					
Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
It has been previously suggested that the site may be protected from future damage by use of a protective covering that is impermeable to water, which is also termed "capping." However, "capping" CA-Yub-5 to protect it from water damage would be very impractical, if not impossible. It would be necessary to have a clear definition of the horizontal and vertical boundaries of CA-Yub-5, and the site would need to be completely encased in the covering so that it would be protected from saturation from all sides, including rising groundwater from below. Option 2: Conduct Data Recovery at CA-Yub-5 Data recovery through destructive excavation is considered an acceptable mitigation measure for damage to archaeological sites if other mitigation measures are less feasible or wholly infeasible. The purpose of data recovery is to obtain scientifically consequential information from an archaeological site that would be partially or completely destroyed. Although much of the work required for data recovery is similar to that conducted during test excavations, the requirements for data recovery call for more extensive manual and perhaps mechanical excavation. Recovered materials shall be subjected to laboratory analysis (e.g., stone tool analysis, faunal analysis, radiocarbon assays, and obsidian hydration studies), and a report and interpretive material shall be prepared that documents the site investigation and findings.					
ASB-5.8-b(1): Conduct Further Evaluation and Subsurface Testing to Determine Whether Proposed Levee Improvements Could Damage Significant Resources Associated with Prehistoric Archaeological Sites CA-Yub-13 and CA-Yub-14. If levee improvements would include activities that could disturb subsurface soils in the vicinity (within 1,000 feet) of the recorded location of either CA-Yub-13 or CA-Yub-14, TRLIA shall have a qualified archaeologist conduct an evaluation designed to assess the potential for damage to resources associated with	Before beginning any construction or ground-disturbing activity in the vicinity of either CA-Yub-13 or CA-Yub-14	When construction is planned to be initiated in the vicinity of either CA-Yub-13 or CA-Yub-14	Lead agency and primary construction contractor	Qualified archaeologist evaluates the sites and recommends appropriate mitigation measures; recommended measures are implemented such that activity does not disturb onsite cultural	

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
the site(s) before initiation of project-related ground-disturbing activities in these areas. The evaluation may require assessment of the condition and data potential of specific areas of anticipated construction disturbance and/or determination of whether one or both of the sites are eligible for inclusion in the CRHR and/or NRHP. This evaluation shall include additional surveys, subsurface test excavations, analyses of any discovered archaeological materials, and (if necessary) data recovery. If the testing indicates the presence of cultural resources, a qualified archaeologist shall evaluate the significance of the finds and shall recommend further mitigation measures. Because of the critical need to remedy weaknesses in the existing levee in Segment 1, it is unlikely that avoidance of any resources directly within the construction footprint would be possible, and data recovery would likely be required. Efforts involving testing, excavation, and monitoring shall be conducted in consultation with appropriate Native American representatives identified by the NAHC.				resources, or, if resources cannot be avoided, data recovery of the site is conducted in accordance with professional practices	
ASB-5.8-b(2): Monitor Ground-Disturbing Activities in the Vicinity of Prehistoric Archaeological Sites CA-Yub-13 and CA-Yub-14. A qualified professional archaeologist and a Native American representative shall monitor all project-related ground-disturbing activities at and near the locations of prehistoric archaeological sites CA-Yub-13 and CA-Yub-14. If intact archaeological materials or human burials not recovered during the subsurface testing and excavation programs described in Mitigation Measure LS-5.8-a(1) are uncovered during project-related ground-disturbing activities, the archaeologist shall determine their possible significance and shall formulate appropriate mitigation measures. Appropriate mitigation may include no action, avoidance of the resource, and potential additional data and burial recovery.	During construction in the vicinity of either CA-Yub-13 or CA-Yub-14	Throughout construction period in the vicinity of either CA-Yub-13 or CA-Yub-14	Lead agency and primary construction contractor	Qualified archaeologist and Native American monitor verify absence of intact archaeological materials or, if such materials are found, recommend mitigation measures; measures are implemented as appropriate	

Exhibit B: Mitigation Monitoring and Reporting Program for the Feather River Levee Repair Project Alternative 2 – The ASB Setback Levee Alternative					
Mitigation Measure	**Initiation of Mitigation**	**Monitoring Frequency**	**Responsibility for Verification of Compliance**	**Performance Criteria**	**Date Compliance Completed**
ASB-5.8-c: Survey Unexamined Areas before Project Ground-Disturbing Activities and Implement Further Mitigation As Necessary. A qualified professional archaeologist shall conduct focused surveys of all portions of the project area that were not adequately surveyed during past efforts or during surveys for the current effort. The survey shall be conducted before activities associated with project preparation or construction are initiated, and during a fallow period, if possible, in the case of areas currently covered in agricultural crops or grasses. If cultural resources are identified as a result of the survey, the archaeologist shall evaluate the significance of the finds and recommend appropriate mitigation measures for significant resources. TRLIA and its construction contractors shall implement these mitigation measures. Mitigation may include, but shall not necessarily be limited to, the avoidance of significant and potentially significant resources through changes in project design and/or subsurface testing and data recovery. Such efforts, particularly those involving testing and excavation, shall be conducted in consultation with appropriate Native American representatives identified by the NAHC.	Before beginning any construction or ground-disturbing activity, during a fallow period	Prior to construction being initiated in a particular area	Lead agency and primary construction contractor	Qualified archaeologist conducts focused surveys, and if cultural resources are found, recommends appropriate mitigation measures	
ASB-5.8-d: Stop Work and Implement Measures to Protect Archaeological Resources If Discovered during Ground-Disturbing Activities. If previously undocumented archaeological materials such as historic building or structure remains; historic artifact deposits or scatters; or prehistoric artifacts such as stone tool flaking debitage, mortars, pestles, shell, or bone are encountered during project construction, all ground-disturbing activity shall be suspended temporarily within a 100-foot radius of the find or a distance determined by a qualified professional archaeologist to be appropriate based on the potential for disturbance of additional resource-bearing soils. A qualified professional archaeologist shall identify the materials, determine their possible significance, and formulate	If cultural resources are discovered during ground-disturbing activities	Throughout construction period	Lead agency and primary construction contractor	Finds of undocumented archaeological materials are reported and protected until evaluated by an archeologist. Recommendations of qualified archaeologist are implemented	

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
appropriate mitigation measures. Appropriate mitigation may include no action, avoidance of the resource, and potential data recovery. Ground disturbance in the zone of suspended activity shall not recommence without authorization from the archaeologist.					
ASB-5.8-e: If Human Remains Are Discovered during Ground-Disturbing Activities, Stop Work and Comply with State Laws Pertaining to the Discovery of Human Remains. If human remains are uncovered during project construction, all ground-disturbing activities shall immediately be suspended within a 100-foot radius of the find or a distance determined by a qualified professional archaeologist to be appropriate based on the potential for disturbance of additional remains, and TRLIA or its designated representative shall be notified. TRLIA shall immediately notify the Yuba County Coroner and a qualified professional archaeologist, if one is not already on-site. The coroner shall examine the discovery within 48 hours. If the coroner determines that the remains are those of a Native American, he or she shall contact the NAHC by phone within 24 hours. The NAHC shall contact the Most Likely Descendant (MLD) of the remains. TRLIA or its appointed representative and the archaeologist shall consult with the MLD regarding the removal or preservation and avoidance of the remains, and the parties shall rebury or preserve the remains as appropriate. Ground disturbance in the zone of suspended activity shall not recommence without authorization from the archaeologist.	If human remains are found during ground-disturbing activities	Throughout construction period	Primary construction contractor	Finds of potential human remains are reported and protected until evaluated by appropriate individuals. Remains are treated or disposed of in accordance with direction received from the county coroner and from the NAHC and Native American representatives as appropriate	
ASB-5.9-a: Implement FRAQMD Pollution-Control Measures to Minimize Temporary Emissions of ROG, NO_X, and PM_{10} during Construction. FRAQMD's *Indirect Source Review Guidelines* and online CEQA guidance provide mitigation measures for reducing short-term air quality impacts. As recommended by FRAQMD, Three Rivers Levee Improvement Authority shall ensure that the following mitigation measures (summarized from FRAQMD guidance) are implemented during all project	Before beginning any construction or ground-disturbing activity	Throughout construction period	Lead agency and primary construction contractor	FRAQMD measures are implemented such that pollutant emissions are minimized. Note: The FRAQMD Fugitive Dust Control Plan is attached to this MMRP in Appendix A	

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
construction activities to the extent practicable. In addition, construction of the proposed project is required to comply with all applicable FRAQMD rules and regulations, in particular Rule 3.0 ("Visible Emissions"), Rule 3.16 ("Fugitive Dust Emissions"), and Rule 3.15 ("Architectural Coatings"). 1. Implement a Fugitive Dust Control Plan that includes the following measures (see Appendix E): ▪ All grading operations on a project should be suspended when winds carry dust beyond the property line despite implementation of all feasible dust control measures. Consideration should be given to suspending all project grading when winds exceed 20 mph to minimize the risk of dust being carried beyond the property line. ▪ Construction sites shall be watered as directed by the [Yuba County] Department of Public Works or FRAQMD and as necessary to prevent fugitive dust violations. ▪ An operational water truck should be on-site at all times. Apply water to control dust as needed to prevent visible emissions violations and off-site dust impacts. ▪ On-site dirt piles or other stockpiled particulate matter should be covered, wind breaks installed, and water and/or soil stabilizers employed to reduce windblown dust emissions. Incorporate the use of approved nontoxic soil stabilizers according to manufacturer's specifications to all inactive construction areas. ▪ All transfer processes involving a free fall of soil or other particulate matter shall be operated in such a manner as to minimize the free fall distance and fugitive dust emissions.					

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
▪ Apply approved chemical soil stabilizers according to the manufacturers' specifications, to all inactive construction areas (previously graded areas that remain inactive for 96 hours) including unpaved roads and employee/equipment parking areas. ▪ To prevent track-out, wheel washers should be installed where project vehicles and/or equipment exit onto paved streets from unpaved roads. Vehicles and/or equipment shall be washed prior to each trip. Alternatively, a gravel bed may be installed as appropriate at vehicle/equipment site exit points to effectively remove soil buildup on tires and tracks to prevent/diminish track-out. ▪ Paved streets shall be swept frequently (water sweeper with reclaimed water recommended; wet broom) if soil material has been carried onto adjacent paved, public thoroughfares from the project site. ▪ Provide temporary traffic control as needed during all phases of construction to improve traffic flow, as deemed appropriate by the Department of Public Works and/or Caltrans [California Department of Transportation] and to reduce vehicle dust emissions. ▪ Reduce traffic speeds on all unpaved surfaces to 15 mph or less and reduce unnecessary vehicle traffic by restricting access. Provide appropriate training, on-site enforcement, and signage. ▪ Reestablish ground cover on the construction site as soon as possible and prior to final occupancy, through seeding and watering. ▪ No open burning of vegetative waste (natural plant growth wastes) or other materials (trash, demolition debris et al.) may be conducted at the project site. Materials also may not be hauled off-					

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
site for disposal by open burning. Vegetative wastes should be chipped or delivered to waste to energy facilities (permitted biomass facilities), mulched, composted, or used for firewood.					
2. Construction equipment exhaust emissions shall not exceed FRAQMD Regulation III, Rule 3.0 ("Visible Emissions") limitations (40% opacity or Ringelmann 2.0). Operators of vehicles and equipment found to exceed opacity limits shall take action to repair the equipment within 72 hours or remove the equipment from service. Failure to comply may result in a Notice of Violation.					
3. The primary contractor shall be responsible to ensure that all construction equipment is properly tuned and maintained prior to and for the duration of onsite operation.					
4. Limit vehicle and equipment idling times to 10 minutes—saves fuel and reduces emissions.					
5. Use existing power sources (e.g., power poles) or clean fuel generators rather than temporary power generators.					
6. Develop and implement a traffic plan to minimize traffic flow interference from construction activities. The plan may include advance public notice of routing, use of public transportation, and satellite parking areas with a shuttle service. Schedule operations affecting traffic for off-peak hours. Minimize obstruction of through-traffic lanes. Provide a flag person to guide traffic properly and ensure safety at construction sites.					
7. Portable engines and portable engine-driven equipment units used at the project work site, with the exception of on-road and off-road motor vehicles, may require ARB Portable Equipment Registration with the state or a local district permit. The owner/operator shall be responsible for arranging appropriate consultations with ARB or the District [FRAQMD] to determine					

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
registration and permitting requirements prior to equipment operation at the site. 8. The proponent shall assemble a comprehensive inventory list (i.e., make, model, engine year, horsepower, and emission rates) of all heavy-duty off-road (portable and mobile) equipment (50 horsepower and greater) that will be used an aggregate of 40 or more hours for the construction project and apply the following mitigation measure: *Reducing NO_X emissions from off-road diesel powered equipment* The project shall provide a plan for approval by FRAQMD demonstrating that the heavy-duty (equal to or greater than 50 horsepower) off-road equipment to be used in the construction project, including owned, leased and subcontractor vehicles, will achieve a projectwide fleet-average 20% NO_X reduction[1] and 45% particulate reduction compared to the most recent ARB fleet average at time of construction. The FRAQMD Fugitive Dust Control Plan is included in Appendix E. ——— [1] Acceptable options for reducing emissions may include use of late-model engines, low-emission diesel products, alternative fuels, engine retrofit technology (Carl Moyer Guidelines), after-treatment products, voluntary off-site mitigation projects, provide funds for air district off-site mitigation projects, and/or other options as they become available. The District [FRAQMD] should be contacted to discuss alternative measures.					
ASB-5.10-a: Limit Generation of Noise by Equipment during Project Construction. Three Rivers Levee Improvement Authority (TRLIA) shall ensure that the primary construction contractor implements the following mitigation measures during construction activities:					

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
(a) To the extent practicable, construction activities shall be limited to the hours of 7 a.m. to 10 p.m. when operations occur within 500 feet of a residential or other noise-sensitive land use. Decisions as to whether nighttime construction is needed within 500 feet of residential or other noise-sensitive land uses shall only consider the need to complete project activities before the beginning of the flood season and the associated need to maintain human safety and the integrity of the flood control system. (b) All construction equipment shall be properly maintained and equipped with noise control, such as mufflers, in accordance with manufacturers' specifications. (c) To the extent feasible, the simultaneous operation of construction equipment within 50 feet of the project boundary shall be limited.	(a,b,c) At initiation of construction	(a,b,c) Throughout construction period	(a,b,c) Lead agency and primary construction contractor	(a,b,c) Noise levels at the locations of noise-sensitive receptors, including occupied dwellings, are reduced to the extent feasible	
In addition, TRLIA shall implement the following measure: (d) Before construction at each site near noise-sensitive receptors, TRLIA shall provide written notification to potentially affected receptors, identifying the type, duration, and frequency of construction operations. Notification materials will also identify a mechanism for residents to register complaints with TRLIA and Yuba County (the agency responsible for enforcement of the Yuba County noise ordinance) if construction noise levels are overly intrusive or construction occurs outside the permitted hours. TRLIA and/or Yuba County would then take corrective action.	(d) Before beginning any construction or ground-disturbing activity near noise-sensitive receptors	(d) Whenever construction is to be implemented n the vicinity of noise sensitive receptors	(d) Lead agency	(d) All residents or other building occupants in areas that could be adversely affected by construction noise have been notified	
ASB-5.11-b: Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways. To reduce hazards to vehicles on local roadways, Three Rivers Levee Improvement Authority (TRLIA) shall ensure that its primary					

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
construction contractor implements the following measures: (a) Develop and implement a traffic safety plan in coordination with the County and Caltrans. The construction contractor shall develop a plan for traffic safety assurance for the county roadways in the project vicinity. The contractor shall submit the plan to the County Public Works Department for approval before the initiation of construction-related activity that could adversely affect traffic on county roadways. A similar plan shall be prepared for SR 70 and submitted to Caltrans for review before initiation of construction-related activity that could adversely affect traffic on the highway. If both the County and Caltrans will accept the same traffic safety plan, then only one plan need be prepared. The plan(s) may call for the following elements, based on the requirements of each agency: ▪ posting warnings about the potential presence of slow-moving vehicles; ▪ using traffic control personnel when appropriate; ▪ scheduling truck trips outside of peak morning and evening traffic periods to the extent feasible; ▪ placing and maintaining barriers and installing traffic control devices necessary for safety, as specified in Caltrans's *Manual of Traffic Controls for Construction and Maintenance Works Zones* and in accordance with County requirements; and ▪ maintaining routes for passage of emergency response vehicles through roadways affected by construction activities. The contractor shall train construction personnel in appropriate safety measures as described in the plan(s), and shall implement the adopted plan(s).	(a) Before beginning any construction or ground-disturbing activity	(a) Throughout construction period (plan implementation)	(a) Lead agency and primary construction contractor	(a) Yuba County approves and Caltrans reviews the traffic safety plan(s), construction personnel are trained in appropriate safety measure, and plan(s) is/are implemented	
(b) Minimize the accumulation of mud and dirt on local roadways. All operations shall limit or expeditiously remove the accumulation of project-generated mud or	(b) At initiation of construction	(b) Throughout construction period, at least once every	(b) Lead agency and primary construction contractor	(b) Accumulation of mud and dirt on local roadways is removed	

Exhibit B: Mitigation Monitoring and Reporting Program for the Feather River Levee Repair Project Alternative 2 – The ASB Setback Levee Alternative					
Mitigation Measure	**Initiation of Mitigation**	**Monitoring Frequency**	**Responsibility for Verification of Compliance**	**Performance Criteria**	**Date Compliance Completed**
dirt from adjacent public streets at least once every 24 hours when operations are occurring. The construction contractor shall sweep the paved roadways (water sweeper with reclaimed water recommended) at the end of each day if substantial volumes of soil material have been carried onto adjacent paved, public roads from the project sites. Also see a similar requirement under Mitigation Measure LS-5.9-a, "Implement FRAQMD Pollution-Control Measures to Minimize Temporary Emissions of ROG, NO_X, and PM_{10} during Construction."		24 hours during construction operations		at least every 24 hours	
ASB-5.12-a: Coordinate with Utility Providers to Remove, Reinforce, and Modify Public Utility Infrastructure in the ASB Levee Setback Area and Prevent Damage of Facilities. TRLIA, the design engineers, or the primary construction contractor for the levee setback, as appropriate, shall implement the following measures before the beginning of construction to ensure that the levee setback does not adversely affect public utility infrastructure or result in interruption of utility service: (a) Coordinate with PG&E to protect electrical lines that cross the levee setback area. To maintain PG&E electrical service through the Bogue Loop 115-kV high-power transmission line and the two standard electrical lines that run along Ella Avenue and Country Club Avenue, TRLIA or its representative shall coordinate with PG&E to raise, relocate, or reinforce the steel towers and wood poles that stand in the proposed bypass area. (b) Ensure that all utility lines in the setback area have been identified and removed or reinforced as necessary. TRLIA or its representative shall ensure that any electrical, telephone, gas, and cable television lines within the levee setback area have been identified before the initiation of any ground-disturbing construction activity. Before the beginning of any construction-related ground disturbance,	(a,b) During final design and before beginning any construction or ground-disturbing activity	(a,b) During reviews of project designs and during construction planning	(a,b) Lead agency, design engineer, and primary construction contractor	(a,b) The entities involved in final design of the project components and construction planning agree that coordination with all potential service providers has occurred before the start of project construction, and that utilities that would be affected within construction areas have been removed or protected as appropriate	

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
TRLIA or its representative shall coordinate with all potential service providers known to have, or potentially having, utility infrastructure in the levee setback area, including but not limited to PG&E, AT&T, Comcast, OPUD, and RD 784, to ensure that the utility lines are removed or reinforced as appropriate.					
ASB-5.12-c	See Mitigation Measure ASB-5.11-b, **"Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways."** Mitigation Measure ASB-5.12-c is identical to Mitigation Measure ASB-5.11-b.				
ASB-5.13-a: Conduct Training for Construction Personnel, Cease Work if Paleontological Resources are Encountered, and Implement an Appropriate Mitigation Strategy. Three Rivers Levee Improvement Authority (TRLIA) or its primary construction contractor shall implement the following measures:					
(a) Before the start of construction activities, construction personnel involved with earthmoving activities shall be informed of the possibility of encountering fossils, the appearance and types of fossils likely to be seen during construction activities, and proper notification procedures should fossils be encountered. This worker training may either be prepared and presented by an experienced field archaeologist at the same time as construction worker education on cultural resources, or be prepared and presented separately by a qualified paleontologist.	(a) Before beginning any construction or ground-disturbing activity	(a) Beginning of each construction phase where significant new staff are on-site	(a) Lead agency and primary construction contractor	(a) Construction personnel are trained as appropriate	
(b) If paleontological resources are discovered during earthmoving activities, the construction crew shall immediately cease work within at least 25 feet of the find. TRLIA shall retain a qualified paleontologist to evaluate the resource and prepare a proposed mitigation plan in accordance with SVP guidelines (1995). The proposed mitigation plan may include a field survey, construction monitoring, sampling and data recovery procedures, museum storage coordination for any specimen recovered, and a report of findings.	(b) At initiation of construction	(b) Throughout construction period	(b) Lead agency and primary construction contractor	(b) Potential paleontological finds are reported and protected until evaluated. Mitigation plan, if needed, is implemented in accordance with SVP guidelines and discovered resources are protected as necessary	

Exhibit B: Mitigation Monitoring and Reporting Program for the Feather River Levee Repair Project Alternative 2 – The ASB Setback Levee Alternative					
Mitigation Measure	**Initiation of Mitigation**	**Monitoring Frequency**	**Responsibility for Verification of Compliance**	**Performance Criteria**	**Date Compliance Completed**
Recommendations determined by TRLIA to be necessary and feasible shall be implemented before construction activities can resume at the site where the paleontological resources were discovered.					

Exhibit B

FEATHER RIVER AIR QUALITY MANAGEMENT DISTRICT

Serving the Counties of Yuba and Sutter
938 14th Street, Marysville, CA 95901
(530) 634-7659 FAX: (530) 634-7660 Burn Information: (530) 741-6299
Email: fraqmd@fraqmd.org Web Site: http://www.fraqmd.org

Steven A. Speckert
Air Pollution Control Officer

REQUIREMENTS FOR THE CONTROL OF FUGITIVE DUST EMISSIONS

Introduction

The Feather River Air Quality Management District (FRAQMD) is designated nonattainment for the California PM10 health standard (particulate matter less than 10 microns in size; also referred to in this document as respirable particulate matter and fugitive dust). This means that Yuba and Sutter Counties violate the state PM10 air quality health standard. Construction activities, agricultural operations, unpaved roads, and windblown dust contribute heavily to these emissions. According to the U.S. EPA, exposure to high concentrations of particulate matter, including airborne dust, affects breathing, aggravates existing respiratory and cardiovascular disease, and alters the body's defenses against foreign materials, lung damage, skin cancer and premature death. Further studies have linked respirable particulate matter with health problems like asthma and chronic bronchitis.

This document serves to address the aforementioned health concerns by informing the public of applicable state laws and local rules and regulations governing fugitive dust emissions and the capacity for the air district to issue violations (refer to Attachment A). Also attached to this document are a list of approved mitigation measures (refer to Attachment B) and a fugitive dust control plan to be submitted by the project proponent for FRAQMD approval (refer to Attachment C).

Discussion

Frequent nuisance complaints are received at the air district in regard to construction site fugitive dust emissions. Standard CEQA mitigation recommendations approved for the project are not always implemented by the project proponent. Appropriate emphasis on the need for fugitive dust controls and the potential impacts of air district enforcement actions need to be stressed.

In accordance with California Health and Safety Code (H&S) section 42400 et seq., the FRAQMD can assess civil and criminal penalties for violations of the FRAQMD Rules and Regulations and the H&S. Violations are misdemeanors and can carry potential penalties from $1,000 to $1,000,000 per day per violation and/or imprisonment in the county jail.

This document cites applicable air pollution regulations, defines performance criteria and acceptable control strategies to implement, and specifies emission levels and standards not to exceed in order to prevent a violation (refer to Attachment A). The project proponent should

have a thorough understanding of these regulations. If additional information is required please contact the District at the location provided above.

Prevention

Fugitive dust control strategies are composed of a balance of available dust mitigation techniques applied on an as needed basis by construction site supervision to

- prevent dust from exiting the property,
- prevent visible emissions from exceeding opacity regulations, and
- prevent public nuisance.

This implies the use of adequate measures during the appropriate evolution of each construction activity and may include wind breaks and barriers, frequent water applications, application of soil additives, control of vehicle access, vehicle speed restrictions, covering of piles, use of gravel at site exit points to remove caked on dirt from tires and tracks, washing of equipment at the end of each work day and prior to site removal, wet sweeping of public thoroughfares, and work stoppage (refer to Attachment B).

Site-Specific Considerations

Time of year, length of project, and acres per day undergoing vegetative removal, excavation, backfilling, hauling and grading should be the primary focus for implementation of dust control measures. The plan must also consider dust emissions associated with construction activities after completion of grading activities including installation of infrastructure (including water, electric, roads, sidewalks, and sewer), digging of building foundations, site vehicle traffic, and landscaping activities.

Knowledge of soil types may be important to understand the free silt content and the ability to hold moisture. Some soils are hydrophobic – repel water - and may require the addition of surfactants during water applications to facilitate penetration and achieve appropriate moisture adsorption. Surfactants may also be used to reduce the amount of water needed.

Activities occurring near sensitive receptors should receive a higher level of preventative planning. Sensitive receptors include school-aged children (schools, daycare, playgrounds), the elderly (retirement community, nursing homes), the infirm (medical facilities/offices), and those who exercise outdoors regularly (public and private exercise facilities, parks).

Other Regulatory Requirements

The project proponent should evaluate water quality, flora and fauna and other environmental impacts (e.g. wildlife, drinking water, stormwater runoff, and surface water impacts) prior to the use of water/soil additives including binders, tackifiers, surfactants, and other materials and methods. All additives at a minimum must meet Regional Water Quality Control Board

(RWQCB) requirements and all applicable federal, state, and local environmental regulations regarding the use of the material.

Fugitive Dust Control Plan Submittal

Complete and sign Attachment C, Fugitive Dust Control Plan, and submit to FRAQMD prior to start of work.

ORIGINAL SIGNED

Larry D. Matlock
Senior Air Quality Planner

Note: This document may be downloaded from our web site at
http:// www.fraqmd.org/Downloads/FugitiveDustControlPlan.doc or
http:// www.fraqmd.org/Downloads/FugitiveDustControlPlan.pdf

FugitiveDustControlPlan09_09_03.doc

Exhibit B

ATTACHMENT A

LOCAL AND STATE REGULATIONS APPLICABLE TO FUGITIVE DUST

I. FRAQMD Rules and Regulations

Note: The following District Rules and Regulations are enforced for each project regardless of lead agency or Board approved project CEQA mitigation requirements.

FRAQMD RULE 3.0 - VISIBLE EMISSIONS *(Adopted 6/91)*

As provided by Section 41701 of the California Health and Safety Code, a person shall not discharge into the atmosphere from any single source of emissions whatsoever, any air contaminants for a period or periods aggregating more than three minutes in any one hour which is:

a. As dark or darker in shade as that designated as No. 2 on the Ringlemen Chart, as published by the United States Bureau of Mines; or

b. Of such opacity as to obscure an observer's view to a degree equal to or greater than does smoke described in Subsection 'a' above.

Enforcement: The District has trained staff capable of performing a Visible Emissions Evaluation (VEE). VEE courses are offered to regulators and the regulated community (for a fee) at regular intervals by staff of the California Air Resources Board.

FRAQMD RULE 3.16 - FUGITIVE DUST EMISSIONS *(Adopted 4/11/94)*

A. PURPOSE
The purpose of this Rule is to reasonably regulate operations which periodically may cause fugitive dust emissions into the atmosphere.

B. DEFINITION
For the purpose of this Rule, the following definitions shall apply:

B.1 Fugitive Dust: Solid airborne matter emitted from any non-combustion source.
B.2 Emergency: Any act of God, but only if the owner of the property from which fugitive dust emissions originate establishes for the Feather River Air Quality Management District, by a preponderance of evidence, that he or she took reasonable precautions in light of the relevant facts and circumstances to minimize emissions.
B.3 Property Line: Adjacent properties which are owned by the same person shall be considered the same property for the purpose of determining the property line.

C. REQUIREMENTS
A person shall take every reasonable precaution not to cause or allow the emissions of fugitive dust from being airborne beyond the property line from which the emission originates, from any construction, handling or storage activity, or any wrecking, excavation, grading, clearing of land or solid waste disposal operation.

Reasonable precautions shall include, but are not limited to:

C.1 use, where possible, of water or chemicals for control of dust in the demolition of existing buildings or structures, construction operations, construction of roadways, or the clearing of land;
C.2 application of asphalt, oil, water, or suitable chemical on dirt roads, material stockpiles, and other surfaces which can give rise to airborne dusts;
C.3 other means approved by the Air Pollution Control Officer.

D. EXEMPTIONS
The provisions of this Rule shall not apply to the following:

D.1 Agricultural Operations
D.2 Currently unworked land designated as reclaimed for agriculture
D.3 An Emergency
D.4 Unpaved roads open to public travel (this inclusion shall not apply to industrial or commercial facilities).

II. State Laws

California Health and Safety Code

Section 41700. Except as otherwise provided in Section 41705, no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.

Section 41701. Except as otherwise provided in Section 41704, or Article 2 (commencing with Section 41800) of this chapter other than Section 41812, or Article 2 (commencing with Section 42350) of Chapter 4, no person shall discharge into the atmosphere from any source whatsoever any air contaminant, other than uncombined water vapor, for a period or periods aggregating more than three minutes in any one hour which is: (a) As dark or darker in shade as that designated as No. 2 on the Ringelmann Chart, as published by the United States Bureau of Mines, or (b) Of such opacity as to obscure an observer's view to a degree equal to or greater than does smoke described in subdivision (a).

California Vehicle Code

Section 23114 requires: No vehicle shall transport any aggregate material upon a highway unless the material is covered. Exception 23114(e)(4): Vehicles transporting loads of aggregate materials shall not be required to cover their loads if the load, where it contacts the sides, front, and back of the cargo container area, remains six inches from the upper edge of the container area, and if the load does not extend, at its peak, above any part of the upper edge of the cargo container area. For purposes of this section, "aggregate material" means rock fragments, pebbles, sand, dirt, gravel, cobbles, crushed base, asphalt, and other similar materials.

Exhibit B

ATTACHMENT B

FRAQMD - FUGITIVE DUST CONTROL MITIGATION MEASURES

Sources: FRAQMD Indirect Source Review Guidelines and Best Available Mitigation Measures compiled by the air districts of the Greater Sacramento Region and approved for implementation by the FRAQMD Board of Directors.

All grading operations on a project should be suspended when winds exceed 20 miles per hour or when winds carry dust beyond the property line despite implementation of all feasible dust control measures.

Construction sites shall be watered as directed by the Department of Public Works or Air Quality Management District and as necessary to prevent fugitive dust violations.

An operational water truck should be onsite at all times. Apply water to control dust as needed to prevent visible emissions violations and offsite dust impacts.

Onsite dirt piles or other stockpiled particulate matter should be covered, wind breaks installed, and water and/or soil stabilizers employed to reduce wind blown dust emissions. Incorporate the use of approved non-toxic soil stabilizers according to manufacturer's specifications to all inactive construction areas.

All transfer processes involving a free fall of soil or other particulate matter shall be operated in such a manner as to minimize the free fall distance and fugitive dust emissions.

Apply approved chemical soil stabilizers according to the manufacturers' specifications, to all-inactive construction areas (previously graded areas that remain inactive for 96 hours) including unpaved roads and employee/equipment parking areas.

To prevent track-out, wheel washers should be installed where project vehicles and/or equipment exit onto paved streets from unpaved roads. Vehicles and/or equipment shall be washed prior to each trip. Alternatively, a gravel bed may be installed as appropriate at vehicle/equipment site exit points to effectively remove soil buildup on tires and tracks to prevent/diminish track-out.

Paved streets shall be swept frequently (water sweeper with reclaimed water recommended; wet broom) if soil material has been carried onto adjacent paved, public thoroughfares from the project site.

Provide temporary traffic control as needed during all phases of construction to improve traffic flow, as deemed appropriate by the Department of Public Works and/or Caltrans and to reduce vehicle dust emissions. An effective measure is to enforce vehicle traffic speeds at or below 15 mph.

Reduce traffic speeds on all unpaved surfaces to 15 miles per hour or less and reduce unnecessary vehicle traffic by restricting access. Provide appropriate training, onsite enforcement, and signage.

Exhibit B

Reestablish ground cover on the construction site as soon as possible and prior to final occupancy, through seeding and watering.

Disposal by Burning: Open burning is yet another source of fugitive gas and particulate emissions and shall be prohibited at the project site. No open burning of vegetative waste (natural plant growth wastes) or other legal or illegal burn materials (trash, demolition debris, et. al.) may be conducted at the project site. Vegetative wastes should be chipped or delivered to waste to energy facilities (permitted biomass facilities), mulched, composted, or used for firewood. It is unlawful to haul waste materials offsite for disposal by open burning.

Exhibit B

ATTACHMENT C

Fugitive Dust Control Plan

This plan, upon signature and submittal to the FRAQMD, will serve as an approved Fugitive Dust Control Plan to be implemented at the designated site. This plan must be submitted by the project proponent and received at the air district prior to start of work.

The approved plan serves as an acknowledgment by the project proponent of their duty to address state and local laws governing fugitive dust emissions and the potential for first offense issuance of a Notice of Violation by the air district where violations are substantiated by District staff.

- Site Location: _____
- Project Type (circle all that apply): Residential Commercial Industrial Transportation
- List of responsible persons:

  Office (name, title, address, phone): _____

  _____

  Field (name, title, phone): _____
- Projected Start and End Dates: _____

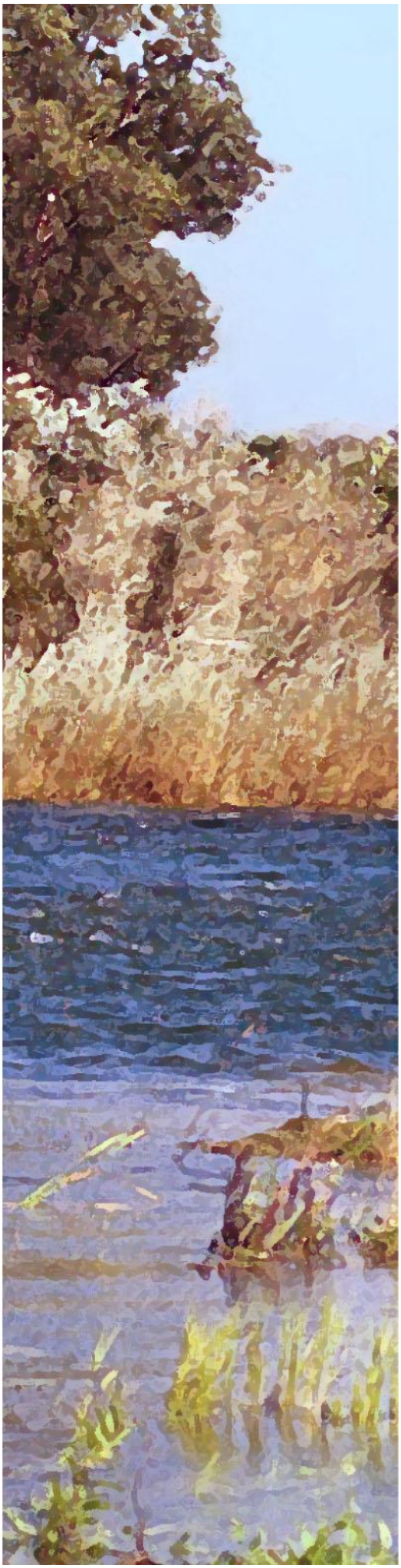
Project Proponent: _____ _____
Printed Name Company/Phone

Signature: _____ Title: _____

By signing this document I acknowledge that I have read the accompanying literature regarding state and local fugitive dust emission laws and understand that it is my responsibility as the project proponent to ensure that appropriate materials and instructions are available to site employees to implement fugitive dust mitigation measures (Attachment B) appropriate for each development phase of this project.

I further acknowledge that it is my responsibility to ensure that site employees are made formally aware of fugitive dust control laws, requirements, and available mitigation techniques, and that appropriate measures are to be implemented at the site as necessary to prevent fugitive dust violations.

Please Submit to: FRAQMD, 938 14th Street, Marysville, CA 95901 Attn: Planning
Phone: 530-634-7659 x202 FAX: 530-634-7660 Email: lmatlock@fraqmd.org



ADDENDUM 5 TO THE ENVIRONMENTAL IMPACT REPORT

FOR THE FEATHER RIVER LEVEE REPAIR PROJECT

AN ELEMENT OF THE YUBA-FEATHER SUPPLEMENTAL FLOOD CONTROL PROJECT

STATE CLEARINGHOUSE NO. 2006062071

PREPARED FOR

THREE RIVERS LEVEE IMPROVEMENT AUTHORITY

PREPARED BY

AECOM
FLOOD CONTROL STUDY TEAM

October 2012

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THREE RIVERS LEVEE IMPROVEMENT AUTHORITY
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Contact: Paul Brunner, P. E.
Executive Director

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Project Manager
916/414-5800

October 2012

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1 INTRODUCTION

1.1 BACKGROUND AND REFINEMENTS IN PROJECT ELEMENTS LEADING TO PREPARATION OF THE ADDENDUM

On August 4, 2006, the draft environmental impact report (DEIR) for the Feather River Levee Repair Project (FRLRP) was distributed to public agencies and the general public. The lead agency under the California Environmental Quality Act (CEQA) is the Three Rivers Levee Improvement Authority (TRLIA), a joint powers authority composed of Yuba County and Reclamation District 784. In November 2006, the final environmental impact report (FEIR), addressing written and oral comments received on the DEIR, was distributed to public agencies and the general public. The TRLIA Board of Directors certified the environmental impact report (EIR), consisting of the DEIR and the FEIR, on February 6, 2007. The EIR was prepared in accordance with the requirements of CEQA and the State CEQA Guidelines.

The FRLRP consists of levee improvements along segments of the existing Feather River and Yuba River levees in southern Yuba County (Figure 1-1). The EIR evaluated three project alternatives at an equal level of detail and a no-project alternative. Concurrent with certification of the EIR, the TRLIA Board of Directors approved Alternative 2, the "Levee Strengthening and ASB [Above Star Bend] Setback Levee Alternative," for implementation. Activities included in Alternative 2 are divided into three project segments as follows:

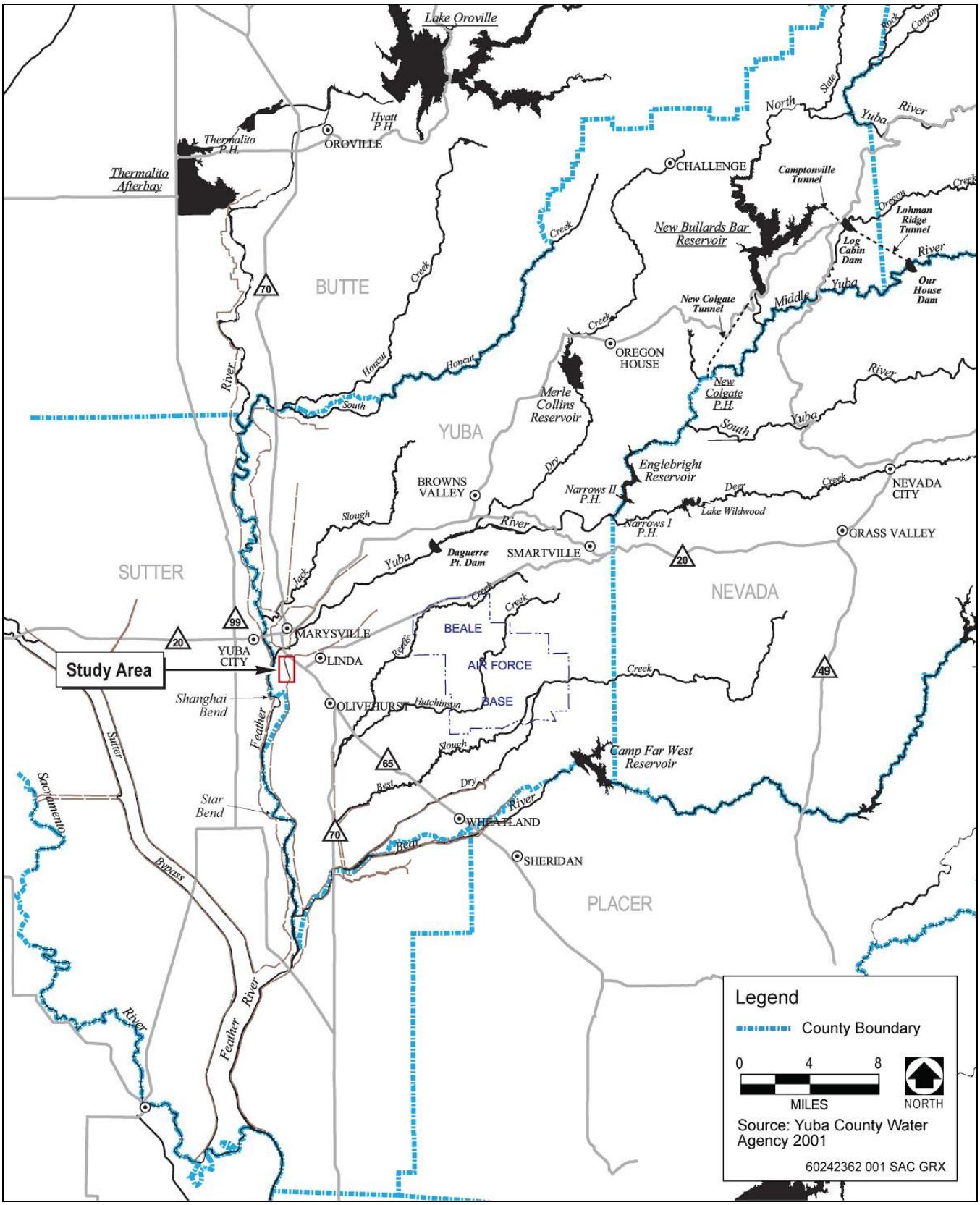
- Segment 1—The existing Feather River left (east) bank levee from Project Levee Mile (PLM) 13.3 to PLM 17.2 (from approximately Pump Station No. 2 to Star Bend) (Figure 1-2). Proposed improvements to this levee segment consist of repairing and strengthening the existing levee in place to correct seepage and/or stability deficiencies.

- Segment 2—The existing Feather River left bank levee from approximately PLM 17.2 to PLM 23.4 (from Star Bend to immediately south of Shanghai Bend [west of the Yuba County Airport]) (Figure 1-2). Proposed improvements to this levee segment consist of replacing the existing levee with a new setback levee (the ASB setback levee). Relocation and replacement of the existing RD 784 Pump Station No. 3 is also included with Segment 2.

- Segment 3—The existing Feather River left bank levee from PLM 23.4 to PLM 26.1, and the Yuba River left (south) bank levee from PLM 0.0 to PLM 0.3 (west of the Yuba County Airport to the railroad crossing at the State Route [SR] 70 bridge) (Figure 1-2). Proposed levee improvements in this area consist of repairing and strengthening the existing levee in place to correct seepage and/or stability deficiencies.

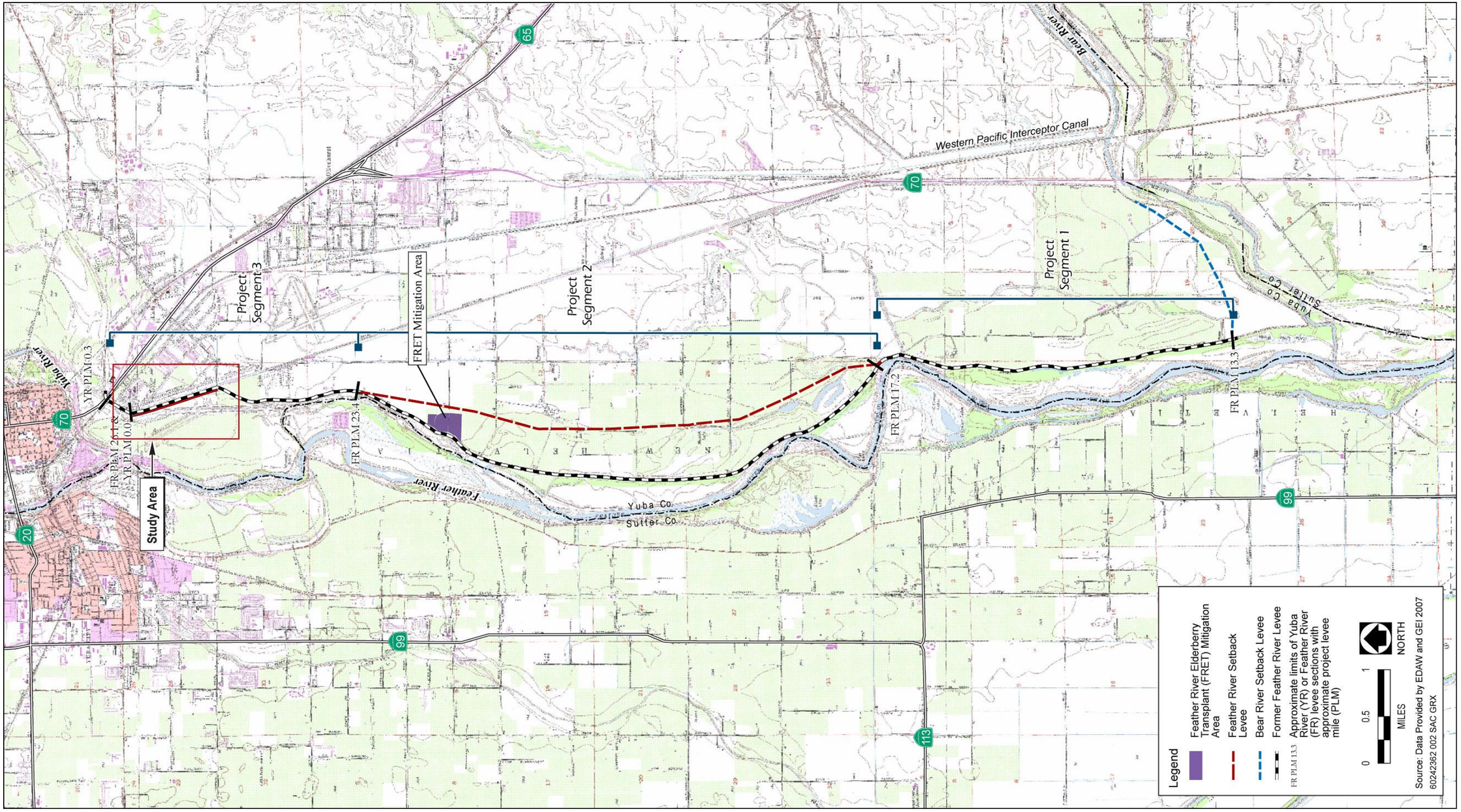
Since certification of the EIR, design, permitting, and construction of FRLRP Alternative 2 have been completed. Construction of Segments 1 and 3 levee improvements was almost entirely complete in 2008, along with some minor items resolved in 2009. Construction of the Segment 2 setback levee and related facilities was completed in fall 2010.

The three project alternatives evaluated in the EIR were developed based on a preliminary design effort. The structural features of the proposed levee repairs and the setback levee (i.e., the improvements in Segments 1, 2, and 3) included in all of the alternatives were developed to a level of detail sufficient for a complete project-level environmental analysis consistent with Section 15161 of the State CEQA Guidelines. An increase in the availability of detailed information regarding the approved project is to be expected as a project transitions from a preliminary design effort for several alternatives to a final design and implementation for a single alternative. This is reflected in the preparation of four previous EIR addenda prepared for the project addressing activities such as extending the anticipated period of closure of a public boat ramp during construction, use of additional borrow areas, modifying a small portion of the Segment 2 setback levee design in response to discovery of a cultural resources site during construction, completion of the Feather River Elderberry Transplant (FRET) mitigation area,



Source: AECOM 2012

Figure 1-1 **Regional Location**



Source: Adapted by AECOM 2012

Figure 1-2 **Project Location**

and establishing a vegetated wave buffer along the water side of the Segment 2 Setback Levee (TRLIA 2008a, 2008b, 2009, 2011; see http://www.trlia.org/EnvironmentalDocs.asp).

The action evaluated in this addendum is not a change to the proposed project but a refinement in the level of detail for actions already presented in the EIR as part of the proposed project. The EIR evaluated proposed actions to correct deficiencies identified along the levee segments in order to meet all state and federal standards for flood protection. TRLIA has recently discovered that existing private properties adjacent to the levee in Segment 3 have encroached an average of 17 feet into state property and prohibit conformance with state and federal requirements for levee access for the purposes of maintenance and flood fighting. Proper levee access is a critically important component of the project for TRLIA to meet all state and federal standards for flood protection. Consequently, TRLIA proposes to construct a 0.9-mile (4,738-foot) long, 20-foot-wide toe access corridor on the landside of Segment 3 north of Island Avenue to meet existing state and federal requirements for levee access. The details of these refinements are presented on page 2-1 of this EIR addendum. TRLIA, as lead agency for the project under CEQA, has determined that these refinements to the FRLRP project constitute minor additions and changes to the EIR and have conservatively decided to prepare this EIR addendum in accordance with Section 15164 of the State CEQA Guidelines.

1.2 STATE CEQA GUIDELINES REGARDING CHANGES TO A PROJECT

If, after certification of an EIR, altered conditions or changes or additions to a project occur, CEQA provides three mechanisms to address these changes: a subsequent EIR, a supplement to an EIR, or an addendum to an EIR.

Section 15162 of the State CEQA Guidelines describes the conditions under which preparation of a subsequent EIR would be appropriate. When an EIR has been certified for a project, preparation of a subsequent EIR would be appropriate if the lead agency determines, on the basis of substantial evidence in light of the whole record, that one or more of the following conditions is met:

(1) substantial changes are proposed in the project which will require major revisions of the previous EIR due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified effects;

(2) substantial changes occur with respect to the circumstances under which the project is undertaken which will require major revisions of the previous EIR due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects; or

(3) new information of substantial importance, which was not known and could not have been known with the exercise of reasonable diligence at the time the previous EIR was certified as complete, shows any of the following:

   (A) the project will have one or more significant effects not discussed in the previous EIR;

   (B) significant effects previously examined will be substantially more severe than shown in the previous EIR;

   (C) mitigation measures or alternatives previously found not to be feasible would in fact be feasible, and would substantially reduce one or more significant effects of the project, but the project proponents decline to adopt the mitigation measures or alternatives; or

   (D) mitigation measures or alternatives which are considerably different from those analyzed in the previous EIR would substantially reduce one or more significant effects on the environment, but the project proponents decline to adopt the mitigation measure or alternative.

Section 15163 of the State CEQA Guidelines states that a lead agency may choose to prepare a supplement to an EIR rather than a subsequent EIR if:

(1) any of the conditions described above for Section 15162 would require the preparation of a subsequent EIR, and

(2) only minor additions or changes would be necessary to make the previous EIR adequately apply to the project in the changed situation.

Section 15164 of the State CEQA Guidelines states that a lead agency may prepare an addendum to a previously certified EIR if some changes or additions are necessary, but none of the conditions described above for Section 15162 calling for preparation of a subsequent EIR have occurred.

The differences between the FRLRP as described in the FRLRP EIR and approved by TRLIA and the refined elements of the FRLRP as they are currently known constitute clarifications that may be addressed in an addendum to an EIR. As described in Section 2 of this document, "Description of FRLRP Refinements," and Section 3, "Environmental Analysis of FRLRP Refinements," none of the conditions described above for Section 15162 calling for preparation of a subsequent EIR have been met. In addition, the FRLRP EIR and associated Mitigation Monitoring and Reporting Program remain valid for assessing and mitigating identified impacts that would result from implementation of the approved project.

Refinements to the FRLRP as described in this addendum and any altered conditions since certification of the EIR on February 6, 2007:

- would not result in any new significant environmental effects, and
- would not substantially increase the severity of previously identified effects.

In addition, no new information of substantial importance has arisen that shows that:

- the project would have new significant effects,
- the project would have substantially more severe effects,
- mitigation measures or alternatives previously found to be infeasible would in fact be feasible, or
- mitigation measures or alternatives that are considerably different from those analyzed in the EIR would substantially reduce one or more significant effects on the environment.

Because none of the conditions described in Section 15162 of the State CEQA Guidelines calling for preparation of a subsequent EIR have occurred, an addendum to the FRLRP EIR, consistent with Section 15164 of the State CEQA Guidelines, is the appropriate mechanism to address the proposed project refinements.

2 DESCRIPTION OF FRLRP REFINEMENTS

The following refinements are proposed for FRLRP Alternative 2 (the approved project) since the FRLRP EIR was certified and Alternative 2 was approved for implementation:

- Construct a 0.9-mile-long, 20-foot-wide toe access corridor on the landside of the Segment 3 levee north of Island Avenue
- Remove and relocate 12 elderberry shrubs within the newly established 20-foot-wide toe access corridor

The proposed project refinements are described below.

2.1 EXPANSION OF ACCESS CORRIDOR

Recent emphasis by the U.S. Army Corps of Engineers (USACE) on vegetation management at the toes of levees and recent new criteria requirements for urban levees (Department of Water Resources Urban Levee Design Criteria, May 2012, Section 7.11.1) by the California Department of Water Resources (DWR) with respect to urban levees have resulted in the requirement that TRLIA expand levee improvements to provide a 20-foot toe access corridor on the landside of Segment 3 north of Island Avenue for approximately 0.9 mile along the levee to the intersection of Riverside Drive and Sycamore Avenue. The expansion of an existing corridor requires removal of existing fences, construction of a new fence along the outside boundary of the toe access corridor, construction of a maintenance road within the access corridor, construction of drainage improvements, and vegetation and trash clearance.

Establishment of a 20-foot-wide toe access corridor on the landside of Segment 3 north of Island Avenue would result in expansion of the toe access corridor past existing fences of adjacent private properties. Although establishment of the toe access corridor would extend past existing fences of private properties, this expansion would occur entirely within the property boundary of the State of California. Recent review of parcel boundaries by TRLIA and DWR revealed that existing private properties adjacent to the levee in Segment 3 have encroached an average of 17 feet into State property.

In accordance with the requirements of USACE and DWR, the widened toe access corridor must include the following elements:

- a new 10-foot-high uniform cyclone fence along the new fence line (Figure 2-1),
- a new maintenance road constructed of road grade fill to 1 to 5 feet along the landside levee toe (Figure 2-1),
- construction of a concrete v-ditch at the south end of the project from Island Avenue to 400 feet north of Island Avenue for drainage to ensure that the maintenance road does not become flooded or impassable (Figure 2-1), and
- installation of a drainage pipe through the Island Avenue crossing of the levee at the south end of the project to drain water from the new concrete v-ditch to existing drainage on the land side of the levee south of Island Avenue (Figure 2-1).

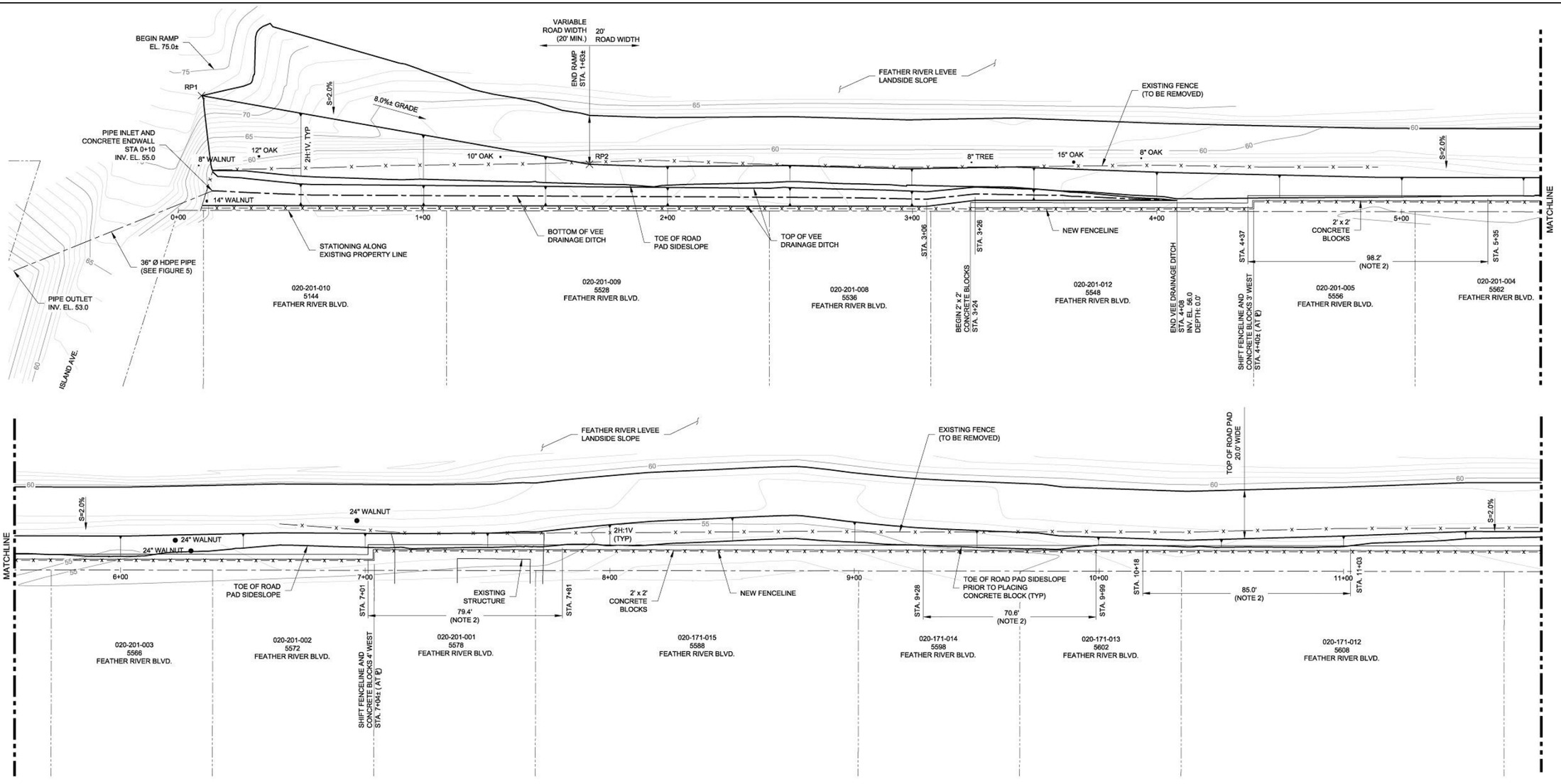
2.2 REMOVE AND RELOCATE ELDERBERRY SHRUBS

State and federal requirements require that vegetation and other encroachments (e.g., trash, equipment, vehicles, and other removable items) be cleared and removed from within the levee access corridor. This requirement

would result in the need to remove the existing fences, vegetation, debris, and other material from within the access corridor. Most of the vegetation in the access corridor consists of weedy herbaceous species, some native and non-native shrubs, and native and non-native trees. However, there are also 12 elderberry shrubs growing along the existing fences that would need to be removed.

Construction of the Segment 2 setback levee and associated facilities would affect elderberry shrubs within and immediately adjacent to the construction footprint. Elderberry shrubs are considered habitat for the threatened Valley Elderberry Longhorn Beetle (VELB). Pursuant to the FRLRP EIR, impacts of the FRLRP to VELB habitat have been mitigated, in part, by establishing the Feather River Elderberry Transplant (FRET) mitigation area. The FRET mitigation area is a 44-acre elderberry mitigation site located in the northern end of the setback area and is a requirement of the August 28, 2008 U.S. Fish and Wildlife Service (USFWS) Biological Opinion (BO) and the USACE Section 404 Permit for the Segment 2 setback levee. The elderberry shrubs along the existing fences on the land side of the levee in Segment 3 are proposed to be removed from Segment 3 and transplanted to the existing FRET mitigation area in Segment 2.

The anticipated construction schedule is for elderberry transplantation to occur during the USFWS recommended period of November 15 to February 15, most likely starting in January 2013. Construction of the new fence, maintenance road, concrete v-ditch, additional vegetation and trash clearing, and other improvements associated with the proposed project refinements would start in summer 2013. No structures are anticipated to be left in the proposed toe access corridor. Existing fences, vegetation, and some trash debris would be cleared from the access corridor and disposed of at the County landfill. Approximately 4,000 cubic yards of fill material would be imported by street legal dump trucks to construct the maintenance road embankment. The maintenance road and embankment would be spread and graded by one standard grader and compacted with a single vibratory roller. A water truck would be used to minimize dust during clearing and grading operations and to moisture condition the fill for compaction. Once the maintenance road embankment is complete, approximately 3,000 tons of road aggregate base would be placed on the embankment, moisture conditioned, and compacted to provide the maintenance road. An excavator would be required to excavate and fill a trench for the pipe through Island Avenue. Commercial concrete trucks would deliver a small amount of concrete for the v-ditch and pipe headwalls. Flatbed trucks would occasionally deliver construction materials such as lumber for framing concrete structures and fence materials. A maximum work force of 10 workers would be on the job at any one time. Construction would occur 6 days a week (Monday through Saturday) from 7 a.m. to 7 p.m.



NOTES:

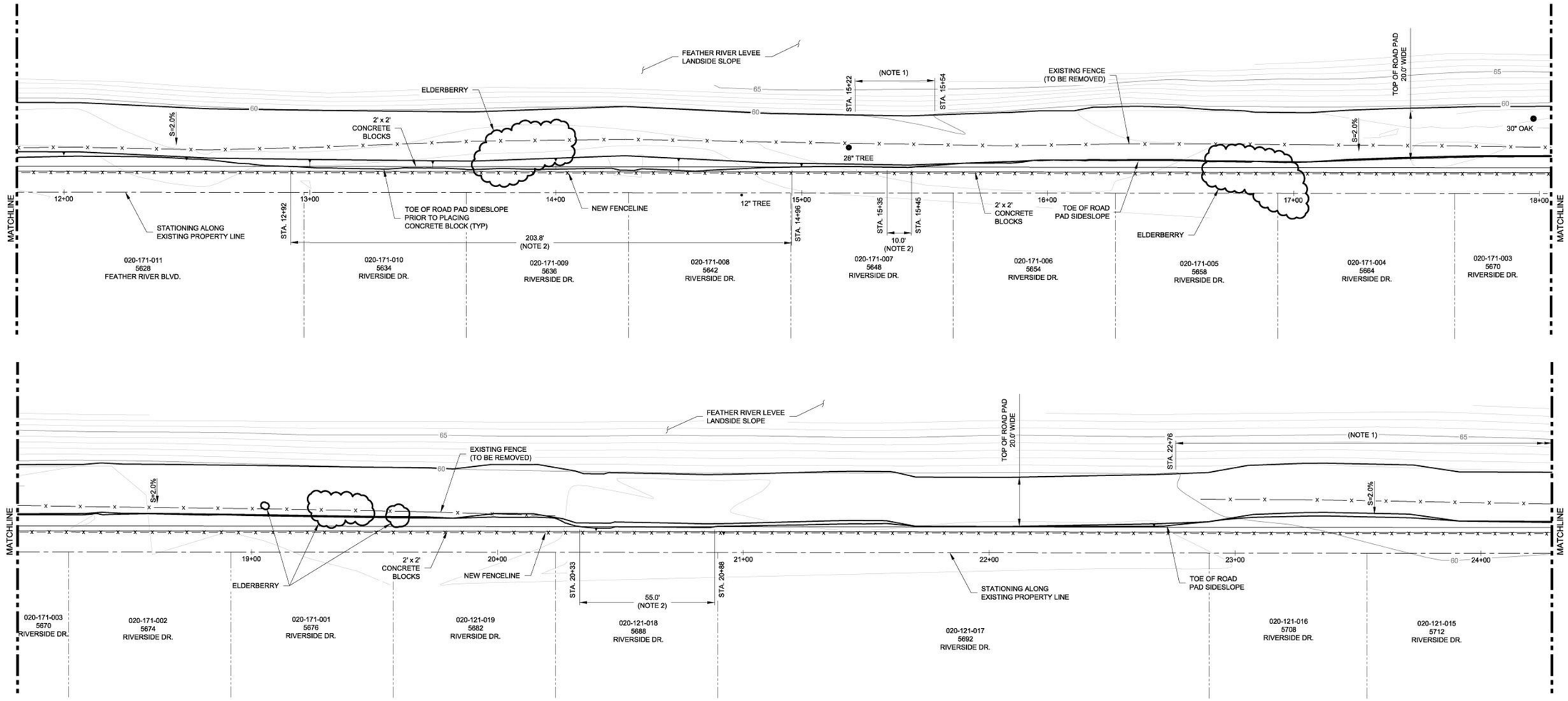
1. AT LOCATIONS WHERE THE WEST ROAD HINGE RISES ABOVE EL. 59, BEGIN THE 2.0% TOE ROAD CROSS SLOPE AT THE ELEVATION OF THE EXISTING HINGE, EXCEPT AS SHOWN IN TABLE 1.
2. ROAD PAD FILL OVERLAPS WITH 2' X 2' CONCRETE BLOCKS IN SEVERAL LOCATIONS IDENTIFIED IN THE PLANS. PLACE CONCRETE BLOCKS PRIOR TO ROAD FILL.
3. PLACE FILL ON THE EXISTING LANDSIDE LEVEE SLOPE BETWEEN STATIONS 44+50 AND 47+38 TO FLATTEN THE SIDE SLOPE TO 2H:1V. THE ROAD WIDTH WILL REDUCE SLIGHTLY WITHIN THIS REACH, AND MAY ABUT DIRECTLY AGAINST THE CONCRETE BLOCKS.

TABLE 1: ROAD PAD ALIGNMENT DEVIATION

POINT	STATION	℄ OFFSET (FT)	APPROX. ELEVATION
RP1	0+00	46.94 (L)	74.0
RP2	1+63	19.01 (L)	62.1
RP3	30+17	30.62 (L)	59.7
RP4	31+03	35.54 (L)	61.7
RP5	32+34	36.04 (L)	61.2
RP6	32+66	31.07 (L)	59.4

Source: GEI Consultants 2012, adapted by AECOM 2012

Figure 2-1 **Project Features (1 of 4)**



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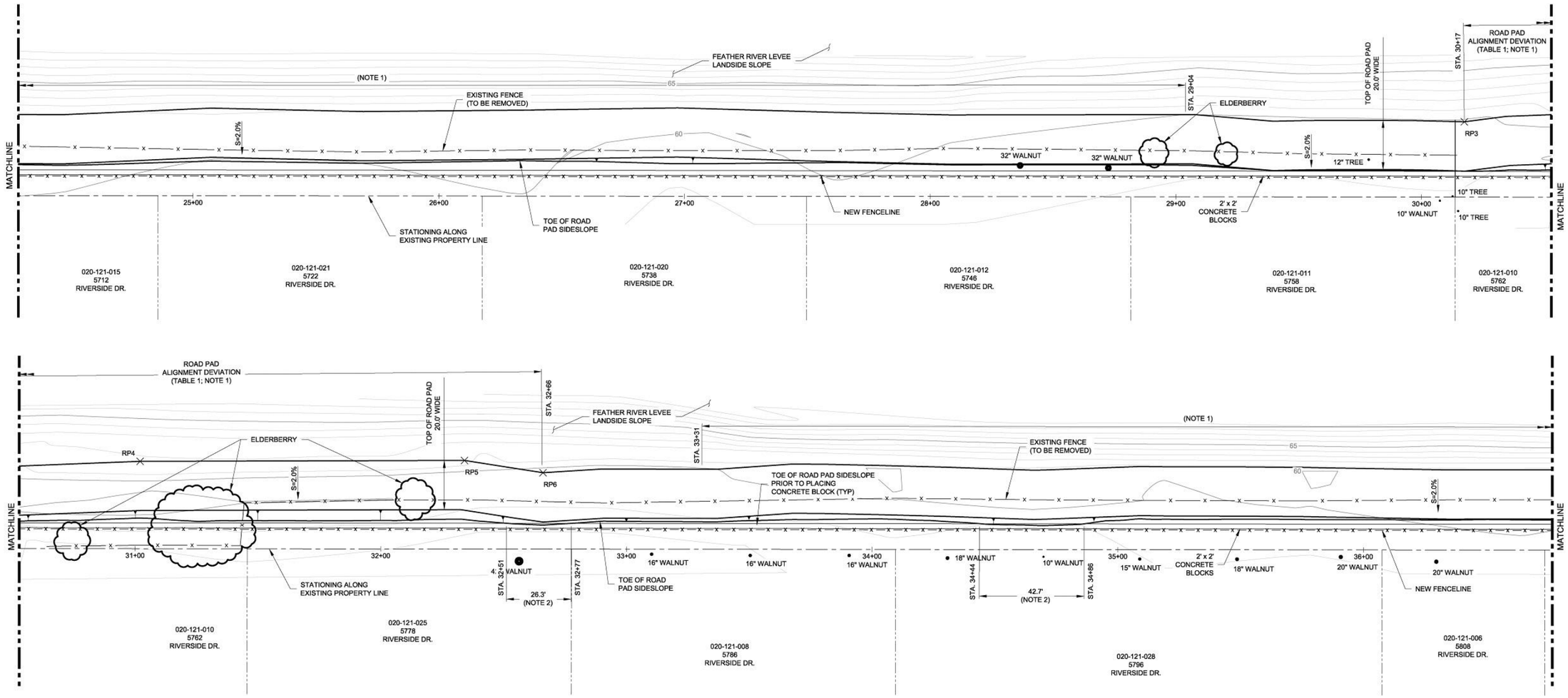
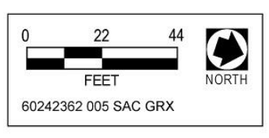
RP6	32+66	31.07 (L)	59.4

Source: GEI Consultants 2012, adapted by AECOM 2012

Figure 2-1 **Project Features (2 of 4)**





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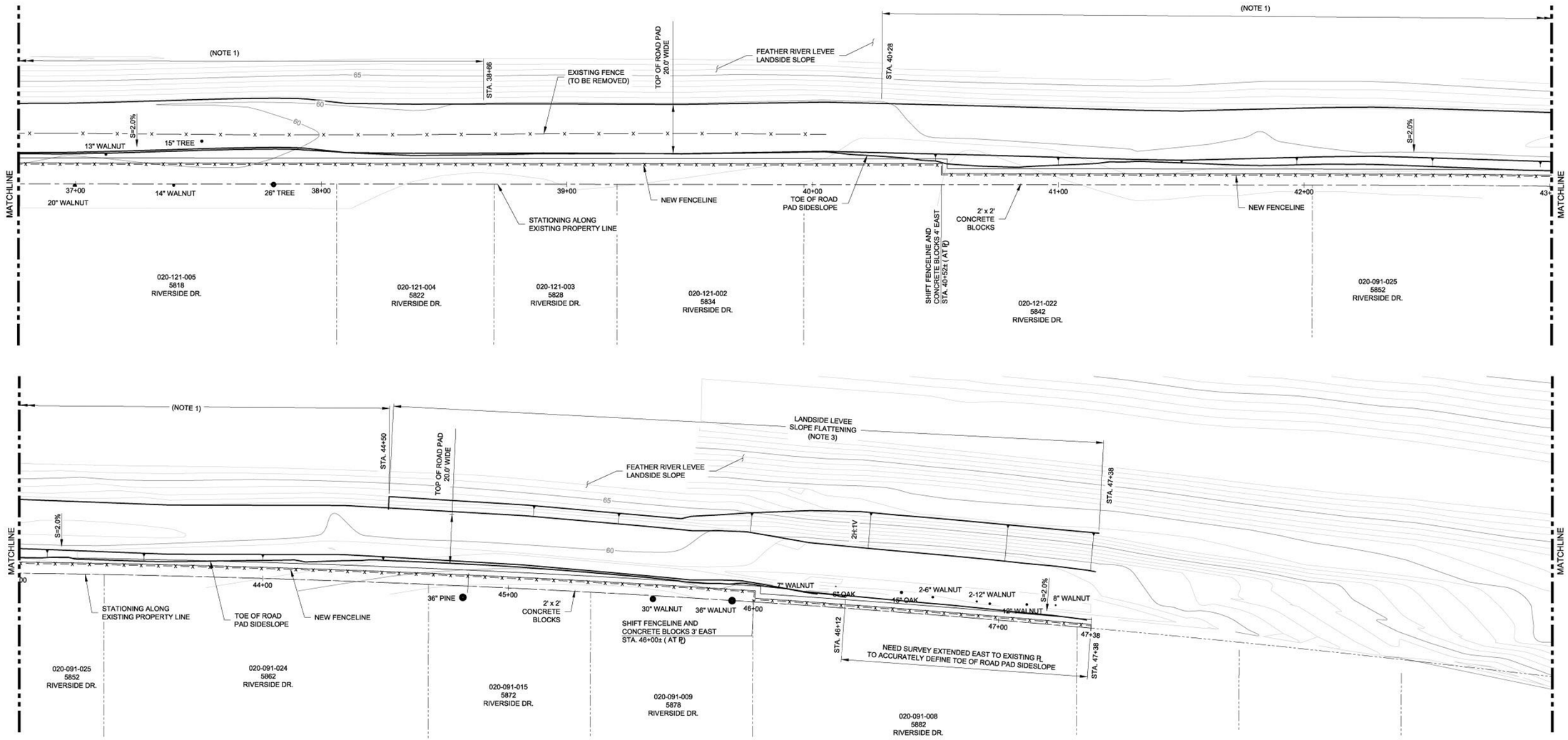
Source: GEI Consultants 2012, adapted by AECOM 2012

Figure 2-1 **Project Features (3 of 4)**



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Source: GEI Consultants 2012, adapted by AECOM 2012

Figure 2-1 **Project Features (4 of 4)**

3 ENVIRONMENTAL ANALYSIS OF FRLRP REFINEMENTS

This section describes the evaluation performed to verify that (1) the two proposed FRLRP refinements described in Chapter 2, "Description of FRLRP Refinements," of this document do not meet any of the criteria in Sections 15162 of the State CEQA Guidelines for preparation of a subsequent EIR and meet the criteria of 15164 of the State CEQA Guidelines for preparation of an EIR addendum, such as not resulting in new significant impacts or substantially more severe impacts than those already described in the FRLRP EIR, and (2) the combined analysis of the FRLRP in the EIR and this addendum is sufficient to meet CEQA requirements and allow the approval of the proposed FRLRP project refinements, if TRLIA so chooses.

The evaluation is provided in the form of a narrative discussion addressing each environmental topic area included in the FRLRP EIR (e.g., land use, transportation/traffic, air quality).

3.1 ANALYSIS BY ENVIRONMENTAL TOPIC AREA

A discussion is provided for each environmental topic area and provides information about the particular environmental topic, how the FRLRP and the proposed project refinements relate to the topic, and the status of any mitigation that may be required.

3.1.1 LAND USE AND PLANNING (INCLUDING AGRICULTURAL AND FORESTRY RESOURCES)

There are no new circumstances since certification of the FRLRP EIR that would influence land use impacts associated with FRLRP Alternative 2 or the proposed project refinements evaluated in this addendum, and there is no new information requiring analysis for verification of the EIR conclusions related to land use and planning, including agricultural resources.

The proposed project refinements evaluated in this addendum include construction of an access corridor along the levee toe within the northern section of Segment 3. The access corridor already exists, but needs to be expanded to a width of 20 feet to meet DWR requirements. Expansion of the existing toe access corridor would occur completely on land owned by the State of California. This expansion of the access corridor would not displace any housing. The access corridor is located between residential development and the existing levee. Therefore, the access corridor would not physically divide an existing community. Expansion of the access corridor would not substantially impact agricultural operations or cause conversion of agricultural land to non-agricultural uses because there are no agricultural uses or zoning within the immediate vicinity of the access corridor.

Expansion of the access corridor would require the relocation of elderberry shrubs. The elderberry shrubs would be removed from their present location within the access corridor and placed within the FRET mitigation area. Relocation of the elderberry shrubs would not physically divide an established community, displace persons or housing, or impact agricultural land.

Regarding land use and planning and agricultural resources, the EIR appropriately assumed actions would be taken to be compliant with DWR requirements, and analyzed impacts to land uses and planning, including agricultural resources, accordingly. Therefore, expansion of the existing access corridor and relocation of elderberry shrubs to the FRET mitigation area refine the levee improvement assumptions already included in the EIR. As discussed above, construction of the access corridor and relocation of elderberry shrubs from within the access corridor, along with associated activities in those areas (see Chapter 2, "Description of FRLRP Refinements"), would not physically divide an established community, conflict with any applicable land use plan or policy, or displace persons or housing, and would not result in more or less effects on land use and planning than those already identified in the EIR. Furthermore, the proposed project refinements would not convert

agricultural land to nonagricultural uses, conflict with agricultural zoning or uses, or cause conversion of agricultural land to nonagricultural use. There is no change in the type, significance, or severity of land use and planning related impacts. Furthermore, there are no changes to the effectiveness of mitigation measures proposed in the EIR or the need for additional mitigation measures.

The FRLRP EIR was prepared in 2006 and did not address potential impacts to forestry resources because the EIR was prepared before the 2010 amendments in the State CEQA Guidelines pertaining to forest land. This addendum, however, addresses forestry resources.

Appendix G of the State CEQA Guidelines defines forestland as land that can support 10 percent native tree cover and woodland vegetation of any species—including hardwoods—under natural conditions, and that allows for management of one or more forest resource—including timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation—and other public benefits (California Public Resources Code [PRC] 12220[g]).

The previously approved project site contains six habitat types within the project area: riparian forest/scrub, elderberry savanna, wetlands, open-water drainages, ruderal areas, orchards/agricultural land, and development (TRLIA 2006a:5.5-4). The only potential forest resources, the riparian forest, occurs as a band of vegetation in the floodways and floodplains of the FRLRP project area (TRLIA 2006a:5.5-5). According to the final EIR prepared for the Yuba County 2030 General Plan, none of the land in the project area is classified as timber areas or timber preserve areas (Yuba County 2011:4.2-11).

The proposed access corridor expansion area includes numerous trees (see Appendix A). These trees are located within fenced residential lots, though all are on land owned by the State of California. Because these trees have not been managed as a forest resource due to their small number and proximity to development, these trees do not qualify as forest resources and the land does not qualify as forestland. The proposed relocation of elderberry shrubs to the FRET mitigation area would not impact forestry resources because the FRET mitigation area is not located on forestland as defined by State CEQA Guidelines.

Based on the discussion presented above, the proposed project refinements do not affect native tree cover that would be classified as forestland under PRC Section 12220(g).

Given these conditions, expansion of the access corridor and relocation of elderberry shrubs are consistent with CEQA requirements for use of an addendum (See Section 1.2, “State CEQA Guidelines Regarding Changes to a Project”). The combined analysis of land use and planning and agricultural resources for FRLRP Alternative 2 in the FRLRP EIR and for the proposed project refinements in this addendum is sufficient to meet CEQA requirements and support the approval of the proposed project refinements, if TRLIA so chooses.

3.1.2 GEOLOGY AND SOILS

There are no new circumstances since certification of the FRLRP EIR that would influence geology, soil, and mineral resource impacts associated with FRLRP Alternative 2 or the proposed project refinements evaluated in this addendum, and there is no new information requiring analysis for verification of the EIR conclusions related to this topic.

The proposed project refinements evaluated in this addendum include construction of an access corridor along the levee toe within the northern section of Segment 3. The access corridor already exists, but needs to be expanded to a width of 20 feet to meet DWR requirements. Expansion of the existing toe access corridor would not pose a geologic hazard to the levees because the access corridor would not compromise the levee integrity, but would allow easier access to the levees such that any hazards could be observed. Construction activities would temporarily disturb soils in the project area, but this impact would be less than significant because soils would be

stabilized after construction. Therefore, the access corridor would not result in any new impacts to geology, soils, and minerals.

Expansion of the access corridor would require the relocation of elderberry shrubs. The elderberry shrubs would be removed from their present location within the access corridor and placed within the FRET mitigation area. Relocation of the elderberry shrubs is consistent with previously reviewed project elements (see Addendum 4 to the EIR which evaluated impacts that would result from establishment of the FRET mitigation area). Relocation of elderberry shrubs from the access corridor to the FRET mitigation area would be consistent with previous reviews and would not result in any additional impacts to geology, soils, and minerals not previously considered.

Regarding geology and soils, the EIR assumed actions would be taken to be compliant with DWR requirements and the analysis of impacts to geology and soils considers that activity. Therefore, construction of the access corridor and relocation of elderberry shrubs to the FRET mitigation area are consistent with assumptions already included in the EIR. These proposed project refinements simply provide specific locations and planting plans for actions already assumed in the EIR. Expansion of the access corridor and relocation of elderberry shrubs to the FRET mitigation area (see Chapter 2, "Description of FRLRP Refinements") would not result in a change in the type, significance, or severity of impacts on geology and soils. Furthermore, there are no changes to the effectiveness of mitigation measures proposed in the EIR or the need for additional mitigation measures.

Given these conditions, expansion of the access corridor and relocation of elderberry shrubs to the FRET mitigation area are consistent with CEQA requirements for use of an addendum (See Section 1.2, "State CEQA Guidelines Regarding Changes to a Project"). The combined analysis of geology and soils for FRLRP Alternative 2 in the FRLRP EIR and for the proposed project refinements in this addendum is sufficient to meet CEQA requirements and support the approval of the proposed project refinements, if TRLIA so chooses.

3.1.3 WATER RESOURCES AND RIVER GEOMORPHOLOGY

There are no new circumstances since certification of the FRLRP EIR that would influence water resources and river geomorphology impacts associated with FRLRP Alternative 2 or the proposed project refinements evaluated in this addendum, and there is no new information requiring analysis for verification of the EIR conclusions regarding these topics.

The proposed project refinements evaluated in this addendum include construction of an access corridor along the levee toe within the northern section of Segment 3. The access corridor already exists, but needs to be expanded to a width of 20 feet to meet DWR requirements. Expansion of the existing toe access corridor would occur completely within land owned by the State of California. The access corridor would be constructed exclusively on the landside of the levee and would be located more than 2,000 feet from the Feather River. Therefore, construction and operation of the expanded access corridor would not result in any impacts to water resources or river geomorphology.

Expansion of the access corridor would require the relocation of elderberry shrubs. The elderberry shrubs would be removed from their present location within the access corridor and placed within the FRET mitigation area. Relocation of the elderberry shrubs is consistent with previously reviewed project elements (see Addendum 4 to the EIR which evaluated impacts that would result from establishment of the FRET mitigation area). Relocation of elderberry shrubs from the access corridor to the FRET mitigation area would be consistent with previous reviews and would not result in any additional impacts to water resources and river geomorphology.

Regarding water resources and river geomorphology, the EIR assumed compliance with DWR requirements and analyzed impacts to water resources and river geomorphology from that activity. Therefore, expansion of the access corridor and relocation of the elderberry shrubs to the FRET mitigation area is consistent with assumptions already included in the EIR. These proposed project refinements simply provide specific details and planting

plans for actions already assumed in the EIR. Expansion of the access corridor and relocation of elderberry shrubs to the FRET mitigation area, along with associated activities in those areas (see Chapter 2, "Description of FRLRP Refinements"), would not result in a change in the type, significance, or severity of impacts on water resources and river morphology. Furthermore, there are no changes to the effectiveness of mitigation measures proposed in the EIR or the need for additional mitigation measures.

Given these conditions, expansion of the access corridor and relocation of elderberry shrubs to the FRET mitigation area are consistent with CEQA requirements for use of an addendum (See Section 1.2, "State CEQA Guidelines Regarding Changes to a Project"). The combined analysis of water resources and river geomorphology for FRLRP Alternative 2 in the FRLRP EIR and for the proposed project refinements in this addendum is sufficient to meet CEQA requirements and support the approval of the proposed project refinements, if TRLIA so chooses.

3.1.4 FISHERIES

There are no new circumstances since certification of the FRLRP EIR that would influence fisheries impacts associated with FRLRP Alternative 2 or the proposed project refinements evaluated in this addendum, and there is no new information requiring analysis for verification of the EIR conclusions regarding fisheries.

The proposed project refinements evaluated in this addendum include expansion of an access corridor along the levee toe within the northern section of Segment 3. The access corridor already exists, but needs to be expanded to a width of 20 feet to meet DWR requirements. Expansion of the existing toe access corridor would occur completely within land owned by the State of California. The access corridor would be constructed exclusively on the landside of the levee and would be located more than 2,000 feet from the Feather River. Therefore, construction and operation of the expanded access corridor would not result in any impacts to fisheries.

Expansion of the access corridor would require the relocation of elderberry shrubs. The elderberry shrubs would be removed from their present location within the access corridor and placed within the FRET mitigation area. Relocation of the elderberry shrubs is consistent with previously reviewed project elements (see Addendum 4 to the EIR which evaluated impacts that would result from establishment of the FRET mitigation area). Relocation of elderberry shrubs from the access corridor to the FRET mitigation area would be consistent with previous reviews and would not result in any additional impacts to fisheries.

Regarding fisheries, the EIR assumed compliance with DWR requirements and analyzed impacts to fisheries from that activity. Therefore, expansion of an access corridor and relocation of elderberry shrubs to the FRET mitigation area is consistent with assumptions already included in the EIR. These proposed project refinements simply provide specific locations and planting plans for actions already assumed in the EIR. Construction of the access corridor and relocation of elderberry shrubs to the FRET mitigation area, along with associated activities in those areas (see Chapter 2, "Description of FRLRP Refinements"), would not result in a change in the type, significance, or severity of impacts on fisheries. Furthermore, there are no changes to the effectiveness of mitigation measures proposed in the EIR or the need for additional mitigation measures.

Given these conditions, expansion of the access corridor and relocation of elderberry shrubs to the FRET mitigation area are consistent with CEQA requirements for use of an addendum (See Section 1.2, "State CEQA Guidelines Regarding Changes to a Project"). The analysis of fisheries for FRLRP Alternative 2 in the FRLRP EIR and for the proposed project refinements in this addendum is sufficient to meet CEQA requirements and support the approval of the proposed project refinements, if TRLIA so chooses.

3.1.5 TERRESTRIAL BIOLOGICAL RESOURCES

There are no new circumstances since certification of the FRLRP EIR that would influence terrestrial biological resource impacts associated with FRLRP Alternative 2 or the proposed project refinements evaluated in this addendum, and there is no new information requiring analysis for verification of the EIR conclusions regarding terrestrial biological resources.

On September 19, 2012, a biologist visited the site of the proposed access corridor to assess the presence of sensitive biological resources in the project vicinity. The reconnaissance-level survey revealed no evidence of sensitive biological resources in the access corridor area (Appendix A).

The proposed project refinements evaluated in this addendum include expansion of an access corridor along the levee toe within the northern section of Segment 3. The access corridor already exists, but needs to be expanded to a width of 20 feet to meet DWR requirements. Expansion of the existing toe access corridor would occur completely within land owned by the State of California. Because the access corridor must be free of vegetation per DWR requirements, trees and shrubs would be removed during project construction.

As stated in the biological survey report, the project site contains elderberry shrubs. As part of the FRLRP EIR, a mitigation measure was included that requires a mitigation plan to be developed by TRLIA and approved by USFWS (DEIR Mitigation Measure LS-5.5-d). Expansion of the access corridor would require removal of the elderberry shrubs and would be done in compliance with Mitigation Measure LS-5.5-d and with approval from USFWS. Because the proposed project refinements would not result in any impacts not already discussed in the FRLRP EIR and would be subject to all mitigation measures and requirements contained therein, the proposed project refinements would not result in any new impacts or increase the significance of any impacts.

The proposed project refinements evaluated in this addendum provide specific locations and plans for actions already assumed in the EIR. For the reasons discussed above, expansion of the access corridor and relocation of elderberry shrubs to the FRET mitigation area, along with associated activities in those areas (see Chapter 2, "Description of FRLRP Refinements"), would not result in a change in the type, significance, or severity of impacts on terrestrial biological resources. Furthermore, there are no changes to the effectiveness of mitigation measures proposed in the EIR or the need for additional mitigation measures.

Given these conditions, expansion of the access corridor and relocation of elderberry shrubs to the FRET mitigation area are consistent with CEQA requirements for use of an addendum (See Section 1.2, "State CEQA Guidelines Regarding Changes to a Project"). The analysis of terrestrial biological resources for FRLRP Alternative 2 in the FRLRP EIR and for the proposed project refinements in this addendum is sufficient to meet CEQA requirements and support the approval of the proposed project refinements, if TRLIA so chooses.

3.1.6 RECREATION

There are no new circumstances since certification of the FRLRP EIR that would influence recreation impacts associated with FRLRP Alternative 2 or the project refinements evaluated in this addendum, and there is no new information requiring analysis for verification of the EIR conclusions regarding recreation.

The proposed project refinements evaluated in this addendum include expansion of an access corridor along the levee toe within the northern section of Segment 3. The access corridor already exists, but needs to be expanded to a width of 20 feet to meet DWR requirements. Expansion of the existing toe access corridor would occur completely within land owned by the State of California. The FRLRP EIR identified that construction activities could result in temporary impacts to recreational users, but those impacts would be temporary in nature and less than significant. The impacts from construction of the access corridor would also be temporary and would not be any greater than already anticipated in the FRLRP EIR. Operation of the access corridor would not interfere with

any recreational uses because the access corridor is on the landside and would not affect waterside recreation, or any use of the levee crown. The access corridor area is not presently used as a recreation area, so construction of the access road would not impact recreational uses.

Expansion of the access corridor would require the relocation of elderberry shrubs. The elderberry shrubs would be removed from their present location within the access corridor and placed within the FRET mitigation area. Relocation of the elderberry shrubs is consistent with previously reviewed project elements (see Addendum 4 to the EIR which evaluated impacts that would result from establishment of the FRET mitigation area). Relocation of elderberry shrubs from the access corridor to the FRET mitigation area would be consistent with previous reviews and would not result in any additional impacts to recreational uses.

The proposed project refinements evaluated in this addendum provide specific locations and plans for actions already assumed in the EIR. Expansion of the access road and relocation of elderberry shrubs to the FRET mitigation area, along with associated activities in those areas (see Chapter 2, "Description of FRLRP Refinements"), would not result in a change in the type, significance, or severity of impacts on recreation. Furthermore, there are no changes to the effectiveness of mitigation measures proposed in the EIR or the need for additional mitigation measures.

Given these conditions, expansion of the access corridor and relocation of elderberry shrubs to the FRET mitigation area are consistent with the CEQA requirements for use of an addendum (See Section 1.2, "State CEQA Guidelines Regarding Changes to a Project"). The analysis of recreation for FRLRP Alternative 2 in the FRLRP EIR and for the proposed project refinements in this addendum is sufficient to meet CEQA requirements and support the approval of the proposed project refinements, if TRLIA so chooses.

3.1.7 AESTHETICS

There are no new circumstances since certification of the FRLRP EIR that would influence aesthetics impacts associated with FRLRP Alternative 2 or the proposed project refinements evaluated in this addendum, and there is no new information requiring analysis for verification of the EIR conclusions regarding aesthetics.

The proposed project refinements evaluated in this addendum include expansion of an access corridor along the levee toe within the northern section of Segment 3. The access corridor already exists, but needs to be expanded to a width of 20 feet to meet DWR requirements. Expansion of the existing toe access corridor would occur completely within land owned by the State of California. The FRLRP EIR identified that construction activities could result in temporary impacts to views in the project area, but those impacts would be temporary in nature and less than significant. The impacts from construction of the access corridor would also be temporary and would not be any greater than already anticipated in the FRLRP EIR. Following construction of the access corridor, views in the area would be substantially similar to those anticipated in the FRLRP EIR.

Expansion of the access corridor would require the relocation of elderberry shrubs. The elderberry shrubs would be removed from their present location within the access corridor and placed within the FRET mitigation area. Relocation of the elderberry shrubs is consistent with previously reviewed project elements (see Addendum 4 to the EIR which evaluated impacts that would result from establishment of the FRET mitigation area). Relocation of elderberry shrubs from the access corridor to the FRET mitigation area would be consistent with previous reviews and would not result in any additional impacts to views.

The proposed project refinements evaluated in this addendum provide specific locations and planting plans for actions already assumed in the EIR. Expansion of the access corridor and relocation of elderberry shrubs to the FRET mitigation area, along with associated activities in those areas (see Chapter 2, "Description of FRLRP Refinements"), would not result in a change in the type, significance, or severity of impacts on aesthetics.

Furthermore, there are no changes to the effectiveness of mitigation measures proposed in the EIR or the need for additional mitigation measures.

Given these conditions, expansion of the access corridor and relocation of elderberry shrubs to the FRET mitigation area are consistent with the CEQA requirements for use of an addendum (See Section 1.2, "State CEQA Guidelines Regarding Changes to a Project"). The analysis of aesthetics for FRLRP Alternative 2 in the FRLRP EIR and for the proposed project refinements in this addendum is sufficient to meet CEQA requirements and support the approval of the proposed project refinements, if TRLIA so chooses.

3.1.8 CULTURAL RESOURCES

There are no new circumstances since completion of the FRLRP EIR that would influence cultural resource impacts associated with FRLRP Alternative 2 or the proposed project refinements evaluated in this addendum, and there is no new information requiring analysis for verification of the EIR conclusions regarding cultural resources.

An archaeologist and an architectural historian surveyed the access corridor site on September 19, 2012, to assess the site for potential cultural resources. The survey revealed no evidence of archaeological resources or structures in the project site requiring further investigation (Appendix B).

A records search of pertinent cultural resource information was conducted by the North Central Information Center (NCIC) of the California Historical Resources Information System (CHRIS) on October 2, 2012. The files maintained at the NCIC contain information on previously conducted archaeological investigations that occurred near the project area. In addition, the NCIC reviewed data maps, historic directories, and literature that were relevant to the immediate area. The results of this records search indicate that no archaeological resources and no State or Federal listed historic resources are within one-quarter mile of the project area (Appendix B).

The proposed project refinements evaluated in this addendum include expansion of an access corridor along the levee toe within the northern section of Segment 3. The access corridor already exists, but needs to be expanded to a width of 20 feet to meet DWR requirements. Expansion of the existing toe access corridor would occur completely within land owned by the State of California, all of which has been previously disturbed. The FRLRP EIR identified that construction activities could damage undocumented cultural resources, but mitigation incorporated reduced the impact to less than significant. While the records search and field survey indicate that there is no evidence of cultural resources in the access corridor area, any previously undiscovered cultural resources would be protected by mitigation measures already in place through the FRLRP EIR (see Mitigation Measures LS-5.8-c and LS-5.8-d). Therefore, the access corridor would not result in any additional significant impacts or increases in significance of any impacts related to cultural resources.

Expansion of the access corridor would require the relocation of elderberry shrubs. The elderberry shrubs would be removed from their present location within the access corridor and placed within the FRET mitigation area. Relocation of the elderberry shrubs is consistent with previously reviewed project elements (see Addendum 4 to the EIR which evaluated impacts that would result from establishment of the FRET mitigation area). Furthermore, removal and replanting would occur in areas of previous disturbance and excavation, making it unlikely that previously unknown cultural resources would be discovered. Any previously unknown cultural resources that might be discovered would be protected by mitigation measures contained in the FRLRP EIR. Therefore, relocation of elderberry shrubs from the access corridor to the FRET mitigation area would be consistent with previous reviews and would not result in any additional impacts to cultural resources.

The proposed project refinements evaluated in this addendum provide specific locations and planting plans for actions already assumed in the EIR. Expansion of the access corridor and relocation of elderberry shrubs to the FRET mitigation area, along with associated activities in those areas (see Chapter 2, "Description of FRLRP

Refinements"), would not result in a change in the type, significance, or severity of impacts on cultural resources. Furthermore, there are no changes to the effectiveness of mitigation measures proposed in the EIR or the need for additional mitigation measures.

Given these conditions, expansion of the access corridor and relocation of elderberry shrubs to the FRET mitigation area are consistent with CEQA requirements for use of an addendum (See Section 1.2, "State CEQA Guidelines Regarding Changes to a Project"). The analysis of cultural resources for FRLRP Alternative 2 in the FRLRP EIR and for the proposed project refinements in this addendum is sufficient to meet CEQA requirements and support the approval of the proposed project refinements, if TRLIA so chooses.

3.1.9 AIR QUALITY (INCLUDING GREENHOUSE GAS EMISSIONS)

There are no new circumstances since certification of the FRLRP EIR that would influence air quality impacts associated with FRLRP Alternative 2 or the proposed project refinements evaluated in this addendum, and there is no new information requiring analysis for verification of the EIR conclusions regarding air quality.

The proposed project refinements evaluated in this addendum include expansion of an access corridor along the levee toe within the northern section of Segment 3. The access corridor already exists, but needs to be expanded to a width of 20 feet to meet DWR requirements. Expansion of the existing toe access corridor would occur completely within land owned by the State of California. The FRLRP EIR identified that construction activities could result in significant and unavoidable emissions during construction. Mitigation Measure LS-5.9-a requires implementation of pollution control measures designed to reduce construction emissions, though emissions would not be reduced to a less-than-significant level. Construction of the access corridor would involve equipment substantially similar to that anticipated by the FRLRP EIR. Given the small scope of the proposed project refinements in this addendum, emissions would not exceed levels of significance. Furthermore, compliance with Mitigation Measure LS-5.9-a would reduce emissions. Therefore, the access corridor would not result in any new significant impacts or any increase in the significance of impacts analyzed in the FRLRP EIR.

Expansion of the access corridor would require the relocation of elderberry shrubs. The elderberry shrubs would be removed from their present location within the access corridor and placed within the FRET mitigation area. Relocation of the elderberry shrubs is consistent with previously reviewed project elements (see Addendum 4 to the EIR which evaluated impacts that would result from establishment of the FRET mitigation area). Relocation of elderberry shrubs from the access corridor to the FRET mitigation area would be consistent with previous reviews and would not result in any additional impacts to air quality.

The proposed project refinements evaluated in this addendum provide specific locations and planting plans for actions already assumed in the EIR. Expansion of the access corridor and relocation of elderberry shrubs, along with associated activities in those areas (see Chapter 2, "Description of FRLRP Refinements"), would not result in a change in the type, significance, or severity of impacts on air quality. Furthermore, there are no changes to the effectiveness of mitigation measures proposed in the EIR or the need for additional mitigation measures.

Given these conditions, expansion of the access corridor and relocation of elderberry shrubs to the FRET mitigation area are consistent with CEQA requirements for use of an addendum (See Section 1.2, "State CEQA Guidelines Regarding Changes to a Project"). The analysis of air quality for FRLRP Alternative 2 in the FRLRP EIR and for the proposed project refinements in this addendum is sufficient to meet CEQA requirements and support the approval of the proposed project refinements, if TRLIA so chooses.

GREENHOUSE GAS EMISSIONS

In September 2006, Governor Arnold Schwarzenegger signed Assembly Bill (AB) 32, the California Global Warming Solutions Act of 2006. AB 32 establishes regulatory, reporting, and market mechanisms to achieve

quantifiable reductions in greenhouse gas (GHG) emissions and a cap on statewide GHG emissions. AB 32 requires that statewide GHG emissions be reduced to 1990 levels by 2020. This reduction will be accomplished through an enforceable statewide cap on GHG emissions that will be phased in starting in 2012. To effectively implement the cap, AB 32 directs the Air Resources Board (ARB) to develop and implement regulations to reduce statewide GHG emissions from stationary sources. AB 32 specifies that regulations adopted in response to AB 1493 should be used to address GHG emissions from vehicles. However, AB 32 also includes language stating that if the AB 1493 regulations cannot be implemented, then ARB should develop new regulations to control vehicle GHG emissions under the authorization of AB 32.

Senate Bill (SB) 97, signed August 2007, acknowledges that climate change is a prominent environmental issue that requires analysis under CEQA. This bill directs the California Office of Planning and Research (OPR) to prepare, develop, and transmit to the California Natural Resources Agency guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions, as required by CEQA by July 1, 2009. The California Natural Resources Agency adopted those guidelines on December 30, 2009, and the guidelines became effective March 18, 2010.

The FRLRP EIR was prepared in 2006 and did not address potential impacts of GHG emissions because the EIR was prepared before the 2010 amendments in the State CEQA Guidelines pertaining to GHG emissions. As discussed in Section 1.1, "Background and Refinements in project Elements Leading to Preparation of the Addendum," levee improvements in Segments 1 and 3 were completed in 2009 and the Segment 2 setback levee was completed in 2010. Thus, project construction other than activities proposed in this addendum was completed at approximately the time when State CEQA Guidelines for GHG emissions analysis became effective. Because the purpose of GHG emissions analysis under CEQA is to disclose and determine the significance of emissions prior to project approval and implementation, analysis of the GHG emissions of the entire FRLRP project at this time is unwarranted because the project has been constructed. Therefore, this addendum analyzes only the potential for GHG emissions from the proposed project refinements: expansion of the access corridor and relocation of elderberry shrubs.

In June 2010 (after certification of the FRLRP FEIR), the Feather River Air Pollution Control District (FRAQMD) issued guidance on how to address GHG impacts under CEQA (FRAQMD 2010). This guidance recommended the use of a white paper by California Air Pollution Control Officer's Association (CAPCOA) for GHG evaluations, and FRAQMD did not establish thresholds of significance for GHG emissions (FRAQMD 2010:27). At the time of this addendum, Yuba County has not yet approved a climate action plan or similar document designed to reduce GHG emissions.

CAPCOA recommends several mitigation measures, most of which are performance-based measures intended to reduce operational GHG emissions (by reducing vehicle miles traveled) through project design (CAPCOA 2008). Operation of the proposed expanded access corridor would be identical to existing use because the proposed project refinements only involve expansion of the existing access corridor. Furthermore, CAPCOA mitigation measures designed to reduce operational emissions are not relevant to the expanded access corridor because there would not be increased use of the access corridor, thus there would not be a need to mitigate GHG emissions by reducing vehicle miles traveled.

While FRAQMD has not adopted thresholds of significance for GHG emissions, a few other air districts in California have provided some guidance. For example, the Bay Area Air Quality Management District (BAAQMD) developed thresholds for project operational emissions, though those thresholds have been challenged and are not currently enforced. In May 2011, BAAQMD adopted thresholds of 1,100 tons per year for land use development projects and 10,000 tons per year for stationary sources (BAAQMD 2011:2-4). BAAQMD has not adopted thresholds of significance for construction emissions.

During project construction, GHG emissions would be generated from a variety of sources, including construction worker vehicles, heavy-duty construction equipment, and/or material delivery trucks. Construction emissions

were modeled using URBEMIS 2007 (v. 9.2.4). Appendix C of this addendum contains the output data sheets. Based on a maximum construction width of 20 feet and approximate length of 0.9 mile, approximate maximum acreage disturbed would be approximately 2.5 acres. Assuming activities such as demolition, trenching, and grading would take place 6 days per week for approximately 5 months, URBEMIS calculated that construction activities would emit approximately 148.12 tons of carbon dioxide (CO_2).

As stated above, land use development that generates greater than 1,100 metric tons of CO_2 per year is considered by BAAQMD to exceed the threshold of significance. Absent any air quality regulatory agency–adopted threshold for GHG emissions, the proposed project modifications would generate substantially fewer emissions than 1,100 metric tons CO_2 per year. This information is presented for informational purposes only, and it is not the intention of FRAQMD to adopt 1,100 metric tons of CO_2 per year as a numeric threshold. Rather, the intention is to put project-generated GHG emissions in the appropriate statewide context in order to evaluate whether the project's contribution to the global impact of climate change is considered substantial. Because project–related emissions would be below the thresholds established by BAAQMD, the GHG emissions from the proposed project refinements would not be a considerable contribution to the significant cumulative global impact.

Based on the discussion presented above, the proposed project refinements would not generate a significant amount of GHG emissions, or conflict with any adopted plan adopted for the purpose of reducing GHG emissions.

3.1.10 NOISE AND VIBRATION

There are no new circumstances since certification of the FRLRP EIR that would influence noise and vibration impacts associated with FRLRP Alternative 2 or the proposed project refinements evaluated in this addendum, and there is no new information requiring analysis for verification of the EIR conclusions regarding noise and vibration effects.

The proposed project refinements evaluated in this addendum include expansion of an access corridor along the levee toe within the northern section of Segment 3. The access corridor already exists, but needs to be expanded to a width of 20 feet to meet DWR requirements. Expansion of the existing toe access corridor would occur completely within land owned by the State of California. The FRLRP EIR identified that construction activities could result in significant and unavoidable noise impacts during construction and less-than-significant impacts related to groundborne vibration. Mitigation Measure LS-5.10-a requires implementation of measures designed to reduce noise during construction, though construction noise would not be reduced to a less-than-significant level. Construction of the access corridor would involve equipment substantially similar to that anticipated by the FRLRP EIR and would be required to comply with Mitigation Measure LS-5.10-a. Therefore, construction of the access corridor would not result in any new significant noise or vibration impacts or any increase in the significance of noise or vibration impacts analyzed in the FRLRP EIR.

Expansion of the access corridor would require the relocation of elderberry shrubs. The elderberry shrubs would be removed from their present location within the access corridor and placed within the FRET mitigation area. Relocation of the elderberry shrubs is consistent with previously reviewed project elements (see Addendum 4 to the EIR which evaluated impacts that would result from establishment of the FRET mitigation area). Relocation of elderberry shrubs from the access corridor to the FRET mitigation area would be consistent with previous reviews and would not result in any additional noise or vibration impacts.

The proposed project refinements evaluated in this addendum provide specific locations and planting plans for actions already assumed in the EIR. Expansion of the access corridor and relocation of the FRET mitigation area, along with associated activities in those areas (see Chapter 2, "Description of FRLRP Refinements"), would not result in a change in the type, significance, or severity of impacts on noise and vibration. Furthermore, there are

no changes to the effectiveness of mitigation measures proposed in the EIR or the need for additional mitigation measures.

Given these conditions, expansion of the access corridor and relocation of elderberry shrubs to the FRET mitigation area are consistent with CEQA requirements for use of an addendum (See Section 1.2, "State CEQA Guidelines Regarding Changes to a Project"). The analysis of noise and vibration for FRLRP Alternative 2 in the FRLRP EIR and for the proposed project refinements in this addendum is sufficient to meet CEQA requirements and support the approval of the proposed project refinements, if TRLIA so chooses.

3.1.11 TRANSPORTATION AND CIRCULATION

There are no new circumstances since certification of the FRLRP EIR that would influence transportation and circulation impacts associated with FRLRP Alternative 2 or the proposed project refinements evaluated in this addendum, and there is no new information requiring analysis for verification of the EIR conclusions regarding transportation and circulation effects.

The proposed project refinements evaluated in this addendum include expansion of an access corridor along the levee toe within the northern section of Segment 3. The access corridor already exists, but needs to be expanded to a width of 20 feet to meet DWR requirements. Expansion of the existing toe access corridor would occur completely within land owned by the State of California. The FRLRP EIR identified that construction activities could result in potentially significant impacts during construction resulting from increased traffic hazards on roadways in the project area. This impact, however, would be mitigated to a less-than-significant level by implementation of Mitigation Measure LS-5.11-b. Mitigation Measure LS-5.11-b required development and implementation of a traffic safety plan. Construction of the access corridor would involve activities substantially similar to that anticipated by the FRLRP EIR and would be required to comply with Mitigation Measure LS-5.11-b. Therefore, construction of the access corridor would not result in any new or increased transportation impacts than those discussed in the FRLRP EIR.

Expansion of the access corridor would require the relocation of elderberry shrubs. The elderberry shrubs would be removed from their present location within the access corridor and placed within the FRET mitigation area. Relocation of the elderberry shrubs is consistent with previously reviewed project elements (see Addendum 4 to the EIR which evaluated impacts that would result from establishment of the FRET mitigation area). Relocation of elderberry shrubs from the access corridor to the FRET mitigation area would be consistent with previous reviews and would not result in any additional or increased transportation impacts.

The proposed project refinements evaluated in this addendum provide specific locations and planting plans for actions already assumed in the EIR. Expansion of the access corridor and relocation of elderberry shrubs to the FRET mitigation area, along with associated activities in those areas (see Chapter 2, "Description of FRLRP Refinements"), would not result in a change in the type, significance, or severity of impacts on transportation and circulation. Furthermore, there are no changes to the effectiveness of mitigation measures proposed in the EIR or the need for additional mitigation measures.

Given these conditions, expansion of the access corridor and relocation of elderberry shrubs to the FRET mitigation area are consistent with CEQA requirements for use of an addendum (See Section 1.2, "State CEQA Guidelines Regarding Changes to a Project"). The analysis of transportation and circulation for FRLRP Alternative 2 in the FRLRP EIR and for the proposed project refinements in this addendum is sufficient to meet CEQA requirements and support the approval of the proposed project refinements, if TRLIA so chooses.

3.1.12 PUBLIC SERVICES, UTILITIES, AND SERVICE SYSTEMS

There are no new circumstances since certification of the FRLRP EIR that would influence public services, utilities, and service systems impacts associated with FRLRP Alternative 2 or the proposed project refinements evaluated in this addendum, and there is no new information requiring analysis for verification of the EIR conclusions regarding effects regarding these topics.

The proposed project refinements evaluated in this addendum include expansion of an access corridor along the levee toe within the northern section of Segment 3. The access corridor already exists, but needs to be expanded to a width of 20 feet to meet DWR requirements. Expansion of the existing toe access corridor would occur completely within land owned by the State of California. The FRLRP EIR identified that construction activities could result in potentially significant impacts during construction resulting from increased traffic hazards that could conflict with emergency response vehicles. This impact, however, would be mitigated to a less-than-significant level by implementation of Mitigation Measure LS-5.11-b. Mitigation Measure LS-5.11-b required development and implementation of a traffic safety plan. Construction of the access corridor would involve activities substantially similar to that anticipated by the FRLRP EIR and would be required to comply with Mitigation Measure LS-5.11-b. Therefore, construction of the access corridor would not result in any new or increased public services, utilities, or service systems impacts than those discussed in the FRLRP EIR.

Expansion of the access corridor would require the relocation of elderberry shrubs. The elderberry shrubs would be removed from their present location within the access corridor and placed within the FRET mitigation area. Relocation of the elderberry shrubs is consistent with previously reviewed project elements (see Addendum 4 to the EIR which evaluated impacts that would result from establishment of the FRET mitigation area). Relocation of elderberry shrubs from the access corridor to the FRET mitigation area would be consistent with previous reviews and would not result in any additional or increased public services, utilities, or service systems impacts.

The proposed project refinements evaluated in this addendum provide specific locations and planting plans for actions already assumed in the EIR. Expansion of the access corridor and relocation of elderberry shrubs, along with associated activities in those areas (see Chapter 2, “Description of FRLRP Refinements”), would not result in a change in the type, significance, or severity of impacts on public services, utilities, and service systems. Furthermore, there are no changes to the effectiveness of mitigation measures proposed in the EIR or the need for additional mitigation measures..

Given these conditions, expansion of the access corridor and relocation of elderberry shrubs to the FRET mitigation area are consistent with CEQA requirements for use of an addendum (See Section 1.2, “State CEQA Guidelines Regarding Changes to a Project”). The analysis of public services, utilities, and service systems for FRLRP Alternative 2 in the FRLRP EIR and for the proposed project refinements in this addendum is sufficient to meet CEQA requirements and support the approval of the proposed project refinements, if TRLIA so chooses.

3.1.13 PALEONTOLOGICAL RESOURCES

There are no new circumstances since certification of the FRLRP EIR that would influence paleontological resource impacts associated with FRLRP Alternative 2 or the proposed project refinements evaluated in this addendum, and there is no new information requiring analysis for verification of the EIR conclusions regarding effects regarding paleontological resources.

As discussed in Section 3.1.8 above, the cultural resources field survey and record search performed specifically for the access corridor identified no evidence of potential paleontological resources (Appendix B). Any previously undiscovered paleontological resources would be protected by mitigation measures already in place through the FRLRP EIR (see Mitigation Measures LS-5.8-c and LS-5.8-d). Therefore, the access corridor would not result in any new or increased impacts related on paleontological resources.

The proposed project refinements evaluated in this addendum provide specific locations and planting plans for actions already assumed in the EIR. Expansion of the access corridor and relocation of elderberry shrubs to the FRET mitigation area, along with associated activities in those areas (see Chapter 2, "Description of FRLRP Refinements"), would not result in a change in the type, significance, or severity of impacts on paleontological resources. Furthermore, there are no changes to the effectiveness of mitigation measures proposed in the EIR or the need for additional mitigation measures.

Given these conditions, expansion of the access corridor and relocation of elderberry shrubs to the FRET mitigation area are consistent with CEQA requirements for use of an addendum (See Section 1.2, "State CEQA Guidelines Regarding Changes to a Project"). The analysis of paleontological resources for FRLRP Alternative 2 in the FRLRP EIR and for the proposed project refinements in this addendum is sufficient to meet CEQA requirements and support the approval of the proposed project refinements, if TRLIA so chooses.

3.2 CONCLUSIONS

3.2.1 ENVIRONMENTAL RESOURCE IMPACTS

As described in the preceding sections, the proposed project refinements evaluated in this addendum (i.e., expansion of the access corridor and relocation of elderberry shrubs to the FRET mitigation area) would not change any of the impact conclusions of the FRLRP EIR and would not substantially increase the severity of identified impacts. Furthermore, there are no changes to the effectiveness of mitigation measures proposed in the EIR or the need for additional mitigation measures.

3.2.2 CUMULATIVE IMPACTS

In Chapter 6 of the DEIR, "Cumulative Impacts," the FRLRP is considered together with related projects and regional development for each of the environmental topic areas evaluated in the DEIR. Consistent with the intent of a cumulative analysis, where the combined effects of multiple projects are to be considered, the various elements of the FRLRP are generally evaluated as a whole. The FRLRP would not make cumulatively considerable contributions to significant cumulative impacts related to geology, soils, and mineral resources; water resources and river geomorphology; fisheries; terrestrial biological resources; recreation; aesthetic resources; cultural resources; transportation and circulation; public services, utilities, and service systems; or paleontological resources. The FRLRP would make cumulatively considerable contributions to significant and unavoidable cumulative impacts related to land use and planning, air quality, and noise.

As documented throughout this addendum, implementing the proposed project refinements (i.e., construction of the access corridor and relocation of elderberry shrubs to the FRET mitigation area) would not result in any new significant impacts or substantially more severe impacts and would not require any new or different mitigation measures. Furthermore, there are no new circumstances since certification of the EIR that would result in new cumulatively considerable contributions to significant cumulative impacts or that would substantially increase the severity of previously identified cumulatively considerable contributions to significant cumulative impacts. There is no other new information requiring analysis or verification. Therefore, the direct, indirect, and cumulative impacts of the proposed project refinements evaluated in this addendum would remain consistent with the conclusions of the cumulative impact analysis in Chapter 6 of the EIR, "Cumulative Impacts."

3.2.3 CONCLUSIONS

Based on the analysis of the categories of environmental impacts evaluated above, expansion of the access corridor with the proposed project refinements described in this document would result in none of the conditions described in Section 15162 of the State CEQA Guidelines calling for preparation of a subsequent EIR. In

summary, there are no altered circumstances or new information of substantial importance since certification of the FRLRP EIR, and the proposed project refinements evaluated in this addendum:

- would not result in any new significant environmental effects,
- would not substantially increase the severity of previously identified effects,
- would not result in mitigation measures or alternatives previously found to be infeasible becoming feasible, and
- would not result in availability/implementation of mitigation measures or alternatives that are considerably different from those analyzed in the previous document that would substantially reduce one or more significant effects on the environment.

These conclusions confirm that this addendum to the FRLRP EIR is the appropriate CEQA document to evaluate and record the proposed project refinements described in this document.

4 REFERENCES

Bay Area Air Quality Management District (BAAQMD). 2011 (May). *California Environmental Quality Act – Air Quality Guidelines*. San Francisco, CA.

California Air Pollution Control Officers Association. 2008 (January). *CEQA & Climate Change – Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act*. Sacramento, CA.

Feather River Air Pollution Control District (FRAQMD). 2010 (June 7). *Indirect Source Review Guidelines – a Technical Guide to Assess the Air Quality Impacts of Land Use Projects Under the California Environmental Quality Act*. Yuba City, CA.

Three Rivers Levee Improvement Authority (TRLIA). 2006a (August). *Draft Environmental Impact Report for the Feather River Levee Repair Project*. State Clearinghouse No. 2006062071. Marysville, CA. Prepared by EDAW, Sacramento, CA.

———. 2006b (November). *Final Environmental Impact Report for the Feather River Levee Repair Project*. State Clearinghouse No. 2006062071. Marysville, CA. Prepared by EDAW, Sacramento, CA

———. 2008a (April). *Addendum to the Environmental Impact Report for the Feather River Levee Repair Project*. State Clearinghouse No. 2006062071. Marysville, CA. Prepared by EDAW, Sacramento, CA.

———. 2008b (May). *Addendum 2 to the Environmental Impact Report for the Feather River Levee Repair Project*. State Clearinghouse No. 2006062071. Marysville, CA. Prepared by EDAW, Sacramento, CA.

———. 2009 (June). *Addendum 3 to the Environmental Impact Report for the Feather River Levee Repair Project*. State Clearinghouse No. 2006062071. Marysville, CA. Prepared by EDAW, Sacramento, CA.

———. 2011 (January). *Addendum4 to the Environmental Impact Report for the Feather River Levee Repair Project*. State Clearinghouse No. 2006062071. Marysville, CA. Prepared by EDAW, Sacramento, CA.

Yuba County. 2011 (May). *Final Yuba County 2030 General Plan Environmental Impact Report*. State Clearinghouse No. 2010062054. Marysville, CA. Prepared by AECOM, Sacramento, CA.

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APPENDIX A

Biological Resources Survey

AECOM
2020 L Street, Suite 400
Sacramento, CA 95811
www.aecom.com

916.414.5800 tel
916.414.5850 fax

Memorandum

To: Eric Htain

From: Kristin Asmus

CC:

Date: September 19, 2012

Subject: TRLIA Feather River Levee Segment 3

As you requested I performed a reconnaissance level survey of the Feather River Levee Segement 3 project site from Island Avenue to approximately the Poplar/Sycamore Avenue intersection on September 19, 2012. The purpose of the survey was to check for the presence of sensitive biological resources in the project area. This memo presents a summary of those findings.

The levee top is compacted gravel roadway and the levee banks are covered with nonnative annual grasses and ruderal forbs. The bank slopes and toes were recently mowed and I was not able to determine dominant species, however, on the slope and toe wild oat (*Avena fatua*) was evident, as was Johnson grass (*Sorghum halapense*), chicory (*Cichorium intybus*), turkey mullein (*Croton (=Eremocarpus) setigerus*), and telegraph weed (*Heterotheca grandiflora*). Along the eastern toe of the slope in the project area were numerous trees and shrubs, a mix of mostly native Valley oak (*Quercus lobata*) and Northern California black walnut (*Juglans hindsii*), with some landscape ornamentals such as edible fig (*Ficus carica*), silktree (*Albizia julibrissin*), and the invasive tree-of-heaven (*Ailanthus altissima*). Shrubs noted include native blue elderberry (*Sambucus nigra* ssp. *caerulea*) and nonnative prickly pear cactus (*Opuntia* sp.).

Surrounding land use includes housing development on the east (inland) side and active agriculture on the west (river) side including an orchard and a recently mowed fallow field. There are no sensitive vegetation communities present and no potentially jurisdictional waters or wetlands. The project area provides only marginal habitat for most wildlife due to the minimal vegetation along the levee and the presence of humans and domestic animals such as dogs, goats, and horses. However, there is suitable habitat present for many bird species including raptors. Nesting birds are protected under the Migratory Bird Treaty Act and California Fish and Game Code; therefore, if project activity is to take place during the nesting bird season (February 1 through August 31), a preconstruction survey should be conducted within 48 hours to check for nests and avoid impacts on active nests.

The project area is located in unincorporated Linda in Yuba County. The Yuba County General Plan has language geared toward the protection of oaks and oak woodland within the county, though the language appears to apply only to development projects. In a summary review of the Yuba County Code of Ordinances I did not find a specific tree protection ordinance or language indicating protection of existing trees. Therefore there does not appear to be any requirement for tree removal permits for this project.

APPENDIX B

Cultural Resources Survey and Record Search

AECOM
2020 L Street, Suite 400
Sacramento, CA 95811
www.aecom.com

916.414.5800 tel
916.414.5850 fax

Memorandum

To: Eric Htain

From: Patricia Ambacher

CC:

Date: September 21, 2012

Subject: TRLIA Feather River Levee Segment 3

On September 19, 2012, AECOM archaeologist Anna Starkey, and architectural historian Patricia Ambacher conducted a field survey of the approximate 1-mile project area near the Yuba River, in Linda, Yuba County, California. The survey area is located on the east side of the Yuba River Southern Levee between Island Avenue to the south and Sycamore Avenue to the north.

Archaeological Survey

The archaeological survey was conducted of an approximately 20-foot area that consisted of privately owned, fenced parcels. Therefore direct access was not possible at the time of the survey. The survey was conducted from the top of the levee, which provided a clear view of the parcels.

Due to the area being a built environment, the possibility of encountering prehistoric artifacts or sites is low. Parcels with exposed soils were observed for shell fragments, darkening of the soil and other constituents denoting the possibility of a prehistoric site. The project area was also surveyed for historic resources and isolates, such as can scatters or materials leftover from mining operations or levee building. No archeological resources were observed.

Architectural Survey

The architectural field survey was conducted from the top of the levee because the parcels were privately owned. Forty-three parcels containing buildings and structures located at the west end of the parcel were documented with photographs and field notes. The project area is residential with some commercial and religious properties and the most of the primary buildings were older than 45 years and were located at the east end of the parcels. The ancillary buildings and structures documented varied in types and included sheds, garages, and animal pens. Based on map research it was determined that all of the ancillary buildings recorded during the survey are less than 45 years old. Therefore, no further investigation was required.

NORTH CENTRAL INFORMATION CENTER

CSU-SACRAMENTO - 6000 J STREET, ADAMS BLDG., #208 SACRAMENTO, CA 95819-6100
916-278-6217 ncic@csus.edu FAX 916-278-5162

October 2, 2012 NCIC File No: YUB-12-09

Anna Starkey
EDAW, Inc.
2022 J Street
Sacramento, CA 95816

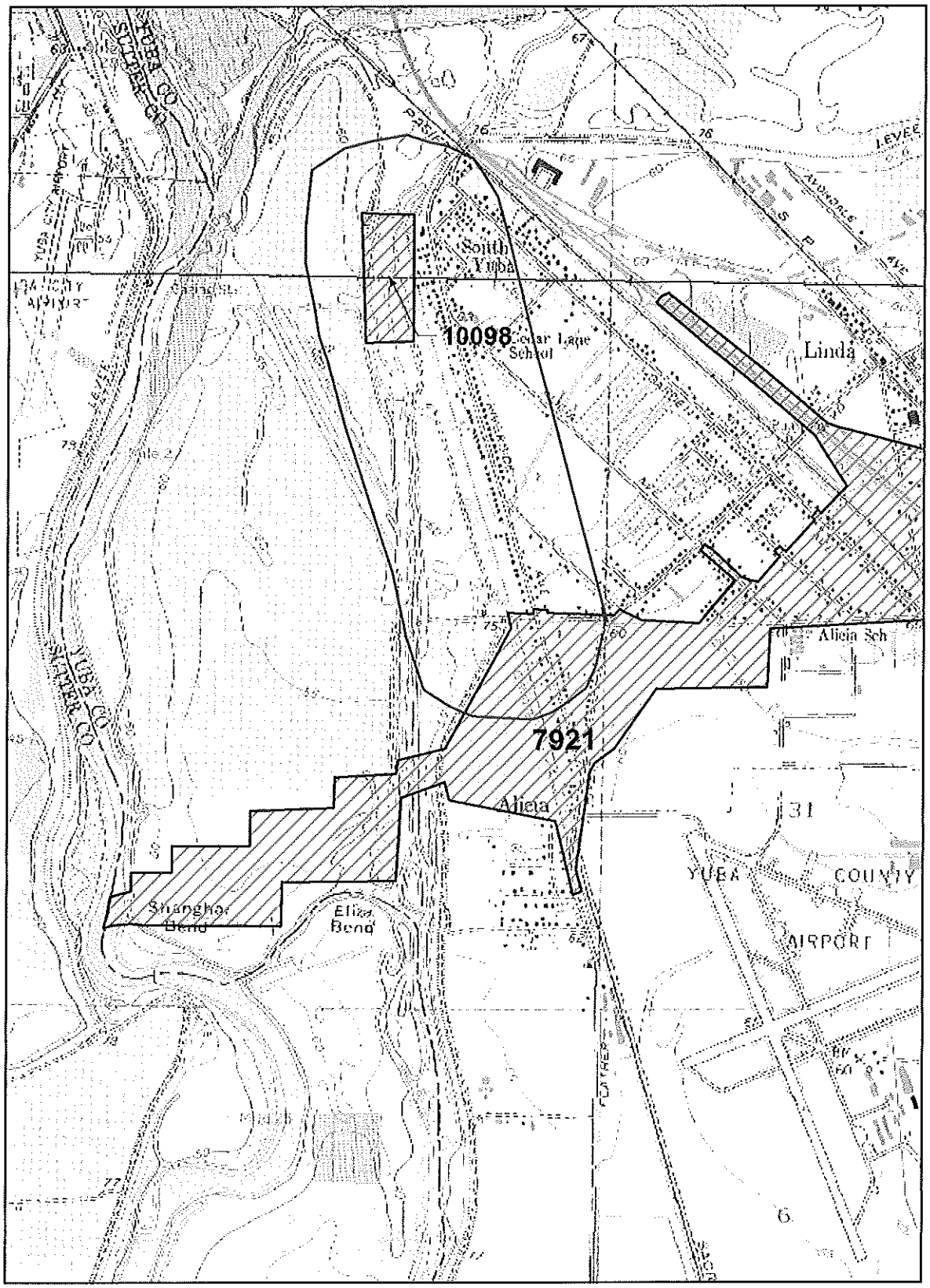
Records Search Results Summary for
TRILIA Gold Fields
T15N/R3E Unsectioned
USGS 7.5' Olivehurst and Yuba City quads, Yuba County

- **Sites Within ¼ Mile Radius Project Area:**
  No new sites
- **NCIC Reports Within ¼ Mile Radius Project Area:**
  #7921
  #10098
- **OHP Historic Property Directory (2012):** Nothing listed
- **Determination of Eligibility (2012):** Not requested
- **National Register of Historic Places/California Register of Historic Resources (2006):** Nothing listed
- **California Inventory of Historic Resources (1976):** Nothing listed
- **State Historic Landmarks (1996 and updates):** Nothing listed
- **Point of Historic Interest (1992 and updates):** Nothing listed
- **Caltrans Inventory of Historic Bridges (1987, 2000):** Nothing listed
- **GLO/Historic Maps:** Not requested

Per your written request NCIC File No: YUB-08-29 sites and reports were not duplicated for this records search.

Thank you for using our services. A copy of an invoice/confidentiality agreement is enclosed; please sign and return with your payment. If you have any questions or would like complete copies of survey reports, please do not hesitate to call us at 916/278-6217 or contact us at the above email address.

TRILIA GOLD FIELDS PROJECT



N

NORTH CENTRAL INFORMATION CENTER
RECORDS SEARCH RESULTS

OLIVEHURST QUAD

TWO REPORTS
NO RESOURCES

May depict confidential cultural resource locations. Do not redistribute.

North Central Information Center Report Detail Record: 7921

Citation Information

Authors: Offermann, Janis
Tina Biorn
Dana McGowan
Daryl Noble
Linda Rodgers
Micahel Rondeau
Larry Wiegel

Year: 1992

Title: Negative Archaeological Survey Report 03-YUB/SUT-65 03205-297300

Affiliation: CalTrans

Client: CalTrans

No. Pages:

Report Type(s): Archaeological survey

Inventory Size: appx. 515 acres

No.Sites: 0

No. Informal:

Collections:

Disclosure: Not for publication

Associated Resources

Notes

Location Info

County(ies): Yuba

USGS 7.5' Quads: OLIVEHURST
YUBA CITY

PLSS:

Township/range	*Sections*	*BL/M*	*or Land Grant*
T 15 N R 3 E		MDBM	New Helvetia
T 15 N R 3 E	31, 37	MDBM	
T 15 N R 4 E	unsectioned	MDBM	

Address:

Database Record Metadata

	Date	*User*
Entered:	11/20/2006	erin
Last Modified:	2/22/2010	lan

IC Actions:

Date	*User*	*Action taken*
2/22/2010	lan	Report survey plotted in GIS, portion in Sutter county not plotted

North Central Information Center Report Detail Record: 10098

Citation Information

Authors: Richard Deis
Year: 2009
Title: Cultural Resources Assessment for the feather River Erosion Site 2 Repair Project
Affiliation: EDAW
Client: Three Rivers levee Improvement Authority
No. Pages:
Report Type(s): Archaeological survey
Inventory Size: 900 foot area
No.Sites:
No. Informal:
Collections: Unknown
Disclosure: Not for publication

Associated Resources

Notes

Location Info

County(ies): Yuba
USGS 7.5' Quads: OLIVEHURST
YUBA CITY

PLSS:	*Township/range*	*Sections*	*BL/M*	*or Land Grant*
	T 15 N R 3 E	25	MDBM	

Address:

Database Record Metadata

	Date	*User*	
Entered:	4/17/2009	alsha	
Last Modified:	4/17/2009	alsha	
IC Actions:	*Date*	*User*	*Action taken*
	4/17/2009	alsha	imported from site record, GIS

California Historical Resource Status Codes

1 Properties listed in the National Register (NR) or the California Register (CR)

1D Contributor to a district or multiple resource property listed in NR by the Keeper. Listed in the CR.
1S Individual property listed in NR by the Keeper. Listed in the CR.

1CD Listed in the CR as a contributor to a district or multiple resource property by the SHRC
1CS Listed in the CR as individual property by the SHRC.
1CL Automatically listed in the California Register – Includes State Historical Landmarks 770 and above and Points of Historical Interest nominated after December 1997 and recommended for listing by the SHRC.

2 Properties determined eligible for listing in the National Register (NR) or the California Register (CR)

2B Determined eligible for NR as an individual property and as a contributor to an eligible district in a federal regulatory process. Listed in the CR.
2D Contributor to a district determined eligible for NR by the Keeper. Listed in the CR.
2D2 Contributor to a district determined eligible for NR by consensus through Section 106 process. Listed in the CR.
2D3 Contributor to a district determined eligible for NR by Part I Tax Certification. Listed in the CR.
2D4 Contributor to a district determined eligible for NR pursuant to Section 106 without review by SHPO. Listed in the CR.
2S Individual property determined eligible for NR by the Keeper. Listed in the CR.
2S2 Individual property determined eligible for NR by a consensus through Section 106 process. Listed in the CR.
2S3 Individual property determined eligible for NR by Part I Tax Certification. Listed in the CR.
2S4 Individual property determined eligible for NR pursuant to Section 106 without review by SHPO. Listed in the CR.

2CB Determined eligible for CR as an individual property and as a contributor to an eligible district by the SHRC.
2CD Contributor to a district determined eligible for listing in the CR by the SHRC.
2CS Individual property determined eligible for listing in the CR by the SHRC.

3 Appears eligible for National Register (NR) or California Register (CR) through Survey Evaluation

3B Appears eligible for NR both individually and as a contributor to a NR eligible district through survey evaluation.
3D Appears eligible for NR as a contributor to a NR eligible district through survey evaluation.
3S Appears eligible for NR as an individual property through survey evaluation.

3CB Appears eligible for CR both individually and as a contributor to a CR eligible district through a survey evaluation.
3CD Appears eligible for CR as a contributor to a CR eligible district through a survey evaluation.
3CS Appears eligible for CR as an individual property through survey evaluation.

4 Appears eligible for National Register (NR) or California Register (CR) through other evaluation

4CM Master List - State Owned Properties – PRC §5024.

5 Properties Recognized as Historically Significant by Local Government

5D1 Contributor to a district that is listed or designated locally.
5D2 Contributor to a district that is eligible for local listing or designation.
5D3 Appears to be a contributor to a district that appears eligible for local listing or designation through survey evaluation.

5S1 Individual property that is listed or designated locally.
5S2 Individual property that is eligible for local listing or designation.
5S3 Appears to be individually eligible for local listing or designation through survey evaluation.

5B Locally significant both individually (listed, eligible, or appears eligible) and as a contributor to a district that is locally listed, designated, determined eligible or appears eligible through survey evaluation.

6 Not Eligible for Listing or Designation as specified

6C Determined ineligible for or removed from California Register by SHRC.
6J Landmarks or Points of Interest found ineligible for designation by SHRC.
6L Determined ineligible for local listing or designation through local government review process; may warrant special consideration in local planning.
6T Determined ineligible for NR through Part I Tax Certification process.
6U Determined ineligible for NR pursuant to Section 106 without review by SHPO.
6W Removed from NR by the Keeper.
6X Determined ineligible for the NR by SHRC or Keeper.
6Y Determined ineligible for NR by consensus through Section 106 process – Not evaluated for CR or Local Listing.
6Z Found ineligible for NR, CR or Local designation through survey evaluation.

7 Not Evaluated for National Register (NR) or California Register (CR) or Needs Revaluation

7J Received by OHP for evaluation or action but not yet evaluated.
7K Resubmitted to OHP for action but not reevaluated.
7L State Historical Landmarks 1-769 and Points of Historical Interest designated prior to January 1998 – Needs to be reevaluated using current standards.
7M Submitted to OHP but not evaluated - referred to NPS.
7N Needs to be reevaluated (Formerly NR Status Code 4)
7N1 Needs to be reevaluated (Formerly NR SC4) – may become eligible for NR w/restoration or when meets other specific conditions.
7R Identified in Reconnaissance Level Survey: Not evaluated.
7W Submitted to OHP for action – withdrawn.

PROPERTY-NUMBER	PRIMARY-#	STREET.ADDRESS.....	NAMES.....	CITY.NAME.....	OWN	YR-C	OHP-PROG..	PRG-REFERENCE-NUMBER	STAT-DAT	NRS	CRIT
136484		11363 SR 70		(VIC) MARYSVILLE	P	1940	HIST.RES.	DOE-58-02-0050-0000	12/16/02	6Y	
							PROJ.REVW.	FHWA021003A	12/16/02	6Y	
136505		10254 TANABE RD		(VIC) MARYSVILLE	P	1930	HIST.RES.	DOE-58-02-0061-0000	12/16/02	6Y	
							PROJ.REVW.	FHWA021003A	12/16/02	6Y	
136497		2907 WALNUT AVE		(VIC) MARYSVILLE	P	1930	HIST.RES.	DOE-58-02-0053-0000	12/16/02	6Y	
							PROJ.REVW.	FHWA021003A	12/16/02	6Y	
136498		2916 WALNUT AVE		(VIC) MARYSVILLE	P	1940	HIST.RES.	DOE-58-02-0054-0000	12/16/02	6Y	
							PROJ.REVW.	FHWA021003A	12/16/02	6Y	
136499		2992 WALNUT AVE		(VIC) MARYSVILLE	P	1915	HIST.RES.	DOE-58-02-0055-0000	12/16/02	6Y	
							PROJ.REVW.	FHWA021003A	12/16/02	6Y	
136500		2996 WALNUT AVE		(VIC) MARYSVILLE	P	1935	HIST.RES.	DOE-58-02-0056-0000	12/16/02	6Y	
							PROJ.REVW.	FHWA021003A	12/16/02	6Y	
136501		3056 WALNUT AVE		(VIC) MARYSVILLE	P	1945	HIST.RES.	DOE-58-02-0057-0000	12/16/02	6Y	
							PROJ.REVW.	FHWA021003A	12/16/02	6Y	
136461		545 WOODRUFF LANE		(VIC) MARYSVILLE	P		HIST.RES.	DOE-58-02-0030-0000	12/16/02	6Y	
							PROJ.REVW.	FHWA021003A	12/16/02	6Y	
163767			C-YCWA-1(CANAL/DITCH-ELEMENT OF RD	OLIVEHURST			PROJ.REVW.	COE050815A	09/01/05	6Y	
163770			BEAR RIVER LEVEE-ELEMENT OF RD784)	OLIVEHURST			PROJ.REVW.	COE050815A	09/01/05	6Y	
163766			C-YCWA-1(DITCH-ELEMENT OF RD784)	OLIVEHURST			PROJ.REVW.	COE050815A	09/01/05	6Y	
170713				OLIVEHURST	U	1945	PROJ.REVW.	COE070329A	05/09/07	6Y	
163765			C-OLIVEHURST-2(REMAINS OF BRIDGE)	OLIVEHURST			PROJ.REVW.	COE050815A	09/01/05	6Y	
163768			C-YCWA-3(FEATHER RIVER LEVEE-ELEME	OLIVEHURST			PROJ.REVW.	COE050815A	09/01/05	6Y	
163764			FEATHER RIDGE BLVD (ROAD)	OLIVEHURST			PROJ.REVW.	COE050815A	09/01/05	6Y	
163769			AGRICULTURAL BUILDING	OLIVEHURST			PROJ.REVW.	COE050815A	09/01/05	6Y	
163763			RECLAMATION DISTRICT 784	OLIVEHURST			PROJ.REVW.	COE050815A	09/01/05	6Y	
165336		1908 11TH AVE		OLIVEHURST	P	1948	PROJ.REVW.	HUD070118G	02/23/07	6Y	
146881		1914 11TH ST		OLIVEHURST	P	1944	HIST.RES.	DOE-58-04-0003-0000	05/20/04	6Y	
							PROJ.REVW.	HUD040423F	05/20/04	6Y	
185609		1679 3RD AVE	ENTIRE ADDRESS IS 1679 3RD AVE, AP	OLIVEHURST	P	1955	PROJ.REVW.	HUD090310E	03/30/09	6Y	
163600		1894 9TH AVE		OLIVEHURST	P	1954	PROJ.REVW.	HUD061012A	10/12/06	6Y	
170716		1122 COUNTRY CLUB AVE		OLIVEHURST	P	1952	PROJ.REVW.	COE070329A	05/09/07	6Y	
170715		1152 COUNTRY CLUB AVE		OLIVEHURST	P	1930	PROJ.REVW.	COE070329A	05/09/07	6Y	
165338		1863 E 11TH AVE		OLIVEHURST	P	1961	PROJ.REVW.	HUD070118I	02/23/07	6Y	
170717		2667 FEATHER RIVER BLVD		OLIVEHURST	P	1950	PROJ.REVW.	COE070329A	05/09/07	6Y	
177776		4370 FLEMING WY		OLIVEHURST	P	1960	PROJ.REVW.	HUD100125F	01/28/10	6Y	
099922		4752 FLEMING WY		OLIVEHURST	P	1935	PROJ.REVW.	HUD951211I	01/04/96	6Y	
146882		1111 LAUREL AVE		OLIVEHURST	P	1949	HIST.RES.	DOE-58-04-0004-0000	05/20/04	6Y	
							PROJ.REVW.	HUD040423G	05/20/04	6Y	
165339		4511 OLIVEHURST AVE		OLIVEHURST	P	1946	PROJ.REVW.	HUD070118J	02/23/07	6Y	
129917		5052 OLIVEHURST AVE		OLIVEHURST	P	1940	HIST.RES.	DOE-58-02-0001-0000	02/14/02	6Y	
							PROJ.REVW.	HUD020208C	02/14/02	6Y	
165343		4750 PACIFIC AVE		OLIVEHURST	P	1949	PROJ.REVW.	HUD070131C	02/14/07	6Y	
169931		4790 POWERLINE RD		OLIVEHURST	P	1950	PROJ.REVW.	HUD080219A	02/28/08	6Y	
176058			LATERAL 15 OF RECLAMATION DISTRICT	(VIC) OLIVEHURST	U	1905	PROJ.REVW.	COE090309A	03/27/09	6Y	
176057			SACRAMENTO NORTHERN RAILROAD SEGME	(VIC) OLIVEHURST		1905	PROJ.REVW.	COE090309A	03/27/09	6Y	
176056			PUMP 1 OF RECLAMATION DISTRICT 784	(VIC) OLIVEHURST		1911	PROJ.REVW.	COE090309A	03/27/09	6Y	
183222		SR 70	WESTERN PACIFIC RAILROAD	(VIC) OLIVEHURST	P	1903	PROJ.REVW.	COE110303A	04/04/11	2S2	
154903			POLE BARN / CHALLENGE WORK CENTER	PLU NF	F	1930	PROJ.REVW.	USFS040810A	12/20/04	6Y	
154647			BUILDING #1033 SINGLE STORY OFFICE	PLU NF	F	1948	PROJ.REVW.	USFS040810A	12/20/04	6Y	
154642			BUILDING #18052 RANGER'S RESIDENCE	PLU NF	F	1930	PROJ.REVW.	USFS040810A	12/20/04	6Y	
154648			DETACHED STORAGE BUILDING / CHALLE	PLU NF	F	1930	PROJ.REVW.	USFS040810A	12/20/04	6Y	

APPENDIX C

URBEMIS Modeling Data

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Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: C:\Documents and Settings\reshac\Application Data\Urbemis\Version9a\Projects\TRLIA Addendum 5 10.23.2012.urb924

Project Name: TRLIA Addendum 5

Project Location: Feather River AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	CO2
2013 TOTALS (tons/year unmitigated)	148.12

AREA SOURCE EMISSION ESTIMATES

	CO2
TOTALS (tons/year, unmitigated)	0.25

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	CO2
TOTALS (tons/year, unmitigated)	0.25

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

CO2

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2013	148.12
Demolition 01/01/2013-02/15/2013	16.05
Fugitive Dust	0.00
Demo Off Road Diesel	14.01
Demo On Road Diesel	0.00
Demo Worker Trips	2.04
Trenching 01/01/2013-02/02/2013	26.34
Trenching Off Road Diesel	24.86
Trenching Worker Trips	1.48
Mass Grading 02/18/2013-03/02/2013	14.10
Mass Grading Dust	0.00
Mass Grading Off Road Diesel	13.48
Mass Grading On Road Diesel	0.00
Mass Grading Worker Trips	0.61
Fine Grading 06/03/2013-08/31/2013	91.63
Fine Grading Dust	0.00
Fine Grading Off Road Diesel	87.65
Fine Grading On Road Diesel	0.00
Fine Grading Worker Trips	3.98

Phase Assumptions

Phase: Demolition 1/1/2013 - 2/15/2013 - Removal of existing fence, structures, and vegetation.

Building Volume Total (cubic feet): 0

Building Volume Daily (cubic feet): 0

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On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Concrete/Industrial Saws (10 hp) operating at a 0.73 load factor for 8 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 1 hours per day

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 6 hours per day

Phase: Fine Grading 6/3/2013 - 8/31/2013 - Default Fine Site Grading Description

Total Acres Disturbed: 2.5

Maximum Daily Acreage Disturbed: 0.62

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Mass Grading 2/18/2013 - 3/2/2013 - Default Mass Site Grading Description

Total Acres Disturbed: 2.5

Maximum Daily Acreage Disturbed: 0.62

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

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Phase: Trenching 1/1/2013 - 2/2/2013 - Default Trenching Description

Off-Road Equipment:

2 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

1 Other General Industrial Equipment (238 hp) operating at a 0.51 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 0 hours per day

RESOLUTION NO. 2007-04

A RESOLUTION BY THE BOARD OF THREE RIVERS LEVEE IMPROVEMENT AUTHORITY IN REGARD TO CERTIFICATION OF THE FEATHER RIVER LEVEE REPAIR PROJECT FINAL EIR; ADOPTION OF CALIFORNIA ENVIRONMENTAL QUALITY ACT FINDINGS, MITIGATION MEASURES, MITIGATION MONITORING PROGRAM AND STATEMENT OF OVERRIDING CONSIDERATIONS; AND APPROVAL OF THE FEATHER RIVER LEVEE REPAIR PROJECT

I. CERTIFICATION OF THE FINAL EIR

Three Rivers Levee Improvement Authority ("TRLIA"), as lead agency, has completed the Final Environmental Impact Report ("Final EIR") for Feather River Levee Repair Project ("Proposed Project" or "FRLRP"). The Final EIR comprises a project-level analysis of the Proposed Project, and has State Clearinghouse No. 2006062071.

A Draft Environmental Impact Report ("Draft EIR") was released for public agency review on August 4, 2006. Volume 1 of the Draft EIR assesses the potential environmental effects of implementation of the Proposed Project, identifies means to eliminate or reduce potential adverse impacts, and evaluates a reasonable range of alternatives to the Proposed Project. Volume 2 of the Draft EIR consists of Appendices referred to in Volume I. The Final EIR is comprised of the Draft EIR together with one additional volume that includes the comments on the Draft EIR submitted by interested public agencies, organizations and members of the public, written responses to the environmental issues raised in those comments, revisions to the text of the Draft EIR reflecting changes made in response to comments and other information, and other minor changes to the text of the Draft EIR. The Final EIR is hereby incorporated into this document by reference.

The Board of Directors of the Three Rivers Levee Improvement Authority ("the Board") certifies that it has been presented with the Final EIR and that it has reviewed and considered the information contained in the Final EIR prior to making the following certifications and the findings in Section II and the approvals in Section III, below.

Pursuant to CEQA Guidelines Section 15090 (Title 14 of the California Code of Regulations, Section 15090) the Board certifies that the Final EIR has been completed in compliance with the California Environmental Quality Act, Public Resources Code Sections 21000 *et seq.* ("CEQA") and the CEQA Guidelines, Title 14 of the California Code of Regulations, Sections 15000 *et seq.* The Board certifies the Final EIR for the actions described in these findings and in the Final EIR, *i.e.*, the Feather River Levee Repair Project

The Board further certifies that the Final EIR reflects its independent judgment and analysis.

II. FINDINGS

The Board is adopting these findings for the entirety of the actions described in these findings and in the Final EIR and for each individual action.

Having received, reviewed and considered the Final EIR and other information in the record of proceedings, the Board hereby adopts the following findings in compliance with CEQA and the CEQA Guidelines:

Part A: Findings regarding the environmental review process and the contents of the Final EIR.

Part B: Findings regarding the environmental impacts of the FRLRP and the mitigation measures for those impacts identified in the Final EIR and adopted as conditions of approval.

Part C: Findings regarding the environmental impacts of the FRLRP and mitigation measures for those impacts identified in the Final EIR and adopted as conditions of approvals relating to development of the FRLRP.

Part D: Findings regarding alternatives and the reasons that such alternatives are rejected.

Part E: Statement of Overriding Considerations determining that the benefits of implementing the FRLRP outweigh the significant unavoidable environmental impacts that will result and therefore justify approval of the FRLRP despite such impacts.

The Board certifies that these findings are based on full appraisal of all viewpoints, including all comments received up to the date of adoption of these findings, concerning the environmental issues identified and discussed in the Final EIR. The Board adopts the findings and the statements in Parts A through E for the approvals that are set forth in Section III, below.

A. Environmental Review Process

1. Development of the Feather River Levee Repair Project

Since the flood events that occurred in 1997, studies have been underway to develop a FRLRP for a higher level of protection to supplement flood protection system for Yuba County. In 2004, Yuba County Water Agency certified a program-level EIR for the Yuba-Feather Supplemental Flood Control Project ("Y-FSFCP"), which evaluated three flood control elements including a setback of the east bank of the Feather River below the Yuba River in two segments. The FRLRP is a modified version of the Above Star Bend ("ASB") levee setback

project segment evaluated in the Y-FSFCP EIR and consists of repairing and strengthening the Feather River left bank levee as well as a small portion of the left (south) bank levee of the lower Yuba River. An alternative approach to simply repairing and strengthening the existing levee is constructing a setback levee in the central portion of the project area following a modified version of the ASB levee setback alignment. The FRLRP Draft EIR evaluated three equal-weight project alternatives reflecting combinations of repair, strengthening, and setback levee components. (Draft EIR, pp. 2-2 to 2-5.)

2. Preparation of the EIR

On June 14, 2006, TRLIA issued a Notice of Preparation announcing the intended preparation of the Draft EIR and describing its proposed scope. A public scoping meeting was held on June 29, 2006. Comments received in response to the Notice of Preparation and the scoping meeting are included in Appendix A to the Draft EIR. Comments pertinent to the scope and content of the EIR are reflected in the Draft EIR.

TRLIA completed the Draft EIR on August 3, 2006 and circulated the Draft EIR for public review and comment for a period of 45 days ending September 18, 2006. Approximately five letters commenting on the Draft EIR were received during the comment period, and two letters (from the California Department of Water Resources and the U.S. Army Corps of Engineers) were received after the close of the comment period. No comments were received at the public meeting on September 6, 2006. (Final EIR, p. 2-1.)

The Final EIR was completed and made available for review by public agencies and members of the public on November 2, 2006.

The Final EIR contains all of the comments received during the public comment period, as well as the two letters received after the close of the comment period, together with written responses to those comments which were prepared in accordance with CEQA and the CEQA Guidelines.

The Board finds and determines that the Final EIR provides adequate, good faith and reasoned responses to all comments that raised significant environmental issues.

3. Absence of Significant New Information

CEQA Guidelines Section 15088.5 requires a lead agency to recirculate an EIR for further review and comment when significant new information is added to the EIR after public notice is given of the availability of the draft EIR but before certification of the Final EIR. New information added to an EIR is not "significant" unless the EIR is changed in a way that deprives the public of a meaningful opportunity to comment upon a substantial adverse environmental effect of the project or a feasible way to mitigate or avoid such an effect that the

project proponent declines to implement. The CEQA Guidelines provide examples of significant new information under this standard. Recirculation is not required where the new information added to the EIR merely clarifies or amplifies or makes insignificant modifications in an adequate EIR.

The Board recognizes that the Final EIR incorporates information obtained by TRLIA since the Draft EIR was completed, and contains clarifications or other non-substantive changes. With respect to this information, the Board finds as follows:

Minor Changes. Various minor changes and edits have been made to the the Draft EIR, as set forth in the Final EIR. These changes are generally of an administrative nature such as correcting typographical errors, making minor adjustments, and adding or changing certain phrases to improve readability. The Board finds that these changes are of a minor, non-substantive nature and do not require recirculation of the EIR.

EIR Table 1.3. The Board further finds that there are no changes to the Draft EIR, Table 1.3 for purposes of certification of the Final EIR, attached as Exhibit A to these Findings. The Board finds that the mitigations proposed are identified in Exhibit A, Table 1.3 and more fully described in the Mitigation Monitoring and Reporting Program attached as Exhibit B to these Findings. The Board finds that any differences between Exhibit A and Exhibit B are minor and clerical in nature, and do not cause any new or more severe environmental impacts than previously revealed. Therefore, in accordance with CEQA and the CEQA Guidelines, no recirculation of the EIR is necessary based on Exhibits A and B.

In addition to the changes and corrections described above, the Final EIR and the February 6, 2007 staff report provide additional information in response to comments and questions from agencies and the public. The Board finds that this additional information does not constitute significant new information requiring recirculation, but rather that the additional information merely clarifies or amplifies or makes insignificant modifications in an adequate EIR. Specifically, the Board finds that the additional information including the changes described above, does not show that:

(1) A new significant environmental impact would result from the project or from a new mitigation measure proposed to be implemented.

(2) A substantial increase in the severity of an environmental impact would result unless mitigation measures are adopted that reduce the impact to a level of insignificance.

(3) A feasible project alternative or mitigation measure considerably different from others previously analyzed would clearly lessen the significant environmental impacts of the project, but the project's proponents decline to adopt it.

(4) The Draft EIR was so fundamentally and basically inadequate and conclusory in nature that meaningful public review and comment were precluded.

Based on the foregoing, and having reviewed the information contained in the Final EIR and in the record of TRLIA's proceedings, including the comments on the Draft EIR and the responses thereto, and the above-described information, the Board hereby finds that no significant new information has been added to the Final EIR since public notice was given of the availability of the Draft EIR that would require recirculation of the EIR.

4. Differences of Opinion Regarding the Impacts of the Project

In making its determination to certify the Final EIR and to approve the Proposed Project, the Board recognizes that the Proposed Project implicates a number of complex environmental issues and that a range of technical and scientific opinion exists with respect to those issues. The Board has acquired an understanding of the range of this technical and scientific opinion by its review of the Draft EIR, the comments received on the Draft EIR and the responses to those comments in the Final EIR, as well as testimony, letters and reports regarding the Final EIR. The Board has reviewed and considered, as a whole, the evidence and analysis presented in the Draft EIR, the evidence and analysis presented in the comments on the Draft EIR, the evidence and analysis presented in the Final EIR, the information submitted on the Final EIR, and the reports prepared by the experts who prepared the EIR, TRLIA's consultants, and by staff, addressing those comments. The Board has gained a comprehensive and well-rounded understanding of the environmental issues presented by the Proposed Project. In turn, this understanding has enabled the Board to make its decisions after weighing and considering the various viewpoints on these important issues. The Board accordingly certifies that its findings are based on full appraisal of all of the evidence contained in the Final EIR, as well as the evidence and other information in the record addressing the Final EIR.

B. <u>Impacts and Mitigation Measures: The Feather River Levee Repair Project</u>

1. Impacts and Mitigation Measures

These findings provide the written analysis and conclusions of the Board regarding the environmental impacts of the Proposed Project and the mitigation measures proposed by the Final EIR and adopted by the Board as conditions of approval for the FRLRP.

In making these findings, the Board has considered the opinions of other agencies and members of the public disagreeing with some of the significance thresholds used in the EIR. The Board finds that the determination of significance thresholds is a judgment decision within the discretion of the Board; the significance thresholds used in the EIR are supported by substantial evidence in the record, including the expert opinion of the EIR preparers and TRLIA

staff; and the significance thresholds used in the EIR provide reasonable and appropriate means of assessing the significance of the adverse environmental effects of the Proposed Project.

Exhibit A attached to these Findings and incorporated herein by reference summarizes the environmental determinations of the Final EIR about the FRLRP's impacts before and after mitigation. This Exhibit does not attempt to describe the full analysis of each environmental impact contained in the Final EIR. Instead, Exhibit A provides a summary description of each impact, describes the applicable mitigation measures identified in the Final EIR and adopted by the Board, and states the Board's findings on the significance of each impact after imposition of the adopted mitigation measures. A full explanation of these environmental findings and conclusions can be found in the Final EIR and these findings hereby incorporate by reference the discussion and analysis in the Final EIR supporting the Final EIR's determinations regarding the FRLRP's impacts and mitigation measures designed to address those impacts. In making these findings, the Board ratifies, adopts and incorporates the analysis and explanation in the Final EIR in these findings, and ratifies, adopts and incorporates in these findings the determinations and conclusions of the Final EIR relating to environmental impacts and mitigation measures, except to the extent any such determinations and conclusions are specifically and expressly modified by these findings. In addition, the February 6, 2007 staff report further explains the TRLIA environmental findings and conclusions and these findings hereby incorporate by reference the discussion and analysis in the February 6, 2007 staff report supporting the Final EIR's determinations regarding the FRLRP's impacts and mitigation measures designed to address these impacts. In making these findings, the Board ratifies and adopts the analysis and explanation in the February 6, 2007 staff report and adopts the recommendations of the staff report regarding mitigation measures.

As set forth in Part III, below, the Board adopts, and incorporates as conditions of approval, the mitigation measures set forth in Exhibits A and B to reduce or avoid the potentially significant and significant impacts of the FRLRP, as well as certain less-than-significant impacts. In adopting these mitigation measures, the Board intends to adopt each of the mitigation measures proposed in the Final EIR together with such supplemental mitigation measures as have been recommended by the February 6, 2007 staff report. Accordingly, in the event a mitigation measure recommended in the Final EIR has inadvertently been omitted from Exhibit A or B, such mitigation measure is hereby adopted and incorporated in the findings below by reference.

Exhibit A is based on Table 1.3 of the Final EIR and with Exhibit B includes the full text of all mitigation measures. It also includes supplemental mitigation measures and enhancements to some mitigation measures identified in the Final EIR compiled by TRLIA's staff after the Final EIR was completed that are also adopted by this Board.

In several comments on the Draft EIR, various measures were suggested by commenters as proposed additional mitigation measures or modifications to the mitigation measures identified by the EIR. Several of the EIR's mitigation measures were modified in

response to such comments, and other mitigation measures were added to the Final EIR in response to such comments. Other comments requested minor modifications in mitigation measures identified in the Draft EIR, requested mitigation measures for impacts that were less than significant, or requested additional mitigation measures for impacts as to which the Draft EIR identified mitigation measures that would reduce the identified impact to a less than significant level; these requests are declined as unnecessary.

With respect to the additional measures suggested by commenters that were not added to the Final EIR or February 6, 2007 staff report, the Board hereby adopts and incorporates by reference the reasons set forth in the response to comments contained in the Final EIR and February 6, 2007 staff report as its grounds for rejecting adoption of these mitigation measures.

2. Further Findings Regarding Proposed Mitigation Measures

In addition to the reasoning contained in the responses to comments contained in the Final EIR, the Board provides the following additional explanation regarding its grounds for rejecting several mitigation measures proposed by commenter's during the EIR comment period or at various meetings:

Proposed Mitigation for Potential Conversion of Agricultural Acreage. The California Department of Conservation, Division of Land Resource Protection, encouraged the TRLIA to consider mitigating for conversion of agricultural land with an agricultural conservation easement in the form of an outright purchase or payment of a mitigation fee to an organization or agency that takes responsibility for agricultural conservation easements. As discussed in the responses to comments contained in the Final EIR, the purchase of conservation easements or payment of mitigation fees are neither necessary nor economically sound for this project. The establishment of agricultural conservation easements does not create new farmland, put new farmland into production, or increase productivity of existing farmland, but rather only ensures that existing farmland is not converted to a different use. Thus, the impact of conversion in one location is not avoided, minimized, rectified, or reduced by establishment of agricultural conservation easement elsewhere. (Final EIR, Response F-3.)

Furthermore, agricultural conservation easements are most commonly established where a project is permanently converting agricultural land to a non-open space use, such as residential, commercial, or industrial development. In those instances, there is no realistic potential for the land to be returned to agricultural use. For the FRLRP, however, most of the agricultural land that may be "converted" in the levee setback areas under Alternative 2 or 3 will remain in an undeveloped condition, as habitat or fallow lands. There is no requirement to commit to any particular scheme of habitat preservation for lands within the levee setback area. Thus, it is possible that some or all of the land, even if temporarily converted, could be returned to agricultural use in the future. (Final EIR, Response F-3; see also Draft EIR, pp. 5.1-15 to 5.1-16, 5.1-19 to 5.1-20.)

Alternative 1 could result in the conversion of up to 180 acres of farmland due to the construction of seepage/stability berms and a detention basin. (Draft EIR, pp. 5.1-12 to 5.1-13.) Alternatives 2 and 3 could result in the conversion of and/or loss of access to up to 1,045 acres or 720 acres, respectively, due to the construction of setback levees. (Draft EIR, pp. 5.1-15, 5.1-19.) Implementation of any of the alternatives would include compensating agricultural operators for temporary disturbance and/or permanent loss of agricultural lands associated with the project. (Draft EIR, pp. 5.1-12, 5.1-14, 5.1-18.) In addition, improvements to the flood control system will provide increased flood protection to thousands of acres of valuable farmland in the project vicinity. (*Id.*) For each alternative, the Draft EIR includes mitigation to minimize losses of farmland where it occurs, consistent with the nature and extent of the loss, and to preserve the productivity of existing farmland to the extent feasible. (Draft EIR, pp. 5.1-20 to 5.1-23; Final EIR, Response F-3.) The Board finds that these measures mitigate the loss of farmland in a manner that is proportionate to the nature and level of anticipated impact from the project.

In addition, there are limited funding sources available to accomplish TRLIA's flood protection goals. Particularly in light of the limited effectiveness of agricultural conservation easements in this context, the Board concludes that the purchase of easements or credits is not sound economic policy. Thus, the Board finds that after balancing environmental and economic factors, the purchase of agricultural conservation easements or mitigation credits, as proposed by the commenter's, is not feasible and declines to adopt the proposed mitigation.

3. Mitigation Measures Within The Jurisdiction And Control Of Other Agencies.

The Board has adopted all of the mitigation measures identified in Exhibit A. Some of the measures identified in Exhibit A are also within the jurisdiction and control of other agencies. To the extent any of the mitigation measures are within the jurisdiction of other agencies, the Board finds those agencies can and should implement those measures within their jurisdiction and control.

Mitigation measures within the control of other agencies include the following:

Mitigation Measure ASB-5.1-a: Resolve Inconsistencies between Proposed Uses of the Levee Setback Area and Yuba County Zoning. Mitigation Measure ASB-5.1-a provides that upon adoption of Alternative 2, TRLIA will coordinate with the Yuba County Planning Department to apply for general plan amendments and/or rezoning or other measures if necessary to ensure the consistency of proposed land uses with County Zoning. Any necessary modifications will require approval by the County Planning Commission and Board of Supervisors pursuant to County ordinances.

Mitigation Measure IS-5.1-a: Resolve Inconsistencies between Proposed Uses of the Levee Setback Area and Yuba County Zoning. If TRLIA adopts Alternative 3,

Mitigation Measure IS-5.1-a provides that TRLIA will coordinate with the Yuba County Planning Department to apply for general plan amendments and/or rezoning or other measures if necessary to ensure the consistency of proposed land uses with County Zoning. Any necessary modifications will require approval by the County Planning Commission and Board of Supervisors pursuant to County ordinances.

C. Basis for the Board's Decision to Approve the Proposed Project Rather Than An Alternative to the Proposed Project

1. Summary of discussion of alternatives in the Final EIR.

The Proposed Project consists of implementing one of three potential alternatives, each evaluated at an equal level of detail in the Draft EIR. The Draft EIR examines and compares the environmental impacts of each alternative and the relative ability of each alternative to satisfy Project Objectives.

The Draft EIR also summarizes the criteria used to identify a range of reasonable alternatives for review in the EIR and describes proposals that TRLIA concluded did not merit additional more detailed review either because they did not present feasible alternatives to the Proposed Project or are variations on the alternatives that are evaluated in detail. (Draft EIR, pp. 8-2 to 8-7.)

The discussion and analysis of alternatives in the Draft EIR is augmented by a further discussion of alternatives in the Responses to Comments section of the Final EIR. That discussion provides additional information about the range of alternatives examined in the EIR, provides further detail on proposals that did not merit more detailed evaluation in the EIR, further describes the relationship between alternatives examined in the EIR and project objectives, and addresses several variations on the alternatives that were suggested in comments on the Draft EIR.

2. The Board's Findings Relating to Alternatives.

In making these findings, the Board certifies that it has independently reviewed and considered the information on alternatives provided in the Final EIR, including the information provided in comments on the Draft EIR that proposed other options for flood protection improvements and the responses to those comments in the Final EIR. The Final EIR's discussion and analysis of these alternatives is not repeated in these findings, but the discussion and analysis of the alternatives in the Final EIR is incorporated in these findings by reference.

The Final EIR describes and evaluates three equal weight alternatives. Implementation of one of these alternatives comprises the Proposed Project. Each of these alternatives includes actions implicating each of the three project segments used to define the project area. Each alternative results in somewhat varying impacts on and benefits to the physical environment. For any of the alternatives, as set forth in section *II*.B above, the EIR

contains and the Board could adopt mitigation measures that substantially mitigate the significant environmental effects of the alternative. As explained in section II.D of these findings, while these mitigation measures will not mitigate all project impacts to a less-than-significant level, the measures will mitigate those impacts to a level that the Board finds is acceptable. Furthermore, the Board finds that each alternative satisfies the project objectives in varying degrees; accordingly, the Board considers the potential to achieve some or all of the project objectives alongside the impacts of each alternative and/or beneficial effect on the environment. The Board finds that, on balance, Alternative 1 has environmental advantages over Alternatives 2 and 3 that make Alternative 1 the "Environmentally Superior" Alternative. Alternatives 2 and 3, in turn have critical hydrologic and ecological benefits.

The Board has determined to approve Alternative 2. In making this determination, the Board finds that when compared to the other alternatives described and evaluated in the Final EIR, Alternative 2, as mitigated, provides a reasonable balance between implementation of the Project Objectives and reducing potential environmental impacts to an acceptable level. The Board further finds and determines that the environmental gains available under other alternatives are less compelling when compared with the benefits of Alternative 2, for the reasons set forth below.

a. Description of Project Objectives.

The overall goal of the Proposed Project is to correct deficiencies in the left (east) bank levees of the Feather and lower Yuba Rivers, and consequently to improve flood protection of the Reclamation District (RD) 784 area in Yuba County, and to achieve the following Project Objectives:

- To secure flood protection for at least a flood event with a 0.5% (or 1-in-200) annual chance of exceedance;
- To help secure Federal Emergency Management Agency (FEMA) accreditation of the subject reaches of levee;
- To avoid increasing downstream flow and stage during peak-flow conditions;
- To achieve those objectives as soon as possible; and
- To incorporate environmental mitigation as appropriate.

(Final EIR, p. 3-2.)

b. Discussion and Findings Relating to the Alternatives Evaluated In The Draft EIR

No Project Alternative. Under CEQA, a "No Project Alternative" compares the impacts of proceeding with a proposed project with the impacts of not proceeding with the proposed project. A No Project Alternative describes the environmental conditions in existence at the time the Notice of Preparation was published, along with a discussion of what would be reasonably expected to occur at the site in the foreseeable future, based on current plans and consistent with available infrastructure and community services. Other than the FRLRP, there are no other near-term plans to comprehensively repair or improve the subject levees. Therefore, under the No-Project Alternative, no levee repair or strengthening would be implemented, and the river bank levees would be left in their current condition. (Draft EIR, p. 8-9.)

The No Project Alternative would not result in any adverse environmental effects from levee repair and strengthening activities or the construction of a setback levee. The No-Project Alternative, however, would not result in any beneficial effects in the form of increased flood protection and other benefits that would occur with implementation of Alternative 1, 2, or 3. (Draft EIR, pp. 8-10 to 8-12.)

Alternative 1 – The Levee Strengthening Alternative. Under Alternative 1, levee repair and strengthening activities, including installation of slurry cutoff walls, relief wells, and seepage/stability berms, would be completed along the entire length of project segments 1, 2, and 3. Pump Station No. 3 would be removed under this alternative, and a new pump station would be constructed farther east of the levee bank. Alternative 1 would also include construction of a detention basin to hold peak flows. (Draft EIR, p. 8-8.)

Alternative 1 has the fewest impacts that remain significant and unavoidable after mitigation. As discussed in section II.D below, of the remaining significant and unavoidable impacts of Alternative 1, two are temporary (construction air quality and noise impacts). (Draft EIR, p. 8-13.) The only non-temporary significant and unavoidable impact is the conversion of farmland to non-agricultural uses, and Alternative 1 results in the smallest acreage to be converted of the three alternatives that are evaluated in equal detail in the EIR (although, as noted above, most of the "conversion" associated with the other alternatives does not necessarily result in the same open space, soil, water and other impacts as does conversion to developed uses). (Draft EIR, pp. 5.1-12 to 5.1-13, 5.1-15, 5.1-19.) On balance, although the Draft EIR does not identify it as such, Alternative 1 should be considered to be the "Environmentally Superior Alternative" for the project under CEQA. Alternative 1 would meet the project objectives related to increasing flood protection, and unlike Alternatives 2 and 3, would not affect residences and other structures that could be affected by construction of a setback levee. Notwithstanding the consideration of Alternative 1 as the Environmentally Superior, some important environmental benefits associated with construction of a setback levee, such as changes in local flood hydrology upstream and downstream of the project area that would

provide higher levels of flood protection, would not occur with Alternative 1. (Draft EIR, pp. 8-12 to 8-18.)

Alternative 2 – The Levee Strengthening and ASB Setback Levee Alternative. Alternative 2 includes the levee repair and strengthening activities of Alternative 1 but adds a setback levee in project segment 2 roughly in the same alignment as the ASB levee identified in the Y-FSFCP EIR. The setback area would occupy approximately 1,600 acres, and would require the removal of several residences and other structures, as well as the relocation of those residents. (Draft EIR, p. 8-8.) The use of the setback area as a floodway would conflict with existing land use designation and zoning of the setback area acreage, and thus, Alternative 2 results in an additional significant and unavoidable impact in the area of Land Use Conflicts, as compared to Alternative 1. (Draft EIR, pp. 5.1-14 to 5.1-15, 8-12, 8-15.)

However, Alternative 2 would provide the greatest degree of flood protection benefits of all of the Alternatives. As identified in Table 1-2, Alternative 2 would result in the greatest reductions in water surface elevations in the Feather River at the upper end of the levee setback area and at the confluence of the Feather and Yuba Rivers than Alternatives 1 or 3. (Draft EIR, pp. 1-4.) Another favorable factor is that, as identified in Table 1-2, Alternative 2 would result in the same or slightly higher water surface elevations downstream of the levee setback area than Alternatives 1 or 3, which minimizes downstream impacts. (*Id.*)

At the same time, due to the size of the setback area Alterative 2 would have a relatively higher magnitude of environmental impacts, and impacts to residences and other structures, than either Alternatives 1 or 3. (Draft EIR, pp. 8-12 to 8-19.) More precisely, Alternatives 2 and 3 have the same number of impacts that remain significant and unavoidable after mitigation, but the magnitude of the impacts would be relatively higher under Alternative 2 because the acreage of the setback area under Alternative 2 is larger than under Alternative 3. At the same time, of the acreage affected by Alternative 2, it is anticipated that a substantial portion could continue to be cultivated and that acreage would benefit in the long-term from increased flood protection. (Draft EIR, pp. 5.1-14.)

The flood protection benefits of Alternative 2 are highly desirable, and the balance of impacts to benefits suggests that approval of this Alternative would be appropriate, as described in the February 6, 2007 staff report. With the passage of State Proposition 1E and DWR's favorable response to TRLIA Feather River Setback Proposition 1E funding request, TRLIA has sufficient funding to implement Alternative 2. Alternative 2 meets the primary objective of achieving the designated level of flood protection as soon as possible.

Alternative 3 – The Levee Strengthening and Intermediate Setback Levee Alternative. Alternative 3 involves the same levee repair and strengthening activities as Alternative 1, and a setback levee in project segment 2 similar to that proposed under Alternative 2. The setback levee follows a different alignment, however, that results in a setback area of approximately 1,300 acres. Thus, fewer houses, structures, and other facilities would be affected

or need to be removed from the setback area under Alternative 3 than under Alternative 2. (Draft EIR, p. 8-9.) Nonetheless, as with Alternative 2, the use of the setback area as a floodway would conflict with existing land use designation and zoning of the setback area acreage results in an additional significant and unavoidable impact in the area of Land Use Conflicts, as compared to Alternative 1. (Draft EIR, pp. 5.1-18 to 5.1-19, 8-12, 8-15.)

Alternatives 2 and 3 have the same number of impacts that remain significant and unavoidable after mitigation. The acreage of the setback area under Alternative 3, however, is smaller than under Alternative 2. Thus, while both Alternative 2 and 3 have more significant and unavoidable impacts than Alternative 1, the magnitude of certain impacts (which ones, plus residences/structures) of Alternative 3 is slightly smaller than under Alternative 2. However, Alternative 3 would provide a lower degree of flood protection benefit than Alternative 2. (Draft EIR, pp. 1-4; 8-12 to 8-19.) Moreover, of the acreage affected by Alternative 2, it is anticipated that a significant portion could continue to be cultivated. (Draft EIR, pp. 5.1-14.)

Summary of Findings Regarding Alternatives. For all of the foregoing reasons, given the nature and type of environmental impacts when viewed in light of the benefits of each Alternative, the record indicates that the Board could reasonably choose to approve any one of the Alternatives. Given the imperative for the highest degree of flood control protection and the availability of funding, the Board finds that on balance, after considering environmental, economic, social, technological and other feasibility considerations, the highest public interest supports approval of Alternative 2 instead of the other Alternatives.

Under Alternative 2, the setback levee footprint and levee easements identified in Segment 2 would cover approximately 240-250 acres of agricultural land, and setting back the levee could indirectly result in the removal of more land from agricultural production by dividing land parcels and allowing periodic flooding of agricultural land. Construction of a detention basin would be required to prevent adverse flooding effects on area properties, and this would like occur on several hundred acres of agricultural land. These uses would conflict without County land use policies regarding the preservation of agricultural land and would be inconsistent with current land use and zoning designations for the area.

This is the only impact that could be mitigated from significant and unavoidable to less than significant levels through selection of another project alternative (Alternative 1). However, TRLIA has concluded that the benefits of Alternative 2 outweigh any environmental gain in this resource category that might be incurred by selecting Alternative 1 over Alternative 2. Alternative 1 also results in some impacts in this resource category. (Draft EIR, pp. 5.1-11 to p. 5.1-12.) Both Alternatives 1 and 3 would result in some conversion of agricultural land, however, in all instances the impact remains significant and unavoidable. Although Alternatives 1 and 3 would convert a relatively smaller amount of land than Alternative 2, TRLIA has concluded that the benefits of Alternative 2 implicate a stronger public interest as compared to those environmental gains. The continuing evolution of flood control knowledge over time suggests that the higher level of protection under Alternative 2 is warranted to protect existing

and planned communities and as a precautionary measure in case new information or changing circumstances reveals new risks in the future. Moreover, of the acreage affected by Alternative 2, conversion impacts are not the same as those associated with conversion to developed urban uses; the vast majority of the Important Farmland that could be "converted" under Alternative 2 (up to approximately 1,045 acres) would remain in an undeveloped condition, as habitat or fallow lands within the levee setback area created by these alternatives. (Final EIR, Response F.) It is anticipated that a substantial portion could continue to be cultivated and that acreage would benefit in the long-term from increased flood protection. (Draft EIR, pp. 5.1-14.)

c. Findings Regarding Suggestions for Modifying the Proposed Project and Variations On The Alternatives.

In addition to the reasoning contained in the responses to comments contained in the Final EIR, the Board provides the following additional explanation regarding commenter's' suggestions for analysis of alternatives:

Eminent Domain Implications for Discussion of Alternatives. Attorney Thomas Eres submitted comments on behalf of Hofman Ranch, in which he opined that "the potential adoption of a 'Resolution of Necessity' may impact the analysis of alternatives" and that "the issue of feasibility of alternatives in the context of eminent domain need [sic] to be addressed." Referring to Alternatives 2 and 3, the commenter seemed to be referring to the private ownership of the acreage that would be inside of a setback levee, if one were approved. As discussed in the responses to comments in the Final EIR, eminent domain proceedings and the accompanying Resolution of Necessity would only be needed if the landowners and TRLIA could not agree upon appropriate compensation for any private property that may be needed to accomplish the objectives of the project or that would otherwise require compensation. (Final EIR, Response G-15.)

Should TRLIA pursue eminent domain proceedings, a Resolution of Necessity would be required which would contain a finding that "the proposed project is planned or located in the manner that will be most compatible with the greatest public good and the least private injury." (Code Civ. Proc. § 1245.230(c)(2); *see also* § 1240.030(b).) As explained in the responses to comments in the Final EIR, there is a strong imperative for local flood control. Alternatives 2 and 3 provide greater flood control benefits than Alternative 1. Thus, although any of the three Alternatives would meet the requirements for eminent domain, if eminent domain proceedings were required, Alternative 2 would most easily meet the requirements.

The relocation of residents in a setback area may result in economic and social effects, as described in the EIR. TRLIA has determined that these effects are not significant, directly or indirectly. TRLIA has committed to pay compensation to relocated landowners and relocation assistance for eligible homeowners, tenants, businesses and farm operations under federal and state relocation statutes. (Draft EIR, pp. 5.1-16 to 5.1-17.) The Draft EIR reports

that as of the 2000 Census, there were 2,101 vacant housing units in Yuba County, with 312 of those units in the Marysville area. (Draft EIR, p. 5.1-17.) According to the U.S. Census Bureau, these numbers represent a 9.3% vacancy rate in Yuba County, and a 6.2% vacancy rate in Marysville. (US Census Bureau 2006.) Thus, the available data indicates there are sufficient existing housing units available in the project area to accommodate displaced residents under Alternative 2. (Draft EIR, p. 5.1-17.)

D. Statement of Overriding Considerations

1. Impacts That Remain Significant

As listed in Exhibit A, the following impacts of the FRLRP remain significant following adoption and implementation of the mitigation measures described in the Final EIR:

Number	Impact	Alt. 1	Alt. 2	Alt. 3
5.1-a	Conflicts with Land Use Planning and Policies Resulting from Levee Repairs and the Levee Setback.	LTS	SU	SU
5.1-b	Conversion of Important Farmland to Nonagricultural Uses Resulting from Levee Repairs and Strengthening.	SU	SU	SU
5.9-a	Temporary Emissions of ROG, NO_X, and PM_{10} during Construction.	SU	SU	SU
5.10-a	Temporary Increase in Noise Levels during Construction.	SU	SU	SU

2. Overriding Considerations Justifying Approval of Alternative 2

In accordance with CEQA Guidelines Section 15093, the Board has, in determining whether or not to approve the FRLRP, balanced the economic, social, technological and other benefits of the FRLRP against its unavoidable environmental risks, and has found that the benefits of the FRLRP outweigh the significant adverse environmental effects that are not mitigated to less-than-significant levels, for the reasons set forth below. This statement of overriding considerations is based on the Board's review of the Final EIR and other information in the administrative record.

The project is needed to help resolve the existing risk of flooding impacts in the identified area, as demonstrated by recent catastrophic flood events. Removing the potential for property and natural resource damage and destruction, personal injury and death, supports strong public, social and economic interests. The project would also address the deficiencies in the Feather River levee that have led to uncertainty and controversy surrounding planned and

ongoing development in the area, which is subject to a higher flood risk than previously believed. The continuing evolution of flood control knowledge over time suggests that the higher level of protection under Alternative 2 is warranted to protect existing and planned communities and as a precautionary measure in case new information or changing circumstances reveals new risks in the future. The additional flood protection will yield economic benefits in the form of reduced costs associated with flood insurance and flood-related property damage. Flood protection also results in an increased sense of security in the community, particularly among owners of property that has flooded in the past or has been in danger of flooding.

Two of the four significant unavoidable impacts of Alternative 2 are temporary: construction emissions of ROG, NO_X, and PM_{10} (Impact ASB-5.9-a) and construction-related increases in noise levels (Impact ASB-5.9-b). Alternative 2 would potentially result in long-term beneficial changes to air quality. (Draft EIR, pp. 5.9-25 to 5.9-26.) The Board has determined to adopt mitigation measures that will reduce these impacts to the extent feasible. (Mitigation Measures ASB-5.9-1, ASB-5.10-a.) The Board finds that the short-term air quality and noise impacts would be significant and unavoidable under all Alternatives, and that the flood protection and other long-term benefits provided by Alternative 2 outweigh these temporary impacts.

The remaining significant unavoidable impacts are the related impacts of conflicts with land use plans and policies (Impact ASB-5.1-a) and conversion of agricultural land to nonagricultural uses (Impact ASB-5.1-b). In part, conflicts with land use plans and policies are outside the jurisdiction of TRLIA, as described above and in the EIR. (Mitigation Measure ASB-5.1-a.)

The EIR concludes that the conversion of agricultural land is significant and unavoidable for any of the three alternatives. Alternative 1 could result in the conversion of up to 180 acres of farmland due to the construction of seepage/stability berms and a detention basin. (Draft EIR, pp. 5.1-12 to 5.1-13.) Alternatives 2 and 3 could result in the conversion of and/or loss of access to up to 1,045 acres or 720 acres, respectively, due to the construction of setback levees, although most of that conversion would not result in the same open space, soil, water, and other impacts that is typically associated with permanent conversion to developed uses. (Draft EIR, pp. 5.1-15, 5.1-19.) Implementation of any of the Alternatives would include compensating agricultural operators for temporary disturbance and/or permanent loss of agricultural lands. (Draft EIR, pp. 5.1-12, 5.1-14, 5.1-18.) In addition, improvements to the flood control system will provide increased flood protection to thousands of acres of valuable farmland in the project vicinity. (*Id.*)

Both Alternatives 1 and 3 would result in some conversion of agricultural land, however, in all instances the impact remains significant and unavoidable. Although Alternatives 1 and 3 would convert a relatively smaller amount of land than Alternative 2, TRLIA has concluded that the benefits of Alternative 2 implicate a stronger public interest as compared to those environmental gains. The continuing evolution of flood control knowledge over time

suggests that the higher level of protection under Alternative 2 is warranted to protect existing and planned communities and as a precautionary measure in case new information or changing circumstances reveals new risks in the future. Moreover, of the acreage affected by Alternative 2, conversion impacts are not the same as those associated with conversion to developed urban uses; the vast majority of the Important Farmland that could be "converted" under Alternative 2 (up to approximately 1,045 acres) would remain in an undeveloped condition, as habitat or fallow lands within the levee setback area created by these alternatives. (Final EIR, Response F.) It is anticipated that a substantial portion could continue to be cultivated and, as noted, that acreage would benefit in the long-term from increased flood protection. (*E.g.,* Draft EIR, pp. 5.1-14.) TRLIA has proposed, and the Board herein adopts, mitigation measures that will preserve the productivity of Important Farmland to the extent feasible by, for example, minimizing fragmentation, retaining contiguous parcels where practical, addressing access issues, providing productive topsoil, and addressing protection of existing utilities, strategically siting laydown and staging areas, and using existing roads for access. (Mitigation Measure ASB-5.1-b.)

The displacement of a small number of residences and other structures in the setback area under Alternative 2 may result in economic and social effects, as described in the EIR. (Draft EIR, pp. 5.1-17.) To the extent these are considered relevant to physical impacts under CEQA, the Board concludes that these effects are not significant. (*Id.*) TRLIA has committed to pay compensation to relocated landowners and relocation assistance for eligible homeowners, tenants, businesses and farm operations under federal and state relocation statutes. (Draft EIR, pp. 5.1-16 to 5.1-17.)

In short, implementation of Alternative 2 will result in additional flood protection, which in turn will yield economic benefits in the form of reduced costs associated with flood insurance and flood-related property damage. Flood protection also results in an increased sense of security in the community, particularly among owners of property that has flooded in the past or has been in danger of flooding. The Board finds that these social and economic benefits outweigh the impacts that cannot be reduced to less than significant levels, and warrant approval of Alternative 2 in spite of those remaining impacts. The Board finds that under all of the circumstances, the flood control benefits of Alternative 2 outweigh its environmental costs.

E. Record of Proceedings

Various documents and other materials constitute the record upon which the Board bases these findings and the approvals contained herein. The location and custodian of these documents and materials is Paul G. Brunner at Three Rivers Levee Improvement Authority.

F. Mitigation Monitoring and Reporting Program

In accordance with CEQA and the CEQA Guidelines, the Board must adopt a mitigation monitoring and reporting program to ensure that the mitigation measures adopted

herein are implemented in the implementation of the Proposed Project. The Board hereby adopts the Mitigation Monitoring Program for the Project attached to these Findings as Exhibit B.

G. Summary

1. Based on the foregoing findings and the information contained in the administrative record, the Board has made one or more of the following findings with respect to each of the significant environmental effects of the Proposed Project identified in the Final EIR:

a. Changes or alterations have been required in, or incorporated into, the Proposed Project which avoid or substantially lessen the significant environmental effects on the environment.

b. Those changes or alterations that are wholly or partially within the responsibility and jurisdiction of another public agency have been, or can and should be, adopted by that other public agency.

c. Specific economic, social, technological, or other considerations make infeasible the mitigation measures or alternatives identified in the Final EIR that would otherwise avoid or substantially lessen the identified significant environmental effects of the Proposed Project.

2. Based on the foregoing findings and information contained in the record, it is hereby determined that:

a. All significant effects on the environment due to approval of the Proposed Project have been eliminated or substantially lessened where feasible.

b. Any remaining significant effects on the environment found unavoidable are acceptable due to the factors described in the Statement of Overriding Considerations in Section II.D above.

III. RESOLUTION OF APPROVAL

NOW, THEREFORE, BE IT RESOLVED THAT:

The Board hereby takes the following actions and makes the following approvals:

A. The Board has certified the Final EIR in Section I, above.

B. The Board hereby adopts as conditions of approval all mitigation measures within the responsibility and jurisdiction of Three Rivers Levee Improvement Authority as set forth in Section II.B of the Findings, above.

C. The Board hereby adopts the Mitigation Monitoring Program for the Proposed Project as set forth in Exhibit B and discussed in Section II.F of the Findings, above.

D. The Board hereby adopts these Findings in their entirety as its findings for these actions and approvals.

E. The Board hereby adopts the statement of overriding considerations set forth herein.

F. Having certified the Final EIR, independently reviewed and analyzed the Final EIR, incorporated mitigation measures into the Proposed Project, and adopted Findings and a statement of overriding considerations, the Board hereby approves Alternative 2 set forth in the EIR as the Feather River Levee Repair Project. The Board also directs staff to file a Notice of Determination pursuant to CEQA Guidelines Section 15094, and to take other necessary and appropriate actions to implement this approval.

PASSED AND ADOPTED this 6th day of February 2007,

by the Board of Directors of Three Rivers Levee Improvement Authority, by the following vote:

AYES: Directors Brown, Crippen, Griego, Logue

NOES: None

ABSENT: Director Webb

ABSTAIN: None

Dan Logue

Vice Chairman

ATTEST:

DONNA STOTTLEMEYER

Secretary

APPROVED AS TO FORM:

Scott Shapiro

TRLIA Special Counsel

Exhibit A

Table 1-3b

SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
5.1 Land Use			
ASB-5.1-a: Conflicts with Land Use Planning and Policies Resulting from Levee Repairs and the Levee Setback. Levee repair and strengthening of the existing levee in Segments 1 and 3 would result in removal of small areas of agricultural land from production associated with installation of seepage/stability berms and other structures. The setback levee footprint and levee easements in Segment 2 would cover approximately 240–250 acres of agricultural land, and setting back the levee could indirectly result in the removal of more land from agricultural production by dividing land parcels and allowing periodic flooding of agricultural land. Construction of a detention basin would be required to prevent adverse flooding effects on area properties, and this would likely occur on several hundred acres of existing agricultural land. These uses would conflict with County land use policies regarding the preservation of agricultural land and would be inconsistent with the current land use and zoning designations for the area. Because of these inconsistencies, this impact would be **significant**.	S	**Resolve Inconsistencies between Proposed Uses of the Levee Setback Area and Yuba County Zoning.** TRLIA shall coordinate with the County Planning Department to appropriately address inconsistencies between proposed land uses and County-planned land uses and zoning designations. Before permanent changes in allowable land uses in the levee setback area need to be established (i.e., before degradation of the existing levee at the latest), TRLIA shall apply for a general plan amendment if necessary and for appropriate rezoning, a zoning amendment, or other measures determined by the Planning Department to be necessary to ensure the consistency of proposed land uses with zoning. Consistency is defined as land uses and activities permitted by the County in the levee setback area, as reflected by zoning and other land use guidelines, that do not conflict with the flood control function of the levee setback area. The approach to resolving any land use planning inconsistencies shall be determined by, and conducted in coordination with, the County Planning Department. Any necessary modifications of general plan land use designations or of zoning, or placement of restrictions on existing zoning, will be determined by the Planning Department and approved by the County Planning Commission and Board of Supervisors as appropriate.	SU
ASB-5.1-b: Conversion of Important Farmland to Nonagricultural Uses Resulting from Levee Repairs and the Levee Setback. Levee repair and strengthening activities in project Segments 1 and 3 could permanently remove up to approximately 10 acres of Prime Farmland from production. Relocation of Pump Station No. 3 could potentially	S	**Preserve the Agricultural Productivity of Important Farmland to the Extent Feasible.** It is not known at this time whether lands in the levee setback area would be retained in agricultural production, converted to habitat, or a mixture of both land uses. If lands classified as Important Farmland in the levee setback area are to be retained in agricultural production, the following measures would apply to these lands.	SU

Exhibit A

Table 1-3b

SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
convert up to 1 acre of Prime Farmland in Segment 2 to nonagricultural use. The levee setback footprint and levee easements in Segment 2 would permanently convert approximately 210 acres of Prime Farmland, 35 acres of Farmland of Statewide Importance, and 2 acres of Unique Farmland to nonagricultural uses, and would potentially convert several hundred additional acres of Important Farmland for the proposed detention basin. The ASB levee setback could potentially result in the conversion of up to approximately 1,025 acres of Prime Farmland, 10 acres of Farmland of Statewide Importance, and 10 acres of Unique Farmland to nonagricultural uses. Implementation of the levee setback also may indirectly lead to the conversion of additional Important Farmland to nonagricultural uses because some properties would be divided by the setback levee, which could make continued farming of some crops, or on some parcels, impractical. This impact would be **significant**.		To support the continued productive use of Important Farmland in the levee setback area in project Segment 2, TRLIA shall ensure that the following measures are implemented, to the extent feasible and practicable, in the design and implementation of the levee setback: (a) When selecting sites for borrow excavation, minimize the fragmentation of lands that are to remain in agricultural use. Where practical, retain contiguous parcels of agricultural land of sufficient size to support their efficient use for continued agricultural production. (b) Where the setback levee would transect agricultural properties and the continuation of agricultural use on the portions within the levee setback area would occur, ensure convenience of access to the levee setback properties sufficient to support ongoing agricultural operations. (c) Make the most productive salvaged topsoil from the levee footprint available to landowners with less productive agricultural lands in the vicinity of, but outside the levee setback area that could benefit from the introduction of good-quality soil. By agreement between TRLIA or landowners of affected properties and the recipient(s) of the topsoil, the recipient(s) would be required to work the topsoil into the agricultural lands where it is delivered. (d) Ensure that utilities currently in the levee setback area that are needed for ongoing agricultural uses, including wells, pipelines, and power lines, are appropriately relocated, replaced, or retrofitted to withstand flooding. Ensure that these systems and drainage systems are functioning as necessary after the project is in place so that agricultural uses are not unduly disrupted. In addition, TRLIA shall ensure that the following measures are	

Exhibit A

Table 1-3b

SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		implemented, to the extent feasible and practical, inside and/or outside the levee setback area: (a) Minimize the disturbance of Important Farmland and continuing agricultural operations during construction by locating construction laydown and staging areas on sites that are fallow, that are already developed or disturbed, or that are to be discontinued for use as agricultural land, and by using existing roads to access construction areas to the extent possible. (b) When selecting the site and configuration of the detention basin, minimize the fragmentation of agricultural lands and retain contiguous parcels of agricultural land of sufficient size to support their efficient use for continued agricultural production.	
ASB-5.1-c: Displacement of Existing Housing in the Levee Setback Area. Implementation of the ASB levee setback would result in the removal of five to 10 residences from the levee setback area. There are sufficient available residences in the area to accommodate these households; therefore, project implementation would not necessitate the construction of replacement housing elsewhere. Although CEQA does not require that economic and social effects be evaluated or considered significant impacts, it is acknowledged that displacement of five to 10 residences would have both economic and social effects on the occupants of these residences (finding replacement housing, moving to a new residence). However, appropriate compensation would be negotiated with landowners displaced by the project. In addition, eligible homeowners,	LTS	No mitigation is required.	LTS

Exhibit A

Table 1-3b

SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
renters/tenants, businesses, and farm operations would receive relocation assistance consistent with the Federal Uniform Relocation Act and the California Relocation Assistance Law. This impact would be **less than significant.**			
5.2 Geology, Soils, and Mineral Resources			
ASB-5.2-a: Risk of Geologic Hazards to the Levees. Characteristics of the soils along the proposed ASB setback levee alignment could lead to structural deficiencies or levee failure if not addressed in construction design. Although no active faults are in the vicinity of the existing levees or the setback levee alignment, some ground shaking is possible from distant sites. Effects on the stability of the proposed ASB setback levee would be no greater than effects on the existing levee. Construction according to design recommendations by the geotechnical engineers, independent reviews of the project design and construction by a Board of Senior Consultants (BOSC), and engineering review and approval by the Corps and The Reclamation Board would ensure the incorporation of appropriate features to address any potential structural instability of the levee. The setback levee would be engineered and constructed to modern standards with appropriate seepage control features and, therefore, would be more stable than the existing levee and unlikely to fail. This would be a **beneficial** effect.	B	No mitigation is required.	B
ASB-5.2-b: Soil Erosion Hazards Associated with Construction of the ASB Setback Levee. Although	LTS	No mitigation is required.	LTS

Exhibit A

Table 1-3b

SUMMARY OF IMPACTS AND MITIGATION MEASURES

THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
construction activities associated with levee repair and strengthening and installation of the ASB setback levee would disturb earth, thereby potentially accelerating erosion, construction disturbance would be temporary and soils in disturbed areas would be vegetated or otherwise stabilized after construction is complete. In addition, the levee setback area is nearly level and is well drained, and the risk of erosion and associated hazards is slight. Levee repair and strengthening activities and construction of the ASB setback levee would not expose persons or property to erosion hazards. This impact would be **less than significant**.			
ASB-5.2-c: Soil Erosion Hazards Associated with Flood Operations with the ASB Setback Levee. Floodwaters passing through the levee setback area could erode soil that is not currently subjected to flood flows on a frequent basis. However, levee construction would increase the width and decrease the depth and velocity of flood flows in the levee setback area, minimizing erosive forces. In addition, vegetative cover in the levee setback area (agriculture or habitat) would reduce the potential for erosion. This impact would be **less than significant.**	LTS	No mitigation is required.	LTS
5.3 Water Resources and River Geomorphology			
ASB-5.3-a: Temporary Effects on Water Quality Associated with Levee Repair and Strengthening Activities and Setback Levee Construction. Ground-disturbing activities associated with repairs and strengthening of the existing levees and	PS	**(1): Prepare a SWPPP, File an NOI, and Comply with the NPDES Stormwater Permit for Project Construction Activities.** This measure is identical to Mitigation Measure LS-5.3-a(1) above.	LTS

Exhibit A

Table 1-3b

SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
construction of the ASB setback levee could cause soil erosion and sedimentation of local drainages and the Feather and Yuba River channels. Construction activities could also discharge waste petroleum products or other construction-related substances that could enter these waterways in runoff. Because the release of soil or other materials into these waterways could adversely affect river water quality, this impact would be **potentially significant.**		**(2): Obtain a Use Permit from Yuba County and Comply with Permit Conditions for Erosion Control.** This measure is identical to Mitigation Measure LS-5.3-a(2) above.	
ASB-5.3-b: Disruption of Local Drainage Systems by the Levee Setback. The ASB setback levee would cross existing drainage infrastructure and sever parts of the drainage system for the local area. Drainage patterns within the levee setback area could be changed by project implementation as well. Because interruption of drainage patterns could cause or exacerbate local flooding, this impact would be **significant.**	S	**Coordinate with RD 784 to Modify Drainage Facilities that Would Be Affected by the Levee Setback and Ensure Appropriate Functioning of the Local Drainage System.** TRLIA or its primary construction contractor shall coordinate with RD 784 to evaluate local drainage needs before and after construction of the setback levee and shall prepare and implement a plan for modification of the portion of the drainage system that would be affected by the levee setback. A drainage study shall be prepared that evaluates the effects on local drainage that would result from the levee setback and any proposed changes in land uses in the levee setback area. The study shall consider the design flows of the existing facilities that cross the proposed setback levee footprint (e.g., Lateral 7/8 and the Plumas Lake Canal). It shall develop appropriate plans for relocation or other modification of these facilities and construction of new facilities, as needed, to ensure equivalent functioning of the system during and after construction of the setback levee. Facility modification will include relocating Pump Station No. 3, and may include removing, filling, and/or rerouting drainage canals and culverts; regrading drainage alignments to redirect drainage; constructing new ditches and	LTS

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Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		canals; and installing new culverts. The plan shall also consider the continuing and proposed uses of the levee setback area and shall incorporate appropriate drainage requirements for those uses to prevent any unintended flooding from stormwater runoff. The plan shall integrate environmental mitigation requirements and drainage of restored borrow sites to the extent feasible and practical. The final plan shall be approved by RD 784. TRLIA and its construction contractor(s) shall ensure that the necessary modifications are implemented without interruption of the adequate functioning of the drainage system. TRLIA shall also ensure that any necessary environmental review requirements have been met before the drainage modifications are implemented.	
ASB-5.3-c: Changes in Local Flood Hydrology Resulting from the Levee Setback. Setting back the left bank Feather River levee along the ASB setback levee alignment would decrease flood stages on the river. The levee setback would also provide a well-designed, well-constructed levee that would be more reliable and less subject to seepage than the existing levee. These changes would improve local flood protection. This effect would be **beneficial.**	B	No mitigation is required.	B
ASB-5.3-d: Changes in Flood Hydrology Downstream of the Setback Levee. The ASB levee setback would lower water levels upstream of the levee setback area, which could increase flows downstream of project Segment 2. This condition could lead to increased flooding downstream of Segment 2 if flood events should occur. However,	LTS	No mitigation is required.	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
the passage of floodwaters downstream to the Feather River would increase floodwater elevation within adequately sized levees, and the increased potential for levee failure and flooding downstream would be very slight. In addition, the implementation of Forecast-Coordinated Operations of Lake Oroville and New Bullards Bar Reservoir would reduce peak flows in the Feather-Yuba River system, and hence downstream of the levee setback area. Therefore, this impact would be **less than significant.**			
ASB-5.3-e: Change in Water Demand and Available Water Supply Resulting from the ASB Levee Setback. Implementation of the ASB levee setback would remove approximately 240–1,300 acres of land from irrigated agricultural use along the proposed setback levee footprint and in the setback area. Alternative uses (e.g., levee, habitat restoration) are not expected to increase demand for water supply but, rather, are expected to decrease water use. This would be a **beneficial** effect.	B	No mitigation is required.	B
ASB-5.3-f: Changes in Groundwater Levels Resulting from Installation of Slurry Cutoff Walls and the Levee Setback. Slurry cutoff walls that would be installed to control seepage in the existing Feather River and Yuba River levees in project Segments 1 and 3 and in the ASB setback levee in Segment 2 could restrict groundwater flow and affect groundwater levels. Potential consequences are localized changes in well water levels and/or high groundwater levels east of the	LTS	No mitigation is required.	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES

THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
setback levee and east and south of the locations where slurry cutoff walls are installed in Segments 1 and 3. Such changes are not expected to substantially affect water supply or adversely affect land uses. This impact would be **less than significant.**			

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
ASB-5.3-g: Long-Term Effects on Water Quality Resulting from the Levee Setback. Potentially hazardous materials related to agricultural activities could be transported downstream when the levee setback area becomes inundated during flood events. These materials could contaminate floodwater and adversely affect river water quality. Because of the potential for adverse effects on water quality in the Feather River, this impact would be **potentially significant.** Public Safety?	PS	**(1): Conduct a Phase I Environmental Site Assessment for the Levee Setback Area and Implement Recommendations.** Before the start of any ground-disturbing construction activity, TRLIA or its primary construction contractor shall have a qualified hazardous waste specialist perform a Phase I Environmental Site Assessment of the levee setback area to identify potential sources of surface and buried contaminants, and provide a report of assessment findings. The assessment shall include the following: ▪ review of available information on property history, including, as appropriate, historical and current topographic maps, aerial photographs, property title and permit information, interviews of environmental regulatory agency and Yuba County personnel, and interviews of current occupants and landowners regarding the current and past uses of the land; ▪ review of federal, state, and county governmental records and databases to determine whether any sites in the area are listed as hazardous waste sites; and ▪ reconnaissance-level surveys to observe visual evidence of hazardous materials use. A written report on the findings of the assessment, including recommendations for the disposition of any identified hazardous waste sites or potential hazardous waste sites, shall be provided to TRLIA. TRLIA or its construction contractor(s) shall implement recommendations made in the Phase I report. If hazardous materials or wastes are identified, recommendations could include, but would not be limited to, a Phase II assessment or cleanup of known identified hazardous waste sites. Presence of hazardous wastes would be determined using waste classification	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		protocols described in CCR Title 22. **(2): Evaluate Levee Borrow Material for Potential Contaminants in Coordination with the RWQCB.** Before the start of construction, TRLIA or its primary construction contractor shall have a qualified hazardous materials specialist collect and evaluate representative soil samples from the existing levee sections that would be used as sources of borrow, and from potential borrow sites. The soil samples shall be evaluated for contaminant residues (e.g., trace metals, organochlorine pesticides, polychlorinated biphenyls) that may be encountered in excavation and grading activities. This evaluation shall be conducted to address any requirements of the Central Valley RWQCB as part of the RWQCB's permitting and approval process for the project (e.g., Section 401 certification). Wastes that are encountered at hazardous levels shall be treated in accordance with CCR Title 22 procedures for hazardous materials reporting and disposal. Where the evaluation of soil samples detects the presence of wastes that are not present at hazardous levels, the results of the evaluation shall be reported to the RWQCB for classification in the RWQCB's designated waste classification program, and the RWQCB will determine the acceptability of the material for levee construction based on the potential of the waste to impair water quality and public health. Borrow material used for construction of the waterside levee face or other features with soil exposure to the aquatic environment (e.g., new drainage channels) that is deemed unacceptable by the RWQCB shall be properly disposed of in a landfill or made available for other approved uses. **(3): Remove Nonhazardous Waste and Debris from the Levee Setback Area.** Before the beginning of the first season of potential flood operations with the setback levee in place, TRLIA	

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		or its primary construction contractor shall ensure the removal from the levee setback area of all large slash and wood piles, nonhazardous waste dumps, and other nonhazardous debris that could adversely affect water quality or create a hazard if carried downriver in flood flows. All removed materials shall be properly disposed of in approved off-site landfills.	
ASB-5.3-h: Changes in Floodplain Sediment Deposition Associated with the Levee Setback. Inundation of the ASB levee setback area would result in the transport and deposition of sediments in the setback area that may contain elevated concentrations of trace metals and/or organic constituents. Because it is unlikely that the sediment constituent concentrations resulting from inundation would be any higher than existing concentrations in the levee setback area, this impact would be **less than significant.**	LTS	No mitigation is required.	LTS
ASB-5.3-i: Changes in Geomorphic Processes Along the River Channels Resulting from the Levee Setback. Increasing the conveyance area of the Feather River floodway along the ASB setback levee alignment would alter water velocities and depths in the existing river channel and floodway in this area and upstream during flood events large enough to inundate the levee setback area (greater than an approximately a 3-year flow). These changes in velocities and depths could lead to decreased shear stresses from Star Bend to just below Shanghai Bend (project Segment 2) and slightly increased shear stresses at Shanghai Bend (Segment 3) and some distance upstream on both	LTS	No mitigation is required.	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES

THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
the Feather River and the Yuba River. Shear stresses would not change downstream of the levee setback area. Portions of the riverbanks and channel bed along the Feather and Yuba Rivers where shear stresses increase could experience minor increases in erosive forces. However, any increases would not be sufficient to result in a substantial increase in the mobilization and/or deposition of sediments. This impact would be **less than significant.**			
ASB-5.3-j: Changes in Geomorphic Processes Along the Project Levees Resulting from the ASB Levee Setback. Increasing the conveyance area of the Feather River floodway along the ASB setback levee alignment would alter water velocities and depths in the existing floodway in this area and upstream during flood events large enough to inundate the levee setback area (greater than an approximately a 3-year flow). These changes in velocities and depths would lead to decreased shear stresses along the right and left bank Feather River levees from Star Bend to just below Shanghai Bend (project Segment 2) and increased shear stresses along the levees at Shanghai Bend (Segment 3) and some distance upstream on both the Feather River and the Yuba River. Shear stresses along the levees would not change downstream of the levee setback area. Portions of the levee area along the Feather and Yuba Rivers where shear stresses increase could experience minor increases in erosive forces. Any increases in shear stresses would not be sufficient to result in a substantial increase in the mobilization	LTS	No mitigation is required.	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
and/or deposition of sediments or increase exposure of persons or private property to flood hazards (i.e., through damage to the levees). This impact would be **less than significant.**			
5.4 Fisheries			
ASB-5.4-a: Loss of Fish Habitat during Levee Repair and Strengthening Activities and Setback Levee Construction. Construction-related increases in sediments, turbidity, and contaminants could adversely affect fish habitats immediately adjacent to and downstream of project construction activities, possibly resulting in adverse effects on fish species listed or proposed for listing as threatened or endangered under ESA. This impact would be **potentially significant.**	PS	**(1): Prepare a SWPPP, File an NOI, and Comply with the NPDES Stormwater Permit for Project Construction Activities.** This measure is identical to Mitigation Measure LS-5.3-a(1) in Section 5.3, "Water Resources and River Geomorphology." **(2): Obtain a Use Permit from Yuba County and Comply with Permit Conditions for Erosion Control.** This measure is identical to Mitigation Measure LS-5.3-a(2) in Section 5.3, "Water Resources and River Geomorphology." **(3): Obtain and Comply with Terms and Conditions of a Streambed Alteration Agreement for Construction Activities Associated with the Setback Levee.** Three Rivers Levee Improvement Authority (TRLIA) or its representative shall consult with DFG regarding potential disturbance to fish habitat as part of the process for obtaining a streambed alteration agreement, pursuant to Section 1602 of the California Fish and Game Code, for construction work associated with the setback levee. TRLIA shall comply with conditions set forth in the streambed alteration agreement to protect fish habitat.	LTS
ASB-5.4-b: Loss of Overhead Cover and Instream Woody Material Associated with Setback Levee Construction. In project Segment 2, vegetation may need to be removed to allow drainage from the levee setback area to the river channel, or it may be cleared at the waterside toe of	LTS	No mitigation is required.	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
the existing levee to accommodate levee removal. The loss in overhead cover for fish would be limited and temporary, however, and revegetation would occur over time. Therefore, this impact would be **less than significant.**			
ASB-5.4-c: Effects on Habitat from Contaminants in Borrow Material. If contaminants are present in soil in the levee setback area or in borrow material used for the setback levee, they could be released when the area is inundated during flood events, resulting in harm to sensitive fish and habitat. This impact would be **potentially significant**.	PS	**(1): Conduct a Phase I Environmental Site Assessment for the Levee Setback Area and Implement Recommendations.** This measure is identical to Mitigation Measure ASB-5.3-g(1) in Section 5.3, "Water Resources and River Geomorphology." **(2): Evaluate Levee Borrow Material for Potential Contaminants in Coordination with the RWQCB.** This measure is identical to Mitigation Measure ASB-5.3-g(2) in Section 5.3, "Water Resources and River Geomorphology." **(3): Remove Nonhazardous Waste and Debris from the Levee Setback Area.** This measure is identical to Mitigation Measure ASB-5.3-g(3) in Section 5.3, "Water Resources and River Geomorphology."	LTS
ASB-5.4-d: Fish Stranding Following Flooding of the Levee Setback Area. Following construction of the setback levee, the levee setback area may contain depressions where water could pond following inundation and fish could become trapped as floodwaters recede to the main river channel. Stranded fish, particularly juvenile chinook salmon and steelhead, would be exposed to predators and increasing water temperatures; with no means to return to the river, they would inevitably die. This impact would be **significant.**	S	**Develop and Implement a Drainage and Grading Plan that Minimizes Loss or Incidental Loss of Fish from Stranding.** TRLIA and its primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize the potential for fish stranding in the levee setback area: (a) Plan and implement drainage improvements. TRLIA or its designated construction contractors, through a combination of grading and drainage improvements, shall minimize the potential for floodwater to pond in the levee setback area in such a way that substantial numbers of fish become stranded and consequently become exposed to hostile environments (warm water temperatures and increased predation).	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		As part of the development of the final design for the levee setback area, TRLIA or its representatives shall determine the specific topographic and hydrologic characteristics of the levee setback area and shall define the anticipated flooding regime (depth, duration, and extent of flooding), drainage patterns, and potential for fish stranding risks there. The final project design shall include recontouring as necessary to ensure complete drainage and provide fish passage back to the main river channel as floodflows recede from the levee setback area. Features with substantial stranding risk shall be identified for filling and/or grading. Complete drainage is important to reduce the risk of stranding; however, maintaining some seasonal aquatic habitat in the levee setback area and/or hydrologic connectivity to the Feather River may also be important features if enhancement of fish habitat and production is selected as a management activity in the levee setback area. Before the design of the setback levee and levee setback area is finalized, TRLIA or its representatives shall obtain the approval of DFG and NMFS indicating that the planned drainage and grading features are sufficient to address concerns about fish stranding potential, similar to the process used for the Feather-Bear Rivers Levee Setback Project currently under construction downstream. The features of the setback levee and levee setback area shall be constructed in accordance with the approved final design. (b) <u>Monitor the success of the drainage features and adjust if necessary</u>. A long-term mitigation monitoring plan shall be developed by a qualified biologist on behalf of TRLIA and shall be approved by DFG and NMFS before implementation of the levee setback. This monitoring plan	

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		shall evaluate the effectiveness of the grading and drainage features in the levee setback area in reducing the risk of fish stranding and the stability of the drainage features and shall determine the need for maintenance or modification. The monitoring plan shall include provisions for remediation should the design of the levee setback area prove to be unsuccessful in preventing fish stranding. These measures shall include, as appropriate, such activities as regrading or filling depressions in the levee setback area. The recommended monitoring scheme shall include annual monitoring for a period of 5 years following the removal of any part of the existing levee. Additional monitoring may be required for areas where remediation is necessary. Monitoring is recommended to include the following actions: ▪ Visual assessment of the levee setback area by a qualified biologist before the flood season (i.e., by October 31). This assessment should note any substantial changes in the overall structure since implementation of the final design for the area, including reestablishment of vegetation and the presence of "holes" or pits. ▪ A visual survey by a qualified biologist at the end of each event that floods the levee setback area (i.e., after the recession of waters that inundate the floodplain). This survey should identify whether there is any ponding that would result in fish stranding, or whether channels have formed that flow through completely to the low-flow channel of the Feather River. Following each flood season (i.e., after April 16), a letter report shall be submitted to NMFS and DFG summarizing	

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		the overall condition of the floodplain area and any changes that have occurred from the previous year(s). If any remediation measures are required, they shall be outlined in the letter report, along with a schedule specifying when the remediation activities will occur. Appropriate remediation measures shall be implemented as soon as is practicable to minimize the potential for fish stranding while maintaining the desired habitat values (if habitat enhancement is included in the floodplain area) and hydraulic characteristics of the area. The performance of the mitigation measure shall be considered successful if there is no isolated standing water and/or barriers to fish passage capable of resulting in substantial fish stranding following a flood event that inundates the levee setback area.	
ASB-5.4-e: Increased Aquatic and Riparian Habitat in the Levee Setback Area. Setting back the Feather River levee in project Segment 2 could allow the expansion of the available aquatic and riparian habitat corridor and could improve the success of fish species that use the area. This effect would be **potentially beneficial.**	PB	No mitigation is required.	PB
5.5 Terrestrial Biological Resources			
ASB-5.5-a: Effects on General Biological Resources. Levee repair and strengthening activities in project Segments 1 and 3 would temporarily disturb ruderal habitat on the levee slopes and adjacent riparian and agricultural land. Construction of the ASB setback levee in Segment 2 would result in loss of primarily agricultural land. Agricultural	LTS	No mitigation is required.	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
lands could also be lost at potential borrow and detention basin sites. These temporary impacts and potential permanent land use changes would affect habitat for many common plant and wildlife species. Although local populations would be reduced by these activities, these species are locally and regionally abundant. This impact would be **less than significant.**			
ASB-5.5-b: Effects on Sensitive Habitats. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities would result in disturbance and/or loss of sensitive habitats, including jurisdictional wetlands, other waters of the United States, and riparian habitats. This impact would be **significant.**	S	**Avoid Disturbance of Sensitive Habitat to the Extent Feasible and Comply with Corps and DFG Processes to Mitigate Unavoidable Effects.** This measure is identical to Mitigation Measure LS-5.5-b above.	LTS
ASB-5.5-c: Loss of Special-Status Plants. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities could result in the loss of rose mallow and Wright's trichocoronis if they are present in areas that would be disturbed during these activities. This impact would be **potentially significant.**	PS	**Conduct Detailed Special-Status Plant Surveys and Establish Construction Buffers as Necessary to Minimize Effects on Special-Status Plants.** This measure is identical to Mitigation Measure LS-5.5-c above.	LTS
ASB-5.5-d: Effects on Valley Elderberry Longhorn Beetle. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities could result in loss of blue elderberry shrubs that are occupied by valley elderberry longhorn beetles. This impact would be **potentially significant.**	PS	**Conduct Protocol-Level Surveys, Establish Buffers, and Implement a Mitigation Plan as Necessary to Minimize Effects on Valley Elderberry Longhorn Beetle.** This measure is identical to Mitigation Measure LS-5.5-d above.	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
ASB-5.5-e: Effects on Northwestern Pond Turtle. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities would result in disturbance and/or loss of suitable aquatic habitat for northwestern pond turtle and could result in direct loss of individuals. This impact would be **potentially significant.**	PS	**Conduct Surveys as Part of Dewatering Activities and Minimize Effects on Northwestern Pond Turtle.** This measure is identical to Mitigation Measure LS-5.5-e above.	LTS
ASB-5.5-f: Effects on Giant Garter Snake. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities would result in disturbance and/or loss of suitable aquatic and upland habitat for giant garter snake. Construction activities also have potential to result in direct take of individuals. This impact would be **significant.**	S	**Implement Applicable Take Minimization Measures and a Mitigation Plan as Necessary for Giant Garter Snake.** This measure is identical to Mitigation Measure LS-5.5-f above.	LTS
ASB-5.5-g: Effects on Swainson's Hawk and Other Nesting Raptors. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities would result in disturbance and/or loss of suitable nesting and/or foraging habitat for Swainson's hawk and other raptors and could result in loss of active nests. This impact would be **potentially significant.**	PS	**(1): Conduct Preconstruction Surveys and Protect Active Nests to Minimize Effects on Swainson's Hawk.** This measure is identical to Mitigation Measure LS-5.5-g(1) above. **(2): Conduct Preconstruction Surveys, Protect Occupied Burrows, and Relocate Individuals as Necessary to Minimize Effects on Burrowing Owl.** This measure is identical to Mitigation Measure LS-5.5-g(2) above. **(3): Conduct Preconstruction Surveys and Protect Active Nests to Minimize Effects on Other Nesting Raptors.** This measure is identical to Mitigation Measure LS-5.5-g(3) above.	LTS
ASB-5.5-h: Effects on Other Special-status Birds. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities would result in disturbance and/or loss of potential nesting and/or foraging habitat for several	LTS	No mitigation is required.	LTS

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THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
special-status bird species. Special-status species are unlikely to nest in areas that would be affected, and large areas of nesting and foraging habitat of equal or higher quality are available elsewhere in the project area. Therefore, this impact would be **less than significant.**			
ASB-5.5-i: Effects on Pacific Western Big-Eared Bat. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities would not affect suitability of foraging habitat or result in loss of important roost or maternity sites. This impact would be **less than significant.**	LTS	No mitigation is required.	LTS
ASB-5.5-j: Effects on Wildlife Corridors. Levee repair and strengthening activities, construction of the ASB setback levee, and related activities would result in limited temporary disturbance of the Feather River and Yuba River habitat corridors and minor corridors associated with canals and ditches in the levee setback area. However, such disturbance is not expected to affect overall use of these corridors by wildlife. This impact would be **less than significant.**	LTS	No mitigation is required.	LTS
5.6 Recreation			
ASB-5.6-a: Temporary Changes in Recreational Opportunities during Levee Repairs and Setback Levee Construction. Construction noise could disrupt recreational uses in the project area, particularly in areas adjacent to the existing levee. Some wildlife species present in or inhabiting	LTS	No mitigation is required.	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
natural areas are likely to be disturbed by noise and by the presence of project construction crews and equipment. Portions of the Feather River State Wildlife Area in project Segment 1 may need to be closed temporarily to hunting and other recreational activities for safety reasons while adjacent sections of the existing Feather River levee are being repaired. There would be no public access to the Star Bend Boat Launch and Fishing Access for several days while levee repairs were conducted in this area. Although these temporary disturbances may affect the recreation experience for bird-watchers, hunters, boaters, and other recreational users, displaced recreational uses could be accommodated by other nearby facilities (Whitmore, pers. comm., 2006). For this reason, and because of the temporary nature of this effect, this impact would be **less than significant**.			
ASB-5.6-b: Long-Term Changes in Recreational Opportunities Resulting from Levee Repairs and Setback Levee Construction. Implementing levee repairs along project Segments 1 and 3 would have little or no effect on recreational uses in the Lake of the Woods Management Unit or along the Feather River channel in these project segments. Implementing the levee setback in Segment 2 would slightly modify Feather River flood stage elevations in the project vicinity during high flows, possibly affecting recreational uses, and could affect survival rates of wildlife following high-flow periods, which could temporarily affect associated wildlife-related	LTS	No mitigation is required.	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
recreation. The changes in Feather River flood stage elevations that would result from expansion of the Feather River floodway in Segment 2, however, would be infrequent, of short duration, and during periods when river stage is already high; therefore, no new effects on recreational uses are expected. Sections of the existing Feather River levee would be left in place as part of the proposed project, which would minimize losses of wildlife that could adversely affect long-term recreational activities. This impact would be less than significant.			

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
5.7 Aesthetic Resources			
ASB-5.7-a: Temporary Changes in Visual Resources Associated with Levee Repairs and Setback Levee Construction. Levee repair and strengthening activities and construction of the ASB setback levee would temporarily reduce the aesthetic qualities of views by introducing earthmoving equipment and other construction equipment, materials, and work crews into the viewshed of recreationists, motorists on SR 70 and Feather River Boulevard, workers in nearby farming areas, and residents of the area. However, the construction areas would typically be distant from and/or screened from most viewers. Where residents would be near the construction area (e.g., in project Segment 3), construction would pass by these areas relatively quickly and changes in aesthetic conditions would be short term and temporary. For these reasons, this impact would be **less than significant.**	LTS	No mitigation is required.	LTS
ASB-5.7-b: Changes in Light and Glare. There would be no substantial sources of light or glare associated with levee repairs or with the long-term presence of the ASB setback levee and detention basin. However, equipment staging areas may be temporarily lit at night during construction, and portions of the construction areas may also need to be lit at night. Although such nighttime lighting may be visible from various residences, particularly in project Segment 3, in most locations views of the construction areas would be largely shielded by	LTS	No mitigation is required.	LTS

Exhibit A

Table 1-3b

SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
orchards, other vegetation, and structures. Where lit construction areas are visible, lighting would be short term and temporary. For these reasons, this impact would be **less than significant.**			
ASB-5.7-c: Long-Term Modifications of Views from Levee Repairs and Installation of the Setback Levee. Levee repair and strengthening activities would not dramatically change the appearance of project Segments 1 and 3. Construction of the ASB setback levee would change the appearance of Segment 2. However, all three project segments are of low to moderate aesthetic value, there would be no substantial adverse effect on any scenic vista, and these changes would not substantially alter the general character of views of the area. This impact would be **less than significant.**	LTS	No mitigation is required.	LTS
5.8 Cultural Resources			
ASB-5.8-a: Damage to or Destruction of Prehistoric Archaeological Site CA-Yub-5. Prehistoric archaeological site CA-Yub-5, which may be eligible for listing in the CRHR and NRHP, could be damaged or destroyed by construction activities or by inundation or scouring when flood flows pass through the levee setback area. Because this site may be a significant cultural resource, this impact would be **potentially significant**.	PS	**Evaluate the Significance of Archaeological Site CA-Yub-5 and, If Determined to Be Significant, Protect the Site from Damage and/or Conduct Data Recovery Excavation.** TRLIA shall have a qualified archaeologist evaluate the extent and significance/eligibility for NRHP and CRHR listing of site CA-Yub-5 through test excavations and analysis of the site's stratigraphy and artifactual constituents. If the site is determined to lack eligibility for NRHP and CRHR listing and is not found to be a significant cultural resource under CEQA, the archaeologist shall report these findings in a site investigation report and ensure that all remains discovered at the site are recorded and reported in accordance with professional practices, and no further protective	LTS

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Table 1-3b

SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		measures will be necessary. If intact stratigraphy, features, additional human remains, or artifacts indicate that the site may be eligible for NRHP or CRHR listing and therefore a significant historical resource according to CEQA criteria, TRLIA shall implement one or both of the measures described below in consultation with a professional archaeologist familiar with CA-Yub-5 to ensure that no significant cultural resources are damaged there. Two basic approaches are described: protecting the site from damage and conducting data recovery at the site. All site testing shall be conducted in consultation with appropriate Native American representatives designated by the NAHC, and a Native American monitor shall be present for monitoring during any excavation. <u>Option 1: Protect CA-Yub-5 from Damage</u> CA-Yub-5 can be protected from direct construction damage if the setback levee is realigned such that the site is beyond the footprint of ground-disturbing levee construction activity. This would require moving the levee alignment to the east of the site boundaries, thus placing the entire site within the levee setback area. It would be highly impractical to move the alignment to the west to place the site outside the project site and thereby avoid damaging it. Based on characteristics observed during archaeological field surveys, it is estimated that the setback levee would need to be constructed approximately 500 feet west of the proposed alignment in the area of CA-Yub-5 to ensure complete avoidance of the site. Geotechnical considerations render such a western shift of the alignment unrealistic because it would place this portion of the levee on a far less stable foundation (old riverbed) than under the proposed alignment. Once situated within the levee setback area (i.e., the expanded floodway), the site should be protected from future erosion and	

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		scour from surface flows, as well as human disturbance, through the use of engineered features and/or strategic plantings. In addition, sufficient site data should be collected and analyzed to establish the important archaeological characteristics of the site. One of the most potentially significant characteristics of CA-Yub-5 is the presence of at least 12 inches of midden soil, which can be a source of information regarding the age of the site (through radiocarbon dating) and prehistoric diets and paleoenvironmental reconstruction (through microconstituent and chemical analyses). Because floodwaters passing through the levee setback area could alter the soil properties that permit accurate radiometric dating or hasten the degradation of macrobotanical and microbotanical remains, scientific data would need to be collected, recorded, and reported before the site is subjected to inundation. It has been previously suggested that the site may be protected from future damage by use of a protective covering that is impermeable to water, which is also termed "capping." However, "capping" CA-Yub-5 to protect it from water damage would be very impractical, if not impossible. It would be necessary to have a clear definition of the horizontal and vertical boundaries of CA-Yub-5, and the site would need to be completely encased in the covering so that it would be protected from saturation from all sides, including rising groundwater from below. <u>Option 2: Conduct Data Recovery at CA-Yub-5</u> Data recovery through destructive excavation is considered an acceptable mitigation measure for damage to archaeological sites if other mitigation measures are less feasible or wholly infeasible. The purpose of data recovery is to obtain scientifically consequential information from an archaeological site that would be partially or completely destroyed. Although much of the work	

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		required for data recovery is similar to that conducted during test excavations, the requirements for data recovery call for more extensive manual and perhaps mechanical excavation. Recovered materials shall be subjected to laboratory analysis (e.g., stone tool analysis, faunal analysis, radiocarbon assays, and obsidian hydration studies), and a report and interpretive material shall be prepared that documents the site investigation and findings.	
ASB-5.8-b: Damage to or Destruction of Resources Associated with Prehistoric Archaeological Sites CA-Yub-13 and CA-Yub-14. This impact would be the same as Impact LS-5.8-a, described under Alternative 1 above. For the same reasons as described above, this impact would be **potentially significant**.	PS	**(1): Conduct Further Evaluation and Subsurface Testing to Determine Whether Proposed Levee Improvements Could Damage Significant Resources Associated with Prehistoric Archaeological Sites CA-Yub-13 and CA-Yub-14.** This measure is identical to Mitigation Measure LS-5.8-a(1) above. **(2): Monitor Ground-Disturbing Activities in the Vicinity of Prehistoric Archaeological Sites CA-Yub-13 and CA-Yub-14.** This measure is identical to Mitigation Measure LS-5.8-a(2) above.	LTS
ASB-5.8-c: Damage to or Destruction of Cultural Resources in Unsurveyed Areas. Portions of the project area could not be surveyed for cultural resources because of ground conditions and lack of site access, and potential borrow or staging areas also have not been surveyed. Significant cultural resources could be present in these areas, and could be damaged by project-related ground-disturbing activities. This impact would be **potentially significant**.	PS	**Survey Unexamined Areas before Project Ground-Disturbing Activities and Implement Further Mitigation As Necessary.** This measure is identical to Mitigation Measure LS-5.8-b above.	LTS
ASB-5.8-d: Damage to or Destruction of Undocumented Buried Archaeological Resources during Construction. This impact would be similar to Impact LS-5.8-c, described under Alternative 1	PS	**Stop Work and Implement Measures to Protect Archaeological Resources If Discovered during Ground-Disturbing Activities.** This measure is identical to Mitigation Measure LS-5.8-c above.	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
above. In addition, ground-disturbing activities associated with the proposed levee setback in project Segment 2, such as construction of the slurry cutoff wall and the setback levee foundation, have the potential to damage or destroy previously unidentified archaeological resources in the setback levee construction area. For the same reasons as described for Alternative 1, this impact would be **potentially significant**.			
ASB-5.8-e: Damage to or Destruction of Undocumented Human Remains during Construction. This impact would be similar to Impact LS-5.8-d, described under Alternative 1 above. In addition, ground-disturbing activities associated with the proposed levee setback in project Segment 2, such as construction of the slurry cutoff wall and the setback levee foundation, have the potential to damage or destroy undocumented human remains in the setback levee construction area. For the same reasons as described for Alternative 1, this impact would be **potentially significant**.	PS	**If Human Remains are Discovered during Ground-Disturbing Activities, Stop Work and Comply with State Laws Pertaining to the Discovery of Human Remains.** This measure is identical to Mitigation Measure LS-5.8-d above.	LTS
5.9 Air Quality			
ASB-5.9-a: Temporary Emissions of ROG, NO_X, and PM_{10} during Construction. Maximum daily emissions of ROG, NO_X, and PM_{10} associated with levee repair and strengthening activities in project Segments 1 and 3 and construction of the Above Star Bend (ASB) setback levee in Segment 2 would exceed FRAQMD's recommended significance thresholds and contribute to existing nonattainment	S	**Implement FRAQMD Pollution-Control Measures to Minimize Temporary Emissions of ROG, NO_X, and PM_{10} during Construction.** This measure is identical to Mitigation Measure LS-5.9-a above.	SU

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Table 1-3b

SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
conditions for ozone and PM_{10} in the NSVAB. This impact would be **significant**.			
ASB-5.9-b: Long-Term Changes in Emissions of ROG, NO_X, and PM_{10} Associated with Levee Repairs and Strengthening and the Levee Setback. The proposed levee repairs and strengthening in project Segments 1 and 3 and the ASB levee setback in Segment 2 would be expected to contribute only minimally, if at all, to long-term emissions of pollutants through vehicle trips related to occasional maintenance activities. The potential cessation of agricultural uses on some lands in the levee setback area could result in a decrease in long-term pollutant emissions in this area, particularly PM_{10} emissions associated with agricultural land disturbance and burning operations. Such a reduction would be a small **potentially beneficial** effect on air quality.	PB	No mitigation is required.	PB
ASB-5.9-c: Exposure of Sensitive Receptors to Toxic Air Emissions. Emissions of TACs associated with construction or operations under Alternative 2 would not result in exposure of receptors to concentrations of TACs in excess of applicable thresholds. This impact would be **less than significant.**	LTS	No mitigation is required.	LTS
5.10 Noise			
ASB-5.10-a: Temporary Increase in Noise Levels during Construction. Noise levels associated with construction activities could exceed the maximum permissible noise limits at residences. Construction	S	**Limit Generation of Noise by Equipment during Project Construction.** This measure is identical to Mitigation Measure LS-5.10-a above.	SU

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Table 1-3b

SUMMARY OF IMPACTS AND MITIGATION MEASURES

THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
equipment may operate between the hours of 10 p.m. and 7 a.m. and could operate within 500 feet of a residential zone during these hours. Therefore, construction activities occurring between 10 p.m. and 7 a.m. could result in annoyance and/or sleep disruption of certain receptors within the project area. In addition, construction operations may result in a noticeable temporary increase (3 dBA or more) in ambient noise levels at these residences. This impact would be significant.			
ASB-5.10-b: Exposure of Sensitive Receptors to Excessive Groundborne Vibration During Construction. This impact would be the same as Impact LS-5.10-b, described under Alternative 1 above. Construction processes under Alternative 2 would not occur any closer to sensitive land uses than discussed under Alternative 1, and no new construction equipment or processes that would generate additional groundborne vibration would be used. For the same reasons as described above, this impact would be less than significant.	LTS	No mitigation is required.	LTS
5.11 Transportation and Circulation			
ASB-5.11-a: Increase in Traffic on Local Roadways near the Existing Levee and Setback Levee Alignment during Construction. During the anticipated 20-month construction period, commute trips and haul truck trips associated with levee repair and strengthening activities and setback levee construction would increase traffic on Feather River Boulevard, SR 70, and local roadways that provide	LTS	No mitigation is required.	LTS

Exhibit A

Table 1-3b

SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
access to the project alignment (e.g., Anderson Avenue, Country Club Avenue, Riverside Drive). However, construction-related trips would not exceed the thresholds established by ITE for temporary traffic increases and would not represent a substantial increase in traffic levels on these roadways or other local roads. This impact would be **less than significant.**			
ASB-5.11-b: Increase in Traffic Hazards on Local Roadways near the Existing Levee and Setback Levee Alignment during Construction. Construction-related traffic could track mud and gravel onto local roadways, and haul truck traffic could interfere with the flow of traffic on these roads. These conditions could pose hazards for travelers on local roadways. This impact would be **potentially significant.**	PS	**Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways.** This measure is identical to Mitigation Measure LS-5.11-b above.	LTS
5.12 Public Services, Utilities, and Service Systems			
ASB-5.12-a: Damage of Public Utility Infrastructure and Disruption of Service in the Levee Repair and ASB Levee Setback Areas. Impacts related to utilities in project Segments 1 and 3 and the area considered for a detention basin/soil borrow site would be the same as those described above in Impact LS-5.12-a under Alternative 1. Most of the public utilities in the proposed ASB levee setback area in Segment 2 would no longer be needed and would be removed. However, a PG&E transmission line and two PG&E distribution lines cross this area and would remain in place under project implementation, and floodwaters could	PS	**Coordinate with Utility Providers to Remove, Reinforce, and Modify Public Utility Infrastructure in the ASB Levee Setback Area and Prevent Damage of Facilities.** TRLIA, the design engineers, or the primary construction contractor for the levee setback, as appropriate, shall implement the following measures before the beginning of construction to ensure that the levee setback does not adversely affect public utility infrastructure or result in interruption of utility service: (a) Coordinate with PG&E to protect electrical lines that cross the levee setback area. To maintain PG&E electrical service through the Bogue Loop 115-kV high-power transmission line and the two standard electrical lines that run along Ella	LTS

Exhibit A

Table 1-3b

SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
threaten the stability of the steel towers and wooden poles that support these lines. In addition, buried utilities could be present in locations that have not been identified in preliminary surveys and contact with service providers. Utilities infrastructure remaining in the levee setback area could be damaged by levee construction, by a proposed soil borrow area, or by floodwaters passing through the setback area, possibly resulting in interruption of service. This impact would be **potentially significant.**		Avenue and Country Club Avenue, TRLIA or its representative shall coordinate with PG&E to raise, relocate, or reinforce the steel towers and wood poles that stand in the proposed bypass area. (b) Ensure that all utility lines in the setback area have been identified and removed or reinforced as necessary. TRLIA or its representative shall ensure that any electrical, telephone, gas, and cable television lines within the levee setback area have been identified before the initiation of any ground-disturbing construction activity. Before the beginning of any construction-related ground disturbance, TRLIA or its representative shall coordinate with all potential service providers known to have, or potentially having, utility infrastructure in the levee setback area, including but not limited to PG&E, AT&T, Comcast, OPUD, and RD 784, to ensure that the utility lines are removed or reinforced as appropriate.	
ASB-5.12-b: Damage of Water Supply and Drainage Facilities and Interference with Service in the Levee Repair and ASB Levee Setback Areas. Impacts on water supply and drainage facilities in project Segments 1 and 3 and the area considered for a detention basin/soil borrow site would be the same as those described above in Impact LS-5.12-b under Alternative 1. Implementation of the levee setback would cut off local drainage systems and could damage privately owned water supply systems that serve agricultural uses. The preliminary design for the setback levee includes conceptual plans for abandoning, relocating, and modifying these systems. Three	LTS	No mitigation is required.	LTS

Exhibit A

Table 1-3b

SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Rivers Levee Improvement Authority (TRLIA) and its design engineers would coordinate with RD 784 and local landowners to relocate pumps and replace wells and irrigation systems as necessary, as determined in final design. Effects of the levee setback on the drainage system are addressed in Section 5.3, "Water Resources and River Geomorphology." The impact on water supply and drainage facilities would be **less than significant.**			
ASB-5.12-c: Potential for Conflicts with Emergency Response Vehicles during Construction. This impact would be similar to Impact LS-5.12-a described under Alternative 1 above. However, construction traffic on Feather River Boulevard would potentially be greater under Alternative 2 because of the greater number of truck haul trips associated with construction of the setback levee. For the same reasons as described above, this impact would be **potentially significant.**	PS	**Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways.** This measure is identical to Mitigation Measure LS-5.11-b, "Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways," in Section 5.11, "Transportation and Circulation."	LTS
5.13 Paleontological Resources			
ASB-5.13-a: Disturbance of Unknown Paleontological Resources during Earthmoving Activities. Portions of the project area and immediate vicinity are underlain by the Modesto and Riverbank Formations, which are paleontologically sensitive rock formations. Construction activities in the Modesto and Riverbank Formations associated with proposed levee strengthening (e.g., slurry cutoff walls, relief wells), construction of the ASB setback levee, use of the soil borrow area/detention basin location, and	PS	**Conduct Training for Construction Personnel, Cease Work if Paleontological Resources are Encountered, and Implement an Appropriate Mitigation Strategy.** This measure is identical to Mitigation Measure LS-5.13-a.	LTS

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SUMMARY OF IMPACTS AND MITIGATION MEASURES
THE LEVEE STRENGTHENING AND ASB SETBACK LEVEE ALTERNATIVE (ALTERNATIVE 2)

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
related activities (e.g., relocation of Pump Station No. 3) could adversely affect unknown subsurface paleontological resources. This impact would be **potentially significant.**			
Cumulative Impacts			
Alternative 2, The Levee Strengthening and ASB Setback Levee Alternative, would also contribute to significant cumulative impacts related to conversion of Important Farmland to nonagricultural uses; emissions of ROG, NO_X, and PM_{10} during construction; and potentially noise during construction. The mitigation described above would not reduce the project's contributions to these impacts to less-than-significant levels.			

B = Beneficial effect
PB = Potentially beneficial effect
NI = No impact

LTS = Less than significant
PS = Potentially significant
S = Significant

Exhibit B

MITIGATION MONITORING AND REPORTING PROGRAM FOR THE FEATHER RIVER LEVEE REPAIR PROJECT

Section 21081.6 of the California Environmental Quality Act (CEQA) Statutes and Section 15097 of the State CEQA Guidelines require that a public agency adopt a monitoring and reporting program for conditions of approval when approving a project for which an environmental impact report (EIR) has been prepared. The program is intended to serve as the framework for implementation of the various conditions of approval imposed on the project to reduce the severity of its environmental impacts. These conditions are referred to as mitigation measures.

The Three Rivers Levee Improvement Authority (TRLIA) directed the preparation of an EIR for the Feather River Levee Repair Project (FRLRP) in accordance with the requirements of CEQA. TRLIA compared the three project alternatives that were analyzed at an equal level of detail in the EIR, and selected Alternative 2—The ASB Setback Levee Alternative for implementation. This mitigation monitoring and reporting program for Alternative 2 has been prepared in conformance with Section 21081.6 of CEQA Statute and Section 15097 of the State CEQA Guidelines to guide in the implementation of the mitigation measures identified in the EIR and to verify that implementation has been completed.

The mitigation monitoring and reporting program is presented in tabular format. The table columns contain the following information:

- **Mitigation Measure:** Lists the text of each mitigation measure that is a condition of project approval.
- **Initiation of Mitigation:** Indicates when the measure is first to be initiated.
- **Monitoring Frequency:** Specifies the frequency/duration of implementation of the measure and when monitoring should be conducted.
- **Responsibility for Verification of Compliance:** Identifies the entity or entities responsible for ensuring that implementation of the measure is completed. This is not intended to represent the agencies involved in facilitating compliance—either through review and approval processes or through other jurisdictional authorities—although in some instances they may be the same as the entity responsible for verification.
- **Performance Criteria:** Establishes the steps necessary to illustrate that the requirements of the measure have been satisfied.
- **Date Compliance Completed:** To be used by TRLIA staff and its designated contractors to indicate that implementation of the measure has been satisfied.

I (1) certify that I have reviewed this mitigation monitoring and reporting program prepared for the FRLRP and find it to be in compliance with the requirements of CEQA, (2) adopt the program on behalf of TRLIA, and (3) agree to implement the program in the design and construction of the project.

_____ _____

Paul G. Brunner, P.E., Executive Director
Three Rivers Levee Improvement Authority

Date

Exhibit B: Mitigation Monitoring and Reporting Program for the Feather River Levee Repair Project
Alternative 2 – The ASB Setback Levee Alternative

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
ASB-5.1-a: Resolve Inconsistencies between Proposed Uses of the Levee Setback Area and Yuba County Zoning. TRLIA shall coordinate with the County Planning Department to appropriately address inconsistencies between proposed land uses and County-planned land uses and zoning designations. Before permanent changes in allowable land uses in the levee setback area need to be established (i.e., before degradation of the existing levee at the latest), TRLIA shall apply for a general plan amendment if necessary and for appropriate rezoning, a zoning amendment, or other measures determined by the Planning Department to be necessary to ensure the consistency of proposed land uses with zoning. Consistency is defined as land uses and activities permitted by the County in the levee setback area, as reflected by zoning and other land use guidelines, that do not conflict with the flood control function of the levee setback area. The approach to resolving any land use planning inconsistencies shall be determined by, and conducted in coordination with, the County Planning Department. Any necessary modifications of general plan land use designations or of zoning, or placement of restrictions on existing zoning, will be determined by the Planning Department and approved by the County Planning Commission and Board of Supervisors as appropriate.	Before beginning any construction or ground-disturbing activities	During activities identified under "Initiation of Mitigation"	Lead agency and Yuba County	Any necessary zoning modifications are approved by the Board of Supervisors and Planning Commission	
ASB-5.1-b: Preserve the Agricultural Productivity of Important Farmland to the Extent Feasible. It is not known at this time whether lands in the levee setback area would be retained in agricultural production, converted to habitat, or a mixture of both land uses. If lands classified as Important Farmland in the levee setback area are to be retained in agricultural production, the following measures would apply to these lands. To support the continued productive use of Important Farmland in the levee setback area in project Segment 2, TRLIA shall ensure that the following measures are	During engineering design phases, before beginning any construction or ground-disturbing activity, and during construction	During activities identified under "Initiation of Mitigation"	Lead agency	The entities involved in final design of the project components, construction mobilization and staging, and construction implementation agree that effects on agricultural operations are minimized to the extent practicable	

Exhibit B: Mitigation Monitoring and Reporting Program for the Feather River Levee Repair Project Alternative 2 – The ASB Setback Levee Alternative					
Mitigation Measure	**Initiation of Mitigation**	**Monitoring Frequency**	**Responsibility for Verification of Compliance**	**Performance Criteria**	**Date Compliance Completed**
implemented, to the extent feasible and practicable, in the design and implementation of the levee setback: (a) When selecting sites for borrow excavation, minimize the fragmentation of lands that are to remain in agricultural use. Where practical, retain contiguous parcels of agricultural land of sufficient size to support their efficient use for continued agricultural production. (b) Where the setback levee would transect agricultural properties and the continuation of agricultural use on the portions within the levee setback area would occur, ensure convenience of access to the levee setback properties sufficient to support ongoing agricultural operations. (c) Make the most productive salvaged topsoil from the levee footprint available to landowners with less productive agricultural lands in the vicinity of, but outside the levee setback area that could benefit from the introduction of good-quality soil. By agreement between TRLIA or landowners of affected properties and the recipient(s) of the topsoil, the recipient(s) would be required to work the topsoil into the agricultural lands where it is delivered. (d) Ensure that utilities currently in the levee setback area that are needed for ongoing agricultural uses, including wells, pipelines, and power lines, are appropriately relocated, replaced, or retrofitted to withstand flooding. Ensure that these systems and drainage systems are functioning as necessary after the project is in place so that agricultural uses are not unduly disrupted. In addition, TRLIA shall ensure that the following measures are implemented, to the extent feasible and practical, inside and/or outside the levee setback area: (a) Minimize the disturbance of Important Farmland and continuing agricultural operations during construction by locating construction laydown and staging areas on sites					

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
that are fallow, that are already developed or disturbed, or that are to be discontinued for use as agricultural land, and by using existing roads to access construction areas to the extent possible. (b) When selecting the site and configuration of the detention basin, minimize the fragmentation of agricultural lands and retain contiguous parcels of agricultural land of sufficient size to support their efficient use for continued agricultural production.					
ASB-5.3-a(1): Prepare a SWPPP, File an NOI, and Comply with the NPDES Stormwater Permit for Project Construction Activities. Before the start of any project construction work, site grading, or excavation, TRLIA or its primary construction contractor shall prepare a SWPPP detailing measures to control soil erosion and waste discharges from construction areas and shall submit an NOI to the Central Valley RWQCB for stormwater discharges associated with general construction activity. TRLIA shall require all contractors conducting construction-related work to implement the SWPPP to control soil erosion and waste discharges of other construction-related contaminants. The general contractor(s) and subcontractor(s) conducting the work shall be responsible for constructing or implementing, regularly inspecting, and maintaining the measures in good working order. The SWPPP shall identify the grading and erosion control BMPs and specifications that are necessary to avoid and minimize water quality impacts to the extent practicable. Standard erosion control measures (e.g., management, structural, and vegetative controls) shall be implemented for all construction activities that expose soil. Grading operations shall be conducted to eliminate direct routes for conveying potentially contaminated runoff to drainage channels. Erosion control barriers such as silt fences and mulching material shall be installed, and disturbed areas shall be reseeded with grass or other plants where	Before beginning any construction or ground-disturbing activity	Throughout construction period	Lead agency and primary construction contractor	BMPs are implemented and maintained such that contaminants are isolated from drainages to the extent practicable	

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
necessary. The SWPPP shall contain specific measures for stabilizing soils at construction-related sites before the onset of the winter rainfall season. These standard erosion control measures shall be designed to reduce the potential for soil erosion and sedimentation of drainage channels. The following specific BMPs are recommended for implementation: ▪ Conduct all work according to site-specific construction plans that identify areas for clearing, grading, and revegetation so that ground disturbance is minimized. ▪ Avoid riparian and wetland vegetation wherever possible and identify vegetation to be retained for habitat maintenance (i.e., as identified through preconstruction biological surveys), cover cleared areas with mulches, install silt fences near riparian areas or streams to control erosion and trap sediment, and reseed cleared areas with native vegetation. ▪ Stabilize disturbed soils at all construction sites (e.g., levee repair areas, borrow areas) and staging areas before the onset of the winter rainfall season. ▪ Stabilize and protect stockpiles from exposure to erosion and flooding. The SWPPP also shall specify appropriate hazardous materials handling, storage, and spill response practices to reduce the possibility of adverse impacts from use or accidental spills or releases of contaminants. Specific measures applicable to the project include, but are not limited to, the following: ▪ Develop and implement strict on-site handling rules to keep construction and maintenance materials out of drainages and waterways. ▪ Conduct all refueling and servicing of equipment with					

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
absorbent material or drip pans underneath to contain spilled fuel. Collect any fluid drained from machinery during servicing in leakproof containers and deliver to an appropriate disposal or recycling facility. ▪ Maintain controlled construction staging, site entrance, concrete washout, and fueling areas at least 100 feet away from stream channels or wetlands to minimize accidental spills and runoff of contaminants in stormwater. ▪ Prevent raw cement; concrete or concrete washings; asphalt, paint, or other coating material; oil or other petroleum products; or any other substances that could be hazardous to aquatic life from contaminating the soil or entering watercourses. ▪ Maintain spill cleanup equipment in proper working condition. Clean up all spills immediately according to the spill prevention and response plan, and immediately notify DFG and the RWQCB of any spills and cleanup procedures.					
ASB-5.3-a(2): Obtain a Use Permit from Yuba County and Comply with Permit Conditions for Erosion Control. Before the start of any project-related grading, excavation, or fill activity, TRLIA or its primary construction contractor shall obtain a use permit from the Yuba County Planning Department in compliance with the Yuba County Ordinance Code. TRLIA shall require all contractors conducting construction-related work to implement the conditions of the permit. The general contractor(s) and subcontractor(s) conducting the work shall be responsible for constructing or implementing, regularly inspecting, and maintaining the required measures in good working order.	Before beginning any construction or ground-disturbing activity	Throughout construction period	Lead agency and primary construction contractor	Use permit is obtained from Yuba County, and compliance with permit conditions is regularly verified	
ASB-5.3-b: Coordinate with RD 784 to Modify Drainage Facilities that Would Be Affected by the Levee Setback	During engineering design phases, before beginning any	During activities identified under "Initiation of	Lead agency and primary construction contractor	Drainage study is prepared, approved, and implemented	

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and Ensure Appropriate Functioning of the Local Drainage System. TRLIA or its primary construction contractor shall coordinate with RD 784 to evaluate local drainage needs before and after construction of the setback levee and shall prepare and implement a plan for modification of the portion of the drainage system that would be affected by the levee setback. A drainage study shall be prepared that evaluates the effects on local drainage that would result from the levee setback and any proposed changes in land uses in the levee setback area. The study shall consider the design flows of the existing facilities that cross the proposed setback levee footprint (e.g., Lateral 7/8 and the Plumas Lake Canal). It shall develop appropriate plans for relocation or other modification of these facilities and construction of new facilities, as needed, to ensure equivalent functioning of the system during and after construction of the setback levee. Facility modification will include relocating Pump Station No. 3, and may include removing, filling, and/or rerouting drainage canals and culverts; regrading drainage alignments to redirect drainage; constructing new ditches and canals; and installing new culverts. The plan shall also consider the continuing and proposed uses of the levee setback area and shall incorporate appropriate drainage requirements for those uses to prevent any unintended flooding from stormwater runoff. The plan shall integrate environmental mitigation requirements and drainage of restored borrow sites to the extent feasible and practical. The final plan shall be approved by RD 784. TRLIA and its construction contractor(s) shall ensure that the necessary modifications are implemented without interruption of the adequate functioning of the drainage system. TRLIA shall also ensure that any necessary environmental review requirements have been met before the drainage modifications are implemented.	construction or ground-disturbing activity, and during and after construction of the setback levee	Mitigation"		based on the specified performance standards	

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
ASB-5.3-g(1): Conduct a Phase I Environmental Site Assessment for the Levee Setback Area and Implement Recommendations. Before the start of any ground-disturbing construction activity, TRLIA or its primary construction contractor shall have a qualified hazardous waste specialist perform a Phase I Environmental Site Assessment of the levee setback area to identify potential sources of surface and buried contaminants, and provide a report of assessment findings. The assessment shall include the following: ▪ review of available information on property history, including, as appropriate, historical and current topographic maps, aerial photographs, property title and permit information, interviews of environmental regulatory agency and Yuba County personnel, and interviews of current occupants and landowners regarding the current and past uses of the land; ▪ review of federal, state, and county governmental records and databases to determine whether any sites in the area are listed as hazardous waste sites; and ▪ reconnaissance-level surveys to observe visual evidence of hazardous materials use. A written report on the findings of the assessment, including recommendations for the disposition of any identified hazardous waste sites or potential hazardous waste sites, shall be provided to TRLIA. TRLIA or its construction contractor(s) shall implement recommendations made in the Phase I report. If hazardous materials or wastes are identified, recommendations could include, but would not be limited to, a Phase II assessment or cleanup of known identified hazardous waste sites. Presence of hazardous wastes would be determined using waste classification protocols described in CCR Title 22.	Before beginning any construction or ground-disturbing activities	During activities identified under "Initiation of Mitigation"	Lead agency and primary construction contractor	Phase I ESA is completed and feasible recommendations are implemented to ensure that hazardous wastes that may be present in the levee setback area are mitigated	
ASB-5.3-g(2): Evaluate Levee Borrow Material for Potential Contaminants in Coordination with the	Before beginning any borrow activities	During activities identified under	Lead agency and primary construction	Applicable RWQCB guidelines for	

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
RWQCB. Before the start of construction, TRLIA or its primary construction contractor shall have a qualified hazardous materials specialist collect and evaluate representative soil samples from the existing levee sections that would be used as sources of borrow, and from potential borrow sites. The soil samples shall be evaluated for contaminant residues (e.g., trace metals, organochlorine pesticides, polychlorinated biphenyls) that may be encountered in excavation and grading activities. This evaluation shall be conducted to address any requirements of the Central Valley RWQCB as part of the RWQCB's permitting and approval process for the project (e.g., Section 401 certification). Wastes that are encountered at hazardous levels shall be treated in accordance with CCR Title 22 procedures for hazardous materials reporting and disposal. Where the evaluation of soil samples detects the presence of wastes that are not present at hazardous levels, the results of the evaluation shall be reported to the RWQCB for classification in the RWQCB's designated waste classification program, and the RWQCB will determine the acceptability of the material for levee construction based on the potential of the waste to impair water quality and public health. Borrow material used for construction of the waterside levee face or other features with soil exposure to the aquatic environment (e.g., new drainage channels) that is deemed unacceptable by the RWQCB shall be properly disposed of in a landfill or made available for other approved uses.		"Initiation of Mitigation"	contractor	detection and treatment of hazardous materials are implemented as needed	
ASB-5.3-g(3): Remove Nonhazardous Waste and Debris from the Levee Setback Area. Before the beginning of the first season of potential flood operations with the setback levee in place, TRLIA or its primary construction contractor shall ensure the removal from the levee setback area of all large slash and wood piles, nonhazardous waste dumps, and other nonhazardous debris that could adversely affect water quality or create a hazard if carried downriver in flood	Before the levee setback area is exposed to river flows	During activities identified under "Initiation of Mitigation"	Lead agency and primary construction contractor	All nonhazardous waste and debris has been removed from levee setback area	

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
flows. All removed materials shall be properly disposed of in approved off-site landfills.					
ASB-5.4-a(1) and ASB-5.4-a(2)	See Mitigation Measure ASB-5.3-a(1), **"Prepare a SWPPP, File an NOI, and Comply with the NPDES Stormwater Permit for Project Construction Activities."** and Mitigation Measure ASB-5.3-a(2), **"Obtain a Use Permit from Yuba County and Comply with Permit Conditions for Erosion Control."** Mitigation Measures ASB-5.4-a(1) and ASB-5.4-a(2) are identical to Mitigation Measure ASB-5.3-a(1) and Mitigation Measure ASB-5.3-a(2).				
ASB-5.4-a(3): Obtain and Comply with Terms and Conditions of a Streambed Alteration Agreement for Construction Activities Associated with the Setback Levee. Three Rivers Levee Improvement Authority (TRLIA) or its representative shall consult with DFG regarding potential disturbance to fish habitat as part of the process for obtaining a streambed alteration agreement, pursuant to Section 1602 of the California Fish and Game Code, for construction work associated with the setback levee. TRLIA shall comply with conditions set forth in the streambed alteration agreement to protect fish habitat.	During final design and development of project components and before beginning any construction or ground-disturbing activity in streambed areas under DFG jurisdiction	Throughout construction period (compliance with conditions of agreement)	Lead agency, design engineer, and primary construction contractor	Streambed Alteration Agreement is received from DFG, and compliance with conditions is achieved	
ASB-5.4-c(1), ASB-5.4-c(2), and ASB-5.4-c(3)	See Mitigation Measure ASB-5.3-g(1), **"Conduct a Phase I Environmental Site Assessment for the Levee Setback Area and Implement Recommendations."**, Mitigation Measure ASB-5.3-g(2), **"Evaluate Levee Borrow Material for Potential Contaminants in Coordination with the RWQCB."**, and Mitigation Measure ASB-5.3-g(3), **" Remove Nonhazardous Waste and Debris from the Levee Setback Area."** Mitigation Measures ASB-5.4-c(1), ASB-5.4-c(2), and ASB-5.4-c(3) are identical to Mitigation Measures ASB-5.3-g(1), ASB-5.3-g(2), and ASB-5.3-g(3).				
ASB-5.4-d: Develop and Implement a Drainage and Grading Plan that Minimizes Loss or Incidental Loss of Fish from Stranding. TRLIA and its primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize the potential for fish stranding in the levee setback area: (a) Plan and implement drainage improvements. TRLIA or its designated construction contractors, through a combination of grading and drainage improvements, shall minimize the potential for floodwater to pond in the levee setback area in such a way that substantial numbers of fish become stranded and consequently become exposed to hostile environments (warm water temperatures and	(a) During engineering design phases, as part of development of final design for the levee setback area	(a) During activities identified under "Initiation of Mitigation"	(a) Lead agency, design engineer, and primary construction contractor	(a) Project design engineer, RD 784, DFG, and NMFS agree on final design of drainage and grading plan, and	

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increased predation). As part of the development of the final design for the levee setback area, TRLIA or its representatives shall determine the specific topographic and hydrologic characteristics of the levee setback area and shall define the anticipated flooding regime (depth, duration, and extent of flooding), drainage patterns, and potential for fish stranding risks there. The final project design shall include recontouring as necessary to ensure complete drainage and provide fish passage back to the main river channel as floodflows recede from the levee setback area. Features with substantial stranding risk shall be identified for filling and/or grading. Complete drainage is important to reduce the risk of stranding; however, maintaining some seasonal aquatic habitat in the levee setback area and/or hydrologic connectivity to the Feather River may also be important features if enhancement of fish habitat and production is selected as a management activity in the levee setback area. Before the design of the setback levee and levee setback area is finalized, TRLIA or its representatives shall obtain the approval of DFG and NMFS indicating that the planned drainage and grading features are sufficient to address concerns about fish stranding potential, similar to the process used for the Feather-Bear Rivers Levee Setback Project currently under construction downstream. The features of the setback levee and levee setback area shall be constructed in accordance with the approved final design.				drainage improvements are implemented	
(b) Monitor the success of the drainage features and adjust if necessary. A long-term mitigation monitoring plan shall be developed by a qualified biologist on behalf of TRLIA and shall be approved by DFG and NMFS before implementation of the levee setback. This monitoring plan shall evaluate the effectiveness of the grading and drainage features in the levee setback area in reducing the risk of fish stranding and the stability of the drainage features and shall determine the need for maintenance or modification. The	(b) During development of final design for the levee setback area and before removing the existing levee	(b) Annually for at least 5 years following the removal of any part of the existing levee	(b) Lead agency and design engineer	(b) A qualified biologist concludes that no isolated standing water is present in the setback area, and no barriers to fish passage are evident following any	

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
monitoring plan shall include provisions for remediation should the design of the levee setback area prove to be unsuccessful in preventing fish stranding. These measures shall include, as appropriate, such activities as regrading or filling depressions in the levee setback area. The recommended monitoring scheme shall include annual monitoring for a period of 5 years following the removal of any part of the existing levee. Additional monitoring may be required for areas where remediation is necessary. Monitoring is recommended to include the following actions: ▪ Visual assessment of the levee setback area by a qualified biologist before the flood season (i.e., by October 31). This assessment should note any substantial changes in the overall structure since implementation of the final design for the area, including reestablishment of vegetation and the presence of "holes" or pits. ▪ A visual survey by a qualified biologist at the end of each event that floods the levee setback area (i.e., after the recession of waters that inundate the floodplain). This survey should identify whether there is any ponding that would result in fish stranding, or whether channels have formed that flow through completely to the low-flow channel of the Feather River. Following each flood season (i.e., after April 16), a letter report shall be submitted to NMFS and DFG summarizing the overall condition of the floodplain area and any changes that have occurred from the previous year(s). If any remediation measures are required, they shall be outlined in the letter report, along with a schedule specifying when the remediation activities will occur. Appropriate remediation measures shall be implemented as soon as is practicable to minimize the potential for fish stranding while maintaining the desired habitat values (if habitat enhancement is included in the floodplain area) and hydraulic				flood event that inundates the levee setback area	

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characteristics of the area. The performance of the mitigation measure shall be considered successful if there is no isolated standing water and/or barriers to fish passage capable of resulting in substantial fish stranding following a flood event that inundates the levee setback area.					
ASB-5.5-b: Avoid Disturbance of Sensitive Habitats to the Extent Feasible and Comply with Corps and DFG Processes to Mitigate Unavoidable Effects. Three Rivers Levee Improvement Authority (TRLIA) and its primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize potential project effects on sensitive habitats. As noted in the setting and impact discussions above, for purposes of this EIR the potential presence of sensitive habitats was assessed through reconnaissance surveys (where access was allowed) and literature review. The mapping and surveys identified below are intended to supplement and clarify these initial surveys and reviews by providing timely, detailed, and finely tuned biological information within the specific geographical areas subject to impact under the alternative selected for implementation. Each measure is accompanied by one or more performance standards to control the ultimate level of impact: (a) Map potential waters of the United States and riparian habitat in the project area and, to the extent feasible and practicable, plan project features and construction activity to avoid direct effects on these areas. Before the beginning of any ground-disturbing project activities, a qualified biologist shall delineate potential waters of the United States and shall formally map all riparian habitat that could be affected by the proposed project. This activity will be performed following the requirements of a formal delineation of waters of the United States for CWA Section 404 permitting as	(a) Before beginning any construction or ground-disturbing activity	(a) Throughout construction period	(a) Lead agency	(a) Corps verifies mapping, and jurisdictional habitats are protected from disturbance wherever possible	

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
described below. The primary engineering and construction contractors shall ensure, through coordination with the biologist, that the footprints of construction zones, borrow areas, staging areas, and access routes are designed to prevent disturbance of waters of the United States and riparian habitat to the extent feasible and practicable. All avoidable jurisdictional habitats that could potentially be affected by ground-disturbing project activity shall be protected during construction by temporary fencing and/or flagging, as appropriate. Qualified biological monitors shall be present during all construction activities that could potentially affect these protected habitats to ensure that project activity is excluded from these areas.					
(b) Complete the Section 404 permitting process, and mitigate the acreage of affected jurisdictional wetland on a "no-net-loss" basis. Before the initiation of any ground-disturbing project activities in areas that contain potentially jurisdictional wetlands, qualified biologists shall complete a delineation of wetlands and other waters of the United States that would be affected by the proposed project. The findings shall be documented in a detailed report and submitted to the Corps for verification as part of the formal Section 404 wetland delineation process. For all jurisdictional areas that cannot be avoided as described above, TRLIA shall secure authorization for fill of wetlands and alteration of waters of the United States from the Corps through the Section 404 permitting process before project implementation. The acreage of jurisdictional wetland affected shall be mitigated (e.g., through restoration, rehabilitation, enhancement, and/or replacement) on a "no-net-loss" basis in accordance with Corps regulations. Habitat restoration, rehabilitation, and/or replacement shall be at a location	(b) During final design and development of project components and before beginning any construction or ground-disturbing activity in jurisdictional areas	(b) Throughout construction period (compliance with permit terms)	(b) Lead agency, design engineer, and primary construction contractor	(b) Section 404 permit is obtained, and compliance with terms is achieved such that no net less of wetlands occurs	

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
and by feasible methods agreeable to the Corps. TRLIA shall implement the feasible mitigation measures adopted through the permitting process. (c) Obtain a streambed alteration agreement from DFG and mitigate affected riparian habitat on a "no-net-loss" basis. Because project implementation would result in changes to the natural flow and bed and bank of a waterway (e.g., vegetated drainage canal, the Feather River), the project would likely require a Section 1602 streambed alteration agreement from DFG. If complete avoidance of identified riparian habitat is not feasible, the acreage of riparian habitat that would be removed shall be mitigated on a "no-net-loss" basis in accordance with DFG regulations and as specified in the streambed alteration agreement, if needed. Habitat mitigation (e.g., restoration, rehabilitation, and/or replacement) shall be at a location and by methods agreeable to DFG.	(c) During final design and development of project components and before beginning any construction or ground-disturbing activity in streambed areas under DFG jurisdiction	(c) Throughout construction period (compliance with conditions of agreement)	(c) Lead agency, design engineer, and primary construction contractor	(c) Streambed Alteration Agreement is received from DFG, and compliance with conditions is achieved such that no net loss of riparian habitat occurs	
ASB-5.5-c: Conduct Detailed Special-Status Plant Surveys and Establish Construction Buffers as Necessary to Minimize Effects on Special-Status Plants. TRLIA and its primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize potential project effects on special-status plants: (a) Conduct detailed special-status plant surveys and document the results. Before the initiation of any ground-disturbing project activities, a qualified botanist shall conduct detailed/focused surveys for rose mallow and Wright's trichocoronis in appropriate habitat within the project area, in accordance with USFWS and DFG guidelines and at the appropriate time of year when the target species would be in flower or otherwise clearly identifiable (June to September for rose mallow and May to September for Wright's	(a) During the blooming period of the target species before beginning any construction or ground-disturbing activity in potential habitat of the species	(a) During activities identified under "Initiation of Mitigation"	(a) Lead agency	(a) Special-status plant surveys are conducted in accordance with USFWS and DFG guidelines and at the appropriate time of year and findings are documented	

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
trichocoronis). The findings shall be documented in a letter report that is retained by TRLIA. If rose mallow and Wright's trichocoronis are not found during focused surveys, no further action shall be required.					
(b) Establish buffers wherever possible to protect identified special-status plants from construction activity. If special-status plants are found during focused surveys, the primary engineering and construction contractors shall ensure, through coordination with a qualified biologist, that the footprint of project features and construction zones, staging areas, and access routes are designed such that any disturbance of the plants is prevented to the extent feasible and practicable. The botanist shall clearly identify the locations of special-status plant populations in the field by staking or flagging before construction. No project activities shall be allowed within the marked areas.	(b) If special-status plants are found during focused surveys, during project design, prior to initiation of construction activities in the vicinity of the plant population	(b) Prior to and during construction period	(b) Lead agency, design engineer, and primary construction contractor	(b) Disturbance to any special-status plants is prevented to the extent feasible and practicable	
(c) Compensate for losses of special-status plants. If populations or individuals of rose mallow and Wright's trichocoronis are found during implementation of item (a) above, and the individuals or populations cannot be avoided during implementation of item (b), a mitigation and monitoring plan for the affected species shall be developed and implemented. The plan shall be prepared by a qualified biologist. Before disturbance of the individuals or populations of the effected species, the mitigation and monitoring plan shall be submitted to TRLIA for review and approval. The plan shall be submitted concurrently to DFG for review and comment, and TRLIA may consult with DFG before approval of the plan. Possible mitigation for individuals or populations removed during construction includes: ▪ removing and stockpiling topsoil with intact roots, rhizomes, and seed bank in the disturbance area,	(c) If special-status plants are found during focused surveys, prior to disturbance plant population(s)	(c) During implementation of mitigation and monitoring plan	(c) Lead agency	(c) Mitigation and monitoring plan is approved by DFG and TRLIA and implemented following approval	

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and either replacing the soil in the same location after construction is complete or placing it in a new area with suitable habitat; or ▪ collecting plants, seeds, or other propogules in the area to be disturbed, and placing propogules or cultivating nursery stock in the disturbed area after construction is complete or in a new area with suitable habitat. Mitigation will be considered successful if populations of the affected species in mitigation areas are sustained for a minimum of 3 years and are of similar size and quality as the affected populations.					
ASB-5.5-d: Conduct Protocol-Level Surveys, Establish Buffers, and Implement a Mitigation Plan as Necessary to Minimize Effects on Valley Elderberry Longhorn Beetle. TRLIA and its primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize potential project effects on valley elderberry longhorn beetles: (a) Conduct protocol-level elderberry shrub surveys in the project area. Before the beginning of ground disturbance within 100 feet of any area that may support elderberry shrubs, a qualified biologist shall conduct an elderberry shrub survey consistent with USFWS protocols for conservation of valley elderberry longhorn beetle (U.S. Fish and Wildlife Service 1999). All elderberry shrubs with potential to be affected by project activities shall be mapped and the number of stems greater than 1 inch in diameter on each shrub that may require removal shall be counted. (Elderberry plants with no stems measuring 1 inch or greater in diameter at ground level are considered unlikely to be habitat for the beetle because of their small size and/or immaturity [U.S. Fish and Wildlife Service 1999].) (b) Protect elderberry shrubs from disturbance. The	(a) Before beginning any construction or ground-disturbing activity in areas where shrubs may be located (b) Before beginning	(a) During activities identified under "Initiation of Mitigation" (b) Throughout	(a) Lead agency (b) Lead agency,	(a) Surveys and mapping are completed in accordance with USFWS protocols (b) Project activities	

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
primary engineering and construction contractors, through coordination with the biologist, shall ensure to the extent feasible and practicable that the footprint of project features and construction zones, staging areas, and access routes are designed to ensure that no project activities would affect an elderberry shrub with stems measuring 1 inch in diameter at ground level. Buffers of at least 100 feet shall be established around all elderberry shrubs with stems greater than 1 inch in diameter at ground level that can be retained undisturbed on-site. The buffer shall be clearly identified in the field by staking or flagging. All project activity shall be prohibited within the buffer areas. If complete avoidance of these buffers is not feasible, consultation with USFWS shall be conducted as described below.	any construction or ground-disturbing activity	construction period (maintenance of buffers)	design engineer, and primary construction contractor	are excluded from all areas within 100 feet of identified potential habitat for valley elderberry longhorn beetle to the extent feasible and practicable, and mitigation of any potential effects is developed and implemented in consultation with USFWS	
(c) <u>If effects on shrubs cannot be avoided, develop and implement a mitigation plan approved by USFWS</u>. If maintaining 100-foot protection buffers or otherwise avoiding construction-related effects on elderberry shrubs with a stem greater than 1 inch in diameter at ground level is not feasible, consultation with USFWS will be required, and an incidental take permit may be required. During this consultation, an appropriate and feasible mitigation plan shall be developed and provided to USFWS for approval. The plan may include, but would not necessarily be limited to, reducing buffers around shrubs that would not be removed; transplanting shrubs to a conservation area; and planting additional seedling or cuttings at a ratio ranging from 1:1 or 1:6, depending on the number of stems greater than or equal to 1 inch in diameter and whether beetle exit holes are found on the shrubs on-site (U.S. Fish and Wildlife Service 1999).	(c) Before beginning any construction or ground-disturbing activity within 100-feet of an elderberry shrub with a stem greater than 1 inch in diameter at ground level	(c) Throughout construction period (implement agency requirements	(c) Lead agency	(c) Mitigation has been performed in accordance with the plan approved by USFWS (if needed)	
ASB-5.5-e: Conduct Surveys as Part of Dewatering	During construction,	Measure must be	Lead agency, design	Qualified biologist	

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
Activities and Minimize Effects on Northwestern Pond Turtle. TRLIA and its primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize potential project effects on northwestern pond turtles: (a) Conduct surveys after dewatering. A qualified biologist shall conduct surveys for northwestern pond turtles in aquatic habitats to be dewatered and/or filled during project construction and grading of aquatic habitat within the setback area. Surveys shall be conducted immediately after any dewatering and before any fill of aquatic habitat. If no pond turtles are found, no further mitigation will be required. (b) Capture and move turtles. If any pond turtles are found, the biologist shall capture them and move them to suitable habitat in the vicinity of the project site.	immediately following dewatering and before filling of any aquatic habitat	repeated any time aquatic habitat could be affected during construction	engineer, and primary construction contractor	verifies absence of turtles where dewatering activities are to be conducted, or has moved turtles to suitable habitat	
ASB-5.5-f: Implement Applicable Take Minimization Measures and a Mitigation Plan as Necessary for Giant Garter Snake. TRLIA and its primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize potential project effects on giant garter snakes: (a) Verify potential habitat in the project area and, to the extent feasible and practicable, plan project features and construction activity to avoid direct effects on these areas. Before the initiation of any ground-disturbing project activities, a qualified biologist approved by USFWS's Sacramento Fish and Wildlife Office shall verify where suitable habitat conditions for giant garter snake occur in areas that could be affected by the proposed project. The primary engineering and construction contractors shall ensure, through coordination with the biologist, that the footprint of project features and construction zones, staging areas,	(a) During development of final design and prior to ground disturbing activities	(a) During reviews of project designs and during construction planning	(a) Lead agency, design engineer, and primary construction contractor	(a) Potential habitat is identified, delineated, and avoided to the extent practicable	

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
and access routes are designed to prevent any disturbance of potential giant garter snake habitat to the extent feasible and practicable.					
(b) Designate areas to be avoided during construction. The primary engineering and construction contractors, through coordination with the biologist, shall designate giant garter snake habitat to be avoided during project construction as Environmentally Sensitive Areas. These areas shall be flagged by the biologist and avoided by all construction personnel.	(b) During development of final design and prior to ground disturbing activities	(b) During reviews of project designs and during construction planning	(b) Lead agency, design engineer, and primary construction contractor	(b) Potential habitat is identified, delineated, and avoided to the extent practicable	
(c) Limit the timing of construction activity within potential habitat. All construction activities that must take place within potential giant garter snake habitat (aquatic habitat and adjacent upland habitat within 200 feet) shall be limited to the period of May 1 to October 1 to the extent feasible.	(c,d) At initiation of construction and continuing throughout construction periods, if habitat cannot be avoided	(c) Throughout construction periods	(c) Lead agency, primary construction contractor	(c) Any construction activity within potential habitat is limited to May 1–October 1 unless otherwise authorized by the regulatory agencies	
(d) Follow guidelines for habitat dewatering. Dewatering of aquatic habitat shall not occur between October 1 and April 15. Any dewatered habitat must remain dry for at least 15 consecutive days after April 15 and before the excavation or filling of the dewatered habitat.	(d) At initiation of construction	(d) Throughout construction periods	(d) Lead agency, primary construction contractor	(d) Dewatering guidelines are followed	
(e) Inspect suitable habitat within 24 hours of beginning construction. Within 24 hours before the initiation of construction activities within suitable habitat, a qualified biologist who is approved by USFWS's Sacramento Fish and Wildlife Office shall conduct preconstruction surveys for giant garter snakes. These areas shall be reinspected whenever a lapse of construction activity within suitable habitat occurs for a period greater than 2 weeks. If a giant garter snake is found, all activity that could result in death or injury of giant garter snake shall be delayed until consultation with USFWS and DFG has been completed and authorization to proceed has been received from those	(e) A day prior to initiation of construction	(e) Repeat surveys throughout construction periods as needed	(e) Lead agency, primary construction contractor	(e) Absence of giant garter snakes is confirmed or, if any giant garter snakes are found, USFWS and DFG have authorized construction to proceed	

Exhibit B: Mitigation Monitoring and Reporting Program for the Feather River Levee Repair Project Alternative 2 – The ASB Setback Levee Alternative					
Mitigation Measure	**Initiation of Mitigation**	**Monitoring Frequency**	**Responsibility for Verification of Compliance**	**Performance Criteria**	**Date Compliance Completed**
agencies.					
(f) Minimize clearing of wetland vegetation. Clearing of wetland vegetation shall be confined to the minimum area necessary. Excavation of channel banks shall be accomplished by using equipment located on and operated from the top of the bank, with the least interference practical for emergent vegetation that would not be affected by the project.	(f) At initiation of construction and continuing throughout construction periods	(f) Throughout construction periods	(f) Lead agency, primary construction contractor	(f) Wetland vegetation is retained to the extent practicable	
(g) Restrict movement of equipment. Movement of heavy equipment to and from the project site shall be restricted to areas outside the identified suitable habitat, unless the equipment is being moved on established roadways or in areas that have been inspected by a qualified biologist.	(g) At initiation of construction and continuing throughout construction periods	(g) Throughout construction periods	(g) Lead agency, primary construction contractor	(g) Equipment movement is restricted as specified	
(h) Participate in environmental awareness program. Construction personnel shall participate in a USFWS-approved worker environmental awareness program. Under this program, workers shall be informed about the presence of giant garter snakes and habitat associated with the species and that unlawful take of the animal or destruction of its habitat is a violation of ESA.	(h) Before beginning any construction or ground-disturbing activity	(h) Beginning of each construction phase where significant new staff are on-site	(h) Lead agency, primary construction contractor	(h) All construction personnel have completed training	
(i) Restore disturbed areas. After completion of construction activities, any construction debris shall be removed and disturbed areas within potential giant garter snake habitat shall be restored to preproject conditions.	(i) Following project construction	(i) Whenever construction is completed in a particular area	(i) Lead agency, primary construction contractor	(i) Potential habitat that has been temporarily disturbed is restored to pre-project conditions	
(j) If impacts cannot be avoided, develop and implement a feasible mitigation plan approved by USFWS. Consultation with USFWS and DFG shall be required for impacts that cannot be avoided, and an incidental take permit may be required. During this consultation, an appropriate and feasible mitigation plan shall be developed and provided to USFWS and DFG for approval. The mitigation plan may include, but would	(j) During development of final design	(j) Throughout construction periods and as specified in permit terms, if permit is required	(j) Lead agency, primary construction contractor	(j) USFWS guidelines are implemented such that take is avoided, or feasible mitigation is developed in consultation with USFWS and DFG and is implemented such	

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
not necessarily be limited to, applicable take minimization measures outlined above, or modifications of those measures, and compensation for unavoidable impacts through replacement of habitat. Compensation ratios may range from 1:1 to 3:1 (replaced aquatic habitat to affected habitat), depending on the amount of habitat lost and the duration of the impact. Replacement habitat shall include both upland and aquatic habitat components at a ratio of 2:1 upland habitat to aquatic habitat.				that appropriate compensation for impacts is achieved	
ASB-5.5-g(1): Conduct Preconstruction Surveys and Protect Active Nests to Minimize Effects on Swainson's Hawk. TRLIA and its primary construction contractor shall ensure that the following measures are implemented to minimize potential project effects on Swainson's hawk: (a) Conduct preconstruction surveys. Because project construction activity would occur during the Swainson's hawk breeding season (March 1 to September 15), a qualified biologist shall conduct preconstruction surveys to identify active nests in the nonorchard trees within ½ mile of construction areas (including staging and borrow areas). Because of the mostly linear nature of project construction, preconstruction surveys may be phased to accommodate construction activities; suitable nesting habitat shall be surveyed only when construction activities would encroach within ½ mile of unsurveyed areas. Surveys shall be conducted no less than 14 days and no more than 30 days before construction activities may encroach within ½ mile of unsurveyed areas. To the extent feasible, guidelines provided in *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (Swainson's Hawk Technical Advisory Committee 2000) shall be followed.	(a,b) 14–30 days before beginning any construction or ground-disturbing activity between March 1 and September 15 within ½ mile of non-orchard trees	(a,b) Throughout construction periods	(a,b) Lead agency and primary construction contractor, DFG	(a,b) Qualified biologist verifies absence of occupied nests for each construction segment as construction progresses, or, if active nests are located, nest disturbance is avoided unless otherwise authorized by the regulatory agencies	

Exhibit B: Mitigation Monitoring and Reporting Program for the Feather River Levee Repair Project Alternative 2 – The ASB Setback Levee Alternative					
Mitigation Measure	**Initiation of Mitigation**	**Monitoring Frequency**	**Responsibility for Verification of Compliance**	**Performance Criteria**	**Date Compliance Completed**
(b) Establish protective buffers around active nests. If an active nest is found, an appropriate buffer to avoid impacts shall be determined by a qualified biologist. No project activities shall commence within the buffer area until a qualified biologist confirms that the nest is no longer active. The size of the buffer may vary, depending on the nest location, nest stage, and construction activity. Monitoring of the nest by a qualified biologist may be required if the activity could adversely affect the nest.					
ASB-5.5-g(2): Conduct Preconstruction Surveys, Protect Occupied Burrows, and Relocate Individuals as Necessary to Minimize Effects on Burrowing Owl. TRLIA and its primary construction contractor shall ensure that the following measures are implemented to minimize potential project effects on burrowing owl:					
(a) Conduct preconstruction surveys. Before project-related activities in the project area, a qualified biologist shall conduct focused surveys for burrowing owls within 250 feet of construction areas (including staging and borrow areas). Surveys shall be conducted no less than 14 days and no more than 30 days prior to initiation of project activities, and surveys shall be conducted in accordance with DFG protocol (California Department of Fish and Game 1995).	(a) 14–30 days before beginning any construction or ground-disturbing activity	(a) Whenever construction is initiated in a new area	(a) Lead agency	(a) Qualified biologist completes surveys in accordance with DFG protocols	
(b) Establish protective buffers around occupied burrows. If occupied burrows are found, an appropriate buffer shall be established to avoid impacts on the burrows. A buffer of 165 feet would be required during the nonbreeding season (September 1 through January 31), and a buffer of 250 feet would be required during the breeding season (February 1 through August 31). To the extent feasible, project activity shall be excluded from within the buffer areas.	(b,c) Before beginning any activity within 250 feet of an occupied burrow	(b,c) Throughout construction periods (maintenance of buffers as needed)	(b,c) Lead agency and primary construction contractor	(b,c) If occupied burrows are found, owls are protected from disturbance by the establishment of buffers or are relocated as appropriate	

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
(c) Relocate owls if necessary. If impacts on occupied burrows are unavoidable, on-site passive relocation techniques approved by DFG shall be used to encourage owls to move to alternative burrows outside the impact area. However, no occupied burrows shall be disturbed during the nesting season unless a qualified biologist verifies through noninvasive methods that the burrow is no longer occupied.					
ASB-5.5-g(3): Conduct Preconstruction Surveys and Protect Active Nests to Minimize Effects on Other Nesting Raptors. TRLIA and its primary construction contractor shall ensure that the following measures are implemented to minimize potential project effects on other nesting raptors:					
(a) Conduct preconstruction surveys. Because project construction activity would occur during the raptor breeding season (February 15 to September 15), a qualified biologist shall conduct preconstruction surveys to identify active nests in the nonorchard trees within 500 feet of potential construction areas (including staging and borrow areas). Because of the linear nature of project construction, preconstruction surveys may be phased to accommodate construction activities; suitable nesting habitat shall be surveyed only when construction activities would encroach within 500 feet of unsurveyed areas. Surveys shall be conducted no less than 14 days and no more than 30 days before construction encroaches within 500 feet of unsurveyed areas. If no active nests are found, no further mitigation shall be required.	(a,b) 14–30 days before beginning any construction or ground-disturbing activities between February 15 and September 15 within 500 feet of non-orchard trees	(a,b) Throughout construction periods	(a,b) Lead agency and primary construction contractor	(a,b) Qualified biologist verifies absence of occupied nests for each construction segment as construction progresses, or, if active nests are located, nest disturbance is avoided unless otherwise authorized by the regulatory agencies	
(b) Establish protective buffers around active nests. If an active nest is found, an appropriate buffer to avoid impacts shall be determined by a qualified biologist. No project activities shall commence within the buffer area until a qualified biologist confirms that the nest is					

Exhibit B: Mitigation Monitoring and Reporting Program for the Feather River Levee Repair Project Alternative 2 – The ASB Setback Levee Alternative					
Mitigation Measure	**Initiation of Mitigation**	**Monitoring Frequency**	**Responsibility for Verification of Compliance**	**Performance Criteria**	**Date Compliance Completed**
no longer active. The size of the buffer may vary, depending on the nest location, nest stage, and construction activity. Monitoring of the nest by a qualified biologist may be required if an activity could adversely affect the nest.					
ASB-5.8-a: Evaluate the Significance of Archaeological Site CA-Yub-5 and, If Determined to Be Significant, Protect the Site from Damage and/or Conduct Data Recovery Excavation. TRLIA shall have a qualified archaeologist evaluate the extent and significance/eligibility for NRHP and CRHR listing of site CA-Yub-5 through test excavations and analysis of the site's stratigraphy and artifactual constituents. If the site is determined to lack eligibility for NRHP and CRHR listing and is not found to be a significant cultural resource under CEQA, the archaeologist shall report these findings in a site investigation report and ensure that all remains discovered at the site are recorded and reported in accordance with professional practices, and no further protective measures will be necessary. If intact stratigraphy, features, additional human remains, or artifacts indicate that the site may be eligible for NRHP or CRHR listing and therefore a significant historical resource according to CEQA criteria, TRLIA shall implement one or both of the measures described below in consultation with a professional archaeologist familiar with CA-Yub-5 to ensure that no significant cultural resources are damaged there. Two basic approaches are described: protecting the site from damage and conducting data recovery at the site. All site testing shall be conducted in consultation with appropriate Native American representatives designated by the NAHC, and a Native American monitor shall be present for monitoring during any excavation. Option 1: Protect CA-Yub-5 from Damage	Before beginning any construction or ground-disturbing activity in the vicinity of either CA-Yub-5	When construction is planned to be initiated in the vicinity of CA-Yub-5. If Option 1 is selected, additional monitoring would be required during project construction, prior to inundation of the setback area. If Option 2 is selected, monitoring would occur during construction planning	Lead agency and primary construction contractor	Qualified archaeologist evaluates the site and recommends appropriate mitigation measures; recommended measures are implemented such that activity does not disturb onsite cultural resources, or, if resources cannot be avoided, data recovery of the site is conducted in accordance with professional practices	

Exhibit 1: Mitigation Monitoring and Reporting Program for the Feather River Levee Repair Project
Alternative 2 – The ASB Setback Levee Alternative

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
CA-Yub-5 can be protected from direct construction damage if the setback levee is realigned such that the site is beyond the footprint of ground-disturbing levee construction activity. This would require moving the levee alignment to the east of the site boundaries, thus placing the entire site within the levee setback area. It would be highly impractical to move the alignment to the west to place the site outside the project site and thereby avoid damaging it. Based on characteristics observed during archaeological field surveys, it is estimated that the setback levee would need to be constructed approximately 500 feet west of the proposed alignment in the area of CA-Yub-5 to ensure complete avoidance of the site. Geotechnical considerations render such a western shift of the alignment unrealistic because it would place this portion of the levee on a far less stable foundation (old riverbed) than under the proposed alignment. Once situated within the levee setback area (i.e., the expanded floodway), the site should be protected from future erosion and scour from surface flows, as well as human disturbance, through the use of engineered features and/or strategic plantings. In addition, sufficient site data should be collected and analyzed to establish the important archaeological characteristics of the site. One of the most potentially significant characteristics of CA-Yub-5 is the presence of at least 12 inches of midden soil, which can be a source of information regarding the age of the site (through radiocarbon dating) and prehistoric diets and paleoenvironmental reconstruction (through microconstituent and chemical analyses). Because floodwaters passing through the levee setback area could alter the soil properties that permit accurate radiometric dating or hasten the degradation of macrobotanical and microbotanical remains, scientific data would need to be collected, recorded, and reported before the site is subjected to inundation.					

Exhibit B: Mitigation Monitoring and Reporting Program for the Feather River Levee Repair Project Alternative 2 – The ASB Setback Levee Alternative					
Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
It has been previously suggested that the site may be protected from future damage by use of a protective covering that is impermeable to water, which is also termed "capping." However, "capping" CA-Yub-5 to protect it from water damage would be very impractical, if not impossible. It would be necessary to have a clear definition of the horizontal and vertical boundaries of CA-Yub-5, and the site would need to be completely encased in the covering so that it would be protected from saturation from all sides, including rising groundwater from below. Option 2: Conduct Data Recovery at CA-Yub-5 Data recovery through destructive excavation is considered an acceptable mitigation measure for damage to archaeological sites if other mitigation measures are less feasible or wholly infeasible. The purpose of data recovery is to obtain scientifically consequential information from an archaeological site that would be partially or completely destroyed. Although much of the work required for data recovery is similar to that conducted during test excavations, the requirements for data recovery call for more extensive manual and perhaps mechanical excavation. Recovered materials shall be subjected to laboratory analysis (e.g., stone tool analysis, faunal analysis, radiocarbon assays, and obsidian hydration studies), and a report and interpretive material shall be prepared that documents the site investigation and findings.					
ASB-5.8-b(1): Conduct Further Evaluation and Subsurface Testing to Determine Whether Proposed Levee Improvements Could Damage Significant Resources Associated with Prehistoric Archaeological Sites CA-Yub-13 and CA-Yub-14. If levee improvements would include activities that could disturb subsurface soils in the vicinity (within 1,000 feet) of the recorded location of either CA-Yub-13 or CA-Yub-14, TRLIA shall have a qualified archaeologist conduct an evaluation designed to assess the potential for damage to resources associated with	Before beginning any construction or ground-disturbing activity in the vicinity of either CA-Yub-13 or CA-Yub-14	When construction is planned to be initiated in the vicinity of either CA-Yub-13 or CA-Yub-14	Lead agency and primary construction contractor	Qualified archaeologist evaluates the sites and recommends appropriate mitigation measures; recommended measures are implemented such that activity does not disturb onsite cultural	

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
the site(s) before initiation of project-related ground-disturbing activities in these areas. The evaluation may require assessment of the condition and data potential of specific areas of anticipated construction disturbance and/or determination of whether one or both of the sites are eligible for inclusion in the CRHR and/or NRHP. This evaluation shall include additional surveys, subsurface test excavations, analyses of any discovered archaeological materials, and (if necessary) data recovery. If the testing indicates the presence of cultural resources, a qualified archaeologist shall evaluate the significance of the finds and shall recommend further mitigation measures. Because of the critical need to remedy weaknesses in the existing levee in Segment 1, it is unlikely that avoidance of any resources directly within the construction footprint would be possible, and data recovery would likely be required. Efforts involving testing, excavation, and monitoring shall be conducted in consultation with appropriate Native American representatives identified by the NAHC.				resources, or, if resources cannot be avoided, data recovery of the site is conducted in accordance with professional practices	
ASB-5.8-b(2): Monitor Ground-Disturbing Activities in the Vicinity of Prehistoric Archaeological Sites CA-Yub-13 and CA-Yub-14. A qualified professional archaeologist and a Native American representative shall monitor all project-related ground-disturbing activities at and near the locations of prehistoric archaeological sites CA-Yub-13 and CA-Yub-14. If intact archaeological materials or human burials not recovered during the subsurface testing and excavation programs described in Mitigation Measure LS-5.8-a(1) are uncovered during project-related ground-disturbing activities, the archaeologist shall determine their possible significance and shall formulate appropriate mitigation measures. Appropriate mitigation may include no action, avoidance of the resource, and potential additional data and burial recovery.	During construction in the vicinity of either CA-Yub-13 or CA-Yub-14	Throughout construction period in the vicinity of either CA-Yub-13 or CA-Yub-14	Lead agency and primary construction contractor	Qualified archaeologist and Native American monitor verify absence of intact archaeological materials or, if such materials are found, recommend mitigation measures; measures are implemented as appropriate	

Exhibit B: Mitigation Monitoring and Reporting Program for the Feather River Levee Repair Project Alternative 2 – The ASB Setback Levee Alternative					
Mitigation Measure	**Initiation of Mitigation**	**Monitoring Frequency**	**Responsibility for Verification of Compliance**	**Performance Criteria**	**Date Compliance Completed**
ASB-5.8-c: Survey Unexamined Areas before Project Ground-Disturbing Activities and Implement Further Mitigation As Necessary. A qualified professional archaeologist shall conduct focused surveys of all portions of the project area that were not adequately surveyed during past efforts or during surveys for the current effort. The survey shall be conducted before activities associated with project preparation or construction are initiated, and during a fallow period, if possible, in the case of areas currently covered in agricultural crops or grasses. If cultural resources are identified as a result of the survey, the archaeologist shall evaluate the significance of the finds and recommend appropriate mitigation measures for significant resources. TRLIA and its construction contractors shall implement these mitigation measures. Mitigation may include, but shall not necessarily be limited to, the avoidance of significant and potentially significant resources through changes in project design and/or subsurface testing and data recovery. Such efforts, particularly those involving testing and excavation, shall be conducted in consultation with appropriate Native American representatives identified by the NAHC.	Before beginning any construction or ground-disturbing activity, during a fallow period	Prior to construction being initiated in a particular area	Lead agency and primary construction contractor	Qualified archaeologist conducts focused surveys, and if cultural resources are found, recommends appropriate mitigation measures	
ASB-5.8-d: Stop Work and Implement Measures to Protect Archaeological Resources If Discovered during Ground-Disturbing Activities. If previously undocumented archaeological materials such as historic building or structure remains; historic artifact deposits or scatters; or prehistoric artifacts such as stone tool flaking debitage, mortars, pestles, shell, or bone are encountered during project construction, all ground-disturbing activity shall be suspended temporarily within a 100-foot radius of the find or a distance determined by a qualified professional archaeologist to be appropriate based on the potential for disturbance of additional resource-bearing soils. A qualified professional archaeologist shall identify the materials, determine their possible significance, and formulate	If cultural resources are discovered during ground-disturbing activities	Throughout construction period	Lead agency and primary construction contractor	Finds of undocumented archaeological materials are reported and protected until evaluated by an archeologist. Recommendations of qualified archaeologist are implemented	

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
appropriate mitigation measures. Appropriate mitigation may include no action, avoidance of the resource, and potential data recovery. Ground disturbance in the zone of suspended activity shall not recommence without authorization from the archaeologist.					
ASB-5.8-e: If Human Remains Are Discovered during Ground-Disturbing Activities, Stop Work and Comply with State Laws Pertaining to the Discovery of Human Remains. If human remains are uncovered during project construction, all ground-disturbing activities shall immediately be suspended within a 100-foot radius of the find or a distance determined by a qualified professional archaeologist to be appropriate based on the potential for disturbance of additional remains, and TRLIA or its designated representative shall be notified. TRLIA shall immediately notify the Yuba County Coroner and a qualified professional archaeologist, if one is not already on-site. The coroner shall examine the discovery within 48 hours. If the coroner determines that the remains are those of a Native American, he or she shall contact the NAHC by phone within 24 hours. The NAHC shall contact the Most Likely Descendant (MLD) of the remains. TRLIA or its appointed representative and the archaeologist shall consult with the MLD regarding the removal or preservation and avoidance of the remains, and the parties shall rebury or preserve the remains as appropriate. Ground disturbance in the zone of suspended activity shall not recommence without authorization from the archaeologist.	If human remains are found during ground-disturbing activities	Throughout construction period	Primary construction contractor	Finds of potential human remains are reported and protected until evaluated by appropriate individuals. Remains are treated or disposed of in accordance with direction received from the county coroner and from the NAHC and Native American representatives as appropriate	
ASB-5.9-a: Implement FRAQMD Pollution-Control Measures to Minimize Temporary Emissions of ROG, NO_X, and PM_{10} during Construction. FRAQMD's *Indirect Source Review Guidelines* and online CEQA guidance provide mitigation measures for reducing short-term air quality impacts. As recommended by FRAQMD, Three Rivers Levee Improvement Authority shall ensure that the following mitigation measures (summarized from FRAQMD guidance) are implemented during all project	Before beginning any construction or ground-disturbing activity	Throughout construction period	Lead agency and primary construction contractor	FRAQMD measures are implemented such that pollutant emissions are minimized. Note: The FRAQMD Fugitive Dust Control Plan is attached to this MMRP in Appendix A	

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
construction activities to the extent practicable. In addition, construction of the proposed project is required to comply with all applicable FRAQMD rules and regulations, in particular Rule 3.0 ("Visible Emissions"), Rule 3.16 ("Fugitive Dust Emissions"), and Rule 3.15 ("Architectural Coatings"). 1. Implement a Fugitive Dust Control Plan that includes the following measures (see Appendix E): ▪ All grading operations on a project should be suspended when winds carry dust beyond the property line despite implementation of all feasible dust control measures. Consideration should be given to suspending all project grading when winds exceed 20 mph to minimize the risk of dust being carried beyond the property line. ▪ Construction sites shall be watered as directed by the [Yuba County] Department of Public Works or FRAQMD and as necessary to prevent fugitive dust violations. ▪ An operational water truck should be on-site at all times. Apply water to control dust as needed to prevent visible emissions violations and off-site dust impacts. ▪ On-site dirt piles or other stockpiled particulate matter should be covered, wind breaks installed, and water and/or soil stabilizers employed to reduce windblown dust emissions. Incorporate the use of approved nontoxic soil stabilizers according to manufacturer's specifications to all inactive construction areas. ▪ All transfer processes involving a free fall of soil or other particulate matter shall be operated in such a manner as to minimize the free fall distance and fugitive dust emissions.					

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
▪ Apply approved chemical soil stabilizers according to the manufacturers' specifications, to all inactive construction areas (previously graded areas that remain inactive for 96 hours) including unpaved roads and employee/equipment parking areas. ▪ To prevent track-out, wheel washers should be installed where project vehicles and/or equipment exit onto paved streets from unpaved roads. Vehicles and/or equipment shall be washed prior to each trip. Alternatively, a gravel bed may be installed as appropriate at vehicle/equipment site exit points to effectively remove soil buildup on tires and tracks to prevent/diminish track-out. ▪ Paved streets shall be swept frequently (water sweeper with reclaimed water recommended; wet broom) if soil material has been carried onto adjacent paved, public thoroughfares from the project site. ▪ Provide temporary traffic control as needed during all phases of construction to improve traffic flow, as deemed appropriate by the Department of Public Works and/or Caltrans [California Department of Transportation] and to reduce vehicle dust emissions. ▪ Reduce traffic speeds on all unpaved surfaces to 15 mph or less and reduce unnecessary vehicle traffic by restricting access. Provide appropriate training, on-site enforcement, and signage. ▪ Reestablish ground cover on the construction site as soon as possible and prior to final occupancy, through seeding and watering. ▪ No open burning of vegetative waste (natural plant growth wastes) or other materials (trash, demolition debris et al.) may be conducted at the project site. Materials also may not be hauled off-					

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
site for disposal by open burning. Vegetative wastes should be chipped or delivered to waste to energy facilities (permitted biomass facilities), mulched, composted, or used for firewood.					
2. Construction equipment exhaust emissions shall not exceed FRAQMD Regulation III, Rule 3.0 ("Visible Emissions") limitations (40% opacity or Ringelmann 2.0). Operators of vehicles and equipment found to exceed opacity limits shall take action to repair the equipment within 72 hours or remove the equipment from service. Failure to comply may result in a Notice of Violation.					
3. The primary contractor shall be responsible to ensure that all construction equipment is properly tuned and maintained prior to and for the duration of onsite operation.					
4. Limit vehicle and equipment idling times to 10 minutes—saves fuel and reduces emissions.					
5. Use existing power sources (e.g., power poles) or clean fuel generators rather than temporary power generators.					
6. Develop and implement a traffic plan to minimize traffic flow interference from construction activities. The plan may include advance public notice of routing, use of public transportation, and satellite parking areas with a shuttle service. Schedule operations affecting traffic for off-peak hours. Minimize obstruction of through-traffic lanes. Provide a flag person to guide traffic properly and ensure safety at construction sites.					
7. Portable engines and portable engine-driven equipment units used at the project work site, with the exception of on-road and off-road motor vehicles, may require ARB Portable Equipment Registration with the state or a local district permit. The owner/operator shall be responsible for arranging appropriate consultations with ARB or the District [FRAQMD] to determine					

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
registration and permitting requirements prior to equipment operation at the site. 8. The proponent shall assemble a comprehensive inventory list (i.e., make, model, engine year, horsepower, and emission rates) of all heavy-duty off-road (portable and mobile) equipment (50 horsepower and greater) that will be used an aggregate of 40 or more hours for the construction project and apply the following mitigation measure: *Reducing NO_X emissions from off-road diesel powered equipment* The project shall provide a plan for approval by FRAQMD demonstrating that the heavy-duty (equal to or greater than 50 horsepower) off-road equipment to be used in the construction project, including owned, leased and subcontractor vehicles, will achieve a projectwide fleet-average 20% NO_X reduction[1] and 45% particulate reduction compared to the most recent ARB fleet average at time of construction. The FRAQMD Fugitive Dust Control Plan is included in Appendix E. ——— [1] Acceptable options for reducing emissions may include use of late-model engines, low-emission diesel products, alternative fuels, engine retrofit technology (Carl Moyer Guidelines), after-treatment products, voluntary off-site mitigation projects, provide funds for air district off-site mitigation projects, and/or other options as they become available. The District [FRAQMD] should be contacted to discuss alternative measures.					
ASB-5.10-a: Limit Generation of Noise by Equipment during Project Construction. Three Rivers Levee Improvement Authority (TRLIA) shall ensure that the primary construction contractor implements the following mitigation measures during construction activities:					

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
(a) To the extent practicable, construction activities shall be limited to the hours of 7 a.m. to 10 p.m. when operations occur within 500 feet of a residential or other noise-sensitive land use. Decisions as to whether nighttime construction is needed within 500 feet of residential or other noise-sensitive land uses shall only consider the need to complete project activities before the beginning of the flood season and the associated need to maintain human safety and the integrity of the flood control system. (b) All construction equipment shall be properly maintained and equipped with noise control, such as mufflers, in accordance with manufacturers' specifications. (c) To the extent feasible, the simultaneous operation of construction equipment within 50 feet of the project boundary shall be limited.	(a,b,c) At initiation of construction	(a,b,c) Throughout construction period	(a,b,c) Lead agency and primary construction contractor	(a,b,c) Noise levels at the locations of noise-sensitive receptors, including occupied dwellings, are reduced to the extent feasible	
In addition, TRLIA shall implement the following measure: (d) Before construction at each site near noise-sensitive receptors, TRLIA shall provide written notification to potentially affected receptors, identifying the type, duration, and frequency of construction operations. Notification materials will also identify a mechanism for residents to register complaints with TRLIA and Yuba County (the agency responsible for enforcement of the Yuba County noise ordinance) if construction noise levels are overly intrusive or construction occurs outside the permitted hours. TRLIA and/or Yuba County would then take corrective action.	(d) Before beginning any construction or ground-disturbing activity near noise-sensitive receptors	(d) Whenever construction is to be implemented n the vicinity of noise sensitive receptors	(d) Lead agency	(d) All residents or other building occupants in areas that could be adversely affected by construction noise have been notified	
ASB-5.11-b: Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways. To reduce hazards to vehicles on local roadways, Three Rivers Levee Improvement Authority (TRLIA) shall ensure that its primary					

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
construction contractor implements the following measures: (a) Develop and implement a traffic safety plan in coordination with the County and Caltrans. The construction contractor shall develop a plan for traffic safety assurance for the county roadways in the project vicinity. The contractor shall submit the plan to the County Public Works Department for approval before the initiation of construction-related activity that could adversely affect traffic on county roadways. A similar plan shall be prepared for SR 70 and submitted to Caltrans for review before initiation of construction-related activity that could adversely affect traffic on the highway. If both the County and Caltrans will accept the same traffic safety plan, then only one plan need be prepared. The plan(s) may call for the following elements, based on the requirements of each agency: ▪ posting warnings about the potential presence of slow-moving vehicles; ▪ using traffic control personnel when appropriate; ▪ scheduling truck trips outside of peak morning and evening traffic periods to the extent feasible; ▪ placing and maintaining barriers and installing traffic control devices necessary for safety, as specified in Caltrans's *Manual of Traffic Controls for Construction and Maintenance Works Zones* and in accordance with County requirements; and ▪ maintaining routes for passage of emergency response vehicles through roadways affected by construction activities. The contractor shall train construction personnel in appropriate safety measures as described in the plan(s), and shall implement the adopted plan(s).	(a) Before beginning any construction or ground-disturbing activity	(a) Throughout construction period (plan implementation)	(a) Lead agency and primary construction contractor	(a) Yuba County approves and Caltrans reviews the traffic safety plan(s), construction personnel are trained in appropriate safety measure, and plan(s) is/are implemented	
(b) Minimize the accumulation of mud and dirt on local roadways. All operations shall limit or expeditiously remove the accumulation of project-generated mud or	(b) At initiation of construction	(b) Throughout construction period, at least once every	(b) Lead agency and primary construction contractor	(b) Accumulation of mud and dirt on local roadways is removed	

Exhibit B: Mitigation Monitoring and Reporting Program for the Feather River Levee Repair Project Alternative 2 – The ASB Setback Levee Alternative					
Mitigation Measure	**Initiation of Mitigation**	**Monitoring Frequency**	**Responsibility for Verification of Compliance**	**Performance Criteria**	**Date Compliance Completed**
dirt from adjacent public streets at least once every 24 hours when operations are occurring. The construction contractor shall sweep the paved roadways (water sweeper with reclaimed water recommended) at the end of each day if substantial volumes of soil material have been carried onto adjacent paved, public roads from the project sites. Also see a similar requirement under Mitigation Measure LS-5.9-a, "Implement FRAQMD Pollution-Control Measures to Minimize Temporary Emissions of ROG, NO_X, and PM_{10} during Construction."		24 hours during construction operations		at least every 24 hours	
ASB-5.12-a: Coordinate with Utility Providers to Remove, Reinforce, and Modify Public Utility Infrastructure in the ASB Levee Setback Area and Prevent Damage of Facilities. TRLIA, the design engineers, or the primary construction contractor for the levee setback, as appropriate, shall implement the following measures before the beginning of construction to ensure that the levee setback does not adversely affect public utility infrastructure or result in interruption of utility service: (a) Coordinate with PG&E to protect electrical lines that cross the levee setback area. To maintain PG&E electrical service through the Bogue Loop 115-kV high-power transmission line and the two standard electrical lines that run along Ella Avenue and Country Club Avenue, TRLIA or its representative shall coordinate with PG&E to raise, relocate, or reinforce the steel towers and wood poles that stand in the proposed bypass area. (b) Ensure that all utility lines in the setback area have been identified and removed or reinforced as necessary. TRLIA or its representative shall ensure that any electrical, telephone, gas, and cable television lines within the levee setback area have been identified before the initiation of any ground-disturbing construction activity. Before the beginning of any construction-related ground disturbance,	(a,b) During final design and before beginning any construction or ground-disturbing activity	(a,b) During reviews of project designs and during construction planning	(a,b) Lead agency, design engineer, and primary construction contractor	(a,b) The entities involved in final design of the project components and construction planning agree that coordination with all potential service providers has occurred before the start of project construction, and that utilities that would be affected within construction areas have been removed or protected as appropriate	

Mitigation Measure	Initiation of Mitigation	Monitoring Frequency	Responsibility for Verification of Compliance	Performance Criteria	Date Compliance Completed
TRLIA or its representative shall coordinate with all potential service providers known to have, or potentially having, utility infrastructure in the levee setback area, including but not limited to PG&E, AT&T, Comcast, OPUD, and RD 784, to ensure that the utility lines are removed or reinforced as appropriate.					
ASB-5.12-c	See Mitigation Measure ASB-5.11-b, **"Limit the Potential for Construction-Related Traffic Hazards on Feather River Boulevard and Other Local Roadways."** Mitigation Measure ASB-5.12-c is identical to Mitigation Measure ASB-5.11-b.				
ASB-5.13-a: Conduct Training for Construction Personnel, Cease Work if Paleontological Resources are Encountered, and Implement an Appropriate Mitigation Strategy. Three Rivers Levee Improvement Authority (TRLIA) or its primary construction contractor shall implement the following measures:					
(a) Before the start of construction activities, construction personnel involved with earthmoving activities shall be informed of the possibility of encountering fossils, the appearance and types of fossils likely to be seen during construction activities, and proper notification procedures should fossils be encountered. This worker training may either be prepared and presented by an experienced field archaeologist at the same time as construction worker education on cultural resources, or be prepared and presented separately by a qualified paleontologist.	(a) Before beginning any construction or ground-disturbing activity	(a) Beginning of each construction phase where significant new staff are on-site	(a) Lead agency and primary construction contractor	(a) Construction personnel are trained as appropriate	
(b) If paleontological resources are discovered during earthmoving activities, the construction crew shall immediately cease work within at least 25 feet of the find. TRLIA shall retain a qualified paleontologist to evaluate the resource and prepare a proposed mitigation plan in accordance with SVP guidelines (1995). The proposed mitigation plan may include a field survey, construction monitoring, sampling and data recovery procedures, museum storage coordination for any specimen recovered, and a report of findings.	(b) At initiation of construction	(b) Throughout construction period	(b) Lead agency and primary construction contractor	(b) Potential paleontological finds are reported and protected until evaluated. Mitigation plan, if needed, is implemented in accordance with SVP guidelines and discovered resources are protected as necessary	

Exhibit B: Mitigation Monitoring and Reporting Program for the Feather River Levee Repair Project Alternative 2 – The ASB Setback Levee Alternative					
Mitigation Measure	**Initiation of Mitigation**	**Monitoring Frequency**	**Responsibility for Verification of Compliance**	**Performance Criteria**	**Date Compliance Completed**
Recommendations determined by TRLIA to be necessary and feasible shall be implemented before construction activities can resume at the site where the paleontological resources were discovered.					

Exhibit B

FEATHER RIVER AIR QUALITY MANAGEMENT DISTRICT

Serving the Counties of Yuba and Sutter
938 14th Street, Marysville, CA 95901
(530) 634-7659 FAX: (530) 634-7660 Burn Information: (530) 741-6299
Email: fraqmd@fraqmd.org Web Site: http://www.fraqmd.org

Steven A. Speckert
Air Pollution Control Officer

REQUIREMENTS FOR THE CONTROL OF FUGITIVE DUST EMISSIONS

Introduction

The Feather River Air Quality Management District (FRAQMD) is designated nonattainment for the California PM10 health standard (particulate matter less than 10 microns in size; also referred to in this document as respirable particulate matter and fugitive dust). This means that Yuba and Sutter Counties violate the state PM10 air quality health standard. Construction activities, agricultural operations, unpaved roads, and windblown dust contribute heavily to these emissions. According to the U.S. EPA, exposure to high concentrations of particulate matter, including airborne dust, affects breathing, aggravates existing respiratory and cardiovascular disease, and alters the body's defenses against foreign materials, lung damage, skin cancer and premature death. Further studies have linked respirable particulate matter with health problems like asthma and chronic bronchitis.

This document serves to address the aforementioned health concerns by informing the public of applicable state laws and local rules and regulations governing fugitive dust emissions and the capacity for the air district to issue violations (refer to Attachment A). Also attached to this document are a list of approved mitigation measures (refer to Attachment B) and a fugitive dust control plan to be submitted by the project proponent for FRAQMD approval (refer to Attachment C).

Discussion

Frequent nuisance complaints are received at the air district in regard to construction site fugitive dust emissions. Standard CEQA mitigation recommendations approved for the project are not always implemented by the project proponent. Appropriate emphasis on the need for fugitive dust controls and the potential impacts of air district enforcement actions need to be stressed.

In accordance with California Health and Safety Code (H&S) section 42400 et seq., the FRAQMD can assess civil and criminal penalties for violations of the FRAQMD Rules and Regulations and the H&S. Violations are misdemeanors and can carry potential penalties from $1,000 to $1,000,000 per day per violation and/or imprisonment in the county jail.

This document cites applicable air pollution regulations, defines performance criteria and acceptable control strategies to implement, and specifies emission levels and standards not to exceed in order to prevent a violation (refer to Attachment A). The project proponent should

have a thorough understanding of these regulations. If additional information is required please contact the District at the location provided above.

Prevention

Fugitive dust control strategies are composed of a balance of available dust mitigation techniques applied on an as needed basis by construction site supervision to

- prevent dust from exiting the property,
- prevent visible emissions from exceeding opacity regulations, and
- prevent public nuisance.

This implies the use of adequate measures during the appropriate evolution of each construction activity and may include wind breaks and barriers, frequent water applications, application of soil additives, control of vehicle access, vehicle speed restrictions, covering of piles, use of gravel at site exit points to remove caked on dirt from tires and tracks, washing of equipment at the end of each work day and prior to site removal, wet sweeping of public thoroughfares, and work stoppage (refer to Attachment B).

Site-Specific Considerations

Time of year, length of project, and acres per day undergoing vegetative removal, excavation, backfilling, hauling and grading should be the primary focus for implementation of dust control measures. The plan must also consider dust emissions associated with construction activities after completion of grading activities including installation of infrastructure (including water, electric, roads, sidewalks, and sewer), digging of building foundations, site vehicle traffic, and landscaping activities.

Knowledge of soil types may be important to understand the free silt content and the ability to hold moisture. Some soils are hydrophobic – repel water - and may require the addition of surfactants during water applications to facilitate penetration and achieve appropriate moisture adsorption. Surfactants may also be used to reduce the amount of water needed.

Activities occurring near sensitive receptors should receive a higher level of preventative planning. Sensitive receptors include school-aged children (schools, daycare, playgrounds), the elderly (retirement community, nursing homes), the infirm (medical facilities/offices), and those who exercise outdoors regularly (public and private exercise facilities, parks).

Other Regulatory Requirements

The project proponent should evaluate water quality, flora and fauna and other environmental impacts (e.g. wildlife, drinking water, stormwater runoff, and surface water impacts) prior to the use of water/soil additives including binders, tackifiers, surfactants, and other materials and methods. All additives at a minimum must meet Regional Water Quality Control Board

(RWQCB) requirements and all applicable federal, state, and local environmental regulations regarding the use of the material.

Fugitive Dust Control Plan Submittal

Complete and sign Attachment C, Fugitive Dust Control Plan, and submit to FRAQMD prior to start of work.

ORIGINAL SIGNED

Larry D. Matlock
Senior Air Quality Planner

Note: This document may be downloaded from our web site at
http:// www.fraqmd.org/Downloads/FugitiveDustControlPlan.doc or
http:// www.fraqmd.org/Downloads/FugitiveDustControlPlan.pdf

FugitiveDustControlPlan09_09_03.doc

Exhibit B

ATTACHMENT A

LOCAL AND STATE REGULATIONS APPLICABLE TO FUGITIVE DUST

I. FRAQMD Rules and Regulations

Note: The following District Rules and Regulations are enforced for each project regardless of lead agency or Board approved project CEQA mitigation requirements.

FRAQMD RULE 3.0 - VISIBLE EMISSIONS *(Adopted 6/91)*

As provided by Section 41701 of the California Health and Safety Code, a person shall not discharge into the atmosphere from any single source of emissions whatsoever, any air contaminants for a period or periods aggregating more than three minutes in any one hour which is:

a. As dark or darker in shade as that designated as No. 2 on the Ringlemen Chart, as published by the United States Bureau of Mines; or

b. Of such opacity as to obscure an observer's view to a degree equal to or greater than does smoke described in Subsection 'a' above.

Enforcement: The District has trained staff capable of performing a Visible Emissions Evaluation (VEE). VEE courses are offered to regulators and the regulated community (for a fee) at regular intervals by staff of the California Air Resources Board.

FRAQMD RULE 3.16 - FUGITIVE DUST EMISSIONS *(Adopted 4/11/94)*

A. PURPOSE
The purpose of this Rule is to reasonably regulate operations which periodically may cause fugitive dust emissions into the atmosphere.

B. DEFINITION
For the purpose of this Rule, the following definitions shall apply:

B.1 Fugitive Dust: Solid airborne matter emitted from any non-combustion source.
B.2 Emergency: Any act of God, but only if the owner of the property from which fugitive dust emissions originate establishes for the Feather River Air Quality Management District, by a preponderance of evidence, that he or she took reasonable precautions in light of the relevant facts and circumstances to minimize emissions.
B.3 Property Line: Adjacent properties which are owned by the same person shall be considered the same property for the purpose of determining the property line.

C. REQUIREMENTS
A person shall take every reasonable precaution not to cause or allow the emissions of fugitive dust from being airborne beyond the property line from which the emission originates, from any construction, handling or storage activity, or any wrecking, excavation, grading, clearing of land or solid waste disposal operation.

Reasonable precautions shall include, but are not limited to:

C.1 use, where possible, of water or chemicals for control of dust in the demolition of existing buildings or structures, construction operations, construction of roadways, or the clearing of land;
C.2 application of asphalt, oil, water, or suitable chemical on dirt roads, material stockpiles, and other surfaces which can give rise to airborne dusts;
C.3 other means approved by the Air Pollution Control Officer.

D. EXEMPTIONS
The provisions of this Rule shall not apply to the following:

D.1 Agricultural Operations
D.2 Currently unworked land designated as reclaimed for agriculture
D.3 An Emergency
D.4 Unpaved roads open to public travel (this inclusion shall not apply to industrial or commercial facilities).

II. State Laws

California Health and Safety Code

Section 41700. Except as otherwise provided in Section 41705, no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.

Section 41701. Except as otherwise provided in Section 41704, or Article 2 (commencing with Section 41800) of this chapter other than Section 41812, or Article 2 (commencing with Section 42350) of Chapter 4, no person shall discharge into the atmosphere from any source whatsoever any air contaminant, other than uncombined water vapor, for a period or periods aggregating more than three minutes in any one hour which is: (a) As dark or darker in shade as that designated as No. 2 on the Ringelmann Chart, as published by the United States Bureau of Mines, or (b) Of such opacity as to obscure an observer's view to a degree equal to or greater than does smoke described in subdivision (a).

California Vehicle Code

Section 23114 requires: No vehicle shall transport any aggregate material upon a highway unless the material is covered. Exception 23114(e)(4): Vehicles transporting loads of aggregate materials shall not be required to cover their loads if the load, where it contacts the sides, front, and back of the cargo container area, remains six inches from the upper edge of the container area, and if the load does not extend, at its peak, above any part of the upper edge of the cargo container area. For purposes of this section, "aggregate material" means rock fragments, pebbles, sand, dirt, gravel, cobbles, crushed base, asphalt, and other similar materials.

Exhibit B

ATTACHMENT B

FRAQMD - FUGITIVE DUST CONTROL MITIGATION MEASURES

Sources: FRAQMD Indirect Source Review Guidelines and Best Available Mitigation Measures compiled by the air districts of the Greater Sacramento Region and approved for implementation by the FRAQMD Board of Directors.

All grading operations on a project should be suspended when winds exceed 20 miles per hour or when winds carry dust beyond the property line despite implementation of all feasible dust control measures.

Construction sites shall be watered as directed by the Department of Public Works or Air Quality Management District and as necessary to prevent fugitive dust violations.

An operational water truck should be onsite at all times. Apply water to control dust as needed to prevent visible emissions violations and offsite dust impacts.

Onsite dirt piles or other stockpiled particulate matter should be covered, wind breaks installed, and water and/or soil stabilizers employed to reduce wind blown dust emissions. Incorporate the use of approved non-toxic soil stabilizers according to manufacturer's specifications to all inactive construction areas.

All transfer processes involving a free fall of soil or other particulate matter shall be operated in such a manner as to minimize the free fall distance and fugitive dust emissions.

Apply approved chemical soil stabilizers according to the manufacturers' specifications, to all-inactive construction areas (previously graded areas that remain inactive for 96 hours) including unpaved roads and employee/equipment parking areas.

To prevent track-out, wheel washers should be installed where project vehicles and/or equipment exit onto paved streets from unpaved roads. Vehicles and/or equipment shall be washed prior to each trip. Alternatively, a gravel bed may be installed as appropriate at vehicle/equipment site exit points to effectively remove soil buildup on tires and tracks to prevent/diminish track-out.

Paved streets shall be swept frequently (water sweeper with reclaimed water recommended; wet broom) if soil material has been carried onto adjacent paved, public thoroughfares from the project site.

Provide temporary traffic control as needed during all phases of construction to improve traffic flow, as deemed appropriate by the Department of Public Works and/or Caltrans and to reduce vehicle dust emissions. An effective measure is to enforce vehicle traffic speeds at or below 15 mph.

Reduce traffic speeds on all unpaved surfaces to 15 miles per hour or less and reduce unnecessary vehicle traffic by restricting access. Provide appropriate training, onsite enforcement, and signage.

Exhibit B

Reestablish ground cover on the construction site as soon as possible and prior to final occupancy, through seeding and watering.

Disposal by Burning: Open burning is yet another source of fugitive gas and particulate emissions and shall be prohibited at the project site. No open burning of vegetative waste (natural plant growth wastes) or other legal or illegal burn materials (trash, demolition debris, et. al.) may be conducted at the project site. Vegetative wastes should be chipped or delivered to waste to energy facilities (permitted biomass facilities), mulched, composted, or used for firewood. It is unlawful to haul waste materials offsite for disposal by open burning.

Exhibit B

ATTACHMENT C

Fugitive Dust Control Plan

This plan, upon signature and submittal to the FRAQMD, will serve as an approved Fugitive Dust Control Plan to be implemented at the designated site. This plan must be submitted by the project proponent and received at the air district prior to start of work.

The approved plan serves as an acknowledgment by the project proponent of their duty to address state and local laws governing fugitive dust emissions and the potential for first offense issuance of a Notice of Violation by the air district where violations are substantiated by District staff.

- Site Location: _____
- Project Type (circle all that apply): Residential Commercial Industrial Transportation
- List of responsible persons:

  Office (name, title, address, phone): _____

  _____

  Field (name, title, phone): _____
- Projected Start and End Dates: _____

Project Proponent: _____ _____
Printed Name Company/Phone

Signature: _____ Title: _____

By signing this document I acknowledge that I have read the accompanying literature regarding state and local fugitive dust emission laws and understand that it is my responsibility as the project proponent to ensure that appropriate materials and instructions are available to site employees to implement fugitive dust mitigation measures (Attachment B) appropriate for each development phase of this project.

I further acknowledge that it is my responsibility to ensure that site employees are made formally aware of fugitive dust control laws, requirements, and available mitigation techniques, and that appropriate measures are to be implemented at the site as necessary to prevent fugitive dust violations.

Please Submit to: FRAQMD, 938 14th Street, Marysville, CA 95901 Attn: Planning
Phone: 530-634-7659 x202 FAX: 530-634-7660 Email: lmatlock@fraqmd.org

Biological Assessment

Feather River
Levee Segment 3 Toe Access Corridor
Yuba County, CA

Prepared for:

Three Rivers Levee Improvement Authority

AECOM

October 2012

Biological Assessment

Feather River
Levee Segment 3 Toe Access Corridor
Yuba County, CA

Prepared for:

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October 2012

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10.08.12

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ACRONYMS AND ABBREVIATIONS

BA	Biological Assessment
CFR	Code of Federal Regulations
CNDDB	California Natural Diversity Database
DWR	California Department of Water Resources
ESA	Endangered Species Act
FRET	Feather River Elderberry Transplant
FRLRP	Feather River Levee Repair Project
SR	State Route
TRLIA	Three Rivers Levee Improvement Authority
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
VELB	Valley Elderberry Longhorn Beetle

1 INTRODUCTION

The purpose of this biological assessment (BA) is to review the proposed Feather River Levee Segment 3 Toe Access Corridor expansion project (proposed action) in sufficient detail to determine to what extent the proposed action may affect any of the threatened, endangered, proposed, or sensitive species and designated or proposed critical habitats listed below. In addition, the following information is provided to comply with statutory requirements to use the best scientific and commercial information available when assessing the risks posed to listed and/or proposed species and designated and/or proposed critical habitat by proposed federal actions. This BA is prepared in accordance with legal requirements set forth under regulations implementing Section 7 of the Endangered Species Act (ESA) (50 CFR 402; 16 U.S.C. 1536 (c)).

2 ACTION AREA

The action area refers to the area that would be directly or indirectly affected by the proposed action. For the Feather River Levee Segment 3 Toe Access Corridor project, the action area is located in the Land Grant of New Helvetia of the United States Geological Survey (USGS) 7.5-minute Olivehurst and Yuba City Quadrangles (Exhibit 1). The 10.1-acre action area is located within the unincorporated community of Linda, which is located on State Route (SR) 70 in the western portion of Yuba County (Exhibit 2). The action area is west of Riverside Drive and Feather River Boulevard; Feather River Boulevard is the primary access (Exhibit 2).

3 SPECIES CONSIDERED

3.1 THREATENED, ENDANGERED, PROPOSED THREATENED OR PROPOSED ENDANGERED SPECIES

A preliminary list of species for consideration was compiled from official species lists maintained by U.S. Fish and Wildlife Service (USFWS) (USFWS 2012; Attachment A) and from a database search of the California Natural Diversity Database (CNDDB 2012) maintained by the California Department of Fish and Game for the USGS Olivehurst and Yuba City 7.5-minute Quadrangles, which encompass the action area.

The following listed species may be affected[1] by the proposed action:

- Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), Threatened

Based on the review of existing information and a field reconnaissance of the action area, only the valley elderberry longhorn beetle (VELB) may potentially occur in the action area. No other special-status species were observed or are expected to occur in the action area because suitable habitat for these species is not present in the action area. The following species were eliminated from consideration at this point in the analysis:

- Conservancy fairy shrimp (*Branchinecta conservatio*), Endangered
- Vernal pool fairy shrimp (*Branchinecta lynchii*), Threatened
- Vernal pool tadpole shrimp (*Lepidurus packardi*), Endangered
- California red-legged frog (*Rana draytonii*), Threatened
- Green sturgeon (*Acipenser medirostris*), Threatened
- Delta smelt (*Hypomesus transpacificus*), Threatened
- Central Valley steelhead (*Oncorhynchus mykiss*), Threatened
- Central Valley spring-run chinook salmon (*Oncorhynchus tshawytscha*), Threatened

[1] This document will discuss making the "may affect" and subsequent determinations in later sections.

- Winter-run chinook salmon, Sacramento River (*Oncorhynchus tshawytscha*), Endangered
- Giant garter snake (*Thamnophis gigas*), Threatened
- Hartweg's golden sunburst (*Pseudobahia bahifolia*), Endangered

3.2 CANDIDATE SPECIES, SENSITIVE SPECIES AND SPECIES OF CONCERN

No candidate or state-listed species were observed or are expected to occur in the action area. Western yellow-billed cuckoo (*Coccyzus americanus occidentale*) was historically recorded at the confluence of the Feather and Yuba Rivers, last observed in 1976 (CNDDB 2012). This species requires dense riparian forest, however, which is not present in the action area.

3.3 CRITICAL HABITAT

Critical habitat is defined in Section 3(5) A of the ESA as specific regions in the geographical area occupied by federally listed species which contain the physical or biological features essential to the conservation of the species and which may require special management considerations or protection. Specific areas outside of the geographical area occupied by the species may also be included in critical habitat designations, upon a determination that such areas are essential for the conservation of the species. The USFWS has designated critical habitat for the VELB (45 FR 52803); however, the critical habitat designation does not include the proposed action area (USFWS 1980).

4 CONSULTATION TO DATE

Consultation or technical assistance with the USFWS has not occurred to date.

5 DESCRIPTION OF THE PROPOSED ACTION

5.1 PROJECT PURPOSE

Recent emphasis by the U.S. Army Corps of Engineers (USACE) on vegetation management at the toes of levees (USACE 2009) and recent new requirements for urban levees (DWR 2012) by the California Department of Water Resources (DWR) has resulted in the requirement that Three Rivers Levee Improvement Authority (TRLIA) expand repairs along a portion of the levee on the east bank of the Feather River. TRLIA is required to provide a 20-foot toe access corridor on the landside of the portion of the levee referred to as Segment 3, north of Island Avenue for approximately 1 mile along the levee to the intersection of Riverside Drive and Sycamore Ave (Exhibit 2).

5.2 PROJECT DESCRIPTION

The implementation of the USACE guidance and DWR requirements to expand the existing corridor requires the following components: removal of existing fences; construction of a new fence, a maintenance road, and drainage improvements; and clearance of vegetation and trash. Establishment of a 20-foot-wide toe access corridor on the landside of Segment 3 north of Island Avenue would result in expansion of the toe access corridor past existing fences of adjacent private properties. Although establishment of the toe access corridor would extend past existing fences of private properties, this expansion would occur entirely within the property boundary of the State of California. Recent review of parcel boundaries by the Feather River Levee Repair Project (FRLRP) and DWR revealed that existing private properties adjacent to the levee in Segment 3 have encroached an average of 17 feet into State property.

In accordance with the requirements of USACE and DWR, the widened toe access corridor would need to include the following elements:

- a new 10-foot-high uniform cyclone fence along the new fence line;
- a new maintenance road that would be constructed with 1 to 5 feet of road grade fill along the landside levee toe;
- construction of a concrete v-ditch at the south end of the project from Island Avenue to 400 feet north of Island Avenue for drainage to ensure that the maintenance road does not become flooded or impassable; and
- installation of a drainage pipe through the Island Avenue crossing of the levee at the south end of the project to drain water from the new concrete v-ditch to existing drainage on the land side of the levee south of Island Avenue.

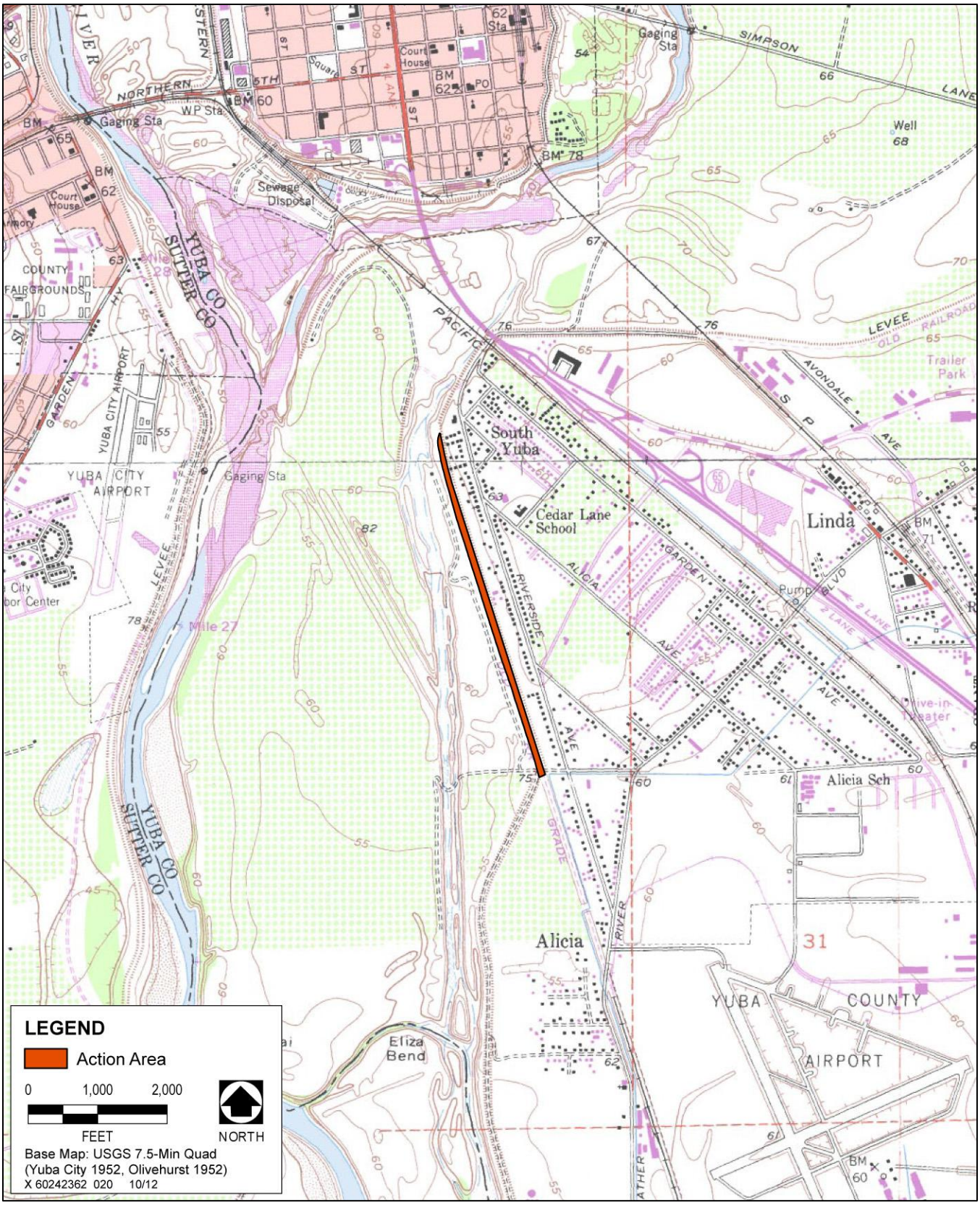
State and federal requirements also require that vegetation and other encroachments (e.g., trash, equipment, vehicles, and other removable items) be cleared and removed from within the levee access corridor. This requirement would result in the need to remove the existing fences, vegetation, debris, and other material from within the access corridor. Most of the vegetation in the access corridor consists of weedy herbaceous species, some native and non-native shrubs, and native and non-native trees. However, there are also 12 elderberry shrubs growing along the existing fences that would need to be removed.

Construction of the FRLRP Segment 2 setback levee and associated facilities in 2008 and 2009 affected elderberry shrubs within and immediately adjacent to the construction footprint. Elderberry shrubs are considered VELB habitat. As a result, impacts of the FRLRP to the VELB habitat were mitigated, in part, by establishing the Feather River Elderberry Transplant (FRET) mitigation area. The FRET mitigation area is a 44-acre elderberry mitigation site located in the northern end of the setback area and is a requirement of the September 29, 2008, USFWS biological opinion (USFWS 2008) and the USACE Section 404 Permit (USACE 2008) for the Segment 2 setback levee. The elderberry shrubs along the existing fences on the land side of the levee in Segment 3 are proposed to be removed from Segment 3 and transplanted to the FRET in Segment 2.

The anticipated construction schedule is for elderberry transplantation to occur during the USFWS-recommended period of November 15 to February 15 (USFWS 1999), most likely starting in January of 2013. Construction of the new fence, maintenance road, concrete v-ditch, clearing of additional vegetation and trash, and construction of other improvements associated with the proposed action would commence in the summer of 2013.

No structures are anticipated to need to be removed from the proposed toe access corridor; however existing fences, vegetation, and some trash debris will be cleared from the access corridor and disposed of at the County landfill. Approximately 4,000 cubic yards of fill material will be imported by street legal dump trucks to construct the maintenance road embankment. This will be spread and graded by one standard grader and compacted with a single vibratory roller. A water truck will be used to minimize dust during clearing and grading operations and to moisture condition the fill for compaction. Once the maintenance road embankment is complete, approximately 3,000 tons of road aggregate base will be placed on the embankment, moisture conditioned, and compacted to provide the maintenance road. An excavator will be required to excavate and fill a trench for the pipe through Island Avenue. Commercial concrete trucks will deliver a small amount of concrete for the v-ditch and pipe headwalls. Flatbed trucks will occasionally deliver construction materials, such as lumber for framing concrete structures and fence materials. A maximum work force of 10 workers will be on the job at any one time. Construction will occur 6 days a week (Monday through Saturday) from 7 a.m. to 7 p.m.

Construction plans for the proposed action are provided in Attachment B.



Source: AECOM 2012

Exhibit 1 **Vicinity of the Action Area**

Source: GEI 2012, AECOM 2012

Exhibit 2 **Action Area and Elderberry Shrubs**

6 SPECIES ACCOUNT AND STATUS OF THE SPECIES IN THE ACTION AREA

The VELB require elderberry shrubs (*Sambucus* spp.) for food and reproduction, and all life stages (egg, larva, pupa, and adult) of the species rely on elderberry shrubs exclusively. Females lay their eggs on the bark. Upon hatching, larval beetles burrow into the pith of the stem where they remain for up to two years. Stems generally must be 1 inch in diameter to provide suitable habitat for larval beetles. Near the end of their lifespan, larval beetles burrow through the stem, creating a characteristic oval exit hole, and quickly morph through the pupal stage into adults. Adults are active (feeding and mating) from March to June, after which they die. Direct evidence of shrub occupation (i.e., observations of adult beetles) is rarely documented, and the most direct evidence of shrub occupation is the characteristic exit hole created by the larva during emergence from the stem. Loss of riparian habitat and non-riparian habitats occupied by elderberry shrubs has resulted from conversion of these habitats to developed and agricultural land uses, which has greatly reduced the availability of suitable habitat for the beetle and fragmented remaining areas of suitable habitat (USFWS 1980).

On June 28, 2012, AECOM biologists Joseph Huang and Matthew Silva surveyed the action area for blue elderberry shrubs (*Sambucus nigra* ssp. *caerulea* [formerly *Sambucus mexicana*]), which are known to occur in the area. All of the action area was surveyed in accordance with USFWS guidelines (USFWS 1999). This included measuring all stems greater than or equal to (≥) 1 inch in diameter at ground level, tabulating the measurements according to three diameter size classes: stems ≥ 1 inch and ≥ 3 inches; stems > 3 inches and < 5 inches; and stems ≥ 5 inches; and inspecting all elderberry stems for VELB exit holes. Following the guidelines, the elderberry shrubs were also categorized between riparian and non-riparian habitat. Reference photos were taken of each shrub (Attachment C).

Twelve elderberry shrubs are present within the action area (Exhibit 2). Table 1 shows the counts of stems ≥ 1 inch in diameter, whether the shrubs were riparian and non-riparian, and if any VELB exit holes were identified.

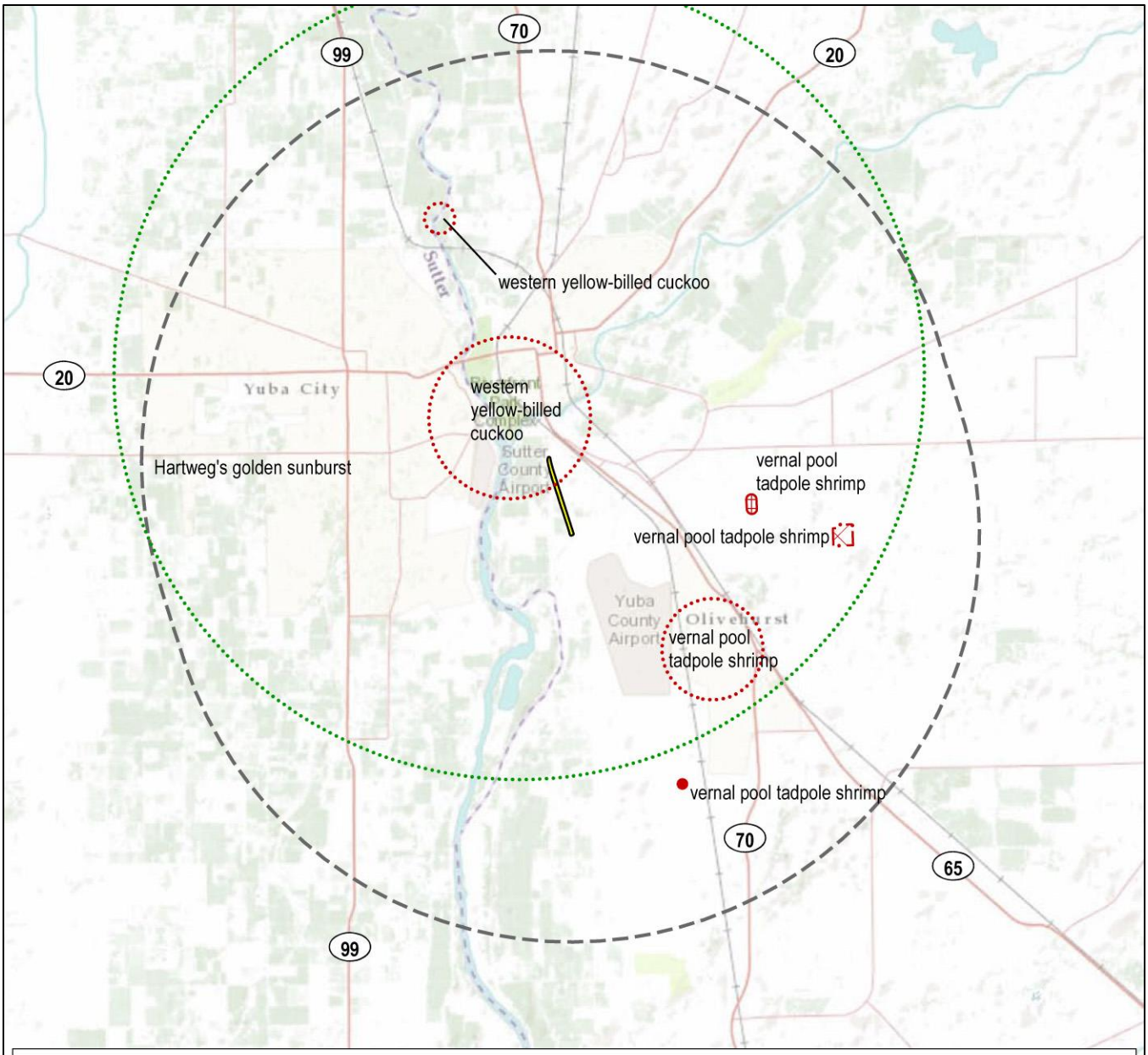
Table 1
Blue Elderberry Shrub Survey Results

Shrub No.	Stem Diameter Class			Riparian	Exit Holes
	≥ 1" & ≤ 3"	> 3" & < 5"	≥ 5"		
1	4	-	-	No	No
2	4	-	-	No	No
3	3	-	-	No	No
4	3	-	-	No	No
5	2	-	-	No	No
6	11	1	-	No	No
7	6	1	-	No	No
8	1	-	-	No	No
9	-	1	-	No	No
10	11	2	-	No	No
11	18	5	-	No	No
12	7	-	-	No	No
Total	**70**	**10**	**0**	0	0

Source: AECOM 2012

The survey tallied a total of 80 stems greater than 1 inch in diameter on 12 elderberry shrubs within the action area. No exit holes were found on the 12 shrubs. No riparian habitat exists within the action area.

The twelve shrubs are located along a fence on the eastern side (land side) of the levee along the Feather River (Exhibit 2). There are no CNDDB mapped occurrences of the VELB within 5 miles of the action area (Exhibit 3). VELB have been observed in the FRET mitigation area (USFWS and TRLIA 2010), however, which is less than 2 miles from the action area.



LEGEND

- Animal - Accuracy Class 1
- Animal - Accuracy Class 2
- Animal - Accuracy Class 3
- Animal - Accuracy Classes 4-9
- Plant - Accuracy Classes 4-9
- Action Area
- Five-Mile Buffer

0 1 2
MILES

NORTH

Base Map: ESRI Topographic
X 60242362 021 10/12

CNDDB Accuracy Class 1: Reported occurrence is a point; location considered accurate to within the minimum mappable unit of 80 meters.

CNDDB Accuracy Class 2: Reported location is an area with defined boundaries..

CNDDB Accuracy Class 3: Reported location is a non-specific area; buffer added to represent degree of uncertainty in reported location.

CNDDB Accuracy Classes 4-9: Reported location considered accurate within the radius shown.

Source: CNDDB 2012

Exhibit 3 **CNDDB Occurrences of Federal Listed Species (5-Mile Search Radius)**

7 EFFECTS OF THE PROPOSED ACTION

7.1 DIRECT AND INDIRECT EFFECTS TO SPECIES IN THE ACTION AREA

As defined under the ESA, direct effects are caused by the proposed project and occur at the time of the project. The area of direct effect within the action area consists of the area shown for the site plans and the access roads (Exhibit 2). Indirect effects are defined as those caused by the proposed project. They occur later in time but are reasonably certain to occur. No indirect effects are expected to occur. Direct effects are expected for all twelve shrubs. The shrubs are intertwined with or very near the existing fence that will be removed, requiring that all shrubs be removed.

7.2 EFFECTS OF INTERRELATED AND INTERDEPENDENT ACTIONS

There are no interrelated actions within the action area.

7.3 CUMULATIVE EFFECTS

Cumulative effects include effects of future state, tribal, local, or private actions that are reasonably certain to occur within the action area under consideration. Future federal actions within the action area that could potentially result in cumulative effects to federally listed species are not expected to occur following completion of the proposed action. Actions that are not subject to federal authorization or funding and that may alter the habitat or increase the incidental take of a federally listed species (and that therefore would have cumulative effects relative to the proposed action) are also not expected to occur within the action area.

8 AVOIDANCE AND CONSERVATION MEASURES

The VELB Conservation Guidelines (USFWS 1999) state that if suitable VELB habitat occurs on a project site or within close proximity to where VELB would be affected by the proposed action, these areas must be designated as avoidance areas and must be protected from disturbance during the construction and operation of the project. Avoidance is described as “complete avoidance” and is assumed when a 100-foot buffer is established and maintained around elderberry plants considered potential habitat for VELB. According to the VELB Conservation Guidelines (USFWS 1999), the minimum setback (i.e., core buffer) is at least 20 feet from the dripline of each elderberry plant.

Because effects to the 12 elderberry shrubs cannot be avoided and the shrubs will be removed, compensation is proposed (see 8.1, “Compensation”).

8.1 COMPENSATION

The transplantation of 12 elderberry shrubs from the action area shall be offset by planting elderberry shrub seedlings and associated native species consistent with the VELB Conservation Guidelines (USFWS 1999). Each transplanted elderberry stem measuring 1 inch or greater in diameter at ground level will be replaced with elderberry seedlings and seedlings of associated species, in accordance with these guidelines (USFWS 1999). Elderberry seedlings or cuttings will be replaced at ratios ranging from 1:1 to 3:1 (new plantings to affected stems), depending on the diameter of the affected elderberry stems. Other native plant species will be planted, in association with the replacement elderberry shrub seedlings or cuttings, at a 1:1 ratio. Table 2 summarizes the specific planting ratios used to determine the appropriate number of mitigation seedlings.

As mentioned in the Project Description (Section 2 of this BA), TRLIA previously established an elderberry shrub mitigation area as part of Segment 2 of the FRLRP. The elderberry mitigation area, known as the FRET, is

Table 2 Blue Elderberry Shrub Mitigation Plantings						
Transplanted Shrub No.	Elderberry Seedlings by Transplanted Shrub Stem Diameter Class			Native Associates by Transplanted Shrub Stem Diameter Class		
	≥ 1" & ≤ 3" Planting ratio 1:1	> 3" & < 5" Planting ratio 2:1	≥ 5" Planting ratio 3:1	≥ 1" & ≤ 3" Planting ratio 1:1	> 3" & < 5" Planting ratio 1:1	≥ 5" Planting ratio 1:1
1	4	-	-	4	-	-
2	4	-	-	4	-	-
3	3	-	-	3	-	-
4	3	-	-	3	-	-
5	2	-	-	2	-	-
6	11	2	-	11	1	-
7	6	2	-	6	1	-
8	1	-	-	1	-	-
9	-	2	-	-	1	-
10	11	4	-	11	2	-
11	18	10	-	18	5	-
12	7	-	-	7	-	-
Total	**70**	**20**	**0**	**70**	**10**	**0**

Source: AECOM 2012

currently owned and being managed by TRLIA to ensure the success of transplanted shrubs as well as elderberry and associated native plant seedlings. The 12 shrubs in the action area are proposed to be transplanted to the FRET and additional elderberry shrub and associated native plant seedlings would be planted in the FRET, where these additional plantings would be managed as part of the overall FRET mitigation area. Although the FRET has been established and is in the maintenance and monitoring phase, TRLIA has confirmed that additional room is available to accommodate the additional transplants and plantings.

8.1.1 BEST MANAGEMENT PRACTICES

During implementation of the proposed action and transplantation of the elderberry shrubs, the following best management practices will be implemented:

- No insecticides, herbicides, or other chemicals that might harm the beetle or its host plant shall be used within 100 feet of the elderberry shrubs.
- Dirt roadways and disturbed areas within 100 feet of elderberry shrubs shall be watered at least twice a day to minimize dust emissions.

8.1.2 TRANSPLANTATION METHODS

Elderberry site preparation, transplanting, and planting will be conducted according to the VELB Conservation Guidelines (USFWS 1999). Elderberry shrubs will be transplanted when the plants are dormant (November

through the first 2 weeks of February) to increase the success of transplanting. Transplantation will not occur during the beetle's flight season (March 15–June 15). A qualified biologist will monitor transplanting activity.

Transplanted elderberry shrubs may be cut back 3–6 feet above the ground or to 50% of their height (whichever is taller) prior to excavation, per guidance from USFWS. The trunk and all stems measuring 1 inch in diameter or greater at ground level will be replanted. All leaves on the shrubs will be removed. Shrubs will be removed with a Vemeer spade, backhoe, front-end loader, or other suitable equipment. During removal, as much of the root ball as possible will be excavated with the shrub. The root ball will be secured with wire and wrapped with burlap. The burlap will be dampened with water, as necessary, to keep the root ball wet. Roots will not be allowed to dry out. The shrub then will be immediately replanted and watered at the mitigation site. Care will be taken to ensure that soil is not dislodged from the root ball. If the planting site receiving the transplant does not have adequate soil moisture, the soil will be pre-wetted a day or two before transplantation. The root ball will be planted so that the top is level with the existing ground and the soil will be compacted so that settlement is minimized.

The planting area will be at least 1,800 square feet (0.04 acre) for every transplanted elderberry shrub. Tree and shrub species associated with elderberries will also be planted around the transplants. A watering basin measuring at least 3 feet in diameter with a continuous berm (approximately 8 inches wide at the base and 6 inches high) will be constructed around each transplanted elderberry shrub. Upon completion of planting, soil will be saturated with water. No fertilizers or other supplements will be used on the shrubs. The frequency of watering will be determined based on soil conditions present at the planting site. Either a drip irrigation system or a watering truck will be used to provide water to the site.

Each transplanted elderberry stem measuring 1 inch or greater in diameter at ground level will be replaced with elderberry seedlings and seedlings of associated species, in accordance with the VELB Conservation Guidelines (USFWS 1999). Stock of seedlings and/or cuttings will be obtained from local sources. Other native plant species will be planted in association with the replacement elderberry shrub seedlings or cuttings.

9 CONCLUSION

Implementation of the proposed action will require removal of 12 elderberry shrubs, which would result in potential adverse effects to the VELB. The elderberry shrubs did not have any exit holes and do not occupy riparian habitat. Compensation for potential unavoidable adverse effects to VELB will be provided in accordance with the VELB Conservation Guidelines (USFWS 1999). Elderberry shrubs will be transplanted to the FRET mitigation area during the shrubs' dormant season. Replacement elderberry cuttings or seedlings and associated plants of appropriate native species will also be planted in the mitigation area. The appropriate number of replacement plantings will be determined based on the size of the stems on the transplanted shrubs. The transplant area will include a minimum of 1,800 square feet (0.04 acre) for each transplanted shrub and up to three replacement elderberry seedlings and one associated native plant.

Implementation of the proposed project would adversely affect potential habitat for VELB and could result in take of the species. Based on implementation of compensation to offset adverse effects to shrubs, however, the proposed action would not jeopardize the continued existence of VELB.

10 LITERATURE CITED

California Natural Diversity Database (CNDDB). 2012. Results of electronic record search. California Department of Fish and Game, Wildlife and Habitat Data Analysis Branch. Sacramento, CA.

Department of Water Resources (DWR). 2012 (May). Urban Levee Design Criteria. Available: http://www.water.ca.gov/floodsafe/leveedesign/. Accessed October 8, 2012.

U.S. Army Corps of Engineers (USACE). 2008 (December 16). Department of the Army Permit SPK-2007-00578. Sacramento, CA.

_____. 2009 (April 10). Engineering and Design: Guidelines for Landscape Planting and Vegetation Management at Levees, Floodwalls, Embankment Damns, and Appurtenant Structures. Engineer Technical Letter (ETL) 1110-2-571. Available: http://140.194.76.129/publications/eng-tech-ltrs/etl1110-2-571/toc.htm. Accessed October 8, 2012.

U.S. Fish and Wildlife Service (USFWS). 1980. 50 CFR Part 17 Listing the Valley Elderberry Longhorn Beetle as a Threatened Species with Critical Habitat, Vol 45, No. 155. Available http://ecos.fws.gov/docs/federal_register/fr449.pdf. Accessed October 9, 2012.

_____. 1999. *Conservation Guidelines for the Valley Elderberry Longhorn Beetle*. Revised July 9. Sacramento, CA. Available: http://www.fws.gov/sacramento/ES/Survey-Protocols-Guidelines/Documents/velb_conservation.pdf. Accessed October 8, 2012.

_____. 2008 (September 29). Biological Opinion in the Proposed Feather River Levee Repair Project Segment 2 (USACE file number 200700578), Yuba County, California. Sacramento Fish and Wildlife Office. Sacramento, CA.

_____. 2012. Species List for Feather River Levee Segment 3 Access Toe Corridor Project. Olivehurst and Yuba City Quadrangles. September 25.

U.S. Fish and Wildife Service (USFWS) and Three Rivers Levee Improvement Authority (TRLIA). 2010. 2010 Annual Report for the Feather River Setback Levee Project Valley Elderberry Longhorn Beetle Mitigation Area. Yuba County, CA. Prepared by River Partners, Chico, CA.

ATTACHMENT A

USFWS Species List for Feather River Levee Segment 3
Toe Access Corridor Project

United States Department of the Interior
FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825

September 25, 2012

Document Number: 120925125702

Ellen Pimentel
AECOM
2020 L Street, Suite 400
Sacramento, CA 95811

Subject: Not specified

Dear: Interested party

We are sending this official species list in response to your September 25, 2012 request for information about endangered and threatened species. The list covers the California counties and/or U.S. Geological Survey 7½ minute quad or quads you requested.

Our database was developed primarily to assist Federal agencies that are consulting with us. Therefore, our lists include all of the sensitive species that have been found in a certain area *and also ones that may be affected by projects in the area*. For example, a fish may be on the list for a quad if it lives somewhere downstream from that quad. Birds are included even if they only migrate through an area. In other words, we include all of the species we want people to consider when they do something that affects the environment.

Please read Important Information About Your Species List (below). It explains how we made the list and describes your responsibilities under the Endangered Species Act.

Our database is constantly updated as species are proposed, listed and delisted. If you address proposed and candidate species in your planning, this should not be a problem. However, we recommend that you get an updated list every 90 days. That would be December 24, 2012.

Please contact us if your project may affect endangered or threatened species or if you have any questions about the attached list or your responsibilities under the Endangered Species Act. A list of Endangered Species Program contacts can be found here.

Endangered Species Division

U.S. Fish & Wildlife Service
Sacramento Fish & Wildlife Office

Federal Endangered and Threatened Species that Occur in or may be Affected by Projects in the Counties and/or U.S.G.S. 7 1/2 Minute Quads you requested

Document Number: 120925125702

Database Last Updated: September 18, 2011

Quad Lists

Listed Species

Invertebrates

Branchinecta conservatio
Conservancy fairy shrimp (E)

Branchinecta lynchi
vernal pool fairy shrimp (T)

Desmocerus californicus dimorphus
valley elderberry longhorn beetle (T)

Lepidurus packardi
vernal pool tadpole shrimp (E)

Fish

Acipenser medirostris
green sturgeon (T) (NMFS)

Hypomesus transpacificus
delta smelt (T)

Oncorhynchus mykiss
Central Valley steelhead (T) (NMFS)
Critical habitat, Central Valley steelhead (X) (NMFS)

Oncorhynchus tshawytscha
Central Valley spring-run chinook salmon (T) (NMFS)
Critical Habitat, Central Valley spring-run chinook (X) (NMFS)
winter-run chinook salmon, Sacramento River (E) (NMFS)

Amphibians

Rana draytonii
California red-legged frog (T)

Reptiles

Thamnophis gigas
giant garter snake (T)

Plants

Pseudobahia bahiifolia
Hartweg's golden sunburst (E)

Candidate Species

Birds

Coccyzus americanus occidentalis

Western yellow-billed cuckoo (C)

Quads Containing Listed, Proposed or Candidate Species:

YUBA CITY (544A)

OLIVEHURST (544D)

County Lists

No county species lists requested.

Key:

(E) *Endangered* - Listed as being in danger of extinction.

(T) *Threatened* - Listed as likely to become endangered within the foreseeable future.

(P) *Proposed* - Officially proposed in the Federal Register for listing as endangered or threatened.

(NMFS) Species under the Jurisdiction of the National Oceanic & Atmospheric Administration Fisheries Service. Consult with them directly about these species.

Critical Habitat - Area essential to the conservation of a species.

(PX) *Proposed Critical Habitat* - The species is already listed. Critical habitat is being proposed for it.

(C) *Candidate* - Candidate to become a proposed species.

(V) Vacated by a court order. Not currently in effect. Being reviewed by the Service.

(X) *Critical Habitat* designated for this species

Important Information About Your Species List

How We Make Species Lists

We store information about endangered and threatened species lists by U.S. Geological Survey 7½ minute quads. The United States is divided into these quads, which are about the size of San Francisco.

The animals on your species list are ones that occur within, **or may be affected by** projects within, the quads covered by the list.

- Fish and other aquatic species appear on your list if they are in the same watershed as your quad or if water use in your quad might affect them.
- Amphibians will be on the list for a quad or county if pesticides applied in that area may be carried to their habitat by air currents.
- Birds are shown regardless of whether they are resident or migratory. Relevant birds on the county list should be considered regardless of whether they appear on a quad list.

Plants

Any plants on your list are ones that have actually been observed in the area covered by the list. Plants may exist in an area without ever having been detected there. You can find out what's in the surrounding quads through the California Native Plant Society's online Inventory of Rare and Endangered Plants.

Surveying

Some of the species on your list may not be affected by your project. A trained biologist and/or botanist, familiar with the habitat requirements of the species on your list, should determine whether they or habitats suitable for them may be affected by your project. We recommend that your surveys include any proposed and candidate species on your list. See our Protocol and Recovery Permits pages.

For plant surveys, we recommend using the Guidelines for Conducting and Reporting Botanical Inventories. The results of your surveys should be published in any environmental documents prepared for your project.

Your Responsibilities Under the Endangered Species Act

All animals identified as listed above are fully protected under the Endangered Species Act of 1973, as amended. Section 9 of the Act and its implementing regulations prohibit the take of a federally listed wildlife species. Take is defined by the Act as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" any such animal.

> Take may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or shelter (50 CFR §17.3).

Take incidental to an otherwise lawful activity may be authorized by one of two procedures:

- If a Federal agency is involved with the permitting, funding, or carrying out of a project that may result in take, then that agency must engage in a formal consultation with the Service.

  During formal consultation, the Federal agency, the applicant and the Service work together to avoid or minimize the impact on listed species and their habitat. Such consultation would result in a biological opinion by the Service addressing the anticipated effect of the project on listed and proposed species. The opinion may authorize a limited level of incidental take.

- If no Federal agency is involved with the project, and federally listed species may be taken as part of the project, then you, the applicant, should apply for an incidental take permit. The Service may issue such a permit if you submit a satisfactory conservation plan for the species that would be affected by your project.

  Should your survey determine that federally listed or proposed species occur in the area and are likely to be affected by the project, we recommend that you work with this office and the California Department of Fish and Game to develop a plan that minimizes the project's direct and indirect impacts to listed species and compensates for project-related loss of habitat. You should include the plan in any environmental documents you file.

Critical Habitat

When a species is listed as endangered or threatened, areas of habitat considered essential to its conservation may be designated as critical habitat. These areas may require special management considerations or protection. They provide needed space for growth and normal behavior; food, water, air, light, other nutritional or physiological requirements; cover or shelter; and sites for breeding, reproduction, rearing of offspring, germination or seed dispersal.

Although critical habitat may be designated on private or State lands, activities on these lands are not restricted unless there is Federal involvement in the activities or direct harm to listed wildlife.

If any species has proposed or designated critical habitat within a quad, there will be a separate line for this on the species list. Boundary descriptions of the critical habitat may be found in the Federal Register. The information is also reprinted in the Code of Federal Regulations (50 CFR 17.95). See our Map Room page.

Candidate Species

We recommend that you address impacts to candidate species. We put plants and animals on our candidate list when we have enough scientific information to eventually propose them for listing as threatened or endangered. By considering these species early in your planning

process you may be able to avoid the problems that could develop if one of these candidates was listed before the end of your project.

Species of Concern

The Sacramento Fish & Wildlife Office no longer maintains a list of species of concern. However, various other agencies and organizations maintain lists of at-risk species. These lists provide essential information for land management planning and conservation efforts. More info

Wetlands

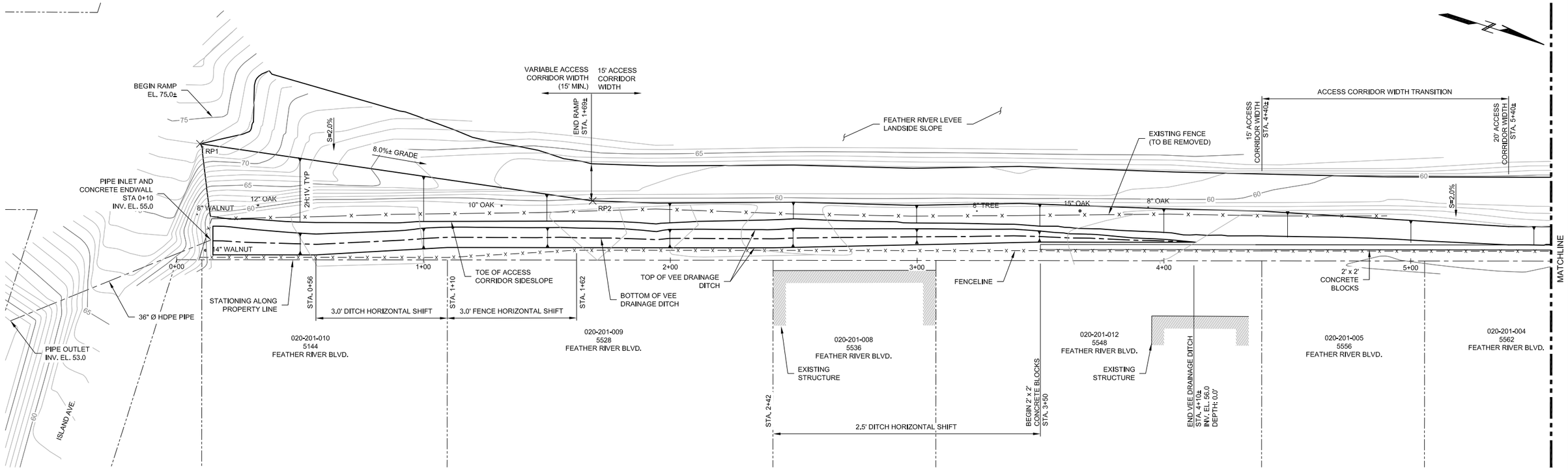
If your project will impact wetlands, riparian habitat, or other jurisdictional waters as defined by section 404 of the Clean Water Act and/or section 10 of the Rivers and Harbors Act, you will need to obtain a permit from the U.S. Army Corps of Engineers. Impacts to wetland habitats require site specific mitigation and monitoring. For questions regarding wetlands, please contact Mark Littlefield of this office at (916) 414-6520.

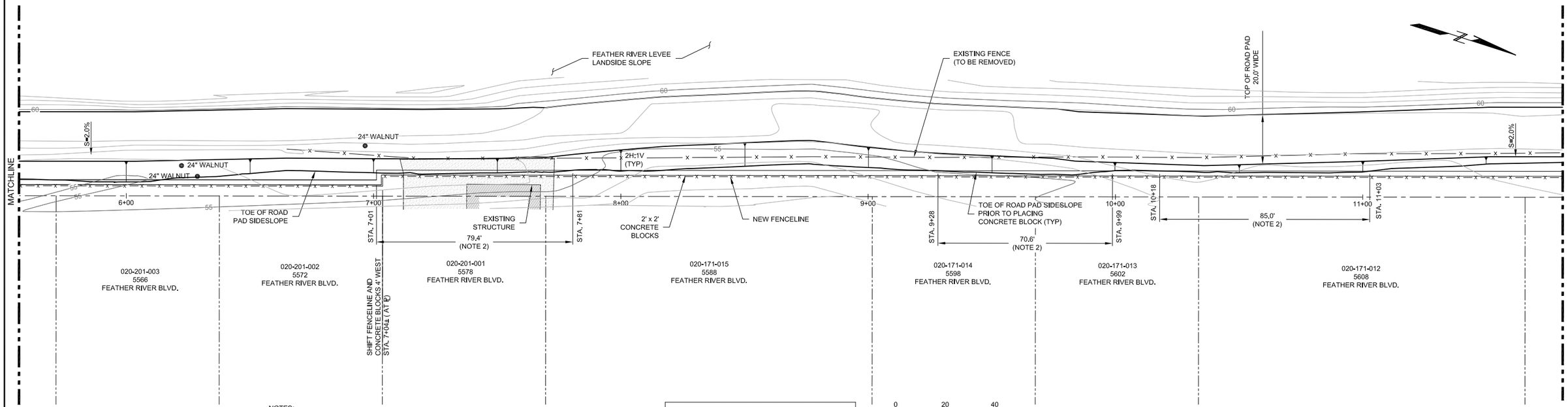
Updates

Our database is constantly updated as species are proposed, listed and delisted. If you address proposed and candidate species in your planning, this should not be a problem. However, we recommend that you get an updated list every 90 days. That would be December 24, 2012.

ATTACHMENT B

Levee Toe Road and Drainage Plan





0 20 40
SCALE, FEET

DRAFT-WORK IN PROGRESS

FIGURE NO.	DESCRIPTION
1	LEVEE TOE ROAD AND DRAINAGE PLAN (SHEET 1 OF 4)
2	LEVEE TOE ROAD AND DRAINAGE PLAN (SHEET 2 OF 4)
3	LEVEE TOE ROAD AND DRAINAGE PLAN (SHEET 3 OF 4)
4	LEVEE TOE ROAD AND DRAINAGE PLAN (SHEET 4 OF 4)
5	ISLAND AVE. CULVERT CROSSING PLAN AND PROFILE
6	TYPICAL SECTIONS AND DETAILS
7	SECTIONS (SHEET 1 OF 5)
8	SECTIONS (SHEET 2 OF 5)
9	SECTIONS (SHEET 3 OF 5)
10	SECTIONS (SHEET 4 OF 5)
11	SECTIONS (SHEET 5 OF 5)

NOTES:

1. AT LOCATIONS WHERE THE WEST ROAD HINGE RISES ABOVE EL. 59, BEGIN THE 2.0% TOE ROAD CROSS SLOPE AT THE ELEVATION OF THE EXISTING HINGE, EXCEPT AS SHOWN IN TABLE 1.
2. ROAD PAD FILL OVERLAPS WITH 2' X 2' CONCRETE BLOCKS IN SEVERAL LOCATIONS IDENTIFIED IN THE PLANS. PLACE CONCRETE BLOCKS PRIOR TO ROAD FILL.
3. PLACE FILL ON THE EXISTING LANDSIDE LEVEE SLOPE BETWEEN STATIONS 44+50 AND 47+38 TO FLATTEN THE SIDE SLOPE TO 2H:1V. THE ROAD WIDTH WILL REDUCE SLIGHTLY WITHIN THIS REACH, AND MAY ABUT DIRECTLY AGAINST THE CONCRETE BLOCKS.

TABLE 1: ROAD PAD ALIGNMENT DEVIATION

POINT	STATION	℄ OFFSET (FT)	APPROX. ELEVATION
RP1	0+00	46.94 (L)	74.0
RP2	1+69	24.00 (L)	62.1
RP3	30+17	30.62 (L)	59.7
RP4	31+03	35.54 (L)	61.7
RP5	32+34	36.04 (L)	61.2
RP6	32+66	31.07 (L)	59.4

Oakland • California
GEI Consultants

Feather River Levee Rehabilitation Project

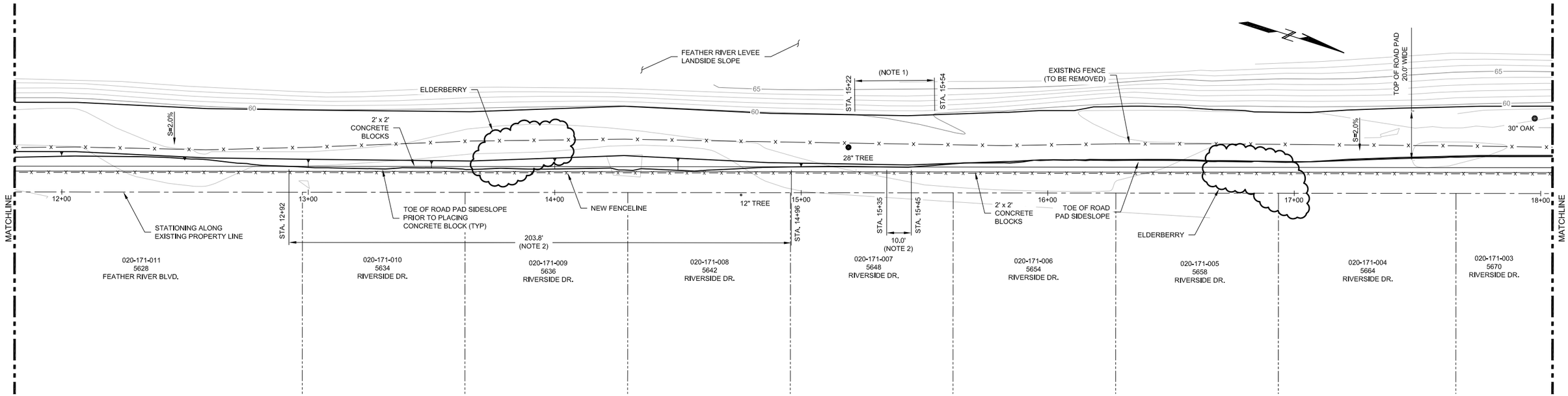
GEI Project 050115

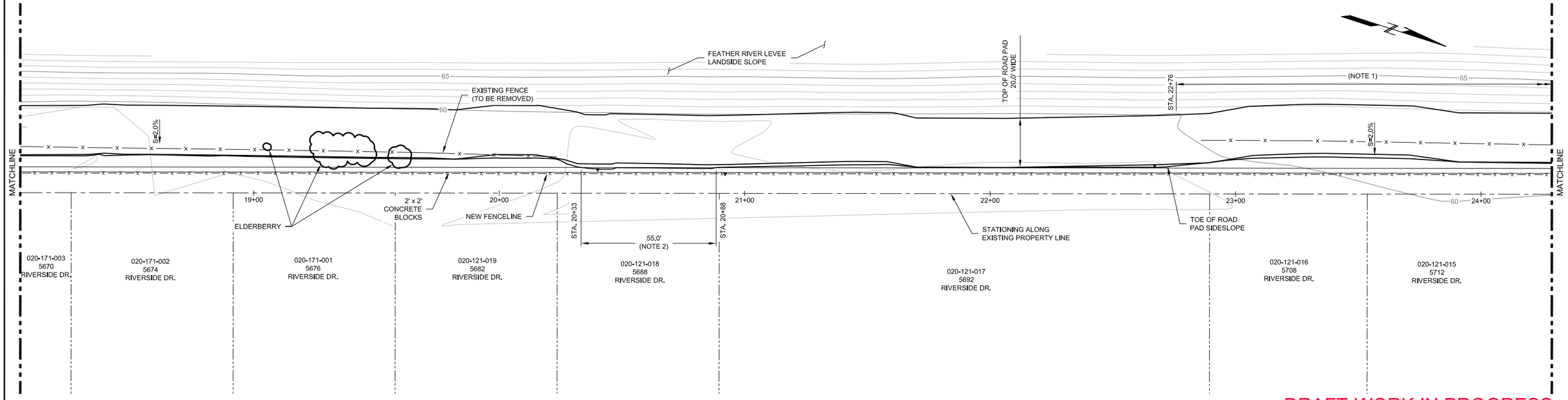
THREE RIVERS LEVEE IMPROVEMENT AUTHORITY
1114 Yuba Street, Suite 218
Marysville, CA 95901

LEVEE TOE ROAD AND DRAINAGE PLAN (SHEET 1 OF 4)

04/20/12

FIGURE 1





DRAFT-WORK IN PROGRESS

NOTES:

1. NOTE AND TABLE FOR THE TOE ROAD PLAN SHEETS ARE PROVIDED ON SHEET 1.

0 20 40
SCALE, FEET

Oakland • California
GEI Consultants

Feather River Levee Rehabilitation Project

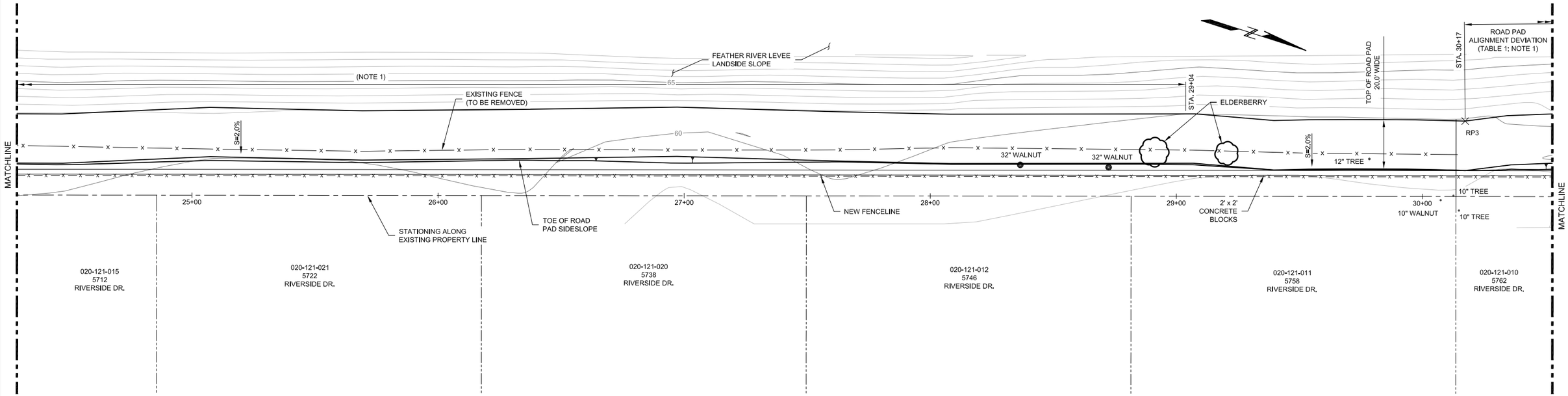
GEI Project 050115

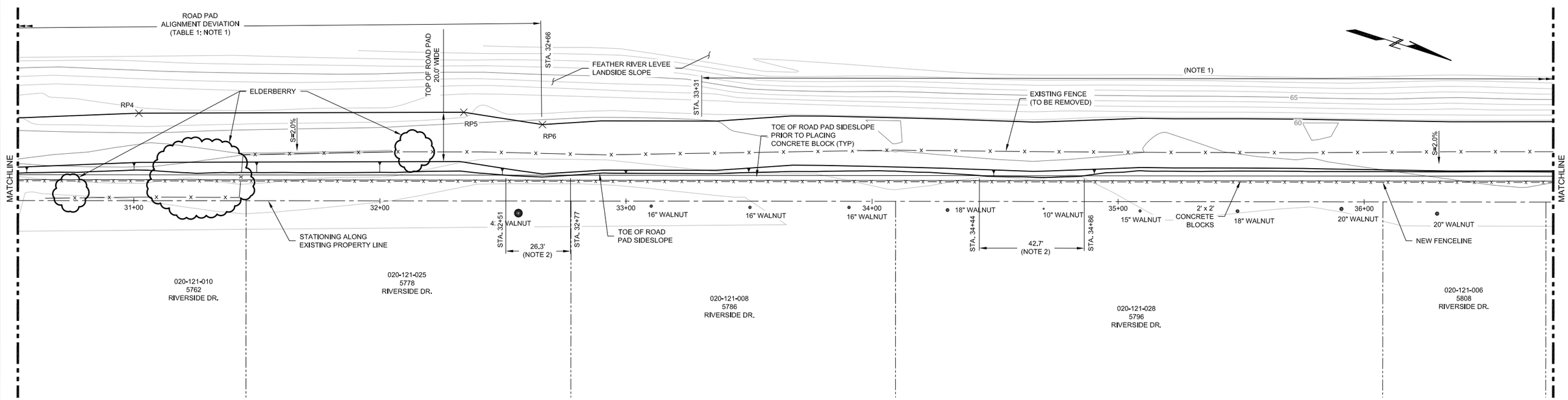
THREE RIVERS LEVEE IMPROVEMENT AUTHORITY
1114 Yuba Street, Suite 218
Marysville, CA 95901

LEVEE TOE ROAD AND DRAINAGE PLAN (SHEET 2 OF 4)

04/20/12

FIGURE
2





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SCALE, FEET

Oakland • California
GEI Consultants

Feather River Levee Rehabilitation Project

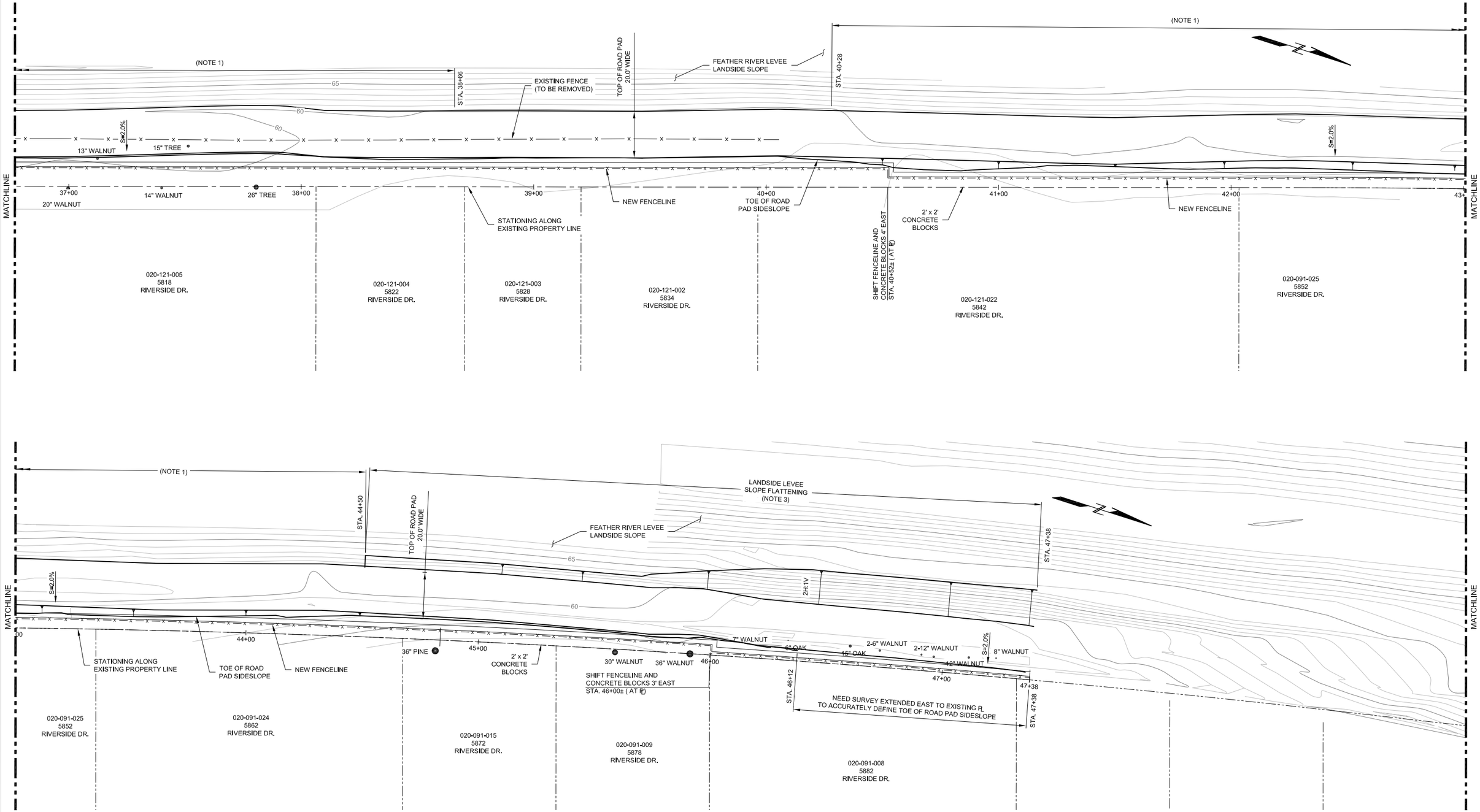
GEI Project 050115

THREE RIVERS LEVEE IMPROVEMENT AUTHORITY
1114 Yuba Street, Suite 218
Marysville, CA 95901

LEVEE TOE ROAD AND DRAINAGE PLAN (SHEET 3 OF 4)

04/20/12

FIGURE
3



DRAFT-WORK IN PROGRESS

NOTES:

1. NOTE AND TABLE FOR THE TOE ROAD PLAN SHEETS ARE PROVIDED ON SHEET 1.

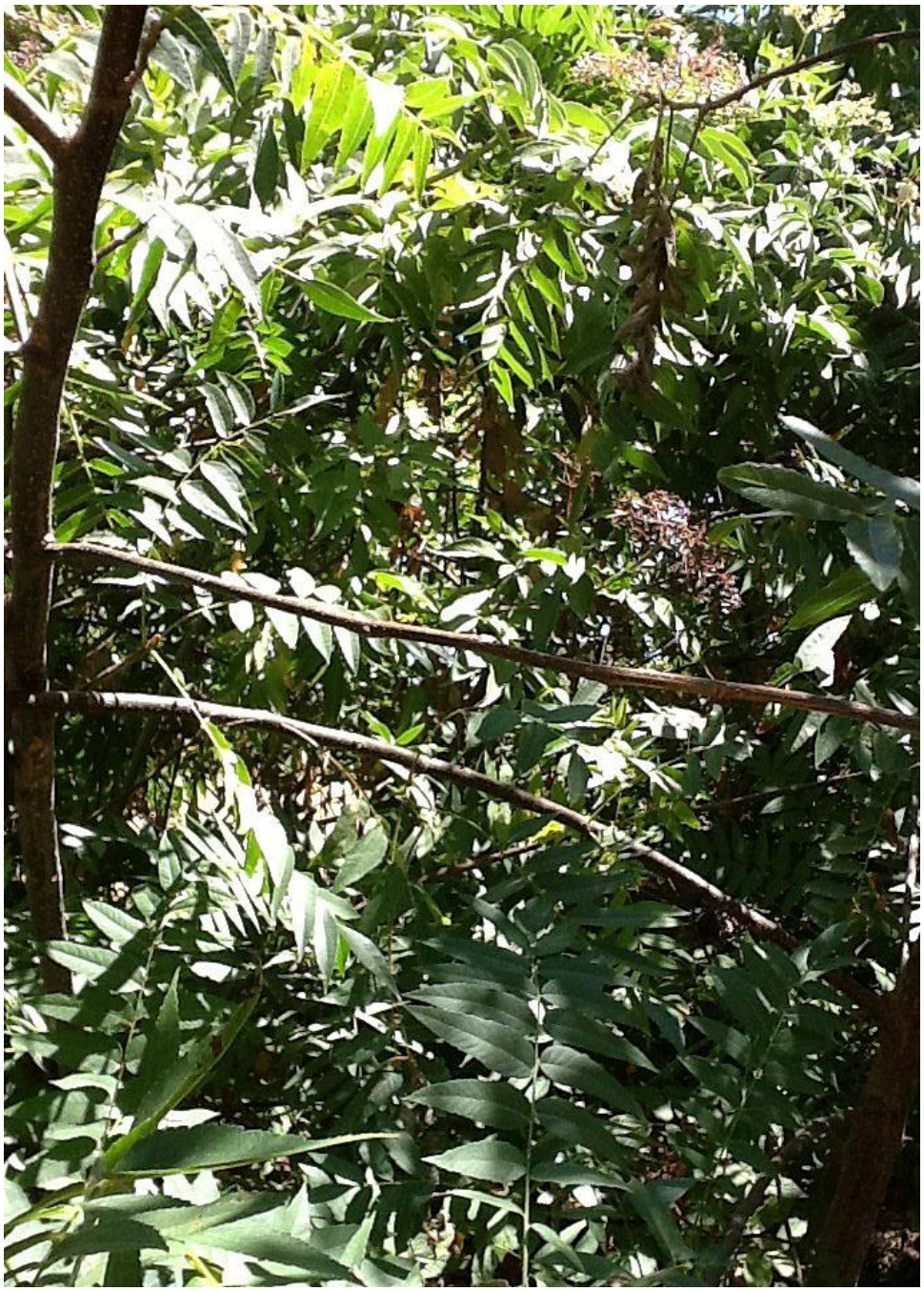
0 20 40
SCALE, FEET

Oakland • California GEI Consultants	Feather River Levee Rehabilitation Project GEI Project 050115	THREE RIVERS LEVEE IMPROVEMENT AUTHORITY 1114 Yuba Street, Suite 218 Marysville, CA 95901	LEVEE TOE ROAD AND DRAINAGE PLAN (SHEET 4 OF 4)	04/20/12 FIGURE 4

ATTACHMENT C

Photographs of Elderberry Shrubs

Shrub 1. June 28, 2012.



Shrub 2. June 28, 2012.

Shrub 3. June 28, 2012.

Shrub 4. June 28, 2012.

Shrub 5. June 28, 2012.

Shrub 6. June 28, 2012.

Shrub 7. June 28, 2012.

Shrub 8. June 28, 2012.

Shrub 9. June 28, 2012.

Shrub 10. June 28, 2012.

Shrub 11. June 28, 2012.

Shrub 12. June 28, 2012.

THREE RIVERS LEVEE IMPROVEMENT AUTHORITY

1114 Yuba Street, Suite 218
Marysville, CA 95901
Office (530) 749-7841 Fax (530) 749-6990

MINUTE ORDER

THREE RIVERS LEVEE IMPROVEMENT AUTHORITY

OCTOBER 30, 2012

D. Approve Addendum No. 5 to the environmental impact report for the Feather River Levee Repair Project. Design Manager Larry Dacas recapped the addendum, report, project, and responded to Board inquiries.

MOTION: Move to approve MOVED: Jerry Crippen SECOND: Don Graham
AYES: Rick Brown, Jerry Crippen, Don Graham, Mary Jane Griego, John Nicoletti
NOES: None ABSTAIN: None ABSENT: None

The foregoing is an accurate statement of the action taken on the above date and on file in this office in the Official Minutes of the Three Rivers Levee Improvement Authority, County of Yuba, State of California.

ATTEST: DONNA STOTTLEMEYER
CLERK OF THE BOARD OF SUPERVISORS
AND EX-OFFICIO SECRETARY OF THE AUTHORITY

Donna Stottlemeyer

Date: November 6, 2012
Distribution: State of California

ENDORSED FILED

Print Form

NOV 07 2012

TERRY A. HANSEN, County Clerk
BY DOROTHY MARTIN
Deputy Clerk

COPY

Notice of Determination

Appendix D

To:

☒ Office of Planning and Research

U.S. Mail: P.O. Box 3044, Sacramento, CA 95812-3044

Street Address: 1400 Tenth St., Rm 113, Sacramento, CA 95814

☒ County Clerk
County of: Yuba
Address: 915 8th Street, Suite 107
Marysville, CA 95901

From:
Public Agency: Three Rivers Levee Imp. Authority
Address: 1114 Yuba Street, Suite 218
Marysville, CA 95901
Contact: Paul Brunner, P.E.
Phone: (530) 749-7841

Lead Agency (if different from above):
Address:
Contact:
Phone:

SUBJECT: Filing of Notice of Determination in compliance with Section 21108 or 21152 of the Public Resources Code.

State Clearinghouse Number (if submitted to State Clearinghouse): 2006062071

Project Title: Addendum 5 to the Environmental Impact Report for the Feather River Levee Repair Project

Project Applicant: Three Rivers Levee Improvement Authority

Project Location (include county): Segment 3 of the FRLRP, north of Island Avenue, Yuba County

Project Description:

The following refinements are proposed for FRLRP Alternative 2 (the approved project) since the FRLRP EIR was certified and Alternative 2 was approved for implementation: establishment of a 0.9-mile-long, 20-foot-wide toe access corridor on the land side of the Segment 3 levee, construction of a 10-foot high cyclone fence along the landward limit of the 0.9-mile-long toe access corridor, and removal and relocation of 12 elderberry shrubs within the newly established 20-foot-wide toe access corridor. Elderberry shrubs will be relocated to the existing Feather River Elderberry Transplant (FRET) area.

This is to advise that the Three Rivers Levee Improvement Authority (☒ Lead Agency or ☐ Responsible Agency) has approved the above described project on October 30, 2012 (date) and has made the following determinations regarding the above described project.

1. The project [☒ will ☐ will not] have a significant effect on the environment.
2. ☒ An Environmental Impact Report was prepared for this project pursuant to the provisions of CEQA.
   ☐ A Negative Declaration was prepared for this project pursuant to the provisions of CEQA.
3. Mitigation measures [☒ were ☐ were not] made a condition of the approval of the project.
4. A mitigation reporting or monitoring plan [☒ was ☐ was not] adopted for this project.
5. A statement of Overriding Considerations [☒ was ☐ was not] adopted for this project.
6. Findings [☒ were ☐ were not] made pursuant to the provisions of CEQA.

This is to certify that the final EIR with comments and responses and record of project approval, or the negative Declaration, is available to the General Public at:
Three Rivers Levee Improvement Authority, 1114 Yuba Street, Ste. 218, Marysville, CA 95901

Signature (Public Agency): Paul G. Brunner Title: Executive Director

Date: November 2, 2012 Date Received for filing at OPR:

Authority cited: Sections 21083, Public Resources Code.
Reference Section 21000-21174, Public Resources Code.

Revised 2011

2012FG-00042

MEETING

STATE OF CALIFORNIA

THE RECLAMATION BOARD

OPEN SESSION

RESOURCES BUILDING

1416 NINTH STREET

AUDITORIUM

SACRAMENTO, CALIFORNIA

FRIDAY, JUNE 8, 2007

12:30 P.M.

JAMES F. PETERS, CSR, RPR
CERTIFIED SHORTHAND REPORTER
LICENSE NUMBER 10063

PETERS SHORTHAND REPORTING CORPORATION (916) 362-2345

APPEARANCES

BOARD MEMBERS

Mr. Benjamin Carter, President

Mr. Butch Hodgkins, Vice President

Ms. Lady Bug Doherty, Secretary

Ms. Rose Marie Burroughs, Member

Ms. Teri Rie, Member

STAFF

Mr. Jay Punia, General Manager

Mr. Stephen Bradley, Chief Engineer

Ms. Nancy Finch, Legal Counsel

Mr. Dan Fua, Supervising Engineer

Ms. Lorraine Pendlebury, Staff Assistant

DEPARTMENT OF WATER RESOURCES

Mr. Mark Herold, Chief, Floodway Protection Section

ALSO PRESENT

Mr. Paul Brunner, Three Rivers Levee Improvement Authority

Mr. Tom Eres, Hofman Ranch

Mr. Thomas Foley, Concerned Citizens for Responsible Growth

Mr. Randy Margo, County of Yuba

Mr. Robert Naylor, representing Mr. and Mrs. Thomas Rice

APPEARANCES CONTINUED

ALSO PRESENT

Mr. Ric Reinhardt, Three Rivers Levee Improvement Authority

Mr. Thomas Rice, Rice River Ranch

Mr. Jim Sandner, United States Army Corps of Engineers

Mr. Scott Shapiro, Three Rivers Levee Improvement Authority

Dr. Dale Smith, Alfa Omega Associates

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REQUESTED ACTIONS

3. Applications

Three Rivers Levee Improvement Authority - Application No. 18170, Yuba County

(A) Consider approval of Cooperation Agreement with TRLIA for the Left Bank Feather and Yuba River Levees Project as described in item (C) 2

(B) Consider approval of a letter to the U.S. Army Corps of Engineers requesting modification of federal flood control project as described in item (C) 2

(C) Consider approval of the strengthening of the left (east) bank levee of Feather River by construction of slurry cutoff walls, stability berms, and waterside blankets between Levee Miles 13.3 to 17.1 and 23.6 to 26.1; and reshaping the levee crown on the left (south) bank levees of Yuba and Feather Rivers. The project is in Yuba County within Reclamation District 784 2

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PROCEEDINGS

PRESIDENT CARTER: Good afternoon, ladies and gentlemen. Thank you very much for your patience. Welcome to the State Reclamation Board meeting.

If General Manager Punia would please call the roll.

GENERAL MANAGER PUNIA: Jay Punia, General Manager of the Reclamation Board.

For the record, Board Member -- except for Board Member Teri Rie, the rest of the Board members are here. And I saw Teri. She's on her way and she will be here pretty soon.

PRESIDENT CARTER: Very good. Thank you.

At this time we'll consider approval of the agenda for today.

Are there any suggested changes or amendments to the agenda for today?

Just as a note, we neglected to put a time on Item 4 of the closed session. We are going to try and hold that closed session as close to 2:30 as we can. Hopefully we'll be done with our Item 3 by that time. But we're going to try and stick to that schedule.

SECRETARY DOHERTY: At 3:30?

PRESIDENT CARTER: At 2:30. So approximately two hours from now.

So I will entertain a motion to approve.

SECRETARY DOHERTY: I'll make a motion that we approve the agenda as presented.

PRESIDENT CARTER: Is there a second?

VICE-PRESIDENT HODGKINS: Second.

PRESIDENT CARTER: We have a second.

Any further discussion?

All those in favor indicate by saying aye.

(Ayes.)

VICE-PRESIDENT HODGKINS: Aye.

Sorry about that.

PRESIDENT CARTER: Opposed?

Very good. The motion carries.

Thank you. All right. We will move on to Item 3, Applications.

This is Three Rivers Levee Improvement Authority, Application No. 18170 in Yuba County.

Mr. Fua.

(Thereupon an overhead presentation was Presented as follows.)

SUPERVISING ENGINEER FUA: Thank you. And good afternoon, Mr. President and Board members. For the record, my name is Dan Fua, the Board's Supervising Engineer. I'm here to present the Three Rivers application 18170 for your consideration for approval.

Before I will proceed with my presentation I would like to alert the Board members of a new addendum to your packet that was inserted in your binder. And that includes the revised draft permit.

--o0o--

SUPERVISING ENGINEER FUA: It includes the revised Corps letter. We found a typo there. So that's the only change. And also the Attachment C, the cooperation agreement.

--o0o--

SUPERVISING ENGINEER FUA: At our last Board meeting last May you directed staff to work with the applicant to resolve the easement conditions as specified in Condition 14 of the first draft of this new permit. You also directed staff to revise the Corps letter that we sent last May first in response for staff's statement at the Board meeting that that draft letter -- that letter on May 1st was not adequate and that they need assurance from the Board that the Board will accept the modified project for operation and maintenance and also to provide assurances for indemnification from liability arising out of this project.

Also, in connection with the Corps's requirements, the state in turn is requesting the same assurances from the local agencies, Three Rivers, Yuba

County, and Reclamation District No. 784. Staff is recommending to accomplish this through a cooperation agreement.

I'd like to refresh the memory of everybody about this application. Again, the applicant is seeking an encroachment permit for modifications to the left bank of the Feather River and Yuba River levees.

--o0o--

SUPERVISING ENGINEER FUA: The proposed project -- this is a slide of the east Feather levee, the location of the project. This is the Feather River, this is the Yuba, and this is the Bear. This is the new setback levee for Bear -- the new setback levee. And this is the Yuba levee -- south levee.

Segment 1 is this area here. And the proposed modification consists of slurry cutoff wall, waterside blankets, and relief wells.

Segment 3, modifications and improvements include slurry cutoff wall; stability berm; waterside slope flattening to achieve 3-to-1 slope; and crown reshaping in two locations, one in the Yuba east levee and one in the Feather River east levee.

--o0o--

SUPERVISING ENGINEER FUA: So at your direction we met with the applicant to resolve the easement problems

that we had at the last meeting. We reviewed the existing land uses of the area, segment 1 and segment 3. And this slide is the location of segment 1.

So as you can see, the existing land use in this segment is agricultural. So staff determined that it would be feasible to acquire a 50-foot easement on the landward toe of the levee in this area. We do recommend that, you know, such easement should not preclude the existing and future agricultural practices provided it's not inconsistent with the easement of the levee.

--o0o--

SUPERVISING ENGINEER FUA: This is segment 3. This is the Yuba levee. This is Highway 70 here. So segment 3 starts at the west end of the Union Pacific Railroad and about 2.8 miles downstream.

As you can see here, this is an aerial photo again. The area adjacent to the levee -- this is the levee here -- is mostly developed, consisting of residential areas over here and other structures, including the Linda Water District wastewater treatment plant over here.

There is also an existing CalTrans environmental mitigation area along the levee in this area here.

So because of that level of development, staff recommends to the Board that the standard ten-foot

easement will be required for this segment, segment number 3.

Staff also determined that the original requirement to acquire easement in the floodway is not critical because the Board regulates the floodway anyway. So staff recommends that we eliminate that requirement.

--o0o--

SUPERVISING ENGINEER FUA: In summary, the easements that we have agreed with are the following: Floodway, none; segment 1, 50 feet; and segment 3, 10 feet.

--o0o--

SUPERVISING ENGINEER FUA: Staff -- this is the -- this line outlines the reason why staff believes that a 50-foot easement is necessary or should be required from the landward toe of the levee where its feasible.

First, it's for flood-fighting purposes. The experienced-base minimum setback requirements for structures is 50 feet for -- you know, during flood fights for safety of the crew, for efficiently moving equipment like -- huge equipment, for having staging area where we not normally, you know, bring in, you know, a lot of stuff for flood-fighting purposes like rocks and sand. Trap traffic also.

This 50-foot easement or setback requirement is

even recommended by the Sacramento River Corridor Planning Forum in their floodway management plan. So this is not something that -- well, as I've said earlier, this is experienced-based requirement, the 50-foot setback from the toe of the levee.

Second, the area is projected to be highly urbanized. And therefore we should have a wider buffer between human habitation and the flood control system, based on our experience with difficulty on regulating encroachments from the people living near the levee. It is our experience that people living near a levee extends their backyard fences. They plant and install irrigation systems near our levees and build structures such as steps on the slopes of our levees.

The Feather River east levee also has a history of failure. And despite all the improvements that the Corps of Engineers did in the last several decades, we continue to experience seepage problems there. So therefore we need to have some space for future operations -- modification or repairs for the levee.

And also, you know, future levee repairs is really likely. Like why do you need a footprint of our existing levee? Because of the uncertainties in the subsurface and foundation materials for authorization, which we use to select and design modification and

outbreaks.

Also, we had some uncertainty in the performance and effectiveness of current control measures.

Also, the changing Corps criteria. And of course the state -- the new state plan of flood control and global warming.

--o0o--

SUPERVISING ENGINEER FUA: The environmental findings. The proposed project does not involve raising levees above the 1957 profile or beyond any authorized levee raises. Nor is realigning or moving levees.

Based on the information that the applicant provided to us, the net additional flow in the Feather River is about two cfs -- two cubic feet per second. Considering that the channel capacity in this location is 300,000 cubic feet per second, we believe that that impact is very -- maybe not measurable an therefore not a significant impact.

Three Rivers had certified a final EIR for all the proposed improvement works in the east levee of the Feather River within Reclamation District 784, including the proposed project in this application.

Environmental impacts of this project within the jurisdiction of the Board includes construction related to erosion problems, and construction-related runoff and

spills. And the applicant has proposed to mitigate these impacts -- potential impacts by using best management practices during construction, complying with a storm water protection program plan and also complying with the waste discharge requirements that will be issued by the Regional Water Quality Control Board.

--o0o--

SUPERVISING ENGINEER FUA: The draft Corps letter. The two things that we had in this drafting -- in that draft is to provide assurance to the Corps. So they requested that we accept the modified project when completed for operations and maintenance.

And the second one is to indemnify the U.S. Government for any liability arising out of this project.

--o0o--

SUPERVISING ENGINEER FUA: So for staff -- well, for the -- in connection with these requirements by the Corps, the state in turn is requesting the same assurances from the local agencies, the Three Rivers, RD 784, and Yuba County. And staff is recommending to accomplish this through a cooperation agreement. And this cooperation agreement includes that the district, RD 784, perform operations and maintenance for this project when completed; and also that Three Rivers, Yuba county, and

Reclamation District 784 indemnify the state from all liabilities arising out of this project.

--o0o--

SUPERVISING ENGINEER FUA: Staff recommendation.

Staff requests that the Board make findings that the environmental impacts of this project within the jurisdiction of the Board have been mitigated or avoided as a result of proposed changes, alterations, and mitigations incorporated into the project; that mitigation measures set forth in the Three Rivers certified EIR relating to flood control and public safety are hereby adopted; and that Three Rivers mitigation and monitoring plan be incorporated by reference; that based on the evidence presented to the Board, the project will not result in hydraulic impacts that will have a significant effect on the environment.

Staff also requests that the Board approve the draft revised letter to the U.S. Army Corps of Engineers to request a review of the proposed modification project.

Staff also requests the Board to approve the draft cooperation agreements among Three Rivers, Yuba County, Reclamation District 784, and the State Reclamation Board.

Also requests that the Board approve the 50-foot easement required for segment 1 to provide adequate room

for levee expansion, modification and upgrades, flood fights, operations and maintenance, and buffer from urban encroachment.

And, finally, I request the Board to approve Permit No. 18170 for the project and delegate the authority to the General Manager to finalize and issue the permit.

And I would like to point out that the permit has a couple of late changes that are in your packet -- the addendum to your packet that you have today. And those are Conditions 19 and 17.

And that concludes my presentation, and I'd be willing to answer any questions you may have.

PRESIDENT CARTER: Are there questions for Mr. Fua?

SECRETARY DOHERTY: I have some questions.

We've put people in space, man on the moon. We've got the greatest technology of all available to us. And yet we're talking about looking to levee failures in the future, and that's why we need this 50-foot setback. I mean we're testing the soils, we're doing everything we can do to make sure that things are right.

Now, why are we stating "future levee repairs"? Are we going to have to repair some more?

SUPERVISING ENGINEER FUA: Well, we just want to

be conservative, because, as I've said, the Corps had repaired these levees for the last several decades starting in 1936, and they're employing the same technology or measures that we have that the applicant is proposing: Cutoff wall, seepage berms, waterside blankets. And they continue to fail.

And also, you know, subsurface investigation is not an exact science because you really can't see underneath -- the whole thing underneath. You could miss something there. So there are uncertainties in this technology.

PRESIDENT CARTER: Are there other questions for Mr. Fua?

I have one. On the staff report, page 4, item 3, it talks about the flood fight activities, the minimally acceptable distance for work crew safety and efficient use of equipment is the 50 feet.

Who's standard is that. Is that --

SUPERVISING ENGINEER FUA: It's --

PRESIDENT CARTER: Sacramento River Corridor Planning Forum or --

SUPERVISING ENGINEER FUA: It's nobody's standard. It's recommended by the Sacramento River Flood -- Corridor Flood -- Corridor Planning Flood Management Plan. And in that draft, they recommended that

a 50-foot setback from the toe of the levee is the minimum adequate setback for flood fighting. And, you know, the forum consists of organizations that are, you know, in the flood business: Reclamation districts, Department of Water Resources, the SAFCA, and, as I've said, other Central Valley flood agencies.

PRESIDENT CARTER: So is it staff's position that they will be requesting this kind of a setback on all future projects?

SUPERVISING ENGINEER FUA: Yes. As I've said, where it's feasible we would like to request that easement -- 50-foot easement. Although, you know, we don't want to be requiring removal of the six-inch structures just to achieve that 50-foot setback.

In addition, you know, we're also saying that there's an -- recommending that, you know, we do not take that area unless necessary and not preclude assisting agricultural activities, you know. In other words, farmers can continue to plant, you know, that area or grow in that area until we need it.

PRESIDENT CARTER: So if somebody has an orchard there, they continue to -- the trees remain in place until such time as the Rec Board decides that -- or DWR I guess decides that they need to be removed for maintenance activities?

SUPERVISING ENGINEER FUA: That's correct. That's our recommendation.

PRESIDENT CARTER: Okay.

SECRETARY DOHERTY: One more question.

In that same area, it says changing Corps criteria. Does that mean future changes or does that mean changes up to this point?

SUPERVISING ENGINEER FUA: Future changes. Like there's some talk about reducing the seepage criteria from -- basic gradient from .5 to maybe .4.

PRESIDENT CARTER: Any other questions for Mr. Fua?

Okay.

VICE-PRESIDENT HODGKINS: I do have one.

It says a 10-foot easement in the area that's developed. And yet we have Corps white paper like this out in effect that says it has to be 15 feet or the levee will not be certifiable or certified in the future.

Can you help me to understand -- I'm not questioning the 10 foot. But I just was wondering either from staff's point or the applicant's point of view, given we have that guidance, and we have an issue coming why we aren't taking 15 feet in the area that's a little development includes taking more. Does staff have thoughts?

CHIEF ENGINEER BRADLEY: Yeah, I had thoughts. The regs actually only require the 10 from The Rec Board. The Corps has discussed the 15 feet. That's not a policy yet. I think it's up to the Board to make -- decide whether they would like that. We did have discussions with the applicant. And it looks like Mr. Shapiro would like to address this issue.

I'm letting him -- be more than happy to hear what he has to say.

PRESIDENT CARTER: Well, just to kind of follow on, Mr. Bradley, that the staff does not choose to be proactive in this case then in terms of requiring an additional five feet over the historical norm?

CHIEF ENGINEER BRADLEY: On segment 3, which is the north area, it's highly urbanized, we agree to the 10 feet. We didn't make a field trip. And I don't know how much space is available up there. We were agreeable to the 10 feet. If the Board would like 15, I would be okay with that.

PRESIDENT CARTER: Okay. Mr. Shapiro.

MR. SHAPIRO: Good morning, Mr. President, members of the Board. Thanks for the chance to speak on this issue.

Three Rivers is an has always been supportive of additional easements being required along project levees.

The fundamental question from our perspective is whether it's appropriate as a condition of a permit where we're going in and upgrading the levee or whether it's really a separate activity. We have agreed to 50 feet in the southern area, and we're willing to absorb that as a project cost, a somewhat substantial project cost, but a project cost nonetheless. We think that a 15-foot easement in this area and all other areas would be excellent. Again, the question is is it really appropriate as a condition of our permit to try to improve the state system of flood protection.

Having said that, we would be very interested in partnering with the Reclamation Board jointly approaching Department of Water Resources, seeking Proposition 1E or Proposition 84 funding. We'd be happy as the local agency on the ground to work with the landowners to push this issue. It just comes down, is it really an appropriate requirement of this permit when it's not even an adopted standard yet by the Army Corps of Engineers?

PRESIDENT CARTER: If not as a part of this permit, when?

MR. SHAPIRO: We have every interest in partnering with you and your staff as soon as you'd like. If you would want to direct your staff to work with us, we're happy to work. We've actually done some preliminary

investigation to try to pull together what the costs would be. Again, the question is, is it really appropriate to be part of this improvement permit when it's not reasonably related in our minds to the work we're doing and it's not yet a standard? But we're doing the 50 feet because we recognize it's good flood management.

PRESIDENT CARTER: Okay. Any other questions?

Okay. So staff has made five requests and five recommends. One is to make findings on the environmental issues, to ask the Board to approve the draft letter, ask the Board to approve the draft cooperation agreement, ask the Board to approve the 50-foot easement in segment 1, and request the Board to approve Permit 18170.

Does the applicant wish to address the Board on any of those five requests?

MR. SHAPIRO: Thank you again.

We've reviewed the permit. And in conjunction with our discussion last time, I came prepared to speak to you about three issues. I've addressed most of the comments that I wanted to provide on the easement. We want to appreciate staff's work. Steve and Dan met with us. We looked at aerials. We went through the area in detail, came up with what we thought was a reasonable compromise. And we appreciate their time and their openness to considering what's on the ground as the Board

looks at this.

We do think it's worth the Board considering adopting a formal policy on this issue. We were able to work through it this time. But for us in the future and for applicants we think a policy is predictability. It also adds support to any eminent domain challenges that may be required to obtain the easements. And, finally, it would be good to have a policy to give more guidance as to the particular areas where it would be applicable. In this case, it was somewhat easy. We had a largely non-ag area and another area that was largely ag. And it allowed us to make that distinction.

But a Board policy we think would help applicants in the future and we would highly recommend that the Board consider that.

The new easement language that your staff has proposed in concept, not in actual writing yet, we think is essential. We've heard the Board's clear message that it didn't wish to disrupt agricultural operations for no reason. We agree. We also note that as a substantial financial impact. By not having to take out trees and orchards, we do not affect existing operations. And that's at least a quarter of a million dollars for us. So we appreciate staff's willingness on that. We think it's a reasonable compromise. We look forward to working with

your lands group and your staff counsel to develop that language in particular.

The two other issues that I wish to speak to are the issue of what I'm calling the levee lowering, and the other is the cooperation agreement.

Now, the good news on the levee lowering is it appears that we've worked out a position this morning and compromise with your staff. And, again, we appreciate your staff's work on that. I do think it's important just to briefly brief the Board on that, because it's another policy issue we think is worth the Board considering in the future.

In particular, this is -- Condition 19?

SUPERVISING ENGINEER FUA: Seventeen.

MR. SHAPIRO: Excuse me, 17. And we didn't notice when we were here a month ago that the language that was in the draft permit on Condition 17 would have had the impact potentially of making us lower the Feather River levee when we were doing construction on it.

And so we raised this issue when we first noticed it about a week ago with your staff. We've had a number of conversations back and forth. And we've ultimately been able to compromise. And we appreciate your staff's work. I'm going to explain what the compromise is and, again, though why we think it's important that there be a

policy in the future on this.

The condition as it was stated originally said that the levee shall be constructed to the higher of two things: Either to the basic survey taken in '57 or to as-builts constructed since then. So levee improvements are done. The Contractor produces as-builts that are supposed to document what was done. And then those documents are filed with the Reclamation Board and with the Army Corps of Engineers. And we were supposed to look at those two and determine which was higher and then not rebuild the levee any higher than that.

Our concern is that the as-built in this section of levee and other sections of levee aren't always complete and they aren't always accurate. In our preliminary surveys, but we never brought this to fruition, indicated we might have to lower the levee one to two feet upon rebuilding. And we raised that concern with your staff, and your staff agreed that we needed to try to come up with some reasonable compromise. And the reasonable compromise we've come up with -- and I'm sure Jay could give you the exact language, though I don't have it in my work packet -- was that it would now be the higher of three things: Either the two that were already mentioned or the actual 1957 design profile with the appropriate amount of freeboard.

That actually takes care of the problem for us. Our levees fit within those three, and so we will not have to lower our levees.

We do think, however, from a policy standpoint, this could present a problem in other reaches or for other applicants in the future. And in particular, it deals with the issue of where a levee may be higher than either the design or as-builts or the original survey, due to work that's done over the years and either not documented or never permitted in the initial situation.

And we take our guidance on this from the Army Corps of Engineers, which submitted a comment letter to the Board and to the staff on this issue. And the comment letter from the Army Corps of Engineers said that the height should be the higher of, if I recall correctly, the '57 design or current condition. And so in that case, there could be levees where the current condition is higher than the three criteria in our permit and an applicant would have to go and lower a levee.

We think the Corps criteria is the appropriate one. We would suggest the Board consider this as a policy issue for the future.

Having said that, we appreciate staff working with us. It's not an issue on our permit because of the compromise. And we're happy to be involved in any

discussions about that going forward.

Jay, I don't know if you have anything you want to add how to characterize it.

GENERAL MANAGER PUNIA: I think I have nothing to add. So we need to compromise. We will revisit this at our policy perspective at a later date.

BOARD MEMBER RIE: Are there any changes to Condition 64 in light of this conversation? Because it says that the permittee shall comply with all conditions in the letter from the Corps except for Condition C, which may be in conflict with Condition 17.

MR. SHAPIRO: I believe that because 17 has now been amended, as Jay can provide to you, or has provided to you in your work packets, to include the design plus three feet of freeboard, there's no longer inconsistency between the conditions in our case. But there would be in other applicants' cases, as I noted, if the levee condition is higher than any of the other standards. And that's why I do believe this is an appropriate policy issue for the future.

I don't want to bog our discussion down on it. I'm very appreciative of staff working with us so it was not an issue. But I can imagine that I will be before you one day for another applicant and it may be. So it would be nice to get ahead of that curve.

So unless there are further discussions on the levee lowering issue, I'd like to move to the third comment. And this is really the substantive one. And this is fundamentally a policy issue for the Board. It's not really a -- in my view, a staff issue. And I don't mean to indicate your staff doesn't have an opinion on it. But it really is a policy issue that I think the Board needs to consider.

And the issue here goes to the local agreement that Dan indicated and has included in your packet, the Cooperation Agreement that's in Attachment C. The Cooperation Agreement comes out of the requirement in Condition 78. And I didn't address this last month because this condition is new since last month, so I wasn't able to address it last month.

And I need to provide just a little bit of context and history here.

In February of 2005, Three Rivers was before your predecessor board with our permit applications for phases 2 and 3, phases that have since been completed. And your predecessor board was very interested in using the power of the Reclamation Board to consider floodplain development. And I'm not saying this Board isn't. But that board had that as a very stated purpose.

One of the things that that board did was state

that it wanted to receive indemnity from RD 784 and Yuba County, the parent members of our Joint Powers Authority, so that the Board could make the point, if you will, to Yuba County that it should be considering development in floodplain areas.

We struggled at the local level very hard on that. I have with me today Randy Margo from Yuba County. He's the Assistant CAO, and he'll speak to this issue when I'm done. He was involved at that time too.

The Yuba County Board struggle very long and hard with this issue. It felt that it was being singularly held out to a different standard than anyone else. It pointed to the fact that there was no basis in the legal codes, in the regulations, or in case law that would allow the Reclamation Board to make that a condition of the permit.

But we went around and around, and at the end of the day that board felt that the project was the most important thing it could do for its community. And in particular, the Board -- the Reclamation Board at the time was very clear that it felt that this new standard would be a standard that should be applied to all applicants in the future; that any JPA that came before it should get the same standard, and these cities or counties that were members should provide indemnification as well.

This issue kind of fell away. We were issued the CalTrans encroachment permit by this Board. It did not have any indemnification requirement for the county. We received the Yuba Phase 4 permit from this Board. It did not have any condition within it for indemnification from the county. And SAFCA was issued a permit three months ago and it did not have any indemnification requirement for its parent agencies.

Now, SAFCA is a JPA created by statute. Three Rivers is a JPA created by agreement. The law says there's no distinction between them.

And I will confess that I thought that the issue was gone. But the Legislature, which is currently thinking about these issues and has been for a year and a half now, as exemplified by David Jones' AB 70, was basically taking up the issue. And the Board had made a policy decision it was going to let the Legislature do what the Legislature was going to do.

Unfortunately with the amended permit that we got last week, it raised this issue anew. And one of the things I did was I went back to the actual transcript from February of 2005. And I wanted to see what the discussion was at the time. And I'd like to read to you just a little bit of that transcript. And I have some copies I can distribute as well.

I stated at that time, "Scott Morgan and I have worked on a number of drafts back and forth on the indemnity issue. And we came to conceptually agreeing yesterday on something that he presented to the Attorney General. And I was prepared to recommend to my board -- to the County Board and RD 784. And those entities have considered that language. There was one, however, we believed to be a policy matter related to indemnity. This is a very difficult issue for the county because the county is not the applicant. And our understanding is that a member of the JPA that's before you has never before been asked to provide an indemnity. And the county, after a lot of difficulty, has expressed to me through its supervisors it will accept indemnification. But that willingness came as a result of statements made by President Marchand and Bill Edgar during the meetings where you explained that this is nothing special, this is nothing different, this

the nothing worse than everyone else is required to do."

We then made a proposal for some language that would have gone into our permit that would have said, if the Board doesn't do this in the future, then the county's indemnity goes away. We felt that was a reasonable way to approach it.

Secretary Bill Edgar responded to me and Mary Jane Griego, the Board of Supervisor member who was here:

"Mary Jane and Scott, we are not going to adopt as a formal addendum to this a condition like this, because it would be viewed as underground regulations, which then goes through various legal procedures and policies. What I can say, and at least -- you know, as one member of the Board, and I think the rest of the Board concurs, in light of Paterno and in light of all of the problems we are facing, we have instructed the general counsel to seek in every situation the tough, hardest indemnification provision that we can possibly do in order to protect the State of California. And if you --

there will be no hold harmless that will be less onerous than this from the future. It will get worse as long as Scott Morgan is at the bargaining table."

I notice he's sick today, so maybe that means something.

(Laughter.)

MR. SHAPIRO: "That's where we are. And this is -- this is probably the first situation that I believe since Paterno. And so we are -- we are pushing the envelope on this, and we are going to continue. And for those applicants who are coming afterwards it's going to be worse, not better, and not -- certainly not more lenient than what you have today. I don't know how I can say it any other way. But that's my view."

And then President Marchand said, "Oh, I agree with you. And, again, as one member of the Board, why would we want to do anything less than this for anyone else? I mean I can't believe

it."

And Ms. Griego of the Board of Supervisors said, "Thank you very much. I appreciate those comments. Because us being the first ones after the Paterno decision, we want to make sure that the standards for everyone else behind us, that they're the same."

And I responded, "I will convey your words back to the Board of Supervisors."

So I sit here two years later -- two and half years later imagining the conversation next week when I have to go up to Yuba County and explain to Yuba County that, well, they are being treated differently.

Now I want to be clear. Three Rivers is not advocating that SAFCA should have to do this. We think the Legislature is considering a policy issue. Right now AB 70 is in the Legislature that would address this issue.

The concern here is, how appropriate is it to ask Yuba County to indemnify the state when it is not the applicant and no other member of a JPA has been asked to do that?

The cooperation agreement that has been prepared by your staff is fine. I don't have a problem with it generically. There are a few tweaks that I would make

here and there that I suspect your staff would not disagree with. But it does do two fundamental things that are troubling: One is it requires indemnification from the county. And the other is it makes the county the guarantor of RD 784's maintenance. It says if 784 doesn't maintain the levees properly and the state has to go in and do it, then the state can charge Yuba County.

And that's simply, in my mind, inconsistent with your current water law code, which says if the state creates a maintenance area, it charges the beneficiaries, not the entire county.

So, I realize that this is a hard issue to grapple with, and I wish I didn't have to bring it to the Board at such a late date. Unfortunately we just had the condition come last week.

And so the question that I would have for the Board is whether you look to that moral agreement that the last board made in February and can fine a legitimate basis to say that that indemnity really shouldn't apply anymore and the Legislature will set the appropriate policy.

I have copies of the transcripts and I can provide them.

PRESIDENT CARTER: Thank you.

Any questions for Mr. Morgan -- I'm sorry -- Mr.

Shapiro?

MR. SHAPIRO: I can play his role too if you'd like.

PRESIDENT CARTER: Maybe another day.

SECRETARY DOHERTY: Just as a comment, Scott. I asked a question just a few minutes ago about changing Corps standards and things change and technologies change. Everything changes.

MR. SHAPIRO: Here it seems to be changing, changing back, and then changing again when we're before you though.

SECRETARY DOHERTY: Depends on the technology that's involved and the situation.

MR. SHAPIRO: Well, the SAFCA application that you just heard was a slurry wall application. This is a slurry wall application.

PRESIDENT CARTER: Mr. Punia.

GENERAL MANAGER PUNIA: I think our legal counsel can differentiate the case of SAFCA and the TRLIA. So I think Nancy Finch is prepared to address this issue.

STAFF COUNSEL FINCH: I'll see how prepared, because this is the first time I've heard some of these issues come up. So I'll do my best.

I'll just kind of go through the points that I heard. And hopefully I will cover all the major ones.

So, as you know, I wasn't here in 2005, so I'll speak as best I can to all of this. My understanding of Phase 2 and 3 that there was -- the Board did receive indemnity. And it's not only -- it didn't begin with the previous board that indemnity was required by the Board. There actually is statutory basis in the Water Code where the state is required to hold the feds harmless and locals are required to hold the Rec Board harmless. So there is statutory basis beyond the previous board's decision.

And regarding Yuba County being singled out, as I mentioned, there is a basis in law that indemnification has been asked for in the past in various situations.

And regarding SAFCA, it is a different situation statutorily, because, as Scott mentioned, that SAFCA is created by statute. And actually in that statute, they can assess to, let's see, fulfill liabilities. So if they need to indemnify the state, they can; and by California statute, they have a provision where they can assess and pay the state back. And TRLIA does not at this point. I don't if they're --

MR. SHAPIRO: Actually we do.

STAFF COUNSEL FINCH: Under the statutes?

MR. SHAPIRO: No, under our JPA agreements.

STAFF COUNSEL FINCH: Okay. But that's agreements, not under state statute, right? The state

statute in the appendix to the Water Code.

MR. SHAPIRO: I apologize for jumping in. I should wait for you to provide your answers and then I can respond at the end.

STAFF COUNSEL FINCH: No, I'm speaking of in the Water Code itself, the appendix to the Water Code, the SAFCA provisions. And if I understand -- right the TRLIA does not have the same. So they are different in that way.

And regarding allowing the Legislature to act. And it seems that it appears the previous board had a certain policy -- you know, a view on things which was consistent with statute. And then I don't know what happened when you came in -- the new board came in. But I don't think, it appears to me, there was a conscious choice to allow the Legislature to take this on; and that there are, as I keep repeating, statutes in place. Even though I, you know, obviously didn't have time to fully research the issue, but there is that basis.

And I guess it's up to the Board to tell us if there was a conscious choice to leave it up to the Legislature.

And also I know you mentioned the underground regulations issue. And I know Rec Board counsel and staff is very sensitive to the fact that we do not want to

create underground regulations. And we are looking towards drafting new regulations to deal with a variety of new issues that have come up. As you know, things are more complicated these days. And also that the Paterno decision as well influences what is happening today regarding the hold-harmless agreements.

And also, as I said before, I can't speak to what has happened recently with the hold-harmless agreements and why it appears that some permits have them, some don't. The staff does advocate that we should have hold-harmless agreements in all the permits. It's unclear, perhaps there's been some oversight in the drafting because so much has gone through. As I said, I can't speak to that.

And as Scott did say, this is a tough issue and it's been presented at a very late date. And so -- there is a lot coming up right now and I'll assist as much as I can. I'm not fully prepared to discuss it in depth if it needs a bigger discussion. But I hope I've given you some thoughts on the matter.

PRESIDENT CARTER: Okay. Thank you.

Any questions for Ms. Finch?

MR. SHAPIRO: Would it be appropriate if I respond to --

VICE-PRESIDENT HODGKINS: Yeah, I'd like to let

Scott respond.

PRESIDENT CARTER: Okay.

MR. SHAPIRO: I agree that there's a statutory basis for indemnification. But the statutory basis is against an applicant. And Yuba County is not the applicant. Indeed your standard permit, you'll notice that the permit has small print and then large print. And the small print, first 12 conditions of the standard conditions. And so number 10 says, "The permittee is responsible for all personal liability and property damage which may arise on a failure on the permittee's part to perform the obligations under this permit. If any claim of liability is made against the State of California, or any departments thereof, the United States of America, a local district or other maintaining agency and the officers, agents or employees thereof, the permittee shall defend and shall hold each of them harmless from each claim."

So it's not that you've been issuing permits that don't provide for indemnification. You have. And this is in SAFCA's, and SAFCA provided indemnification. And Three Rivers does in every permit you provide by accepting the permit.

The issue is one of fundamentally going through the applicant and trying to get to the agencies that

created or make up the applicant. And so while I agree there's statutory authority for indemnification, I don't know of any statutory authority that explicitly states you can go after the parent members of the agency.

In regard to the underground regulations point, I agree with Nancy it's a concern and you have to be careful with it. But your election to include or not include Yuba County is not really an issue of underground regulations. In fact, I could argue that your unofficial policy, as may be stated, the argument that Nancy just made, of, "Well, we request and require indemnification from parents when it's an agreement-created JPA, but we don't when it's a statutorily required JPA," might be viewed as underground regulations. Because you seem to be making a distinction on that basis without really providing notice to the public about it.

I agree Paterno is an issue. Indemnification is appropriate. Three Rivers is not here saying, "We're not going to provide it." We're saying, "Policy-wise, do you need it and should you get it from Yuba County?"

And then, finally, on the issue of SAFCA being statutorily created, I continue to not understand how that's a relevant distinction. SAFCA under statute can assess. Three Rivers under contract can assess. We both have assessment powers. We are hoping to have a 218

election this fall. SAFCA just completed a 218 election. Both agencies, if there was ever a judgment and the state went after them, would have to conduct 218 elections. So whether we were created by the people in the white building over there or created by the people in the beige building in Yuba County, it doesn't matter; the powers are essentially the same. And it doesn't seem to be a relevant distinction that you would go after one and not the other.

Fundamentally, the question is, is it appropriate to go after the land-use agency that created Three Rivers? And if it is, it's good for the goose, it's good for the gander. I believe it's not appropriate.

And I apologize, but I never gave a chance for Randy Margo at the county to speak. And I wonder if this would be an appropriate time for him to share his remarks.

STAFF COUNSEL FINCH: Actually I'd like to respond first, if you don't mind --

MR. SHAPIRO: Sure.

STAFF COUNSEL FINCH: -- to make some distinctions.

Scott is speaking in terms of why are we going after the land-use agency. And the Rec Board position is we're looking for a financially responsible agency. And perhaps you can clarify how TRLIA -- well, one thing I

understand about SAFCA is they have ability to assess to pay for any liability that incurs into their projects.

Now, my questions to you is: 1) Does TRLIA have the ability to assess to pay for any liability that is created? And how long will TRLIA be in existence? I mean is it -- because like, you know, California statute based on -- versus the agreement.

MR. SHAPIRO: Sure. Well, I think that the issue of perpetuity or continuity is a legitimate issue. And it seems that RD 784 is the appropriate answer to that. RD 784 is going to be the one who maintains these levees in to perpetuity. And just as a normal RD that would come before you to fix its levees would be the one providing indemnification and would be the one into the future to indemnify and hold harmless the state, that seems appropriate.

The fact that Yuba County made the mistake of entering into the JPA and is now being punished for it -- and I know that's not your motivation. I know you're not trying to punish them. But from a local perspective that's how it feels when they're the only ones who are required to provide indemnification.

STAFF COUNSEL FINCH: Yeah, in response to that as well, the reason RD 784 does not appear to be a good entity to have the indemnification, they don't have the

ability to raise money. And they have shown in the past with previous floods, they don't indemnify the state. And so it's true, we -- you know, once they got up and say, "We're looking for a financially responsible agency," that is part of this agreement

MR. SHAPIRO: Well, they've never been asked to indemnify the state out of the '86 or '97 floods. The state did not request indemnification from RD 784.

STAFF COUNSEL FINCH: And so are you -- so you believe that 784 could raise the money and indemnify the state based on the way it's structured?

MR. SHAPIRO: I believe subject to Proposition 218 they could, just as SAFCA subject to proposition 218 could.

STAFF COUNSEL FINCH: Okay.

SECRETARY DOHERTY: Scott, at the last meeting we had one of the questions I asked you was how long TRLIA would be in existence, because this was one of the things that concerned me.

MR. SHAPIRO: And the answer remains that we have a core mission. Our mission is to improve the 784 levees. I think many of us personally hope that that mission may expand to address other issues in Yuba County. At the moment, the policy-makers have not changed it. And that's why all of our long-term planning assumes 784 to step into

the maintenance role.

So, again Mr. Margo is here.

PRESIDENT CARTER: Yes, why don't we hear from Mr. Margo.

MR. MARGO: Good afternoon, Mr. President, members of the Board. For the record, my name is Randy Margo. I'm the Assistant County Administrator for the County of Yuba.

I first want to express my appreciation from the county for having this special meeting and to try and move promptly and timely on these very complicated issues and to have this special meeting that will obviously help us provide greater flood control for the area on the Feather River.

With that said, I want to add some emphasis to Mr. Shapiro's remarks; and first by providing a little bit of context and background.

One of the things that concerned the county when we were moving forward on Phases 2 and 3 was the indemnification issues. And to understand it from a county perspective, you have to understand that many people live outside of the flood area. However, they do live in a fire zone that is very hazardous and fires occur on an annual basis. And so for those residents and for their representatives, there's always the question of,

"Well, why do we have to put our property at risk for people living in a flood zone when that same corresponding indemnification doesn't occur for people who may live in a fire zone or perhaps in an earthquake zone along the coast?"

And so that was a huge leap for the Board to get over -- to understand how flooding is different than major fires or major earthquakes.

Nonetheless, the reason why the Board went along with the indemnification proposal was that we felt that this was a critical project in order to provide public safety, and that we didn't want to risk the project following through because of the indemnification issue.

And we asked for mainly one caveat to that. And that was simply that we be treated the same as any other public agency or jurisdiction in the State of California. And it was represented to us by the Board at that time that that would be the case, that they would hold that standard to every entity that came in front of the State Reclamation Board for an encroachment permit. And so we could go back to our residents and say that, "Yes, we did have to agree to this indemnification, even though we had issues with it. Nonetheless, we have been informed that the Board will hold that standard to every other applicant that comes before it."

Now, we have found according to the facts presented by Mr. Shapiro that that has not been the case and there are these nuances as to why it is not the case. And so it causes some pause on our behalf as to why.

One of the things that we do as a county and you do as the State Reclamation Board is to provide that the law is consistently and fairly carried out. Our credibility is at stake both from the county level and through state agencies when the law and those regulations are not consistently and fairly applied. And that is simply what we're asking for today.

A lot has been mentioned about, you know, the state and, you know, where they're going with this. And we agree to adhere to any state law that comes down, whether it be AB 70 or some other legislation, that will be fairly and consistently applied to all local public agencies.

What we do have an issue with is that we are, in essence, being singled out. And it's perplexing to us.

One of the things that's kind of interesting to note, and just as sort of an aside to how counties are financed. The majority of our money for our budget comes from the State of California. In essence, any type of indemnification on liability will revert back to the state, because of how the state funding mechanisms work

and the state subventions. And so I'm just wondering about the practicalness of this as well. And I guess with that, I would take any questions that the Board might have.

PRESIDENT CARTER: Are there any questions for Mr. Margo?

VICE-PRESIDENT HODGKINS: In terms of the liability reverting back to -- I'm trying to get at what I think is a fundamental issue, which I don't think anybody out there has really said, which is that if the county is part of the indemnification and there were to be a judgment, that the judgment would in effect -- what priority would that have legally in the county's budget? Would you be allowed to defer payment of the judgment so that you could continue to provide, share, fire, whatever else you brought, provide from whatever discretionary remedy you have?

MR. MARGO: Mr. Hodgkins, let me just give you some context to your question. Under the Paterno lawsuit the judgment was approximately $455 million. The county's general fund this year is $33 million. The county's total budget including all federal and state subventions is $163 million. And so that's the order of magnitude difference from a lawsuit that transpired back in 1986 and dealt with property values at that time.

VICE-PRESIDENT HODGKINS: But if there was a judgment, would the county legally have to pay it from whatever revenues were available?

MR. MARGO: Well, that's I guess a legal question.

One of the things that I would wonder about is that -- and, again, it gets back to how the counties function. Many of the services that we provide are state functions. The entire health and welfare system as an example; child support services; the criminal justice system, you know, the courts, et cetera. And so I don't know the answer to that question, but I know that it would be very difficult

MR. SHAPIRO: My understanding -- and I don't do general government work, so take this with a grain of salt. But my understanding is that the 33 million that Randy mentioned, the general fund amounts, would be available to pay a judgment subject to certain requirements the county still has even as to general fund allegations, such as paying a sheriff. And indeed if all 33 million went to pay a judgment, then the county could be sued for not providing law enforcement.

So what you end up talking about is a county basically giving up all non-entitlement programs, except public safety, for 5, 10, 15 years as a practical matter.

And that's why, in my mind, this is a symbolic issue. And the question is, what is it symbolic of? And I think it's symbolic of seeking land-use authorities to put their name on the line. And if that's the real issue, I mean if that's the Board's position, we want to seek land-use authorities to put their name on the line, then we're back to the original question: Isn't that appropriate for SAFCA's case? Isn't that appropriate for Wheatland, where an RD came before you and got an application and the City of Wheatland wasn't approached? Isn't it appropriate up and down the valley, Lathrop RDs come in -- the City of Lathrop?

So it's an application issue. Why are you doing if? Is it symbolic? Does it make sense to do? And if it's the symbolism of putting the city's name on the line, then isn't the Legislature grappling with that right now in considering bills that would do it?

MR. MARGO: You know, there's one other point that I'd want to make, and that has to do with the insurance issue. One of the things that the county did, and we thought it was a good thing to do in conjunction with the State Reclamation Board, is that we require the developers in that area to provide flood insurance until the levees were built and certified. And that at that time was unknown throughout the State of California. And

the county has emphasized in every public meeting the need for individuals who live in that area to obtain flood insurance.

It's still an individual decision to live in areas that are prone to flooding. But I think we can do -- and I would look for the State Reclamation Board and its assistance to maybe look at some type of mandate for flood insurance for people who live in that area of flooding and flood hazard. And I think that would be a more appropriate approach to this.

PRESIDENT CARTER: Thank you.

Any other questions of Mr. Margo?

BOARD MEMBER RIE: Yes. Anybody can answer this question.

If you go back to the agreement and you look at the actual language, it says that "the local sponsors shall hold and save the State of California harmless from any and all claims arising out of work performed by the government." Is that the State of California Government?

So if the State of California is negligent in some manner with respect to these levees, should Yuba County be responsible for any claims that result?

SUPERVISING ENGINEER FUA: Actually the "government" there means the United States Government, not the state.

MR. SHAPIRO: And it's not limited to just the government. It's basically arising out of any and all claims or damages arising out of a project, including responsibility for claims or damages arising out of work by the United States.

So if the damage -- if the project failed because it wasn't built correctly, if it failed because RD 784 didn't maintain it correctly, if it failed because you imposed a condition in here that created a problem with the levee, if it failed because you or the federal government went in and made changes later, any of those things require indemnification by Yuba County.

BOARD MEMBER RIE: So whether it's the State of California, Army Corps of Engineers, the federal government or any of its employees, if we do anything negligent with respect to these levees, Yuba County is holding us harmless --

MR. SHAPIRO: Yes.

BOARD MEMBER RIE: -- for that?

MR. SHAPIRO: Yes.

BOARD MEMBER RIE: Is this something your board of supervisors would agree to?

MR. MARGO: Well, that's something that we're going to have to visit with our board about. That's the whole point of the discussion here, is that there is

consternation over this amendment, if you will, to the agreement

PRESIDENT CARTER: Okay. Any other questions?

We've got a number of people from the public that wanted to address this as well.

STAFF COUNSEL FINCH: I would just like to make a couple comments.

PRESIDENT CARTER: Yes.

STAFF COUNSEL FINCH: When they were speaking about the county budget and all that 33 million, that's the point of finding and to do that, to make an assessment -- make an additional assessment for any money they may owe for damages or liabilities.

And then they also mentioned how the Legislature's grappling with this at this time. It may happen that the Legislature will come up out with some -- a new statute that overrides what the Reclamation Board is doing at this time. But at this point, staff recommendation is to include the hold-harmless agreement in this agreement, the clause.

And also, in terms of -- one thing to keep in mind with a hold harmless, the practical reality of a situation is -- you know, look at the Paterno lawsuit. If a levee fails and we're trying to find blame and all that, that's a process of itself in addition to this one.

PRESIDENT CARTER: Okay. Thank you.

BOARD MEMBER BURROUGHS: Mr. President, Steve has a comment.

PRESIDENT CARTER: Yes, Mr. Bradley.

CHIEF ENGINEER BRADLEY: Yes. Mr. Shapiro had several things he was talking about. But the one thing I wanted to correct, when he was talking about Special Condition 17, he said there were three conditions there: The 1957 profile, the as-built drawings, or the '57 profile plus three feet. That last was not correct. And I think I'll read into the record 17, which says:

"The maximum levee crown elevations of the levee reaches where construction activities affect the levee crown area shall be limited to the maximum crown elevation shown for the same reaches on the U.S. Army Corps of Engineers' Sacramento River Flood Control Project, California, Levee and Channel Profiles, dated March 15th, 1957, or as modified by the Corps of Engineers and shown on as-built drawings provided to the Reclamation Board subsequent to March 15th, 1957, or other documentation of authorized levee improvements acceptable to the Reclamation Board."

We didn't limit it to the 1957 profile plus three feet, because there may be cases where there are other documentation that comes to the Board that we know

about -- we may not have the as-built but we will know about those things. And so we wanted some ability to make those decisions based on, you know, discussions with the Corps, discussions with the applicant.

The reason the '57 profile plus three feet was important in this area is that the '57 profiles do not have the three feet of freeboard required for the system.

In the turnover memorandum from the Corps of Engineers to the Board, the project was not complete at that time. And there was a little over half a million dollars of federal and state money that was allocated to fixing the left bank levee of the Feather River. And so that was to be raised up to that three feet. That occurred I believe in the early sixties, and there are as-built drawings that the Corps has in around 1961. Or they have at least reference to them. But we haven't actually found the drawings yet, but they have reference to them.

There were also things that were done after the 1997 flood. There was the levee reevaluation in that area. There was also the Site 7 work and the Site 7 extension work of the south end where the pump station is.

So there's lots of information out there. We didn't want to be tied to just the '57 profile plus three feet.

PRESIDENT CARTER: A question I have with regard to this is: At the end of day, are there any levees that are going to be lowered on these two segments as a result of this permit or this work?

CHIEF ENGINEER BRADLEY: In general I'd say no, because most levee raising out there, prior to recent history when development in the valley had made it possible for public agencies other than the Rec -- other than the state or the federal government to raise levees, were all done under federal projects.

So I think there could have been work that was done out there where somebody left a pile of dirt that there's no reason for that shows a two-foot hump in some localized area. But if you're talking about a raise over a significant period, I would expect that to have occurred under a federal project.

Does that make sense?

PRESIDENT CARTER: Yes and no. I think it's directionally improper to be talking about lowering levees when --

CHIEF ENGINEER BRADLEY: We're not lowering levees. They're going to be cutting these levees down for the slurry wall. What they won't be allowed to do is to raise them over anything that's been authorized.

BOARD MEMBER RIE: What about over time some

farmer went out there and raised the levees without a permit?

CHIEF ENGINEER BRADLEY: Then that's an unauthorized raise.

BOARD MEMBER RIE: Are we asking them to go back, and whatever dirt or base rock or asphalt is there, remove it now and bring it back down?

CHIEF ENGINEER BRADLEY: They're going to be removing that to begin with to put in the slurry wall. They cut the levee down to put in the slurry wall. And then they would rebuild it up to the authorized profile.

BOARD MEMBER RIE: So you're saying when they rebuild it, they can't rebuild it to the existing elevation that it is today?

CHIEF ENGINEER BRADLEY: If it looks like it's an illegal raise, no. Now, if you're talking about lowering the overall elevation two feet or something, I think we'd have to look at that.

A farmer's not going to go out and raise it two feet because it's very expensive to do that kind of work.

But I can see, in the future what would happen is somebody comes to the Board and says, "Oh, out there we've got two more feet than it shows on the drawings," because they went out and they piled a bunch of dirt up there prior to the project so that they could get higher

elevation.

It's the Board's -- part of the Board's reason for being is to make sure one side of the flood control project doesn't raise a levee and flood the other side. So you don't have these levee wars that are going on where you're raising on each side.

MR. SHAPIRO: And I just wanted to note that the first point Mr. Bradley made, that we didn't read the condition in detail. I don't disagree with that. I don't have a printout of the condition. So when I was telling you my understanding, I was characterizing it, because I don't have a printout. So I don't disagrees with that.

But the questions the Board was asking about whether this condition -- cases could require the actual lowering of a levee is the very reason why we think a policy from the Board is appropriate going forward.

And I know Ric has talked with the Army Corps as recently as this morning and -- Thank you -- and may have something to add.

MR. REINHARDT: Ric Reinhardt, Three River's Program Manager.

I'm in agreement with Steve's statements. I think the challenge here is the way the special condition is worded, is it's thrown out a very broad net to capture what might be a very few isolated incidents where the

levees have been raised.

I think that from a practical standpoint, in working on a number of projects throughout the system, what I found is that there isn't a lot of as-built information and that there is variance in the top of levees between what exists out there today and what is shown on the 1957 profiles and as-builts that we've been able to gather. And in at least three projects that I looked at as part of preparing to come here today, I noted significant differences between tops of levees in other locations and what's shown on the 1957 design profile.

And that's why we recommend that while we've resolved it for this application, we think there is an issue that the Board needs to grapple with. And in our discussions with the Corps, the Corps' position on this is that you restore it to the higher of either the 1957 design or existing condition.

VICE-PRESIDENT HODGKINS: May I ask a question?

If you're allowed to restore the levees in the areas where you do work to the '57 profile plus three feet, are you okay with that?

MR. REINHARDT: Yes, we are.

VICE-PRESIDENT HODGKINS: Will this condition allow them to do that?

CHIEF ENGINEER BRADLEY: Yes.

VICE-PRESIDENT HODGKINS: Okay. So the issue for this particular project at this time is resolved.

There is a broader question that the Board may choose to pursue separately as to whether or not we think it's appropriate to require applicants, or people in general, to bring their levees down to the highest approved elevation that exists. But it's a separate question. It's not an issue for the permit. Don't confuse your permit with a public policy issue.

MR. REINHARDT: I believe Mr. Shapiro started off our presentation making that statement.

VICE-PRESIDENT HODGKINS: Okay. I think he did. But I'm not sure it was said real clearly. So I want to clarify that.

PRESIDENT CARTER: Okay. So let's move on.

Mr. Smith, did you want to -- Dr. Smith -- I'm sorry -- would you like to address the Board?

DR. SMITH: Good afternoon, President Carter and other esteemed members of this Board. I'm Dale Smith. I speak for my company Alfa Omega Associates and CCRG, Inc.

I note that nearly one hour was given to the proponent here. I always script my material, as you know, so I'll run through it very quickly. It will take a little bit of time, but not a lot.

And I consider this hearing to be a little bit

ill-advised, if not illegal, because of the serious flaw in The Rec Board procedures for even to be hearing the TRLIA matter. And nothing I've heard in the last hour has changed my opinion on that at all.

Now, I have provided a packet for you. I hope that material is there. If it isn't, she'll give it to you. And there's a number of documents in there, and I prepared it especially for this meeting. And all the documents that I'm going to talk about are there.

And the first one -- and it's a very important set of documents. And these are three editorials -- two editorials and a written -- a report from the Sacramento Bee, all in these first days of June this year.

The first one, "Flood Liabilities: Bill to reduce state risk faces key test, that's from 6/5.

The June 1st editorial, "Flood breakthrough: Governor wants to limit floodplain building."

And then Deb Kollars' article of 6/6/07, "Governor floats floodplain development curbs."

Now, the California Reclamation Board, by law, is the flood management agency for the Central Valley. And this Board both has the authority and the legal basis for taking charge of this most vital state function of floodplain management.

The United States transferred ownership of the

Central Valley Project levees to California in 1953. And I can't understand why the state doesn't acknowledge that the project levees are not reclamation district levees. They belong to the State of California. No public purpose is solved by having local agencies haphazardly design components of a state-owned Central Valley-wide system. It's not even legal.

You're all very familiar with the Paterno case. It's been discussed a number of times here today. Who paid for the Linda levee failure in Yuba County, the state or RD 784? The state, of course. RD 784 did not have to pay because the Linda levee reach that failed was a component of the state-owned Sacramento River Flood Control Plan.

And it just looks like in this last hour, only brings it out stronger, that Yuba County and the state are acting together to increase the risks/costs for all of us.

Imagine being a resident in the RD 784. You're flooded out in 1986, you're flooded out in 1997. And you're still at risk today and facing flooding next winter, where the state wastes valuable time conspiring with Yuba County to limit what damages the citizens might collect from the next flood.

And the truth of the matter is: Does Yuba County have the $455 million or more that might be needed, or

does RD 784 or TRLIA? I think the answer is none of them have it.

Now, all floodplain development permitted today shortchanges the public for a levee infrastructure cost. But it's never -- hardly ever mentioned, much less taken care of.

Strong restrictions that would ensure that developers pay at the outset their fair share of the levee infrastructure is what should happen. And I think the bills that are in the Assembly and in the Senate now are bringing -- coming towards that. The state must accept its liability and responsibility and then wield -- direct Board's authority to get this job done.

Now, that first Sac Bee editorial: "Over the last week the Administration has quietly floated a proposal that is rocking the flood management world. The proposal is marked 'confidential and privileged.'" And I say, "Hooray." This document is in your packet.

And the editorial made a very telling point, saying, "Currently officials don't know which levees in the Central Valley even meet the minimal 100-year level of flood protection." And that's a sad story.

Now, back on 11/1/05, DWR Director Lester Snow said, quote, "The catastrophic impact of a significant earthquake puts thousands of lives and billions of dollars

at risk."

So who is responsible? You know, fingers are pointed in every direction. But I don't state they're ever pointed in the right direction. And excuse me for pointing my finger up this way right now, but it is the California Reclamation Board legally that has this responsibility, not the DWR. The DWR works for the Rec Board.

You know, your mission statement has a very interesting three points to it. It's in your packet there.

1. To control flooding along the Sacramento and San Joaquin rivers and their tributaries in cooperation with the U.S. Army Corps of Engineers.

2. To cooperate with various agencies of the federal, state, and local governments in establishing, planning, constructing, operating, and maintaining flood control works.

3. To maintain the integrity of the existing flood control system and designated floodways through the Board's regulatory authority by issuing permits for encroachments.

Now, the Rec Board has the authority over anything that interferes or could interfere with carrying out the plan of flood control in the Central Valley. And

that Rec Board authority is with you, not with the DWR. And it's based on California law. I'll just give three quotes: Cal Water Code paragraph 8710; Cal Government Code paragraph 65302; CEQA Guidelines, Appendix G and 7 -- or 6 rather, just to name three laws.

Now for three years, the CCRG has been saying this in these chambers, on our website, in our letters to you, our letters to USACE, FEMA, the FBI, the Governor, and hundreds more. But it seems like nobody even wants to read the law, much less follow it.

For some months now your Board has had only five members. As you know, this recently caused serious problems, paralyzing the Board on vital decisions. And it's caused consternation for some Board members.

It's not fair to the people of California that this Board runs for months without all seven members. I feel sorry for you. I think you need those other two members.

Now, the Bee wrote in the Wednesday editorial, quote, "Schwarzenegger to his credit says he supports the shared liability concept in AB 70," closed quotes. I really don't believe that. If he lets the most important board involved in the flood process languish with only five members for all this time, that's an injustice to you as a board.

Now, I think you might say I'm a little harsh today. It's because there are thousands of lives at stake and millions of dollars.

The Bee said in the editorial, "If the legislators in both chambers can work with him on final product, 207 could be a historic year for smart flood planning." I'm not counting on that, because there's millions, maybe even billions of builder dollars at stake, and those people are not going to give up very easily.

Now, the distinguished educator, UC Davis Professor Jeffrey Mount, who used to sit up there on that podium, said it about as well as anyone could when he spoke to the Yuba County Supervisors May 22nd, 2004. The document is there in your packet. And here it is here and it's on our website.

He said, "You've said, 'Come hell or high water,' literally and figuratively, we're going to build. You're building a house of cards. If someone pulls one of the cards out, people are left at risk. I'm willing to bet my house that $250 million won't be enough. We have a long history of these things going way over target of the original estimates."

Not a profit. Just an honest man is Dr. Jeffrey, who called it like he saw it, and he got sacked for his efforts.

Now, over 2,000 homes have been built in Plumas Lakes; 12,000 are scheduled there. The bottom has fallen out of the housing market and these builders want to renege on their promises. And your chief engineer warned you about this more than a year and a half ago.

And I'm just about to wrap it up now.

Yesterday's Bee article had a couple of lines that support my argument. A good quote from Assemblywoman Wolk.

"Last year several bills in the Legislature tried to put the brakes on development in high risk flood zones. They met with stiff opposition from the development industry and failed to pass, closed quotes." Now, that's penny-wise and pound-foolish. Because like Lester Snow said, thousands of lives and billions of dollars are at risk.

Senator Darrell Steinberg here of Sacramento said it's critical for communities to start including flood concerns in land-use decisions. I haven't heard a thing about that so far today. He said it's important for state leaders to find ways to leverage the $5 billion in new bond funds because it could take three times that amount to make all the improvements needed in the state.

Now, over these last three years I've filed many documents with this Board. All of them are now in the

administrative record. And you know what that means. It can and will be used for any legal case that comes out of severe flooding. God forbid it that it happens, but you all know it can happen. You'll have many years of experience.

Now, in light of the testimony of my good friend, Professor Dr. Robert Villa, who spoke here recently, I put another document in my packet for you. I hope you'll take the time to read it, because it clearly will show you that awesome authority and responsibility is on this Rec Board.

That document is called "Risks and Liability: Who is responsible for avoiding a California 'Katrina,' and who will pay if we do not?" This is the report of a joint hearing of the Judiciary Committee; Water, Parks, and Wildlife Committee; and the Insurance Committee of California Assembly, October 25th, 2005.

The Board has a legal responsibility for oversight of the entire Central Valley Flood Management System. Although it presides administratively with the DWR, still the buck stops right here. And I hope that I've encouraged you to step up to the plate, take charge. Remember, it's the law.

Your discussions today are the most encouraging I've had to date. Staff has tried to rescue -- or wrestle with this whole problem of identification, something I

brought up two years ago when I was disturbed by that. I wish that there were a better and simpler answer, but there's not. Who will pay if the levees fail?

The people who own the levees, the State of California, in both cases.

Thank you.

Any questions?

PRESIDENT CARTER: Any questions for Dr. Smith?

Thank you very much.

At this time I'd like to take a ten-minute recess. And we will go ahead and continue this discussion.

(Thereupon a recess was taken.)

PRESIDENT CARTER: Ladies and gentlemen, if you'd go ahead and take your seats, we'll continue the meeting, please.

We are on our Agenda Item No. 3. And we were in the process of hearing public comment.

During the break, Mr. Sandner from the U.S. Army Corps of Engineers said that he had a prior commitment. I wanted to be sure that none of the members of the Board or the staff or audience -- I want to be sure that we addressed any questions to him that they may have with regard to this particular application.

As you recall, we do have a request from staff to

approve a draft revised letter to the Corps. There have been some comments with regard to levee raises and the Corps's position on that.

Does board or staff have any questions for Mr. Sandner at this time?

If not, we can tell him that he won't hold up the show if he leaves.

Okay. Mr. Sandner, thank you very much for coming. Appreciate it.

MR. SANDNER: Thank you. Glad to do it.

PRESIDENT CARTER: Okay. With that, we will continue with public comment on Item No. 3.

Mr. Foley.

MR. FOLEY: Good afternoon, Mr. President and the Board. I'm Tom Foley, Yuba City. I'm director of a small nonprofit, Concerned Citizens for Responsible Growth. And I'd like to speak to the issue of the application.

Our little group spoke about this before, and we believe that the Reclamation Board should -- this board -- state board should take a much more active role in this. And I'd like to get a few comments on that.

The history of these levees that we are discussing today is that there's tax report I believe and a grant report that The Reclamation Board has formed. But the important issue is that there was a series of floods

and it was recognized by the State of California, by the federal government that the Central Valley could not be developed without a state Central Valley-wide system of flood control. This is a system of flood control, and does not work except as a system. The Central valley could not have been developed if -- except that a system-wide -- Central Valley-wide system of flood control was developed.

The Army Corps stepped in. It was the first federal project outside the Mississippi Valley. It was called the Sacramento River Plan Project of Flood Control. That project, the project levees comprised I believe 980 miles of levees, bypasses, weirs. That project -- federal project and its components was turned over to the State of California in 1953 with the Reclamation Board under the supervision -- of supervision. So speaking, that's the history of these levees, that RD 784 levees are -- they owned -- formerly federal project turned over to the states. They own levees.

With that little bit of history, Paterno held that the state as owner of the levee deferred repairs to the Linda levees. They enjoyed those savings -- the state as owners enjoyed the savings. And when one reach of that system failed at the Linda levee, the state must pay because the state enjoyed over the years the savings. And

Peter Paterno, et al., could not be burdened with unreasonable costs when this -- it was a system. That is the Paterno decision, it is a system. So when one component of the state-owned system failed because of deferred repairs by the State of California, the state had to pay. RD 784 was excused of it by the Paterno.

Now, I believe DWR appealed that to the Supreme Court. So the Paterno hold -- Paterno -- since Paterno the State of California state agencies are operating under a court decision. The Paterno decision is the new law of the land. And any deferred repairs by the state, any failures since the date of Paterno -- DWR is aware of it. DWR isn't operating as though they want Paterno. They are operating under disbelief.

Any failures that the system cannot convey design flows will be a state -- will be Paterno instantly, that Paterno established. These are project levees; 980 miles of weirs, bypasses. These are not RD -- these are not -- Yuba County has no obligation on them. This is state plan of flood control turned over to the federal government.

So when the state plays games, DWR or Rec Board, I shouldn't say that. But when the state does not make that clear or is not -- is not well understood when they -- when these local agencies are -- they're bringing certain things up there and it delays these repairs, and

something breaks in the meantime, the state owns those levees. The state -- there is no ownership of Yuba County. There's no ownership of RD 784.

So I just wanted to make the Board become -- understand that, be aware. I did not before. I did not understand this till I read Paterno over again. And I don't think DWR has accepted it. And I don't think you should -- you should be very careful about following DWR's lead on this.

Whatever happens since Paterno, it's the new law of the land. If anything fails, any section of levees fail to the project levees, the state is liable.

Thank you.

PRESIDENT CARTER: Thank you.

Mr. Eres, would you like to address the Board?

MR. ERES: Good afternoon, Mr. President, members of the Board. Thank you the opportunity to address you. I'm representing Hofman Ranch. I had not anticipated the direction some of the presentations were going to go, so I'm going to address in two different segments here, the comments I want to make. And what I'm referring to here was the rather remarkable conversation dealing with the Joint Power Authority, Three Rivers, and whether or not it has an obligation to indemnify and whether or not they're being treated in some, call it, lack of equal protection.

I would remind the Board that when references are made to a particular transcript, in this case it was February of 2005, that's out of context. You need to take a look at a series of transcripts, of a series of meetings to give you a full flavor of what the opportunities, constraints, and issues were during that time.

Clearly one of the concerns, and I think that your legal counsel has addressed it, is Three Rivers is a paper shell. Nobody can get up here and tell you anything different than that. It is a political document. It is a political contract. It can disappear tomorrow. As Board Member Lady Bug Doherty asked the question, and she's asked it a number of times, how long can we be guaranteed, as like in a statute, that Three Rivers will exist as a joint power authority? And the reason that nobody's giving you an answer is they don't know, it could disappear tomorrow.

The idea that somehow the county was drawn into the Joint Power Authority, I really think it would be well worth your while to get a little of the history there. The Joint Power Authority really initially intended to have a third member, Yuba County Water Agency. In fact, it was identified in those initial documents and then dropped out.

It's also interesting, if you read the document,

it seems to talk about jurisdiction larger than RD 784. However, it didn't include the other obvious RDs that are there, 2103 being one of them; 813 I think is the other one.

So basically the bottom line is that your concerns and your predecessor board concerns for financial responsibility were very well taken. It was negotiated. That's the infamous Condition 13. The idea that somehow there can be assessments if there's liability -- and I would suggest to you it's a little bit of a red herring. And the reason for that is sort of blithely it's referred to as a 218 election. Well, I think Board Member Hodgkins can give you a real tutorial on 218 elections and how easy they are to accomplish, and getting the required number of votes is just not a problem.

The idea of getting a 218 election passed in Yuba County right now I think is indicative of their current efforts to try to conduct surveys in order to find out how to do assessments for operation and maintenance. And that whole process is, to say the least, stalled. The idea of getting a 218 election at this stage of the game I think is -- I'll say it's remote, but that's my personal view. And the idea is, assess who? Who are those that would be benefited, that would fall under the jurisdiction of a joint power authority for purposes of levying an

assessment? What's the nexus. What's the benefit?

Those are very significant issues and they can't be just simply marginalized by saying, "Well, yes, we have the authority to have assessments. We'll just do a 218 election." Somewhere a snowball in Needles during July would have a better chance of making it across the street, I would suggest.

So, again, let's remember the context of -- Paterno has been referred to, Katrina, public safety; and then there's also involving law here in terms of condemnation, inverse condemnation. There's a of issues here that go directly as to who's going to be responsible for what acts.

Clearly it is a policy issue. Yes, and indeed it is being addressed one way or the other in the Legislature, at least over the last few years.

So the idea that you have kept Three Rivers' feet to the fire because it is a shell, and you've already identified that RD 784 has two lawn mowers and a tractor, and so the next thing you can look at is the only other principal behind the shell and that's the county. And whether or not the county can respond or not and whether or not the taxpayers in the county understand that potential exposure, is a delightful discussion for a later day.

The second part of my concerns had to do really with the application that you have before you more directly. You've heard me say this before. I think by moving or trying to move on this application today is premature. They seem to think that somehow in the applicant's mind that you can take and bifurcate this project and somehow say, "We're going to look at segment 1 and then we're going to jump over and look at segment 3, and we're going to avoid segment 2 because that's the 900 pound gorilla in the room nobody wants to address at this time."

Well, I'm sorry. It should be addressed at this time. Otherwise what you have here is piecemeal. And if you take a look at the way the project fits, you have other things going on here in terms of: What's going on with Wheatland in the Bear River levee, what's going on with Sutter and what they want to do with the levee, and what are the other implications that may be downstream with respect to Natomas and their cross canal? System, system, system, system. And it needs to be looked at as a system.

And the concern that was expressed I think by a Board member earlier, "Well, let's not confuse this permit with the broader policies," with all due respect, you exactly have to do that. That's your jurisdiction, that's

your purview, that's your statutory responsibility. If you don't, you're ad hoc making policy by taking applications and permits up one at a time without ever looking at what the end result is going to be.

There's an old passage I may have mentioned to you in Alice in Wonderland: If you don't know where you're going, any road will get you there. And at the end of the day you should have a policy locked in and you should be theming everything that comes before you to that policy. It is inappropriate not to do that.

I would suggest to you that your staff report and Dan Fua really set the stage for what has been the concerns of my client and as I have been expressing them to you in page 4 of that staff report. And he listed them quite dramatically, and I will restate them for you for emphasis.

History in this area is of failures. But we have uncertainties in subsurface and forming a formulation of materials used in select and design seepage control measures, uncertainty in the performance and effectiveness of seepage control measures, changing core criteria, impacts of global warming, impacts of new state plan of flood control. I would suggest to the Board that those are exactly the environmental components that you're in today as you're taking a look at this application that is

before you today. And, again, if you needed to have any assurance the fact that it's premature to even look at this application today, at a minimum it ought to be looked at when you have segment 2 in front of you. It's inappropriate not to do that.

Now, I would also indicate to you that you're going to be asked to make some environmental findings. I've indicated to you that I feel that Three Rivers made an error in not trying to early-on link up its environmental considerations under CEQA with Corps of Engineers federal responsibilities under NEPA. They know that's been our position, continues to be our position. And if you take a look at page 18 of their report that they have presented to you -- and I think it's a report as of April 30th, 2007 -- it identifies documentation compliance with CEQA.

But if you take a look at it, and I find it a little bit disconcerting, because in a sense what they're saying here is that, "Well, there is a NEPA component to this thing here. And you can actually handle that by taking a look at a final environmental impact statement, an EIR back in April of 1998." Well, that's magical. That's old. That's before Paterno. That's before Katrina. That's before some of the policy issues that you have before you today. And as I urged them to try to

combine those environmental requirements of both the federal and the states, you heard it, "Well, we don't have to do that. We'll wait until we have a permit before" -- "the application before the Corps of Engineers. And then we'll take care of the NEPA side of it at that stage of the game." You're not going to be able to do that. You're the big picture people. You are the people that have the responsibility for policy.

So this is the opportunity to take in context what is being presented to you in this application today and say, "Time out, time out. We're going to look at this as a system. We're going to look at all the segments of it. And we're going to take a look at it in terms of what is in the best interests of the people of California you've got for public safety." That's what your responsibility is.

Now, for purposes of trying to get a sense of, well, what is project -- what is this project that is referred to today? I would just simply have you take a look at the CEQA guidelines; 15378 defines "project" as the whole entity that is being created, not little segments. So, again, from the environmental point, just on the environmental point, there's a context here that's missing: One, the entire project, all three segments, in that context; in the broader context you have other

projects that are working their way up to you; and the broader context of that, you've got the whole Corps of Engineers, NEPA responsibility, which I would suggest to you should not be taken lightly.

There's also been a reference to what is the real concern here? Seepage, seepage, seepage. If you take a look at your staff report, it identifies seepage on the landward side of the levee 300 feet and refers to that in a couple of paragraphs, 300 feet landward side going inside. And that's not necessarily a limit.

So the issues that we've had all along with respect to that if you have these uncertainties that the staff report identifies, and you're taking a look at a piecemeal approach at trying to put these levees in place at this stage of the game for Three Rivers, again I would suggest that's piecemeal.

I would also suggest that references were made to the 1957 profile. And that just keeps coming back as some sort of a baseline. Well, my goodness, 1957, I think that was before 1987, 1997 and before a whole heck of a lot of not only flood events that we've had, major policy shifts and law that we've had. I requested from Colonel Light in a letter for him, if he would, to address the issue with respect to that 1957 profile and whether it's even relevant in California anymore post-Katrina.

You have a copy of a letter I received yesterday from him. I wanted to make sure that you were copied in as well as Three Rivers. And he has an interesting paragraph I'd like to read to you. It says, "In response to your last question, the 1957 profile is the authorized design for the Sacramento River Flood Control Project. The Sacramento and San Joaquin River basin's comprehensive study was completed in 2002. This study included analysis of the 1957 design profile on the Sacramento River Flood Control Project.

"The Corps has been unable to identify a non-federal sponsor to participate in a system-wide project that may change the 1957 design profile. Any new project would require Congressional authorization."

My goodness, shouldn't there be a non-federal sponsor in the State of California linking up with the Corps of Engineers to review the 1957 profile to determine whether or not that doggone thing is even relevant anymore? I suggest to you that that's exactly what ought to be done.

There was also some comments made -- and I'll conclude -- and the idea, well, why would you ever think of lowering a levee? Well, let me suggest why you might consider lowering a levee. Because the levees may have been granted to the state or the district -- the

Sacramento/San Joaquin Levee District by easement, and the easement is a document that is recorded in the county recorder's office and is a legal document that describes the opportunities and constraints with respect to that easement and may well set the burdens in that easement as to what can be legally constructed within that easement.

And if that has been exceeded over time, there may be now an overburdening that has occurred with respect to the holder of that easement and the underlying owner of the property, if you will, the burdened property. So there may be issues lurking out there with respect to that issue of levee height.

But, again, if I may conclude, this project -- or this application today, mind you, really needs to be put back in context, if you would. I don't think it's appropriate for you to act on it today. And you have heard in the last couple of hours a number of issues that seem to be catching us all by a little surprise.

It doesn't hurt to take a pause here and to do it right. You're only going to have one chance at this.

Thank you very much.

SECRETARY DOHERTY: Mr. Eres?

MR. ERES: Yes, ma'am.

SECRETARY DOHERTY: You said we had a copy of a letter. Am I missing it somewhere?

MR. ERES: It's not in your packet. I was indicating that the Corps -- that Colonel Light sent me a letter. I got it yesterday. And It shows on the bottom of it that it had been copied to Three Rivers. You may not have received it in your mail yet. I assume it will be distributed in the ordinary course of your internal distribution.

GENERAL MANAGER PUNIA: We haven't received it. But we'll receive -- and we'll share it with the Board members.

SECRETARY DOHERTY: That's okay. I just thought maybe I had a pile of papers here --

MR. ERES: I again had requested that it been distributed to you.

Thank you.

PRESIDENT CARTER: Thank you.

Mr. Margo, did you want -- is Mr. Margo still here or --

MR. SHAPIRO: No, he had to leave for a previous obligation.

PRESIDENT CARTER: Okay. Very good. I had a card. I assume he spoke on what he wanted during his -- okay.

Those are all the public comment cards I have for this particular item on the agenda.

So we have a staff recommendation before us at this point, ladies and gentlemen, again to request the Board make findings on the environmental issues, approve the draft revised letter to the U.S. Army Corps of Engineers to request that the cooperative agreement be approved by the Board, to approve the 50-foot easement for segment 1 of the project, and, finally, to approve the permit.

What's the Board's pleasure at this point?

Any discussion?

VICE-PRESIDENT HODGKINS: You know me.

SECRETARY DOHERTY: Yes.

VICE-PRESIDENT HODGKINS: Here's what I think. I thought the testimony we got was great. I thought the staff report was well done. I have a question here.

The way the indemnity provision is written in the report -- I mean in the permit, it would rope -- or it might -- it depends on how you guys interpret it -- rope Yuba County into the responsibility for maintenance of these levees.

Now, quite frankly, having lived with the local government and knowing how much trouble they have raising money, I really think that in the event that this can't be maintained by TRLIA and the 784, the best thing to do is to form a maintenance district, because we're not subject

with the maintenance districts to 218 and so appropriate money can be raised from the beneficiaries to maintain the levees appropriately.

So my question for staff is, is the intent here to make Yuba County also responsible for funding maintenance in the way you've written this?

STAFF COUNSEL FINCH: No, it's not. And also, if it comes to that point, there's a different mechanism that could be used.

VICE-PRESIDENT HODGKINS: Okay. So that's not an issue that we have to deal with.

MR. SHAPIRO: With respect to it's in the cooperation agreement explicitly and says, "The local sponsors" -- which includes the county -- "shall be jointly and severally liable to reimburse the Board or the government for the reasonable cost of performing maintenance." So while I agree that may not have been the intent, if the Board agrees with that intent, that last sentence of section 3B should be stricken.

VICE-PRESIDENT HODGKINS: I simply don't think it makes any sense from the standpoint of getting the maintenance done to make Yuba County responsible for it. I mean you heard what their budget is. And we can form a maintenance district and in effect, other than for the heat of the assessment, they can assess for whatever the

cost is to maintain to dam the levees. And so leave the county out of it.

STAFF COUNSEL FINCH: Well, what sections were you referring to, Scott?

SUPERVISING ENGINEER FUA: 3B.

MR. SHAPIRO: 3B, last sentence of the cooperation agreement in Attachment C. The whole B says, "If a district has failed or refused to perform the obligations set forth in the section" -- which was O&M -- in the opinion of the government or the Board that constitutes a threat to the ability of the end of the project, then the Board or government performs the work. And the local sponsor shall be jointly and severally reliable to reimburse the Board or government for reasonable costs of performing that work.

And I agree with you, Butch, that the cheapest mechanism for the Board is a maintenance area as opposed to suing the county to have them impose something through a 218 election.

VICE-PRESIDENT HODGKINS: I mean it sort of gets to practicality here. The best way to get the maintenance done if 784 falls on its face is form a maintenance district. And leave the county out of it.

And so what I heard -- and I could at least read the condition in the permit that the county might not be

part of the maintenance. But what you're saying is in the cooperative it's very specific. Okay, I think that should be stricken.

Now, here's the important thing I think for the Board members to understand about the indemnification, is if we include this indemnification here, we need to recognize -- this Board needs to recognize that that really is saying it's our intent to connect the land-use agencies -- and that's at least the way I would say it, because I think that's the real policy issues here -- connecting the land-use agency, their land-use planning power and the liability for damage to development that goes in and behind levees whereas somebody -- and none of us they could take and really hold.

Now, I personally think that's a good policy. Okay? Although I will tell you that I also would be willing, if the Legislature approves any kind of law that does that, to back away from that. Because I think as long as local governments have to think about liability, whether it's on future development or, in this particular case, development that's already taken place, then the policy objective that I'm concerned about, which is not separating land-use planning from the liability associated with the damages from flooding, has been addressed.

So, I am prepared, although I don't have the

exact wording, to move this item with the understanding that we're not going to make Yuba County responsible for maintenance costs, but that we are going to include them in the indemnification. And that it's the intent of the Board when SAFCA comes back in front of us to do the same thing to SAFCA. Because despite things that Nancy said, everything you heard about TRLIA is true about SAFCA. It could be gone tomorrow.

It cannot assess other than through 218, which means you have to have the voters approve it. The same thing is true of the reclamation districts. I mean there have been many in the valley that have just gone. And that's why we have maintenance districts. So nothing is permanent forever. And there is no difference. And I promise you -- this is a vow -- if you think Yuba County's upset, remember, they already agreed to this once. Okay. So they have sort of swallowed it. And it's not going to make a whole lot of difference whether they agree to it a second time, other than from a principle standpoint.

But I think it's important that we recognize that if we do this to them again, we're saying we're going to do it to everybody, I'm prepared to do our best to do that. And I think it makes sense until the Legislature adopts a law that puts the -- part of the burden of the liability here on the counties and the cities, all

land-use agencies, so that they have to think about it. At that point I'd be prepared to revisit that policy.

So that's kind of where I am. I don't want to make a motion though. I think the most important thing here is to get this permit approved. But despite what Mr. Eres said, and my general agreement that it would be nice to be able to deal with the whole system as a system, the simple fact of the matter is that there is no way to do that from a practical standpoint. This is improvements that need to be made, and our job should be to get the permit out of here so they can go about doing the work, in my opinion

BOARD MEMBER BURROUGHS: Butch, why do you say that it's impractical to look at this project as a whole system?

VICE-PRESIDENT HODGKINS: Because the state and the Corps together spent $35 million on the comprehensive study trying to come up with a plan for the whole system and it went nowhere. Okay? It is an issue that is impossible politically to address in this state. We don't have the staff, DWR doesn't have the staff. And the time required to develop a new state plan of flood control would mean basically we're going to leave every urban area that's ready to go forward and make improvements sitting with levees that don't provide 100-year flood protection

for, I would guess, at the minimum seven years, if ever.

I appreciate that that's the way things should work. But unfortunately in the State of California things just don't work that way. There are too many interests that that -- are best served especially if you stop any improvements to this system until we have a plan. Then you empower anybody who doesn't want to see more development in the valley to stop that process and -- or whatever their interest is. And unfortunately we're not able to -- we don't have the leadership or the will politically as a whole to overcome that. And this Board could absolutely make that commitment and it won't make a damn bit of difference at the end.

I'm sorry, that's the political reality of California government.

So, you know, I say stake out our position, which you ought to be connecting land-use planning authority and liability and get this permit out so that the work can be done. That's where I come from. But if that's not acceptable to three of the members, then I'm prepared to entertain whatever it takes to get this permit out so the work can get done.

PRESIDENT CARTER: Further discussion?

SECRETARY DOHERTY: One of the things that bothers me about the project is that across the river

there are problems and they want to make modifications to the levee. Now, this is all so close together. What I am curious to know is, why didn't Yuba County go across the river to Sutter County and say, "Hey, you've got some problems over there and we've got some problems here. Why don't we work together and solve this?" Because what's happening on your side is going to affect their side.

PRESIDENT CARTER: Do we want an explanation?

SECRETARY DOHERTY: Well, Scott can maybe tell me.

MR. SHAPIRO: I thought it was a question. But if it was rhetorical, I'd be happy to sit down.

PRESIDENT CARTER: We'll take a brief explanation.

MR. SHAPIRO: Okay.

SECRETARY DOHERTY: We've gotten a couple of explanations.

MR. SHAPIRO: We -- really picking up on Butch's comments, we don't have a lot of success stories -- I can't really think of any -- of cross-river successes. Actually we forged a bit of the success with Sutter County. If you look at the Feather River, you have three segments, as you know.

Segments 1 and 3 that were before you today, the channel is adequately wide there. And that's why there

doesn't seem to be relevance to going across the river to Sutter and asking for help or vice versa.

However, segment 2 is not adequately wide. We'll refund this afternoon. There'll be a public comment on it that will be here as well. That area we did need to do a setback. Sutter supports our setback. They've written a support letter. They have a setback at Star Bend proposed. We support theirs. We've written a support letter.

So our efforts are being coordinated. It's just that there's no reason for a setback or significant changes in segments 1 and 3 because the channel adequately wide.

PRESIDENT CARTER: That's the explanation to your rhetorical question.

(Laughter.)

PRESIDENT CARTER: Any further discussion, Comments?

BOARD MEMBER RIE: I have a question for staff, for Steve Bradley or Dan Fua.

I believe it was condition 64 that said comply with all the requirements of the Corps except for Item C, the Corps letter.

Should we change that or are we going to leave that as it is?

CHIEF ENGINEER BRADLEY: I don't think we should change that.

PRESIDENT CARTER: What does Condition C refer to in the Corps's letter?

CHIEF ENGINEER BRADLEY: It said that they would leave it at -- basically leave it at the elevation that it is. You could have a locally say an emerging flood fight repair that they didn't come back and remove rock that they placed or a road or some such like that, that's locally high.

C: That after the installation of slurry wall, the levee should be reconstructed to at least the Corps's design profile or the height before construction, whichever is higher.

If the height before construction had an anomaly there, I don't think we should raise it. In fact, I think this Board should not consider something that could be considered a nonauthorized raise. I don't think you want to inadvertently approve raising a levee that there was no authorization.

BOARD MEMBER RIE: Was it reasonable to suspect that the '57 profile that we have on file could be inaccurate?

CHIEF ENGINEER BRADLEY: That is what was turned over to us as the project, with the proviso -- provision

that there was some improvements to be made later in that turnover.

BOARD MEMBER RIE: Well, let's say we had a difference in elevation of six inches. Could it be possible that the existing heights of the levee is at the 1957 profile and surveying techniques were not as sophisticated as they are today and the as-builts are wrong?

CHIEF ENGINEER BRADLEY: Well, they -- surveying the surveying, we have digital measuring now rather than physical measuring with a tape. But they constructed all the infrastructure in this country with historic surveying. In fact, they laid out their tunnel through the Sierra and came right on. So I think the surveying is just as accurate back then as it is today.

But I don't think that's a question.

The question of whether it's six inches, that probably would be debatable because you could -- you're going to have to interpolate this a little bit off the design -- or the profiles, and they aren't really that close.

I'm more worried about where you -- when they run a profile prior to doing the project, if it shows an anomaly, that is, a hump in the system, then something's wrong. And I don't think this is a big problem. I think

we can work through this. What we want to end up -- really end up with is a fairly level profile for this entire reach. And I don't want to see an anomaly somewhere because there was a pile of rock that got left during a flood fight, or a farmer dumped a bunch of stuff on the levee and it just happened to be a little hump. I think that this is not a problem. I think we can -- if they show us the profiles, I think we can work through anything there is. I don't think it's a problem.

BOARD MEMBER RIE: Okay. I --

CHIEF ENGINEER BRADLEY: But I don't think you want to just be locked into leaving it just because it was there.

BOARD MEMBER RIE: I'm just concerned that if the Corps told us in their letter either the '57 profile or the existing height, whatever's higher, and we're opening the door to possibly lowering the levee.

CHIEF ENGINEER BRADLEY: Well, if it's an unauthorized raising, are you going to authorize that? It is not -- if it's not any kind of authorized raise, just because there was a pile of dirt there, you're going to authorize raising that? I don't think this is an issue.

BOARD MEMBER RIE: Okay.

PRESIDENT CARTER: So just so I understand how this would be handled during reconstruction of the levee

and prior to work.

I'm familiar with levees where they have riprap piled on a wide section of the levee. Is that considered a raising of the levee? And would that be the profile that would be surveyed and then restored if we followed the Corps's guidelines or -- I mean there's -- it seems to me that we ought to apply a little bit of common sense to the process.

CHIEF ENGINEER BRADLEY: That's exactly what I'm saying. I think that's what it comes down to. You don't want your levee profiled to look up and down as you go along it, through entire reach. It should be a fairly level even profile.

PRESIDENT CARTER: And perhaps maybe after they're done with the levee repairs it makes sense to leave that pile of rock that was there and maybe they don't have to disturb it. I don't know. But for --

CHIEF ENGINEER BRADLEY: Well, they're going to be --

PRESIDENT CARTER: But for flood-fighting purposes these stockpiles are strategically placed around.

CHIEF ENGINEER BRADLEY: They are degrading the levee. What we're saying is they're not going to be raising them back up if there was some anomaly there; that it should be a nice even profile along this stretch.

PRESIDENT CARTER: Okay.

CHIEF ENGINEER BRADLEY: A pile of rock that should not be surveyed as a levee profile.

PRESIDENT CARTER: And I don't think that the Corps thinks that the existing condition is probably indicated by a pile of rock or a pile of dirt that's piled off on the crown somewhere.

CHIEF ENGINEER BRADLEY: Yeah, it depends on what they survey as the levee crown. If they're going up -- if there's an obvious pile of riprap there, you wouldn't want to survey that as your levee crown. But you do get material placed for flood fighting to build up a road, you know, build up the crown sometimes for heavy equipment. They pile on a bunch of gravel. They're supposed to come back after -- you know, at the end of the flood fight when they do the rehab and level that back out. Sometimes that does not get taken care of.

PRESIDENT CARTER: Okay. Mr. Punia.

GENERAL MANAGER PUNIA: I want to make it clear in Condition 2. So this condition that we -- the way we negotiated, if they're going to degrade the levee, only then we are asking them to restore to these conditions. If they're not touching most of the -- the major portion of the section where they will be putting seepage well on the landside berms, in that area we are not asking them to

lower it even if -- but where they're going to degrade it, then -- to put the slurry wall, and then these conditions will apply when they're restoring the height.

PRESIDENT CARTER: Okay. Thank you.

Any more discussions?

SECRETARY DOHERTY: I want Butch one more time to explain. You don't want Yuba County to be held responsible or to be the maintaining district?

VICE-PRESIDENT HODGKINS: That's correct. The way in my opinion to maintain levees when the local agency fails is to form a maintenance district, because the maintenance district doesn't have to get voter approval to assess people the cost of maintenance. Everybody else has to. And I don't know how you maintain something if you can't get money from the voters to do it. And --

SECRETARY DOHERTY: So when will they create this agency?

VICE-PRESIDENT HODGKINS: Well, they wouldn't do that -- it simply would be that the signatories for maintenance in the long term would I assume be TRLIA and 784. And in the event that the inspections or TRLIA and 784 aren't doing an adequate job, the state could form a maintenance area.

PRESIDENT CARTER: It's similar to what we embarked upon in Knights Landing. But it turns out

Knights Landing ridge cut took it over. But essentially the state would take over responsibility for --

SECRETARY DOHERTY: That was a little tiny levee.

PRESIDENT CARTER: Yes.

SECRETARY DOHERTY: This a great big one.

PRESIDENT CARTER: Okay. Any further discussion or comment?

MR. FOLEY: May I speak out of turn since Mr. Shapiro has?

PRESIDENT CARTER: Just -- yes, but in a moment.

MR. FOLEY: Okay.

BOARD MEMBER BURROUGHS: I have a couple comments.

I absolutely feel that we go with the recommendations of the staff to hold the county accountable and connect the land-use planning and the liability. I don't think we need to go to the Legislature to pass legislation that leads the way on that.

In the interests of holding public safety at the highest level, I want to see a project -- this project presented to us in its entirety as a system, as was mentioned earlier, looking at the whole picture. It's very difficult to have a piecemeal application process. And I don't know exactly how we can stop midway and ask for that. I'm not interested in holding projects back. I

am interested in making -- ensuring that public safety is held in the highest regard as we continue.

I'm very uncomfortable with the fact that county came with Mr. Margo and his comment saying that he went along with indemnification in the beginning but now wants to back out. This project needs to be held accountable in its entirety, but by all the people that have presented it to us. So I'm not interested, Butch, in letting anyone off the hook as far as liability.

VICE-PRESIDENT HODGKINS: Neither am I.

STAFF COUNSEL FINCH: Could I make a clarification at this point?

I don't -- for some reason I don't have that -- is it 13B? -- in front of me. But if it separate from the 19, which is the liability -- the condition for liability, and 13B is about maintenance, I don't think -- you know, legally there's a problem with going the root of forming a maintenance area. It's actually more expensive for the locals, because then they have to pay the state. But I think that that one -- if I could look at the language, if there's a copy -- I think that that separation would be fine. But I would like to look at the language.

VICE-PRESIDENT HODGKINS: I'm not saying form one. Okay? I am simply saying that I -- leave Yuba County out of the responsibility for raising money for

maintenance. They can't do it. Okay? And if we need more money at some point in time, we would form a maintenance area.

PRESIDENT CARTER: Mr. Punia.

GENERAL MANAGER PUNIA: I think Vice President Hodgkins is absolutely right. In the Water Corps there's a provision, if the local agency fails to maintain properly, then state has the right to form a maintenance area, and Board will be the agency to approve those maintenance areas.

CHIEF ENGINEER BRADLEY: It is DWR's responsibility though to form the maintenance area.

GENERAL MANAGER PUNIA: Yes. Board will approve the DWR recommendation to approve the maintenance area, yes

PRESIDENT CARTER: So if -- I think there have been a few questions in terms of -- it sounds like there's a general consensus on indemnification with regard to the county. And Butch has proposed a change to the actual cooperation agreement, Section 3B, last sentence, striking "The local sponsor shall be jointly and severally liable to reimburse the Board for the reasonable cost of performing that work." And that work refers to obligations to operate, maintain, repair, replace, rehabilitate. So it's the O&M piece. And that's an

alternative if you utilize the other -- the standard process of forming a maintenance area.

So that's kind of what is on the table at this point. We do not have a motion.

Is there further discussion or is there a member that wishes to make a motion on this action item?

MR. FOLEY: Could I still have a chance to speak?

PRESIDENT CARTER: Oh, I'm sorry.

Yes, please, Mr. Foley.

MR. FOLEY: We spoke -- Mr. Eres spoke that we believe that it should not be piecemeal -- shouldn't be done piecemeal. Mr. Hodgkins spoke I guess contravening that, that there is not the political -- he agreed that maybe it should have been done differently. Maybe it's not the best -- piecemeal is the best way to do it. If they're not, the political will at state level -- State of California to get it done.

And I wanted to say if the political will is not with Mr. Hodgkins, where is it? Or if the political will to get this done properly is not with the Board, who do we look to?

PRESIDENT CARTER: Thank you.

I might add that I -- with regard to that issue, the approaching this from a system, this is a very, very complex system. If we were to approach it from a

systematic perspective, we would be paralyzed. We would not be able to -- these projects are so large, so huge, there's so much data and they are so interrelated, that we would not be able to make any improvements to the system. We have to decrease the complexity by segmenting the system and trying to do improvements to the system. I mean where do we draw the lain what the system is? Does it include the entire Central Valley? Is it the San Joaquin? Is it the Sacramento. Do we --

MR. FOLEY: May I --

PRESIDENT CARTER: We all know what --

MR. FOLEY: It's a process --

PRESIDENT CARTER: -- what is involved in that.

MR. FOLEY: It's a process --

PRESIDENT CARTER: Excuse me. I'm talking. Thank you.

MR. FOLEY: You are making decisions for the public.

PRESIDENT CARTER: So I agree with Butch that, although it would be nice, it is I don't think either technically -- in our life times we would not be able to solve the problems of the system on a timely basis and without the system changing again and the rules of the game changing again. So we have to address these on project by project, piece by piece and make improvements

incrementally, small steps. But continuous improvement is what's important.

So that's my two cents.

Do we have any other comments from the Board or suggested motions?

BOARD MEMBER BURROUGHS: I do want to just say one other comment. I attended the -- can I say that about the Superior Court hearing?

STAFF COUNSEL FINCH: In the court, yes.

BOARD MEMBER BURROUGHS: I attended the Superior Court hearing the Reclamation Board was involved in. And the Judge made a comment that piecemeal is not the way to look at these projects, that we need to look at them as a whole project. And I understand that right now the way the system has been, it's been very difficult to get things through. But at least I think the project in its entirety should be presented so that we look at this project in its entire form. And there are major issues with seepage issues and I am hoping that they get addressed. Because as we have had presentations, we've been told that they're addressed, and then they've changed, and then now they're addressed in another form. And that's what I'm uncomfortable about, is the fact that things have changed back and forth. And I would feel much more comfortable if, especially in regards to section 2,

which is the big major problem, if we could have a presentation in looking at this project in its entirety as how it's going to be coming to us.

Thank you.

PRESIDENT CARTER: Okay. I'm going to propose that we take a five-minute recess. And so we'll reconvene here in five minutes.

(Thereupon a recess was taken.)

PRESIDENT CARTER: Okay. Ladies and gentlemen, if you could please take your seats and we'll continue. Hopefully have some closure to this.

We were having Board discussion regarding Item 3 on our agenda. Is there any more discussion or any more comments with regard to this?

If not, the Chair will entertain a motion.

Oh, Mr. Punia, did you have some suggestions for the Corps letter?

GENERAL MANAGER PUNIA: Staff has a minor recommendation to change the letter to the U.S. Army Corps of Engineers. Jim Sandner of the U.S. Army Corps of Engineers suggested that we should change the word "modification" or "modify" to "alter" and "alteration" in the proposed letter we will be sending to the U.S. Army Corps of Engineers. There are nine places where we have used the term "modify" or "modification". The

recommendation is to change those words to "alter" or "alteration".

Thank you.

PRESIDENT CARTER: So we would appreciate it if any motion to approve this letter is approved as altered.

SECRETARY DOHERTY: Well, now that's an easy one. I can make a motion to that one.

BOARD MEMBER RIE: Are we including approval of the letter, approval of the permit, and approval of the cooperation agreement all as one motion or not?

PRESIDENT CARTER: We can take them --

SECRETARY DOHERTY: I just had a motion to approve the letter modified. Just that.

PRESIDENT CARTER: Did you make a motion?

SECRETARY DOHERTY: Yes.

PRESIDENT CARTER: Okay. So we have a motion to approve the draft revised letter to the Army Corps of Engineers requesting approval -- requesting review of the proposed alteration project, with the letter to be approved as altered as suggested by Mr. Punia.

Is there a second?

BOARD MEMBER RIE: Second.

PRESIDENT CARTER: Second.

All those in favor indicate by saying aye.

(Ayes.)

PRESIDENT CARTER: And opposed?

Okay. The motion carries.

BOARD MEMBER RIE: I'll make a motion to approve the cooperation agreement minus the requirement that Yuba County be required to maintain the levees.

PRESIDENT CARTER: So we have a motion to approve the cooperation agreement with striking the language from section 3B, last sentence in that paragraph 3B, "Local sponsors shall jointly and severally be liable to reimburse the Board or the government for the reasonable cost of performing that work." Is that --

BOARD MEMBER RIE: Yes.

PRESIDENT CARTER: Is there a second?

VICE-PRESIDENT HODGKINS: Second.

PRESIDENT CARTER: Okay. We have a motion and a second.

All those in favor indicate by say aye.

(Ayes.)

PRESIDENT CARTER: And opposed?

(Aye.)

PRESIDENT CARTER: So the motion carries 4 to 1.

All right. We can do this one by one.

VICE-PRESIDENT HODGKINS: Well, how about I make a motion that we approve the remaining items in conformance with the staff recommendation.

SECRETARY DOHERTY: Tell we what the main item is.

VICE-PRESIDENT HODGKINS: Well, it's the issuance of the permit.

PRESIDENT CARTER: Here, I can read it.

VICE-PRESIDENT HODGKINS: Thank you.

PRESIDENT CARTER: So the remaining items before us per the staff recommendation is to request the Board make findings that the environmental impacts of this project within the jurisdiction of the Board have been mitigated or avoided as a result of the proposed changes, alterations, and mitigation measures incorporated into the project; that mitigation measures set forth in Three River Levee Improvement Authority certified EIR relating to flood control and public safety are hereby adopted and Three River Levee Improvement Authority's mitigation monitoring plan is incorporated by reference. And based on the evidence presented to the Board, the project will not result in hydraulic impacts that will have a significant effect on the environment.

The next item remaining is that the Board approve the 50-foot easement required for segment 1 to provide adequate room for levee expansion, modification, upgrades, flood fights, operations and maintenance, and a buffer for urban encroachment.

And, finally, that the Board approve permit No. 18170 for the project and delegate the authority to the General Manager to finalize and issue the permit.

That's your motion.

VICE-PRESIDENT HODGKINS: So moved.

BOARD MEMBER RIE: Second.

PRESIDENT CARTER: We have a motion and a second.

Any discussion?

SECRETARY DOHERTY: What is the staff's recommendation?

PRESIDENT CARTER: That was it.

SECRETARY DOHERTY: That is their recommendation --

PRESIDENT CARTER: Yes.

SECRETARY DOHERTY: -- as written?

BOARD MEMBER RIE: To approve the permit?

PRESIDENT CARTER: Yes.

Okay. Any further discussion?

BOARD MEMBER RIE: I believe staff had a revision to Condition 17.

SUPERVISING ENGINEER FUA: Yes, and that's attached in your packet.

BOARD MEMBER RIE: Okay.

PRESIDENT CARTER: And that was intended to be included in the motion.

VICE-PRESIDENT HODGKINS: Yes, it's the way it was delivered today.

PRESIDENT CARTER: That was read into the record earlier today. Do we need to read it again?

Just for clarification, the revised Condition 17 to the permit is: The maximum levee crown elevations of the levee reaches where construction activities affect the levee crown area shall be limited to the maximum crown elevations shown for the same reaches on the U.S. Army Corps of Engineers' Sacramento River flood Control Project, California, Levee and Channel Profiles, dated March 15th, 1957, or as modified by the Corps of Engineers and shown on as-built drawings provided to the Reclamation Board subsequent to March 15th, 1957, or other documentation of authorized levee improvements acceptable to the Reclamation Board.

That's the revised language for 17.

So we a motion and a second to approve the remaining items, which have been read into the record.

Any further discussion?

Okay. All those in favor indicate by saying aye.

(Ayes.)

PRESIDENT CARTER: And opposed?

(Aye.)

PRESIDENT CARTER: The motion carries 4 to 1.

Thank you very much.

All right. At this time, the Board is going to adjourn from open session and move into closed session. We expect the closed session to last no longer than hopefully 15 to 20 minutes.

And so we would ask that those members of the audience please excuse themselves. And we will reconvene into open session no earlier than 10 of 4:00.

Thank you very much.

(Thereupon the meeting recessed

Into closed session.)

PRESIDENT CARTER: Ladies and gentlemen, we can go ahead and continue our discussion.

Let the record reflect that the Reclamation Board did enter into closed session. We had a discussion with our legal counsel regarding litigation as agendized, and no decisions were made.

We are now coming out into open session. And we will continue with your agenda.

We are on Item 5 of Informational Briefings, Phase 4 Feather River Levee Repair Project (Segment 2 - setback levee). This is a briefing in preparation for an agenda item for our meeting in a week's time. So we have had a little bit of time to prepare for that.

Let me do one administrative item before we begin

that item. And, that is, I want to introduce Mark Herold from DWR. Mark, if you could stand up. Mark has had the patience to sit through this all afternoon.

Mark is the new Chief of the Floodway Protection Section. He is replacing Mike Mirmazaheri, who many of you know. Mark is a Registered Professional Engineer, civil engineer. He's had 14 years of experience with DWR in the O&M area. He's worked on State Water Project and has been involved -- intimately involved with permitting of projects on the State Water Project.

So we are very happy that Mark is taking over the reins for Mike. We have -- we work very closely with that group with our permits.

So, Mark, welcome aboard. Thank you for accepting the challenge.

DWR FLOODWAY PROTECTION SECTION CHIEF HEROLD:

Thank you.

PRESIDENT CARTER: All right. With that, we'll turn it over to Mr. Shapiro.

(Thereupon an overhead presentation was

Presented as follows.)

MR. SHAPIRO: Mr. President, thank you.

I will endeavor to be briefer than usual in light of the late hour. But I also want to pay due respect to Ms. Burroughs, who hasn't seen any of this briefing yet

despite the subcommittee members seeing it. So I do want to provide enough detail, broad context.

Did Ms. Rie leave or is she still here?

VICE-PRESIDENT HODGKINS: No, she had to leave.

PRESIDENT CARTER: Yes, Ms. Rie had to leave for a prior family commitment.

MR. SHAPIRO: Okay. So we're going to tag team this. I'm going to present the majority of the general information. And then Paul Brunner is going to do a more detailed presentation on alignment in light that the Board's expressed interest in that issue at the subcommittee meeting and also the Rices' interest in their presence here today, so we can give the Board a good understanding of the basis for those decisions.

There are handouts, which I hope you have. And I have a few extra if anyone in the audience would like one as well.

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MR. SHAPIRO: The project goals for the Feather River setback levee are really the same project goals as we've had throughout the entire project. And that includes Phases 1, 2, 3, and Yuba Phase 4, which are all complete and those words are all certified.

The project goals are achieving at least a 200-year level of public safety flood protection for south

Yuba County. Obviously we're working towards regional system and environmental benefits. We obviously want to complete and have committed to the Rec Board to complete the remaining major public safety elements in 2007 and 2008. And hopefully your action before the break in approving segments 1 and 3 will allow us to continue on that schedule.

And, finally, achieving a fair and equitable state and local cost share with the local cost share generated through continued development, the local developers have come up with somewhere in the neighborhood of $70 million thus far. And that has been a very effective way of us funding the work we've done to date.

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MR. SHAPIRO: So this is the overview of the presentation. There's five essential points, with subpoints under each of them. I'm going to go through a little bit of a history on the setback levee, provide some detail of the benefits of the setback levee, talk about the design, permitting, and construction schedule. I'm going to spend a little bit of time talking about the way this fits into the implementation and funding agreements that the previous board approved and that this Board has been briefed on. And then, as I mentioned, the final will be the presentation of the setback alignment.

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MR. SHAPIRO: So I'm going to start with the history of a setback levee.

The setback levee has been contemplated for a number of years. In 2003 Yuba County Water Agency used Proposition 13 funds to do a feasibility study and programmatic EIR that identified the Feather River setback levee as a potential option. This section of the river, as you'll see in graphics now and particular in the alignment narrows down through section 2 to an extremely narrow area. And there's been interest in this area for a long time in widening out that channel.

Now, the prior Rec Board has approved the approaches for Phases 1 through 3. That was back in February through April of 2005, as we talked about earlier today. Those phases, as you know, are substantially complete. Certification has been received for almost all the reaches, with some erosion issues holding up one or two other issues.

And it's really been our private-public partnership that has allowed us to get the 135 million in flood protection improvements in. If you think about it, we've done that in about two and a half or three years. And there are just very few other communities in the state or in the country where you've seen that kind of

improvement that quickly, bringing a high level of flood protection, especially to a community that's been historically socioeconomically challenged.

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MR. SHAPIRO: In May of 2006 the Board approved the approach for the Feather River Phase 4. And that was assumed at that point to be strengthened in place and the Yuba River. At that point we could not identify sufficient funds to fund the setback levee. And so our assumption was we would not construct one.

In August of 2006, there was a landowner capital call. That money from the Plumas Lake developers down in the south funded the remaining improvements required in the main section of the Yuba. And that actually took most of the communities of Linda and part of Olivehurst out of the deep floodplain. And so that was a tremendous advance of money that really helped us advance public safety. That work is completed, as you know, certified.

In November of 2006, when the propositions passed, we took another look at the opportunity for a setback levee. We've been talking with DWR for literally over a year about the setback levee. And DWR had expressed a lot of interest in doing the kind of system changes, as you know, that are part of the white paper and the Flood Safe program. And so we rescheduled the second

capital call, which would have been for Feather River strengthen in place, and said, "Let's take some time. We're not holding the schedule up at this point. And let's evaluate our options."

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MR. SHAPIRO: We talked, as I said, to DWR. They liked the project. They wanted to see it constructed. They did not make any funding commitments. I'll be really clear on that. They did not. But they said this is the kind of project that they would like to see funded.

We've received tremendous written support. We've received it from Sutter County across the river, as we talked about before; Levee District 1, which is in Sutter County; Friends of the river; SYRCL, which is the South Yuba River Citizens League; Sierra Club; Yuba County Water Agency; even SAFCA. And we have about eight or nine others that have supported this project.

And then in February of 2007, after making the determination that we felt we could swing it, we could get this done, we had the local funding share from the developers available, and we had we believed state money potentially coming in from the propositions, we certified the EIR and we selected a setback levee.

As you know, in May of 2007 the certification of the levees was done by the Corps. And in May Three Rivers

also set a second capital call for 9.1 million from the developers, and that money was deposited into escrow. And that's the money that basically we will operate under for the next few months.

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MR. SHAPIRO: So you've seen this drawing many, many times. Just to make clear for everybody, using the mouse, from basically mile marker 17 up to about 22 1/2 is the proposed Feather River setback levee. It's about 5.9 miles and it replaces a little over 6 miles of existing levee.

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MR. SHAPIRO: So let's talk about the benefits of the setback levee.

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MR. SHAPIRO: There's four primary benefits, and I'll talk about each in a little bit of detail. It's superior flood protection. It provides regional benefits. It's consistent with the flood safe program of what the state is trying to do. And it creates a lot of land available for habitat or, frankly, continued farming in the floodplain.

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MR. SHAPIRO: So, first, superior flood protection. This levee, like the Bear River setback levee

that's already been constructed, is built to current engineering standards. It's not a retrofit. Slurry walls can be very effective.

But there's really no question that constructing a new levee from scratch when economically feasible is the superior option because you know exactly what material goes into it. It's built with suitable soils. The soils in the Feather River levee are not suitable. They're very sandy. This setback will reduce and remove a river choke point and widen out the floodplain.

The current levee is actually built over old river channels. And this will move it away substantially from those old river channels. This will eliminate current significant erosion sites by setting the river back -- the levee back. And of course it achieves greater than a 200-year protection because of the widened channel.

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MR. SHAPIRO: In terms of regional flood protection benefits, what this does is it lowers the water surface at that area and upstream. And so that has primary benefits to Marysville and Yuba City. But a 1.3 foot reduction in that area for a hundred-year storm and a 1.5 foot reduction for a 200-year storm. And it actually results in a 2.7 foot reduction in a hundred year and 3.0 reduction in a 200-year in the most dramatic place.

This is really important for our neighbors from Marysville and Sutter County and represents a real cooperative effort. Neither of those communities have ongoing flood protection improvements right now. And if we can do something that lowers the water surface that substantially for them, it really is a wonderful regional benefit.

And because of the regulated nature of the Feather River and the addition of these acres within the floodplain, there are no downstream hydraulic impacts.

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MR. SHAPIRO: Here's a numeric representation of the quality of the statement I just made. For example, if you look at Marysville on the Yuba at 2.6, in 1986 the water surface elevation was 77, in 1997 the water surface elevation was 78.5. In a hundred-year storm it would now be 73.9. And in a 200-year storm it would now be 77.2. So it's just a great way to understand the significant water surface reduction benefits for those communities.

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MR. SHAPIRO: The program is consistent with the Flood Safe California program. We meet or exceed every one of the criteria included in that program. The program talks about the need to make system changes, that we can't just strengthen all the levee in place, and this does

that. It reduces erosion. It lowers O&M costs and allows us to recognize the fluvial nature of the river.

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MR. SHAPIRO: Importantly from an environmental perspective, this creates up to 1550 acres of habitat for restoration, mitigation, or other uses. You'll see there, it could be used for a mitigation bank, for habitat restoration. It could be state-owned land that's leased back for agricultural use. Our application to DWR presumes taking it in fee and transferring it to the state. So it really becomes a state choice as to what that land should be used for, which is a tremendous opportunity for mitigating other projects or allowing it to continue in agriculture until such time as those projects are needed, or even potentially restoration.

BOARD MEMBER BURROUGHS: If I could stop you right there for a quick comment.

MR. SHAPIRO: Sure.

BOARD MEMBER BURROUGHS: You don't have anywhere written that it could be continued for agricultural use other than lease back for agricultural use.

MR. SHAPIRO: Yeah, our discussions with the larger farming operations in that area was that they did not want us to have them continue to own it with a flowage easement over it. Their interest was in selling it.

Doesn't mean that they wouldn't potentially lease it back or that it wouldn't be leased to someone else. But the -- we've talked to large operations, primarily in the north, that are completely covered by the setback area. And the Rices are a little different situation because the levee directly impacts and leaves some land in and some land out. But for the ones that are completely within the setback, really the universal message has been, "If your going to do this, we'd like you to buy our land or eminent domain. We're not interested in just having an easement over it." And that's why it's phrased that way.

In addition, in talking with senior management of Department of Water Resources --

SECRETARY DOHERTY: I'm sorry. I forgot to turn it off.

MR. SHAPIRO: Is the rate at which I should be presenting?

(Laughter.)

PRESIDENT CARTER: That's a hint.

MR. SHAPIRO: In our discussions with senior management at DWR, they were also clear they wanted the land purchased in fee. They did not want to be in a situation years from now when they have to put additional money into buying the remainder rights to use it for other purposes. So this creates the most flexibility.

And the final point there on that slide is important. With the setback on the Bear, we took measures in place to make sure that all necessary O&M could be done there. So, for example, as you will recall, there are areas down there where there are veld that have been planted. But for that veld we have an agreement with Fish and Wildlife Service, we can cut it out for O&M purposes. So that has been taken care of. And we have created an endowment to assure that the area is maintained. And the same would occur here.

SECRETARY DOHERTY: And that's written into the agreement, that you can touch an elderberry?

MR. SHAPIRO: Yes. Yes, because we so over-mitigated any impact, that the Fish and Wildlife Service acknowledged that there was such a benefit to the plant community that it was reasonable that if for O&M purposes and for flow we needed to impact them, we could without mitigation requirement.

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MR. SHAPIRO: So design, permitting, and construction schedule. I'm going to be very brief on this one. Segments 1 and 3 are out for bid. Now that the permit was issued, once 408 comes in, assuming Yuba County accepts the indemnification, we could construct one or both of those segments this summer. We are working with

the Corps on 408 and hope to hear obviously once an approval comes in.

Segment 2, design is underway. We are going to bid this one a little differently. We're talking about bidding it at a lower percentage completion so you can get input from a contractor as to how to construct it more cost effectively. And we actually will be in a position to send it out to bid in the next month or two.

The strengthen in place tie-ins can actually start this year. We can do the foundation work over the winter and then construct the actual embankment next year during the drier weather.

We have been doing land acquisition issues in stages working from the north to the south. We've been doing both voluntary and eminent domain land acquisition. As part of the alignment, Paul will share with you some statistics on the number of people we've interacted with and the overwhelmingly voluntary response to our request for rights of energy to -- excuse me -- rights of entry to come in and to do investigation.

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MR. SHAPIRO: Here's a slide that is almost unreadable on the TV. But it basically shows us moving forward through the project and outlines the particular aspects of each job and how we're proposing to schedule

it.

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MR. SHAPIRO: So the last point that I'm going to address in any detail is the interplay with the existing implementation agreement and the funding agreement.

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MR. SHAPIRO: As with the Bear River setback levee that we constructed, we found that multiple funding sources were required to fund the more extensive project that had regional system and environmental benefits. The Bear River setback levee was funded from three separate sources: The local dollars, Department of Water Resources Prop 13 dollars, and Fish and GAME dollars. And that's what allowed us to build a brand new levee, state of the art for flood protection, and also produce 600 acres of habitat for the environment.

Now that we've select the setback levee, we're working with the landowners to discuss amending the funding agreement to address the changed scope. As I noted earlier, our assumption when we negotiated it was we were doing a strengthen in place. And at this point we're just waiting for DWR's response on our application. And once we get that, we can dive to the table, we can work out the last of the details.

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MR. SHAPIRO: Which brings us to the presentation of setback alignment. And I just want to briefly introduce this topic. And then Paul has a lot of detail and some excellent slides to help you understand the decision-making process.

The alignment has been an interesting discussion from a local agency perspective. And I'm going to ask the Board to think about as you review the alignment what the Board's role should be in reviewing that alignment. It seems to us as a local applicant that it's completely appropriate for the Board to basically look and say, "Did the agency do this arbitrarily" or did we have a legitimate basis for our decision? Did we have hydro -- did we have geotechnical experts who went in, who gathered information, who had a series of factors that they looked at and ultimately made a decision?

We have sought to be flexible in our alignment. You will hear from Paul on the circumstances where we have successfully moved the levee to accommodate individual landowners' interests in a way that we felt would not jeopardize the overall impact of the project. We have not been successful every time we've been asked.

And so this will really be a story of us and our experts trying to strike a balance of the factors that have to be considered. Because I may not have an

opportunity to speak later, I just want to note that I know the Board received a letter from Mr. Naylor, excellent letter that laid out the Rices' concerns. I trust you've received our response as well, which really lays out our attempt to explain the various factors and the necessary balancing that must occur in evaluating our experts' decisions and then moving forward with those decisions.

So unless there are questions on the basic setback that I've discussed, I'll ask Paul to go through the alignment.

VICE-PRESIDENT HODGKINS: When do you expect to hear from DWR on your application?

MR. SHAPIRO: The latest information that we heard is that we will hear the week after next. And we heard that during the break.

PRESIDENT CARTER: Mr. Shapiro, I noticed that your discussion of the basic setback didn't include a discussion on the downside of the setback. What are the negatives in the setback?

MR. SHAPIRO: The negatives are: It is a higher cost. It has potential socioeconomic impacts on farming in the area. But I do not believe there are any technical or flood protection negative impacts. And I'll look to Ric to ask if he has anything to add to that.

MR. REINHARDT: No.

PRESIDENT CARTER: I think you should not omit that discussion from your presentation.

MR. SHAPIRO: It was certainly contained in -- well, I shouldn't say that. I believe it was contained in the EIR. I don't have a copy with me and I haven't memorized it. But, yes, we acknowledge that those are two absolute negatives, the higher cost and potential socioeconomic impacts to the community.

PRESIDENT CARTER: Right. We should attempt to present the whole story and not just the nice parts of the story.

MR. SHAPIRO: Thank you.

(Thereupon an overhead presentation was Presented as follows.)

MR. BRUNNER: Good afternoon. I'm Paul Brunner, the Executive Director for Three Rivers.

What I'm going to do is what Scott said, was piggyback on what he was just talking about. I think he set the ground rules really well for -- laid out what I was going to be talking about here and why we did the alignment the way it is.

But I do have some graphics. This is a -- really carries on from the Reclamation Board's subcommittee meeting on 22 March where we talked about this and the

alignment, and move forward from there.

We worked on the alignment for many years to get to this point. What you're going to see, we're going to about the floodway. I have a graphic for that. The geological conditions play a key to this. We're going to put the levee -- constructibility plays reducing impacts on residents where we can. There's an economics one. And then I think you'll -- as you go through here, there is an element of judgment that comes from building a levee and where we place it.

We factored all that in together based upon what you'll see here, and then made a judgment as to what we would do when we replace it. And we think we have the right alignment and right place for it.

If we were to move the alignment, we would have impact on our schedule at this point. That was a question that came up at the last Rec Board meeting.

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MR. BRUNNER: For the sake of the group, this slide shows the overview. This is the segment that Scott was just talking about. Let me find the mouse here and point out some -- this down here is Star Bend, Shanghai Point is over here.

The red lines here represent the existing levees that are there now. This is the setback area here. It's

color coded in blue, red, and yellow for a reason, because we plan on our construction to start at the north end and work our way down with the foundation. And then hopefully starting in September, if we get the money from the Prop 180 funds that we just talked about the status and move forward on, we hope to start that in September.

We are starting our acquisition for land up in this northerly end here and moving down. Our next phase would be in this area with the acquiring land in the red area. The Rice family is in the red area right in this area right here.

We would then carry on down with the yellow and eventually acquire all this property that you see in here.

Our goal is to construct the foundation during the winter time. That's weather dependent to a large degree. But to construct it. And then next spring to start the embankment and build this in the 2008 season -- construction season and complete by 2008.

In 2009, we would degrade this levee -- the existing levee.

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MR. BRUNNER: This next slide speaks to the floodway. And what you're going to see is a series of presentations that really takes the same snapshot. The last one showed the parcels in the aerial view. This one

is a aerial view muted in the background. But here you'll see, again, red is the consistent color for the existing levees. And there's a noticeable choke point, Scott was mentioning it in his briefing, right in through here where we currently have our setback. And the green is shown in setback. And the color, green for the levees will always be the setback location.

You'll notice that we have this large expanded floodway that is now created -- or will be created when we build the setback.

The consistency is that we want to have this width in here as consistent up here as downstream, so that the water continually will flow through there and will not have this choke point causing the water to backwater and causing the erosion problems that we have and move forward.

Now, the point is, why did we build it in the green area? Part of it is the hydraulic model that we have here. But a large part of it ties with soils and soils types that we would then build over.

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MR. BRUNNER: To start the discussion on soils, the next slide does talk about a 1911 -- or present a 1911 graphic of the Feather River as to how it has flowed over that time.

During this time period Plumas Lake actually existed. It's right over in here. It wandered around the Feather River, flowing from here down to the my left. Notice that it kind of -- really kind of wanders up over through here. It currently doesn't do that. But it comes along through here.

The whole point of showing this slide is that it has changed cores, it's meandered in this area, and that it's had a big impact on sediments and soil deposits over time. And that sediment deposits over time are reflected on this map here.

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MR. BRUNNER: Now, this is a USGS map. It shows an aerial behind it but also displays different type of soil types. For simplicity, the QA soils represent more recent sediments that came about, much more permeable. The QRs and QMs represent much older formation, Modesto formation, riverine formation, that are older and less permeable. For a levee location, the older formations are better to build upon.

You'll notice that the area here for the Yuba side of the river is really out in the QA area almost all the way. And when I show you another slide coming up, you'll understand why we have boils and issues and problems with our levees out in that area right now.

Interestingly, you know, when I saw this slide being prepared, the work on it, I noticed that our friends across the river in the Sutter County area, their particular levee is built a lot on the Modesto levee, a soil which is a better condition.

This scheme of QA and QM and QR soil types will come up over and over again throughout our briefing.

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MR. BRUNNER: What I've done here is highlight the QA around the river. Because when a river flows and it has a floodway, it actually raises above and beyond the banks and floods the area as it flows downstream, and into a much wider area than the rivers typically flow.

I overlaid the QA that's in yellow with the 1911 map. And you'll notice that the alignment with that QA in previous river locations is almost dead-on, showing that the deposits over time with sand and sediments have come through here, flooded out here, left the QA soils along in this area; and represents really an area of large deposits. You'll see later on when we view soil boring locations for you to point that out and a cross-section that will be coming up in a second.

This red area here that you see, these little red dots, represent underseepage area -- boil areas that we've been experiencing over time or historically. And they're

out in this QA area predominantly.

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MR. BRUNNER: This slide introduces the setback. And what we did with the setback, keeping in mind that we have the hydraulic model of the floodway, that to try to keep a consistent channel width, we lay down the setback that's shown here in green. And part of the process was to really be as close as possible and stay on the QM soil -- or QR soil, which is the better soil type for levee foundations, and hug along through here as much as possible and then eventually connect that here at Shanghai Point in this proximity here.

This area down here where Plumas Lake is is really just a lot of sandy deposits and that that we'll -- we have to deal with. We'll have cutoff walls and that when we're through as we build the setback. Part of the economic justification in looking at the project and working through it is it seemed really unreasonable that we pull the levee way back down here to try to miss that totally, is that that would just impact more farming and more land is the -- we had to use some judgment to work through that. And we work through here, but staying on the QM soil as much -- or QR as much as possible and then connecting back over through here.

Above this point here, once we leave Plumas Lake,

somewhere in the neighborhood of 70 to 75 percent of the levee that we'll be building is on the better soil.

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MR. BRUNNER: Now, this feature of the map shows it again, with the floodway, the river being in blue. And then we overlay -- and this is a little bit hard to see, but it does show the topo map that we have. And during our discussions and our documentation and also with the Rice family, we had mentioned this concept of a bench. And a bench is just a higher elevation where the soil is higher in one ground level and then it slopes down to a lower one.

There is a bench in the area where the red dots are. And the topo would verify that. You'll notice that that bench really tracks along the edge of the QA. Now, we didn't highlight the QR or the QM, but that's right on the other side over here not in color. So that bench really does exist right at the edge of the formation. That becomes an important point on constructibility and what we're doing with levee work into the future as to how we build the levee and what we do.

Again, here's the green setback, the red being the bench. The QA soil being the bad -- or the more sandy soils. And then we're trying to build the levee as much as possible on the better soil.

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MR. BRUNNER: Now, if I take a cross-section right here and look at it, you'll see this. Again, this is the Sutter side of the river. This is an old remnant. Apparently we're building the second setback on this segment of the river. There was an old remnant right here built along the river. And now this is the existing levee that's there. We're putting the setback levee on top of the QM-QR soil.

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MR. BRUNNER: And in this particular cross-section I picked an area right there where that's where the levee is is on the QM-QR soil.

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MR. BRUNNER: This levee -- large parts of these levees do have a cutoff wall. The QM-QR soil is not totally impervious, though we are putting in some cutoff walls.

But here's the impact of a bench, is that from here where we go off and we may slope down into this area here, we pull the property off. And this is shown approximately somewhere 2-, 300 feet away from the levee, somewhat of a typical cross-section but in that area. We would then build a higher levee -- or not higher, but a levee that actually is higher from ground surface, same

elevation. But more materials would have to be included. That's shown in the red. The foundation would be on QA soils, not as good as the QM-QR soils.

The cutoff wall would go deeper than this wall here, all adding to cost. There's also a drainage issue along the toe of the land side here that we would then be working with and having to solve if the water came down here and drained to this low spot. Perhaps having to put a pump station in to handle that problem in that.

The yellow area that you see here -- we have soil borings, not a huge amount of soil borings, but we have soil borings that we felt technically represent what we're doing on the project. And these represent soil borings that we've taken. And they would show that this is a lot of QA soils in through here. Which then you'll see from that bank -- or that bench, it comes down, and we could plot down through here, that it does slope down, and we'd have this effect at the cutoff wall.

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MR. BRUNNER: What I'd like to move to here is to actually point you to another little handout that we gave you, which was our examples of trying to work with residents and what we have. There are several examples. I'm going to walk through some graphics here.

Scott did point out one of the points where, when

we'd been working on this project, not acquiring the property by fee but through getting easements right to the entry to do our work, we have approached many of the residents out there, 35 landowners representing over 50 parcels that are out here. And we were able to reach agreement with them all. There was one that balked and then eventually we were able to work that out without going to court.

SECRETARY DOHERTY: That's just for the right of entry; that's not --

MR. BRUNNER: That's just for the right of entry.

SECRETARY DOHERTY: That's just for looking and exploration and --

MR. BRUNNER: Well, we were -- when we do approach the people, there's an opportunity there to interact with them, talk about why we're doing and what we're doing on the project. And it's also part of the point that we're -- there is a beginning of an interaction with the residents at that time.

The other three examples here, there's these words here, I'm going to walk through here on the slides and explain to you some of the things that we've tried to do on the levees.

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MR. BRUNNER: I'm going to start actually with

the middle property, which is Rice family's property, go to this one, and then swing back to this one right here. So I'm going to start in the middle, go the right in here.

And as I walk through the three examples, all three examples -- and this is key -- is we met with the residents, we talked with them to some degree, and expressed -- desire was given about what was going. That meeting could take many different forms, you'll find as we talk through this.

But the key for us to make an adjustment was based upon true to our basic design presumptions or criteria that we use. None of these alignments that we have here moved the alignment off of the QR-QM soil. They stayed there. And if they stayed there, we could do our hydraulics still. We tried to make the adjustment to match what the families were talking about who own it.

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MR. BRUNNER: This is one of the items that we worked with. And this represents the work that we did to try to accomplish with the Rice family. And we did move the levee 90 feet. This one came about really somewhat perhaps by the Rice family by happenstance, because on -- when we were doing our certification of our levee, or project, at our EIR meeting on February 6th apparently, there was a discussion between our engineer, real estate

folks about -- in the hallway where we were doing that about -- desire about our project and moving it. And we went back, my design team, and tried to adjust the project. And we did adjust 90 feet, the red here being the original alignment. And then we adjusted the 90 feet and pulled it to the blue alignment. We didn't get totally off the property, but we stayed on the good soil. We didn't move it out. But we adjusted as far as we could.

We did save one acre. They still have five acres impacted on the property. But we did do that.

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MR. BRUNNER: Norm Keller, resident had some interaction with, and asked us to -- if we could move the levee somewhat to avoid having more property behind the levee that make it unusable or -- and make his property more valuable.

We stopped, we considered, and we made an alignment adjustment, again staying on the good soil, felt that the hydraulics would work out, and moved forward. And again you'll see that here's the red alignment, and we adjusted to the blue alignment, which then freed up the yellow.

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MR. BRUNNER: This is probably the most recent

adjustment that we made. In this particular case -- this is the Anderson family, where the red represents the old alignment and the blue is the new alignment. In this particular case we just nipped the edge of the Anderson family's parcel here. But it became really apparent when she came and talked at our TRLIA board meeting that we were impacting some redwoods that her son had planted, but had been recently deceased, and really wanted the redwoods to stay. We listened to that and then we went back and worked with her and adjusted the levee to pull it back off and not go through that property area to take out the redwoods. So we did do that.

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MR. BRUNNER: My final slide that I have is the question that's come up about economics and how we chose the levee. Under the federal criteria, we do -- the criteria specifies that the -- federal criteria specifies that the economically preferred alternative is that which provides the greatest overall net benefit.

The setback does cost more, but it provides much more benefits. And that's this column right through here. And as a federal levee system, we believe that that's a great criteria to use as we go forward for federal buy-in for the projects and incorporation into the project.

If you do this comparison over here, a cost

difference, is that for, say, between two and -- one of the setback ones is 3A, for $11.9 million more we get 35 million more benefits. For this one here for 14.5 million more we get $58 million -- almost $59 million more benefit.

Overall this is their net benefit that we get for this particular project that we're working on.

In overall, our particular project, the alignment is based upon judgment. It's based upon the criteria for a floodway. It's based upon soil types and trying to build as best levee that we can, weighing a whole bunch of factors together.

So with that, I'm going to stop and ask for questions.

SECRETARY DOHERTY: What happens if another group of homes is red tagged? And why were they red tagged? And did -- is he able to put up his share of the money that he's supposed to?

MR. BRUNNER: I don't understand the concept of red tagging.

SECRETARY DOHERTY: In Plumas Lakes there were 62 homes that were red tagged because of falsifications of records.

MR. BRUNNER: Oh, with D.R. Horton?

SECRETARY DOHERTY: Yes. Aren't builders putting

up money?

MR. BRUNNER: The builders are putting up money, sure.

SECRETARY DOHERTY: So does that affect him? Is he able to put up his share? Is it going to affect the economic evaluation?

MR. BRUNNER: Well, let me try to explain this.

What the -- in the case of a specific developer, the very first development agreement -- or the next escrow around that we have, that's my next presentation actually if we have time to go there.

There's a second capital call which I reported on at one of the previous Rec Board meetings. The developers have put money into the escrow account to make that happen. It just so happens that D.R. Horton actually had put I think $2.1 million into the escrow for the levees. Certainly it's -- into the future we'll see what happens there for that particular developer. But they did already contribute to that second capital call. And the money's in the escrow that will be used when we start the project again with Prop 180 funds coming in.

Scott, did you just want to answer on that?

MR. SHAPIRO: I just want to expand on it a little bit.

That particular developer has already paid its

entire share for the entire project in. They have basically paid to the county, and county has for us, if you will, 100 percent of the money required for them to build out their entire project. So that developer it's not an issue.

I will note that you can't build a single home in Plumas Lake until you've already forwarded the money. And that's not move into the home. That's get the building permit in the first place. And, finally, I noticed, only through the newspaper articles, whoever had falsified the records apparently has been fired and the bolts have been fixed and the homes are under construction again.

So it's certainly an issue from a public safety standpoint for home building. But the way our program is structured, it doesn't have a financial impact on us.

PRESIDENT CARTER: Mr. Brunner, on the red and blue lines where you show the levee footprint, does that -- does that include setbacks from the levee? And if it does, for example, the classical ten-foot waterside, ten-foot landside? Or does it include other setbacks? As you heard today, it's staff's intension to seek a larger setback in the future in areas. And so what does this plan show?

MR. BRUNNER: This particular plan -- well, this plan here on this graphic that I showed, the dark line

here is the center line. On this particular item here, this would be a center line also. So it's not trying to portray the width of something on those graphics.

But on here we are trying to show the width of the right of way.

PRESIDENT CARTER: Show the Anderson parcel.

MR. BRUNNER: The Anderson parcel. Anderson parcel only showed the center line. And on the scale here it would just be one-half of the --

PRESIDENT CARTER: Okay. So it shows the eastern half of the footprint.

Now, does that eastern half of the footprint include the landside setback or not? And if it does, what is that?

MR. REINHARDT: Ric Reinhardt, Three Rivers Program Manager.

Yes, we do have the 50-foot landside setback and then we have an additional as much as 60-foot utility corridor on top of that. And both of those were reflected on this drawing.

PRESIDENT CARTER: Okay. So the physical dirt levee is defined by the center line -- the dark dash center line. And then what you're saying is that there's a 50-foot landside toe setback plus an additional 60-foot utility corridor that is all encompassed in that narrower

blue dash line, is that -- did I hear that right?

MR. REINHARDT: The current setback alignment is the center line of the levee. And so from that point to the outer width includes the levee and both of those setbacks that I told you about, 50-foot clear zone and then the utility corridor.

PRESIDENT CARTER: Which was -- you said 60 feet?

MR. REINHARDT: About 60 feet.

PRESIDENT CARTER: Okay. So we have essentially got land there -- property there that we're talking about that is 110 feet from the toe of the physical levee?

MR. REINHARDT: And that's very similar to the approach we took on the Bear River, although not exactly the same. We took a 50-foot landside easement and additional easement outside of that to be with utilities and other issues.

PRESIDENT CARTER: Thank you.

Any other questions for Mr. Brunner on what he's presented so far?

Oh, I'm sorry. Steve.

CHIEF ENGINEER BRADLEY: Yeah. Where the levee goes across the QA soils -- I mean not all of it's on the QM-QR soils -- is that levee structured different than on the harder, more impermeable soils? Is it wider? Will you tell me whatever it is? And is the seepage wall much

deeper in through there like you talked about earlier?

MR. BRUNNER: Well, it definitely follows more of a red model here, Steve. It goes deeper to take that into consideration to handle that situation.

As far as it being wider and that, Rick, do you want to address that?

MR. REINHARDT: The most significant issue is settlement. We do experience more settlement on those soils and so we will have to slightly overbuild it, much like we did on the Bear River.

CHIEF ENGINEER BRADLEY: Okay.

PRESIDENT CARTER: Thank you.

Please proceed.

MR. BRUNNER: If there are -- you know, if there are other technical questions, I do have my technical team here from GEI. Alberto Pujol, Dan Wanket is here also from GEI. And you've already met Ric Reinhardt to answer questions too.

And I'm at the end of the presentation as far as our alignment. Is there any other questions?

PRESIDENT CARTER: Are there any other questions as far as alignment?

SECRETARY DOHERTY: Yeah. Why'd you go down and build in Plumas Lakes. Just think, life would have been so much simpler.

PRESIDENT CARTER: That's not an alignment question.

(Laughter.)

MR. SHAPIRO: We didn't.

MR. BRUNNER: We're just trying to construct the levees that we said we'd construct.

PRESIDENT CARTER: So do you have more?

MR. BRUNNER: No, not on this topic. I have more on the next topic.

PRESIDENT CARTER: Okay. Then we'll move on to Item 6 on our agenda.

MR. NAYLOR: Do we have public comments?

PRESIDENT CARTER: Oh, I'm sorry. I apologize.

Mr. Naylor.

MR. NAYLOR: Yes.

PRESIDENT CARTER: An oversight on my part. I apologize.

MR. NAYLOR: I can't blame you for wanting to get out of here.

(Laughter.)

MR. NAYLOR: My name is Robert Naylor.

Can you hear me?

I' here representing Mr. and Mrs. Thomas Rice. As you know, we made a brief appearance a couple of weeks ago. As a result of that appearance, for the very first

time, on May 23rd, TRLIA did agree to meet with us and go over much of the information that TRLIA has just shared with you. And we appreciated that meeting. But this was 11 months into the process from the first EIR that there was any significant response. And Mr. Rice has a presentation which -- by the way, have you all got this document? I don't have the electronics and graphics capacity. So it's going to be a lot of the same material. But I want you to take a look at these maps.

As a result of representations in the letter that TRLIA wrote you about his being a Johnny-come-lately, he put together a chronology which is at Tab A. And he'll have some remarks following my remarks on that issue.

But let me just take you through these tabs. It's a lot of the same material, so this should go quickly.

What I did in Tab B is outline in red what I call the family farm parcels, the center of this reach of levee segment 2.

That's really a strange sensation looking at your hand.

You can see outlined in red the family farm parcels. Mr. Rice's parcels are the ones on the east side. He'll probably comment on why his most important parcel is the one that is being impacted in terms of his

overall farming business. That's his crucial piece.

Tab C you can see I outlined in red also. This is the map of the alternatives that were considered in the alternatives analysis by TRLIA. And you can see that the two alternatives -- two alternative setback levees -- three setbacks were considered in all -- do not impact or come close to impacting the family farm.

In Tab D -- this gets a little harder to see -- but again this is placing these parcels in the map that shows the seepage and boil problems that have occurred on the existing levee. And those seepage boil problems are the red spots that are out toward the river.

The thing to note here is that the area for most of this property, and certainly the Rice parcel, is not close to the seepage and boil spots, and that they have not had problems with the existing levee immediately west of these parcels, even though it's QA soil.

Now, Tab E is the QA, QR, QM map that Mr. Brunner discussed. And it's our view that a modest westward adjustment in the neighborhood of 250 to 300 feet of the levee alignment in that area would still allow them to be on QR soil and have almost no other negative consequences. There would be a slight increase in QA soil. But compared with the long stretch of QA soil to the north over here and the long stretch of QA soil over near what used to be

Plumas Lake, when it was a lake, it would be a minor increase. And it would succeed in saving major impact on several family farms in that red square area.

Looking -- if you'd sort of flip back and forth between D and E, you can see that TRLIA's prepared to build a levee on QA soil right next to the largest problem areas and they're not prepared to do any increase in QA soil in the area of these small family farms where there haven't been problems in the area to the west.

And it's that lack of consistent logic that we are puzzled about. And we came away from our meeting on May 23rd simply unpersuaded that they couldn't make an adjustment here. And, yes, it would require -- when they have to expand QA soil foundation, it would require a change in construction. But they're willing to do that along very significant stretches of this segment 2.

And by the way, the advantage of doing a westward adjustment here is that they'll not have to acquire as much property. So the construction costs tend to get offset by lower acquisition costs.

Now, Tab F is the topographic map. And this is pretty hard to look at even when -- by the way, these maps were sent to us by TRLIA electronically. And we did our best to kind of blow them up and print them in a way that you could follow the discussion.

And this goes to the question of the bench. I've been out to Mr. Rice's property. And there is no topographic bench at the northern edge of his property. And the immediate adjacent parcel to his property to the south, there is a bench in the sense that that land -- and Mrs. Rice's grandfather did this -- that land has been graded so that it would level out to allow flood irrigation. And apparently this is a common technique, and there tend to be stages. But it doesn't speak to the construction conditions underneath that bench. This was soil that was, you know, piled up there in order to have an irrigation -- a level irrigation plain.

I don't know, there may be benches elsewhere along this alignment. I'm not disputing that there isn't -- there is obviously some topography. But in the area -- in this general vicinity of these red outlined parcels, we didn't see a bench and we're just not persuaded. We think if there is a bench, it's man made and it doesn't speak to the construction.

So we're basically -- in the sum, we do not see that the soils analysis on this part of the setback levee justify the alignment in precisely where it is now. By the way, the first time that we ever heard of a 90-foot adjustment was at this meeting on May 23rd. So that struck as an interesting surprise to get that. And maybe

there's -- maybe they've already adjusted 90 of the 250 feet that we're claiming. Because I don't know whether we're using the old centerline maps or something that reflects the 90-foot adjustment that they claim to have made. But we don't think the adjustment has been shown to Mr. Rice. An he may want to add to that -- that comment.

Let me turn to the letter that was sent to us by TRLIA. And I'm getting pretty close to the end in the interests of time. But basically what you've heard is that there are lots of factors that are taken into account when they make a judgment. And they outline seven factors in their letter. And when I hear something like that, it would concern me because I know this Board does not want to get into second guessing professional engineers when they're making a professional judgment about where an alignment should go.

But if you look at the seven factors, the first is ensuring that the new channel is wide enough to improve hydraulics. Well, we're conceding that a major setback is probably indicated. And we're not disputing the idea of the setback. We're not arguing for repair in place. And if there were a 250-foot adjustment, about 90 percent or more of the setback that's proposed would be preserved.

Secondly, the second factor is avoiding certain areas where historic boils and seepage demonstrate a

severely damaged foundation. Well, this property is not in one of the historic seepage areas. So that's not a factor in this particular parcel.

Selecting appropriate soil types where possible. Well, that's -- I spoke to that. That is a factor. But we're arguing for a modest increase in QA and keeping the bulk of the existing QM and QR foundation in the design.

The fourth, where possible, siting a levee on the topographic bench. Well, I spoke to the bench. We don't think that's a compelling issue in this particular segment.

Point 5, avoiding certain existing through-levee or levee-adjacent infrastructure. I don't think that's an issue. Point 6, seeking to avoid where possible placing the new levee on relatively knew alluvium which settled within the historic river channel. I think that's the soils issue repeated.

And, seven, attempting to minimize disruption to homeowners and businesses, both social and economic, including agricultural operations. Well, that's the factor we don't think has been adequately addressed in this particular instance. And we don't think that the other factors outweigh the argument in favor of again a modest adjustment.

On the timing issue, it's not really Mr. Rice's

fault that the first significant meeting we got after a lot of trying was on May 23rd. It sounds a little hollow to say you can't make an adjustment -- a modest adjustment in your design, which by the way they've been doing apparently in two other instances, and still stay on a construction schedule that will allow you to finish in the winter of 2008-9 because they do not plan to tear down the existing levee, which they just testified, until the dry weather conditions of 2009.

So I guess the bottom line is we don't think Mr. Rice has been particularly fairly dealt with until just recently. We think there -- this Board could take a look at this. And we urge the Board to consider what I've said, consider urging and requiring TRLIA as a condition of their permit to make an adjustment that would save this and a couple of other family farms.

PRESIDENT CARTER: Thank you.

Questions for Mr. Naylor?

Thank you very much, Mr. Naylor.

Mr. Rice.

MR. RICE: Thank you. And in the interests of time, I will also try and keep my remarks concise. But I'll be glad of course to go into detail. I'll elaborate as necessary.

I was wanted to give the members here a little

bit more background to understand where I'm coming from as well.

I'm not a farmer just by chance. I'm a farmer by choice. I have a Masters Degree in Engineering. I'm currently a master level engineer for Agilent Technologies, a major electronics company. I know how to look at data. I know how to look at maps. I know how to do analysis and know proper engineering procedures.

So when I went to meet with TRLIA I was able look at their data. I was going in ready to be, not necessarily happy, but give them the chance to convince me, to show me that what they had was without a choice as to what had to be done.

Had they had the data to convince me, I would have taken my lumps and started packing. I do not believe they have made that case to me.

What I want to do is basically -- Mr. Naylor has very concisely and clearly presented what we think the current situation is. We've detailed for you some of the issues, inconsistencies, and really imbalances we think we're seeing in the current approach in how the judgments are being applied.

And we think we do have the case here saying that we think they can provide a better solution, that they can find something that more clearly meets the same criteria

that we detailed are their criteria about taking care of the community, about taking care of the economics, about taking care of the people.

To this respect there are only two main points I also want to make. And these are in response to TRLIA's comments in a return response to our letters in our written position. The first is that many of their arguments are really about whether their current segment 2 design could be built and certified. Of course it could. We're not challenging that. There are many alternatives here that could be built and certified with different tradeoffs, different advantages and disadvantages, different cost points. And even Mr. Brunner himself has acknowledged that this is possible.

The real point we want to make here is not whether the current design could be built. But has that current design, the process by which it's been done, the decisions have been made, has it resulted in a balanced public policy that is a result of good public process?

And this leads me to my comments on the -- my second comments here, is there are comments -- there are remarks that I am somehow a Johnny-come-lately to this process. I've gotten involved too late. My recollections and my documentation differ significantly in my experiences that's here at TRLIA. To that end, I prepared

for you the summary you have in Tab A, a chronology of my most significant or major or influential contacts. This is certainly not a complete list. That is about a three-inch binder. But it's to try and show the flow and the tone of my attempt at communication and collaboration.

I would politely encourage you to take the time to examine this and see for yourselves the situations that I have experienced and my wife has experienced in trying to deal with this situation. It shows that I've been trying to be involved from the earliest stages; in fact, submitting comments, submitting reviews a year ago in June, the first time of which public comment on the draft EIR was allowed.

Throughout the process I've tried to engage at the earliest opportunity with all the relevant agencies, individuals, at the earliest chance. And this includes of course the Yuba County Board of Supervisors, TRLIA, Bender Rosenthal, and of course this Board. I think I have acted in a timely responsible manner, executing what should have been at least, if not above and beyond, the necessary and expected level of due diligence for a citizen to have in dealing with the public process. And obviously I've not been satisfied with what I believe is the response of Yuba County and of TRLIA in dealing with myself and in dealing with the agricultural community.

Nearly a year of poor responsiveness to the agricultural community to collaborate -- willingness to collaborate and communicate those who've been in the community waiting to try and get a chance to see data to work with them to try and find solutions, waiting to this very endpoint to finally begin that engagement at least in my case. It's not what I consider to be a satisfactory approach.

Ladies and gentlemen, I live right next to where the water's going to be. My family has been flooded there three times. Easily as much as anyone I want to see the levees fixed. I want to see them fixed well and in a timely fashion. I want to see them protect my community. But I want to see this done the proper way, to serve and respect the community that we're trying to protect. I think we can do this better and that we can, should, and must push for a better overall solution, a better approach for where we do the setback.

I will gladly take any questions.

PRESIDENT CARTER: Any questions for Mr. Rice?

VICE-PRESIDENT HODGKINS: Mr. Rice, is there something about this particular ground that makes it critical to your operation?

MR. RICE: Yes, there is. This particular five acres, which is the farthest from my house, farthest from

my wells, the most difficult to maintain and secure, is also the most fertile soil I've ever seen in my life. I started in the midwest before I -- as a farming family before I came out here. And I have trees that bear fruit at second leaf. That's their second year of growing. I've never seen that before.

That particular five-acre parcel is extremely fertile, it is extremely high quality, it produces fruit that is cherished in five counties. For those who shop at farmers markets, my apologies. I'm one of the reasons the cost of fresh fruit for high quality has gone up in those markets because of the quality I produce. So, yes, it is key to this farming operation.

But, again, that was not the only issue here. If this was I believe the best place to build this, if there was a consistency that we were only building on those good soils, that we were not building on the QAs, that we took that extra little hit near where Plumas Lake used to be -- certainly that's a high risk area compared to where I am -- if we had a consistency of approach here and following all this criteria for the same judgment, I might be more accepting of this design. But I do not believe when we've seen all the other tradeoffs, all the other compromises where we can handle those situations, where we can handle not exactly the most perfect soil but close to

it at least in my area, we can handle those situations, that we can do that to preserve the homes, preserve the communities in those areas, it seems to me we have the margin to find adjustments for these family farms.

PRESIDENT CARTER: Other questions for Mr. Rice?

MR. RICE: Thank you for your time.

PRESIDENT CARTER: Thank you very much.

BOARD MEMBER BURROUGHS: I have another question, Mr. Rice.

What would you like to see happen?

MR. RICE: I know the Board does not want to second guess the designs. I'm not asking to do that. I'm not asking you to come in with a red pen and draw all the different line. What I'm asking is for you to encourage TRLIA to take a very hard look at the socioeconomic impact they're having, a hard look at the data they've missed, for example, using aerial data to assume a bench instead of coming in and doing soil samples; to really put their engineers to work, to say can we move this 400 feet, 300 feet, 200 feet? To really do a better due diligence, working with the agricultural community, to lessen or eliminate this impact.

It's rather interesting that actually the line of the current levee just barely misses the property to my west, which was at one time hoped to be a flowage

easement. Now, of course that -- taking. I don't know if that includes the decision or not. That would be speculation. But since that is no longer going to be a flowage easement, that should not be a concern. Maybe there are economic factors there now that will again allow it to move further to the west. We need to do a more balanced exploration to make sure we have a good balanced policy here.

SECRETARY DOHERTY: How many feet to the west would the line have to move?

MR. RICE: If the line moved 350 to 400 feet to the west, it would clear -- almost entirely clear the four major family farms that are shown on your map. Anything in between that helps. Moving even 250 feet may restore economic viability to some of those farms.

We're not talking moving it back to the intermediate setback. We're not talking moving entire lands of QA soil. We are -- let's be honest here. There's not an abrupt cliff change from one soil to another. It's gradual, it's transition. Can we find a spot in between that still has acceptable enough soil, that has a reasonable mitigation of the construction costs, gives us the safety we need in a lower risk area, but it's also able to reduce the impact on the farms and the economic social impact there as well.

SECRETARY DOHERTY: Of those farms that will be impacted, are there farmers that still want to remain even though they lose some of their lands, and would they be economically viable?

MR. RICE: I do not all of those parcels. I know the one directly to my south has actually been fighting very hard to prevent access to their lands, as they are very much opposed to the taking of their land for losing farming or losing it to borrow pits. And that is a fairly substantial parcel, the one immediately to my south.

PRESIDENT CARTER: Any furthers questions for Mr. Rice?

MR. RICE: Thank you again for your time.

PRESIDENT CARTER: Thank you.

BOARD MEMBER BURROUGHS: Thank you.

Now, I would like to ask questions that Mr. Rice just proposed to TRLIA.

MR. BRUNNER: Did you have specific questions?

BOARD MEMBER BURROUGHS: I pretty much want to ask the same questions that he asked in totality. Has there been studies about the economic impact at these different degrees of 200, 300, or 400 feet?

MR. BRUNNER: Well, we do have -- well, why don't you -- I'll find my --

MR. SHAPIRO: The answer is that the economic

impact -- the socioeconomic impact was ultimately addressed through either the voluntary or condemnation land purchase effort. The way that the condemnation pricing works -- and I don't think this was covered in complete detail at the land briefing we had at the last meeting -- I guess it's been muted -- is that when we determine which lands we need, we get an appraisal. And what appraiser does is determines both the value of the lands that we need as well as the impacts to remaining lands that are part of that parcel. And so if this truly becomes a situation where the entire farm becomes economically not feasible, then that's valued in the appraisal process. And that's the exact spot where that land valuation occurs.

I don't know where we are with the appraisal on the Rice's farm. I believe that they've done the inspection already, but I don't believe that there's an appraisal yet.

MS. RICE: They did it two months ago. I've never been back.

MR. SHAPIRO: Thank you.

And so that's the circumstance. And Paul can present the details of the question of moving it 3- to 400 feet.

I do think it's important to harken back to a

decision that was before this Board within the last year. I'm referring to the Mayhew levee situation. And that was a situation where there was a debate as to whether to take out some very historic trees in the Mayhew area and realign the levee to avoid them. And while everybody concluded technically it was feasible, the judgment of the engineers was it was better to do a traditional levee even if it meant taking out those trees. And that was a decision that the Corps made and that the Rec Board bought into as the local sponsor for that.

And I think that's really the -- I'll just be kind of blunt now. I think that's the appropriate role for the Reclamation Board. We did a full evaluation. We did a CEQA document. We looked at issues. The CEQA document is final, it's certified and not challenged. And all of that investigation has been done. Our board made the decision when it felt it was appropriate to proceed. And now the question is: Will the Rec Board issue an encroachment permit?

Paul, do you have anything to add about moving?

MR. BRUNNER: I did. Is there a way to get the -- up here?

This slide shows the various alternatives that we looked at. And it starts to address the question of moving it 3- to 400 feet off on it.

These alignments that appear in red and blue were farther than the 3- or 400 feet. But moving it from here, which is the Rice property, which is right in this area here, out 3-, 400 feet moves it directly into the QA -- into the QA soil.

SECRETARY DOHERTY: I have a question for you.

If originally it was stated to us that this levee could be a strengthened in place, and that would have been on QA soils, and now they're moving it and -- but nobody has ever said that it still couldn't be strengthened in place, but just that setback levees are better.

MR. BRUNNER: Well, actually that's identified in the overall -- when I showed you the economic impact slide -- I could go back there -- with the total net benefits. You end up having a -- when you pull the levee off -- and one of the reasons why I went through this presentation a lot is that the QA soil causes the ability -- or really creates the condition where you have the underseepage issue occur. As long as you're out in the QA soil, this yellow area, you are subject to experiencing -- more subject to experiencing underseepage problems, which we already have here along the existing levee.

I think I've said before that we could go and improve, strengthen in place the existing levee. Yes, you

could. And I'll say that again. But we've already put slurry walls into the existing levee in this particular location and it hasn't worked. You end up with all these soil deposits and sandy deposits out here that make it really hard to capture -- we have the opportunity with the setback to build a new levee on top of really good soil -- or better soil that we have, which is represented by these formations. It is difficult when you impact farms and that -- than just people in homes. I understand that. But in this particular case, you would end up having -- if we made it this example -- or this exception, everyone would want to just move, and pretty soon we'd all move to the west and we'd have the condition again potentially of being all back in QA soil. There's great benefit of moving from this condition, pulling it back into the better soil alignment, so you're not experiencing this.

We acknowledge that there are portions of this levee that are on QA soil. Down through here it's hard to do this. One could look and say should we pull way back here and miss it? Even up here, should we go through and try to use this with the levee? Think of all the property that we would take if we did that.

SECRETARY DOHERTY: And you're saying then that everybody would want to move to the west. Maybe everybody doesn't want to move to the west. Maybe this is the only

person that wants a slight movement to the west.

MR. BRUNNER: That slight movement would pull us here, around. And then you do need to have some type of hydraulic flow for the river, is that it would cause us to do a redesign with some of the levee that we do not believe needs to be in the QA into the QA soil and make that adjustment. And then it would impact our schedule. And we believe it would impact cost too.

PRESIDENT CARTER: Have you verified the margin of the QA versus QM along the entire length of the proposed setback? Have you verified that in fact the -- well, these are USGS maps are accurate in that area?

MR. BRUNNER: The soil borings that we have taken would verify this location. Could always take more soil borings. We had a space in through here on original alignment I believe it was what, one -- 3,000 feet, something like that, originally. And then we've gone and spaced it closer.

PRESIDENT CARTER: Now, your figure 8 shows some -- which is the cross-section at that area -- shows four soil borings. But, you know, the nearest one to the margin is 700 feet, more or less, you know, into the QA. So when we're talking a couple hundred feet, that's a lot -- that's a big distance.

MR. REINHARDT: It's not just taking borings. We

also have site geologists go out and inspect the conditions in the field that support the determination of where that transition of soils is. So it's not solely based on the borings.

And I want to add one more point to Member Doherty's question. And that's -- this is an issue of residual risk. We can strengthen existing levee. And there's a residual risk that there's going to be problems with it. And each sacrifice we make on design process to a less than desirable condition, we're taking a higher residual risk that there's going to be a problem. So, yes, we can move to the other soils. But it's not a preferred condition, and we're accepting a slightly higher risk that we're going to run into problems in the future.

And I just wanted to bring probably a much more pronounced problem, as I understand it, the issue in Sutter County, the Star Bend setback that Sutter County's pursuing. As it's been explained to me, this is the current levee alignment, this is where the Star Bend setback is proposed. What they've told me is the land owner at that time wanted the levee realigned to go around that property, and that's why we got that elbow.

So now Sutter County's going back and cutting across this, which should have been the original alignment, now at a later date at a much higher cost.

It's an extreme example, but it's where it they made a sacrifice at the time to accommodate a landowner's request and now we're having to go back and rectify that.

BOARD MEMBER BURROUGHS: Well, we're not just satisfying a landowners' request. Now we're talking with the Reclamation Board. And as a board, I want to have the questions answered for Mr. Rice in regards -- with our staff as well. Being a farmer, I mean I realize that farmland is very valuable. And I would like to know that the economic adjustment that's going to be incurred by the whole community is long lasting. It's not just one farmer that's here today; it's the whole community. And it's not only the community; it's our state. And it's not only our state; it's our world.

So for me farming is very valuable. And I would like our staff -- if they have any comments about how we could sit at the table and discuss the feasibility of trying to answer some of the questions that we've been presented with today.

MR. REINHARDT: The only thing that I would add to that is that that's exactly what we do in the California Environmental Quality Act process. And while the Reclamation Board wasn't at the Three Rivers board meetings, wasn't at the public hearings, that's the exact discussion that was presented to our board members, that

the Rices presented these issues to them and our board members carefully considered that before making a decision on which alternative to select. This isn't the first time that this has been addressed in terms of taking into consideration their concerns.

BOARD MEMBER BURROUGHS: What did your study show as far as the economic effect on this community? What does that represent in terms of dollars lost?

MR. REINHARDT: I don't have that information. I don't have the EIR with me. But we can certainly provide that to your staff and it could be distributed to the Board members.

PRESIDENT CARTER: Other questions for Three Rivers staff?

Okay.

MR. NAYLOR: Mr. Chairman, would you mind if I just read an excerpt from the EIR, since that's been raised?

PRESIDENT CARTER: If you could do it in less than a minute.

MR. NAYLOR: Less than minute easily.

PRESIDENT CARTER: Then we need to move on.

MR. NAYLOR: I understand. And I appreciate the courtesy that you're showing the Rices and myself.

The draft EIR said at page 42, "The intermediate

setback levee" -- which is one of the alternatives considerably to the west of what we're proposing -- that alignment "more closely follows some property parcel lines than the ASB setback levee" -- the one adopted -- "reducing or splitting the parcel by the setback levee. Because existing parcel configurations would be more closely maintained, these parcels would remain large enough to cost effectively continue agricultural operations. Under the ASB setback levee alignment, by contrast, portions of these parcels would be separated or split by the setback levee, resulting in a smaller land area that may not be large enough to cost effectively continue agricultural operations."

Now, that's in the EIR. And for one reason or another, the TRLIA board chose to ignore that particular conclusion. And we're asking for a more modest modification.

Thank you.

PRESIDENT CARTER: Thank you.

Anything else on this item?

Okay. At this point I'm going to ask what the Board's pleasure is as far as moving forward with this. Do we want to postpone Item 6 until our next meeting? Or do we want to -- the hour is late -- or do we want to continue? What's your pleasure?

BOARD MEMBER BURROUGHS: Well, I guess I'd like to ask TRLIA one more question.

PRESIDENT CARTER: Go ahead.

BOARD MEMBER BURROUGHS: Are you willing to look at any of the proposed comments that have some questions in regard to align where the setback levee is?

MR. BRUNNER: We believe that we've already looked at the alignments. We're far into design, moving forward on a very fast track schedule.

MR. SHAPIRO: I guess I would just add to that that, despite what Mr. Naylor said, the Three Rivers board didn't ignore the statement from the EIR. It considered it. It ultimately made the decision that it felt we should go forward with this particular alignment. And we've accommodated that alignment as best we can through the 90-foot adjustment.

MR. REINHARDT: The issue of consideration of this also gets to the demands that this Board has placed on us, the requirements that this Board has placed on us that we complete this project by the end of 2006 -- I'm sorry -- 2008. That was a critical element of -- was it the second implementation agreement? -- where this Board said, "We're going to accelerate this program, but we want it done in 2008."

We cannot proceed -- right now our current

schedule is to start construction on the setback levee in late September. If we revisit the alignment, we will not be able to maintain that schedule. If we don't start in September, we will be getting started too late to do construction this year, and that will result in a one-year delay.

As part of the challenge we have is we're on this fast track where everybody's telling us, "Go as fast as you can." And we've done the best we could to address the concerns to incorporate it. We've made slight adjustments. But if we want to take it further, it is going to result in a delay of the project. That's the balancing act we're trying to maintain here, addressing the public's needs but maintaining the schedule that you've required of us. And it is our shared goal.

MR. BRUNNER: And we're also trying to build what we believe is the best levee, not only for us but for this region.

PRESIDENT CARTER: The real question boils down to: If you had more time, would the outcome be different? We don't know.

MR. BRUNNER: We don't know.

VICE-PRESIDENT HODGKINS: You know --

MR. BRUNNER: You saw our criteria that we laid out as to where we are. If we had more time, then one

could do the evaluation. But we're working on that schedule.

VICE-PRESIDENT HODGKINS: And, you know, from my perspective, before I would ask them to move that levee, I think there should be soil borings done to make absolutely certain we're not moving it into an area that it makes a difference that that can be done. But I know if you do that, to get those -- get that work done and be in a position to make sure that you're not building the levee in a worse place, it takes 60 days. And it's the nature of, you know, getting the boring rig out there, getting it scheduled, and getting the work done. And so that's the problem here.

And, you know, I think the challenge for the Board members is going to be, you know, would you delay this project for a year, because that's really probably what it breaks down to, in order to address this particular issue? And that's what I think -- you know, we're a week away from finding out where we are on that.

PRESIDENT CARTER: Well, maybe I need to be reminded of the project schedule, because you're talking about doing the foundation work next winter.

MR. BRUNNER: This winter. We're planning to start this September on the foundation work.

PRESIDENT CARTER: This fall.

So getting borings and collecting some more data for another 60 days is going to put that potential construction start date off for another 60 days. So instead of -- you're talking November instead of September potentially, weather pending, and -- it may be raining in September as well.

MR. BRUNNER: Right. Those 60 days, 90 days, whatever it takes to do that, would impact the design, land acquisition, permitting, whatever -- all those things factor in and puts us deeper into the winter when we start.

SECRETARY DOHERTY: But you said you've already done borings. Have you got those samples set aside somewhere?

MR. BRUNNER: We have done borings that come in for test pits for soil for the levee. And we've got borings that are in there. I think the borings that we've used for levee alignment are here, used in the alignment. Right now we do have some other borings along the alignment that we're fine-tuning that we're still taking. So we still have some borings to do. But those borings would come in within the range of our work on the levee today.

SECRETARY DOHERTY: What I'm saying is --

MR. BRUNNER: They wouldn't allow us to adjust.

SECRETARY DOHERTY: No. But what I'm saying is, do you have those borings somewhere and are they labeled --

MR. BRUNNER: Oh, yes.

SECRETARY DOHERTY: -- where they were from and everything?

Okay. That's what I wanted to know.

PRESIDENT CARTER: Okay. Anything more on this?

VICE-PRESIDENT HODGKINS: Well, I don't think we know that they have any borings on the Rice property or in this particular area. Do you know?

MR. RICE: They have done two borings on my property, but none to the immediate west in some of the other potential areas.

PRESIDENT CARTER: There's a figure 1 that we were given today from Three Rivers that shows sites on borings. I don't know if it's the most up to date. But this thing locates a series of borings. My count is there's a little over a half a dozen that are actually on the proposed levee alignment.

MR. BRUNNER: These are boring locations here.

PRESIDENT CARTER: Okay. So, Mr. Brunner, how much time do you need for Item 6?

MR. BRUNNER: Item 6 could be very brief. You already know Prop 1E. We gave you that, as to where we

are on the status for that.

The other two slides are really updates from what I presented on March 22nd. We still have money in the bank. We're still solvent. We're still at a critical time for the Prop 20 money to come in June. And we're right on -- you know, to move forward. We need to have the application where funding becomes -- to move forward.

PRESIDENT CARTER: Is the Board interested in seeing that this afternoon?

VICE-PRESIDENT HODGKINS: I'm interested. But here's what I think the fundamental issue is -- and we need before the next Board meeting to touch base with DWR. If DWR is going to have an answer in two weeks, that's when we need to dig into what the issue is. Because if they're going to get money from DWR, their financial problems are gone. If they're not going to get money from DWR, then we have a whole different can of worms. But that's -- I don't want to in any way minimize your effort. But that's fundamentally what the problem is. And so the DWR answer is the critical thing here.

MR. BRUNNER: Right.

PRESIDENT CARTER: Okay. And we're meeting in a week to consider the section 104 request.

Okay. Well, I would encourage and strongly suggest that you continue to look at your levee alignment

and tweaking it and working with the landowners in regard to moving it further west. It sounds like that could create maybe a little more heartburn for you but a lot less heartburn for other folks as well. So I guess I'd be biased that way.

BOARD MEMBER BURROUGHS: Ditto.

PRESIDENT CARTER: Okay. Let's --

MR. BRUNNER: If you're bias that way, even to affect the schedule?

PRESIDENT CARTER: I hear what you're saying. I'm not sure I believe that it's going to impact the schedule that much, given that you're currently doing borings, you've got somebody on staff -- on the site doing borings now. They -- those resources could be redirected potentially. It's not going to take 60 days, I don't think. But that's just my opinion. And other Board members have their opinion. So I'm not convinced that it's going to delay the schedule that much. That's my take.

SECRETARY DOHERTY: Mine also.

PRESIDENT CARTER: Let's take -- we'll stay here till 6 o'clock. And then at 6 o'clock we're going to end our discussion about that. So if you can give us the high spots of the finances, we will I'm sure revisit this at some point.

(Thereupon an overhead presentation was Presented as follows.)

MR. BRUNNER: All right. This is -- I have two slides. This one shows the project revenues in the future and total expenditures that we have.

Here are -- our revenue stream is here. We have most of our money coming from one of two sources.

Prop 13 funds to date we received close to 45 million through April.

This is our funding stream through the landowners/developer money. Our funding agreements that are here. About 69 million have come to date from them.

Other miscellaneous revenues that have come in, levee impact fees and that.

Total we have $133.9 million that have come in. Our total expenses are 130.8.

Which you'll see across here then is a projected revenue stream of Prop 13 funds. In July we had a Prop 1E, most likely Prop 84 funding stream. So it's crucial that we get the grant application approved and move forward for land acquisition -- prop 84 is really only for land acquisition -- and we get that consummated so we can make those land purchases and move forward with the setback.

We have it targeted at 10/10/10 throughout these

months. This information was provided in the application.

We do not know what the dollar amount will be from the grant application yet. That's what we were talking about before, and that's why I labeled it as X at this point.

This line item through here is significant. These numbers add up to the 9.1 million. They represent the second capital call that was now established and we're moving forward. The money is in escrow.

I don't have additional capital calls put down there yet. I labeled that Y because strategically that will be based upon how much money we have to come up with local share once we know the grant application. And once that comes in, we will then fill that in.

I will let you know that we are in direct communication with the developers ourselves, the county, our partners, working through a capital call list and what they would be and how they could be in trying to work -- make sure that we're in place. Because once we get the call of what the application says that we're going the get, we have a specified time period to turn in a financial plan. So we're working those details out as much as we can preparatory for that. And we'll then turn that in. But the team that are working together to try to make that happen.

We do have a little bit of federal funding coming in to our program.

This is for FEMA. This is a grant program that the county actually had for the all -- detention basin flood control. Two point three million has come in. We expect another 2.4 to come in from there.

Overall the program ends up balancing. Our FEMA goal -- or our TRLIA goals, that we -- our expenses match our revenues when we get done, as close as possible.

--o0o--

MR. BRUNNER: I carry that over here. The revenues are portrayed across here. These revenues would match what we just saw on the other page. And the total -- and expenses also match that.

And one of the things -- what was on the other page? -- I was asked to do at the 22 March meeting was to list down the various critical elements on our program of how we financed them, particularly land acquisitions that we already committed to, to make sure that we had funding for those and what was going on with our designs and that, that we needed to stay on schedule.

And as you see through here on the bottom, this is our cash balance. And we're in a positive situation across the lines. And that's what I've been reporting to you in each Reclamation Board meeting when I come back, is

that we are solvent, we are honoring our commitments to you in our program, and we're doing that.

And our day when we come to a decision is really with the Prop 1E. When that comes in we'll have a big decision what it is, work out the local share, find out what that is.

Our commitment that we still are trying to do is move forward on segment 3 -- thank you for doing that encroachment permit today -- and press on with the flood control, and hopefully get done by the end of 2008.

And I think that's all. With that, those are all my slides.

Any questions?

PRESIDENT CARTER: May I make a request. On this slide here you talked about the Feather River setback, segments 1 and 3 and segment 2. But we also talked about the Feather River levee, segments 1, 2, and 3. I get confused. I don't know if we could maybe refer to it differently. I got confused in the subcommittee meeting, I got confused I think in the last Board meeting as well, because everything's in segments of three and we talked about segment 1. And I don't know weather we're talking about the setback or we're talking about the Feather River levee.

Then we had a permit today that talked about

segments 1 and 3.

MR. BRUNNER: Right, the two ends.

PRESIDENT CARTER: Now we're talking about Feather River setback. So let's say this 1 or 3 design -- and at one point in one of the subcommittee meetings I got confused.

Can we name those something else, maybe A, B, and C or something like that?

MR. BRUNNER: Well, I think for the nomenclature here we could just take the setback out of that discussion and just call it Feather segments 1 and 3, and then call --

PRESIDENT CARTER: So that's what that -- that's not the Feather River setback design?

MR. BRUNNER: It is -- wherever you see 2 it deals a setback. What we strategically are trying to do in our application talk is that the entire 13-mile length of the feather -- earlier we had a system communication where we were. Our point on the feather we did our CEQA document the entire length of the Feather, we did our alternative analysis on how to place the levee across the entire reach of that levee.

For our trying to get the project built by the schedule, we broke it up in segments to get through this, where segment 2 turned out to be the setback on the

project. We've elected the project going as a full reach and system where it was. And for convenience we've called them the setback here. Our application --

PRESIDENT CARTER: There's 201 million here. It talks about Feather River setback photo segments 1, 2, and 3.

MR. BRUNNER: Yeah, I was going to go to that point.

When we turn in our application to the state for the project, we have made an appeal to the state in our application that they should actually consider for funding under Prop 1E segments 1, 2, and 3 as a system. It is one reach of that levee that we need to fix, and they should consider it that way. And I think that nomenclature that carries over here where it -- we call the entire reach the setback. But in reality, 1 and 3 really isn't -- aren't the portions of the setback.

PRESIDENT CARTER: Okay. Well, then you're -- to keep me up with you, you need to be more specific when you talk about these things, because --

MR. BRUNNER: Yeah, we'll work on the nomenclature.

Okay. Thank you.

PRESIDENT CARTER: Any other questions?

We've got three minutes left.

(Laughter.)

PRESIDENT CARTER: If there's nothing else, then we are adjourned.

Thank you very much for your patience.

(Thereupon the Reclamation Board open session meeting adjourned at 6:00 p.m.)

CERTIFICATE OF REPORTER

I, JAMES F. PETERS, a Certified Shorthand Reporter of the State of California, and Registered Professional Reporter, do hereby certify:

That I am a disinterested person herein; that the foregoing Reclamation Board open session meeting was reported in shorthand by me, James F. Peters, a Certified Shorthand Reporter of the State of California, and thereafter transcribed into typewriting.

I further certify that I am not of counsel or attorney for any of the parties to said meeting nor in any way interested in the outcome of said meeting.

IN WITNESS WHEREOF, I have hereunto set my hand this 19th day of June, 2007.

JAMES F. PETERS, CSR, RPR
Certified Shorthand Reporter
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