

PHASE 2 MERIDIAN FARMS FISH SCREEN PROJECT

Draft Initial Study/Mitigated Negative Declaration

Environmental Assessment/Finding of No Significant Impact

**Prepared for:
U.S. Bureau of Reclamation
Meridian Farms Water Company**

May 2012

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SECTION 1

Introduction

1.1 Introduction

The United States Department of Interior (DOI) Bureau of Reclamation (Reclamation) and the United States Fish and Wildlife Service (USFWS) jointly manage the Anadromous Fish Screen Program (AFSP). The AFSP was established in 1994 to help meet the fish restoration objectives required in the Central Valley Project Improvement Act (CVPIA) Section 3406 (b)(21). The AFSP has provided cost share funding for several fish screen construction projects in California. Fish screens are designed to protect juvenile anadromous fish from water diversion entrainment along the Sacramento and San Joaquin rivers, their tributaries, and the Sacramento-San Joaquin Delta.

In accordance with the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA) this Initial Study/Environmental Assessment (IS/EA) discloses potential environmental impacts associated with the construction and operation of the following elements by the Meridian Farms Water Company (MFWC): (1) a new 135 cubic feet per second (cfs) diversion with fish screen and pumping plant adjacent to the existing Meridian Diversion; (2) increased capacity of the Main Canal to convey flows to the Drexler Service Area; (3) a new 35 cfs re-lift pump station to deliver flows to the Drexler Service Area via the new Drexler Pipeline; (4) extension of the Drexler Pipeline; (5) removal of the existing Meridian Diversion/Pumping Plant; (6) removal of the existing Drexler Pumping Plant; and (7) lining of approximately 2,500 feet of the Grimes Canal. For the purposes of CEQA, the project is the Proposed Project; for the purposes of NEPA, it is the Proposed Action. The project is referred to as the Proposed Project/Action throughout this document. Additional information on specific project facilities and components is included in Chapter 2.

This document was prepared as a joint CEQA/NEPA document because the Proposed Project/Action is a discretionary project of a local lead agency with federal involvement. Because MFWC is a private water distribution company and cannot act as lead agency under CEQA, the California Department of Fish and Game (CDFG) has agreed to be the CEQA lead agency. Reclamation is the federal lead agency under NEPA, because design and construction of the Proposed Project/Action involves federal funds through the AFSP. A list of other state and federal agencies that may have discretionary approval over the proposed project is provided in Section 1.6.

This IS/EA is a public document that analyzes the environmental impacts of the Proposed Project/Action, presents feasible measures to reduce or avoid potential environmental impacts,

and evaluates alternatives to the project. It complies with environmental requirements established by both CEQA and NEPA. This IS/EA serves as an informational document to be used in the decision-making process and does not recommend either approval or denial of the Proposed Project/Action.

This section provides a description of the study area, a summary of the project background, identification of the purpose and need and objectives for the proposed project, discussion of anticipated regulatory requirements and permits for construction and implementation of the proposed project, and the scope and organization for this IS/EA.

1.2 Study Area

MFWC is located in Sutter County, California, between Interstate 5 and Highway 99 east of the Sacramento River and southwest of the Sutter Bypass. **Figure 1-1** depicts the approximate limits of MFWC's service area. MFWC provides irrigation water to three separate service areas encompassing 9,150 total acres, with an estimated annual water delivery of 35,000 acre-feet (af).

1.3 Project Background

MFWC has diverted water from the Sacramento River under the provisions of a License for Diversion and Use of Water with a priority date of September 10, 1918. The existing Sacramento River diversions are located near the communities of Meridian, Drexler, and Grimes. These diversions presently utilize unscreened diversions, and may have entrained Chinook salmon, steelhead trout, and other anadromous fish species that pass by the intake. These diversions fall within the criteria established by the CVPIA, passed in 1992, for the protection and recovery of fisheries and fish habitat.

In March of 2002, MFWC's engineers (MWH Americas, Inc. [MWH]) completed a *Surface Water Diversion and Fish Screening Feasibility Study* that evaluated alternatives for improvements to the existing MFWC diversion facilities to provide a positive barrier fish screen for anadromous fish at each pump intake. The alternative selected by the MFWC Board of Directors (MFWC Board) for further design and environmental analysis was a plan to consolidate the three existing diversions into two new pump station facilities with positive barrier fish screens. The AFSP Technical Team (Tech Team) and Reclamation's Value Engineering Team reviewed and approved the plan

In 2008 the plan was divided into two phases for construction (Phase 1 and Phase 2) and an IS/MND and Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) was prepared that addressed both Phase 1 and Phase 2 elements (2008 IS/EA). Funds were available to construct one of the planned diversions and fish screen and providing some benefit to fish species. The MND was certified (for Phase 1 and Phase 2) and FONSI was adopted for Phase 1 only. Phase 1 was completed in 2010 and included the following elements:

- New Grimes Diversion/Pumping Plant. Construction of a new 30 cfs diversion with fish screen and pumping plant installed north of the existing Grimes Diversion/Pumping Plant.

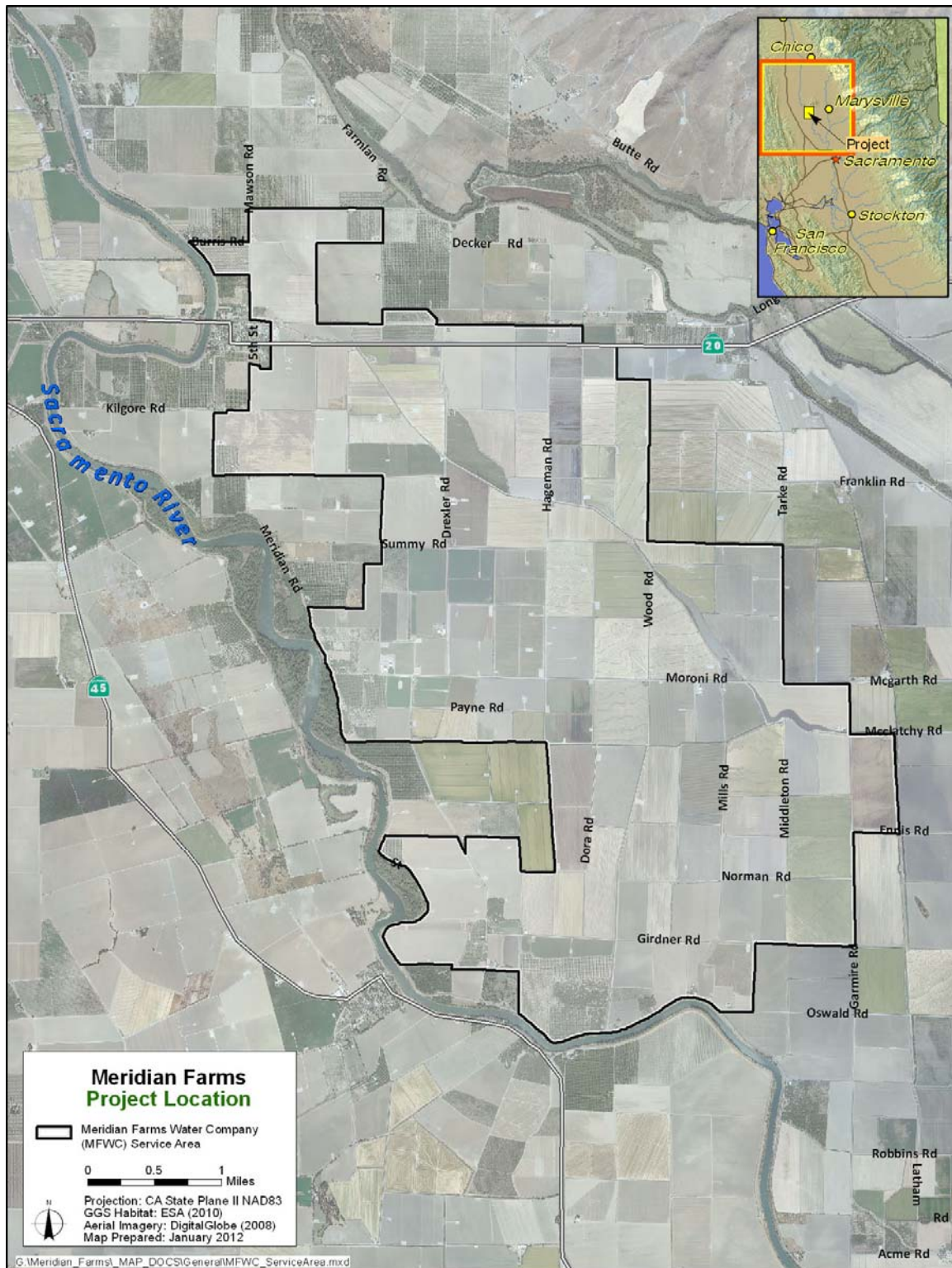


Figure 1-1. Meridian Farms Water Company Service Area

- New Grimes Pipeline and Modifications to the existing Main Canal. Approximately 650 lineal feet of 36-inch diameter pipeline was installed and approximately 3,800 lineal feet of the existing earthen canal was modified to deliver flows from the New Grimes Diversion/Pumping Plant to the Grimes Service Area. Approximately 1,200 linear feet of ditch was concrete lined and approximately 3,250 feet of earthen ditch was left unlined.
- Drexler Pipeline. Approximately 6,500 lineal feet of a 36-inch diameter pipeline was installed beginning at the Drexler Pumping Plant and terminating at the intersection of Summy Road and the Main Canal (this was proposed as part of Phase 2 but was completed as part of Phase 1).
- Existing Grimes Diversion/Pumping Plant. The existing pumping facility was removed.

Phase 2 described in the 2008 plan included the following elements:

- New Meridian Diversion/Pumping Plant. A new 135 cfs diversion with fish screen and pumping plant would be installed adjacent to and would replace the existing Meridian Diversion.
- Main Canal Modifications. The capacity of approximately 15,200 lineal feet of the Main Canal would be increased to convey flows over to the Drexler Service Area in order to accommodate the consolidation of the Meridian and Drexler diversions.
- New Drexler Re-lift Pumping Plant. A new 35 cfs pumping plant would be installed at the end of the Main Canal modifications to deliver flows to the Drexler Service Area via the new Drexler Pipeline.
- Removal of Existing Meridian Diversion/Pumping Plant. The existing diversion/pumping facility would be removed after the new Meridian Diversion/Pumping Plant was constructed and operational.
- Removal of the Existing Drexler Pumping Plant. The existing pumping facility would be removed after the new pumping plant was constructed.

The new diversion with fish screen proposed as part of Phase 2 would increase diversion capacity at the existing Meridian Diversion to compensate for the abandonment and removal of the Drexler Diversion while reducing fish entrainment in the pumps. Note that the increase in capacity at the Meridian diversion would not exceed the existing allowable capacity of the Meridian and Drexler diversion combined. The Main Canal modifications would increase conveyance capacity in order to handle increased flows resulting from the consolidation of the existing Drexler and Meridian diversions. A relift pump station would be constructed to deliver flows to the Drexler Service Area via the Drexler Pipeline.

As stated in Section 1.1, this document will evaluate the Proposed Project/Action which includes the construction and operation of Phase 2 which has been modified to include the following additional elements. A complete description of the Proposed Project/Action is included in Section 2.

- Drexler Pipeline. Phase 2 would include the possible extension of the Drexler Pipeline to improve service to a portion of the Drexler Service Area and to reduce pumping costs.
- Grimes Canal. Phase 1 of the Project included concrete lining of 1,080 linear feet of the Grimes Canal while the remaining 2,500 linear feet were re-graded, but not lined. When the canal was put in operation, it was found that significant leakage was occurring in the unlined portion. Phase 2 may include concrete lining of the remaining portion of the

canal. (Note: this element of the Proposed Project/Action has not yet been funded, and implementation is to be determined based on funding support. The adequacy of environmental compliance for the remaining portions of the project would not be affected if this component is not funded.)

1.4 Purpose and Need

Under NEPA, the federal purpose of the Proposed Project/Action is to screen an existing unscreened diversion owned by the MFWC with a state-of-the-art fish screen that meets current National Marine Fisheries Service (NMFS) and California Department of Fish and Game (CDFG) fish screen design criteria, thereby reducing fish entrainment associated with MFWC diversions (CDFG, 2000; NMFS, 1997). The Proposed Project/Action is needed to minimize diversion impacts to outmigrating anadromous fish on the Sacramento River without impairing the ability of MFWC to divert water consistent with its existing water rights.

1.5 Project Objectives

Under CEQA, MFWC and CDFG have two primary project objectives for the Proposed Project/Action:

1. To construct a new screened intake facility that meets current NMFS and CDFG fish screen design criteria, and
2. To protect MFWC's existing water rights so that it can maintain a reliable long-term supply to its service area while reducing impacts to listed species in the vicinity of the intake facility.

1.6 Anticipated Regulatory Requirements and Permits for the Project

The permits and approvals that may be required for the Proposed Project/Action, as well as the regulatory agencies that may rely on this document and the aforementioned permits and/or approvals for consideration, are identified in **Table 1-1**. Some state and federal agencies will use this document for compliance with NEPA and CEQA, to the extent applicable, to issue necessary federal and state permits and approvals.

**TABLE 1-1
ANTICIPATED REGULATORY REQUIREMENTS AND PERMITS
FOR PROJECT IMPLEMENTATION**

Agency	Type of Approval
Federal Agencies	
U.S. Bureau of Reclamation	NEPA Lead Agency, Funding Approval
U.S. Army Corps of Engineers	NEPA Lead Agency Clean Water Act Section 404 Permit Rivers & Harbors Act Section 10 Permit Federal Endangered Species Act compliance (Section 7)
U.S. Fish and Wildlife Service	Federal Endangered Species Act compliance (Section 7)
National Marine Fisheries Service	Federal Endangered Species Act compliance (Section 7)
State Agencies	
California Department of Fish & Game	State Endangered Species Act compliance Section 1601 Streambed Alteration Agreement Consistency Determination or Incidental Take Permit
Central Valley Flood Protection Board	Encroachment Permit
Central Valley Regional Water Quality Control Board	National Pollutant Discharge Elimination System General Construction Storm Water Permit (Section 402) Clean Water Act Section 401 Water Quality Certification General Order for Dewatering and Other Low Threat Discharge to Surface Waters Permit
State Historic Preservation Office	National Historic Preservation Act Section 106
Local/Other Agencies	
Feather River Air Quality Management District	Authority to Construct Permit to Operate
County of Sutter	Building Permit County Road Encroachment Permit

1.7 Scope and Organization

This IS/EA describes the affected environment, identifies and discloses potential environmental impacts of the Proposed Project/Action, and describes mitigation measures to avoid, minimize, or compensate for potentially significant impacts. Chapter 2 describes the Proposed Project/Action. Chapter 3 describes the affected environment of the project area. Chapter 4 describes the resources that would be affected by implementation of the Proposed Project/Action, including impacts, and mitigation measures to reduce these impacts. This Environmental Checklist presented in Chapter 4 is based on the checklist suggested in Appendix G of the CEQA Guidelines. The checklist has been modified to address both CEQA and NEPA requirements, including NEPA requirements to evaluate Indian Trust Assets, Environmental Justice, and Socioeconomic Effects.

Consistent with CEQA Guidelines Section 15150, the 2008 IS/EA is incorporated by reference into this IS/EA for the Proposed Project/Action, including applicable environmental setting, impact analysis and mitigation measures that are relevant to the Proposed Project/Action. Applicable mitigation measures adopted by the California Department of Fish and Game (CDFG) that would mitigate Proposed Project/Action impacts are incorporated into the Proposed Project/Action. MFWC would

ensure that construction and operation of the Proposed Project/Action would be implemented consistent with the mitigation, monitoring and enforcement requirements of the 2008 IS/EA Mitigation Monitoring and Reporting Program (MMRP) (Appendix A). These measures are included along with all new mitigation measures proposed as part of implementation of Phase 2.

This IS/EA is being circulated for review and comment by the public and other interested parties, agencies, and organizations for a 30-day review period beginning on ### and ending at 5 pm on ####. Please send your comments to: ###

During the review period copies of the IS/EA will be available for review at:

U.S. Bureau of Reclamation

Mid-Pacific Region

2800 Cottage Way,
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SECTION 2

Description of Proposed Project/Action

2.1 Background

As described in Subsection 1.1 of Section 1, in 2008 the plan was divided into two phases for construction (Phase 1 and Phase 2). A MND and FONSI were signed for the Phase 1 which was completed in 2010. The Proposed Project/Action includes the construction and operation of Phase 2 elements as described in the 2008 Plan, as modified. A complete description of the Proposed Project/Action is provided in subsection 2.3.

2.2 No Action Alternative

Under the No Action Alternative, construction and operation of Phase 2 facilities would not occur. Operation of the existing unscreened Meridian Diversion/Pumping Plant and Drexler Diversion/Pumping Plant would continue to put migrating salmon, steelhead, and other native fish species at risk of entrainment associated with operations.

2.3 Proposed Project/Action

The Proposed Project/Action would include the construction and operation of: (1) a new 135 cfs diversion with fish screen and pumping plant adjacent to the existing Meridian Diversion; (2) increased capacity of the Main Canal to convey flows to the Drexler Service Area; (3) a new 35 cfs re-lift pump station to deliver flows to the Drexler Service Area via the new Drexler Pipeline; (4) extension of the Drexler Pipeline; (5) removal of the existing Meridian Diversion/Pumping Plant; (6) removal of the existing Drexler Pumping Plant; and (7) if funding is available, the lining of approximately 2,500 feet of the Grimes Canal (**Figure 2-1**). The new Meridian Diversion with fish screen would increase diversion capacity to compensate for the abandonment and removal of the existing Drexler Diversion while reducing fish entrainment in the pumps, but would not increase the amount of diversion capacity overall. The Main Canal modifications would increase conveyance capacity in order to handle increased flows resulting from the consolidation of the existing Drexler and Meridian diversions. A re-lift pump station would be constructed to deliver flows to the Drexler Service Area via the Drexler Pipeline. The 2,500 linear feet of the Grimes Canal that was re-graded as part of Phase 1 will be lined with concrete to prevent leakage on to adjacent fields. Operation of the Phase 2 facilities would be the responsibility of MFWC.

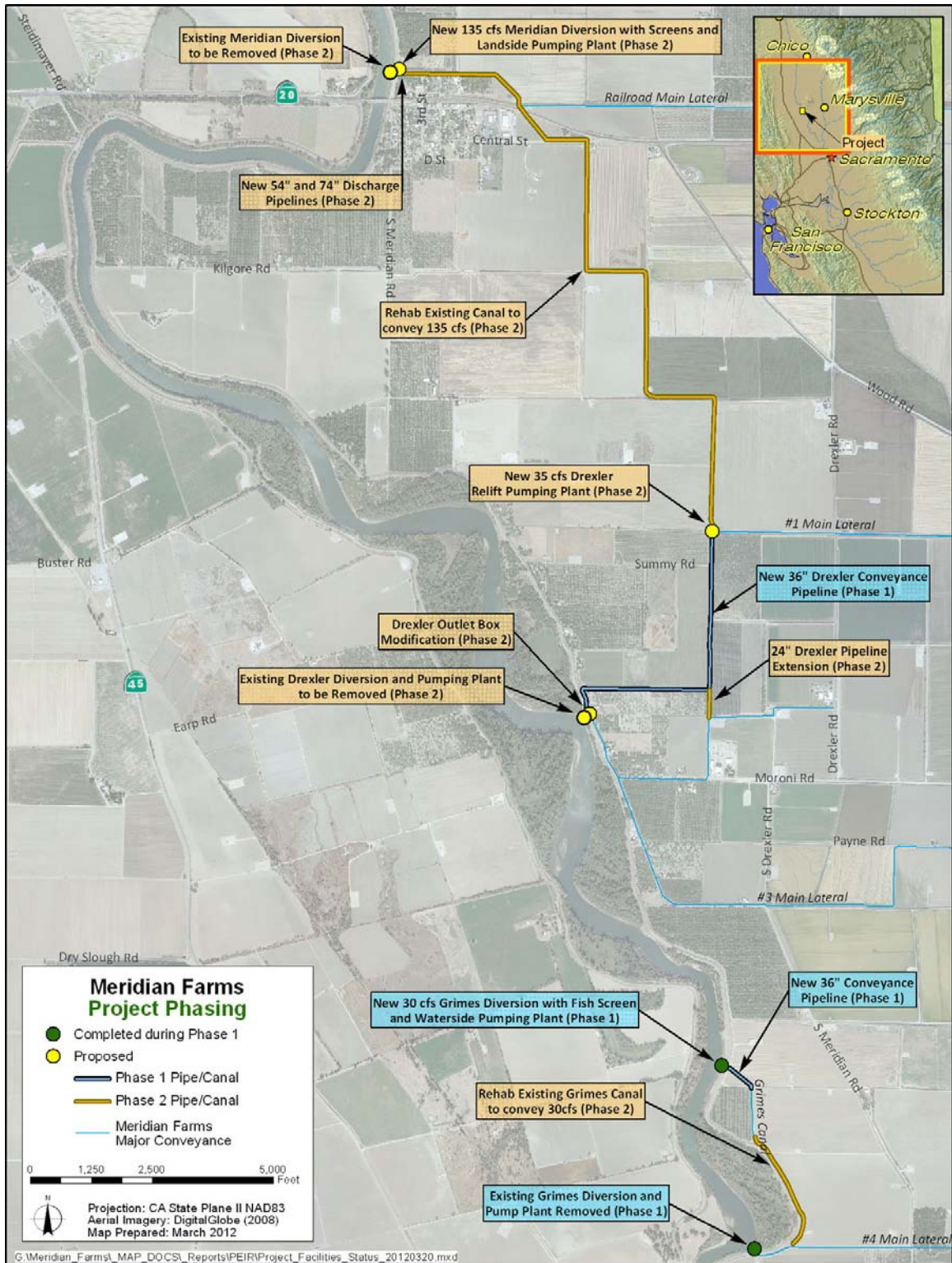


Figure 2-1. Phase 1 and 2 Project Components

The Proposed Project/Action would not increase MFWC's overall diversion capacity from the Sacramento River. Once the new diversions are completed at the new Meridian and Grimes site locations, the existing diversions at Meridian and Drexler would be removed in compliance with Central Valley Flood Protection Board (CVFPB), CDFG, National Marine Fisheries Service (NMFS), USFWS, and U.S. Army Corps of Engineers (Corps) requirements.

Specifically, the Proposed Project/Action includes the following elements:

- **New Meridian Diversion/Pumping Plant.** A new 135 cfs diversion with fish screen and pumping plant would be installed adjacent to the existing Meridian Diversion.
- **New Drexler Re-lift Pumping Plant.** A new 35 cfs pumping plant would be installed at the end of the Main Canal modifications to deliver flows to the Drexler Service Area via the new Drexler Pipeline.
- **Main Canal Modifications.** Approximately 15,200 linear feet of the Main Canal would be widened up to three feet, depending on the location, to provide adequate capacity to convey flows to the Drexler Service Area in order to accommodate the consolidation of the Meridian and Drexler diversions.
- **Drexler Pipeline Extension.** The Drexler Pipeline would be extended by approximately 500 feet to improve service to a portion of the Drexler Service Area and reduce pumping costs. The outlet box at the end of the Drexler Pipeline could be modified to reduce pumping costs.
- **Removal of Existing Meridian Diversion/Pumping Plant.** The existing diversion/pumping facility would be removed after the new Meridian Diversion/Pumping Plant is constructed and operational.
- **Removal of the Existing Drexler Diversion/Pumping Plant.** The existing pumping facility would be removed after the new Drexler Re-Lift Pumping Plant is construction and operational.
- **Grimes Canal Modifications.** Concrete lining of approximately 2,500 linear feet of the Grimes canal. (Note: this element of the Proposed Project/Action has not yet been funded, and implementation is to be determined based on funding support. The adequacy of environmental compliance for the remaining portions of the project would not be affected if this component is not funded.)

Each of the Proposed Project/Action elements are described in more detail below.

2.3.1 Meridian Diversion/Pumping Plant

The Meridian Diversion/Pumping Plant would consist of a new 135 cfs diversion and pumping plant that would be installed immediately upstream of the existing Meridian Diversion. The pumping plant would be located on the land-side of the levee.

Meridian Diversion Fish Screen

The retractable cylindrical fish screen with brush cleaning system would consist of two 20-foot long, 60-inch-diameter cylindrical screens. The total capacity of the screens would be 135 cfs. Pile-supported retrieval tracks that parallel the riverside levee face would be installed for screen removal during periodic maintenance or in the irrigation off-season. The pile-supported tracks would allow the screens to be removed out of the water via a motorized hoist and cable system.

The screens would be designed to have a minimum of 3 feet of submergence during low river levels (Water Surface Elevation 32.6 feet). When in operation, the screen mounts to a docking inlet. The docking inlet is covered by a trash-rack to prevent debris from entering the manifold when the screens are out of the water. This docking inlet would be part of an approximately 20-foot-long header manifold fabricated by the system manufacturer. This header manifold would connect to the 72-inch intake pipeline that runs through the levee to the pump station. The header manifold would either be supported on a concrete slab and H piles, similar to the stationary cylindrical design, or be mounted directly to the piles. A platform would be constructed at the top of the tracks to provide access to the screens when in a retracted position, as well as to mount the system control panel. **Figure 2-2** provides an overall site plan of the retractable cylindrical fish screen structure and pumping plant.

The brush cleaning system would consist of cylindrical screens equipped with hydraulic motors that rotate the screen against fixed external and internal brushes (see **Figure 2-3**).

Conveyance from River Inlet to Sump

The inlet structure would consist of two 66-inch steel tees, each with two fish screens mounted on top. The tees would be connected to a short segment of 84-inch steel pipeline. The 84-inch pipeline would then be reduced to a 72-inch steel pipeline, which would transition to a reinforced concrete pipe before passing through the levee and underneath North Meridian Road to the pump station wet-well. The fish screens, tees and the segment of 84-inch pipe would be supported by a three-foot six-inch thick concrete pad supported on piles.

The layout of the screens could change to allow the motors to be spaced properly and removed from the river for inspection and maintenance. This would require tracks mounted on piles for the screens to be pulled from the river by a winch. Short lengths of pipe would convey the intake water from the individual fish screens to the 84-inch intake pipe.

Deflection Piles

If necessary, approximately 10 steel deflection piles would be installed just upstream of the fish screens in the river. The flanges on the piles would be approximately 15 inches wide and 14 inches deep, with a steel weight of 89 pounds per foot. The purpose of the deflection piles would be to protect the fish screens from large debris floating down the river. The top of the piles would be submerged a minimum of three feet as required for navigable waterways. The use of deflection piles may not be necessary with use of a retractable screen.

Gate Structure

The gate structure would provide a means for positive closure of the levee penetration by the 72-inch inlet pipeline. A sluice gate with 72-inch diameter thimbles would be mounted in a concrete structure on the water-side of the levee.

Wet Well

The pumping plant wet well structure would be constructed on the east side of the Sacramento River at the northeast corner of North Meridian Road and Alameda Street near the community of Meridian. The inside dimensions of the sump are 35-feet wide by 46-feet long. The inlet pipeline would enter the sump with the pipe invert approximately 30 feet below grade. The wet well would direct the intake water to the five vertical turbine pumps.

Meridian Diversion Pumping Plant

The pumping plant would be equipped with two 16.5 cfs and three 34 cfs mixed flow pumps. The pumps would be mixed flow, vertical shaft pumps, with the electric motors mounted on the concrete deck, directly above the wet well described above. The concrete deck is at approximately the same elevation as the existing surrounding grade (elevation 53.5 feet).

The pumping plant site would be surrounded by a chain link fence on the north and west sides of the site and a masonry wall on the east and south sides. The masonry wall would provide a visual barrier between the pumping plant and nearby residences. The wet well, pumping pad, pumps, air compressor, air tank, and an electrical building would be located within the fenced site. A driveway and 15-foot access gate would allow vehicle access into the site off North Meridian Road. A three-foot gate would be located at the southeast corner of the site just off Alameda Street.

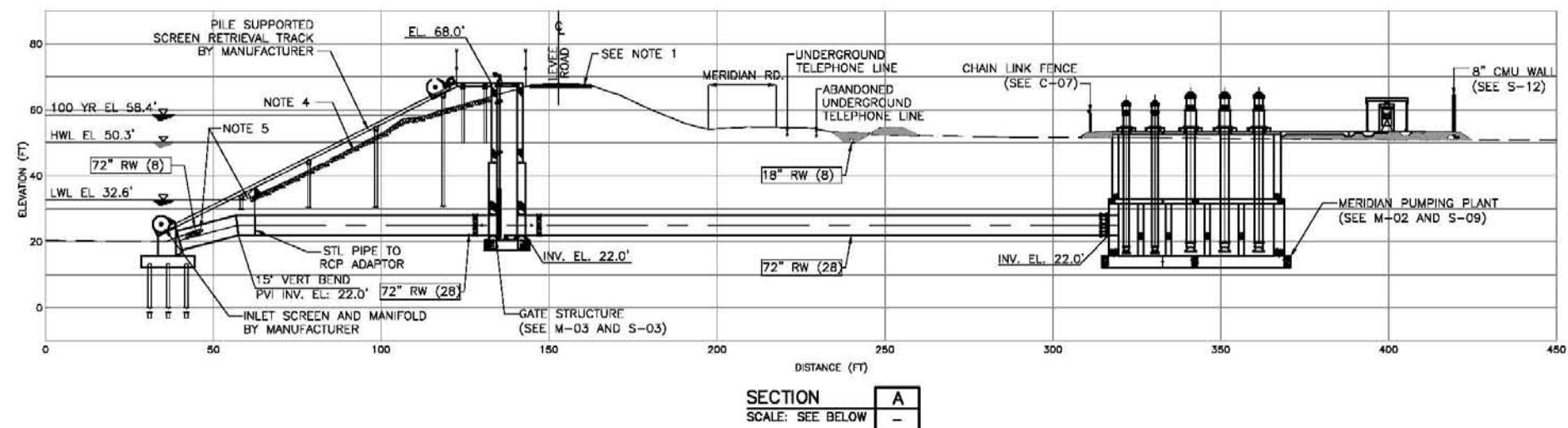
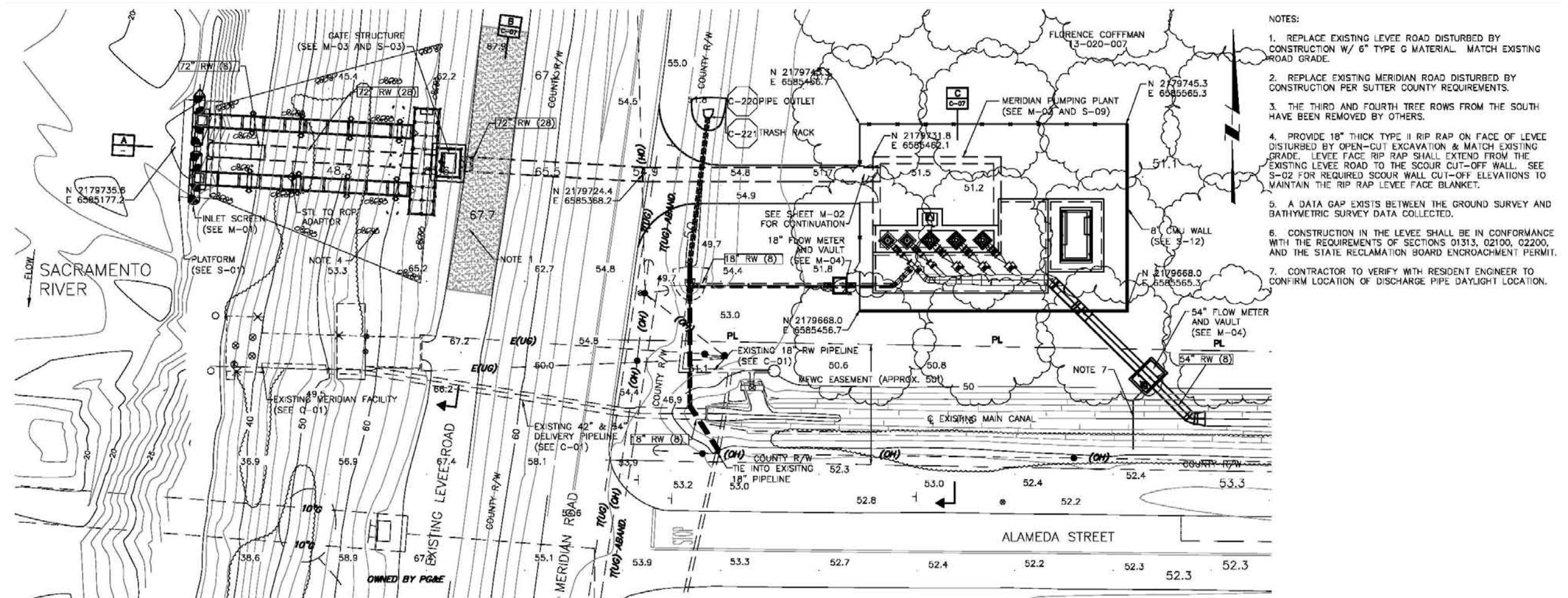
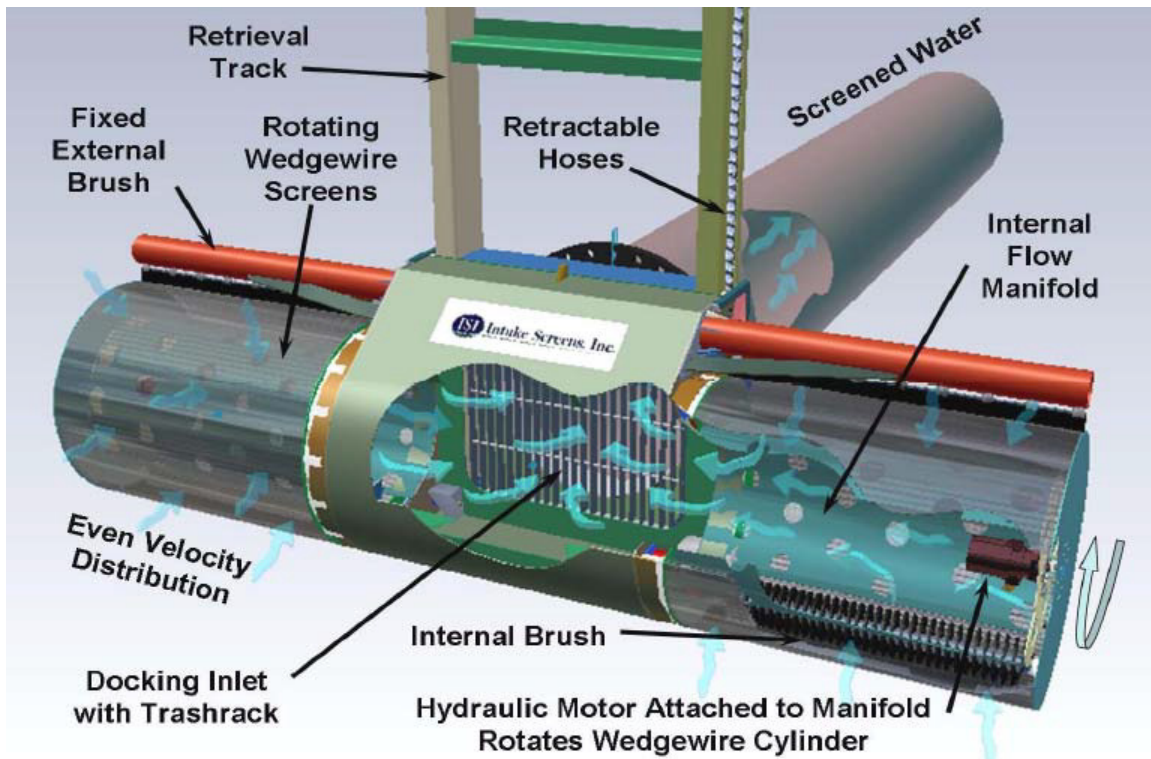


Figure 2-2. Retractable Cylindrical Fish Screen

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**Figure 2-3. Typical Rotating Cylinder Brush Cleaning System
(Image by Intake Screens, Inc.)**

Pumps

Two 16.5 cfs and three 34 cfs mixed flow pumping units would be installed to pump the total design flow of 135 cfs into MFWC's Main Canal. At minimum speed, the low capacity pumps would be able to pump at a rate of 8.3 cfs. This provides MFWC the same pumping flexibility they have at their existing Meridian and Drexler pumping plants. The pumping plant would operate up to capacity when the Sacramento River water surface elevations vary between 32.6 and 50.3 feet.

Discharge Piping

The 16.5 cfs pumps and 34 cfs pumps would discharge into their respective 20-inch and 30-inch, above ground, pump discharge header pipes. The water would be conveyed from the discharge header into a common 54-inch, above ground, manifold pipeline. The 54-inch pipeline would drop underground just before exiting the fenced area of the pumping plant site. Underground, the pipeline would transition to a 72-inch discharge pipeline that would eventually discharge into the Main Canal near Mawson Road.

A separate 18-inch discharge would connect to the most westerly 16.5 cfs pump and would branch off and head both north and south to existing irrigation ditches. The north branch would serve the

existing walnut orchard located next to the pumping plant. The south branch would serve the property located immediately south of the pumping plant on the other side of Alameda Street.

Flow Measurement

The water pumped from the Sacramento River would be measured with a 54-inch flowmeter just downstream from the pumping plant, and an 18-inch flowmeter located just west of the most westerly 16.5 cfs pump. The 54-inch flowmeter would measure the amount of water being diverted and pumped into the Main Canal. The 18-inch meter would be used to measure the water being pumped into the 18-inch waterline serving the north and south properties. The meter would be either above ground inside the pumping plant wall or housed in a concrete vault below ground. Flow measurements would be used by MFWC and Reclamation to log and report diversions.

Construction Considerations

Diversion and Fish Screen

Construction of the fish screen, intake piping and valve vault must be inside a sheet pile coffer dam to protect the site from flooding. Interlocking sheet piles would be driven into the river bottom using a vibratory or impact hammer attached to a crane. The crane would be floated to the site on a barge. The sheet piles would be driven one at a time to form the coffer dam. This work would begin after July 1 to minimize impacts to listed aquatic species.

After completion of the coffer dam, the river bottom would be excavated to a level approximately five feet below the top of the H piles that would support the fish screen foundation. The piles would then be driven and a concrete tremie seal poured. These piles must be driven with an impact hammer to verify they are properly imbedded and providing required support. All this work must be done without dewatering the site. Before the concrete in the tremie seal sets, there is a danger the difference in water pressure inside and outside the coffer dam could cause the river bottom to rise; therefore, the concrete tremie seal must be in place before water inside the dam is pumped out. Prior to cofferdam dewatering, a fish rescue and salvage plan would be implemented to minimize potential construction-related effects to species present in the project area. The plan will be developed in the preconstruction phase. The contractor will have a contingency plan in place to prevent water contamination in the event of concrete tremie seal failure. Sump pumps inside the coffer dam would pump the river water out and then operate continuously to keep seepage from flooding the work site.

The reinforced concrete support pad would then be poured above the support piles and the screens themselves and intake piping would be mounted on the pad. The levee would be excavated at this time allowing placement of the intake to the pumping plant and the valve vault.

Alternatively, the levee could be excavated first. This would provide a way to move equipment and material to the fish screen installation site without a barge. The contractor would need to compare the cost of the additional excavation and backfill of the levee material versus the time saved by not needing to work from a barge. This would also allow the contractor to install the sheet piles for the intake pipe trench construction at the same time, saving overall construction time. The levee would then be replaced with the excavated material, if it meets requirements for levee use. The

material would be placed in 6-inch lifts and compacted to 90% relative density in accordance with CVFPB requirements.

Pumping Plant

The proposed site for the pumping plant, on the land side of the levee, is currently a walnut orchard and several walnut trees would be removed to accommodate construction. The depth of the wet well (approximately 40 feet to the bottom of the concrete bottom slab) would require sheet piling to support the excavation and protect workers. The sheet piles would be driven by vibratory or impact methods. Sump pumps would be installed to remove groundwater and keep the excavation dry. Once the vertical walls of the wet well are in place the excavation would be backfilled and the sheet piles would be removed or abandoned in place. The pumps, piping and electrical equipment would be installed and a perimeter fence constructed.

After placement through the levee, the 72-inch RCP intake pipe would be placed in an approximately 30-foot deep by 10-foot wide sheet pile supported trench. Material excavated from the trench would be placed adjacent to the trench and used as backfill after pipe installation. The intake pipe would also be placed under North Meridian Road. To accommodate its installation, North Meridian Road would be closed for approximately one month and traffic would be detoured to Mawson Road and Burris Road to access areas north of the construction site. Following pipe installation, the trench would be backfilled and the road repaved to repair any damage done during construction activities.

The pumping plant 54-inch steel discharge pipe would be placed in a trench approximately 50-foot long by 10-foot deep by 8 feet wide. The contractor could opt to slope walls back in lieu of using sheet piles for trench support. At the end of the trench the pipe would transition to a 72-inch RCP and would be placed in the bottom of the existing canal for approximately 1,050 feet. The soil in the bottom of the canal would be wet and unusable for pipe support, so it would be removed and replaced with gravel. The discharge pipe would be placed beneath Mawson Road which would require a road closure and detour. The closure of North Meridian Road, described above and Mawson Road would not be done at the same time to allow traffic to access areas north of Meridian.

2.3.2 Main Canal Modifications

The Proposed Project/Action would increase the capacity of approximately 15,200 lineal feet of the Main Canal to convey flows to the Drexler service area needed as a result of the consolidation of the Meridian and Drexler diversions. The current maximum capacity of the Main Canal is estimated at 120 cfs from the outlet of the existing pumping plant to Siphon 2 (State Highway 20) which is not large enough to convey the new maximum flow (135 cfs) from the proposed new Meridian Pumping Plant; therefore, the canal would be widened and relined as shown in **Figure 2-4**.

The concrete lined canal would have a trapezoidal shape and side slopes of 1.5 horizontal to 1 vertical (1.5:1). The canal section would be lined with four-inch-thick un-reinforced, cast-in-place concrete. The maximum bottom width would be 5.5 feet and the minimum bottom width would be 3.5 feet depending on the capacity requirements of the reach. The new canal invert elevation would be the same as the current elevation in order to continue utilizing existing siphons wherever hydraulic capacity is available. See **Table 2-1** for a summary of the Main Canal Modifications.

**TABLE 2-1
PROPOSED CANAL MODIFICATIONS**

Description	Existing Bottom Width (ft)	Proposed Bottom Width (ft)	Flow (cfs)	Velocity (ft/s)
End of 54-inch Manifold pipe to Siphon 1	6.0-6.5	6 Pipe	135	4.8
Check Structure (moved from original location before Siphon)	5.2-7.9	5.5	135	2.5
Siphon 2 to Siphon 3	1.7-3.6	5.5	120	2.9
Siphon 3 to Bend Transition	2.6-3.5	5.5	120	2.7
Bend Transition to Check Structure	2.6-3.1	5.5	70	2.0
Check Structure to Siphon 4	3.1-3.3	3.5	70	2.0
Siphon 4 to Siphon 5	2.6-3.4	3.5	70	2.2

SOURCE: MWH Americas, Inc., 2004

The close proximity of the open canal to traffic on Alameda Street between the pumping plant and Mawson Road presents a safety hazard. The 72-inch discharge pipe would be extended to Mawson Road and backfilled to address the safety hazard. A two-foot deep drainage ditch would be constructed along Alameda Street to convey surface runoff that previously discharged to the canal.

The existing canal would be demolished and widened from one side or the other depending on the needed expanded width and the availability of right-of-way. The Operations and Maintenance (O&M) road would be widened, as necessary, to a width of 12-feet, as shown in **Figure 2-3**. Typical construction of the canal widening would involve a backhoe moving along the O&M road to remove the existing concrete lining by breaking the lining with the bucket into pieces which could be removed and placed into dump trucks. Due to the narrow work area, one dump truck at a time would need to back in from the nearest access point. At this time, the only access to the canal work area are from Mawson Road, Highway 20, Central Street, Blackmer Road and Summy Road. The next truck would need to wait for the previous truck to pull off the access road. The contractor may try to bring a second dump truck on the opposite side of the canal and load it while waiting for a dump truck on the near side of the canal. Or a second excavator could start at the other end of the Main Canal and load dump trucks accessing the site from Summy Road. The old concrete lining would be landfilled.

It has been estimated that approximately 550 dump truck trips will be required to remove the old concrete lining. At 15 minutes per truck, it will take 24 working hours or about 3 days to remove the concrete. If truck access can maintain that rate, it should take about 4 weeks to remove all the concrete with one excavator working.

The same backhoe used to remove concrete or a second backhoe would then excavate the sides of the canal to the required dimensions. A surveyor would need to work with the excavator operator. The soil removed would be used to widen or raise the O&M road. Where the soil along the side of the canal is not suitable for supporting the concrete lining, it would be removed and replaced.

The existing canal width varies, but is generally between 16 feet and 20 feet wide. North of the transition at Station 72+09 the canal must be widened to approximately 21.5 feet wide. South of the transition it must be widened to approximately 19.5 feet wide. The width of the limits of work available to the contractor vary between approximately 40 feet and 50 feet. The canal is generally in the center of the limits of work with an access road on one side or the other. However, the levee on the side opposite of the access road is generally not wide enough for trucks. Small backhoes or excavators are 8 to 10 feet wide, and the access road would be too narrow in some locations to allow access. It would also not be wide enough to allow other trucks with equipment and work crews to move around the work area, so access along both sides of the canal will be needed. Therefore, the access road will need to be widened before the start of work in some locations.

Once the canal is widened, it would be lined with four inches of concrete. It is expected that the new concrete lining would be shotcrete. However, the contractor could opt to use a concrete lining machine. In either case, concrete delivery trucks with a 10 cubic yard capacity would need to access the shotcrete crew or lining machine. At an estimated rate of 400 feet per day, the lining would require 35 working days or 7 weeks. Approximately 105 cubic yards of concrete or about 10 concrete truck deliveries would be required per day. One concrete truck every 45 minutes would need to access the site.

Check Structures and Turnouts

Seven reinforced concrete check structures and 15 turnouts to local irrigation ditches exist at various locations along the existing Main Canal. Of the seven check structures two would remain in place, one is no longer needed and would be demolished and the remaining four would be demolished and then replaced to accommodate the canal widening. Of the 15 existing turnouts, three would be maintained in place, two are no longer needed and would be demolished, 10 would be demolished and replaced to accommodate the canal widening. One new turnout is required in a new location, so a total of 11 turnouts would be constructed. It may be necessary to install a small pump in the canal to provide the required flow through the turnout and into the irrigation ditch at the Mawson Road crossing. Turnouts would be installed within the canal and would not increase the canal footprint.

Construction of the turnouts would likely not be initiated until the completion of the old lining removal. The turnout construction could take place concurrently with canal widening. An excavator would excavate the area for the new turnout and remove the old pipe. Then forms and rebar are placed and concrete poured. The gate mechanism would be installed at the end of the job. This work should not take more than a week per structure. More than one crew may be required.

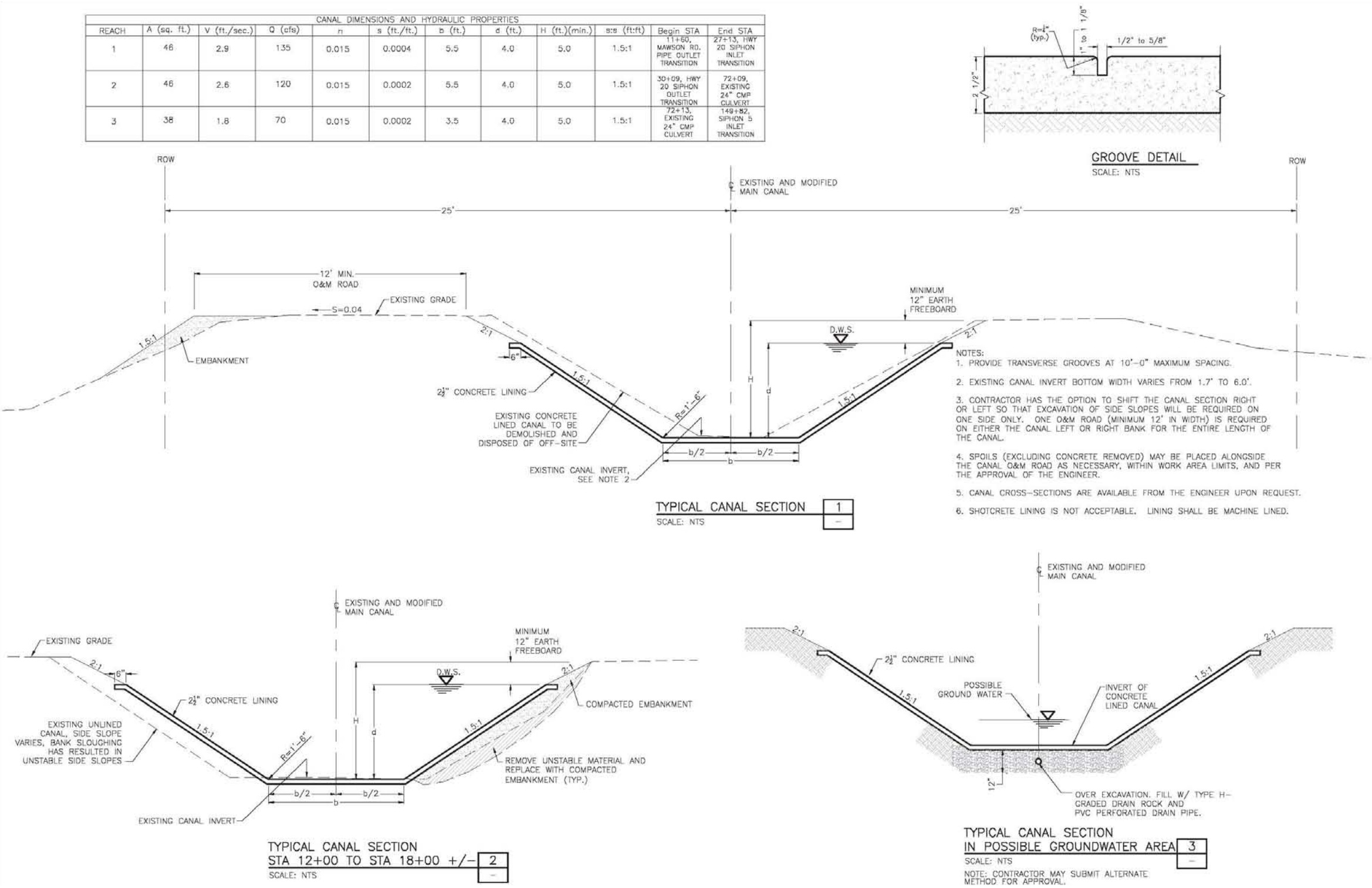


Figure 2-4. Main Canal Modifications

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The estimated duration of construction activities during the Main Canal widening is 5 months. This includes 4 weeks for removal of old concrete, 8 weeks for canal widening and turnout construction, and 8 weeks for canal lining.

Siphons

Two siphons (Siphon 1 and Siphon 3) would be replaced as part of the canal modifications. Siphon 1 under Mawson Road would be removed and replaced with the 72-inch diameter RCP which is part of the Pumping Plant discharge piping. The replacement of Siphon 1 would require a closure of Mawson Road to facilitate the pipe installation. Mawson Road would be restored and repaved following the pipe installation.

Siphon 3 would be replaced by a 72-inch diameter RCP. Replacement of Siphon 3 would require a shutdown and replacement of Central Road and would be subject to Sutter County Public Works' design standards. Siphon 3 would be lengthened to 200 feet (is currently 44-feet long) to extend it past a home on Central road that is situated next to the canal.

The remaining siphons (2, 4, and 5) provide adequate capacity and would be left in-place. Upstream and downstream transitions at each siphon would be constructed of four-inch thick cast-in-place concrete.

2.3.3 Drexler Re-Lift Pumping Plant

The Drexler Re-Lift Pumping Plant would be installed on the main canal, just upstream of the existing Siphon 5 and Pump #10. The purpose of the pumping plant would be to divert 35 cfs from the main canal to the Drexler Service Area. The existing Drexler Diversion would be abandoned. Water would be pumped up to a new turnout structure via the Drexler Pipeline installed under Phase 1. This pipeline consists of approximately 6,500 feet of 36-inch pipe of and a turnout structure. From the turnout structure, the water would gravity flow to the original Drexler canal outfall via approximately 600 feet of 36-inch pipe.

Figure 2-5 provides a general schematic of the proposed Drexler Re-Lift Pumping Plant. The pumping plant would include a 14-foot wide by 32-foot long forebay that would draw water off the Main Canal to two vertical turbine pumps. The forebay would be 10 feet deep and would be divided into two individual bays by a concrete wall with the pumps set at the end of each bay. The pump motors and discharge piping would be supported above a concrete slab that also forms the roof of the forebay. The individual pump discharge pipes would connect to a below ground 36-inch pipeline that would tie into the beginning of the Drexler Pipeline about 200 feet south of the Re-Lift Pumping Plant. An existing drainage ditch that parallels the Main Canal to the west would be filled to allow the construction of the pumping plant, and a new 24-inch storm drain would convey drainage from the ditch to the existing Reclamation District 70 canal to the south. The site construction also includes a 50-foot long by 21-foot wide concrete spillway in the O&M road opposite the Re-Lift Plant location. A 36-inch flow meter would be located in a below ground vault or sited above ground on the concrete pad.

Construction of the wet well and the overflow spillway must be done when the Main Canal is empty. However, the relocation of the drain from the seep to the ditch west of Summy Road and the connection to the Drexler Pipeline could be done during summer months.

2.3.4 Drexler Pipeline Extension

The Drexler Pipeline was connected to an existing 18-inch corrugated metal pipe (CMP) that discharges to an existing outlet box. The connection to the CMP was made with a concrete collar that would likely leak when under pressure. An alternative to replace the CMP and outlet box is being considered to provide a permanent connection and improve pump hydraulics.

A 24-inch branch of the Drexler Pipeline could be extended by approximately 500 feet to connect to the #3 Lateral Canal. This would improve pumping hydraulics by by-passing 3,000 feet of pipe and 3,000 feet of canals. Service to the Drexler Service Area would be improved and pumping costs would be reduced.

2.3.5 Removal of Existing Meridian Diversion/Pumping Plant and Drexler Pumping Plant

Once the New Meridian Diversion/Pumping Plant and Drexler Relift pumping plant are constructed and operational, the existing Meridian and Drexler Diversion/Pumping Plants would be removed. At a minimum, removal of these facilities would include the removal of the pumps, equipment platforms, electrical equipment, gauging stations, pile supports to required level, and river side-piping. It would also include the excavation of the levee so the discharge pipe through the levee could be removed. The replacement levee section would be constructed to Corps and CVFPB requirements. Sheet pile coffer dams would likely be required to protect the work in the levee and landside flooding.

Removal of the existing diversions would require a large crane sited on the top of the levee or on a barge in the river. As the pumps, piping and support structures are cut into manageable sections, they would be lifted and removed to a stockpile on the landside and hauled away by trucks. Some of the equipment such as the pumps could be reused, but most of the scrap would be landfilled. The contractor would attempt to pull the support piles out of the river, but most likely they would be cut three feet below river bottom and abandoned, in accordance with CVFPB requirements. The concrete vaults would be difficult and costly to remove. If CVFPB requires removal, the vaults would need to be demolished with jackhammers or a wrecking ball. The debris would then need to be removed from the river bank and bottom with a backhoe and hauled to a landfill.

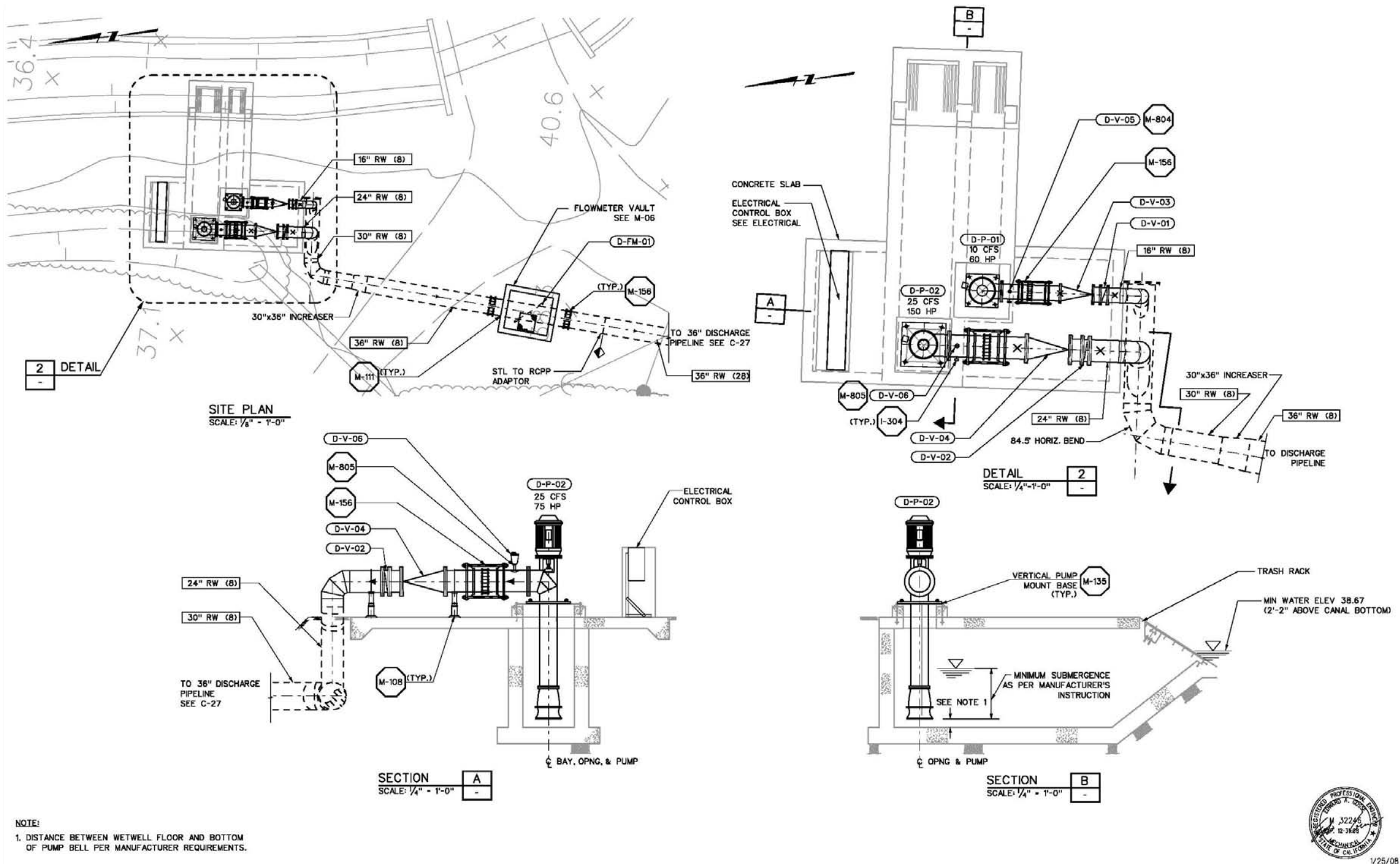


Figure 2-5. Drexler Re-Lift Pumping Plant

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Removal of the pipes through the levee would require excavation of the levee by backhoe down to the pipe. A cofferdam should not be required if the construction is done during low river flow periods. CVFPB requires excavations in the levee to have trench walls sloped back at 1.5 to 1.0 side slopes. This means the trench would be approximately 80 feet wide at the top. If the pipe sections are welded together, it would need to be cut into sections with a cutting torch. A crane would then lift the sections out of the trench to trucks for recycling or landfilling. The soil removed to uncover the pipe would be stockpiled at a nearby staging area. If the soil meets minimum requirements for use in a levee, it would be hauled back, placed in six-inch lifts and compacted to 90 percent relative density, in accordance with CVFPB requirements. The levee would be restored to pre-existing grades.

2.3.6 Grimes Canal Modifications

Under Phase 1 the existing unlined canal was widened and the banks were raised to accommodate a change in the how the canal is used. Previously, the canal flowed from south to north because the old diversion was at the south end of the canal. With the relocation of the New Grimes Diversion to the north end of the canal, the water would flow from north to south resulting in a higher water surface along most of the canal. New check structures and turnouts were also installed under Phase 1, and about 1,080 feet of the canal was lined with concrete. Under Phase 2, it is proposed that the remaining 2,500 linear feet of canal be lined with a 4 inches of concrete (shotcrete). The canal was widened under Phase 1, so the only work necessary is to remove and silt in the bottom of the canal and apply the shotcrete. The proposed Phase 2 Grimes Canal modifications are an optional component of the Phase 2 Proposed Project/Action; implementation of this component will be determined at a later date based on available funding.

2.4 Construction Phase

Construction Personnel and Equipment

The estimated construction personnel and equipment for the Proposed Project/Action is shown in **Table 2-2**. The actual equipment used during construction would be determined by the contractor and the construction schedule. Listed equipment includes all aspects of construction for facility construction and materials handling.

The specific routes to transport equipment, dispose excavated materials, or to obtain imported fill and other materials would likely vary for each project component. Because a number of construction materials sources are located in the surrounding area and urban centers, the selected routes use a combination of highways (e.g., Interstate-5 (I-5), State Route (SR)-99, SR-20, and SR-45), arterials and designated truck routes in the project vicinity. Construction worker trips are assumed to originate from the major urban areas in the project region and nearby communities primarily within Sutter County, Sacramento County, and Yolo County.

**TABLE 2-2
ESTIMATED CONSTRUCTION EQUIPMENT AND PERSONNEL**

Activity	Personnel	Equipment/Quantity
Meridian Diversion and Pumping Plant	20	Excavator, large (1), Excavator small (1), Loader (1), Crane (1),, Backhoe/loader (1), Bulldozer (1), Compactor (1), Portable Generator (1), Concrete Pumper (1), Welder truck w/generator (1), Equipment truck (1) Dump trucks (4) Concrete trucks
Main Canal Modifications	8	Excavator (1), Dump truck (2), Concrete lining machine (1), Concrete pumper (1), Concrete trucks, Equipment truck (1)
New Drexler Re-Lift Pumping Plant	15	Excavator (1), Crane (1),, Backhoe/loader (1), Portable Generator (1), Concrete Pumper (1), Welder truck w/generator (1), Equipment truck (1) Dump trucks (1) Concrete trucks
Drexler Pipeline Extension	6	Excavator (1), Loader (1), Equipment truck (1)
Removal of Existing Meridian Diversion/Pumping Plant	8	Excavator (1), Bulldozer (1), Crane (1), Loader (1) Dump trucks (4), Equipment truck (1)
Removal of Existing Drexler Pumping Plant	8	Excavator (1), Bulldozer (1), Crane (1), Loader (1) Dump trucks (4) Equipment truck (1)
Grimes Canal Modification	6	Shotcrete pumper (1), Equipment truck (1), Backhoe (1)
SOURCE: MWH, 2011; ESA 2011		

Staging Areas

Main staging areas would be located in an easily accessible area. Arrangements would be made between the contractor and property owner for all stored construction and equipment materials. Temporary staging of raw materials could occur in existing rights-of-way when short-term storage is needed. Site preparation for staging areas would incorporate appropriate measures to prevent unnecessary vegetation removal. Ingress and egress roads would be covered with rock base at a minimum to prevent off-tracking of dirt.

Main staging areas would be large enough to safely store heavy equipment, work crew vehicles, long-term storage of construction materials, and job site trailer(s). The long-term staging area(s) would be used for storage of construction equipment and materials, as a reporting location for workers, and as the location of the job site trailer and parking area for vehicles and equipment.

The contractor would be responsible for securing the job site with temporary chain link fencing or other fencing acceptable to the project engineer. Power to the job site will be provided by existing electrical utilities, if needed.

Affected Roadways

The roadways identified in **Table 2-3** will be affected during construction. All roadways would be restored to original condition or better and subject to Sutter County Public Works' design standards.

**TABLE 2-3
AFFECTED ROADWAY SEGMENTS**

Segment	Anticipated Level of Disruption
North Meridian Road	Temporary closure and detour (6 months)
Mawson Road	Temporary closure and detour (1 month)
Central Road	Temporary closure and detour (1 month)
South Meridian Road	Temporary closure and detour (1 month)

Construction Considerations

Construction activities would comply with the requirements set by the Central Valley Regional Water Quality Control Board (CVRWQCB) to minimize construction-related impacts to water quality. In addition, silt screens and/or silt fences would be used where construction activities could possibly cause sediment to enter the river. All water-side construction activities, with the exception of riprap installation, would be confined within a sheet-pile cofferdam, which would be put in place and removed during the "dry" season from July 1 to October 1, although this could be extended to November 1 with NMFS approval. In addition, canal modifications would occur between October 1 and April 30 to avoid disruption to the irrigation delivery schedule and growing season.

All construction contracts would specify staging areas for heavy equipment on the land-side of the Sacramento River so that spills of oil, grease, or other petroleum by-products would not be discharged in the Sacramento River. All machinery would be properly maintained and cleaned to prevent spills

and leaks. Any spills and leaks from equipment would be reported immediately and cleaned up in accordance with applicable local, state, and/or federal regulations.

Construction contracts would note the location of staging areas for stockpiling material and would be required to maintain Storm Water Pollution Prevention Plan (SWPP) Best Management Practices (BMPs) to prevent the migration of material off site.

2.5 Environmental Commitments

Measures to protect sensitive environmental resources during the construction have been incorporated into the proposed project. These environmental commitments are consistent with those incorporated into the 2008 Meridian Farms Fish Screen Project IS/MND EA/FONSI. The following are the environmental commitments that are part of the Proposed Project/Action:

2.5.1 Biological Resources

- Project construction and operations will result in no net loss of wetland resources.
- Construction of the temporary cofferdam will only take place after July 1 and prior to October 1. The in-water work period may be extended to November 1 with approval from NOAA Fisheries.
- Pump(s) used for dewatering during Phase 2 construction areas will be screened according to NMFS fish screening criteria for anadromous salmonids (NMFS, 1997b). All construction contracts would specify a fish salvage program for all dewatered areas as part of construction. Prior to cofferdam dewatering, a fish rescue and salvage plan would be implemented to minimize potential construction-related effects to species present in the project area. A qualified biologist will be on-site during such pumping activities to ensure that any fish that may be present within the construction area are relocated to suitable habitat near the project area. The Department of Fish and Game will be contacted to determine the proper disposition of salvaged aquatic organisms, including trapped fish and aquatic species.
- Additional measures to avoid impacts to sensitive biological resources, including special-status fish and the giant garter snake, are included in Chapter 4.

2.5.2 Cultural Resources

- All construction contracts would inform the contractor(s) of the potential for accidental discovery of subsurface archaeological, paleontological, and/or significant cultural resources artifacts or human remains. In the event of the discovery of any buried archeological or paleontological deposits, construction activities in the vicinity (within 50 feet) of the find will be temporarily halted and a qualified archeologist will be consulted to assess the significance, need for recovery, and/or proper management recommendations. Possible management recommendations for important resources could include resource avoidance or data recovery excavations. In addition, if any bone is discovered that appears to be human, work within the area will be stopped and Sutter County Sheriff-Coroner will be

notified immediately. Work will only resume after the investigation and in accordance with any requirements and/or procedures imposed by the Sutter County Sheriff-Corner.

In the event that the bone most likely represents a Native American interment, the Native American Heritage Commission will be notified so the most likely descendents can be identified. No Project Personnel will be allowed to collect cultural resources.

2.5.3 Land Use

- Unless the affected landowner and the District mutually agree to another solution, the District will compensate for any temporary or permanent easements, property loss, and/or damage to third-parties. Compensation will be at fair market value, determined by qualified and objective third-party real estate appraisers.

2.5.4 Air Quality

- The District will coordinate with the Feather River Air Quality Management District (FRAQMD) to determine the need for preparation of a construction-generated emissions control plan or to identify measures that would be implemented during construction to control fugitive dust or other vehicle or equipment emissions. At a minimum, fugitive dust will be controlled by watering the soil surface and covering haul vehicles and exposed dirt piles. All construction contracts will specify such dust and emission control requirements and any additional controls as required by FRAQMD.

2.5.5 Hazards and Hazardous Materials

- Construction, welding and other areas where spark-producing equipment will be used will be cleared of dried vegetation or other materials that could serve as fire fuel. Any construction equipment that normally includes a spark arrester will be equipped with an arrester in good working order.
- All construction-related hazardous materials will be transported, stored, and handled in a manner consistent with relevant regulations and guidelines, including those recommended and enforced by the state and federal Departments of Transportation, CVRWQCB, Sutter County, the local Fire District and other appropriate fire districts, among others as appropriate.
- A Hazardous Materials Management Plan (or equivalent) will be prepared and/or followed to provide specific emergency response protocols for the accidental release or threatened release of hazardous materials used as part of the construction and operation of the Proposed Project/Action. In the event a release was to occur, this emergency response plan will provide emergency responders with a protocol for continuing and disposing of the release.

2.5.6 Noise

- Standard noise abatement measures will be implemented during construction to reduce noise impacts from construction activities. Construction activities will be limited to the hours between 7:00 a.m. and 5:00 p.m. on weekdays to reduce potential noise impacts to

area residents. In addition, staging areas and stationary noise generating construction equipment will be located as far as possible from sensitive receptors, and all construction equipment will be maintained with the manufacturer's specified noise-muffling devices.

- Final design of the facilities in the Proposed Project/Action will incorporate noise attenuating technologies and/or noise barriers to mitigate that noise emanating from the facilities at maximum operational load will not exceed applicable standards or lead to cumulative increases in ambient noise levels.

SECTION 3

Environmental Setting/Affected Environment

This section provides an overview of the environmental setting and affected environment, which represents the baseline condition for assessing the potential for the Proposed Project/Action to impact the environment.

3.1 Aesthetics

The project area is characterized by relatively flat terrain with generally expansive viewsheds. The Sutter Buttes, remnant volcanoes with a peak elevation approximately 2,000 feet above the surrounding valley floor, are located within two miles of the project area (Sutter County, 2008). Much of the land in the project area is agricultural with the exception being the town of Meridian. The project area is also located adjacent to the Sacramento River which provides scenic views along the western border of the County and project area. Also in the project area is the existing Grimes Pumping Plant and existing Main Canal and Grimes Canal which contribute to the existing viewshed in the project area.

3.2 Agricultural and Forest Resources

The project area is located along the western edge of Sutter County. The project area is zoned for agriculture with the exception of the Town of Meridian, a rural community. In 2011, approximately 57 percent of the irrigated agricultural land comprised of rice, which was the predominant grain crop. Tomatoes, wheat, and sunflower are also important crops, with each comprising six to seven percent of the cropping pattern during the same year. Permanent tree crops (orchards) encompass about 10 percent of the planted area, with walnuts being the predominant crop.

The land within the project area is zoned as Prime Farmland and also includes several Williamson Act parcels. No forest resources are located within the project area (Sutter County, 2008).

3.3 Air Quality

Sutter County is located within the Sacramento Valley Air Basin (SVAB) which consists of the northern half of the Central Valley and approximates the drainage basin for the Sacramento River and its tributaries. Regionally, some portions of the SVAB have fewer air quality problems than others. Only the southern portion of the SVAB is in non-attainment for federal ozone standards, which includes the southern portion of Sutter County. Regarding State standards, the entire SVAB is in nonattainment for ozone and PM standards.

3.4 Biological Resources

Biological communities in the study area include valley foothill riparian, ruderal/annual grassland, agricultural land, and riverine habitat (the Sacramento River). The Sacramento River provides freshwater habitat for fish, amphibians, reptiles, and waterfowl. Roads, levees, and agricultural activities have modified the adjacent riparian habitat. Inland project areas, beyond the Sacramento River and associated habitats, are characterized as agricultural (field crops and orchards). Human presence within the project area is minimal based on the surrounding land use; however river recreation activities increase during the late spring, summer and fall. **Figure 3-1** presents the general habitat types surrounding the project components, including the proposed Meridian diversion and pumping plant, as well as around the proposed Drexler re-lift pumping plant.

3.4.1 Habitats

Valley Foothill Riparian

Valley foothill riparian habitat in the study area occurs in small strips adjacent to the Sacramento River system as it winds south along the western boundary of the Meridian Farms service area, and is usually located within the flood plain and levee system. In the areas of the diversions, habitat is disturbed and density and structure vary. Some relatively open areas are interspersed with multi-layer areas containing, and can include large trees, dense shrubs, California grape vines (*Vitis californica*), and a well-developed herbaceous layer. Trees and shrubs include narrowleaf willow (*Salix exigua*) and black willow (*Salix gooddingii*), Himalayan blackberry (*Rubus discolor*), poison oak (*Toxicodendron diversilobum*), cottonwood (*Populus fremontii*), ash (*Fraxinus latifolia*), and boxelder (*Acer negundo*). The herbaceous layer contains native and non-native species, including black mustard (*Brassica nigra*), Canada horseweed (*Conyza canadensis*), tall amaranth (*Amaranthus rudis*), epazote (*Chenopodium ambrosioides*), and barnyard grass (*Echinochloa crusgalli*). Mature cottonwood stands dominate the closed canopy overstory and characterize the riparian forest areas adjacent to and within the riverine environment (during high flow season).

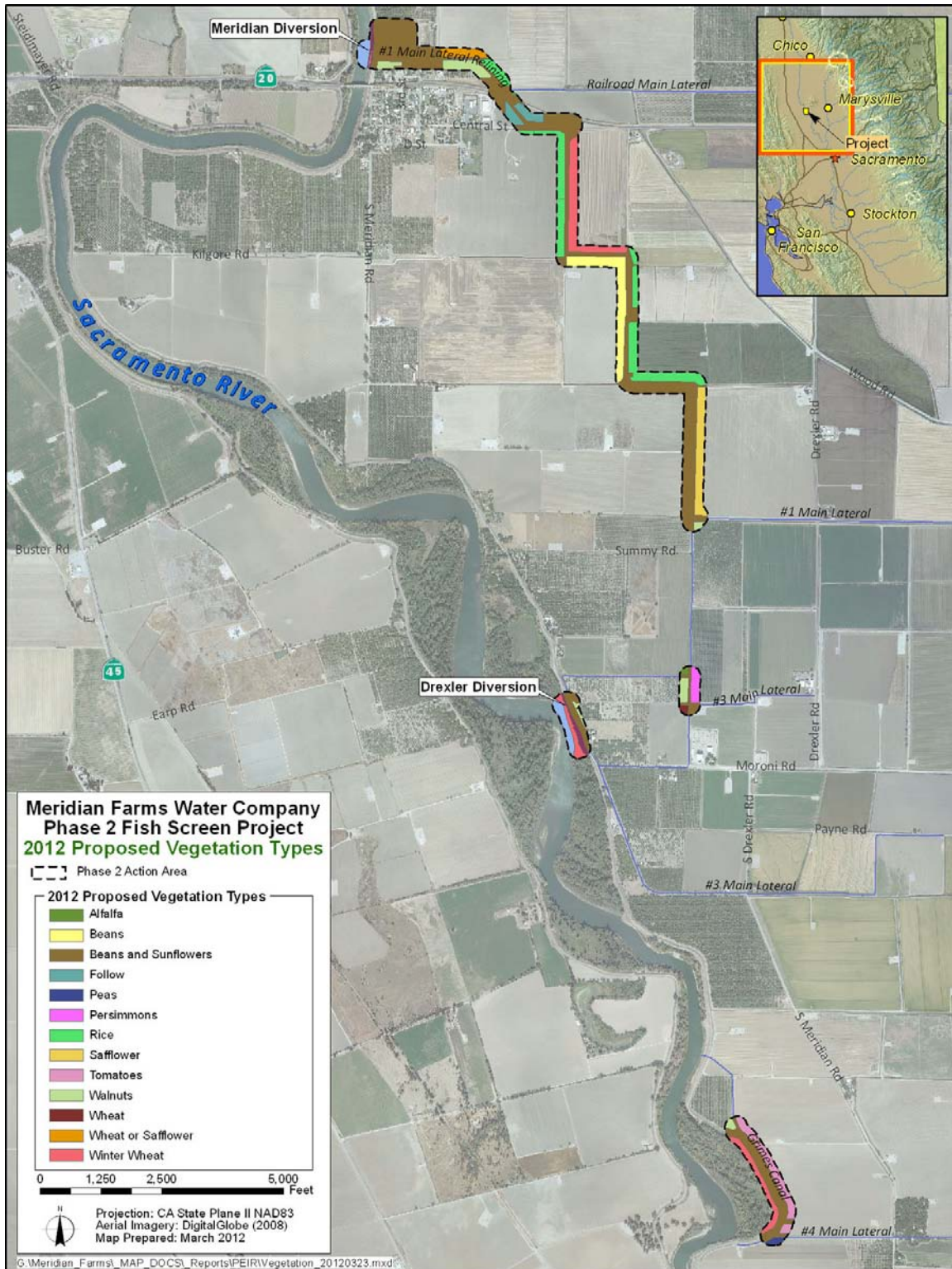


Figure 3-1

Valley riparian habitats provide food, water, migration and dispersal corridors, and escape, nesting, and thermal cover for an abundance of wildlife. At least 50 amphibians and reptiles and 147 bird species occur in lowland riparian systems. Additionally, 55 species of mammals are known to use California's Central Valley riparian communities.

Mature riparian habitat is not located within the immediate vicinity of proposed activities near or in the Sacramento River. However, disturbed valley foothill riparian habitat does occur along the opposite bank of the existing Drexler Diversion pumping plant, which is proposed to be demolished. Mature riparian habitat also occurs in the vicinity (west) of a segment of the Grimes Canal proposed to be concrete lined.

Ruderal/Annual Grassland

In the study area, ruderal habitats dominated by non-native annual grasses occur in narrow strips adjacent to roads, canals, and the Sacramento River levee. Species in these areas include ripgut brome (*Bromus diandrus*), and wild oats (*Avena barbata*). Other common species include Johnson grass (*Sorghum halepense*), wild rye (*Leymus triticoides*), sow thistle (*Sonchus asper*), filaree (*Erodium moschatum*), mugwort (*Artemisia douglasiana*), and cocklebur (*Xanthium strumarium*). Many of these species are also found in the disturbed understory of the valley foothill riparian habitat along the Sacramento River.

Sacramento River

Within the vicinity of the project area the Sacramento River riverine habitat is characterized by fresh-water aquatic and shaded riparian. The adjacent riparian habitat has been modified by trails (both paved and unpaved), levees, and general recreation activities. The river is approximately 800 feet wide and flows year-round. Flows are relatively slow within the project area, exhibiting deep channel characteristics with levied banks. Vegetative cover/shading along the channel banks is dependant upon the adjacent habitat (i.e., exposed annual grassland or riparian habitat). Channel substrate generally consists of fine sandy-loam with sparse areas imported rip-rap along the banks used to reinforce the adjacent levees. At the proposed new diversion location the channelized river bank habitat is exposed and dominated by annual grassland, exhibiting a deep, cold and slow moving flow.

The Sacramento River in the vicinity of the proposed intake location serves as a migratory corridor for the upstream migration of adult salmon and steelhead, and the downstream migration of juvenile salmon and steelhead. Other fish species common in the Sacramento River near the proposed intake location include striped bass, threadfin shad, American shad, catfish, Sacramento pikeminnow, tule perch, sculpin, bullhead, white and green sturgeon, Sacramento splittail, and a variety of other resident fish species. The Sacramento River near Sacramento also provides habitat for a variety of invertebrates, including planktonic species such as copepods, and epibenthic species such as crawfish and amphipods.

Agricultural

The predominant land use within the project area is agriculture. Although the specific crop cultivated on a parcel of land may vary annually, the general types of crops grown in the region remain relatively consistent. The major crops include rice, safflower, sunflower, tomatoes, and beans. Hay crops, such as alfalfa, are widely grown, and orchards in the area grow walnuts and persimmons. These crops are irrigated by a series of canals that deliver water from the Sacramento River. The delivery canals within the project area are generally well maintained and concrete lined, and support minimal vegetation. There are unlined overflow ditches characterized by emergent aquatic vegetation such as cattails (*Typha latifolia*) and tules (*Scripus californicus*) that occur in the vicinity, adjacent or perpendicular to the Main Canal. All ditches owned and managed by MFWC are maintained annually, and generally lack dense upland or aquatic vegetation. A few ditches that are owned by the local Reclamation District are not maintained as regularly and support denser stands of tules and cattail. Agricultural crops and irrigation drainages provide foraging and cover habitat for a variety of wildlife such as birds, mammals, and some reptiles.

All project components are located in or adjacent to agriculture. The Main Canal and other delivery canals that are proposed for widening (increased conveyance) are surrounded by lands in active crop production. These canals are generally concrete-lined; although, in some locations, the concrete bed is damaged and there are places where the canals are unlined. The proposed Drexler Re-Lift Pumping Plant is adjacent to existing canals and ditches. Irrigation ditches lateral to the Main Canal in the vicinity of the project support emergent aquatic vegetation. Canals and ditches may provide habitat for fish, aquatic invertebrates, and aquatic snakes.

3.4.2 Special Status Species

Table 3-1 lists the species of concern, their preferred habitats, and whether, based on the activities the project proposes, a given species has the potential of being affected. Species that may be affected by the Proposed Project/Action (and are therefore addressed in detail in this document) are in bold type.

**TABLE 3-1
SPECIAL STATUS SPECIES THAT MAY OCCUR IN THE PROJECT AREA**

Scientific Name Common Name	Federal Status	State Status	CNPS Listing	Habitat Description / Blooming Period	Potential to Occur in the Action Area
Fish					
<i>Acipenser medirostris</i> North American green Sturgeon (Southern DPS)	FT	CSC	--	Spawns in large cobble in deep and turbulent river mainstem. The Southern DPS spawns in the Sacramento River basin and in the Sacramento-San Joaquin Delta and Estuary.	High. Migratory route in the Sacramento River; also provides suitable rearing habitat in riparian bank areas.
<i>Hypomesus transpacificus</i> Delta smelt	FT	CT	--	Found in the Sacramento-San Joaquin delta, Suisun bay, Carquinez Straight, and San Pablo Bay.	Unlikely. Project site outside area designated as Critical Habitat and does not have habitat required for reproduction or cover. Project site likely outside of the upstream migratory extent.
<i>Oncorhynchus mykiss</i> Central Valley steelhead	FT	--	--	Spawns in Sacramento River and tributaries where gravelly substrate and suitable water conditions occur.	High. Migratory route in the Sacramento River; also provides suitable rearing habitat in riparian bank areas.
<i>Oncorhynchus tshawytscha</i> Central Valley spring-run Chinook	FT	CT	--	Spawns in Sacramento River and few select tributaries where gravelly substrate and suitable water conditions occur.	High. Migratory route in the Sacramento River; also provides suitable rearing habitat in riparian bank areas.
<i>Oncorhynchus tshawytscha</i> Sacramento River winter-run Chinook	FE	CE	--	Spawns primarily in upper reaches of the mainstem Sacramento River.	High. Migratory route in the Sacramento River; also provides suitable rearing habitat in riparian bank areas.
Reptiles					
<i>Emys marmorata</i> Western pond turtle	--	CSC	--	Ponds, marshes, rivers, streams, and irrigation ditches with aquatic vegetation. Requires basking sites and suitable upland habitat for egg-laying. Nest sites most often characterized as having gentle slopes (<15%) with little vegetation or sandy banks.	Unlikely. No suitable habitat within or adjacent to the project site.
<i>Thamnophis gigas</i> Giant garter snake	FT	CT	--	Generally inhabits marshes, sloughs, ponds, slow-moving streams, ditches, and rice fields which have water from early spring through mid-fall, emergent vegetation (such as cattails and bulrushes), open areas for sunning, and high ground for hibernation and escape cover.	Moderate. Limited aquatic habitat in Main Canal, in adjacent Reclamation Drains or within adjacent seasonally inundated rice fields. Potential upland habitat in unpaved areas up to 200 feet from aquatic habitat.
Amphibians					
<i>Ambystoma californiense</i> California tiger salamander	FT	CSC	--	Annual grassland and grassy understory of valley-foothill hardwood habitats in central and northern California. Needs underground refuges and vernal pools or other seasonal water sources.	Unlikely. No suitable habitat within or adjacent to the project site.
<i>Rana aurora draytonii</i> California red-legged frog	FT	CSC	--	Breeds in slow moving streams with deep pools, ponds, and marshes with emergent vegetation.	Unlikely. No suitable habitat within or adjacent to the project site.

**TABLE 3-1
SPECIAL STATUS SPECIES THAT MAY OCCUR IN THE PROJECT AREA**

Scientific Name Common Name	Federal Status	State Status	CNPS Listing	Habitat Description / Blooming Period	Potential to Occur in the Action Area
<i>Spea</i> (=Scaphiopus) <i>hammondii</i> Western spadefoot toad	--	CSC	--	Occurs seasonally in grasslands, prairies, chaparral, and woodlands, in and around wet sites. Breeds in shallow, temporary pools formed by winter rains. Takes refuge in burrows.	Unlikely. No suitable habitat within or adjacent to the project site.
Birds					
<i>Agelaius tricolor</i> Tricolored blackbird	--	CSC	--	Nests in dense thickets of cattails, tules, willow, blackberry, wild rose, wheat and barley crops, and other tall herbs near fresh water.	Unlikely. Marginal riparian nesting habitat along Sacramento River banks. However, no suitable nesting habitat in the immediate vicinity of the project.
<i>Ardea alba</i> (nesting) Great egret	--	--	--	Colonial nester in large trees. Rookery sites located near marshes, tideflats, irrigated pastures and margins of rivers and lakes.	Low. No suitable nesting habitat in the immediate vicinity of the project. Potential for species to forage within or in the vicinity of the project.
<i>Ardea herodias</i> (nesting) Great blue heron	--	--	--	Colonial nester in tall trees, cliff sides and isolated marsh habitats.	Low. No suitable nesting habitat in the immediate vicinity of the project. Potential for species to forage within or in the vicinity of the project.
<i>Athene cunicularia</i> Western burrowing owl	--	CSC	--	Utilizes ground squirrel (or other mammal) burrows within open grasslands, prairies, savanna, or agricultural fields.	Moderate. Potential nesting habitat along the perimeter of agricultural fields and along the banks/levees of the Sacramento River.
<i>Branta hutchinsii leucopareia</i> Cackling (=Aleutian Canada) Goose	FD	--	--	Breeds in open or forested areas near water. Often found in wetlands, grasslands, or cultivated fields during migration.	Moderate. The CNDDDB (2011) records an occurrence near the project site. Marginal foraging habitat occurs in agricultural fields adjacent to project.
<i>Buteo swainsoni</i> Swainson's hawk	--	CT	--	Breeds in California's Central Valley. Winters primarily in Mexico. Typically nests in scattered trees or along riparian systems adjacent to agricultural fields or pastures.	Moderate. The CNDDDB (2011) records an occurrence near the project site. Suitable nesting habitat occurs within trees along the Sacramento River and within the Action Area. The Action Area also provides foraging for this species.
<i>Carduelis</i> (<i>Spinus</i>) <i>lawrencei</i> Lawrence's goldfinch	--	--	--	Dry grassy slopes with weed patches, chaparral, and open woodlands; nests in trees or shrubs.	Unlikely. No suitable habitat within or adjacent to the project site.
<i>Charadrius montanus</i> Mountain plover (wintering)	--	CSC	--	In California, winters in open short grasslands and plowed agricultural fields in the Central Valley and in foothill valleys west of San Joaquin Valley, and in Imperial Valley. Winters below 1000 m (3200 ft).	Unlikely. Project area is outside of known species range.
<i>Circus cyaneus</i> Northern harrier	--	CSC	--	Forages over open ground. Nests on ground in shrubby vegetation, usually at marsh edge in emergent wetland or along rivers or lakes, but also in grasslands, grain fields, or on sagebrush flats several miles from water.	Unlikely. Forages over open ground. Nests on ground in shrubby vegetation, usually at marsh edge in emergent wetland or along rivers or lakes, but also in grasslands, grain fields, or on sagebrush flats several miles from water
<i>Coccyzus americanus occidentalis</i> Western yellow-billed cuckoo	FC	CE	--	Nests in extensive riparian forests (at least 40 hectares).	Unlikely. Riparian area surrounding project site is highly fragmented.

**TABLE 3-1
SPECIAL STATUS SPECIES THAT MAY OCCUR IN THE PROJECT AREA**

Scientific Name Common Name	Federal Status	State Status	CNPS Listing	Habitat Description / Blooming Period	Potential to Occur in the Action Area
<i>Grus canadensis tabida</i> Greater sandhill crane	--	CSC	--	Open habitats, shallow lakes, and emergent wetlands. In winter also uses dry grasslands and croplands near wetlands.	Low. Potential foraging and roosting habitat within farm fields in the vicinity of the project, particularly rice fields and croplands near wetlands. Species is known to occur in the region during winter months.
<i>Laterallus jamaicensis coturniculus</i> California black rail	--	CT	--	Freshwater, brackish, or tidal salt marshes.	Unlikely. No suitable habitat within or adjacent to the project site. Project area is outside of known species range.
<i>Pandion haliaetus</i> Osprey	--	WL	--	Habitat varies greatly and usually includes adequate supply of accessible fish, shallow waters, open and elevated nest sites (10-60 feet in height), and artificial structures such as towers. Builds large platform stick nests near or in open waters such as lakes, estuaries, bays, reservoirs, and within the surf zone.	Moderate. Potential nesting habitat along the banks of the Sacramento River in the vicinity of the project.
<i>Plegadis chihi</i> White-faced ibis	--	CSC	--	Nest and forages in freshwater marshes and rivers, respectively.	Unlikely. No suitable nesting habitat within or adjacent to the project site.
<i>Riparia riparia</i> (nesting) Bank swallow	--	CT	--	Nests in holes dug in sandy cliffs and river banks near water.	Low. Potential nesting habitat along the banks of the Sacramento River in the vicinity of the project.
<i>Spinus lawrencei</i> Lawrence's goldfinch	--	--	--	Breeds in open oak or other arid woodland and chaparral, near water. Requires open woodland or shrubland, a nearby source of water, and forb and shrub seeds.	Unlikely. Project area is outside of known species range.
Mammals					
<i>Antrozous pallidus</i> Pallid bat	--	CSC	--	Prefers caves, crevices, hollow trees, or buildings in areas adjacent to open space for foraging. Associated with lower elevations in California.	Unlikely. No suitable roost or maternity sites occur in the immediate vicinity of the project.
<i>Dipodomys californicus eximius</i> Marysville California kangaroo rat	--	CSC	--	Needs friable soil, grass stages of chaparral. Only found in the area of the Sutter Buttes.	Unlikely. No suitable habitat within or adjacent to the project site.
<i>Lasiurus blossevillei</i> western red bat	--	--	--	Roosts primarily in trees, 2-40 feet above ground, from sea level up through mixed conifer forests. Prefers habitat edges and mosaics with trees that are protected from above and open below with open areas for foraging.	Unlikely. No suitable roost or maternity sites occur in the immediate vicinity of the project.
<i>Lasiurus cinereus</i> hoary bat	--	CSC	--	Prefers open habitats or habitat mosaics, with access to trees for cover and open areas or habitat edges for feeding. Roosts in dense foliage of medium to large trees. Feeds primarily on moths; requires water.	Unlikely. Limited roosting habitat within forested areas along the Sacramento River; however, dense foliage for roosting is not available in the Action Area.

**TABLE 3-1
SPECIAL STATUS SPECIES THAT MAY OCCUR IN THE PROJECT AREA**

Scientific Name Common Name	Federal Status	State Status	CNPS Listing	Habitat Description / Blooming Period	Potential to Occur in the Action Area
<i>Myotis ciliolabrum</i> western small-footed myotis	--	--	--	In association with steep limestone outcrops and talus slopes. Forages over a wide range of habitats, mostly open, arid wooded and brushy uplands near water. Seeks cover in caves, buildings, mines and crevices.	Unlikely. No suitable roost or maternity sites occur in the immediate vicinity of the project.
<i>Myotis yumanensis</i> Yuma myotis	--	--	--	Often near reservoirs, optimal habitats are open forests and woodlands with water sources to feed over. Roosts in buildings, trees, mines, caves, bridges, and rock crevices. Maternity colonies active May through July.	Unlikely. Limited roosting habitat within forested areas along the Sacramento River; however, dense foliage for roosting is not available in the Action Area.
<i>Perognathus inornatus inornatus</i> San Joaquin Pocket Mouse	--	--	--	Uses arid annual grassland, savanna, and desert scrub, with sandy washes, fine soils, and scattered vegetation between 1,100 and 2,000 feet in elevation.	Unlikely. Marginal vegetation along irrigation ditch and not within the required elevation range.
Invertebrates					
<i>Branchinecta conservatio</i> Conservancy fairy shrimp	FE	--	--	Lifecycle restricted to large, cool-water vernal pools with moderately turbid water.	Unlikely. No suitable habitat within or adjacent to the project site.
<i>Branchinecta lynchi</i> Vernal pool fairy shrimp	FT	--	--	Lifecycle restricted to vernal pools.	Unlikely. No suitable habitat within or adjacent to the project site.
<i>Lepidurus packardii</i> Vernal pool tadpole shrimp	FE	--	--	Found in vernal pools, swales, ephemeral drainages, stock ponds, reservoirs, or ditches.	Unlikely. No suitable habitat within or adjacent to the project site.
<i>Cicindela hirticollis abrupta</i> Sacramento Valley (Hairy-necked) tiger beetle	--	--	--	Larvae and usually adults occur on sand bars, sandy shores, flood scours etc. immediately associated with rivers. Requires fine sand that is damp at, or a few centimeters below, the surface, and sparse or absent vegetation. Habitats must also not be subject to inundation for more than a few days at a time.	Unlikely. The project site habitat conditions are not suitable for this species.
<i>Desmocerus californicus dimorphus</i> Valley elderberry longhorn beetle	FT	--	--	Breeds and forages exclusively on blue elderberry shrubs (<i>Sambucus mexicana</i>) below 3,000 feet in elevation.	Unlikely. No elderberry shrubs with stems measuring at least one inch in diameter occur within 100 feet of the Proposed Project/Action.
Vascular Plants					
<i>Astragalus tener</i> var. <i>ferrisiae</i> Ferris's milk-vetch	--	--	1B.1	Vernally mesic meadow and seeps, and sub alkaline flats in valley and foothill grasslands. 5-75 meters elevation./ April – May.	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Atriplex cordulata</i> Heartscale	--	--	1B.2	Chenopod scrub, alkali seasonal wetlands, and grassland. Often found in the sandy soils of alkaline flats and scalds in the Central Valley. Blooms Apr-Oct.	Unlikely. No suitable habitat within the immediate vicinity of the project site.

**TABLE 3-1
SPECIAL STATUS SPECIES THAT MAY OCCUR IN THE PROJECT AREA**

Scientific Name Common Name	Federal Status	State Status	CNPS Listing	Habitat Description / Blooming Period	Potential to Occur in the Action Area
<i>Atriplex depressa</i> Brittlescale	--	--	1B.2	Chenopod scrub, valley and foothill grasslands, meadows and seeps / May – October.	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Atriplex joaquiniana</i> San Joaquin saltbrush	--	--	1B.2	Chenopod scrub, valley and foothill grasslands, meadows and seeps / April – October.	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Atriplex minuscula</i> Lesser saltscale	--	--	1B.1	Annual herb occurring in chenopod scrub, playas, and in valley and foothill grassland with sandy, alkaline substrate. Found at 15-200 meters elevation. Blooms May-Oct.	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Atriplex persistens</i> Vernal pool smallscale	--	--	1B.2	Found in alkaline vernal pools. Blooms Jun-Oct. 10-115 m elevation.	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Atriplex subtilis</i> Subtle orache	--	--	1B.2	Valley and foothill grassland up to 400 feet in elevation.	Unlikely. Project is outside of known species range. No records of species occurrence within Sutter County.
<i>Brasenia schreberi</i> Watershield	--	--	2.3	Freshwater marshes and swamps. 30-2200 m elevation. Blooms June – September.	Unlikely. No suitable habitat within the immediate vicinity of the project site. No records of species occurrence within Sutter County.
<i>California macrophylla</i> Round-leaved filaree	--	--	1B.1	Valley grasslands and foothill woodlands, 0-3937 feet in elevation. / March – May.	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Castilleja rubicundula</i> ssp. <i>rubicundula</i> Pink creamsacs	--	--	1B.2	Annual herb occurring in open areas of chaparral, in cismontane woodland, in meadows and seeps, and on serpentinite substrate in valley and foothill grassland. Found at 20-900 m elevation. Blooms Apr-Jun.	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Centromadia parryi</i> ssp. <i>parryi</i> Pappose tarplant	--	--	1B.2	Vernally mesic, often alkaline sites in coastal prairies, meadows and seeps, coastal salt marshes, and valley and foothill grasslands. 2-420m.	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Chloropyron palmatum</i> Palmate-bracted bird's-beak	FE	CE	1B.1	Chenopod scrub, valley and foothill grassland, often alkaline sites.	Unlikely. No suitable habitat within the immediate vicinity of the project site. No records of species occurrence within Sutter County.
<i>Cuscuta obtusiflora</i> var. <i>glandulosa</i> Peruvian dodder	--	--	2.2	Freshwater marshes and swamps at 15-280 meters. Blooms July – October.	Unlikely. No suitable habitat within the immediate vicinity of the project site. No records of species occurrence within Sutter County.
<i>Hibiscus lasiocarpus</i> var. <i>occidentalis</i> Rose mallow	--	--	1B.2	Marshes and freshwater swamps / June – September.	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Lasthenia glabrata</i> ssp. <i>coulteri</i> Coulter's goldfields	--	--	1B.1	Annual herb occurring in coastal salt marshes and swamps, playas, and vernal pools. 1-1220 m elevation. / February – June.	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Layia septentrionalis</i> Colusa layia	--	--	1B.2	Annual herb occurring in chaparral, cismontane woodland, and valley and foothill grassland on sandy, serpentine substrate. 100-1095 m elevation / April –May.	Unlikely. No suitable habitat within the immediate vicinity of the project site.

**TABLE 3-1
SPECIAL STATUS SPECIES THAT MAY OCCUR IN THE PROJECT AREA**

Scientific Name Common Name	Federal Status	State Status	CNPS Listing	Habitat Description / Blooming Period	Potential to Occur in the Action Area
<i>Navarretia leucocephala</i> ssp. <i>bakeri</i> Baker's navarretia	--	--	1B.1	Annual herb occurring in cismontane woodland, lower montane coniferous forest, meadows and seeps, Valley and foothill grassland, and vernal pools / May – July.	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Silene verecunda</i> San Francisco campion	--	--	1B.2	Perennial herb occurring in coastal bluff scrub, chaparral, coastal prairie, coastal scrub, and in Valley foothill grassland in sandy substrate. 30-645 m elevation / March – June (uncommon in August).	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Trichocoronis wrightii</i> var. <i>wrightii</i> Wright's Trichocoronis	--	--	2.1	Primarily associated with alkali floodplains of the San Jacinto River in association with Willows, Domino, and Traver soils.	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Wolffia brasiliensis</i> Brazilian watermeal	--	--	2.3	Shallow freshwater marshes and swamps at 30-100 meter elevation. Blooms April to December.	Unlikely. No suitable habitat within the immediate vicinity of the project site.

SOURCE: USFWS (12/2011), CDFG (12/2011), CNPS (12/2011).

Notes:

The "Potential for Effect" category is defined as follows:

Unlikely:	The project site and/or immediate area do not support suitable habitat for a particular species. Project site is outside of the species known range.
Low Potential:	The project site and/or immediate area only provide limited habitat for a particular species. In addition, the known range for a particular species may be outside of the Proposed Project/Action Area.
Moderate Potential:	The project site and/or immediate area provide suitable habitat for a particular species.
High Potential:	The project site and/or immediate area provide ideal habitat conditions for a particular species.

Species that have medium or high potential to be impacted by the proposed project are shown in boldface type.

STATUS CODES:

FEDERAL:

FE	=	Listed as "endangered" under the federal Endangered Species Act
FT	=	Listed as "threatened" under the federal Endangered Species Act
FSC	=	NMFS designated "species of concern"
FPD	=	Proposed delisted
FD	=	Delisted

STATE:

CE	=	Listed as "endangered" under the California Endangered Species Act
CT	=	Listed as "threatened" under the California Endangered Species Act
CSC	=	California Department of Fish and Game designated "species of special concern"
CFP	=	California Department of Fish and Game designated "fully protected"
WL	=	California Department of Fish and Game designated "watch list"

CNPS:

List 1B	=	Plants rare, threatened, or endangered in California and elsewhere
List 2	=	Plants rare, threatened, or endangered in California, but more common elsewhere
List 3	=	Plants about which we need more information--a review list
List 4	=	Plants of limited distribution--a watch list

North American Green Sturgeon

Sturgeon are an anadromous fish species, spending the majority of their life in marine waters and then moving into freshwater throughout the fall and winter to spawn in the spring. Upon hatching the young green sturgeon develop in the fresh water and are known to return to the ocean within one to four years (COSEWIC, 2004). Historically, green sturgeon were found in the lower reaches of the San Joaquin River and Delta. Today, they occur in the upper Sacramento River and tributaries to the Sacramento River including the Feather, Yuba and American Rivers. Green sturgeon are frequently caught along the coast; but are present in limited numbers in the estuaries (COSEWIC, 2004).

Green sturgeon have diverse habitat needs ranging from freshwater streams, rivers, estuarine habitat as well as marine waters depending upon their life stage. The specific habitat requirements for green sturgeon are poorly understood but are thought to resemble those of white sturgeon. Green sturgeon spawning is thought to occur in deep pools in areas of large cobbles, but can range from clean sand to bedrock in turbulent river mainstems. The larger eggs and higher growth rates of developing green sturgeon in comparison to white sturgeon suggest that a higher oxygen demand may be required for proper embryonic development. Therefore, green sturgeon may subsequently require colder, cleaner water for spawning relative to white sturgeon (COSEWIC, 2004).

On April 7, 2006, National Oceanic and Atmospheric Administration /U.S. National Marine Fisheries Service (NMFS) listed the Southern Distinct Population Segment (DPS) of the North American green sturgeon as threatened. Final Critical Habitat for the green sturgeon was designated on October 9, 2009.

Central Valley Steelhead

The Sacramento and San Joaquin Rivers offer the only migration route to the drainages of the Sierra Nevada and southern Cascade mountain ranges for steelhead. Information on migration and spawning tendencies of steelhead is difficult to determine due to the low abundance of spawners and the high flows and turbid waters occurring during winter spawning periods. NMFS reports limited data on the recent abundance of this evolutionarily significant unit (ESU), but its present total run size based dam counts, hatchery returns, and past spawning surveys is probably less than 10,000 fish (NMFS, 1996). The most widespread run type of steelhead is in the winter (ocean-maturing) steelhead. Winter steelhead occurs in essentially all coastal rivers in California, while summer steelhead is far less common. In California, both winter and summer steelhead generally begin spawning in December. Spawning occurs December through April in the Sacramento River mainstem and tributaries. Eggs are buried by the females in the loose gravel, usually at the lower end of a pool. Newly hatched larvae initially stay in the gravel nesting area until their yolk sacs are absorbed (about two weeks) and then move into adjacent shallow and quiet pools. Juvenile steelhead remain in freshwater streams from one to three years before entering the ocean. Downstream migration predominantly occurs during fall and spring. Generally, steelhead will return to their natal streams in one to three years.

Adult steelhead typically migrate upstream within the Sacramento River during the winter (November - January) to spawning areas upstream of the proposed diversion location and juvenile smolts migrate downstream during the spring (March – May). Steelhead inhabit the upper Sacramento River and occur seasonally in the vicinity of the proposed diversion location. Within the immediate vicinity of the Proposed Project/Action, there is limited quality juvenile rearing habitat (riverine aquatic habitat) in the Sacramento River. Areas of shaded riverine aquatic are most likely to provide rearing habitat. Riparian habitat occurring along the river banks in the area provides more suitable rearing opportunities, and is located at the existing Drexler Diversion and west of the Grimes canal within the Action Area.

On September 2, 2005, NMFS issued the final designated critical habitat for Central Valley steelhead. The project area is located within the Colusa Basin Hydrologic Unit (5520) of Critical habitat for Central Valley steelhead. This unit includes the Sacramento River upstream to and including: Tisdale Bypass, Butte Creek, Butte Slough, Nelson Slough, Sacramento Slough, Sutter Bypass, Colusa Bypass, Little Chico Creek, and Little Dry Creek.

Central Valley Spring-Run Chinook Salmon

Chinook salmon runs (fall-run, late fall-run, winter-run, and spring-run) are named for the time of season that upstream spawning migration occurs, and are defined by the combined timing of adult migration, the amount of time juveniles reside in a stream, and the time of year the smolts migrate out to sea. Timing of adult upstream migration varies within individual runs depending upon the region (Yoshiyama, 1998). Central Valley spring-run Chinook enter the Sacramento River system from March to July, and spawning occurs from late August through early October (Yoshiyama, 1998). Due to the longer period of time between upstream migration and spawning, spring-run Chinook must hold out in the cold temperatures of mountain headwaters to avoid excessive summertime temperatures of the valley and foothills. Spring-run ascent to mountain elevations can only be accomplished if there are no obstructions within the drainage system preventing passage.

Life histories (migration, holding, spawning, rearing, and juvenile emigration) of Chinook salmon vary within the separate runs, but essential habitat requirements including substrate, temperature, dissolved oxygen, stream flow, and water quality are consistent throughout the runs. Chinook salmon require a water temperature from 43° to 56° F to successfully spawn (Boles, 1988). Spawning can occur in habitats ranging from small tributaries to large river beds, and generally requires coarse gravel riffles. Chinook salmon eggs incubate in the gravel for approximately 35 to 50 days, depending on the temperature. The newly emerged fry remain in the gravel until most of the yolk sac is absorbed.

Successful rearing of juvenile Chinook requires cool streams/rivers with significant vegetative cover providing shade for protection from predation. Emigration strategies within the Sacramento-San Joaquin system can vary depending on the time of emergence. Spring-run emigration timing is dependant upon the tributaries of origin, and can occur through the period of November through June. Based upon Butte Creek research conducted by CDFG, over 95% of spring-run emigrate as

fry/young-of-the-year. Only a small portion of the population will over-summer emigrating the subsequent fall as yearlings (McReynolds et al., 2006).

Sacramento River Winter-Run Chinook Salmon

Winter-run Chinook salmon generally begin migrating upstream from December through February and hold-over in the river system (Sacramento River) for a couple of months before peak spawning occurs between May and July (Groot 1998). Temperatures must be suitable for the winter-run to hold over. Winter-run Chinook emigration to the Delta has been known to occur from November through April, after only four to seven months of river life (Groot, p. 319, 1998). Juveniles may exhibit a sustained residence in the middle or lower Sacramento River or Upper Delta prior to seaward migration.

Adult winter-run typically migrate to spawning areas upstream of the proposed diversion location, and occur seasonally in the vicinity of the proposed diversion location. In the immediate vicinity of the proposed new diversion location, suitable winter-run Chinook rearing habitat does not occur.

Critical habitat for the endangered Sacramento River winter-run Chinook ESU was designated on June 16, 1993. Critical habitat is designated to include the Sacramento River from Keswick Dam, Shasta County (River Mile 302) to Chipps Island (River Mile 0) at the westward margin of the Sacramento-San Joaquin Delta, all waters from Chipps Island westward to Carquinez Bridge, including Honker Bay, Suisun Bay, and Carquinez Strait, all waters of San Pablo Bay westward of the Carquinez Bridge, and all waters of San Francisco Bay (north of the San Francisco/Oakland Bay Bridge) from San Pablo Bay to the Golden Gate Bridge. Major river basins containing spawning and rearing habitat for this ESU comprise approximately 9,329 square miles in California.

Adult winter-run typically migrate to spawning areas upstream of the proposed diversion location, and occur seasonally in the vicinity of the proposed diversion location. In the immediate vicinity of the proposed new diversion location, suitable winter-run Chinook rearing habitat does not occur.

Giant Garter Snake

Giant garter snake preys primarily on aquatic species such as fish and amphibians. Generally active from April through September, the giant garter snake breeds from March into May, and again briefly in September. Young are brooded internally by females, who give birth to 10 to 46 (average is 23) live young from late July into September. Young disperse into dense cover and reabsorb their yolk sacs, then begin feeding on their own. They reach sexual maturity in three to five years. From early October to April, the giant garter snake takes refuge in winter retreats and is generally not active (USFWS, 1999).

The giant garter snake is endemic to wetlands of California's Central Valley. This snake inhabits irrigation and drainage canals, rice lands, marshes, sloughs, ponds, small lakes, low-gradient streams, and adjacent uplands. The snake requires enough water during their active season to maintain high densities of prey; emergent wetland vegetation for cover and foraging; and adjacent uplands and

openings in streamside vegetation for basking sites. Higher uplands are used for cover and refuge from floodwaters during their non-active season. The giant garter snake is typically absent from wetlands with sand, gravel, or rock substrates, and from riparian woodlands.

The giant garter snake population was probably always disjunct, with a southern population occurring from the vicinity Buena Vista Lake in Kern County to Merced County, and a northern population occurring from San Joaquin County to Butte County. To the east and west, the populations were probably confined by the foothills of the Sierra Nevada Mountains and the Coast Ranges. There are 13 separate populations presently recognized by the USFWS, coinciding with historic flood basins and tributary streams in the Central Valley (USFWS, 1999). These populations are discontinuously distributed from the Fresno area in the south to Butte Creek in the north. Dispersal corridors do not exist between the populations.

Giant garter snakes have been recorded in one location near the Proposed Project/Action Area. The record dates back to 1983 and is approximately six miles southwest of the Proposed Project/Action Area (CNDDDB, 2011). No giant garter snakes were observed during field reconnaissance for this project; however, given the cryptic and evasive nature of this species, determination of presence more often relies on the habitat characteristics, the most current information about the extant range of the species, surrounding locality records, and the biology and ecology of the giant garter snake.

Agricultural land use within the region generally provides suitable giant garter snake habitat, with abundant rice fields and associated irrigation ditches, rodent burrows for upland refugia, and open upland areas for basking. Within the project area, there are several types of drainage ditches that border various types of crops and in rice fields as well. Available emergent or aquatic vegetation for cover and basking varies with each ditch, the season, and the operations of MFWC. Also, installation of fish screens may reduce available fish prey for the giant garter snake by preventing fish entrainment into the irrigation system. Potential giant garter snake habitats are described in detail within the ASIP in **Appendix B (see ASIP Section 3.1.5)**. Within the Action Area, all habitats within 200 feet of suitable giant garter snake aquatic habitat are considered either aquatic or upland habitat for the snake. However, upland areas that are covered by a walled structure such as a building or more than 200 feet from suitable aquatic habitat are generally not considered suitable habitat for giant garter snake.

Western Burrowing Owl

Western burrowing owls inhabit open grasslands and shrub lands with perches and burrows. These owls eat mainly insects, with small mammals, reptiles, and birds making up a portion of the diet as well. For cover and breeding, old rodent burrows, as well as debris piles are used. The western burrowing owl generally breeds from March through August, peaking in April and May.

In the Proposed Project/Action vicinity, potential nest/burrow sites occur along the adjacent agricultural fields as well as the exposed banks and levees of the Sacramento River and drainage canals.

Cackling (=Aleutian Canada) Goose

The cackling goose is a small, island-nesting subspecies of the Canada goose. This subspecies nests on the Aleutian Islands and winters in the Central Valley where it forages in meadows, agricultural fields, pastures, and moist grasslands near open water (lakes and ponds) and wetlands. The cackling goose was federal-listed endangered in 1967 due to a severe decline in populations. Hunting and loss of migration and wintering habitat contributed to this species' decline, although the introduction of Arctic and red foxes to the breeding islands was the main reason for population decline. However, due to reintroductions of wild geese onto fox-free islands and other conservation efforts, populations of cackling goose have recovered from approximately 6,300 individuals in 1989 to 37,000 individuals in 1999 (Kraege, 2005). The cackling goose was reduced to federal-listed threatened status in 1989, and finally delisted in 2001 (FR 66:54, 15642-15656, March 2001). Monitoring of goose populations will continue for 5 years after delisting, as required by the Endangered Species Act to ensure full recovery of the species. The cackling goose is still protected under the Migratory Bird Treaty Act, and is a federal species of concern.

Within the Proposed Project/Action Area, suitable foraging habitat exists in the surrounding agricultural fields along the Sacramento River and the MFWC Service Area. The only occurrence in the CNDDDB (2011) is from 1978, documenting this species at Davis Ranch, 5 miles north of Grimes and within two miles of the MFWC service boundary.

Swainson's Hawk

The Swainson's hawk is a migratory raptor listed as threatened by the State of California, and federally as a species of special concern. It breeds in western North America and winters for the most part in South America. It nests in trees, usually in riparian areas, but forages over pasturelands and open agricultural fields. In the Central Valley it is associated with riparian corridors adjacent to field crops and grasslands and subsists largely on small mammals, especially California vole, California ground squirrel, and large insects. Suitable foraging habitat within an energetically efficient flight distance from active Swainson's hawk nests has been found to be of great importance. Because the prey base for Swainson's hawk is highly variable from year to year, depending on cycles of agriculture, rainfall, and other natural cycles, large acreages of potential foraging habitat must be allotted per breeding pair.

The decline of the species in the Central Valley has been associated with extensive reduction of Swainson's hawk habitat. Suitable foraging habitat is present within the Proposed Project/Action Area in agricultural fields, where populations of prey species are supported. Suitable nesting habitat occurs within the riparian woodland habitats adjacent with the Proposed Project/Action site. Large valley oak and cottonwood trees occur adjacent to the river on the bank opposite from the proposed intake structures and fish screens. The most recent CNDDDB (2011) occurrence for Swainson's hawk within the MFWC service boundary was observed in 1989 within riparian forest along the Sacramento River, approximately 0.5-mile north of Grimes. Within two miles of the MFWC service area, an active nest was observed in a strip of riparian forest on the north bank of the Sacramento River, east of Colusa. One active nest was observed in 2003, located on the west side of the Sacramento

River at Twenty Mile Bar, 2.3 miles north of Grimes. The active nest was approximately 0.5 miles south of the existing Drexler Diversion and Pumping Plant.

Osprey

The osprey is a migratory raptor that occurs in northern California from Cascade Ranges south to Lake Tahoe and along the coast south to Marin County. The osprey arrives in California around mid-March to early April and begins breeding activities until September. Ospreys use large trees, snags, and dead-topped trees in open forest habitats for cover and nesting. Nests are platforms of sticks located high above ground, sometimes reaching as much as 250 feet tall. Breeding population was estimated in 1975 at 350-400 pairs in Northern California; numbers of breeding pairs have increased in recent years (Zeiner et al., 1988-1990).

The osprey preys primarily on fish; sometimes mammals, birds, reptiles, amphibians, and invertebrates. This species require open, clear waters for foraging. Suitable foraging habitat includes rivers, lakes, reservoirs, bays, estuaries, and surf zones (Zeiner et al., 1988-1990).

In the general Proposed Project/Action Area there is potential for nesting along the banks of the Sacramento River. There are no CNDDDB occurrences of osprey within the MFWC service area.

Bank Swallow

The bank swallow is the smallest North American swallow, with a body length of about 4.75 inches. The bank swallow nests in colonies and creates nests by burrowing into vertical banks consisting of fine-texture soils. Bank swallows breed in California from April to August and spend the winter months in South America. Currently, bank swallows are locally common only in restricted portions of California where sandy, vertical bluffs or riverbanks are available for the birds to dig their burrows and nest in colonies. Most of California's remaining populations nest along the upper Sacramento River where it still meanders in a somewhat natural manner. In this alluvial plain, the river system provides suitable soil types and erosion needed for prime nesting habitat. Seventy-five percent of the State's population is concentrated on the banks of Central Valley streams, including several colonies on the Sacramento River.

Since 1900, the range of bank swallows in California has been reduced by approximately 50 percent largely attributed to habitat loss. The rip-rapping of natural stream banks is the single most serious, human-caused threat to the long-term survival of the bank swallow in California. Existing colonies and areas of potential habitat may be lost over the next several years if current planning is implemented. Rip-rap installed by the U.S. Corps of Engineers (Corps) under the Sacramento River Bank Protection Project has already affected almost 150 miles of Sacramento River bank since 1960. Additional rip-rap proposed under this project may result in extensive loss of essential, eroding bank habitat.

On the Sacramento River, bank swallow populations continue to decline. Based on an average occupancy rate of about 45 percent of all burrows dug into river banks, an estimated population of 13,170 pairs of bank swallows nested in Sacramento River habitats in 1986. In 1998 the population

reached its lowest level of 4,990 pairs and then rebounded dramatically in 1999 to 8,210 pairs regaining some habitat from which it was extirpated (in 1998) on the lower end of its Sacramento River range. The significance of the apparent turnaround may not be known for a few years if it continues. The 1999 result may be a beginning of an expanding population boom for the species or just a momentary upswing. Further monitoring will be necessary to determine the true population trend, if any. Currently, the status of the bank swallow is still considered declining (CDFG, 2000).

In the general Proposed Project/Action Area there is potential for nesting along the banks of the Sacramento River. The CNDDDB documents two occurrences of bank swallow within the MFWC service area. The most recent observation is from 1987; approximately 0.5-mile north of Grimes a colony of bank swallows was observed nesting in the river bank. There are three more observations, dated 1986-1987, of nesting colonies within two miles outside of the MFWC service area. The bank swallow prefers steep, open cliff-like banks for nesting. However, at the location of the proposed Meridian diversion and pumping plant, the shore slopes gradually up to the levee and is largely vegetated with annual grasses.

3.5 Cultural Resources

3.5.1 Prehistory

Central California archaeology has been described as a series of patterns. Fredrickson (1973) defines pattern as an essentially nontemporal, integrative cultural unit — the general life way shared by people within a given geographic region. Specifically, three such patterns which overlap somewhat in adjoining areas are recognized for central California: the Windmill, Berkeley, and Augustine Patterns.

The Windmill Pattern, which may represent the advent of early Penutian speaking populations extends from approximately 4,500 to 3,000 B.P. This pattern was focused primarily on the lower Central Valley and Delta regions and reflects the influence of a lacustrine or marsh adaptation. This economic stance may have preadapted them for the environment of the lower Sacramento-San Joaquin Valley and Delta and may have entered the region with this adaptation more or less fully developed.

The Berkeley Pattern extends roughly from 3,000 to 1,500 B.P. and became more widespread or at least more archaeologically visible than the antecedent complex. The Berkeley Pattern has a greater emphasis on the exploitation of the acorn as a staple. The Berkeley Pattern initially may represent the spread of proto Miwok and Costanoans, collectively known as Utians, from their hypothesized lower Sacramento Valley/Delta homeland.

The last complex in this sequence is the Augustine Pattern which extended temporally from circa 1,500 B.P. to European contact. Augustine initially appears to be largely an outgrowth of the Berkeley Pattern but may have become a blend of Berkeley traits with those carried into the state by the migration of Wintuan populations from the north (Moratto, 1984).

3.5.2 Ethnographic Background

The project area was once inhabited by the Patwin Indians, who held an extensive region within north-central California. Patwin territory included the lower portion of the west side of the Sacramento Valley west of the Sacramento River from about the location of the town of Princeton in the north to Benicia in the south (Kroeber, 1925). The Patwin were bounded to the north, northeast, and east by other Penutian-speaking peoples (the Nomlaki, Wintu, and Maidu, respectively), and to the west by the Pomo and other coastal groups. Within this large territory, the Patwin have traditionally been divided into River, Hill and Southern Patwin groups, although in actuality a more complex set of linguistic and cultural differences existed than is indicated by these three geographic divisions. Near the project area, the Patwin are believed to have reached the Carquinez/Suisun area by about 1,500 B.P. (Whistler, 1977; McCarthy, 1985).

As with most of the hunting-gathering groups of California, the “tribelet” represented the basic social and political unit. Typically, a tribelet chief would reside in a major village where ceremonial events were also typically held. The status of such individuals was inherited patrilineally among the Patwin, although village elders had considerable power in determining who actually succeeded to particular positions. The chief’s main responsibilities involved administration of ceremonial and economic activities. Such individuals often decided when and where various fishing, hunting or gathering expeditions would occur, and similarly made the critical decisions concerning the more elaborate ceremonial activities. He also played a central role in resolving conflicts within the community or during wars which occasionally broke out with neighboring groups. Apparently, a Patwin chief had more authority than his counterparts among many of the other central California groups (McKern, 1922; Kroeber, 1925).

The onslaught of Euro-American culture brought the end of Patwin culture. By 1871–72, when Stephen Powers surveyed the state gathering ethnographic information, the Patwin culture appeared to him to be virtually extinct.

3.5.3 Historic Setting

The first European to see the Sutter Buttes was Gabriel Moraga, a Spaniard trying to locate mission sites in 1808. Another Spaniard, Luis Arguello, led an expedition in 1817 to explore Northern California by water and called the Buttes *Los Picacho* or “the peaks.” He also named the Feather River *El Rio de las Plumas*, due to the quantities feathers he observed in the river. In 1828, the renowned mountain man Jedediah Smith trapped in the vicinity of the Buttes. It was in 1833 a brigade of French fur trappers from the Hudson Bay Company first referred to these mountains as the “buttes.” This group is purportedly responsible for the introduction of the small pox virus to the Native American population. This had a decimating effect on the local indigenous populations (Sutter County, 1996).

The town of Meridian was founded in 1852 by Lewis O’Neill who built a crude cabin to the south of present-day Main Street. In 1857, a settler named John F. Fouts came to Meridian and, in 1860, established a ferry over the Sacramento River. By 1862, the settlement became known as Fout’s

Ferry. “However, W. C. Smith arrived and the growing town was renamed Meridian, being barely one-fourth mile from the Meridian Line of the U.S. Survey of California, which stretches from Mt. Diablo baseline through the Sacramento Valley. In 1879 there were 120 residents of the town which was a regular stop for the stage and mail pick-up station between Marysville and Colusa which continued through the early 1900’s with the addition of the Sacramento Northern Railroad line. Meridian was also the center for riverboats to load and unload cargo for the rich farming area” (Sutter County, 1996).

The Sacramento Valley remained relatively isolated and sparsely populated until the advent of the Gold Rush period. But, with Sacramento’s proximity to mining areas, and its accessibility to maritime traffic, the area quickly became a trading and economic center. Sutter County itself experienced little mining, but was attractive for its agricultural potential and was primarily settled by former miners who became interested in agriculture after 1860. The burgeoning commerce along the Sacramento River encouraged continued population growth, with many of the miners and farmers settling along the natural levees of the Sacramento River. The settlements recognized that the active flood plain deposited fertile soils in the lands nearest to the river, which supported bountiful crops and provided easy access to transportation corridors along the river itself. When floods continued to beset agricultural activities in the area, a comprehensive flood control plan was designed and implemented by 1912 and irrigation projects were initiated and continue to the present time.

3.5.4 Known Cultural Resources

The effort to identify cultural resources in the area of the Proposed Project/Action included a cultural resources records search, contacts with Native Americans, and a field reconnaissance conducted by Registered Professional Archaeologists. The records search, which consisted of a review of all pertinent survey and site data was conducted at the Northeast Information Center at California State University, Chico on April 7, 2004 (IC File # D04-20). The records were accessed by utilizing the Meridian and Grimes USGS 7.5-minute quadrangle maps, T14N, R1E; T15N, R1E; and T15N, R1W in Sutter County. The review included the Proposed Project/Action footprint (proposed pump locations, existing pump locations, and proposed pipelines and canals) as well as a ¼ mile around the Proposed Project/Action locations. The records search included a review of the Directory of Properties in the Historic Property Data File for Sutter County for information on sites of recognized historical significance within the National Register of Historic Places, the California Register of Historic Resources, the California Inventory of Historic Resources (1976), the California Historical Landmarks (1996), and the California Points of Historical Interest (1992). The records search indicated that no archaeological or historical resources have been previously recorded within the boundaries of the Proposed Project/Action, but that most of the area has not been previously inspected for the presence of these resources. The records search also indicated that one historical resource (the Meridian Railroad Depot) has been recorded within ¼ mile of the Proposed Project/Action.

The Native American Heritage Commission was contacted on March 11, 2004 and again on November 7, 2007 to request a search of their Sacred Lands File and for a list of Native Americans that should be contacted concerning the Proposed Project/Action. A letter was sent to each individual

or organization on the list on March 26, 2004 and again in November, 2007. To date, no responses have been received.

An archaeological field inspection of the project area was conducted on May 7, 2004 by two ESA Registered Professional Archaeologists. The surface of the locations of proposed pump facilities, existing pump facilities that would be removed, and proposed pipeline and canal alignments were inspected using systematic survey transects spaced approximately 10 to 15 meters apart. Segments of the existing canal that will be rehabilitated were inspected using cursory survey techniques.

The cultural resources field reconnaissance conducted for the Proposed Project/Action resulted in the identification of no potentially significant historical or archaeological resources in the project area. A small, concrete-lined irrigation canal extending south from the existing Meridian pumping facility was noted. Although an exact date of construction of this canal is not known, available information indicated that it was built in 1964 (Hargrove Personal Communication) and is not yet 50 years old. Other existing facilities that were examined included the existing Meridian pumping facility, also built in 1964; the existing Drexler pumping facility, a minimal structure which was moved to its present location; and the existing Grimes pumping facility, also a minimal structure that has been modified several times since its original construction in the 1920s. No archaeological remains were identified as a result of the field reconnaissance.

On January 23, 2008, Reclamation initiated National Historic Preservation Action (NHPA) Section 106 Consultation with the California State Historic Preservation Officer (SHPO). Reclamation concluded that both Phase 1 and Phase 2 of the Proposed Project/Action would not result in an affect to historic properties. On February 5, 2008, SHPO concurred with these findings (Appendix C).

3.6 Geology, Soils, and Seismicity

Published geologic mapping indicates that the project area is underlain by Quaternary age natural levee and river deposits within the floodplain of the Sacramento River. No faults are shown on published mapping to pass through the project area. The nearest mapped faults are the Coast Ranges-Sierran Block Boundary Zone (or Great Valley fault) to the west and elements of the Foothill fault system to the east. The project area is within Seismic Zone 3 and peak ground acceleration is anticipated to be 0.14g with 10 percent chance of exceedance in 50 years (MWH, 2008).

Soils encountered in the test borings consist mostly of clay with silty and sandy zones – identifiable with Sacramento River basin deposits. The consistency of these soils is typically soft to stiff with relatively common zones of very soft consistency and one occasion of “hard” materials. In sandy zones, native soils were found to be persistently very loose. Soils along the project area are considered adequately stable and capable of supporting the proposed improvements. No site specific geologic hazards (landslides, active faults, etc.) are indicated. The primary geotechnical considerations for design and construction are expected to include shallow groundwater and the potential compressibility, low strength and shrink/swell characteristics of native soils (MWH, 2008).

3.7 Greenhouse Gas Emissions/Climate Change

Gases that trap heat in the atmosphere are referred to as greenhouse gases (GHGs) because they capture heat radiated from the sun as it is reflected back into the atmosphere, similar to a greenhouse. The accumulation of GHGs has been implicated as a driving force for Global Climate Change. Definitions of climate change vary between and across regulatory authorities and the scientific community, but in general can be described as the changing of the earth's climate caused by natural fluctuations and the impact of human activities that alter the composition of the global atmosphere. Both natural processes and human activities emit GHGs. Global Climate Change is a change in the average weather on earth that can be measured by wind patterns, storms, precipitation and temperature. Although there is disagreement as to the speed of global warming and the extent of the impacts attributable to human activities, the vast majority of the scientific community now agrees that there is a direct link between increased emission of GHGs and long term global temperature. Potential global warming impacts in California may include, but are not limited to, loss in snow pack, sea level rise, more extreme heat days per year, more high ozone days, more large forest fires, and more drought years. Secondary effects are likely to include a global rise in sea level, impacts to agriculture, changes in disease vectors, and changes in habitat and biodiversity. GHG impacts are considered to be exclusively cumulative impacts; there are no non-cumulative GHG emission impacts from a climate change perspective (California Air Pollution Control Officers Association, 2008).

Carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O) are the principal GHGs, and when concentrations of these gases exceed natural concentrations in the atmosphere, the greenhouse effect may be enhanced. CO₂, CH₄ and N₂O occur naturally, but are also generated through human activity. Emissions of CO₂ are largely by-products of fossil fuel combustion, whereas CH₄ results from off-gassing associated with agricultural practices and landfills. Other human generated GHGs, which have much higher heat-absorption potential than CO₂, include fluorinated gases such as hydrofluorocarbons (HFCs), perfluorocarbons (PFC), and sulfur hexafluoride (SF₆) which are byproducts of certain industrial processes. The effect each GHG has on climate change is measured as a combination of the volume of its emissions, and its global warming potential (GWP),¹ and is expressed as a function of how much warming would be caused by the same mass of CO₂. Thus, GHG emissions are typically measured in terms of pounds or tons of CO₂e.

3.8 Hazards/Hazardous Materials

Information about hazardous materials sites in the Proposed Project Area was collected by conducting a review of the California Environmental Protection Agency's (Cal EPA) Cortese List Data Resources (Cortese List). The Cortese list includes the following data resources that provide information regarding the facilities or sites identified as meeting the Cortese list requirements: the list of Hazardous Waste and Substances sites from Department of Toxic Substances Control (DTSC) EnviroStor database; the list of Leaking Underground Storage Tank (LUST) sites from GeoTracker database; the list of solid waste disposal sites identified by Water Board; the list of active Cease and

¹ The potential of a gas or aerosol to trap heat in the atmosphere.

Desist Orders and Cleanup and Abatement Orders from Water Board; and the list of hazardous waste facilities subject to corrective action pursuant to Section 25187.5 of the Health and Safety Code identified by DTSC. The Cortese List is a reporting document used by the state, local agencies, and developers to comply with CEQA requirements in providing information about the location of hazardous materials release sites. The Cortese List is updated at least annually, in compliance with California regulations (California Code Section 65964.6(a)(4)). The Cortese List includes federal superfund sites, state response sites, non-operating hazardous waste sites, voluntary cleanup sites, and school cleanup sites.

Only one open site was found within one mile of the Proposed Project/Action. The site is listed as inactive. Potential contaminants of concern are listed as: other inorganic/salt. Two other sites listed sites were related to leaking underground storage tanks (LUST); however, cleanup has been completed and the cases are now closed (DTSC, 2011).

3.9 Hydrology and Water Quality

MFWC received a License (No. 4676-B) from the State of California, State Water Rights Board in 1955 to divert water from the Sacramento River under the provisions of a License for Diversion and Use of Water. This license recognizes a priority date of September 10, 1918. The License, as amended in 1992, provides for the irrigation on approximately 9,150 acre service area, and allows for a diversion flow of 138 cfs from a period of about March 1 through about November 1. Historical monthly diversion usage for MFWC for the years 1982 to 2000 based upon the Water Account Record data as recorded by Reclamation indicate that diversion demands reach levels of 165 cfs on a short-term basis primarily due to the need to accommodate flood-up deliveries for rice fields and to meet peak short-term demands.

MFWC diverts water from the Sacramento River under the terms of a Contract for Project Water Service and Agreement on Diversion Water (Contract No. 14-06-200-838A) with Reclamation. The contract with Reclamation provides MFWC with a total annual water supply of 35,000 af, consisting of 23,000 af base supply and 12,000 af project water supply.

Surrounding land uses largely affect surface water quality, with both point-source and nonpoint-source discharges contributing contaminants to surface waters. A majority of the surrounding land area consists of agricultural land, vineyards and a small residential community to the south. Pollutant sources in residential areas include streets, roof tops, exposed earth at construction sites, automobiles and landscaped areas. Water quality impacts from construction are of particular concern. Grading for construction activity removes vegetation and exposes soil to erosion from wind and water. Erosion can result in sedimentation that ultimately flows into surface waters. Other contaminants in urban runoff include sediment, hydrocarbons, metals, pesticides, bacteria, and trash. Runoff from agricultural areas is characterized by constituents such as fertilizers, herbicides, and pesticides, and often contains bacteria, high nutrient content and dissolved solids.

3.10 Land Use and Land Use Planning

As depicted in **Figure 1-1** in Section 1, the project area is located in unincorporated Sutter County, between Interstate 5 and Highway 99, east of the Sacramento River and southwest of the Sutter Bypass. The overall project area covers the MFWC service areas near Meridian, Grimes, and Drexler. Access to the project area is provided via State Route (SR) 20 (see **Figure 2-1**). The Sacramento River depicts the western edge of the project area. Land use to the east of the Sacramento River is predominantly agricultural with scattered rural residences (see **Figure 2-1**). Denser residential clusters are located in the vicinities of Meridian and Drexler. The closest recreational facility to the Proposed Project/Action is Lovey's Landing located 2.7 miles north of Meridian on Levee Road along the Sacramento River. It provides recreational facilities including a boat launch ramp and RV campground (Sutter County General Plan, 2008).

3.11 Mineral Resources

The Sutter County Surface Mining Code and the Zoning Code provide for the extraction of mineral resources from unincorporated lands. The extraction of mineral resources in Sutter County has historically been limited to the extraction of clay, sand, soils, and rock. Construction aggregate, consisting primarily of sand, gravel, and crushed stone, is currently the County's main mining resource. No active mining operations are within the project area (Sutter County, 2008).

3.12 Noise and Vibration

Noise

Sound is mechanical energy transmitted by pressure waves through the air. Noise can be defined as unwanted sound. Sound is characterized by various parameters that include the rate of oscillation of sound waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude). In particular, the sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound level. The decibel (dB) scale is used to quantify sound intensity. Since the human ear is not equally sensitive to all frequencies within the entire spectrum, noise measurements are weighted more heavily within those frequencies of maximum human sensitivity in a process called "A-weighting," referred to as dBA. In general, a difference of more than three dBA is a perceptible change in environmental noise, while a five dBA difference typically causes a change in community reaction. An increase of 10 dBA is perceived by people as a doubling of loudness (USEPA, 1974).

Cumulative noise levels from two or more sources will combine logarithmically, rather than linearly. For example, if two identical noise sources produce a noise level of 50 dBA each, the combined noise level would be 53 dBA, not 100 dBA.

Time variation in noise exposure is typically expressed in terms of the average energy over time (L_{eq}), or alternatively, as a statistical description of the sound level that is exceeded over some fraction of a given period of time. For example, the L_{50} noise level represents the noise level that

is exceeded 50 percent of the time – half the time the noise level exceeds this level and half the time the noise level is less than this level. This level is also representative of the level that is exceeded 30 minutes in an hour. Similarly, the L_8 and L_{25} represent the noise levels that are exceeded eight and 25 percent of the time, respectively, or for five and 15 minutes during a 1-hour period, respectively.

Several methods have been devised to relate noise exposure over time to human response. The Day-Night Noise Level (L_{dn}) is a 24-hour L_{eq} that adds a 10 dBA penalty to sounds occurring between 10 PM to 7 AM to account for the increased sensitivity to noise events that occur during the quiet late evening and nighttime periods. A commonly used noise metric for this type of study is the Community Noise Equivalent Level (CNEL). The CNEL, originally developed for use in the California Airport Noise Regulation, adds a five dBA penalty to noise occurring during evening hours from 7 PM to 10 PM, and a 10 dBA penalty to sounds occurring between the hours of 10 PM and 7 AM to account for the increased sensitivity to noise events that occur during the quiet late evening and nighttime periods. Thus, the CNEL noise metric provides a 24-hour average of A-weighted noise levels at a particular location, with an evening and a nighttime adjustment, which reflects increased sensitivity to noise during these times of the day.

Vibration

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. There are several different methods that are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe vibration impacts to buildings. The root mean square (RMS) amplitude is most frequently used to describe the affect of vibration on the human body. The RMS amplitude is defined as the average of the squared amplitude of the signal. Decibel notation (Vdb) is commonly used to measure RMS. The decibel notation acts to compress the range of numbers required to describe vibration (FTA, 2006). Typically, groundborne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration. Man-made vibration issues are therefore usually confined to short distances (i.e., 500 feet or less) from the source. Sensitive receptors for vibration include structures (especially older masonry structures), people (especially residents, the elderly and sick), and vibration sensitive equipment. Fragile buildings can be exposed to ground-borne vibration levels of 0.5 PPV without experiencing structural damage. The FTA measure of the threshold of architectural damage for conventional sensitive structures is 0.2 in/sec PPV. The human annoyance response level is 80 RMS.

3.13 Public Services

The Sutter County Sheriff's Department has the responsibility for providing law enforcement services to the unincorporated county area as well as being contracted to provide service to the City of Live Oak. The CHP provides traffic enforcement on all highways and roadways in the unincorporated area. Additional law enforcement services are provided to the county through the

District Attorney's office. The Sutter County Sheriff's Department is authorized to staff 58 sworn deputies, 54 correctional officers, and 34 civilian staff (Sutter County, 2008).

The project area is within the Meridian Fire District, an independent district covering approximately 93 square miles providing fire protection to areas bounded by the Sacramento River, Tisdale Weir, Sutter Bypass and County Service Area-F. One fire station is located within this district. The Meridian Fire Station Number 65 is located in the community of Meridian and is a part time station staffed with 1 paid firefighter during the week. The station is supplemented with 18 or more volunteer firefighters during high fire season. Seven fire station vehicles are housed on site for use in the service area (Sutter County, 2008).

The project area lies within the Meridian Elementary School District. Elementary education (K-8) is provided for students within the district, at a single school. Following eighth grade, Meridian students attend middle school and high school in the Sutter Union High School District (Sutter County, 2008).

3.14 Recreation

The closest recreational facility to the project area is Lovey's Landing. The facility is approximately 2.7 miles north of Meridian on Levee Road along the Sacramento River. It provides recreational facilities such as a boat launch ramp and a RV campground (Sutter County General Plan, 2008). The Sacramento River provides for water recreation in the area.

3.15 Transportation and Traffic

State Routes 20, 99 and 113 provide regional access to the project area (Sutter County, 2008). State Route 20 is a two, four and six lane roadway which extends through Sutter County from Colusa County to Yuba County. This roadway is one of the two roadways that cross the Sacramento River in Sutter County. State Route 99 extends from the Sacramento County line north through Sutter County to the Butte County line. The roadway has two and four lanes over its length and provides regional access to the Sacramento metropolitan area in the south and the cities of Gridley and Chico in the north and beyond. State Route 113 within the county extends from the Yolo County line over the Sacramento River to SR 99 near the community of Tudor. This two-lane roadway is one of the two roadways that cross the Sacramento River in Sutter County. The project area is served locally by rural roadways. Rural Collectors typically serve intra-county rather than regional or statewide circulation needs. Their primary function is to provide access to adjacent properties and connections between rural local roads and other roadways that are higher in the classification hierarchy. Rural Local roads provide access to adjacent properties and distribute traffic to rural collectors. They differ from their urban counterparts in their design cross section and location.

3.16 Utilities and Service Systems

Potable water in the project area is provided by groundwater sources. The groundwater is pumped by privately owned wells. Groundwater supplies provide adequate supply; however, the quality of the groundwater supplies is at risk. Two areas within the project area have elevated levels of naturally occurring arsenic. The groundwater around Meridian also has elevated levels of iron and manganese. Sutter County is currently preparing a groundwater management plan that will help protect the County's groundwater resources. Wastewater within the project area is treated and disposed of through privately owned septic systems. Stormwater drainage is provided by open channel systems. Minor flooding may occur rarely and flood damage from local runoff to homes and other structures occurs very rarely. Solid waste services are provided by the Yuba-Sutter Regional Waste Management Authority. The Ostrom Landfill is the primary disposal site for the County and has enough capacity to remain open through 2066 (Sutter County, 2008). PG&E provides electrical and gas services with the project area.

3.17 Indian Trust Assets

Indian Trust Assets (ITAs) are legal interests in property rights held by the United States for Indian Tribes or individuals. Trust status originates from rights imparted by treaties, statutes, or executive orders. ITAs are lands, including reservations and public domain allotments, minerals, water rights, hunting and fishing rights, or other natural resources, money or claims. Assets include real property, physical assets, or intangible property rights. ITAs cannot be sold, leased, or otherwise alienated without Federal approval. ITAs do not include things in which a tribe or individuals have no legal interest, such as off-reservation sacred lands or archaeological sites in which a tribe has no legal property interest. There are no ITAs within the vicinity of the project area.

3.18 Environmental Justice and Socioeconomics

Executive 12898 requires each federal agency to achieve environmental justice as part of its mission, by identifying and addressing disproportionately high and adverse human health on environmental effects, including social and economic effects of its programs, policies, and activities on minority populations and low-income populations of the United States. The Proposed Project/Action would involve the construction and operation of a replacement diversion system that would help protect and enhance the anadromous fisheries in the Sacramento River and ensure that MFWC continues to divert water from Sacramento River for irrigation purposes without regulatory restrictions. The Proposed Project/Action does not propose any features that would result in adverse human health or environmental effects, have any physical effects on minority or low-income populations, and/or alter socioeconomic conditions of populations that reside or work in the vicinity of the project site.

SECTION 4

Initial Study

1. **Project Title:** Phase 2 Meridian Farms Fish Screen Project
2. **Lead Agency Name and Address:** CEQA Lead Agency
California Department of Fish and Game
629 Entler Ave. Suite 12
Chico, CA 95928
3. **Contact Person and Phone Number:** Tracy McReynolds at 530-895-5111
4. **Project Location:** The MFWC's fish screen project is located near the Town of Meridian in Sutter County, California (see Figure 1-1). The entire project covers areas east of the Sacramento River in the vicinity of the towns of Meridian, Grimes, and Drexel.
5. **Project Sponsor's Name and Address:** Meridian Farms Water Company
1138 4th Street
Meridian, California 95957
6. **General Plan Designation(s):** Agricultural, Rural Residential
7. **Zoning Designation(s):** Various

8. Description of Project:

The Proposed Project/Action includes the construction and operation of the following elements by the MFWC: (1) a new 135 cubic feet per second (cfs) diversion with fish screen and Pumping Plant adjacent to the existing Meridian Diversion; (2) increased capacity of the Main Canal to convey flows to the Drexler Service Area; (3) a new 35 cfs re-lift pump station to deliver flows to the Drexler Service Area via the new Drexler Pipeline; (4) extension of the Drexler Pipeline; (5) removal of the existing Meridian Diversion/Pumping Plant; (6) removal of the existing Drexler Pumping Plant; and (7) lining of approximately 2,500 feet of the Grimes Canal. A complete description of the Proposed Project/Action is included in Section 2.

9. Surrounding Land Uses and Setting.

The project area is located in Sutter County, California, between Interstate 5 and Highway 99 east of the Sacramento River and southwest of the Sutter Bypass. Predominant land uses include agricultural and rural residential uses.

10. Other public agencies whose approval is required (e.g., permits, financing approval, or participation agreement. Indicate whether another agency is a responsible or trustee agency.)

Detailed below are the other agencies that may require permits or approval prior to construction of the Proposed Project/Action.

**TABLE 4-1
ANTICIPATED REGULATORY REQUIREMENTS AND PERMITS
FOR PROJECT IMPLEMENTATION**

Agency	Type of Approval
Federal Agencies	
U.S. Bureau of Reclamation	NEPA Lead Agency, Funding Approval
U.S. Army Corps of Engineers	NEPA Lead Agency Clean Water Act Section 404 Permit Rivers & Harbors Act Section 10 Permit Federal Endangered Species Act compliance (Section 7)
U.S. Fish and Wildlife Service	Federal Endangered Species Act compliance (Section 7)
National Marine Fisheries Service	Federal Endangered Species Act compliance (Section 7)
State Agencies	
California Department of Fish & Game	State Endangered Species Act compliance Section 1601 Streambed Alteration Agreement Consistency Determination or Incidental Take Permit
Central Valley Flood Protection Board	Encroachment Permit
Central Valley Regional Water Quality Control Board	National Pollutant Discharge Elimination System General Construction Storm Water Permit (Section 402) Clean Water Act Section 401 Water Quality Certification General Order for Dewatering and Other Low Threat Discharge to Surface Waters Permit
State Historic Preservation Office	National Historic Preservation Act Section 106
Local/Other Agencies	
Feather River Air Quality Management District	Authority to Construct Permit to Operate
County of Sutter	Building Permit County Road Encroachment Permit

4.1 Environmental Checklist

This Environmental Checklist identifies the project-specific effects of the Proposed Project/Action, and whether or not those effects were adequately addressed in the 2008 Meridian Farms Fish Screen Project IS/MND EA/FONSI (2008 IS/EA). Consistent with CEQA Guidelines Section 15150, the 2008 IS/EA is incorporated by reference into this Environmental Checklist, including applicable environmental setting, impact analysis and mitigation measures.

This Environmental Checklist is based on the checklist suggested in Appendix G of the CEQA Guidelines. The checklist has also been adapted to assist in evaluating the environmental effects of the proposed project with respect to the analysis in the Phase 1 Meridian Farms Fish Screen Project IS/EA as well as specific NEPA topics related to Indian Trust Assets, Environmental Justice, and Socioeconomic Effects.

Each environmental issue includes a discussion applicable 2008 IS/EA mitigation measures; and discussion of environmental checklist items, including findings for potential project effects. The Environmental Checklist identifies potential project effects as corresponding to the following categories of environmental impacts:

- **Potentially Significant Impact.** Adverse environmental consequence that has the potential to be significant according to the threshold criteria identified for each resource, even after mitigation strategies are applied. This classification also applies to adverse effects that could be significant and for which no mitigation has been identified. If any potentially significant impacts are identified, an Environmental Impact Report (EIR) and/or an Environmental Impact Statement (EIS) must be prepared to meet CEQA and/or NEPA requirements, respectively.
- **Less-than-Significant Impact with Mitigation.** Adverse environmental consequence that has the potential to be significant, but can be reduced to less-than-significant levels through incorporation of mitigation measures adopted by the CDFG in the 2008 IS/EA. MFWC would ensure that construction and operation of the Proposed Project/Action would be implemented consistent with the mitigation, monitoring and enforcement requirements of the 2008 IS/EA Mitigation Monitoring and Reporting Program (MMRP) **AND/OR** new or modified mitigation measures would reduce potentially significant impacts to a less-than-significant level (Appendix A).
- **Less-than-Significant Impact.** Adverse environmental consequence has been identified; however, the level of significance does not meet or exceed the significance threshold for that resource.
- **No Impact.** No adverse environmental consequences have been identified for the resource or the consequences are negligible, undetectable and/or not applicable.

4.1.1 Aesthetics

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
1. AESTHETICS — Would the project:				
a) Have a substantial adverse effect on a scenic vista?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d) Create a new source of substantial light or glare which would adversely affect daytime or nighttime views in the area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion

- a) **Less-than-Significant Impact.** The proposed improvements for the Proposed Project/Action are not located in areas within local or state-designated scenic vistas. Additionally, as the Proposed Project/Action would entail the consolidation of existing water diversion structures, views along the Sacramento River would not substantially change following project construction. In this context, the Proposed Project/Action would not result in substantial adverse impacts to a scenic vista and the impact would be less than significant.
- b) **No Impact.** The proposed improvements for the Proposed Project/Action are not located in close proximity to a state-designated scenic highway. Review of the 2010 Sutter County General Plan and Department of Transportation's list of designated scenic highways indicates that there are no officially designated scenic highways in Sutter County (DOT, 2012). For this reason, the Proposed Project/Action would not damage any scenic resources within a state highway and no impact would occur.
- c) **Less-than-Significant Impact.** Construction equipment and activities would be visible from the Sacramento River during construction of the Meridian Diversion and during demolition of the existing Meridian Diversion and Drexler diversion. Construction equipment and activities would also be visible from rural roads and agricultural areas during construction of all project facilities. However, construction would occur over no more than two seasons, and aesthetics impacts associated with construction activities would be temporary and less than significant.
- Once completed, the new Meridian Diversion and Pumping Plant and Drexler re-lift Pumping Plant would be visible to the several residences located in the project vicinity. However, given that the project represents the consolidation of existing diversions structures, the overall visual character of the riverfront area of the project would experience a desired benefit. In this context, the Proposed Project/Action would not substantially degrade the existing visual character or quality of the project area and the impact would be less than significant.
- d) **No Impact.** Given that the project would not include the installation of any exterior lighting and that any new internal lighting would be comparable to existing conditions, impacts resulting from light and glare would be less than significant.
-

4.1.2 Agricultural and Forest Resources

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
2. AGRICULTURAL AND FOREST RESOURCES —				
In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board.				
Would the project:				
a) 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?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Result in the loss of forest land or conversion of forest land to non-forest use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion

- a) **Less-than-Significant Impact.** With exception of the town of Meridian, the entire land base within the project area is designated as Prime Farmland according to Important Farmland maps prepared by the Department of Conservation (DOC, 2011). Project facilities that could affect local agricultural lands include the proposed Meridian Diversion and Pumping Plant located to the north of the town of Meridian, the new Drexler re-lift Pumping Plant, and the Drexler pipeline extension. Construction of the land-side Meridian Pumping Plant north of the town of Meridian in the southwest corner of a walnut orchard may require removal of two to five trees. The Drexler re-lift Pumping Plant would be located at the edge of an agricultural parcel and the Drexler pipeline extension would cross a small portion of the agricultural land. However, the pipeline would be buried deep enough, where appropriate, so it would not preclude future agricultural activities. Other temporary construction related impacts to important farm land would be associated with materials staging areas. In these instances where temporary and permanent disruption to agricultural operations would occur, (MFWF) would compensate affected land owners in accordance with State and local laws and ordinances related to compensation for impacts to agricultural lands. As a result, the Proposed Project/Action would not result in the conversion of Prime Farmland to non-agricultural use and the impact would be less than significant.

- b) **No Impact.** The overall project area contains numerous agriculturally zoned properties as well as parcels listed under Williamson Act contracts. However, construction of permanent Proposed Project/Action facilities would be confined to existing disturbed facilities, including existing roadways, canal rights-of-way, and levees along the Sacramento River. For this reason, the Proposed Project/Action would not conflict with any existing Williamson Act Contracts and no impact would occur.
- c-e) **No Impact.** The Proposed Project/Action is not located in an area zoned as forest, timberland or used for timber production. Therefore, the Proposed Project/Action would not convert timber or forest lands to other uses or conflict with existing forest and timberland zoning. The Proposed Project/Action would continue to serve existing agricultural uses and would not result in the conversion of existing agricultural lands to non-agricultural use. As a result, there would be no conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use. No impact would occur.

4.1.3 Air Quality

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
3. AIR QUALITY —				
Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations.				
Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d) Expose sensitive receptors to substantial pollutant concentrations?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Create objectionable odors affecting a substantial number of people?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

The following mitigation measures from 2008 IS/EA were adopted by CDFG and would mitigate air quality impacts associated with implementation of the Proposed Project/Action. CDFG and MFWC would ensure that construction and operation of the Proposed Project/Action would be implemented consistent with the mitigation, monitoring and enforcement requirements for the 2008 IS/EA MMRP (See Appendix A).

2008 IS/EA MITIGATION MEASURES

Air Quality

AIR-1 Implement FRAQMND Best Available Mitigation Measures for Construction Activity

Discussion

- a) **Less-than-Significant Impact.** The project area is located near the center of the Sacramento Valley Air Basin (SVAB) and under the jurisdiction of the Feather River Air Quality Management District (FRAQMD). The SVAB is designated non-attainment for several ambient air quality standards established under the federal and state Clean Air Acts¹. Pollutants of particular concern in the project region include ozone² and respirable particulate matter (PM₁₀)³. Areas within the SVAB are designated as being in nonattainment for these standards during warmer times of the year when climatic conditions are favorable for their development.

The Proposed Project/Action would take place in an area for which ozone and PM₁₀ plans have been developed. These plans describe how the project area will achieve the national and state standards and how the area will continue to make progress towards achieving more stringent state standards. Based on the nature of the Proposed Project/Action, construction would not alter existing land use designations in the project area and would not facilitate any new growth not previously envisioned in the County's currently adopted General Plan. At the completion of the Proposed Project/Action, operational vehicle trips would be similar to existing conditions. Consequently, construction and operation of the Proposed Project/Action would not conflict with or obstruct implementation of any applicable air quality regulation, plan, or policy and the impact would be less than significant.

- b) **Less-than-Significant Impact with Mitigation.** Construction-related activities resulting from the Proposed Project/Action would result in emissions of air pollutants from construction equipment, truck exhaust, soil disturbance, and wind erosion. **Table 4-2** estimates the typical daily construction emissions for the project assuming a total of three work crews working simultaneously (e.g., trenching and one boring).

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- ¹ An "ambient air quality standard" represents the level of air pollutant in the outdoor (ambient) air necessary to protect public health. The Federal Clean Air Act (FCAA) requires the USEPA to identify National Ambient Air Quality Standards (national standards) to protect public health and welfare. National standards have been established for ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter, and lead. These pollutants are called "criteria" air pollutants because standards have been established for each of them to meet specific public health and welfare criteria.
- ² Ozone is a reactive pollutant, which is not emitted directly into the atmosphere, but is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving reactive organic gases (ROG) and oxides of nitrogen (NO_x). ROG and NO_x are precursor compounds for ozone. Significant ozone production generally requires ozone precursors to be present in a stable atmosphere with strong sunlight for approximately three hours.
- ³ "Respirable" particulate matter (PM₁₀) and "fine" particulate matter (PM_{2.5}) consist of particulate matter that is 10 microns or less in diameter and 2.5 microns or less in diameter, respectively (A micron is one-millionth of a meter). PM₁₀ and PM_{2.5} represent fractions of particulate matter that can be inhaled into the air passages and the lungs and can cause adverse health effects.

The air pollutants of primary concern during construction projects are generally particulate matter less than 10 microns (PM_{10}), fine particulate matter ($PM_{2.5}$) and oxides of nitrogen (NO_x). Reactive organic gasses (ROG) are generated by the use of gasoline-powered vehicles (and, to a lesser extent, diesel-fueled vehicles); however, this type of construction project is likely to generate only minor amounts of ROG. Diesel fuel would generate primarily NO_x emissions, but also ROG, PM_{10} and $PM_{2.5}$ in varying amounts depending largely on fuel oil grade and existing emission controls. PM_{10} and $PM_{2.5}$ represent fractions of particulate matter that can be inhaled into the air passages and the lungs and that can cause adverse health effects. Particulate matter in the atmosphere results from many kinds of dust- and fume-producing industrial and agricultural operations, grading and construction, and motor vehicle use. Some sources of particulate matter, such as wood burning in fireplaces, demolition, and construction activities, are more local in nature, while others, such as vehicular traffic, have a more regional effect. Very small particles of certain substances (e.g., sulfates and nitrates) can cause lung damage directly or can contain adsorbed gases (e.g., chlorides or ammonium) that may be injurious to health. Particulates also can damage materials and reduce visibility.

PM_{10} and $PM_{2.5}$ is less of a concern for linear projects, such as the Proposed Project/Action, within existing streets and canals and the minimal demolition expected during the dismantling of the existing diversions. Major PM_{10} problems generally occur during mass grading, when several acres of ground are simultaneously stripped bare of vegetation and thus are subject to wind erosion or disturbance from vehicles traveling on the site.

As shown in **Table 4-2**, the projected construction-related emissions for NO_x exceed significance thresholds established by the FRAQMD. Consequently, the FRAQMD will require implementation of its best available mitigation for construction activity to reduce impacts associated with NO_x to a less-than-significant level.

Earth moving and construction activities may also result in short-term localized increases in ambient concentrations of dust or Particulate Matter PM_{10} . As mentioned above, these dust emissions are expected to be minor, but would vary from day to day, depending on the level and type of activity, silt content of the soil, type of equipment used, and the prevailing weather. On days when construction would involve extensive site preparation activities, earth-moving activities, or during periods when these activities would occur when wind speeds are relatively high, construction dust could be substantial and could violate the state standard for PM_{10} without proper controls. Several residences are located adjacent to proposed construction areas and may experience visibility and nuisance effects associated with construction-related dust. However, implementation of the 2008 IS/EA Mitigation Measure AIR-1 would reduce impacts associated with construction air quality emissions to a less-than-significant level.

TABLE 4-2
ESTIMATED UNMITIGATED CONSTRUCTION-PHASE EMISSIONS FOR TRENCHING AND BORING
(POUNDS/DAY)

Pollutant	Maximum Daily Construction Scenario ^{a, b}			Significance Criteria ^c	
	1 Crew Trenching (pounds / day)	1 Crew Boring (pounds / day)	Total Emissions 2 Crew Trenching + 1 Crew Boring (pounds/day)	FRAQMD (pounds / day)	Significant? (Yes or No)
Reactive Organic Gases (ROG)	3	5	11	25	No
Nitrogen Oxides (NOx)	26	16	68	25	Yes
Particulate Matter (PM ₁₀) ^d	3	2	7	80	No

a Maximum daily construction scenario would involve no more than three construction crews (e.g., 2 trenching crews and 1 boring crew).

b Calculations based on street trenching and boring 1-crew daily totals.

c Significance criteria are from FRAQMD Air Quality Thresholds of Significance.

d No established significance criteria for PM_{2.5}.

SOURCE: Meridian Farms Water Company, 2007

- c) **Less-than-Significant Impact.** Operation of the the Proposed Project/Action would be similar to existing conditions however, with the operation of one less water diversion. Additionally, the new pumps are proposed to operate via electricity and would not lead to any cumulative increase of criteria air pollutant. As a result, implementation and operation of the Proposed Project/Action would not generate air emissions in excess of existing condition and therefore would not result in a cumulatively considerable net increase of any criteria pollutant. Thus, the impact would be less than significant.
- d) **Less-than-Significant Impact with Mitigation.** Residential areas tend to be sensitive areas for air pollution because residents (children and the elderly) tend to be at home for extended periods of time resulting in sustained exposure to any pollutants present. However, the Proposed Project/Action would be located in a predominately rural area with few sensitive receptors that could be exposed construction-related emissions. There is a residential neighborhood in the vicinity of the land-side pump station in Meridian, and a few residences in the proximity of the re-lift pump station in Drexler. Additionally, a few residences are interspersed along the Main Canal right-of-way. With the implementation of 2008 IS/EA Mitigation Measure AIR-1, construction of the Proposed Project/Action would not significantly affect local sensitive receptors and the impact would be less than significant.
- e) **No Impact.** Implementation of the Proposed Project/Action would not involve the storage and/or spreading of materials or involve activities such as prescribed burns or sewage treatment that would generate objectionable odors. Consequently, operation of the Proposed Project/Action would not generate any objectionable odors that would adversely affect sensitive receptors located near the proposed facility improvements and no impact would occur.

4.1.4 Biological Resources

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
4. BIOLOGICAL RESOURCES — Would the project:				
a) Adverse impact, either directly or through habitat modifications, any endangered, rare, or threatened species, as listed in Title 14 of the California Code of Regulations (Sections 670.2 or 670.5) or in Title 50, Code of Federal Regulations (Sections 17.11 or 17.12)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) 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 the California Department of Fish and Game or U.S. Fish and Wildlife Service?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
f) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
g) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

The following mitigation measures from 2008 IS/EA were adopted by CDFG and would mitigate biological resources impacts associated with implementation of the Proposed Project/Action. CDFG and MFWC would ensure that construction and operation of the Proposed Project/Action would be implemented consistent with the mitigation, monitoring and enforcement requirements for the 2008 IS/EA MMRP (See Appendix A).

2008 IS/EA MITIGATION MEASURES

Biological Resources	
BIO-1	Traffic Routing and Movement.
BIO-4	Timing of Construction.
BIO-6	Worker Awareness Training.
BIO-7	Install Snake Exclusion Fencing.
BIO-8	Provide Adequate Signage.
BIO-9	Implement BMPs.
BIO-10	Erosion Control Materials.
BIO-11	Properly Dispose of Garbage.
BIO-12	Use Approved Aggregate, Fill or Borrow Materials.
BIO-13	Restore Temporarily Affected Habitat.
BIO-14	Post-construction Monitoring.
BIO-19	Pile Driving Activities.
BIO-20	Dewatering.
BIO-21	Tree Removal Period.

Discussion

A field reconnaissance of the Project Site was conducted in 2006 by Environmental Science Associates (ESA), which covered both Phase 1 and Phase 2 Action areas (Phase 2 is known as the Proposed Project/Action), to determine the potential for Project impacts on endangered, threatened, and/or rare plant and wildlife species (special-status species) or their habitats. In addition, a wetland delineation was performed by MWH on November 7, 2011 to identify features within the Proposed Project/Action area that could be considered waters of the United States (U.S.) and that would therefore be subject to Section 404 of the Clean Water Act (CWA). Concurrently, MWH also identified giant garter snake (GGS) upland and aquatic habitats within the Proposed Project/Action Area. Updated species lists were obtained from the U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Game (CDFG), California Natural Diversity Database (CNDDB), and the California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants (December 2011). These lists are included as **Table 3-3** in Section 3. The following analysis summarizes potential effects to special status species and habitats. Please refer to the ASIP (Appendix B) for detailed analysis.

- a) **Less-than-Significant with Mitigation.** The Proposed Project/Action may have potentially significant adverse impacts, either directly or through habitat modifications, to the giant garter snake, an endangered, rare, or threatened species, as listed in Title 14 of the California Code of Regulations (Sections 670.2 or 670.5) or in Title 50, Code of Federal Regulations (Sections 17.11 or 17.12). The Proposed Project/Action would have a less-than-significant impact to other special-status species within the Action Area. Impacts to GGS and other special-status species are described below.

Giant Garter Snake

The Proposed Project/Action includes the construction of the New Meridian Diversion/Pumping Plant, Main Canal Modifications, Drexler Re-lift Pumping Plant, Drexler Pipeline Extension, and removal of the existing Meridian Diversion/Pumping Plant and Drexler Pumping Plant as described in Section 2.2 of this IS/EA. Construction activities associated with the Main Canal modifications and the construction of the Drexler Re-lift Pumping Plant would potentially impact suitable aquatic and upland habitat for GGS. 38.9 acres of GGS aquatic habitat and 21.3 acres of GGS upland habitat were mapped within the Proposed Project/Action Area in the ASIP (Section 3.1.5). Of this area, approximately 6.4 acres of GGS upland habitat and 3.4 acres of GGS aquatic habitat in the Main Canal would be temporarily impacted when the existing canal is demolished and widened. As a result of the proposed widening modifications, there would be some conversion of GGS upland habitat to GGS aquatic habitat.

In order to construct the Drexler Re-lift Pumping Plant, an existing drainage ditch would be replaced with a new 24-inch storm drain to allow for placement of a concrete pad. Construction of the pumping plant and storm drain would result in permanent effects to approximately 512 square feet of GGS upland habitat. An additional minimal area of the Reclamation District 70 canal would be disturbed temporarily when the storm drain is connected. The total permanent impacts are <0.1 acre. (ASIP, Section 4.3.2).

Because the operation of the Main Canal is essential for MFWC water delivery in the spring and summer, the Proposed Project/Action improvements to the Main Canal must occur during the fall and winter (October 1st through April 30th), during the GGS inactive period of October 1st to May 1st. Upland GGS habitat in the Action Area is primarily composed of frequently disturbed agricultural lands and relatively shallow canal berms with few evident rodent burrows. These areas are not optimal habitat for GGS hibernation; however, there is some potential for snakes to remain in the Project Area/Action Area during the inactive season. Construction activities, either permanent or temporary in nature, from October 1 to May 1 are assumed to likely result in take (injury or death) of GGS that may be hibernating in the area, rather than harm and harassment. Thus, mitigation for the take of GGS in the form of restoration or replacement of affected habitat through the purchase of mitigation credits may be required by the USFWS; the specific mitigation bank and number of credits required to be purchased in advance of the implementation of the project shall be determined in consultation with the USFWS according to the *Programmatic Formal Consultation for the U.S. Army of Engineers 404 Permitted Projects with Relatively Small Effects on the Giant Garter snake within Butte, Colusa, Glenn, Fresno, Merced, Sacramento, San Joaquin, Solano, Stanislaus, Sutter and Yolo Counties, California* [Programmatic Biological Opinion (BO)]. Implementation of mitigation measures and fulfillment of habitat compensation for construction activities occurring during the October 1 to May 1 period would avoid potentially significant impacts to GGS.

To reduce and minimize impacts to giant garter snake as a result of the implementation of the Proposed Project/Action, the Programmatic BO measures and those described below

would be implemented as appropriate. As mentioned above, compensation would be required for permanent loss of giant garter snake habitat. With implementation of 2008 IS/EA Mitigation Measures BIO-1, BIO-4, BIO-6 through BIO-14, and modified 2008 IS/EA Mitigation Measures BIO-2, BIO-3, and BIO-15 through BIO-17, presented below, impacts to giant garter snake would be less than significant.

Mitigation Measure BIO-2: Staging Areas. During construction operations, stockpiling of construction materials, portable equipment, vehicles, and supplies will be restricted to the designated construction staging areas and exclusive of the Environmentally Sensitive Areas (ESAs). A solid barrier fence, such as silt fencing, will be installed along the boundaries of the staging area to prevent contamination of ESAs during such operations.

Mitigation Measure BIO-3: Pre-construction Surveys. No more than 24-hours prior to the commencement of construction activities, a USFWS-approved biologist shall survey areas deemed suitable giant garter snake (GGS) habitat for the presence of giant garter snakes. The biologist will provide the USFWS with a written report that adequately documents the methodology and results of the pre-construction survey within three days of the survey. These areas shall be re-inspected by the biologist whenever a lapse in construction activity of two and removed at the end of each workday from the entire project site.

Mitigation Measure BIO-15: De-watering Giant Garter Snake Habitat. During the GGS active period (May 1-September 31), GGS aquatic habitat may be dewatered starting on April 15. Any dewatered habitat must remain dry for at least 15 consecutive days after April 15 and prior to excavating or filing the dewatered habitat.

Measure BIO-16: Monitoring During Construction. A USFWS-approved biologist shall be available on an on-call basis in the event that a giant garter snake is encountered on site during construction activities. The biologist shall have the authority through communication with the resident engineer to stop construction activities in the immediate area if a giant garter snake is encountered during construction until appropriate corrective measures have been completed or until the snake is determined to be unharmed. Snakes encountered during construction activities shall be allowed to move away from the area on their own volition. The biologist shall notify the USFWS immediately if any listed species are found on-site, and will submit a report, including date(s), location(s), habitat description, and any corrective measures taken to protect the species found. The biologist shall be required to report any take of listed species to the USFWS immediately by telephone at 916/ 414-6600 and by electronic mail or written letter addressed to the Chief, Endangered Species Division, within three (3) working days of the incident. The Service does not authorize any handling or moving of a giant garter snake by other than USFWS-permitted biologist.

Mitigation Measure BIO-17: Compensation. Compensation for temporary and permanent impacts to GGS habitat is the responsibility of MFWC. Temporary impacts shall be restored to pre-project conditions. Areas subject to temporary impacts shall be limited to one season (the calendar year period between May 1 and October 1) and be restored within two seasons. Permanent impacts to giant garter snake habitat shall be

replaced at a 3:1 ratio which must include both upland and aquatic habitat components. A portion of the mitigation for permanent loss of wetlands at a ratio no less than 1:1 may fulfill a portion of the 3:1 mitigation obligation for permanent impacts to giant garter snake habitat. This mitigation may be fulfilled through in-kind, onsite or off-site, out-of-kind mitigation as approved by the USFWS and the Corps.

Fish Species: The Proposed Project/Action would involve work within the Sacramento River; therefore, the important special-status species to consider in this habitat are the threatened North American green sturgeon (Southern DPS), threatened Central Valley steelhead, threatened Central Valley spring-run Chinook salmon and endangered Sacramento River winter-run Chinook salmon.

Construction and operation of a surface water diversion in the Sacramento River has the potential to adversely impact various salmonid and other fish species and their habitats through several mechanisms, including entrainment into the water diversion, impingement on the intake screen, increased vulnerability to predation mortality, increased levels of turbidity and suspended solids, and underwater sound pressure waves. Direct mortality of fish species may also occur during cofferdam installation and dewatering.

Fish screen design criteria outlined by the Proposed Project/Action would reduce potential effects from entrainment and impingement substantially. Placement of structures within the Sacramento River, including a positive barrier fish screen, would modify local velocity and current patterns, create localized turbulence and eddies, and provide cover habitat for a variety of predatory fish species, such as striped and smallmouth bass. Structural components of the positive barrier fish screen may result in the potential for increased localized predation mortality for juvenile Chinook salmon, steelhead, and other fish species within the river. However, placement of the new diversion structures is within areas with adequate flow velocities, thereby minimizing backwater eddy effects and potential impacts to salmonids from predatory species. And ultimately, construction of the proposed new facilities fitted with fish screens would benefit these and all fish species.

In-water construction activities would take place during the construction period that would impact the least number of individuals of special-status fish. This in-water work period is June 1 to October 1, for this stretch of the Sacramento River; however, with NMFS approval, the work period may be extended through November 1. This period coincides with when Central Valley steelhead, and Chinook salmon are least likely to be present in the vicinity of the Action Area. Green sturgeon, however, may occur in the Action Area on a year-round basis. The construction of the proposed Meridian Diversion fish screen facility would require placement and removal of a sheet-pile cofferdam to isolate the work site from the rest of the river. This would result in a temporary localized disturbance with minor siltation of the water. Increased sedimentation may cause reduced survival of eggs or alevins, reduce primary and secondary river productivity, interfere with feedings, cause behavioral avoidance, and cause a breakdown of social organization to native species downstream of the discharge area. Furthermore, installation of sheet piles and beams during construction of the

cofferdam may require the use of vibratory or percussion (impact) hammer methods. Both methods produce underwater sound pressure waves that can be perceived by fish. However, while vibrating hammers do not produce sound pressure levels that would result in injury or mortality to fish, fish may be injured or killed by the impact sounds generated by percussive pile driving. Their hearing may also be affected or their behavior altered such that it constitutes harassment or harm. The specific effects of pile driving on fish depend on a wide range of factors including the type of pile, type of hammer, fish species, environmental setting, and many other factors (Popper et al., 2006). The percussion hammer, if needed for cofferdam installation, would be used on an intermittent and short duration basis. Use of the percussion hammer would be minimized to the maximum extent possible. All these impacts to special status fish are considered potentially significant.

The construction of the Meridian Diversion and Pump Station would span 6 and 10 months, respectively; however, all in-water construction (including the cofferdam) would be completed within the in-water work period to avoid effects to salmonids and special-status fish. The Proposed Project/Action also includes abandonment of the existing Meridian Diversion and the Drexler Diversion, which would require minimal in-river to cap and seal the existing intake pipe manifold. Any in-water activities involved in removal of these facilities would also occur within the in-water work period to reduce impacts to fish.

Given the overall benefit to fish as a result of the Proposed Project/Action, as well as the use of a cofferdam, the fish salvage requirement for dewatered work sites, the localized and minimal in-river disturbances, and constructing within the work period when fish would least likely be in the area, the Proposed Project/Action is expected to result in minimal impacts to the fisheries resources of the Sacramento River. With the implementation of 2008 IS/EA Mitigation Measures BIO-19, BIO-20 and proposed Mitigation Measures BIO-A through BIO-H⁴, presented below, impacts to listed and special-concern fish species would be reduced to a less-than-significant level.

Mitigation Measure BIO-A: Spoil Sites. Spoil sites shall be located so they do not drain directly into the waterways. If a spoil site drains into a water body, catch basins shall be constructed to intercept sediment before it reaches the channels. Spoil sites shall be graded to reduce the potential for erosion.

Mitigation Measure BIO-B: Hazardous Materials. A spill prevention plan for potentially hazardous materials shall be prepared and implemented. The plan shall include the proper handling and storage of all potentially hazardous materials, as well as the proper procedures for cleaning up and reporting of any spills. If necessary, containment berms shall be constructed to prevent spilled materials from reaching the creek channels.

Mitigation Measure BIO-C: Storage. Equipment and materials shall be stored at least 50 feet from waterways. No debris such as trash and spoils shall be deposited

⁴ Mitigation measures BIO-A through BIO-H are identified with alphabetical letters instead of numbers to avoid confusion with mitigation measures from the 2008 IS/EA.

within 100 feet of waterways. Staging and storage areas for equipment, materials, fuels, lubricants and solvents, shall be located outside of the stream channel and banks. Stationary equipment such as motors, pumps, generators, compressors and welders, located within or adjacent to the stream shall be positioned over drip pans. Any equipment or vehicles driven and/or operated within or adjacent to the stream shall be checked and maintained daily, to prevent leaks of materials that if introduced to water could be deleterious to aquatic life. Vehicles shall be moved away from the stream prior to refueling and lubrication.

Mitigation Measure BIO-D: Vehicle Maintenance. Proper and timely maintenance for vehicles and equipment used during construction shall be provided to reduce the potential for mechanical breakdowns leading to a spill of materials into or around the creeks. Maintenance and fueling shall be conducted in an area that meets the criteria set forth in the spill prevention plan (i.e., away from sensitive drainages).

Mitigation Measure BIO-E: Dust Prevention. Water used for dust abatement, if necessary, shall be acquired from an authorized off-site source. Water shall be a clean water source in accordance with California RWQCB Construction Storm Water Program and/or as authorized under a separate National Pollutant Discharge Elimination System (NPDES) permit.

Mitigation Measure BIO-F: Daily Monitoring. A qualified biological monitor shall be on site during in-water construction activities. The biological monitor shall be authorized to halt construction if impacts to special-status salmonid species are evident.

Mitigation Measure BIO-G: Riparian Habitat. Current riparian vegetation shall be retained to extent feasible.

Mitigation Measure BIO-H: Fish Rescue Plan. A fish rescue plan shall be prepared by MFWC prior to the implementation of the project and provided for review and comment to NMFS, USFWS and CDFG as appropriate. A qualified fisheries biologist will design and conduct a fish rescue and relocation effort to collect fish from the area within the cofferdam involving the capture and return of those fish to suitable habitat within the Sacramento River. To ensure compliance, a fisheries biologist shall provide observation during initial dewatering activities within the cofferdam. Following the fish rescue effort, a report shall be prepared by the fisheries biologist and submitted to NMFS within 30 days.

Valley Elderberry Longhorn Beetle (VELB). The Project site was surveyed for the presence of suitable habitat for the federally threatened valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*, VELB). No elderberry shrubs were observed within 100 feet of the project site. Based on this survey, no impacts to VELB would result from the Proposed Project/Action.

Swainson's Hawk. No known Swainson's hawk nesting habitat is proposed to be modified or eliminated by the Proposed Project/Action. Suitable nesting habitat is found adjacent to the Sacramento River within the valley riparian habitat. Habitat in this area includes riparian woodlands with large diameter (i.e., greater than 30 inches diameter at breast

height) valley oak (*Quercus lobata*), cottonwood (*Populus fremontii*) and black willow (*Salix goodingii*). These overstory trees provide moderate to high (i.e., greater than 50%) canopy closure in this area. However, this riparian habitat would not be impacted by project activities. Scattered native trees also occur sparsely throughout the Action Area, and a few may be suitable for Swainson's hawk nesting. Disturbances to potential foraging habitat (i.e., annual grassland and agricultural areas) would be minimal and temporary, and are not expected to impact this species based on the overall regional abundance of these habitat types.

The Swainson's hawk is listed as threatened by the State of California. With numerous records of Swainson's hawk nests occurring within one mile of the project site along the Sacramento River (CNDDDB, 2011) there is a moderate to high potential this area may be used by this species for nesting. Impacts to an active Swainson's hawk nest would be potentially significant. To compensate potential disturbance and to avoid impacts to active nest sites, the following mitigation measures are proposed. With implementation of 2008 IS/EA Mitigation Measures BIO-21, and modified 2008 IS/EA Mitigation Measures BIO-22 and BIO-23, presented below, potential impacts to Swainson's hawk would be reduced to a less-than-significant level.

Mitigation Measure BIO-22: Swainson's Hawk, Nesting Raptors and Other Nesting Bird Survey. For any construction activities that will occur between March 1 and August 31 of any given year, the applicant shall conduct preconstruction surveys in suitable nesting habitat within 0.5 mile of the construction area for nesting raptors. Surveys shall be conducted by a qualified biologist. In addition, all trees slated for removal during the nesting season shall be surveyed by a qualified biologist no more than 48-hours before removal to ensure that no nesting birds are occupying the tree.

If active nests are found during the survey, the applicant shall implement appropriate mitigation measures to ensure that the species will not be adversely affected, which will include establishing a no-work buffer zone as, approved by the CDFG, around the active nest. The no-work buffer may vary depending on species and site specific conditions as approved by CDFG. Appropriate mitigation measures include delaying construction activities until a qualified biologist determines that juveniles have fledged the nest(s), or establishing a "no construction" zone buffer around the nest.

The results of the survey shall be documented in a letter report that is distributed to the CDFG. These measures would ensure compliance with the Migratory Bird Treaty Act and California Department of Fish and Game Code 3503.5.

Mitigation Measure BIO-23: Riparian Habitat Exclusion. Where construction work occurs adjacent to riparian habitat (i.e., at the existing Drexler Diversion and Pumping Plant and the Grimes Canal modifications), there shall be no encroachment by construction equipment or personnel into existing riparian habitat areas located along the Sacramento River. Storage or parking of equipment shall be restricted within 100 feet of riparian habitat.

b) **Less-than-Significant with Mitigation.** Based on the habitats present in the project site, the following special-status species may be impacted by the Proposed Project/Action:

- Western burrowing owl
- Bank Swallow
- Cackling (Aleutian Canada Goose)
- Osprey

Western burrowing owl, bank swallow, cackling goose, and osprey. Potential nest sites for these birds may be directly or indirectly affected by project construction. In addition, other nesting birds such as migratory birds protected by the Migratory Bird Treaty Act may also be impacted by the Proposed Project/Action. To compensate for these potential impacts, the following mitigation measure is proposed. With implementation of 2008 IS/EA Mitigation Measures BIO-21, modified 2008 IS/EA Mitigation Measures BIO-22, and proposed Mitigation Measure BIO-H potential impacts to these species would be reduced to a less-than-significant level.

Mitigation Measure BIO-H: Pre-construction surveys for burrowing owls shall be conducted by a qualified biologist as approved by the California Department of Fish and Game (CDFG) within 30-days prior to the start of work activities where land construction is planned in known or suitable habitat. If construction activities are delayed for more than 30 days after the initial preconstruction surveys, then a new preconstruction survey shall be required. All surveys shall be conducted in accordance with the CDFG/California Burrowing Owl Consortium survey protocols. This survey can be conducted concurrently with Mitigation Measure BIO-22.

If burrowing owls are discovered in the proposed project site vicinity during construction, the onsite biologist shall be notified immediately. Occupied burrows should not be disturbed during the nesting season (February 1 through August 31) unless a qualified biologist approved by the CDFG verifies through non-invasive methods that either: (1) the birds have not begun egg-laying and incubation; or (2) that juveniles from the occupied burrows are foraging independently and are capable of independent survival.

If this criteria is not met, occupied burrows during the nesting season will be avoided by establishment of a no-work buffer of 250-foot around the occupied/active burrow. Where maintenance of a 250-foot no-work buffer zone is not practical, the applicant shall consult with the CDFG to determine appropriate avoidance measures. Burrows occupied during the breeding season (February 1 to August 31) will be closely monitored by the biologist until the young fledge/leave the nest. The onsite biologist shall have the authority to stop work if it is determined that construction related activities are disturbing the owls.

If criterion 1 or 2 above are met and as approved by CDFG, the biologist shall undertake passive relocation techniques by installing one-way doors in active and suitable burrows allowing owls to escape but not re-enter. Owls should be excluded from the immediate impact zone and within a 160-foot buffer zone by having one-way doors placed over the entrance to prevent owls from inhabiting those burrows.

After nesting season ends (August 31) and the burrow is deemed unoccupied by the biologist, passive relocation techniques shall take place. Construction activities may occur once a qualified biologist has deemed the burrows are unoccupied.

- c) **Less-than-Significant with Mitigation.** The sensitive natural community that would be potentially impacted by the Proposed Project/Action is the Sacramento River and associated Valley foothill riparian. However, with avoidance, minimization, and erosion control measures outlined in Section 2 (Project Description), impacts to the Sacramento River and riparian habitats are considered less-than significant. Both communities provide habitat for a range of terrestrial wildlife species, including several species of songbirds, small mammals, mesocarnivores, and herptiles. Implementation of 2008 IS/EA Mitigation Measure BIO-1, modified 2008 IS/EA Mitigation Measures BIO-2 and BIO-23 and Mitigation Measure BIO-G would ensure no disturbance and encroachment into these sensitive riparian habitat areas, and would reduce this impact to a less-than significant level.
- d) **Less-than-Significant with Mitigation.** The Proposed Project/Action would temporarily and permanently fill perennial stream channel (Sacramento River) with the proposed placement of the Meridian diversion facilities within the ordinary high water mark of the Sacramento River. These features are navigable and therefore regulated under Section 10 of the Rivers and Harbors Act. In addition, existing irrigation channels would be modified to improve conveyance from the proposed diversion facilities. These channels would likely be considered jurisdictional by the Corps per Section 404 of the Clean Water Act and RWQCB per Section 401 of the Clean Water Act. Lastly, alteration to the beds or banks of the Sacramento River would require entering into a Streambed Alteration Agreement with the CDFG as required per Section 1602 of the State Fish and Game Code. According to a wetland delineation prepared by MWH in 2011, the only feature that may qualify as a wetland and/or waters of the U.S. in the Proposed Project/Action area is the Sacramento River. The location and extent of wetlands or waters of the U.S., as identified in the wetland delineation, will be confirmed when the Corps verifies the wetland delineation. Therefore, implementation of BIO-I and modified 2008 IS/EA Mitigation Measure BIO-28 would reduce impacts to wetlands in the event that the potential fill of these features requires compensation to a less-than-significant level.

Mitigation Measure BIO-I: Wetlands. If it is determined that the Proposed Project/Action impacts waters of the U.S., the MFWC shall obtain all required permit approvals from the Corps, RWQCB, CDFG and any other agencies with permitting responsibilities for construction activities within jurisdictional features. Permit approvals and certifications would likely include the following:

Clean Water Act Section 404. Permit approval from the Corps shall be obtained for the placement of dredge or fill material in waters of the U.S. pursuant to Section 404 of the federal Clean Water Act. The Section 404 permit application would require a delineation of wetlands and other waters of the U.S., a jurisdictional determination from the Corps, and preparation of a Pre-Construction Notification (PCN) and supporting documentation. A PCN outlines project activities, areas of impact, construction techniques, and methods for avoiding and reducing impacts to jurisdictional features. State and federal regulations require that the project applicant avoid or

minimize impacts to wetlands and waters and develop appropriate protection for wetlands. Wetlands that cannot be avoided must be compensated to result in “no net loss” of wetlands to ensure that the project would maintain the current functions and values of onsite wetland habitats.

Clean Water Act Section 401 Water Quality Certification/Porter-Cologne Act. Approval of Water Quality Certification (WQC) under the CWA and/or Waste Discharge Requirements (WDRs) under the Porter-Cologne Act shall be obtained from the RWQCB for work within jurisdictional waters. Application for a WQC requires an application and supporting materials, including construction techniques, areas of impact, mitigation measures, project schedule, and proof of CEQA compliance. Application for a WDR requires an application and supporting materials, including a characterization of the discharge which includes but is not limited to: design and actual flows; a list of constituents and the discharge concentration of each constituent; a list of other appropriate waste discharge characteristics; a description and schematic drawing of all treatment process; a description of any BMPs used; and a description of disposal methods. Proof of CEQA compliance is also required.

California Fish and Game Code Section 1602. CDFG requires a Streambed Alteration Agreement for activities that result in alteration of the bed or bank of a stream (typically the top of bank or edge of riparian habitat, whichever is greater), or that adversely impact fish or wildlife resources. The notification package must include supporting materials, including construction techniques, areas of impact, mitigation measures, project schedule, and proof of CEQA compliance.

Mitigation Measure BIO-28: Compensation for Loss of Jurisdictional Wetlands.

If the Proposed Project/Action results in the permanent degradation of riverine and wetland habitat, those impacts shall be compensated for at a 1:1 ratio through the purchase of similar habitat value from a USFWS-approved conservation bank. Compensation shall take the form of wetland and/or riverine preservation or creation in accordance with the Corps and CDFG mitigation requirements, as required under project permits. Preservation and creation may occur onsite through a conservation agreement or offsite through purchasing credits at a Corps approved mitigation bank.

- e) **Less-than-Significant Impact.** Construction of the Proposed Project/Action may have a temporary impact to the movements of some terrestrial wildlife during construction. In addition, salmonids and other fresh water fish species may be temporarily displaced during construction. However, construction of the Proposed Project/Action would not result in any permanent barriers to species movement, and migratory corridors for fish and wildlife would be unaffected. In addition, as part of the Fish Rescue Plan a fish-salvage program would be implemented during coffer dam construction as described in the Project Description (attached). Therefore, this impact would be less than significant.
- f) **No Impact.** The Proposed Project/Action is not anticipated to conflict with any local policies or ordinances protecting biological resources. No impact would occur.
- g) **No Impact.** The Proposed Project/Action is not located within a defined Habitat Conservation Area and therefore is not expected to conflict with the provisions of an

adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, regional, or state habitat conservation plan. No impact would occur.

4.1.5 Cultural Resources

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
5. CULTURAL RESOURCES — Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d) Disturb any human remains, including those interred outside of formal cemeteries?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

A records search of all pertinent survey and site data was conducted at the Northeast Information Center at California State University, Chico on April 7, 2004 (IC File # D04-20). The records search covered the Phase 1 and Phase 2 project area (which included the Proposed Project/Action facilities). The records were accessed by using the Meridian and Grimes U.S. Geological Survey (USGS) 7.5-minute quadrangle maps, T14N, R1E; T15N, R1E; and T15N, R1W in Sutter County. The review included proposed Phase 1 and Phase 2 facilities footprints (proposed pump locations, existing pump locations, and proposed pipelines and canals) as well as a ¼ mile around the Phase 1 and Phase 2 facilities locations. The records search included a review of the *Directory of Properties in the Historic Property Data File for Sutter County* for information on sites of recognized historical significance within the *National Register of Historic Places*, the *California Register of Historic Resources*, the *California Inventory of Historic Resources* (1976), the *California Historical Landmarks* (1996), and the *California Points of Historical Interest* (1992).

An archaeological field inspection of the project area was conducted on May 7, 2004 by two ESA Registered Professional Archaeologists. The proposed Phase 1 and Phase 2 facilities sites inspected using systematic survey transects spaced approximately 10 to 20 meters apart. Segments of the existing canal that would be rehabilitated were inspected using cursory survey techniques.

On January 23, 2008, Reclamation initiated National Historic Preservation Action (NHPA) Section 106 Consultation with the California State Historic Preservation Officer (SHPO). Reclamation concluded that both Phase 1 and Phase 2 of the Proposed Project/Action would not result in an affect to historic properties. On February 5, 2008, SHPO concurred with these findings.

Appendix C contains the January 2008 Cultural Resources Inventory Report which includes the results of the records search and field inspection. Reclamation and SHPO's findings are also included in Appendix C. The results of the January 2008 Report adequately cover the potential effects of the Proposed Project/Action and no further analysis was required. Therefore, the analysis of potential impacts to cultural resources resulting from implementation of the Proposed Project/Action is based on the findings included in that 2008 Report.

- a) **Less-than-Significant Impact.** The cultural resources inventory conducted for the proposed Phase I and Phase 2 facilities identified one potentially significant historical resource, the Main Canal, a small, concrete-lined irrigation canal extending south from the existing Meridian pumping facility. Although an exact date of construction of this canal is not known, available information indicated that it was built prior to 1952 but after 1912. Other existing facilities that would be modified under the Proposed Project/Action include: the existing Meridian pumping facility, built in 1964; and the existing Drexler pumping facility, also a minimal structure which was moved to its present location.

None of the facilities described above meet significance criteria established under CEQA and Section 106 of the NHPA; and therefore, are not considered to be significant resources and any alteration of these structures, including demolition, would be considered less than significant. In addition, as described in subsection 2.5, measures have been incorporated into the Proposed Project/Action that will be made conditions of approval which minimize potential damage or destruction of cultural resources discovered during construction activities. The measures state that if any potential historical resources should be encountered during construction of the Proposed Project/Action, all work within a 50-foot radius of the resource would stop until the resource can be evaluated and a determination made of its significance and need for additional studies. As a result, construction and operation the Proposed Project/Action would result in less-than-significant impacts to historical resources.

- b) **Less-than-Significant Impact.** According to the results of the records search, the Phase 1 and Phase 2 project area has never been previously inspected for the presence of archaeological remains and no archaeological remains have been identified within the project area or within a ¼ mile radius. The archaeological field survey conducted by ESA Registered Professional Archaeologists on May 7, 2004 did not result in the identification of any archaeological remains in or adjacent to the project area. The Native American Heritage Commission was contacted on March 11, 2004 and again on November 7, 2007 and requested to search their Sacred Lands File and requested to provide a list of Native American that should be contacted concerning the Proposed Project/Action. A letter was sent to each individual or organization on the list on March 26, 2004 and again in November of 2007. On December 27, 2007, ESA received a letter from the Enterprise Band of Maidu Indians requesting that if during ground disturbing activities, any resources are uncovered, all work cease within the area of the find pending an examination of the site and materials by a professional archaeologist. The contact information provided by the NAHC for the Strawberry Valley Rancheria included only a mailing address, and on January 24, 2008, ESA sent a follow up letter to the Strawberry Rancheria requesting that they contact ESA if they had any questions or concerns. To date, no responses have been received.

Although no archaeological remains have been identified for the project area, there is a remote chance that construction activities could result in accidentally discovering previously unidentified archaeological resources. As described in subsection 2.5, measures have been incorporated into the Proposed Project/Action that will be made conditions of approval which minimize potential damage or destruction of cultural resources discovered during construction activities. The measures state that if any potential historical resources should be encountered during construction of the Proposed Project/Action, all work within a 50-foot radius of the resource would stop until the resource can be evaluated and a determination made of its significance and need for additional studies. As a result, construction and operation the Proposed Project/Action would result in less-than-significant impacts to archeological resources.

- c) **Less-than-Significant Impact.** No known paleontological resources or unique geologic features exist within the project area. Therefore, the Proposed Project/Action is not likely to destroy, either directly or indirectly, a unique paleontological resource or site, or geological feature. However, it is possible that previously unidentified paleontological resources could be uncovered during construction activities. As described in subsection 2.5, measures have been incorporated into the Proposed Project/Action that will be made conditions of approval which minimize potential damage or destruction of cultural resources discovered during construction activities. The measures state that if any potential historical resources should be encountered during construction of the Proposed Project/Action, all work within a 50-foot radius of the resource would stop until the resource can be evaluated and a determination made of its significance and need for additional studies. As a result, construction and operation the Proposed Project/Action would result in less-than-significant impacts to paleontological resources.
- d) **Less-than-Significant Impact.** Based upon a records search, contacts with Native Americans, and a field survey, no human remains are known to exist within the project area. However, As described in subsection 2.5, measures have been incorporated into the Proposed Project/Action that will be made conditions of approval which minimize potential damage or destruction of cultural resources or human remains discovered during construction activities. The measures state that in the unlikely event that human remains are discovered, work within the area would be stopped and Sutter County Sheriff-Coroner would be notified immediately. Work would only resume after the investigation and in accordance with any requirements and procedures imposed by the Sutter County Sheriff-Corner. In the event that the bone most likely represents a Native American interment, the Native American Heritage Commission would be notified so that the most likely descendents can be identified and appropriate treatment can be implemented. As a result, construction and operation the Proposed Project/Action would result in less-than-significant impacts to archeological resources.
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4.1.6 Geology, Soils, and Seismicity

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
6. GEOLOGY, SOILS, AND SEISMICITY — Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? (Refer to Division of Mines and Geology Special Publication 42.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ii) Strong seismic ground shaking?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
iii) Seismic-related ground failure, including liquefaction?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
iv) Landslides?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Result in substantial soil erosion or the loss of topsoil?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) 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 on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion

a i.) **No Impact.** The project site is not located in an Alquist-Priolo Earthquake Fault Zone, as defined by the California State Department of Conservation, Geological Survey (CGS, formerly the Division of Mines and Geology), and no active or potentially active faults exist on, or in the immediate vicinity of the site (Sutter County, 2008). The Proposed Project/Action would involve trenching and excavating to a depth of no more than 25 feet on primarily level terrain and will incorporate the use of trench shoring measures consistent with the CBC and CAL/OSHA requirements for trenching and excavation activities. As a result the potential for slope instability hazards and landslides during construction and operation of the proposed project is not anticipated and no impact would occur.

a ii-iv.) **Less-than-Significant Impact.** According to the Fault Activity Map for California (Jennings, 1994), the project area is located approximately 38 miles northeast of the Concord/Green Valley fault; 15 miles east of the Great Valley thrust fault (segments 4 and 5); 40 miles west of the Foothills Fault System; and 50 miles west of the Marsh Creek-Greenville fault system. It is likely that the project area would experience at least

one major earthquake, greater than Magnitude 6, within the next 30 years. In the event of an earthquake in the eastern San Francisco Bay Area or along the Coast Range-Central Valley, severe ground motion could occur within the project area. The intensity of such an event would depend on the active fault, the distance to the epicenter, the magnitude of the event, and the duration of shaking.

The project area is generally level with the exception of the levee in the vicinity of the Meridian Diversion and Drexler diversion. Levees within the project area are inspected and maintained by the various Reclamation Districts that have jurisdiction and the California Department of Water Resources (DWR). These levees could be susceptible to failure during excessive ground motion, and areas where earthen fills are present could experience differential settlement. Construction of the Meridian Diversion and the demolition of the existing Meridian and Drexler diversions have the potential to alter the structural integrity of the levee by placing additional structural stress on the levee during a seismic event. Settling of a levee during an earthquake could result in failure of the earthen structure and result in damage to Proposed Project/Action facilities and damage to areas being protected by levees.

Proposed Project/Action facilities would be designed and constructed to industry standards to protect against impacts from adverse geological impacts associated with seismic activity and other site specific soils and geology constraints, including compliance with Uniform Building Code (UBC) standards for Seismic Risk Zone 3, California Building Code (CBC), International Building Code (IBC), and American Society of Civil Engineers (ASCE) standards. With respect to the levee in the proposed project site, construction of new and removal of existing diversion would require compliance with Central Valley Flood Protection Board (CVFPB) and Corps requirements. As a result, impacts associated with strong seismic ground shaking and seismic related ground failure would be less than significant.

- b) **Less-than-Significant Impact.** During construction of the Proposed Project/Action, grading and other soil disturbing activities may introduce the potential for soil erosion. See the discussion under Checklist Item 8 a,f for a discussion of the effects of soil erosion on water quality. As discussed under Checklist item 8 a,f, the MFWC would be required to prepare and implement a Storm Water Pollution Prevention Plan (SWPPP) in accordance with Section 402 of the Clean Water Act. In addition, to the extent possible and practical, topsoil that is removed in the farmed areas as part of project construction would be stockpiled separately and then replaced at the conclusion of construction. Stockpiles that are to remain on the site would be protected to prevent wind and water erosion according to measures outlined in the SWPPP. As a result, any potential impacts related to soil erosion and loss of top soil associated with the Construction of the Proposed Project/Action would be less than significant.
- c,d) **Less-than-Significant Impact.** As described under Checklist Item aii-iv, construction and demolition activities associated with the Proposed Project/Action would be accomplished according to industry standards, including conformance with the CBC, UBC, IBC, and

ASCE standards to protect proposed project facilities against hazards associated with unstable soil conditions, expansive soils, landslides, lateral spreading, subsidence, and/or liquefaction. As a result, impacts related to unstable and expansive soils would be less than significant.

- e) **No Impact.** No additional new on-site wastewater treatment systems would be installed to support the Proposed Project/Action and no impact would occur.

4.1.7 Greenhouse Gas Emissions

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
7. GREENHOUSE GAS EMISSIONS — Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Discussion

- a,b) **Less-than Significant Impact.** The Proposed Project/Action would result in minor emissions of GHGs associated with construction and operational activities. During construction, the proposed project would generate short-term, less than significant CO₂ emissions associated with combustion of gasoline and diesel fuel during the trenching, grading, clearing, and other site preparation activities. Operation of the Proposed Project/Action would result in the consolidation of existing intake facilities and would likely result in similar to or less than operational emissions as existing conditions. Lastly, both construction and operational GHG emissions would be intermittent and would be less than the lower reporting limit for major stationary sources established by the California Air Resources Board and the EPA, which typically include fossil fuel burning power plants, petroleum refineries, petrochemical plants, and food processing plants. As a result, the Proposed Project/Action would not represent a major source of GHGs and would be less than significant.

4.1.8 Hazards and Hazardous Materials

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
8. HAZARDS AND HAZARDOUS MATERIALS — Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Discussion

- a,b) Construction and operation of the Proposed Project/Action could involve the use, storage and disposal of small quantities of hazardous materials. The use, storage, and transport of hazardous materials would be required to comply with applicable local, state, and federal regulations. Transportation of hazardous materials on area roadways is regulated by CHP and Caltrans, and use of these materials is regulated by DTSC, as outlined in Title 22 of the CCR. Any project facilities that would use or store hazardous materials would be required to obtain permits and comply with appropriate regulatory agency standards designed to avoid hazardous waste releases. Because the Proposed Project/Action is required by law to implement and comply with existing hazardous material regulations, impacts related to the creation of significant hazards to the public through routine, transport, use, disposal, and risk of upset are less than significant. In addition, measures described in subsection 2.5, have been incorporated into the Proposed Project/Action that will be made conditions of approval, which minimize potential impacts associated with hazards and hazardous materials during construction and operation. These measures include

- protocols for the handling and transportation of potentially hazardous materials and the preparation of a hazardous materials management plan in the event of an accidental release or threatened release of hazardous materials. As a result, construction and operation the Proposed Project/Action would result in less-than-significant impacts related to hazards and hazardous materials.
- c) **Less-than-Significant Impact.** Winship Elementary is located within one quarter mile of Proposed Project/Action facilities. However, construction and operation of the pump station would be confined to the land parcel at the intersection of Alameda Street and South Meridian Road and would not affect the school facility. In considering the distance of these schools from proposed facilities and minimal quantities and types of hazardous substances used during construction, there would be negligible impacts to existing schools. In addition, measures described in subsection 2.5, have been incorporated into the Proposed Project/Action that will be made conditions of approval, which minimize potential impacts associated with hazards and hazardous materials during construction and operation. These measures include protocols for the handling and transportation of potentially hazardous materials and the preparation of a hazardous materials management plan in the event of an accidental release or threatened release of hazardous materials. As a result, construction and operation the Proposed Project/Action would result in less-than-significant impacts to existing schools.
- d) **Less-than-Significant Impact.** None of the Proposed Project/Action facilities are located on a site which is known to be included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5. As indicated in Section 3, one site was identified within one mile of the Proposed Project/Action; however, the site is a sufficient distance (e.g. > 400 feet) away from actual construction activities and; therefore, would not create a significant hazard to the public or the environment and this impact would be less than significant.
- e,f) **No Impact.** The closest airport is Sutter County Airport, which is located over 10 miles to the east of the project area. The construction and operation of the Proposed Project/Action would have no effect on preexisting safety hazards relative to any nearby public airport operations; therefore, no impact would occur.
- g) **Less-than-Significant Impact.** The Proposed Project/Action would not affect any roads identified in the Sutter County General Plan as primary evacuation routes. However, several other temporary lane or road closures may be required as identified in Table 2-3 in Proposed Project/Action Description. MFWC would be required to obtain encroachment permits for all temporary and permanent road closures for all County road rights-of-way (ROW). Compliance with the terms of the encroachment permits would ensure that construction and operation of the Proposed Project/Action does not physically interfere with any adopted emergency response plan or emergency evacuation plan. As a result, the impact would be less than significant.

- h) **Less-than-Significant Impact.** The project area is classified as primarily non-fuel in nature, with one area having a moderate risk for wildfire (CalFire, 2008). As described in the Proposed Project/Action description, during construction, staging areas, welding areas, or areas slated for development using spark-producing equipment would be cleared of dried vegetation and other materials that could serve as fire fuel. Any construction equipment that normally includes a spark arrester shall be equipped with an arrester in good working order. Therefore construction and operation of the Proposed Project/Action would not be expected to expose people or structures to a significant risk of loss, injury or death involving wildland fires and this impact would be less than significant.

4.1.9 Hydrology and Water Quality

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
9. HYDROLOGY AND WATER QUALITY — Would the project:				
a) Violate any water quality standards or waste discharge requirements?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) Substantially alter the existing drainage pattern of a site or area through the alteration of the course of a stream or river, or by other means, in a manner that would result in substantial erosion or siltation on- or off-site?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d) Substantially alter the existing drainage pattern of a site or area through the alteration of the course of a stream or river, or by other means, substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
f) Otherwise substantially degrade water quality?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
h) Place within a 100-year flood hazard area structures that would impede or redirect flood flows?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
i) Expose people or 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?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
j) Expose people or structures to a significant risk of loss, injury or death involving inundation by seiche, tsunami, or mudflow?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

The following mitigation measures from the 2008 IS/EA were adopted by CDFG and would mitigate hydrology and water quality associated with implementation of both Phase 1 and Phase 2 of Proposed Project/Action. CDFG and MFWC would ensure that construction and operation of the Proposed Project/Action would be implemented consistent with the mitigation, monitoring and enforcement requirements for the 2008 IS/EA MMRP (See Appendix A).

2008 IS/EA MITIGATION MEASURES

Hydrology and Water Quality

HYDRO-1 Identify Site Specific Control Measures

Discussion

- a,f) **Less-than-Significant.** At the onset of project construction, there would be a potential for surface runoff to transport upland construction spoils into the adjacent river, which could result in temporary increases in turbidity and sedimentation in downstream portions of the Sacramento River. Construction operations within the river channel during trenching operations would also result in increases in turbidity. Excessive sediment in the water column (increased turbidity) can reduce channel capacity, alter drainage characteristics, or affect aquatic organisms through reduced water quality.

The removal of riparian vegetation along drainages and disturbance of the riverbed, bank or levees could also result in increased erosion during construction activities. Disturbing the geomorphic characteristics and stability of the channel bed and banks could lead to chronic erosion problems in the river's channel. Such impacts could be exacerbated if the riparian vegetation is not reestablished and stabilized prior to the next high-flow or precipitation event or if appropriate stream channel restoration actions are not taken.

Prior to construction, MFWC would be required to obtain an National Pollutant Discharge Elimination System (NPDES) Permit for Discharges of Stormwater Associated with Construction Activities (NPDES General Stormwater Permit), from the CVRWQCB. Conditions of this permit would include adherence to requirements of the revised NPDES General Permit, effective July 1, 2010. Permit requirements would include:

- Preparation of hazardous material spill control and countermeasure programs;
- Stormwater quality sampling, monitoring, and compliance reporting;
- Development and adherence to a Rain Event Action Plan;
- Adherence to numeric action levels and effluent limits for pH and turbidity; monitoring of soil characteristics on site;
- Mandatory training under a specific curriculum; and
- Mandatory implementation of Best Management Practices (BMPs), which may include, but would not be limited to:

- Physical barriers to prevent erosion and sedimentation including setbacks and buffers, rooftop and impervious surface disconnection, rain gardens and cisterns, and other installations;
- Construction and maintenance of sedimentation basins;
- Limitations on construction work during storm events;
- Use of swales, mechanical, or chemical means of stormwater treatment during construction, including vegetated swales, bioretention cells, chemical treatments, and mechanical stormwater filters; and
- Implementation of spill control, sediment control, and pollution control plans and training.

The specific BMPs to be implemented would be determined prior to issuance of the NPDES General Permit, in coordination with the CVRWQCB. Adherence to these BMPs would be required as a condition of the permit, and would substantially reduce or prevent waterborne pollutants from entering natural waters, per CVRWQCB standards.

The project would also be required to obtain Clean Water Act Section 401 and 404 permits which include requirements for the preparation of a SWPPP. The SWPPP would include measures to minimize erosion and sediment transport to streams and identify best management practices (e.g., water diversion and sediment containment devices, protection of construction spoils, installation of water bars), site restoration, post-construction monitoring of the effectiveness of best management practices, contingency measures, responsible parties, and agency contacts.

Groundwater extracted during construction dewatering would be undertaken in accordance with RWQCB General Order No. 5-00-175 for NPDES General Permit No. CA G995001. This General Order and NPDES permit covers waste discharge requirements for dewatering and other low threat discharges to surface water.

Compliance with NPDES permit requirements and development and implementation of a SWPPP would reduce construction water quality impacts to less-than-significant level.

- b) **Less-than-Significant Impact.** The use of groundwater wells for potable or irrigation water is not proposed and no existing wells are located within the footprint of proposed facilities. It is recognized that dewatering operations would occur and may result in localized and temporary lowering of the water table. However, as described under Checklist Item 8a,f, these operations would implement standardized methods as required by the RWQCB and the MFWC's adopted NPDES General Dewatering Permit. Methods for treating this water would also be outlined in the MFWC's SWPPP. Consequently, impacts to groundwater quantity and quality during the construction and operation of the Proposed Project/Action would be less than significant.
- c) **Less-than-Significant Impact.** Construction activities would occur during periods of low flow (July through September) to minimize bank erosion. Once fully implemented, the Proposed Project/Action would result in a net reduction in the number of diversion

impoundment along the Sacramento River. In addition, implementation of 2008 IS/EA Mitigation Measure HYDRO-1 would minimize the exposure of sediments to runoff and would not result in the permanent alteration of the river's channel and this impact would be reduced to a less-than-significant level.

- d) **Less-than-Significant Impact.** Existing drainage patterns would be temporarily disrupted during project construction. Two small drainage ditches are located near the proposed Drexler re-lift pump station on the western side of the Main Canal. Berm widening and the placement of the pump pad would impact these two locations. These activities, however, are not likely to affect the overall capacity of the drainages. As a result, drainage related impacts would be less than significant.
- e) **Less-than-Significant Impact.** Implementation of the Proposed Project/Action would overall create up to a half acre of new impervious surface but is not expected to substantially create runoff that would exceed the capacity of an existing or planned stormwater drainage system; therefore, this impact would be areas of low permeability. Consequently, the amount of additional runoff expected to be generated by the project would be minimal. Therefore, the Proposed Project/Action is not expected to exceed the capacity of existing or planned storm water drainage systems, and impacts would be less than significant.
- g) **No Impact.** The Proposed Project/Action would include the construction or placement of housing within floodplains; therefore, no impact would occur.
- h) **Less-than-Significant Impact.** MWH engineers (2002) conducted a preliminary hydraulic analysis for sections of the Sacramento River in the vicinity of the project. Based upon the data from 1950 through 2000, the 90 percent and 10 percent exceedance flows at Meridian were used to calculate the stage elevations. The stage elevations used for the design at Meridian were 32.6 feet at 90% exceedance flows and 50.3 feet at 10% exceedance flows. Likewise, the stage elevations used for the design at the Grimes diversion were 27.7 feet at 90 % exceedance flows and 45.6 feet at 10% exceedance flows. The 90% exceedance flow elevation was used as a starting point to determine the upper limit of the fish screens that would lead to submergence. The pump motors at the proposed Meridian Diversion would be located on the land-side of the levee.

Control structures utilized during construction of the Proposed Project/Action would be used during the summer months when surface flows are at their minimum. It is the MFWD's intention to complete all river-side work during the lowest possible levels. In addition, the Proposed Project/Action would result in the consolidation of existing surface water diversions, thereby resulting in a net reduction in the number of diversion impoundments with the Sacramento River. Therefore, no new structures would be placed within a 100-year flood hazard that would redirect or impede flood flows and this impact would be less than significant.

- i) **Less-than-Significant Impact.** All structures constructed on or adjacent to the Sacramento River levee would be designed and built to Corps and CVFPB standards and requirements

to mitigate the risk of levee failure and flooding. Compliance with Corps and CVFPB standards would reduce impacts associated with flooding to less than significant.

- j) **No Impact.** The project area is located on and near flat topography remote from major water bodies capable of producing a seiche, tsunamis, or significant mudflows. No impact would occur.

4.1.10 Land Use and Land Use Planning

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
10. LAND USE AND LAND USE PLANNING — Would the project:				
a) Physically divide an established community?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion

- a,b) **No Impact.** Implementation of the Proposed Project/Action would not directly or indirectly physically divide an established community as there are no established communities in the project area. The Proposed Project/Action would continue to serve existing agricultural uses in the vicinity of the project area and would not conflict with or be incompatible with existing land use and zoning plans related to agriculture. Therefore, no impact would occur. Never the less, measures described in subsection 2.5, have been incorporated into the Proposed Project/Action that will be made conditions of approval, which would require compensation for temporary and permanent easements and for property loss and/or damage to property.
- c) **No Impact.** The Project/Action area is not within a defined Habitat Conservation Plan Area and therefore, construction and operation of the Proposed Project/Action is not expected to conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. No impact would occur.

4.1.11 Mineral Resources

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
11. MINERAL RESOURCES — Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion

- a,b) **No Impact.** As identified in the Sutter County General Plan, there are no active mines or sources of mineral extraction in the vicinity of the project site (Sutter County, 2008). Therefore, implementation of the Proposed Project/Action would not result in the loss of availability of a known mineral resource and would not result in the loss of availability of a locally-important mineral resource recovery site. No impact would occur.

4.1.12 Noise

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
12. NOISE — Would the project:				
a) Result in Exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Result in Exposure of persons to, or generation of, excessive groundborne vibration or groundborne noise levels?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Result in A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d) Result in A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) For a project located within an airport land use plan area, or, where such a plan has not been adopted, in an area within two miles of a public airport or public use airport, would the project expose people residing or working in the area to excessive noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) For a project located in the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

The following mitigation measures from the 2008 IS/EA were adopted by CDFG and would mitigate noise impacts associated with implementation of both Phase 1 and Phase 2 of Proposed Project/Action. CDFG and MFWC would ensure that construction and operation of the Proposed Project/Action would be implemented consistent with the mitigation, monitoring and enforcement requirements for the 2008 IS/EA MMRP (See Appendix A).

2008 IS/EA MITIGATION MEASURES

Noise

NOISE-1	Minimization of Construction and Operational Noise
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Discussion

- a) **Less-than-Significant Impact with Mitigation.** Sutter County does not have a community noise ordinance, but regulates noise and noise land use incompatibility through implementation of its General Plan Noise Element (Sutter County, 2011). Policy N 1.4 requires that all new non-transportation noise (e.g., stationary sources) be mitigated to levels in Table 11-3 of the Sutter County General Plan Noise Element (Sutter County, 2011). Table 11-3 establishes an hourly noise level of 55 dBA and maximum noise level of 70 dBA for non-transportation noises sources during daytime hours (7:00 am to 10:00 pm) (Sutter County, 2011). In addition, the Noise Element establishes noise level performance standards.

The project site is located in rural Sutter County. Sensitive receptors in the vicinity of the Proposed Project/Action area are generally limited to scattered rural residences and small residential areas in the town of Meridian. The Meridian pump station would generate noise comparable to that of the existing pump station facility; no long-term changes to the ambient noise environment are anticipated. The Drexler re-lift pump station is located over 3,000 feet from the closest resident and therefore would have little or no effect on the existing ambient noise environment. In addition, measures described in subsection 2.5, have been incorporated into the Proposed Project/Action that will be made conditions of approval, which would require noise attenuation during construction activities to minimize exposure of persons to noise levels in excess of applicable standards. In addition, implementation of 2008 IS/EA Mitigation Measure NOISE-1 would further minimize increases in noise levels. Therefore, this would be considered a less-than-significant impact.

- b,d) **Less-than-Significant Impact with Mitigation.** Construction activities could lead to temporary or periodic increases in ambient noise levels in the project vicinity above the existing ambient noise levels. Construction of the Proposed Project/Action would also involve the use of pile-driving activities which could generate noise in excess of 95 dBA at a distance of 50 feet, despite the incorporation of feasible noise control measures. The nearest residence to the proposed Meridian Diversion is located at a distance of approximately 630 feet.

Using this distance in conjunction with an attenuation rate of 6 dBA per doubling of distance from the source, noise at the nearest residence during pile driving activities could reach 74 dBA. This value is above the County's maximum standard of 70 dBA during daytime hours.

Measures described in subsection 2.5, have been incorporated into the Proposed Project/Action that would be made conditions of approval, which would require noise attenuation during construction activities to minimize exposure of receptors to increased noise levels. In addition, implementation of 2008 IS/EA Mitigation Measure NOISE-1 would further minimize increases in noise levels. Therefore, increases in noise levels associated with pile driving and other construction activities would be less than significant.

- c) **Less-than-Significant Impact.** As described in Checklist Item 11a, noise generated from the operation of the Proposed Project/Action would be comparable to the existing ambient noise environment once constructed. In addition, measures described in subsection 2.5, have been incorporated into the Proposed Project/Action that will be made conditions of approval, which would require noise attenuation be incorporated into final project design to minimize exposure of persons to increases in operational noise levels. Therefore, the Proposed Project/Action would not result in a substantial permanent increase in noise levels and this impact would be less than significant.
- e) **No Impact.** The closest airport, Sutter County Airport, is located at approximately 14 miles from the Proposed Project/Action. Furthermore, no new development of noise sensitive land uses is proposed as part of the Proposed Project/Action. For this reason, the Proposed Project/Action would not expose people residing or working in the project area to excessive noise levels associated with air traffic. No impact would occur.
- f) **No Impact.** The Proposed Project/Action is not located within the immediate vicinity of a private airstrip. No impact would occur

4.1.13 Population and Housing

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
13. POPULATION AND HOUSING — Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Displace substantial numbers of existing housing units, necessitating the construction of replacement housing elsewhere?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion

- a) **No Impact.** The Proposed Project/Action is designed to protect and enhance anadromous fisheries on the Sacramento River and comply with state and federal Endangered Species

Acts as MFWC continues to divert water from the Sacramento River for agricultural irrigation. The Proposed Project/Action would not increase the amount of entitled water diverted from the Sacramento River and all diverted water would continue to be used exclusively for agricultural irrigation. Therefore, construction and operation of the Proposed Project/Action would not contribute to an increase in regional or local populations and no impact would occur.

- b,c) **No Impact.** The Proposed Project/Action would not require the demolition of existing housing, thereby displacing substantial numbers of people necessitating the construction of housing elsewhere. As a result, no impacts related to population and housing would occur.

4.1.14 Public Services

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
14. PUBLIC SERVICES — Would the project:				
a) Result in substantial adverse physical impacts associated with the provision of, or the need for, new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services:				
i) Fire protection?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ii) Police protection?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
iii) Schools?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
iv) Parks?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
v) Other public facilities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion

- ai-v) **No Impact.** The Proposed Project/Action is designed to divert water from the Sacramento River for agricultural irrigation and would not increase the amount of entitled water diverted from the Sacramento River. Therefore, construction and operation of the Proposed Project/Action would not contribute to an increase in regional or local populations resulting in an increased demand for public services. No impact would occur.

4.1.15 Recreation

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
15. RECREATION — Would the project:				
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facilities would occur or be accelerated?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion

- a,b) **No Impact.** The Proposed Project/Action is the construction and operation of an agricultural water system to support existing agricultural uses. Implementation of the Proposed Project/Action would not contribute to an increased in demand for parks or other recreational facilities or require the construction or expansion of new recreational facilities. No impact to recreational resources would occur.

4.1.16 Transportation and Traffic

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
16. TRANSPORTATION AND TRAFFIC — Would the project:				
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Conflict with an applicable congestion management program, including, but not limited to, level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) 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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Result in inadequate emergency access?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion

- a,b) **Less-than-Significant Impact with Mitigation.** Construction of the Proposed Project/Action would intermittently and temporarily generate increases in vehicle trips by construction workers and construction vehicles on area roadways. Construction activities would also result in a temporary reduction in the number of, or the available width of, travel lanes on roads where full or partial closures are required, resulting in short-term traffic delays for vehicles traveling past the construction zones, and in some cases, temporary closure of road segment, with resulting disruption to access for adjacent land uses and streets for both general traffic and emergency vehicles.

Construction activities would also generate short-term increases in vehicle trips by construction workers and construction vehicles on area roadways to and from construction areas. Construction-generated traffic would be temporary and therefore would not result in any long-term degradation in operating conditions or level of service (LOS) on any local roadways. The primary off-site impacts from the movement of construction trucks, primarily any materials hauling trucks, would include short-term and intermittent lessening of roadway capacities due to slower movements and larger turning radii of the trucks compared to passenger vehicles.

Implementation of the following mitigation measures would reduce potential conflicts during construction activities to a less-than-significant level.

Mitigation Measure TRAFFIC-1: Following completion of construction activities, contractor(s) shall restore any damage to construction access routes to existing conditions or better.

Mitigation Measure TRAFFIC-2: Prior to and during construction activities, contractor(s) shall prepare and implement a Traffic Control Plan in accordance with professional engineering standards prior to construction. The Traffic Control Plan should include the following requirements, or equally effective measures:

- Emergency services access to local land uses shall be maintained at all times for the duration of construction activities. Local emergency service providers shall be informed of road closures and detours.
- For roadways requiring full closures, contractor(s), in coordination with Sutter County, shall develop circulation and detour plans to minimize impacts to local street circulation. This would include the use of signing to guide vehicles onto alternative roads around the construction zone.
- Advanced warning signs of construction activities shall be posted to allow motorists to select alternative routes in advance. This will include noticing of residents and businesses fronting the alignment at least two weeks prior to the commencement of construction activities.
- Access for local land uses including during construction activities shall be maintained.
- Roadside safety protocols shall be complied with, so as to reduce the risk of accident.
- A telephone resource shall be arranged to address public questions and complaints during project construction.

- c) **No Impact.** The proposed project would not involve aircraft, nor would the project structures intrude into aircraft flight paths or air traffic spaces. Therefore, the Proposed Project/Action would not impact on air traffic patterns that results in substantial safety risks. No impact would occur.
- d) **No impact.** The Proposed Project would not include the design, construction or operation of any roadways. Therefore, it would not substantially increase hazards due to sharp curves or dangerous intersections or incompatible uses. No impact would occur.
- e) **Less-than-Significant Impact with Mitigation.** Construction activities would affect access for emergency vehicles traveling past the construction zones. Construction within or across streets, and temporary reduction in travel lanes, could result in delays for emergency vehicle access in the vicinity of the worksites. In addition, access to driveways and to cross streets along the construction route could be temporarily blocked due to trenching and paving. This could be an inconvenience to some and a significant problem for others, particularly emergency service providers (e.g., police and fire). Travel through the construction zone by emergency vehicles would be maintained at all time. With the incorporation of Mitigation Measure TRAFFIC-2 impacts to emergency access would be less than significant.
- f) **No Impact.** The project area is not served by designated transit, bicycle, or pedestrian facilities. Therefore impacts to adopted plans or policies related to public transit, bicycle, or pedestrian facilities are not anticipated and no impact would occur.

4.1.17 Utilities and Service Systems

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
17. UTILITIES AND SERVICE SYSTEMS —				
Would the project:				
a) Conflict with wastewater treatment requirements of the applicable Regional Water Quality Control Board?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Require or result in the construction of new storm water drainage facilities, or expansion of existing facilities, the construction of which could cause significant environmental effects?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Result in a determination by the wastewater treatment provider that would serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
g) Comply with federal, state, and local statutes and regulations related to solid waste?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Discussion

- a,b,e) **No Impact.** The Proposed Project/Action is designed to divert water from the Sacramento River for agricultural irrigation and would not increase the amount of entitled water diverted from the Sacramento River. Therefore, construction and operation of the Proposed Project/Action would not contribute to an increase in regional or local populations resulting in the construction of new or expanded wastewater or water treatment facilities. Therefore, implementation of the Proposed Project/Action would not exceed wastewater treatment requirements of the CVRWQCB. Therefore, no impact would occur.
- c) **No Impact.** The Proposed Project/Action would not increase impervious surface cover over existing condition so that it would require the construction of a new storm drainage system or expansion of an existing stormwater drainage facility. Therefore, no impact would occur.
- d) **No Impact.** MFWC has sufficient water supplies and existing entitlements to serve the Proposed Project/Action. Therefore, no new or expanded entitlements would be required for the Proposed Project/Action and no impact would occur.
- f,g) **Less-than-Significant Impact.** Construction activities would not generate a significant amount of solid wastes. It is anticipated that solid wastes generated by construction activities would be disposed by the contractor(s) at the Ostrum Road Landfill landfill in Yuba County, which has an expected closure date of 2066 (Sutter County , 2008). The Ostrum Road Landfill is the primary location for the disposal of waste by the Yuba Sutter Disposal, Inc. Once constructed, operation of the Proposed Project/Action would continue to produce solid wastes approximately equivalent to the existing operations and therefore would not substantially increase the amount of wastes to be collected, transported and disposed of at the YSDI landfill. As a result, the Proposed Project/Action is expected to have less-than-significant impact on solid waste disposal.

4.1.18 Environmental Justice, Socioeconomics, and Indian Trust Assets

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
18. Environmental Justice, Socioeconomics, and Indian Trust Assets — Would the project:				
a) Adversely affect minority or low-income populations and Indian Trust Assets?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Discussion

- a) Demographic analysis of the local population indicates that no minority or low-income communities of concern are located within the affected environment for the Proposed

Project/Action that warrant environmental justice analysis. Reclamation has determined that there are no ITAs within the vicinity of the project area. Consequently, no environmental justice, socioeconomic or Indian trust impacts are associated with the Proposed Project/Action.

4.1.19 Mandatory Findings of Significance

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
19. MANDATORY FINDINGS OF SIGNIFICANCE —				
Would the project:				
a) Have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Have environmental effects that would cause substantial adverse effects on human beings, either directly or indirectly?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Discussion

- a) **Less-than-Significant with Mitigation.** As discussed in the Air Quality, Geology Soils and Seismicity, Hydrology and Water Quality, Noise, and the Transportation and Traffic, sections of this Initial Study, the Proposed Project/Action would result in potentially significant temporary impacts as a result of construction of the Proposed Project/Action that would have the potential to degrade the quality of the environment. However, adoption and implementation of mitigation measures described in this Initial Study would reduce these individual impacts to less than significant levels.
- b) **Less-than-Significant with Mitigation.** The impacts of the Proposed Project/Action are individually limited and not considered "cumulatively considerable". Although incremental changes can be expected as a result of the implementation of the Proposed Project/Action, all environmental impacts that could potentially occur would be reduced to a less than significant level through implementation of the mitigation measures recommended in this Initial Study for the following resource areas: Air Quality, Geology Soils and Seismicity, Hydrology and Water Quality, Noise, and Transportation and Traffic.

- c) **Less-than-Significant with Mitigation.** Proposed Project/Action impacts include the potential for an accidental release of hazardous materials stored in the proposed project construction area that could enter nearby waterways, adjacent lands, or public roadways. With implementation of mitigation measures provided in the Hazards and Hazardous Materials section, the proposed project would not result in environmental effects that could cause adverse effects on human beings, either directly or indirectly. Temporary impacts to human beings through degradation of local air quality and noise could occur during construction. However, with implementation of mitigation measures provided in the Air Quality and Noise sections, these temporary impacts would be less than significant.
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APPENDIX A

Mitigation Monitoring and Reporting Program

This Mitigation Monitoring and Reporting Program (MMRP) has been prepared by the California Department of Fish and Game (CDFG) and the U.S. Bureau of Reclamation (Reclamation) in conjunction with the Proposed Project/Action. The Proposed Project/Action has been evaluated in an Initial Study/Environmental Assessment and Mitigated Negative Declaration/Finding of No Significant Impact prepared in accordance with the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). The legislation requires public agencies to ensure that adequate mitigation measures are implemented and monitored for Mitigated Negative Declarations.

The legal basis for the development and implementation of the MMRP lies within both CEQA (including the California Public Resources Code) and NEPA. Sections 21002 and 21002.1 of the California Public Resources Code state:

- Public agencies are not to approve projects as proposed if there are feasible alternatives or feasible mitigation measures available that would substantially lessen the significant environmental effects of such projects; and each public agency shall mitigate or avoid the significant effects on the environment of projects that it carries out or approves whenever it is feasible to do so.
- Section 21081.6 of the California Public Resources Code further requires that the public agency shall adopt a reporting or monitoring program for the changes made to the project or conditions of project approval, adopted to mitigate or avoid significant effects on the environment. The reporting or monitoring program shall be designed to ensure compliance with mitigation measures during project implementation. The monitoring program must be adopted when a public agency makes its findings under CEQA so that the program can be made a condition of project approval in order to mitigate significant effects on the environment.

NEPA 40 CFR Sections 1502.14f requires:

- Agencies shall include appropriate mitigation measures not already included in the proposed action or alternatives.

This MMRP has been developed to ensure that project sponsor, Meridian Farms Water Company (MFWC), carries out the adopted measures to mitigate and/or avoid significant environmental impacts associated with the construction and operation of the Proposed Project/Action. This MMRP identifies new and/or modified mitigation measures specific to the Phase 2 Proposed Project/Action as well as applicable 2008 IS/EA measures previously adopted by the CDFG. These 2008 IS/EA mitigation measures would be implemented, enforced, and monitored

consistent with the MMRP for the 2008 IS/EA and are included in the MMRP for the Proposed Project/Action for reference only.

**TABLE 3-1
MITIGATION MONITORING AND REPORTING PROGRAM**

Mitigation Measure	Implementing/ Funding Responsibility	Monitoring/Review Oversight	Timing	Verification of Compliance (Initials and Date)
Biological Resources				
Mitigation Measure BIO-2: Staging Areas. During construction operations, stockpiling of construction materials, portable equipment, vehicles, and supplies will be restricted to the designated construction staging areas and exclusive of the Environmentally Sensitive Areas (ESAs). A clear and solid barrier fence, such as a combination of exclusionary and silt fencing, will be installed along the boundaries of the staging area to prevent contamination of ESAs during such operations.	MFWC	CDFG/USBR	Prior to and throughout construction activities	
Mitigation Measure BIO-3: Pre-construction Surveys. No more than 24-hours prior to the commencement of construction activities, a USFWS-approved biologist shall survey areas deemed suitable giant garter snake (GGS) habitat for the presence of GGS. The biologist will provide the USFWS with a written report that adequately documents the methodology and results of the pre-construction survey. These areas shall be re-inspected by the biologist whenever a lapse in construction activity of two and removed at the end of each workday from the entire project site.	MFWC	CDFG/ USFWS	Prior to construction activities	
Mitigation Measure BIO-15: De-watering GGS Habitat. Any dewatered habitat must remain dry for at least 15 consecutive days after April 15 and prior to excavating or filling the dewatered habitat.	MFWC	CDFG/USBR	15 consecutive days prior to construction in any dewatered areas after April 15.	
Measure BIO-16: Monitoring During Construction. A USFWS-approved biologist shall be available on an on-call basis in the event that a GGS is encountered on site during construction activities. The biologist shall have the authority through communication with the resident engineer to stop construction activities in the immediate area if a GGS is encountered during construction until appropriate corrective measures have been completed or until the snake is determined to be unharmed. Snakes encountered during construction activities shall be allowed to move away from the area on their own volition. The biologist shall notify the USFWS immediately if any listed species are found on-site, and will submit a report, including date(s), location(s), habitat description, and any corrective measures taken to protect the species found. The biologist shall be required to report any take of listed species to the USFWS immediately by telephone at 916/ 414-6600 and by electronic mail or written letter addressed to the Chief, Endangered Species Division, within three (3) working days of the incident. The Service does not authorize any handling or moving of a GGS by other than USFWS-permitted biologist.	MFWC	CDFG//USFWS	Throughout construction activities	
Mitigation Measure BIO-17: Compensation. Temporary impacts shall be restored to pre-project conditions. Areas subject to temporary impacts shall be limited to one season (the calendar year period between May 1 and October 1) and be restored within two seasons. Permanent impacts to GGS habitat shall be replaced at a 3:1 ratio which must include both upland and aquatic habitat components. A portion of the mitigation for permanent loss of wetlands at a ratio no less than 1:1 may fulfill a portion of the 3:1 mitigation obligation for permanent impacts to GGS habitat. This mitigation may be fulfilled through in-kind, onsite or off-site, out-of-kind mitigation as approved by the USFWS and the Corps.	MFWC	CDFG/USBR	After completion of construction activities	

Mitigation Measure	Implementing/ Funding Responsibility	Monitoring/Review Oversight	Timing	Verification of Compliance (Initials and Date)
Mitigation Measure BIO-A: Spoil Sites. Spoil sites shall be located so they do not drain directly into the waterways. If a spoil site drains into a water body, catch basins shall be constructed to intercept sediment before it reaches the channels. Spoil sites shall be graded to reduce the potential for erosion.	MFWC	CDFG/USBR	Prior to and throughout construction activities	
Mitigation Measure BIO-B: Hazardous Materials. A spill prevention plan for potentially hazardous materials shall be prepared and implemented. The plan shall include the proper handling and storage of all potentially hazardous materials, as well as the proper procedures for cleaning up and reporting of any spills. If necessary, containment berms shall be constructed to prevent spilled materials from reaching the creek channels.	MFWC	CDFG/USBR	Prior to construction activities	
Mitigation Measure BIO-C: Storage. Equipment and materials shall be stored at least 50 feet from waterways. No debris such as trash and spoils shall be deposited within 100 feet of waterways. Staging and storage areas for equipment, materials, fuels, lubricants and solvents, shall be located outside of the stream channel and banks. Stationary equipment such as motors, pumps, generators, compressors and welders, located within or adjacent to the stream shall be positioned over drip pans. Any equipment or vehicles driven and/or operated within or adjacent to the stream shall be checked and maintained daily, to prevent leaks of materials that if introduced to water could be deleterious to aquatic life. Vehicles shall be moved away from the stream prior to refueling and lubrication.	MFWC	CDFG/USBR	Throughout construction activities	
Mitigation Measure BIO-D: Vehicle Maintenance. Proper and timely maintenance for vehicles and equipment used during construction shall be provided to reduce the potential for mechanical breakdowns leading to a spill of materials into or around the creeks. Maintenance and fueling shall be conducted in an area that meets the criteria set forth in the spill prevention plan (i.e., away from sensitive drainages).	MFWC	CDFG/USBR	Throughout construction activities	
Mitigation Measure BIO-E: Dust Prevention. Water used for dust abatement, if necessary, shall be acquired from an authorized off-site source. Water shall be a clean water source in accordance with California RWQCB Construction Storm Water Program and/or as authorized under a separate National Pollutant Discharge Elimination System (NPDES) permit.	MFWC	CDFG/USBR	Throughout construction activities	
Mitigation Measure BIO-F: Daily Monitoring. A qualified biological monitor shall be on site during in-water construction activities. The biological monitor shall be authorized to halt construction if impacts to special-status salmonid species are evident.	MFWC	CDFG/USBR	Throughout construction activities	
Mitigation Measure BIO-G: Riparian Habitat. Current riparian vegetation shall be retained to extent feasible.	MFWC	CDFG/USBR	Throughout construction activities	
Mitigation Measure BIO-H: Fish Rescue Plan. A fish rescue plan shall be prepared by MFWC prior to the implementation of the project and provided for review and comment to U.S. National Marine Fisheries Service (NMFS), USFWS, and CDFG as appropriate. A qualified fisheries biologist will design and conduct a fish rescue and relocation effort to collect fish from the area within the cofferdam involving the capture and return of those fish to suitable habitat within the Sacramento River. To ensure compliance, a fisheries biologist shall provide observation during initial dewatering activities within the cofferdam. Following the fish rescue effort, a report shall be prepared by the fisheries	MFWC	NMFS	Prior to and during construction activities	

Mitigation Measure	Implementing/ Funding Responsibility	Monitoring/Review Oversight	Timing	Verification of Compliance (Initials and Date)
biologist and submitted to NMFS within 30 days.				
<p>Mitigation Measure BIO-22: Swainson's Hawk, Nesting Raptors and Other Nesting Bird Survey. The applicant shall make every effort to conduct any tree and shrub removal activities that are required for project construction outside of the migratory bird and raptor breeding season (February 15th through August 31st.</p> <p>For any construction activities that will occur between March 1 and August 31 of any given year, the applicant shall conduct preconstruction surveys in suitable nesting habitat within 0.5 mile of the construction area for nesting raptors. Surveys shall be conducted by a qualified biologist. In addition, all trees slated for removal during the nesting season shall be surveyed by a qualified biologist no more than 48-hours before removal to ensure that no nesting birds are occupying the tree.</p> <p>If active nests are found during the survey, the applicant shall implement appropriate mitigation measures to ensure that the species will not be adversely affected, which will include establishing a no-work buffer zone as, approved by the CDFG, around the active nest. The no-work buffer may vary depending on species and site specific conditions as approved by CDFG. Appropriate mitigation measures include delaying construction activities until a qualified biologist determines that juveniles have fledged the nest(s), or establishing a "no construction" zone buffer around the nest.</p> <p>The results of the survey shall be documented in a letter report that is distributed to the CDFG. These measures would ensure compliance with the Migratory Bird Treaty Act and CDFG Code 3503.5.</p>	MFWC	CDFG/USBR	Prior to and throughout construction activities	
<p>Mitigation Measure BIO-23: Riparian Habitat Exclusion. Where construction work occurs adjacent to riparian habitat (i.e., at the existing Drexler Diversion and Pumping Plant and the Grimes Canal modifications), there shall be no encroachment by construction equipment or personnel into existing riparian habitat areas located along the Sacramento River. Storage or parking of equipment shall be restricted within 100 feet of riparian habitat.</p>	MFWC	CDFG/USBR	Throughout construction activities	
<p>Mitigation Measure BIO-H: Pre-construction surveys for burrowing owls shall be conducted by a qualified biologist as approved by the CDFG within 30-days prior to the start of work activities where land construction is planned in known or suitable habitat. If construction activities are delayed for more than 30 days after the initial preconstruction surveys, then a new preconstruction survey shall be required. All surveys shall be conducted in accordance with the CDFG/California Burrowing Owl Consortium survey protocols. This survey can be conducted concurrently with Mitigation Measure BIO-22.</p> <p>If burrowing owls are discovered in the proposed project site vicinity during construction, the onsite biologist shall be notified immediately. Occupied burrows should not be disturbed during the nesting season (February 1 through August 31) unless a qualified biologist approved by the CDFG verifies through non-invasive methods that either: (1) the birds have not begun egg-laying and incubation; or (2) that juveniles from the occupied burrows are foraging independently and are capable of independent survival.</p> <p>If this criteria is not met, occupied burrows during the nesting season will be avoided by establishment of a no-work buffer of 250-foot around the occupied/active burrow. Where maintenance of a 250-foot no-work buffer zone is not practical, the applicant shall consult with the CDFG to determine appropriate avoidance measures. Burrows occupied during the breeding season (February 1 to August 31) will be closely monitored by the biologist until the young fledge/leave the nest. The onsite biologist shall have</p>	MFWC	CDFG/USBR	Prior to and throughout construction activities	

Mitigation Measure	Implementing/ Funding Responsibility	Monitoring/Review Oversight	Timing	Verification of Compliance (Initials and Date)
<p>the authority to stop work if it is determined that construction related activities are disturbing the owls.</p> <p>If criterion 1 or 2 above are met and as approved by CDFG, the biologist shall undertake passive relocation techniques by installing one-way doors in active and suitable burrows allowing owls to escape but not re-enter. Owls should be excluded from the immediate impact zone and within a 160-foot buffer zone by having one-way doors placed over the entrance to prevent owls from inhabiting those burrows.</p> <p>After nesting season ends (August 31) and the burrow is deemed unoccupied by the biologist, passive relocation techniques shall take place. Construction activities may occur once a qualified biologist has deemed the burrows are unoccupied.</p>				
<p>Mitigation Measure BIO-1: Wetlands. If it is determined that the Proposed Project/Action impacts waters of the U.S., the MFWC shall obtain all required permit approvals from the Corps, Regional Water Quality Control Board (RWQCB), CDFG and any other agencies with permitting responsibilities for construction activities within jurisdictional features. Permit approvals and certifications would likely include the following:</p> <p><u>Clean Water Act Section 404.</u> Permit approval from the Corps shall be obtained for the placement of dredge or fill material in waters of the U.S. pursuant to Section 404 of the federal Clean Water Act. The Section 404 permit application would require a delineation of wetlands and other waters of the U.S., a jurisdictional determination from the Corps, and preparation of a Pre-Construction Notification (PCN) and supporting documentation. A PCN outlines project activities, areas of impact, construction techniques, and methods for avoiding and reducing impacts to jurisdictional features. State and federal regulations require that the project applicant avoid or minimize impacts to wetlands and waters and develop appropriate protection for wetlands. Wetlands that cannot be avoided must be compensated to result in "no net loss" of wetlands to ensure that the project would maintain the current functions and values of onsite wetland habitats.</p> <p><u>Clean Water Act Section 401 Water Quality Certification/Porter-Cologne Act.</u> Approval of Water Quality Certification (WQC) under the CWA and/or Waste Discharge Requirements (WDRs) under the Porter-Cologne Act shall be obtained from the RWQCB for work within jurisdictional waters. Application for a WQC requires an application and supporting materials, including construction techniques, areas of impact, mitigation measures, project schedule, and proof of CEQA compliance. Application for a WDR requires an application and supporting materials, including a characterization of the discharge which includes but is not limited to: design and actual flows; a list of constituents and the discharge concentration of each constituent; a list of other appropriate waste discharge characteristics; a description and schematic drawing of all treatment process; a description of any BMPs used; and a description of disposal methods. Proof of CEQA compliance is also required.</p> <p><u>California Fish and Game Code Section 1602.</u> CDFG requires a Streambed Alteration Agreement for activities that result in alteration of the bed or bank of a stream (typically the top of bank or edge of riparian habitat, whichever is greater), or that adversely impact fish or wildlife resources. The notification package must include supporting materials, including construction techniques, areas of impact, mitigation measures, project schedule, and proof of CEQA compliance.</p>	MFWC	CDFG/USBR	Prior to construction activities	
<p>Mitigation Measure BIO-28: Compensation for Loss of Jurisdictional Wetlands. If the Proposed Project/Action results in the permanent degradation of riverine and wetland habitat, those impacts shall be compensated for at a 1:1 ratio through the purchase of similar habitat value from a USFWS-</p>	MFWC	CDFG/USBR	After completion of construction activities	

Mitigation Measure	Implementing/ Funding Responsibility	Monitoring/Review Oversight	Timing	Verification of Compliance (Initials and Date)
approved conservation bank. Compensation shall take the form of wetland and/or riverine preservation or creation in accordance with the Corps and CDFG mitigation requirements, as required under project permits. Preservation and creation may occur onsite through a conservation agreement or offsite through purchasing credits at a Corps approved mitigation bank.				
Transportation and Traffic				
Mitigation Measure TRAFFIC-1: Following completion of construction activities, contractor(s) shall restore any damage to construction access routes to existing conditions or better.	MFWC	CDFG/USBR	After completion of construction activities	
Mitigation Measure TRAFFIC-2: Prior to and during construction activities, contractor(s) shall prepare and implement a Traffic Control Plan in accordance with professional engineering standards prior to construction. The Traffic Control Plan should include the following requirements, or equally effective measures:	MFWC	CDFG/USBR	Prior to and throughout construction activities	
<ul style="list-style-type: none"> Emergency services access to local land uses shall be maintained at all times for the duration of construction activities. Local emergency service providers shall be informed of road closures and detours. For roadways requiring full closures, contractor(s), in coordination with Sutter County, shall develop circulation and detour plans to minimize impacts to local street circulation. This would include the use of signing to guide vehicles onto alternative roads around the construction zone. Advanced warning signs of construction activities shall be posted to allow motorists to select alternative routes in advance. This will include noticing of residents and businesses fronting the alignment at least two weeks prior to the commencement of construction activities. Access for local land uses including during construction activities shall be maintained. Roadside safety protocols shall be complied with, so as to reduce the risk of accident. A telephone resource shall be arranged to address public questions and complaints during project construction. 				
2008 IS/EA Adopted Mitigation Measures				
Air Quality				
Mitigation Measure AIR-1. Implement FRAQMD Best Available Mitigation Measures For Construction Activity:	MFWC	CDFG/USBR	Prior to approval of dust control plan	
Implement PM10 control measures outlined in the FRAQMD Fugitive Dust Control Plan.				
MFWC shall require its construction contractor(s) to assemble a comprehensive inventory list (i.e., make, model, engine year, horsepower, 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 both Phases 1 and 2 construction activities and apply the following mitigation measure: <i>Reducing NOx emissions from off-road diesel powered equipment</i> MFWC or its construction contractor(s) 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 construction of Phases 1 and 2, including owned, leased and subcontractor vehicles, will achieve a project wide fleet-average 20 percent NOx reduction and	MFWC	CDFG/USBR	Throughout construction activities	

Mitigation Measure	Implementing/ Funding Responsibility	Monitoring/Review Oversight	Timing	Verification of Compliance (Initials and Date)
45 percent particulate reduction 1 compared to the most recent CARB fleet average at time of construction. A Construction Mitigation Calculator (MS Excel) may be downloaded from the SMAQMD web site to perform the fleet average evaluation http://www.airquality.org/ceqa/index.shtml . Acceptable options for reducing emissions may include use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, perform offsite mitigation projects, provide funds for air district offsite mitigation projects, and/or other options as they become available. The District should be contacted to discuss alternative measures.				
Construction equipment exhaust emissions shall not exceed FRAQMD Regulation III, Rule 3.0, Visible Emissions limitations (40 percent 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.	MFWC	CDFG/USBR	Throughout construction activities	
The primary contractor shall be responsible to ensure that all construction equipment is properly tuned and maintained.	MFWC	CDFG/USBR	Throughout construction activities	
Minimize idling time to 10 minutes – saves fuel and reduces emissions.	MFWC	CDFG/USBR	Throughout construction activities	
No open burning of removed vegetation during infrastructure improvements. Vegetative material should be chipped or delivered as waste to energy facilities.	MFWC	CDFG/USBR	Throughout construction activities	
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 California Air Resources Board (CARB) Portable Equipment Registration with the State or a local district permit. The owner/operator shall be responsible for arranging appropriate consultations with the CARB or the District to determine registration and permitting requirements prior to equipment operation at the site.	MFWC	CDFG/USBR	Throughout construction activities	
Biological Resources				
Mitigation Measure BIO-1: Traffic Routing, and Movement:	MFWC	CDFG/USBR	Prior to and throughout construction activities	
During construction operations, the number of access routes, number and size of staging areas, and the total area of the proposed project activity will be limited to the minimum necessary.				
Routes and boundaries will be clearly demarcated. Movement of heavy equipment to and from the project site will be restricted to established roadways to minimize habitat disturbance.	MFWC	CDFG/USBR	Prior to and throughout construction activities	
Project-related vehicles shall observe a 20-mile-per-hour speed limit within construction areas, except on County roads and on State and Federal highways. This is particularly important during periods when the GGS may be sunning or moving on roadways. All heavy equipment, vehicles, and supplies will be stored at the designated staging area at the end of each work period.	MFWC	CDFG/USBR	Prior to and throughout construction activities	
Mitigation Measure BIO-4: Timing of Construction:	MFWC	CDFG/USFWS	May 1 through	

Mitigation Measure	Implementing/ Funding Responsibility	Monitoring/Review Oversight	Timing	Verification of Compliance (Initials and Date)
Construction activity within GGS habitat (<i>e.g.</i> aquatic, upland, and rice habitat) shall be conducted between May 1 and October 1.			October 1	
If it appears that construction activity may go beyond October 1, the project proponents shall contact the USFWS as soon as possible, but not later than September 15 of the year in question, to determine if additional measures are necessary to minimize take.	MFWC	CDFG/USFWS	May 1 through September 15 (Conditionally).	
Construction activities within 200 feet from the banks of snake aquatic habitat will be avoided during the snake's inactive season. If this is not feasible, the Project Proponent must consult with USFWS to determine measures to avoid impacts to GGS.	MFWC	CDFG/USFWS	May 1 through October 1 May 1 through September 15 (Conditionally)	
Mitigation Measure BIO-6: Worker Awareness Training: A Worker Environmental Awareness Training Program for construction personnel shall be conducted by the USFWS-approved biologist for all construction workers, including contractors, prior to the commencement of construction activities.	MFWC	CDFG/USBR /USFWS	Prior to and throughout construction activities	
The program shall provide workers with information on their responsibilities with regard to the snake, an overview of the life history of this species, information on take prohibitions, protections afforded this animal under the Act, and an explanation of the relevant terms and conditions of this biological opinion.	MFWC	CDFG/USBR /USFWS	Prior to and throughout construction activities	
Written documentation of the training must be submitted to the Sacramento Fish and Wildlife Office within 30 days of the completion of training. As needed, training shall be conducted in Spanish for Spanish language speakers.	MFWC	CDFG/USBR /USFWS	Prior to and throughout construction activities	
Mitigation Measure BIO-7: Install Snake Exclusion Fencing: Prior to the commencement of construction activities, high visibility fencing will be erected around the habitats of federally listed species to identify and protect these designated ESAs from encroachment of personnel and equipment. These areas will be avoided by all construction personnel.	MFWC	CDFG/USBR	Prior to and throughout construction activities	
The fencing shall be inspected by the Contractor before the start of each work day and maintained by the Contractor until completion of the project. The fencing may be removed only when the construction of the project is completed.	MFWC	CDFG/USBR	Prior to the start of each work day	
Fencing will be established in upland immediately adjacent to aquatic snake habitat and extending up to 200 feet from construction activities. Silt fencing, if properly installed, may serve as suitable snake exclusion fencing.	MFWC	CDFG/USBR	Prior to and throughout construction activities	
Mitigation Measure BIO-8: Provide Adequate Signage: Signs will be posted by the Contractor every 50 feet along the edge of the ESAs, with the following information: "This area is habitat of federally-threatened and/or endangered species, and must not be disturbed. These species are protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment." The signs should be clearly readable	MFWC	CDFG/USBR	Prior to and throughout construction activities	

Mitigation Measure	Implementing/ Funding Responsibility	Monitoring/Review Oversight	Timing	Verification of Compliance (Initials and Date)
from a distance of 20 feet, and must be maintained by the Contractor for the duration of construction.				
Mitigation Measure BIO-9: Implement BMPs: Best Management Practices (BMPs), including a Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP), will be implemented to minimize effects to the GGS during construction. Best management practices will be implemented to prevent sedimentation from entering ESAs and to reduce erosion, dust, noise, and other deleterious aspects of construction related activities. These BMPs may include, but are not limited to, silt fencing, temporary berms, restrictions on cleaning equipment in or near ESAs, installation of vegetative strips, and temporary sediment disposal. Runoff from dust control and hazardous materials will be retained on the construction site and prevented from flowing into the ESAs.	MFWC	CDFG/USBR	Prior to and throughout construction activities	
Mitigation Measure BIO-10: Erosion Control Materials: Tightly woven fiber netting (mesh size less than 0.25 inch) or similar material shall be used for erosion control and other purposes at the ESA to ensure that the GGS is not trapped or becomes entangled. This limitation shall be communicated to the contractor using special provisions included in the bid solicitation package.	MFWC	CDFG/USBR	Prior to and throughout construction activities	
Mitigation Measure BIO-11: Properly Dispose of Garbage: To eliminate an attraction to predators of the snake, all food-related trash items, such as wrappers, cans, bottles, and food scraps, must be disposed of in closed containers and removed at the end of each workday from the entire project site.	MFWC	CDFG/USBR	Throughout construction activities	
Mitigation Measure BIO-12: Use Approved Aggregate, Fill, or Borrow Materials: The Contractor shall provide documentation that aggregate, fill, or borrow material provided for the proposed project was obtained in compliance with the State Mining and Reclamation Act (SMARA). Evidence of compliance with the Act shall be demonstrated by providing the resident engineer with one of the following: 1) a letter from the USFWS stating that the use of the borrow pit will not result in the incidental take of species; 2) an incidental take permit for contractor-related activities issued by the USFWS pursuant to section 10(a)(1)(B) of the Act; 3) a biological opinion or letter concurring with a "not likely to adversely affect" determination issued by the USFWS to the Federal agency having jurisdiction over contractor-related services; 4) a letter from the USFWS concurring with the "no effect" determination for contractor-related activities; or 5) contractor submittal of information to the resident engineer indicating compliance with the SMARA and provision of County land use permits and California Environmental Quality Act (CEQA) clearance.	MFWC	CDFG/USBR /USFWS	Prior to and throughout construction activities	
Mitigation Measure BIO-13: Restore Temporarily Affected Habitat: After construction activities are complete, any temporary fill or construction debris shall be removed and disturbed areas restored to their pre-project conditions. An area subject to "temporary" disturbance includes any area that is disturbed during the project, but that, after project completion, will not be subject to further disturbance and has the potential to be re-vegetated. All ESA GGS habitats subject to temporary ground disturbances, including storage and staging areas and temporary roads, will be restored to pre-project conditions. If appropriate, these areas shall also	MFWC	CDFG/USBR /USFWS	After completion of construction activities	
	MFWC	CDFG/USBR /USFWS	After completion of construction	

Mitigation Measure	Implementing/ Funding Responsibility	Monitoring/Review Oversight	Timing	Verification of Compliance (Initials and Date)
be re-contoured to pre-project conditions. A written report shall be submitted to the USFWS within ten (10) working days of the completion of construction at the project site and restoration of the site to pre-project conditions.			activities	
A written report shall be submitted to the USFWS within ten (10) working days of the completion of construction at the project site and restoration of the site to pre-project conditions.	MFWC	CDFG/USBR /USFWS	10 days after completion of construction activities	
Mitigation Measure BIO-14: Post-construction Monitoring: An inspection of the site, with a photo documentation report showing pre- and post-project area photos, will be conducted and photos and a brief report will be submitted to USFWS one year from implementation of restoration to pre-project conditions.	MFWC	CDFG/USBR /USFWS	After the completion of construction activities	
Mitigation Measure BIO- 19: Pile Driving Activities: For Phases 1 and 2, the contractor shall use vibrational pile driving to the greatest extent feasible. If percussive pile driving is necessary, its use shall be minimized to the maximum extent possible and comply with the following <i>Interim Criteria for Injury of Fish to Pile Driving Operations</i> (Popper et al., 2006): The Sound Exposure Level (SEL) shall not exceed 187 dB (re:1 $\mu\text{Pa}^2 \text{ sec}$) in any single strike, measured at a distance of 32.8 ft from the source; The peak sound pressure level should not exceed 208 dB (re:1 $\mu\text{Pa}_{\text{peak}}$) in any single strike, measured at a distance of 32.8 ft from the source.	MFWC	CDFG/USBR	Throughout construction activities	
Mitigation Measure BIO-20: Dewatering: Pump(s) used for dewatering the construction site will be screened according to NMFS fish screening criteria for anadromous salmonids (NMFS, 1997b). A qualified biologist will be on-site during such pumping activities to ensure that any fish that may be present within the construction area are relocated to suitable habitat near the project area.	MFWC	CDFG/USBR/NMFS	Throughout construction activities	

Mitigation Measure	Implementing/ Funding Responsibility	Monitoring/Review Oversight	Timing	Verification of Compliance (Initials and Date)
Mitigation Measure BIO-21: Tree Removal Period: If possible, trees required for removal shall be removed outside of the nesting period (nesting period = March 1st through August 31st).	MFWC	CDFG/USBR	March 1 through August 31	
Hydrology and Water Quality				
Mitigation Measure HYDRO-1: Identify Site-Specific Control Measures: To minimize the exposure of sediments to runoff, MFWC or its construction contractor(s) will identify and implement site-specific construction and post-construction water quality control measures for both Phase 1 and 2 of the Proposed Project/Action facilities. Control measures will include those contained in the Construction Contractor's Guide and Specification of the Caltrans Storm Water Quality Handbook (The Handbook; April 1997); Sutter County Code Section 5, Storm Drainage Design, and the State Water Resources Control Board (SWRCB) Water Quality Order 99-08-DWQ, NPDES, General Permit for Stormwater Discharge Associated with Construction Activity.	MFWC	CDFG/USBR	Prior to, throughout, and following construction activities	
	MFWC	CDFG/USBR	Prior to, throughout, and following construction activities	
Noise				
Mitigation Measure NOISE-1. Minimization of the Construction and Operational Noise: Standard noise abatement measures will be implemented during construction to reduce noise impacts from construction activities. Construction activities will be limited between 7:00 a.m. and 5:00 p.m. on weekdays to reduce potential noise impacts to area residents. In addition, staging areas and stationary noise generating construction equipment will be located as far as possible from sensitive receptors, and all construction equipment will be maintained with the manufacturer's specified noise-muffling devices. Final design of the facilities of the Proposed Project/Action will incorporate noise attenuating technologies and noise barriers to mitigate that noise emanating from the facilities at maximum operational load will not exceed applicable standards or lead to cumulative increases in ambient noise levels.	MFWC	CDFG/USBR	Prior to and throughout construction activities	
	MFWC	CDFG/USBR	During operational activities	

MERIDIAN FARMS FISH SCREEN PROJECT, PHASE 2

Revised Draft Action Specific Implementation Plan

Prepared for:
Meridian Farms Water Company
May 2012

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CHAPTER 1

Introduction

This document is an Action Specific Implementation Plan (ASIP) which analyzes the potential environmental effects on aquatic and terrestrial species of the Meridian Farms Water Company (MFWC) proposed plan to construct positive barrier fish screen diversions on the Sacramento River and to modify their distribution system to accommodate the changed intakes. The MFWC Fish Screen and Diversion Project is divided into two phases, which are described in Chapter 2. The ASIP was a product of the CALFED Bay-Delta Program (CALFED) and was meant to streamline the regulatory process for CALFED Actions. The MFWC Fish Screen and Diversion Project were included as a CALFED Action.

The CALFED Bay-Delta Program was a collaborative effort of more than 20 Federal and State agencies that seek to resolve water supply and water quality issues as well as restore ecological health of the San Francisco Bay-Delta. After assessing the effects of potential CALFED Actions on the environment, the CALFED agencies developed initial conservation measures that, when implemented, would meet the overall CALFED Program objectives. These are contained within the Multi-Species Conservation Strategy (MSCS).

The MSCS explains how CALFED Program Actions will comply with the Federal Endangered Species Act (FESA), California Endangered Species Act (CESA), and Natural Communities Conservation Planning Act (NCCPA) requirements. The U.S. Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration (NOAA) Fisheries used the MSCS as the program-level biological assessment to develop the programmatic Biological Opinions (BOs) for the CALFED Preferred Program Alternative. The California Department of Fish and Game (CDFG) used the MSCS for compliance with the CESA and NCCPA.

The MSCS contains a two-tiered approach to FESA, CESA, and NCCPA compliance that corresponds to the CALFED Program's two-tiered approach to compliance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). The first tier of compliance is embodied in the MSCS itself. For the CALFED Program's Project Actions identified in the Programmatic Environmental Impact Statement / Environmental Impact Report (PEIS/EIR) and Record of Decision (ROD), an ASIP is developed to address the FESA, CESA, and NCCPA consultation requirements of Federal and State agencies. As a second tier document, this ASIP focuses on issues specific to MFWC's Fish Screen and Diversion Project (Proposed Project/Action). Therefore, this ASIP addresses the biological assessment requirements related to the Proposed Project/Action described in Chapter 2. The USFWS and NOAA Fisheries may use this ASIP for informal consultation and/or to develop action-specific BOs relative to the Proposed Project/Action. The CDFG will use this ASIP to address compliance with the CESA and NCCPA.

The CALFED Bay-Delta Program transitioned to the Delta Stewardship Council, established by S.B. No. 1 (Ch. 5, Stats. 09-10, 7th Ex. Sess.), on February 3, 2010. In conjunction with this change, ASIPs are no longer being used by agencies to review new projects. Because Phase 2 is a continuation of the larger MFWC Fish Screen Project, and effects to species and habitat were evaluated through the ASIP process during Phase I, USFWS indicated that this format could be continued in Phase 2 (pers. comm. with T. Adelsbach, USFWS, January 5, 2012).

1.1 Project Background

The MFWC is located in Sutter County, between Interstate 5 and Highway 99, east of the Sacramento River and southwest of the Sutter Bypass. **Figure 1-1** depicts the approximate limits of the MFWC Service Area. MFWC provides irrigation water to three distinct Service Areas encompassing approximately 9,150 acres, with an estimated annual water delivery of 35,000 acre-feet (af). The water service is provided by surface water diversions from the Sacramento River, drain water reuse, and groundwater pumping. Both lined and unlined canals are used for water conveyance. As irrigation water circulates through the canals and laterals, drainage water is collected and pumped into the conveyance facilities via re-lift pumps, providing a blend with better quality irrigation water from the Sacramento River.

MFWC diverts surface water from the Sacramento River under the provisions of a License for Diversion and Use of Water with a priority date of September 10, 1918. Presently MFWC diversions are at three locations on the Sacramento River: Meridian, Drexler, and Grimes. These diversions utilize unscreened intakes which likely entrain juvenile Chinook salmon, steelhead trout, green sturgeon, and other anadromous fish species that pass by the intake. Improvements to these diversions would fulfill conservation goals established by the CVPIA, which passed in 1992 for the protection and recovery of fisheries and fish habitat.

1.1.1 Project Overview

The primary purpose of the Proposed Project/Action is to prevent entrainment of migrating, at-risk, native fish species at MFWC's existing diversion facilities by removing one intake and installing fish screen structures at the other two intakes. Each existing pump utilizes an unscreened intake which likely entrains juvenile Chinook salmon and steelhead trout, green sturgeon and other fish species. Consequently, the continued operation of the MFWC diversion facilities likely remove some of the salmonid and sturgeon out-migrants from the mainstem of the Sacramento River. Under the CVPIA, the diversion pumps are now required to operate without causing detrimental effects to migrating fish; therefore, it is essential that fish screens be installed at the water intakes. As the existing diversion or pump station facilities cannot be retrofitted with a fish screen that would comply with CDFG and NOAA Fisheries criteria, MFWC will construct new positive barrier fish screen diversions that meet these criteria. Positive barrier fish screens will physically prevent fish from passing through the intake; these differ from behavioral barrier fish screens which encourage fish to swim away from a structure.

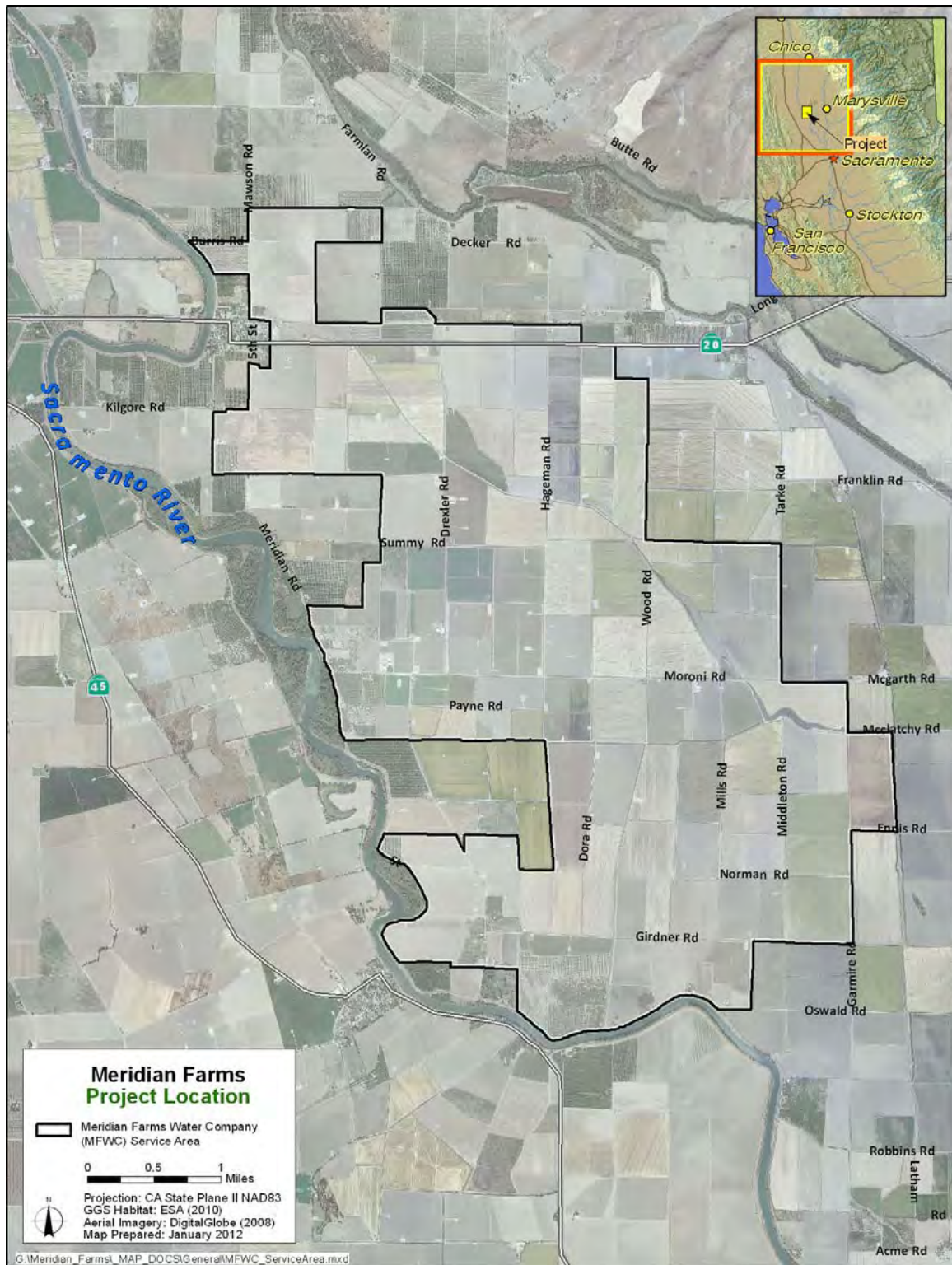


Figure 1-1. Project Location Map

The Proposed Project/Action will allow migrating Chinook salmon, steelhead trout, and green sturgeon to pass by the intake without risk of entrainment and, thus, contribute to the recovery of the anadromous and resident fish populations in the Sacramento River. The Proposed Project/Action will also allow MFWC to continue the diversions even while listed species are present in the vicinity of the diversion, enabling MFWC to provide a reliable long-term water supply to the MFWC Service Area in a manner that complies with present regulatory requirements.

The Proposed Project/Action is composed of several components, which were defined through a March 2002 Feasibility Study and subsequently selected as part the preferred project alternative by the MFWC Board of Directors. MFWC proposes to implement these components, which include the fish screen improvements and other associated conveyance improvements, in two separate phases. Each phase is independent of the other, and each will benefit fish species. The implementation of the Proposed Project/Action in two separate phases is more economically feasible and would coordinate better with MFWC operations. The components of these phases are listed in **Table 1-1** and each component is detailed in Chapter 2.

The Proposed Project/Action Area (Action Area) is defined to include all components of the Proposed Project/Action plus a 200-foot buffer of these components. On the landward side of the levee along the Sacramento River, no direct or indirect effects are anticipated outside this 200-foot zone due to the localized and temporary disturbance of the Proposed Project/Action upon the habitat. Similarly, on the riverside of the levee along the Sacramento River, no direct or indirect effects are anticipated within this 200-foot zone. The benefits resulting from implementation of the Proposed Project/Action, however, extend beyond the Action Area to include the entire Sacramento River migration corridor for fishes, from the Delta to spawning areas upstream from the Action Area. Implementation of the Proposed/Action would benefit fish populations by decreasing fish entrainment in diversions on the Sacramento River.

**TABLE 1-1
MFWC PROPOSED PROJECT/ACTION
COMPONENTS**

PHASE 2
New Meridian Diversion/Pumping Plant
Removal of Existing Meridian Diversion/Pumping Plant
Main Canal Modifications
Drexler Pipeline (option)
New Drexler Re-lift Pumping Plant
Removal of Existing Drexler Diversion/Pumping Plant

1.1.2 Current Management Direction

Currently, MFWC provides water to farmers for irrigation of their crops. There are 173 individual fields within the MFWC water Service Area. In the year 2011, approximately 57 percent of the irrigated area comprised of rice, which was the predominant grain crop. Tomatoes, wheat, and

sunflower are also important crops, with each comprising six to seven percent of the cropping pattern during the same year. Permanent tree crops (orchards) encompass about 10 percent of the planted area, with walnuts being the predominant crop.

MFWC's goals are to be able to maintain water diversion operations while avoiding entrainment of listed fish species present near the water intake. MFWC will achieve this goal by decommissioning and relocating the existing Grimes pumping plant and replacing the existing Meridian and Drexler facilities with a newly consolidated facility that complies with CDFG and NOAA Fisheries fish screen standards. The amount of water diverted from the Sacramento River will not increase as a result of the Proposed Project/Action to construct new facilities, as the existing facilities will be removed.

1.1.3 Implementing Entities

Both Federal and State agencies are involved in administering the MFWC Fish Screen Project. The U.S. Bureau of Reclamation (Reclamation) is the federal agency under NEPA, and the California Department of Fish and Game (CDFG) is the state lead under CEQA. The Project/Action may involve the use of federal funds from Reclamation, and Reclamation would be responsible for administering those funds.

The State and Federal agencies – USFWS, NOAA Fisheries, and CDFG – act as regulatory agencies and are responsible for making recommendations for actions to be taken to protect fish populations and special status wildlife and plant species. Reclamation, as the lead agency implementing CALFED, helps to coordinate agency consultation throughout the ASIP process. As MFWC would construct, own, and operate the new facilities in the Project, MFWC would be responsible for implementing operational changes based on the recommendations.

1.1.4 ASIP Contents

To fulfill the requirements of FESA Section 7 and California Fish and Game Code Sections 2835 and 2081, as applicable, the MFWC Fish Screen ASIP includes the following information pursuant to the November 2001 Guide to Regulatory Compliance for Implementing CALFED Actions (CALFED 2001a).

- A detailed project description (Proposed Project/Action – Chapter 2);
- A list of covered species and any other special-status species that may occur in the Action Area (Chapter 3);
- A discussion of essential habitat (Chapter 3);
- The analysis identifying the direct, indirect, and cumulative impacts on the covered species, other special-status species occurring in the Action Area (along with an analysis of impacts on any designated Critical Habitat) likely to result from the Proposed Fish Screen Project, as well as actions related to and dependent on the Proposed Project/Action (Chapter 4);
- The analysis identifying the direct, indirect, and cumulative impacts on Natural Community Conservation Planning (NCCPA) communities occurring in the Action Area likely to result from the Proposed Fish Screen Project, as well as actions related to and dependent on the

Proposed Project/Action (Chapter 6);

- The conservation measures that the Proposed Project/Action agencies will undertake to minimize adverse effects to species (Chapters 2 and 4), and as appropriate, measures to enhance the condition of NCCPA communities (Chapters 2 and 6) and covered species along with a discussion of:
 - A plan to monitor the impacts and the implementation and effectiveness of these measures (Chapter 8), and
 - The procedures to address changed circumstances (Chapter 9);
- The additional measures USFWS, NOAA Fisheries, and CDFG may require as necessary or appropriate for compliance with FESA, CESA, and NCCPA; and a description of how and to what extent the action or group of actions addressed in the ASIP will help the CALFED Program to achieve the MSCS's goals for the affected species (Chapters 4, 6, and 8).

1.2 ASIP Process

The ASIP process is directly related to the relationships between the FESA, CESA, and State NCCPA. If neither the programmatic BOs nor the programmatic NCCPA determination for the CALFED Program authorizes incidental take of MSCS-covered species, ASIPs, which serve as individual consultation documents, are required for each Project or Action. Take authorization for implementing CALFED Program Actions follow a simplified compliance process that tiers from the MSCS and programmatic determinations. CDFG may authorize incidental take of State-listed Endangered, Threatened, or Candidate species through a CDFG Consistency Determination (Fish and Game Code 2081(b)). The entity implementing CALFED Program Actions (Reclamation) will coordinate the development of the ASIP with USFWS, NOAA Fisheries, and CDFG to ensure that the ASIP incorporates appropriate conservation measures for the Proposed CALFED Program Actions consistent with the MSCS.

The CALFED Program MSCS evaluates 244 species and 20 natural communities. Included within the MSCS are species identified by USFWS, NOAA Fisheries, and CDFG that are covered under BOs and NCCPA determination. An ASIP is prepared for FESA-, CESA-, and NCCPA-covered species. In the case of the MFWC Project, the ASIP will be used for informal or formal consultation on CESA species. Effects to FESA- and CESA-covered species are addressed in this ASIP, and typically the species evaluated will be a subset of the overall 244 species included in the MSCS.

1.2.1 Informal and Formal Consultation Processes

ASIPs are developed for individual CALFED Program Actions or groups of Actions when enough detailed information about the actions is available to fully analyze their impacts on covered species and habitats. Informal consultation is conducted in coordination with the development of an ASIP. Pursuant to the FESA, the Fish and Wildlife Coordination Act, and the Magnuson-Stevens Fisheries Conservation and Management Act (MSFCMA) regarding Essential Fish Habitat (EFH), the lead Project agency (Reclamation) has organized meetings throughout the development of the ASIP to (1) identify covered species and endangered, threatened, and

proposed or candidate species that may occur in the Action Area; (2) develop an appropriate approach for assessing species listed and proposed for listing as part of the Section 7 consultations required by FESA; and (3) determine to what extent the action may affect any of the identified species, including impacts to EFH.

The MFWC Project ASIP is submitted on behalf of Reclamation to USFWS, NOAA Fisheries, and CDFG to consult with these agencies on the potential for the Proposed Project/Action to affect special-status species. USFWS and NOAA Fisheries will review the ASIP for compliance with FESA, under Section 7. NOAA Fisheries will also review the ASIP for compliance with the MSFCMA. The conclusion of the formal consultation process is for USFWS and NOAA Fisheries to prepare BOs on the species that the action is likely to adversely affect. As part of these BOs, USFWS and NOAA Fisheries may authorize incidental take of endangered and threatened species. For this project, a NCCP is not required by CDFG because the project would not result in a change in land use within the Water District Service Area. The ASIP will be used to meet its requirements under CESA, including consideration of species listed for protection under CESA and NCCPA. Acceptance of the ASIP will fulfill CDFG's requirements for a Consistency Determination under Fish and Game Code Section 2081.

1.2.3 Consultation to Date

For implementation of the Proposed Project/Action to be economically feasible and for ease of coordination, consultation on the project has occurred separately for each phase. During the Phase 1 consultation, an official list of threatened and endangered species that may occur within the Action Area and vicinity was generated online from the Sacramento Fish and Wildlife Office website. The California Natural Diversity Database (CNDDDB) and California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants were also queried during the Phase 1 consultation for special-status species that may occur in the Proposed Project/Action and surrounding area. The USGS 7.5-minute quadrangles that were considered in the Phase 1 evaluation included: Grimes, Kirkville, Dunnigan, Arbuckle, Colusa, Wildwood School, Tisdale Weir, Sutter Buttes, and Meridian, CA.

The Phase 1 ASIP was submitted to USFWS and NOAA on February 22, 2008, initiating formal consultation. Analysis of potential effects to giant garter snake in the Phase 1 ASIP determined that 1.67 acres of upland habitat and 0.01 acres of aquatic habitat would be affected. On May 27, 2008, USFWS issued a Biological Opinion concluding that Phase 1 of the project was likely to adversely affect the snake through temporary loss of habitat, but that the level of anticipated take is not likely to result in jeopardy to the giant garter snake.

On May 1, 2008, NOAA issued a letter concurring with Reclamation's conclusion that the project is not likely to adversely affect Federally listed endangered Sacramento River winter-run Chinook salmon (*Oncorhynchus tshawytscha*), threatened Central Valley spring-run Chinook salmon (*O. tshawytscha*), threatened Central Valley steelhead (*O. mykiss*), threatened Southern Distinct Population Segment (DPS) of North American green sturgeon (*Acipenser medirostris*) or designated critical habitat. NOAA also concluded that Phase 1 of the project would not adversely affect EFH for Pacific salmon.

This ASIP document analyzes Phase 2 effects at the level of detail necessary for consultation. There has been informal consultation with both USFWS and NOAA Fisheries throughout development of both phases of the ASIP.

A new USFWS custom list and consultation letter were generated for the Phase 2 consultation (USFWS 2012). Only the USGS 7.5-minute quadrangles containing the Action Area were queried for federal species (Meridian and Grimes). New CNDDDB (CDFG 2012a) and CNPS (CNPS 2012) queries were also generated during Phase 2. CNDDDB and CNPS queries included the Action Area and immediately surrounding quadrangles (Moulton Weir, Sanborn Slough, Pennington, Colusa, Meridian, Sutter Buttes, Arbuckle, Grimes, Tisdale Weir, Wildwood School, Dunnigan, and Kirkville). The Phase 2 USFWS custom list and consultation letter, and results of the CNDDDB and CNPS queries are included in **Appendix A**.

A pre-application meeting was held on January 5, 2012 with the U.S. Army Corps of Engineers to describe the Phase 2 project components and schedule. USFWS and NOAA Fisheries staff were in attendance at the meeting and indicated that an ASIP could be submitted for Phase 2 components of the project.

1.2.4 Compliance with Federal Endangered Species Act

USFWS and NOAA Fisheries share responsibility for administering FESA. NOAA Fisheries is primarily responsible for implementing FESA on behalf of marine fishes and mammals, including migratory or anadromous fish species such as salmon, steelhead, and green sturgeon. USFWS is primarily responsible for non-marine species. The FESA section 7(a)(2) consultation requirement is meant to ensure that any action authorized, funded, or carried out by any Federal agency is not likely to jeopardize the continued existence of any covered species or result in the destruction of Critical Habitat. Typically, in order to comply with this regulation, a biological assessment (BA) is prepared to analyze effects on listed and proposed species and designated and proposed Critical Habitat. This ASIP is intended to function as a BA and fulfill the requirements of the MFWC Action agencies pursuant to the FESA as amended.

1.2.5 Compliance with Magnuson-Stevens Fisheries Conservation and Management Act

Public Law 104-297, the Sustainable Fisheries Act of 1996, amended the MSFCMA to establish new requirements for EFH descriptions in federal Fisheries Management Plans (FMPs). The MSFCMA, which was reissued in 2006, requires all fishery management councils to amend their FMPs to describe and identify EFH for each managed fishery. The EFH assessment is meant to determine whether a Proposed Project/Action may adversely affect a designated EFH for federally managed species in the Action Area. In California, there are three FMPs that cover coastal pelagic species, groundfish, and Pacific salmon. In consideration of the Proposed Project/Action, the Pacific Chinook salmon and steelhead have potential to be affected. These effects will be addressed in this document.

In addition, the MSFCMA requires federal agencies to consult with NOAA Fisheries on activities that may adversely affect EFH. The MSFCMA contains procedures to identify, conserve, and enhance EFH. NOAA Fisheries is required to provide EFH conservation and enhancement recommendations to Federal and State agencies for actions that adversely affect EFH. This ASIP will meet all the compliance requirements that have been identified for consulting with NOAA Fisheries on effects to EFH.

1.2.6 Compliance with California Endangered Species Act and Natural Community Conservation Plan

The CESA (CDFG Code Sections 2050-2097) is similar to the FESA. The California Fish and Game Commission is responsible for maintaining lists of threatened and endangered species under the CESA, which prohibits the “take” of listed and candidate species. “Take” as defined under California law is to “hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill” (CDFG Code Section 86). To this date, there are several State-listed species – primarily salmonid fish species – that may occur within the Action Area; therefore, a CDFG Consistency Determination (CDFG code 2081) authorizing incidental take of State-listed species may be required for the Proposed Project/Action.

The California Natural Community Conservation Planning Act (NCCPA) (California Fish and Game Code, section 2800, et seq.) was enacted to form a basis for broad-based planning to provide for effective protection and conservation of the State’s wildlife heritage, while continuing to allow appropriate development and growth. State of California NCCPA General Process Guidelines define an NCCPA as “...a plan for the conservation of natural communities that takes an ecosystem approach and encourages cooperation between private and governmental interests. The plan identifies and provides for the regional or area-wide protection and perpetuation of plants, animals, and their habitats, while allowing compatible land use and economic activity. An NCCPA seeks to anticipate and prevent the controversies caused by species’ listings by focusing on the long-term stability of natural communities” (CDFG 2000a).

The purpose of natural community conservation planning is to sustain and restore those species and their habitat identified by CDFG that are necessary to maintain the continued viability of biological communities impacted by human changes to the landscape. An NCCPA identifies and provides for those measures necessary to conserve and manage natural biological diversity within the plan area while allowing compatible use of the land.

On February 2, 2002, SB 107 was signed by Governor Gray Davis, which repealed and replaced the NCCPA with a new NCCPA. Although SB 107 became effective on January 1, 2003, the MSCS will continue to be in-effect as an approved NCCP, in accordance with Section 2830 (c) of the same bill.

This ASIP is a multi-purpose project-level document that is intended to streamline the environmental regulatory process for CALFED Program Actions. The Proposed Project/Action is such an action, as it will protect species covered under the MSCS. This ASIP provides all the

information necessary to initiate project-level compliance with the FESA and NCCPA. Not only will this ASIP fulfill CDFG's requirements under Fish and Game Code Sections 2835 and 2081, it will also include appropriate conservation measures relevant to the Proposed Project/Action.

1.3 Relationship to CALFED Program

The CALFED Program's purpose is to develop and implement a comprehensive, long-term plan that will restore ecological health to the Bay-Delta system and improve management of water for beneficial uses. The MFWC Project falls within one component of the overall CALFED Program strategy. CALFED agencies plan to address issues of the Bay-Delta region within the following categories: ecosystem quality, water quality, water supply reliability, and levee system integrity. CALFED agencies must consider important physical, ecological, and socioeconomic linkages between the problems and potential solutions in each of these resource categories. The CALFED planning effort was therefore divided into a three-phase cooperative planning process in order to facilitate determining the most appropriate strategy and actions to reduce conflicts in the Bay-Delta system.

The construction of fish screens that use the best available technology will eliminate fish passage barriers. The fish screens will be funded with federal funds from the CALFED Bay-Delta Authority (CBDA) and Reclamation would be responsible for administering those funds. Implementation of the Proposed Project/Action will help MFWC continue to draw water from the Sacramento River without entraining native fish species that may reside in the Sacramento River near, or which may pass by, the existing diversions.

1.4 Species Addressed in this ASIP

To comply with FESA, CESA, and NCCPA requirements, a list of special-status species is evaluated and presented in this ASIP. The following tables (**Table 1-2 and Table 1-3**) list the species with potential to occur in the Action Area, their Federal and State status, and how likely they are to occur in the Proposed Project/Action Area. Those species with potential to be affected by the Proposed Project/Action are shown in bold text and are addressed in more detail in Chapter 3.

**TABLE 1-2
ANIMAL SPECIES WITH POTENTIAL TO OCCUR IN THE ACTION AREA**

Scientific Name Common Name	Federal Status	State Status	CNPS Listing	Habitat Description	Potential to Occur in the Action Area
Fish					
<i>Acipenser medirostris</i> North American green sturgeon (Southern DPS)	FT	CSC	--	Spawns in large cobble in deep and turbulent river mainstem. The Southern DPS spawns in the Sacramento River basin and in the Sacramento-San Joaquin Delta and Estuary.	High. Migratory route in the Sacramento River; also provides suitable rearing habitat in riparian bank areas.
<i>Hypomesus transpacificus</i> Delta smelt	FT	CT	--	Found in the Sacramento-San Joaquin delta, Suisun bay, Carquinez Straight, and San Pablo Bay.	Unlikely. Project outside area designated as Critical Habitat project site does not have Critical Habitat for reproduction or cover. Project site likely outside of the upstream migratory extent.
<i>Oncorhynchus mykiss</i> Central Valley steelhead	FT	--	--	Spawns in Sacramento River and tributaries where gravelly substrate and suitable water conditions occur.	High. Migratory route in the Sacramento River; also provides suitable rearing habitat in riparian bank areas.
<i>Oncorhynchus tshawytscha</i> Central Valley spring-run Chinook	FT	CT	--	Spawns in Sacramento River and few select tributaries where gravelly substrate and suitable water conditions occur.	High. Migratory route in the Sacramento River; also provides suitable rearing habitat in riparian bank areas.
<i>Oncorhynchus tshawytscha</i> Sacramento River winter-run Chinook	FE	CE	--	Spawns primarily in upper reaches of the mainstem Sacramento River.	High. Migratory route in the Sacramento River; also provides suitable rearing habitat in riparian bank areas.
Reptiles					
<i>Thamnophis gigas</i> giant garter snake	FT	CT	--	Generally inhabits marshes, sloughs, ponds, slow-moving streams, ditches, and rice fields which have water from early spring through mid-fall, emergent vegetation (such as cattails and bulrushes), open areas for sunning, and high ground for hibernation and escape cover.	Moderate. Limited aquatic habitat in the Main Canal, in adjacent Reclamation drains, or within adjacent seasonally inundated rice fields. Potential upland habitat in unpaved areas up to 200 feet from aquatic habitat.
<i>Emys marmorata</i> western pond turtle	--	CSC	--	Permanent ponds, lakes, streams, irrigation ditches or permanent pools along intermittent streams. Require basking sites such as partially submerged logs, rocks, mats of floating vegetation, or open mud banks	Unlikely. No suitable habitat within or adjacent to the project site.

**TABLE 1-2
ANIMAL SPECIES WITH POTENTIAL TO OCCUR IN THE ACTION AREA**

Scientific Name Common Name	Federal Status	State Status	CNPS Listing	Habitat Description	Potential to Occur in the Action Area
Amphibians					
<i>Ambystoma californiense</i> California tiger salamander	FT	CT	--	Annual grassland and grassy understory of valley-foothill hardwood habitats in central and northern California. Needs underground refuges and vernal pools or other seasonal water sources.	Unlikely. No suitable habitat within or adjacent to the project site.
<i>Rana aurora draytonii</i> California red-legged frog	FT	CSC	--	Breeds in slow moving streams with deep pools, ponds, and marshes with emergent vegetation.	Unlikely. No suitable habitat within or adjacent to the project site.
<i>Spea (=Scaphiopus) hammondi</i> western spadefoot toad	--	CSC	--	Occurs seasonally in grasslands, prairies, chaparral, and woodlands, in and around wet sites. Breeds in shallow, temporary pools formed by winter rains. Takes refuge in burrows.	Unlikely. No suitable habitat within or adjacent to the project site.
Birds					
<i>Agelaius tricolor</i> tricolored blackbird	--	CSC	--	Nests in dense thickets of cattails, tules, willow, blackberry, wild rose, wheat and barley crops, and other tall herbs near fresh water.	Unlikely. Marginal riparian nesting habitat along Sacramento River banks. However, no suitable nesting habitat in the immediate vicinity of the project.
<i>Ardea alba</i> (nesting) great egret	--	--	--	Colonial nester in large trees. Rookery sites located near marshes, tideflats, irrigated pastures and margins of rivers and lakes.	Unlikely. No suitable nesting habitat in the immediate vicinity of the project.
<i>Ardea herodias</i> (nesting) great blue heron	--	--	--	Colonial nester in tall trees, cliff sides and isolated marsh habitats.	Unlikely. No suitable nesting habitat in the immediate vicinity of the project.
<i>Athene cunicularia</i> western burrowing owl	--	CSC	--	Utilizes ground squirrel (or other mammal) burrows within open grasslands, prairies, savanna, or agricultural fields.	Moderate. Potential nesting habitat along the perimeter of agricultural fields and along the banks/levees of the Sacramento River.
<i>Branta hutchinsii</i> <i>leucopareia</i> cackling (=Aleutian Canada) goose	FD	--	--	Breeds in open or forested areas near water. Often found in wetlands, grasslands, or cultivated fields during migration.	Moderate. Marginal foraging habitat occurs in agricultural fields adjacent to project.

**TABLE 1-2
ANIMAL SPECIES WITH POTENTIAL TO OCCUR IN THE ACTION AREA**

Scientific Name Common Name	Federal Status	State Status	CNPS Listing	Habitat Description	Potential to Occur in the Action Area
<i>Buteo swainsoni</i> Swainson's hawk	--	CT	--	Breeds in California's Central Valley. Winters primarily in Mexico. Typically nests in scattered trees or along riparian systems adjacent to agricultural fields or pastures.	Moderate. The CNDDB (CDFG 2012a) records several historic occurrences near the project site. Suitable nesting habitat occurs within trees along the Sacramento River and within the Action Area. The Action Area also provides foraging for this species.
<i>Charadrius montanus</i> mountain plover (wintering)	--	CSC	--	In California, winters in open short grasslands and plowed agricultural fields in the Central Valley and in foothill valleys west of San Joaquin Valley, and in Imperial Valley. Winters below 1000 m (3200 ft).	Unlikely. Project area is outside of known species range.
<i>Circus cyaneus</i> northern harrier	--	CSC	--	Forages over open ground. Nests on ground in shrubby vegetation, usually at marsh edge in emergent wetland or along rivers or lakes, but also in grasslands, grain fields, or on sagebrush flats several miles from water	Unlikely. Suitable nesting habitat does not occur within the Action Area or immediate vicinity.
<i>Coccyzus americanus occidentalis</i> western yellow-billed cuckoo	FC	CE	--	Nests in extensive riparian forests (at least 40 hectares).	Unlikely. Riparian area surrounding project site is highly fragmented.
<i>Grus canadensis tabida</i> greater sandhill crane	--	CSC	--	Open habitats, shallow lakes, and emergent wetlands. In winter also uses dry grasslands and croplands near wetlands.	Unlikely. No suitable habitat within or adjacent to the project site.
<i>Laterallus jamaicensis coturniculus</i> California black rail	--	CT	--	Occurs most commonly in tidal emergent wetlands dominated by pickleweed, or in brackish marshes supporting bulrushes in association with pickleweed. In freshwater, usually found in bulrushes, cattails, and saltgrass	Unlikely. No suitable habitat within or adjacent to the project site.
<i>Pandion haliaetus</i> osprey	--	--	--	Preys mostly on fish, requires open, clear waters for foraging. Uses large trees, snags, and dead-topped trees in open forest habitats for cover and nesting.	Moderate. Suitable nesting habitat occurs within trees along the Sacramento River and within the Action Area. The Action Area also provides foraging for this species.
<i>Plegadis chihi</i> white-faced ibis	--	--	--	Nest and forages in freshwater marshes and rivers, respectively.	Unlikely. No suitable nesting habitat within or adjacent to the project site.

**TABLE 1-2
ANIMAL SPECIES WITH POTENTIAL TO OCCUR IN THE ACTION AREA**

Scientific Name Common Name	Federal Status	State Status	CNPS Listing	Habitat Description	Potential to Occur in the Action Area
<i>Riparia riparia</i> (nesting) bank swallow	--	CT	--	Nests in holes dug in sandy cliffs and river banks near water.	Moderate. The CNDDDB (CDFG 2012a) records occurrence near the Drexler Diversion and Grimes Canal. Potential nesting habitat along the banks of the Sacramento River in the vicinity of the project.
<i>Spinus (=Carduelis) lawrencei</i> Lawrence's goldfinch	--	--	--	Dry grassy slopes with weed patches, chaparral, and open woodlands; nests in trees or shrubs.	Unlikely. No suitable habitat within or adjacent to the project site.
Mammals					
<i>Antrozous pallidus</i> pallid bat	--	CSC	--	Prefers caves, crevices, hollow trees, or buildings in areas adjacent to open space for foraging. Associated with lower elevations in California.	Unlikely. No suitable roost or maternity sites occur in the immediate vicinity of the project.
<i>Dipodomys californicus eximius</i> Marysville California kangaroo rat	--	CSC	--	Needs friable soil, grass stages of chaparral. Only found in the area of the Sutter Buttes.	Unlikely. No suitable habitat within or adjacent to the project site.
<i>Lasiurus blossevillei</i> western red bat	--	--	--	Roosts primarily in trees, 2-40 feet above ground, from sea level up through mixed conifer forests. Prefers habitat edges and mosaics with trees that are protected from above and open below with open areas for foraging.	Unlikely. No suitable roost or maternity sites occur in the immediate vicinity of the project.
<i>Lasiurus cinereus</i> hoary bat	--	CSC	--	Prefers open habitats or habitat mosaics, with access to trees for cover and open areas or habitat edges for feeding. Roosts in dense foliage of medium to large trees. Feeds primarily on moths; requires water.	Unlikely. Limited roosting habitat within forested areas along the Sacramento River; however, dense foliage for roosting is not available in the Action Area.
<i>Myotis ciliolabrum</i> western small-footed myotis	--	--	--	In association with steep limestone outcrops and talus slopes. Forages over a wide range of habitats, mostly open, arid wooded and brushy uplands near water. Seeks cover in caves, buildings, mines and crevices.	Unlikely. No suitable roost or maternity sites occur in the immediate vicinity of the project.

**TABLE 1-2
ANIMAL SPECIES WITH POTENTIAL TO OCCUR IN THE ACTION AREA**

Scientific Name Common Name	Federal Status	State Status	CNPS Listing	Habitat Description	Potential to Occur in the Action Area
<i>Myotis yumanensis</i> Yuma myotis	--	--	--	Roosts in buildings, mines, caves, crevices, or under bridges. Optimal habitats are open forests and woodlands with sources of water over which to feed.	Unlikely. Limited roosting habitat within forested areas along the Sacramento River; however, dense foliage for roosting is not available in the Action Area.
<i>Perognathus inornatus inornatus</i> San Joaquin pocket mouse	--	--	--	Uses arid annual grassland, savanna, and desert scrub, with sandy washes, fine soils, and scattered vegetation between 1,100 and 2,000 feet in elevation.	Unlikely. Marginal vegetation along irrigation ditch and not within the required elevation range.
Invertebrates					
<i>Branchinecta conservatio</i> Conservancy fairy shrimp	FE	--	--	Lifecycle restricted to large, cool-water vernal pools with moderately turbid water.	Unlikely. No suitable habitat within or adjacent to the project site.
<i>Branchinecta lynchi</i> vernal pool fairy shrimp	FT	--	--	Lifecycle restricted to vernal pools.	Unlikely. No suitable habitat within or adjacent to the project site.
<i>Cicindela hirticollis abrupta</i> Sacramento Valley (Hairy-necked) tiger beetle	--	--	--	Larvae and usually adults occur on sand bars, sandy shores, flood scours etc. immediately associated with rivers. Requires fine sand that is damp at, or a few centimeters below, the surface, and sparse or absent vegetation. Habitats must also not be subject to inundation for more than a few days at a time.	Unlikely. The project site habitat conditions are not suitable for this species.
<i>Desmocerus californicus dimorphus</i> Valley elderberry longhorn beetle	FT	--	--	Breeds and forages exclusively on blue elderberry shrubs (<i>Sambucus mexicana</i>) below 3,000 feet in elevation.	Unlikely. No elderberry shrubs with stems measuring at least one inch in diameter occur within 100 feet of the Proposed Project/Action.
<i>Lepidurus packardii</i> vernal pool tadpole shrimp	FE	--	--	Found in vernal pools, swales, ephemeral drainages, stock ponds, reservoirs, or ditches.	Unlikely. No suitable habitat within or adjacent to the project site.

**TABLE 1-2
ANIMAL SPECIES WITH POTENTIAL TO OCCUR IN THE ACTION AREA**

Scientific Name Common Name	Federal Status	State Status	CNPS Listing	Habitat Description	Potential to Occur in the Action Area
SOURCE: USFWS (2012), CDFG (2011, 2012a, 2012b).					
Notes:					
The "Potential for Effect" category is defined as follows:					
Unlikely:	The project site and/or immediate area do not support suitable habitat for a particular species. Project site is outside of the species known range.				
Low Potential:	The project site and/or immediate area only provide limited habitat for a particular species. In addition, the known range for a particular species may be outside of the Proposed Project/Action Area.				
Moderate Potential:	The project site and/or immediate area provide suitable habitat for a particular species.				
High Potential:	The project site and/or immediate area provide ideal habitat conditions for a particular species.				
Species that have medium or high potential to be impacted by the proposed project are shown in boldface type.					
STATUS CODES:					
FEDERAL:					
FE	=	Listed as "endangered" under the federal Endangered Species Act			
FT	=	Listed as "threatened" under the federal Endangered Species Act			
FC	=	Candidate for listing under the federal Endangered Species Act			
FD	=	Delisted			
FSC	=	NOAA Fisheries designated "species of concern"			
STATE:					
CE	=	Listed as "endangered" under the California Endangered Species Act			
CT	=	Listed as "threatened" under the California Endangered Species Act			
CSC	=	California Department of Fish and Game designated "species of special concern"			

**TABLE 1-3
PLANT SPECIES WITH POTENTIAL TO OCCUR IN THE ACTION AREA**

Scientific Name Common Name	Federal Status	State Status	CNPS Listing	Life Form	Habitat Description / Elevation Range (meters) / Blooming Period	Potential to Occur in the Action Area
<i>Astragalus tener</i> var. <i>ferrisiae</i> Ferris's milk-vetch	--	--	1B.1	annual herb	Meadows and seeps (vernally mesic), valley and foothill grasslands (subalkaline flats) / 5-75 m / April – May	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Atriplex cordulata</i> heartscale	--	--	1B.2	annual herb	Chenopod scrub, meadows and seeps, valley and foothill grassland (sandy/saline or alkaline) / 0-560 m / April – October	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Atriplex depressa</i> brittlescale	--	--	1B.2	annual herb	Chenopod scrub, meadows and seeps, playas, valley and foothill grasslands, vernal pools (alkaline, clay) / 1-321 m / May – October	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Atriplex joaquiniana</i> San Joaquin saltbrush	--	--	1B.2	annual herb	Chenopod scrub, meadows and seeps, playas, valley and foothill grasslands (alkaline) / 1-835 m / April – October	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Atriplex minúscula</i> lesser saltscale	--	--	1B.1	annual herb	Chenopod scrub, playas, valley and foothill grasslands / 15- 200 m / May – October	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Atriplex persistens</i> vernal pool smallscale	--	--	1B.2	annual herb	Vernal pools / 10-115 m / June – October	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Atriplex subtilis</i> subtle orache	--	--	1B.2	annual herb	Valley and foothill grasslands / 40-100 m / June – August (also October - uncommon)	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Brasenia schreberi</i> watershield	--	--	2.3	perennial rhizomatous herb aquatic	Marshes and swamps (freshwater) / 30-2200 m / June – September	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>California macrophylla</i> round-leaved filaree	--	--	1B.1	annual herb	Cismontaine woodland, valley and foothill grassland / 15-1200 m / March – May	Unlikely. No suitable habitat within the immediate vicinity of the project site.

**TABLE 1-3
PLANT SPECIES WITH POTENTIAL TO OCCUR IN THE ACTION AREA**

Scientific Name Common Name	Federal Status	State Status	CNPS Listing	Life Form	Habitat Description / Elevation Range (meters) / Blooming Period	Potential to Occur in the Action Area
<i>Castilleja rubicundula</i> ssp. <i>rubicundula</i> pink creamsacs	--	--	1B.2	annual herb	Chaparral (openings), cismontaine woodland, meadows and seeps, valley and foothill grassland / 20-910 m / April – June	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Centromadia parryi</i> ssp. <i>parryi</i> pappose tarplant	--	--	1B.2	annual herb	Chaparral, coastal prairie, meadows and seeps, marshes and swamps (coastal salt), valley and foothill grassland (vernally mesic, often alkaline) / 2-420 m / May – November	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Chloropyron palmatus</i> palmate-bracted bird's beak	FE	CE	1B.1	annual herb hemiparasitic	Chenopod scrub, valley and foothill grasslands (alkaline) / 5-155 m / May – October	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Cuscuta obtusiflora</i> var. <i>glandulosa</i> Peruvian dodder	--	--	2.2	annual vine parasitic	Marshes and swamps (freshwater) / 15-280 m / July – October	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Hibiscus lasiocarpus</i> rose mallow	--	--	1B.2	perennial rhizomatous herb emergent	Marshes and swamps (freshwater) / 0-120m / June – September	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Lasthenia glabrata</i> ssp. <i>coulteri</i> Coulter's goldfields	--	--	1B.1	annual herb	Marshes and swamps (coastal salt), playas, vernal pool / 1-1200 m / February – June	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Layia septentrionalis</i> Colusa layia	--	--	1B.2	annual herb	Chaparral, cismontane woodland, valley and foothill grassland (sandy, serpentine) / 100-1095 m / April – May	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Navarretia</i> <i>leucocephala</i> ssp. <i>bakeri</i> Baker's navarretia	--	--	1B.1	annual herb	Cismontane woodland, lower montane coniferous forest, meadows and seeps, valley and foothill grassland, vernal pools (mesic) / 5-1740 m / May – July	Unlikely. No suitable habitat within the immediate vicinity of the project site.

**TABLE 1-3
PLANT SPECIES WITH POTENTIAL TO OCCUR IN THE ACTION AREA**

Scientific Name Common Name	Federal Status	State Status	CNPS Listing	Life Form	Habitat Description / Elevation Range (meters) / Blooming Period	Potential to Occur in the Action Area
<i>Silene verecunda</i> ssp. <i>verecunda</i> San Francisco campion	--	--	1B .2	perennial herb	Coastal bluff scrub, chaparral, coastal prairie, coastal scrub, valley and foothill grassland (sandy) / 30- 645 m / March – June (also August - uncommon)	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Trichocoronis wrightii</i> var. <i>wrightii</i> Wright's trichocoronis	--	--	2.1	annual herb	Meadows and seeps, marshes and swamps, riparian forest, vernal pools (alkaline) / 5-435 m / May - September	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Wolffia brasiliensis</i> Brazilian watermeal	--	--	2.3	perennial herb aquatic	Marshes and swamps (assorted shallow freshwater) / 30-100 m / April - December	Unlikely. No suitable habitat within the immediate vicinity of the project site.

SOURCE: USFWS (2012), CDFG (2012a), CNPS (2012).

Notes:

The "Potential for Effect" category is defined as follows:

Unlikely: The project site and/or immediate area do not support suitable habitat for a particular species. Project site is outside of the species known range.

Species that have medium or high potential to be impacted by the proposed project are shown in boldface type.

STATUS CODES:

FEDERAL:

FE = Listed as "endangered" under the federal Endangered Species Act

STATE:

CE = Listed as "endangered" under the California Endangered Species Act

CNPS:

List 1B = Plants rare, threatened, or endangered in California and elsewhere

List 2 = Plants rare, threatened, or endangered in California, but more common elsewhere

List 3 = Plants about which we need more information--a review list

List 4 = Plants of limited distribution--a watch list

Extensions: .1 = Seriously endangered in California

.2 = Fairly endangered in California

.3 = Not very endangered in California

1.4.1 Identification of Species Analyzed in Detail in the ASIP

Pursuant to Section 7(c) of FESA, a species list was requested from USFWS regarding any species listed or proposed for listing as Threatened or Endangered, including designated or proposed Critical Habitats under FESA, that may be present in the Action Area (USFWS 2007, USFWS 2012). Additionally, a list of special-status species known to occur or with the potential to occur within the Action Area was compiled from a query of the California Natural Diversity Database (CNDDDB) (CDFG 2007, CDFG 2012a) and the California Native Plant Society's Inventory of Rare and Endangered Plants (CNPS 2007, CNPS 2012). Special-status fish, wildlife, and plant species considered in the MSCS (CALFED 2001b) combined with the results from the species request lists and the database searches were used to generate a preliminary species list.

Initial screening of the overall species list eliminated from further consideration those species that only inhabited areas outside of the general Action Area. The second level of screening was based on species that occasionally visited (their life cycles are not dependent on) habitats affected by the MFWC Project/Action. These included mostly migratory species that may be observed infrequently in areas where the Proposed Project will occur. Finally, a focused list of Federal- or State-listed, Special-concern, or CALFED MSCS-covered species was compiled for detailed analysis in this ASIP and is included in Chapter 3. There are no candidate species potentially occurring in the Action Area.

1.4.2 Critical Habitat

Critical Habitat is designated in the Sacramento River within the project area for the listed Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, Central Valley steelhead, and Southern Distinct Population Segment (DPS) of the North American Green Sturgeon which are presented in this ASIP. Critical Habitat for vernal pool tadpole shrimp is designated within the region, but it is not included within the Action Area. The nearest Critical Habitat Unit for vernal pool tadpole shrimp is located approximately 3 miles northwest of shrimp in the Action Area. Details on the Critical Habitat designations are included in the species descriptions in Chapter 3. There is no suitable habitat for vernal pool tadpole in the Meridian Farms Service Area boundary.

1.4.3 Essential Fish Habitat

The Action Area is within the region identified as Essential Fish Habitat (EFH) for Pacific salmon, including all Chinook salmon runs, in Amendment 14 of the Pacific Salmon FMP. This ASIP addresses potential effects of the MFWC Project on delineated EFH in the Sacramento River within the Action Area.

1.5 NCCPA Habitats

A total of 20 natural communities were analyzed on a broad, programmatic level in the MSCS – 18 habitats and 2 ecologically based fish groups. The term “NCCPA communities” refers to both habitats and fish groups. Of the 20 community types and fish groups, four are included in the Action Area and are evaluated in this ASIP. The others were not considered either because there was no such habitat in the Action Area or because the Proposed Project/Action would not affect the habitat. Although there is no estuarine habitat within the Action Area, this NCCPA Fish Group is included in the analysis in order to consistently analyze effects to a few estuarine fish species which may migrate through the Action Area. Descriptions of the two NCCPA Habitats and two NCCPA fish group are listed below (**Table 1-4**) and detailed in Chapter 5.

TABLE 1-4
NCCPA COMMUNITIES ANALYZED IN THIS ASIP

NCCPA Habitats	NCCPA Fish Groups
Valley Riverine Aquatic	Anadromous Fish Species
Valley/Foothill Riparian	Estuarine Fish Species

CHAPTER 2

Description of the Proposed Project/Action

The objective of the Proposed Project/Action is to ensure that no fish species are entrained in MFWC's diversion pumps, so that MFWC is in compliance with present regulatory requirements, including ESA compliance, and is able to continue to divert water for agricultural irrigation, avoiding effects to listed fisheries species that may be present near the diversions. Needed conveyance improvements related to the fish screen improvements are included within the Proposed Project/Action. This chapter describes the two phases of the Proposed Project/Action and existing conditions of Action Area, including the existing intake facilities. A description of the regulatory authorities that set the regulatory framework for the Proposed Project/Action is included. Conservation measures included with the Proposed Project/Action are described as well.

2.1 Authorities

2.1.1 Central Valley Improvement Act and Anadromous Fish Screen Program

On October 30, 1992, a multipurpose water law which contained 40 separate titles providing for water resource projects throughout the Western United States was established. Title 34, the CVPIA, mandates changes in management of the Central Valley Project, particularly for the protection, restoration, and enhancement of fish and wildlife. Under the CVPIA, a program dedicated to screening agricultural water diversions to protect anadromous fish in California's Central Valley was developed. The U.S. Department of the Interior established the Anadromous Fish Screen Program (AFSP) which satisfies section 3406(b)(21) of the CVPIA. CVPIA section 3406 (b)(21) states that the AFSP will "assist the State of California in efforts to develop and implement measures to avoid losses of juvenile anadromous fish resulting from unscreened or inadequately screened diversions on the Sacramento-San Joaquin Delta, and the Suisun Marsh. Such measures shall include but shall not be limited to construction of screens on unscreened diversions, rehabilitation of existing screens, replacement of existing non-functioning screens, and relocation of diversions to less fishery-sensitive areas. The Secretary's share of costs associated with activities authorized under this paragraph shall not exceed 50 percent of the total cost of any such activity."

The Proposed MFWC Project is consistent with the CVPIA Anadromous Fish Screen Program.

2.1.2 Endangered Species Acts

This ASIP is intended to provide all the necessary elements to comply with the FESA and CESA. Currently, there are eight species addressed within this ASIP that are identified as a listed species

or a candidate for listing, and two that have been delisted. The Central Valley steelhead is federal-listed threatened, and the Central Valley spring-run Chinook is both federal- and state-listed threatened. The Sacramento River winter-run Chinook salmon is federal- and state-listed endangered. The North American green sturgeon (Southern DPS) is federal-listed threatened. The giant garter snake is both federal- and state-listed threatened, and the Swainson's hawk is state-listed threatened. The bank swallow is state-listed threatened. The cackling goose has been federally delisted, but still remains under scrutiny, and is therefore included in this ASIP. All of these species are covered in the MSCS.

2.2 Proposed Project/Action Area

The MFWC is located in Sutter County, between Interstate 5 and Highway 99, east of the Sacramento River and southwest of the Sutter Bypass. The approximate limits of MFWC Service Area are shown in **Figure 1-1**. MFWC provides irrigation water to three distinct Service Areas encompassing approximately 9,150 acres of mostly agricultural land, with an estimated annual water delivery of 35,000 acre-feet (af). Small areas of riparian forest, grassland, wetland and open water, as well as the small urban area of Meridian, are also included in the Service Area.

The Action Area includes the existing MFWC diversion facilities, locations of the proposed new and improved facilities, conveyance improvements, proposed construction equipment staging areas, and proposed grading and in-water construction locations. Areas within 200 feet of these project components are also included within the Action Area. Most of this area will not be affected by the Proposed Project/Action, but is included in order to analyze all potential effects resulting from the Proposed Project/Action. The Action Area is depicted in **Figure 2-1**.

Biological communities in the Action Area include valley riparian/Cottonwood riparian forest, annual grassland, and valley riverine habitat (Sacramento River). Agricultural land also provides habitat for wildlife. The Sacramento River provides freshwater habitat for fish, amphibians, reptiles, and waterfowl. Roads, levees, and agricultural activities have modified the adjacent riparian habitat. Inland project areas, beyond the Sacramento River and associated habitats, are characterized as agricultural (field crops and orchards). Human presence within the Action Area is minimal based on the surrounding land use, however river recreation activities increase during the late spring, summer and fall. **Figure 2-2** depicts the vegetation communities, including crop types, within the Action Area.

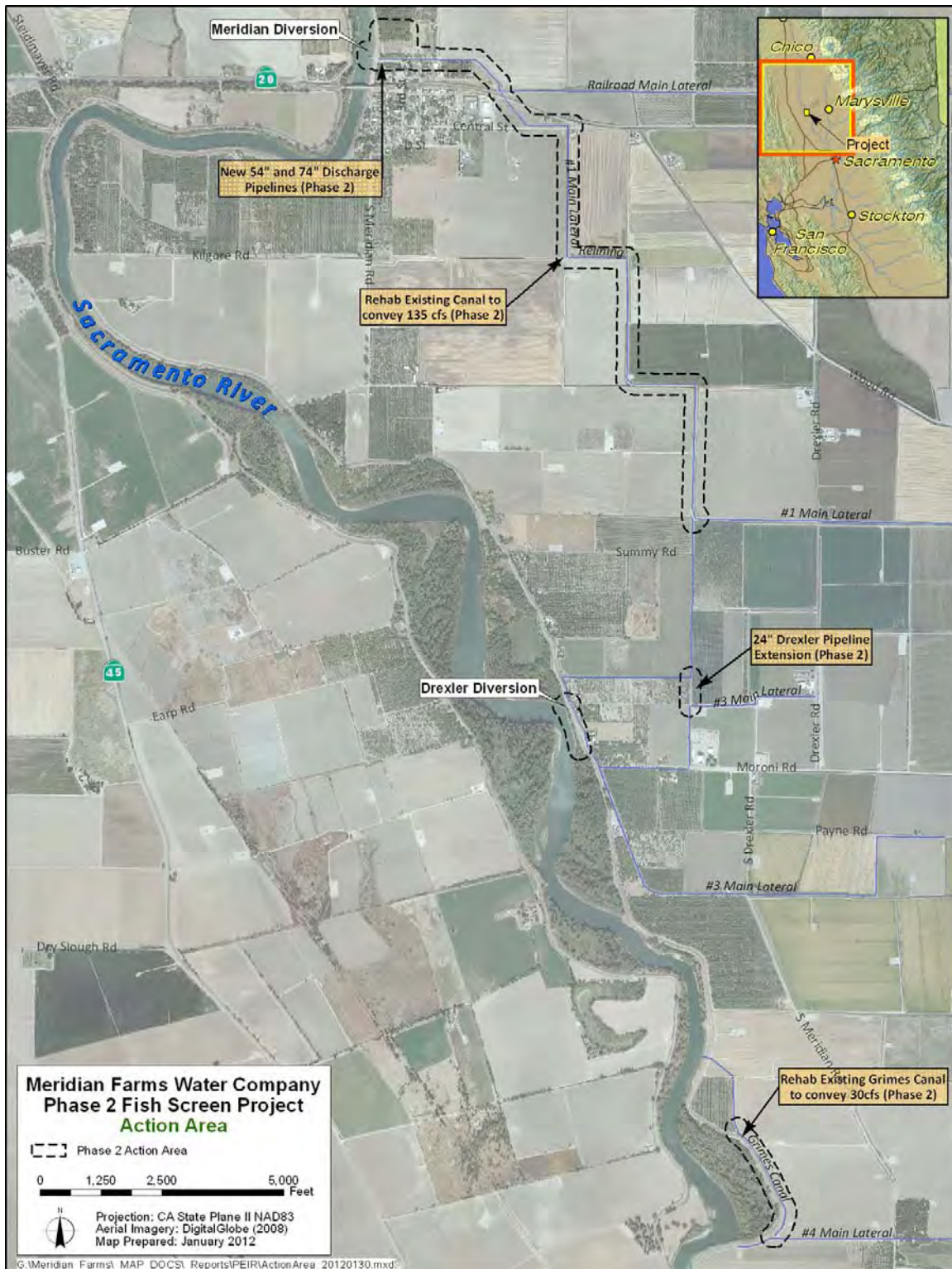


Figure 2-1. Action Area

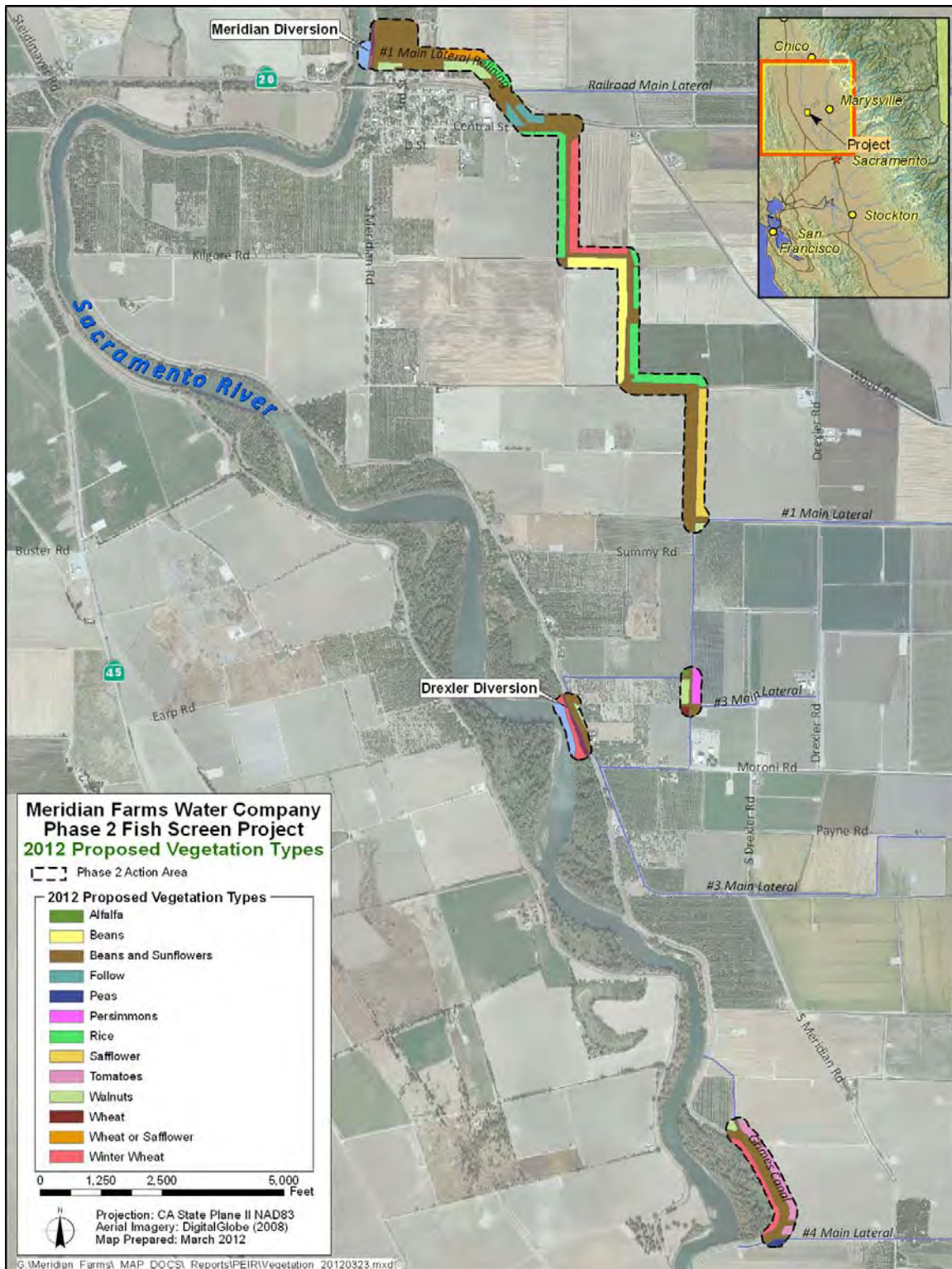


Figure 2-2. Vegetation in the Action Area

2.2.1 General Habitat

Valley Riparian/Cottonwood Riparian Forest

The valley riparian and riparian forest habitats are located adjacent to the Sacramento River system as it winds south along the western boundary of the MFWC Service Area, and much of the habitat is located within the flood plain of the levee system. Riparian areas with less mature canopy cover are dominated by narrow-leaf willow (*Salix exigua*) and black willow (*Salix gooddingii*), with occurrences of valley oak (*Quercus lobata*) and cottonwood (*Populus fremontii*). Himalayan blackberry (*Rubus discolor*), California rose (*Rosa californica*), nutsedge (*Cyperus* spp.), curly dock (*Rumex crispus*), poison oak (*Toxicodendron diversilobum*) and several species of exotic grass characterize the shrub and herbaceous layers. Mature cottonwood stands dominate the closed canopy overstory and characterize the riparian forest areas adjacent to and within (during high flow season) the riverine environment. See **Photos 1 and 2** in **Appendix B** for a view of riparian habitat in the Action Area.

Valley Riparian/Cottonwood Riparian Forest habitats provide food, water, migration and dispersal corridors, and escape, nesting, and thermal cover for an abundance of wildlife. At least 50 amphibians and reptiles and 147 bird species occur in lowland riparian systems. Additionally, 55 species of mammals are known to use California's Central Valley riparian communities.

Valley Riparian/Cottonwood Riparian Forest occurs along the Sacramento River within the general vicinity of the Proposed Project/Action. Within the Action Area, riparian habitat is included along a portion of the proposed Grimes conveyance improvements and the existing diversion facility. In addition, disturbed patches of mixed willow riparian habitat occur in the vicinity of the Drexler and Meridian diversions. The area of the Meridian diversion primarily supports nonnative herbaceous and shrubby vegetation; vegetation is denser, with larger trees and shrubs in the vicinity of the Drexler Diversion. Riparian areas provide food, cover, and nesting for a variety of birds, mammals, amphibians, and even reptiles and fish. Riparian vegetation along the banks of the Sacramento River provide shaded aquatic riverine habitat for fish species.

Sacramento River

Within the vicinity of the Action Area the Sacramento River riverine habitat is characterized by freshwater aquatic and shaded riparian habitats. The adjacent riparian habitat has been modified by trails (both paved and unpaved), levees, and general recreation activities. Flows are relatively slow within the Action Area, exhibiting deep channel characteristics with levied banks. Channel substrate generally consists of fine sandy-loam with sparse areas of imported rip-rap along the banks used to reinforce the adjacent levees. At the proposed Meridian diversion location the river is channelized, exhibiting a deep, cold and slow moving flow. The Sacramento River in this vicinity is channelized, lacks aquatic vegetation, and has minimal streambank vegetative cover. The value of shaded riverine aquatic habitat in the Action Area near the diversions is minimal for fish (see **Photo 1** in **Appendix B**).

The Sacramento River in the vicinity of the proposed intake locations serves as a migratory corridor for the upstream migration of adult salmon and steelhead, and the downstream migration of juvenile salmon and steelhead. North American green sturgeon may also utilize the Action Area as migratory habitat. Other fish species common in the Sacramento River near the proposed intake locations include striped bass, threadfin shad, American shad, catfish, Sacramento pikeminnow, tule perch, sculpin, bullhead, and a variety of other resident fish species. The Sacramento River near Sacramento also provides habitat for a variety of invertebrates, including planktonic species such as copepods, and epibenthic species such as crawfish and amphipods.

Agriculture

Agriculture, irrigated with water drawn from the Sacramento River, dominates the surrounding landscape. Although the specific crop cultivated on a parcel of land may vary annually, the general types of crops grown in the region remain relatively consistent. The major crops include rice, safflower, sunflower, tomatoes, and beans. Hay crops, such as alfalfa, are widely grown, and orchards in the area grow walnuts and persimmons. These crops are irrigated by a series of canals that deliver water from the Sacramento River (**Photos 3 through 9 in Appendix B**). The delivery canals within the Action Area are generally well maintained, typically concrete lined, and support minimal vegetation. There are unlined overflow ditches characterized by emergent aquatic vegetation such as cattails (*Typha latifolia*) and tules (*Scripus californicus*) that occur within the study area, adjacent or perpendicular to the Main Canal. All ditches owned and managed by MFWC are maintained annually, and generally lack dense upland or aquatic vegetation. A few ditches that are owned by the local Reclamation District are not maintained as regularly, and support denser stands of tules and cattail. Agricultural crops and irrigation drainages provide foraging and cover habitat for a variety of wildlife such as birds, mammals, and some reptiles.

All Proposed Project/Action components are located in or adjacent to agriculture. The Main Canal and other delivery canals that are proposed for widening (increased conveyance) are surrounded by lands in active crop production. These canals are generally concrete-lined; although, in some locations, the concrete bed is damaged and there are places where the canals are unlined. The proposed Drexler Re-Lift Station is adjacent to existing canals and ditches. Irrigation ditches lateral to the Main Canal in the vicinity of the Proposed Project/Action support emergent aquatic vegetation. The proposed Drexler pipeline is located adjacent to existing orchards and an irrigation ditch (seep). Canals and ditches may provide habitat for fish, aquatic invertebrates, and aquatic snakes.

Ruderal

In the study area, ruderal or disturbed habitats generally occur in narrow stretches adjacent to levees, roads, and along canals, ditches, river banks and agricultural land boundaries. Ruderal areas within the Action Area are located along the banks of the Sacramento River and are characterized by non-native annual grassland. Non-native annual grassland includes ripgut brome (*Bromus diandrus*), and wild oats (*Avena barbata*), and other common species including

Johnson grass (*Sorghum halepense*), Leymus (*Leymus triticoides*), thistle (*Sonchus asper*), and filaree (*Erodium moschatum*). This habitat is also present in the understory of the riparian woodland habitat, and within the Action Area represents much of the vegetation growing within and along the banks of drainage ditches and irrigation canals. Ruderal grasslands provide important foraging, breeding, and resting habitat for many species of wildlife.

Developed / Disturbed

Developed and disturbed areas include major roads, highways, and buildings and structures within more urban areas, but also facilities and access roads which are located throughout agricultural areas within the Action Area. Also included within this category are the unpaved turnouts and shoulders of dirt access roads, and the regularly maintained banks of the levee, adjacent to the Sacramento River. Vegetation on these levees is removed through burning or by dragging a chain across its slopes.

2.2.2 Current Facilities

MFWC currently operates three surface water diversion/pumping plants on the Sacramento River at Meridian, Drexler, and Grimes in Sutter County. The diversions use pumps with unscreened intakes which likely entrain juvenile Chinook salmon, steelhead trout, and other native fishes that pass by the intake. Current facilities and improvements are described in more detail the following section which describes the Proposed Project/Action. The locations of the existing facilities are shown in **Figure 1-1**.

2.3 Proposed Project/Action Characteristics

2.3.1 Project Components

The MFWC Proposed Project/Action includes several components which were divided into two project phases (**Table 1-1**). The purpose for the phasing was to be able to implement the Proposed Project/Action in a way that was both economically feasible and practical for MFWC. The phases are independent of the other and were both designed to benefit fish species while allowing MFWC to more efficiently deliver water to its service areas. Consultation and implementation of Phase 1 is complete. Phase 2 components are the focus of this ASIP.

Phase 2 includes the construction of the New Meridian Diversion/Pumping Plant, removal of the Existing Meridian Diversion/Pumping Plant, modifications to the Main Canal, construction of the New Drexler Re-lift Pumping Plant, and removal of the Existing Drexler Diversion/Pumping Plant. The new diversion with fish screen will increase diversion capacity to compensate for the abandonment and removal of the existing Drexler Diversion while reducing fish entrainment in the pumps. The Main Canal modifications will increase conveyance capacity in order to handle increased flows resulting from the consolidation of the existing Drexler and Meridian diversions. A relift pump station will be constructed to deliver flows to the Drexler Service Area via the Drexler Pipeline.

The following is a summary of the Project facilities and proposed improvements in Phase 2 (also shown in **Figure 1-1**):

- **New Meridian Diversion/Pumping Plant.** A new 135 cfs diversion with fish screen and pumping plant will be located adjacent to and will replace the existing Meridian Diversion.
- **Main Canal Modifications.** Increase the capacity of approximately 15,200 lineal feet of the Main Canal to convey flows over to the Drexler Service Area in order to accommodate the consolidation of the Meridian and Drexler diversions.
- **New Drexler Re-lift Pumping Plant.** A new 35 cfs pumping plant will be located at the end of the Main Canal modifications to deliver flows to the Drexler Service Area via the new Drexler Pipeline.
- **Removal of Existing Meridian Diversion/Pumping Plant.** The existing diversion/pumping facility will be removed after the new pumping plant is constructed.
- **Removal of Existing Drexler Pumping Plant.** The existing pumping facility will be removed after the new pumping plant is constructed.

2.4 Proposed Project/Action Specifics

2.4.1 New Meridian Diversion/Pumping Plant

The Meridian Diversion/Pumping Plant would consist of a new 135 cfs diversion and pumping plant that would be installed immediately upstream of the existing Meridian Diversion on an approximately 10 acre site. The pumping plant would be located on the land-side of the levee.

2.4.1.1 Meridian Diversion Fish Screen

The retractable cylindrical fish screen with brush cleaning system would consist of two 20-foot long, 60-inch-diameter cylindrical screens. The total capacity of the screens would be 135 cfs. Pile-supported retrieval tracks would that parallel the riverside levee face would be installed for screen removal during periodic maintenance or in the irrigation off-season. The pile-supported tracks would allow the screens to be removed out of the water via a motorized hoist and cable system.

The screens would be designed to have a minimum of 3 feet of submergence during low river levels (Water Surface Elevation 32.6 feet). When in operation, the screen mounts to a docking inlet. The docking inlet is covered by a trash-rack to prevent debris from entering the manifold when the screens are out of the water. This docking inlet would be part of an approximately 20-foot-long header manifold fabricated by the system manufacturer. This header manifold would connect to the 72-inch intake pipeline that runs through the levee to the pump station. The header manifold would either be supported on a concrete slab and H piles, similar to the stationary cylindrical design, or be mounted directly to the piles. A platform would be constructed at the top of the tracks to provide access to the screens when in a retracted position, as well as to mount the system control panel.

The brush cleaning system would consist of cylindrical screens equipped with hydraulic motors that rotate the screen against fixed external and internal brushes.

2.4.1.2 Conveyance from River Inlet to Sump

The inlet structure would consist of two 66-inch steel tees, each with two fish screens mounted on top. The tees would be connected to a short segment of 84-inch steel pipeline. The 84-inch pipeline would then be reduced to a 72-inch steel pipeline, which would transition to a reinforced concrete pipe before passing through the levee and underneath North Meridian Road to the pump station wet-well. The fish screens, tees and the segment of 84-inch pipe would be supported by a three foot six-inch thick concrete pad supported on piles.

The layout of the screens could change to allow the motors to be spaced properly and removed from the river for inspection and maintenance. This would require tracks mounted on piles for the screens to be pulled from the river by a winch. Short lengths of pipe would convey the intake water from the individual fish screens to the 84-inch intake pipe.

2.4.1.3 Deflection Piles

If necessary, approximately 10 steel deflection piles would be installed just upstream of the fish screens in the river. The flanges on the piles would be approximately 15 inches wide and 14 inches deep, with a steel weight of 89 pounds per foot. The purpose of the deflection piles would be to protect the fish screens from large debris floating down the river. The top of the piles would be submerged a minimum of three feet as required for navigable waterways. The use of deflection piles may not be necessary with use of a retractable screen.

2.4.1.4 Gate Structure

The gate structure would provide a means for positive closure of the levee penetration by the 72-inch inlet pipeline. A sluice gate with 72-inch diameter thimbles would be mounted in a concrete structure on the water-side of the levee.

2.4.1.5 Wet Well

The pumping plant wet well structure would be constructed on the east side of the Sacramento River at the north east corner of North Meridian Road and Alameda Street near the community of Meridian. The inside dimensions of the sump are 35-feet wide by 46-feet long. The inlet

pipeline would enter the sump with the pipe invert approximately 30 feet below grade). The wet well would direct the intake water to the five vertical turbine pumps.

2.4.1.6 Meridian Diversion Pumping Plant

The pumping plant would be equipped with two 16.5 cfs and three 34 cfs mixed flow pumps. The pumps would be mixed flow, vertical shaft pumps, with electric motors mounted on the concrete deck, directly above the wet well described above. The concrete deck is at approximately the same elevation as the existing surrounding grade (elevation 53.5 feet).

The pumping plant site would be surrounded by a chain link fence on the north and west sides of the site and a masonry wall on the east and south sides. The masonry wall would provide a visual barrier between the pumping plant and nearby residences. The wet well, pumping pad, pumps, air compressor, air tank, and an electrical building would be located within the fenced site. A driveway and 15-foot access gate would allow vehicle access into the site off North Meridian Road. A three-foot gate would be located at the southeast corner of the site just off Alameda Street.

Pumps

Two 16.5 cfs and three 34 cfs mixed flow pumping units would be installed to pump the total design flow of 135 cfs into MFWC's Main Canal. At minimum speed, the low capacity pumps would be able to pump at a rate of 8.3 cfs. This provides MFWC the same pumping flexibility they have at their existing Meridian and Drexler pumping plants. The pumping plant would operate up to capacity when the Sacramento River water surface elevations vary between 32.6 and 50.3 feet.

Discharge Piping

The 16.5 cfs pumps and 34 cfs pumps would discharge into their respective 20-inch and 30-inch, above ground, pump discharge header pipes. The water would be conveyed from the discharge header into a common 54-inch, above ground, manifold pipeline. The 54-inch pipeline would drop underground just before exiting the fenced area of the pumping plant site. Underground, the pipeline would transition to a 72-inch discharge pipeline that would eventually discharge into the Main Canal near Mawson Road.

A separate 18-inch discharge would connect to the most westerly 16.5 cfs pump and would branch off and head both north and south to existing irrigation ditches. The north branch would serve the existing walnut orchard located next to the pumping plant. The south branch would serve the property located immediately south of the pumping plant on the other side of Alameda Street.

Flow Measurement

The water pumped from the Sacramento River would be measured with a 54-inch flowmeter just downstream from the pumping plant, and an 18-inch flowmeter located just west of the most westerly 16.5 cfs pump. The 54-inch flowmeter would measure the amount of water being diverted and pumped into the Main Canal. The 18-inch meter would be used to measure the water being pumped into the 18-inch waterline serving the north and south properties. The meter

would be either above ground inside the pumping plant wall or housed in a concrete vault below ground. Flow measurements would be used by MFWC and Reclamation to log and report diversions.

2.4.1.7 Construction Considerations

Diversion and Fish Screen

Construction of the fish screen, intake piping and valve vault must be inside a sheet pile coffer dam to protect the site from flooding. Interlocking sheet piles would be driven into the river bottom using a vibratory or impact hammer attached to a crane. The crane would be floated to the site on a barge. The sheetpiles would be driven one at a time to form the coffer dam. This work would begin after July 1 to minimize impacts to listed aquatic species.

After completion of the coffer dam, the river bottom would be excavated to a level approximately five feet below the top of the H piles that would support the fish screen foundation. The piles would then be driven, and a concrete tremie seal poured. These piles must be driven with an impact hammer to verify they are properly imbedded and providing required support. All this work must be done without dewatering the site. Before the concrete in the tremie seal sets, there is a danger the difference in water pressure inside and outside the coffer dam could cause the river bottom to rise; therefore, the concrete tremie seal must be in place before water inside the dam is pumped out. Prior to cofferdam dewatering, a fish rescue and salvage plan would be implemented to minimize potential construction-related effects to species present in the project area. The plan will be developed in the bidding and preconstruction phase. The contractor will have a contingency plan in place to prevent water contamination in the event of concrete tremie seal failure. Sump pumps inside the coffer dam would pump the river water out and then operate continuously to keep seepage from flooding the work site. Prior to cofferdam dewatering, a fish rescue and salvage plan would be implemented to minimize potential construction-related effects to species present in the project area.

The reinforced concrete support pad would then be poured above the support piles, and the screens themselves and intake piping would be mounted on the pad. The levee would be excavated at this time allowing placement of the intake to the pumping plant and the valve vault.

Alternatively, the levee could be excavated first. This would provide a way to move equipment and material to the fish screen installation site without a barge. The contractor would need to compare the cost of the additional excavation and backfill of the levee material versus the time saved by not need to work from a barge. This would also allow the contractor to install the sheet piles for the intake pipe trench construction at the same time, saving overall construction time. The levee would then be replaced with the excavated material if it meets requirements for levee use. The material would be placed in 6 inch lifts and compacted to 90% relative density in accordance with CVFPB requirements.

Pumping Plant

The proposed site for the pumping plant, on the land side of the levee, is currently a walnut orchard and several walnut trees would be removed to accommodate construction. The depth of

the wet well (approximately 40 feet to the bottom of the concrete bottom slab) would require sheet piling to support the excavation and protect workers. The sheet piles would be driven by vibratory or impact methods. Sump pumps would be installed to remove groundwater and keep the excavation dry. Once the vertical walls of the wet well are in place the excavation would be backfilled and the sheet piles would be removed or abandoned in place. The pumps, piping and electrical equipment would be installed, and a perimeter fence constructed.

After placement through the levee, the 7- inch reinforced concrete pipe (RCP) intake pipe would be placed in an approximately 30-foot deep by 10-foot wide sheet pile supported trench. Material excavated from the trench would be placed adjacent to the trench and used as backfill after pipe installation. The intake pipe would also be placed under North Meridian Road. To accommodate its installation, North Meridian Road would be closed for approximately one month, and traffic would be detoured to Mawson Road and Burris Road to access areas north of the construction site. Following pipe installation, the trench would be backfilled and the road repaved to repair any damage done during construction activities.

The pumping plant 54-inch steel discharge pipe would be placed in a trench approximately 50-foot long by 10-foot deep. The contractor could opt to slope walls back in lieu of using sheet piles for trench support. At the end of the trench the pipe would transition to a 72-inch RCP and would be placed in the bottom of the existing canal for approximately 1,050 feet. The soil in the bottom of the canal would be wet and unusable for pipe support, so it would be removed and replaced with gravel. The discharge pipe would be placed beneath Mawson Road, which would require a road closure and detour. The closure of North Meridian Road, described above and Mawson Road would not be done at the same time to allow traffic to access areas north of Meridian.

2.4.2 Main Canal Modifications

The Proposed Project/Action would increase the capacity of approximately 15,200 lineal feet of the Main Canal to convey flows to the Drexler service area needed as a result of the consolidation of the Meridian and Drexler diversions. The current maximum capacity of the Main Canal is estimated at 120 cfs from the outlet of the existing pumping plant to Siphon 2 (State Highway 20) which is not large enough to convey the new maximum flow (135 cfs) from the proposed new Meridian Pumping Plant; therefore, the canal would be widened and relined as described in **Table 2-1**.

**TABLE 2-1
PROPOSED CANAL MODIFICATIONS**

Description	Existing Bottom Width (ft)	Proposed Bottom Width (ft)	Flow (cfs)	Velocity (ft/s)
End of 54-inch Manifold pipe to Siphon 1	6.0-6.5	6 Pipe	135	4.8
Check Structure (moved from original location before Siphon)	5.2-7.9	5.5	135	2.5
Siphon 2 to Siphon 3	1.7-3.6	5.5	120	2.9
Siphon 3 to Bend Transition	2.6-3.5	5.5	120	2.7
Bend Transition to Check Structure	2.6-3.1	5.5	70	2.0
Check Structure to Siphon 4	3.1-3.3	3.5	70	2.0
Siphon 4 to Siphon 5	2.6-3.4	3.5	70	2.2

Source: MWH Americas, Inc., 2004

The concrete lined canal would have a trapezoidal shape and side slopes of 1.5 horizontal to 1 vertical (1.5:1). The canal section would be lined with four-inch-thick un-reinforced, cast-in-place concrete. The maximum bottom width would be 5.5 feet and the minimum bottom width would be 3.5 feet depending on the capacity requirements of the reach. The new canal invert elevation would be the same as the current elevation in order to continue utilizing existing siphons wherever hydraulic capacity is available.

The close proximity of the open canal to traffic on Alameda Street between the pumping plant and Mawson Road presents a safety hazard. The 72-inch discharge pipe would be extended to Mawson Road and backfilled to address the safety hazard. A two foot deep drainage ditch would be constructed along Alameda Street to convey surface runoff that previously discharged to the canal.

The existing canal would be demolished and widened from one side or the other depending on the needed expanded width and the availability of right-of-way. The Operations and Maintenance (O&M) road would be widened, as necessary, to a width of 12-feet. Typical construction of the canal widening would involve a backhoe moving along the O&M road to remove the existing concrete lining by breaking the lining with the bucket into pieces which could be removed and placed into dump trucks. Due to the narrow work area, one dump truck at a time would need to back in from the nearest access point. At this time, the only access to the canal work area are from Mawson Road, Highway 20, Central Street, Blackmer Road and Summy Road. The next truck would need to wait for the previous truck to pull off the access road. The contractor may try to bring a second dump truck on the opposite side of the canal and load it while waiting for a dump truck on the near side of the canal. Or a second excavator could start at the other end of the Main Canal and load dump trucks accessing the site from Summy Road. The old concrete lining would be landfilled.

It has been estimated that approximately 550 dump truck trips will be required to remove the old concrete lining. At 15 minutes per truck, it will take 24 working hours or about 3 days to remove the concrete. If truck access can maintain that rate, it should take about 4 weeks to remove all the concrete with one excavator working.

The same backhoe used to remove concrete or a second backhoe would then excavate the sides of the canal to the required dimensions. A surveyor would need to work with the excavator operator. The soil removed would be used to widen or raise the O&M road. Where the soil along the side of the canal is not suitable for supporting the concrete lining, it would be removed and replaced.

The existing canal width varies, but is generally between 16 feet and 20 feet wide. North of the transition at Station 72+09 the canal must be widened to approximately 21.5 feet wide. South of the transition it must be widened to approximately 19.5 feet wide. The width of the limits of work available to the contractor vary between approximately 40 feet and 50 feet. The canal is generally in the center of the limits of work with an access road on one side or the other. However, the levee on the side opposite of the access road is generally not wide enough for trucks. Small backhoes or excavators are 8 to 10 feet wide, and the access road would be too narrow in some locations to allow access. It would also not be wide enough to allow other trucks with equipment and work crews to move around the work area, so access along both sides of the canal will be needed. Therefore, the access road will need to be widened before the start of work in some locations.

Once the canal is widened, it would be lined with four inches of concrete. It is expected that the new concrete lining would be shotcrete. However, the contractor could opt to use a concrete lining machine. In either case, concrete delivery trucks with a 10 cubic yard capacity would need to access the shotcrete crew or lining machine. At an estimated rate of 400 feet per day, the lining would require 35 working days or 7 weeks. Approximately 105 cubic yards of concrete or about 10 concrete truck deliveries would be required. One concrete truck every 45 minutes would need to access the site.

Check Structures and Turnouts

Seven reinforced concrete check structures and 15 turnouts to local irrigation ditches exist at various locations along the existing Main Canal. Of the seven check structures two would remain in place, one is no longer needed and would be demolished and the remaining four would be demolished and then replaced to accommodate the canal widening. Of the 15 existing turnouts, three would be maintained in place, two are no longer needed and would be demolished, 10 would be demolished and replaced to accommodate the canal widening. One new turnout is required in a new location, so a total of 11 turnouts would be constructed. It may be necessary to install a small pump in the canal to provide the required flow through the turnout and into the irrigation ditch at the Mawson Road crossing. Turnouts would be installed within the canal and would not increase the canal footprint.

Construction of the turnouts would likely not be initiated until the completion of the old lining removal. The turnout construction could take place concurrently with canal widening. An excavator would excavate the area for the new turnout and remove the old pipe. Then

forms and rebar are placed and concrete poured. The gate mechanism would be installed at the end of the job. This work should not take more than a week per structure. More than one crew may be required.

The estimated duration of construction activities during the Main Canal widening is 5 months. This includes 4 weeks for removal of old concrete, 8 weeks for canal widening and turnout construction, and 8 weeks for canal lining.

Siphons

Two siphons (Siphon 1 and Siphon 3) would be replaced as part of the canal modifications. Siphon 1 under Mawson Road would be removed and replaced with the 72-inch diameter RCP which is part of the Pumping Plant discharge piping. The replacement of Siphon 1 would require a closure of Mawson Road to facilitate the pipe installation. Mawson Road would be restored and repaved following the pipe installation.

Siphon 3 would be replaced by a 72-inch diameter RCP. Replacement of Siphon 3 would require a shutdown and replacement of Central Road and would be subject to Sutter County Public Works' design standards. Siphon 3 would be lengthened to 200 feet (is currently 44-feet long) to extend it past a home on Central road that is situated next to the canal.

The remaining siphons (2, 4, and 5) provide adequate capacity and would be left in-place. Upstream and downstream transitions at each siphon would be constructed of four-inch thick cast-in-place concrete.

2.4.3 Drexler Re-Lift Pumping Plant

The Drexler Re-Lift Pumping Plant would be installed on the main canal, just upstream of the existing Siphon 5 and Pump #10. The purpose of the pumping plant would be to divert 35 cfs from the main canal to the Drexler service area. The existing Drexler Diversion would be abandoned. Water would be pumped up to a new turnout structure via the Drexler Pipeline installed under Phase 1. This pipeline consists of approximately 6,500 feet of 36-inch pipe and a turnout structure. From the turnout structure, the water would gravity flow to the original Drexler canal outfall via approximately 600 feet of 36-inch pipe.

The pumping plant would include a 14-foot wide by 32-foot long forebay that would draw water off the Main Canal to two vertical turbine pumps. The forebay would be 10 feet deep and would be divided into two individual bays by a concrete wall with the pumps set at the end of each bay. The pump motors and discharge piping would be supported above a concrete slab that also forms the roof of the forebay. The individual pump discharge pipes would connect to a below ground 36-inch pipeline that would tie into the beginning of the Drexler Pipeline about 200 feet south of the Re-Lift Pumping Plant. An existing drainage ditch that parallels the Main Canal to the west would be filled to allow the construction of the pumping plant, and a new 24-inch storm drain would convey drainage from the ditch to the existing Reclamation District 70 canal to the south. The site construction also includes a 50-foot long by 21-foot wide concrete spillway in the O&M

road opposite the Re-Lift Plant location. A 36 inch flow meter would be located in a below ground vault or sited above ground on the concrete pad.

Construction of the wet well and the overflow spillway must be done when the Main Canal is empty. However, the relocation of the drain from the seep to the ditch west of Summy Road and the connection to the Drexler Pipeline could be done during summer months.

2.4.4 Drexler Pipeline Extension

The Drexler Pipeline was connected to an existing 18-inch corrugated metal pipe (CMP) that discharges to an existing outlet box. The connection to the CMP was made with a concrete collar that would likely leak when under pressure. An alternative to replace the CMP and outlet box is being considered to provide a permanent connection and improve pump hydraulics.

A 24 inch branch of the Drexler Pipeline could be extended by approximately 500 feet to connect to a canal. This would improve pumping hydraulics by by-passing 3,000 feet of pipe and 3,000 feet of canals. Service to the Drexler Service Area would be improved and pumping costs would be reduced.

2.4.5 Removal of Existing Meridian and Drexler Diversions

Once the New Meridian Diversion/Pumping Plant and Drexler Relift pumping plant are constructed and operational, the existing Meridian and Drexler Diversion/Pumping Plants would be removed. At a minimum, removal of these facilities would include the removal of the pumps, equipment platforms, electrical equipment, gauging stations, pile supports to required level, and river side-piping. It would also include the excavation of the levee so the discharge pipe through the levee could be removed. The replacement levee section would be constructed to USACE and CVFPB requirements. Sheet pile coffer dams would likely be required to protect the work in the levee and landside flooding.

Removal of the existing diversions would require a large crane sited on the top of the levee or on a barge in the river. As the pumps, piping and support structures are cut into manageable sections, they would be lifted and removed to a stockpile on the landside and hauled away by trucks. Some of the equipment such as the pumps could be reused, but most of the scrap would be landfilled. The contractor would attempt to pull the support piles out of the river, but most likely they would be cut three feet below river bottom and abandoned, in accordance with CVFPB requirements. The concrete vaults would be difficult and costly to remove. If CVFPB requires removal, the vaults would need to be demolished with jackhammers or a wrecking ball. The debris would then need to be removed from the river bank and bottom with a backhoe and hauled to a landfill.

Removal of the pipes through the levee would require excavation of the levee by backhoe down to the and from around the pipe. A sheet pile coffer dam would be constructed to protect the construct site and the landside of the levee from flooding. CVFPB requires excavations in the levee to have trench walls sloped back at 1.5 to 1.0 side slopes. This means the trench would be

the trench would be approximately 80 feet wide at the top. If the pipe sections are welded together, it would need to be cut into sections with a cutting torch. A crane would then lift the sections out of the trench to trucks for recycling or landfilling. The soil removed to uncover the pipe would be stockpiled at a nearby staging area. If the soil meets minimum requirements for use in a levee, it would be hauled back, placed in six-inch lifts and compacted to 90 percent relative density, in accordance with CVFPB requirements. The levee would be restored to pre-existing grades.

2.4.6 Grimes Canal Modifications

Under Phase 1 the existing unlined canal was widened and the banks were raised to accommodate a change in the how the canal is used. Previously, the canal flowed from south to north because the old diversion was at the south end of the canal. With the relocation of the New Grimes Diversion to the north end of the canal, the water would flow from north to south resulting in a higher water surface along most of the canal. New check structures and turnouts were also installed under Phase 1, and about 1,080 feet of the canal was lined with concrete. Under Phase 2, it is proposed that the remaining 2,500 linear feet of canal be lined with a 4 inches of concrete (shotcrete). The canal was widened under Phase 1, so the only work necessary is to remove and silt in the bottom of the canal and apply the shotcrete. The proposed Phase 2 Grimes Canal modifications are an optional component of the Phase 2 Proposed Project/Action; implementation of this component will be determined at a later date based on available funding.

2.5 Construction Phase

The specific routes to transport equipment, dispose excavated materials, or to obtain imported fill and other materials would likely vary for each project component. Because a number of construction materials sources are located in the surrounding area and urban centers, the selected routes use a combination of highways (e.g., Interstate-5 (I-5), State Route (SR)-99, SR-20, and SR-45), arterials and designated truck routes in the project vicinity. Construction worker trips are assumed to originate from the major urban areas in the project region and nearby communities primarily within Sutter County, Sacramento County, and Yolo County.

2.5.1 Staging Areas

Main staging areas would be located in an easily accessible area. Arrangements would be made between the contractor and property owner for all stored construction and equipment materials. Temporary staging of raw materials could occur in existing rights-of-way when short-term storage is needed. Site preparation for staging areas would incorporate appropriate measures to prevent unnecessary vegetation removal. Ingress and egress roads would be covered with rock base at a minimum to prevent off-tracking of dirt.

Main staging areas would be large enough to safely store heavy equipment, work crew vehicles, long-term storage of construction materials, and job site trailer(s). The long-term staging area(s)

would be used for storage of construction equipment and materials, as a reporting location for workers, and as the location of the job site trailer and parking area for vehicles and equipment.

The contractor would be responsible for securing the job site with temporary chain link fencing or other fencing acceptable to the project engineer. Power to the job site will be provided by existing electrical utilities, if needed.

2.5.2 Affected Roadways

The roadways identified in **Table 2-3** will be affected during construction. All roadways would be restored to original condition or better and subject to Sutter County Public Works' design standards.

**TABLE 2-2
AFFECTED ROADWAY SEGMENTS**

Segment	Anticipated Level of Disruption
North Meridian Road	Temporary closure and detour (6 months)
Mawson Road	Temporary closure; Detour route (1 month)
Burris Road	Temporary closure; Detour route (1 month)
Central Road	Temporary closure and detour (1 month)

2.5.3 Construction Considerations

Construction activities would comply with the requirements set by the Central Valley Regional Water Quality Control Board (CVRWQCB) to minimize construction-related impacts to water quality. In addition, silt screens and/or silt fences would be used where construction activities could possibly cause sediment to enter the river. All water-side construction activities, with the exception of riprap installation, would be confined within a sheet-pile cofferdam, which would be put in place and removed during the “dry” season from July 1 to October 1, although this could be extended to November 1 with NMFS approval. In addition, canal modifications would occur between October 1 and April 30 to avoid disruption to the irrigation delivery schedule and growing season.

All construction contracts would specify staging areas for heavy equipment on the land-side of the Sacramento River so that spills of oil, grease, or other petroleum by-products would not be discharged in the Sacramento River. All machinery would be properly maintained and cleaned to prevent spills and leaks. Any spills and leaks from equipment would be reported immediately and cleaned up in accordance with applicable local, state, and/or federal regulations.

Construction contracts would note the location of staging areas for stockpiling material and would be required to maintain Storm Water Pollution Prevention Plan (SWPP) Best Management Practices (BMPs) to prevent the migration of material off site.

2.6 Actions Contributing to MSCS Goals

The MSCS contains a list of conservation goals for each species and NCCPA community evaluated in the MSCS. The three alternative goals for species are recovery (“R”), contribute to recovery (“r”), and maintain (“m”). The goal of “recovery” was assigned to those species whose recovery is dependent on restoration of the Delta and Suisan Bay/Marsh ecosystems and for which CALFED could reasonably be expected to undertake all or most of the actions necessary to recover the species. Recovery is achieved when the decline of a species is arrested or reversed, threats to the species are neutralized, and the species long-term survival in nature is assured. The goal “contribute to recovery” was assigned to species for which CALFED Actions affect only a limited portion of the species range and/or have limited effects on the species. To achieve the goal of contributing to a species recovery, CALFED is expected to undertake some of the actions under its control and within its scope that are necessary to recover the species. When a species has a recovery plan, CALFED may implement both plan measures that are within the CALFED Solution Area and some measures that are outside the Solution Area. For species without a recovery plan, CALFED will need to implement specific measures that will benefit the species. The goal “maintain” was assigned to species expected to be affected minimally by CALFED Actions. For this category, CALFED will avoid, minimize, and compensate for any adverse effects to the species commensurate with the level of effect on the species. Actions may not actually contribute to the recovery of the species; however, at a minimum, they will be expected to not contribute toward the need to list the species or degrade the status of a listed species. CALFED also will, to the extent practicable, improve habitat conditions for these species.

The CALFED Ecosystem Restoration Program (ERP) has adopted the CALFED MSCS goals related addressing “recovery”, “contribute to recovery”, and “maintain” for MSCS covered species as described above. The ERP has also adopted the MSCS conservation measures and would build upon those measures during the process of completing ERP studies and actions. The ERP focuses on measures to enhance NCCPA communities and has a goal related to the need to “enhance and/or conserve biotic communities” (“E”). A final ERP goal is to “maintain and/or enhance harvested species” (“H”), which relates to commercial/recreational use of native and non-native biological resources. The MFWC Project will fulfill the following milestone of the CALFED ERP to the benefit of all MSCS “R” and “r” covered fish:

- Install positive barrier fish screens on all diversions greater than 250 cfs in all Ecological Management Zones (EMZs) and 25% of all smaller unscreened diversions in the Sacramento River Basin.

2.7 Conservation Measures

The CALFED MSCS presents the basis for conservation measures developed to address CALFED Actions overall, as outlined in the Programmatic CALFED EIS/EIR. The CALFED MSCS follows the two-tiered approach to FESA, CESA, and NCCPA compliance initiated by the CALFED Programmatic EIS/EIR and MSCS. The MSCS provides the CALFED programmatic compliance with FESA, CESA, and NCCPA while this MFWC ASIP provides the project-level compliance with these acts. As such, this ASIP represents the project-level biological assessment

for initiating consultation with USFWS and NOAA-Fisheries under the Section 7 of the FESA and the project-level NCCPA compliance.

The conservation measures summarized in **Table 2-3** are from a USFWS Programmatic Biological Opinion and will be incorporated into the Project Description. Conservation measures, as defined in this ASIP, include avoidance and minimization, compensation, and mitigation measures for giant garter snake. The following tables list the CALFED MSCS species specific conservation goals and measures, and habitat conservation measures for NCCPA habitats.

- The contractor shall use vibrational pile driving to the greatest extent feasible. If percussive pile driving is necessary, its use shall be minimized to the maximum extent possible and comply with the following *Interim Criteria for Injury of Fish to Pile Driving Operations* (Popper et al. 2006):
 - The Sound Exposure Level (SEL) shall not exceed 187 dB (re: 1 $\mu\text{Pa}^2 \cdot \text{sec}$) in any single strike, measured at a distance of 32.8 ft from the source;
 - The peak sound pressure level should not exceed 208 dB (re: 1 $\mu\text{Pa}_{\text{peak}}$) in any single strike, measured at a distance of 32.8 ft from the source.
- Pump(s) used for dewatering the construction site will be screened according to NMFS fish screening criteria for anadromous salmonids (NMFS 1997). Prior to cofferdam dewatering, a fish rescue and salvage plan approved by NMFS will be implemented to minimize potential construction-related effects to species present in the project area. A qualified biologist will be on-site during such pumping activities to ensure that any fish that may be present within the construction area are relocated to suitable habitat near the project area.
- During construction operations, the number of access routes, number and size of staging areas, and the total area of the proposed project activity will be limited to the minimum necessary. Routes and boundaries will be clearly demarcated. Movement of heavy equipment to and from the project site will be restricted to established roadways to minimize habitat disturbance. Project-related vehicles shall observe a 20-mile-per-hour speed limit within construction areas, except on County roads and on State and Federal highways. This is particularly important during periods when the snake may be sunning or moving on roadways. All heavy equipment, vehicles, and supplies will be stored at the designated staging area at the end of each work period.
- During construction operations, stockpiling of construction materials, portable equipment, vehicles, and supplies will be restricted to the designated construction staging areas and exclusive of the Environmentally Sensitive Areas (ESAs). The applicant will ensure contamination of habitat does not occur during such operations. All workers will be informed of the importance of preventing spills and appropriate measures to take should a spill occur.
- At most 24-hours prior to the commencement of construction activities, the ESA shall be surveyed for giant garter snakes by a USFWS-approved biologist. The biologist will provide the USFWS with a written report that adequately documents the monitoring efforts within 24-hours of commencement of construction activities. The project area

shall be re-inspected by the monitoring biologist whenever a lapse in construction activity of two weeks or greater has occurred.

- Construction activity within giant garter snake habitat (*e.g.* aquatic, upland, and rice habitat) shall be conducted between May 1 and October 1. This is the active period for the snake and direct mortality is lessened, because snakes are expected to actively move and avoid danger. If it appears that construction activity may go beyond October 1, the project proponents shall contact the USFWS as soon as possible, but not later than September 15 of the year in question, to determine if additional measures are necessary to minimize take. Construction activities within 200 feet from the banks of snake aquatic habitat will be avoided during the snake's inactive season. **If this is not feasible, the Project Proponent must consult with USFWS to determine measures to avoid impacts to giant garter snake.**
- A USFWS-approved biologist shall inspect construction-related activities at the ESA to ensure that no unauthorized take of federally listed species or destruction of their habitat occurs. The biologist shall be available for monitoring throughout all phases of construction that may result in adverse effects to the giant garter snake. This includes clearing and grubbing activities and installation of exclusion fence in giant garter snake upland habitat. Furthermore, the biologist shall have the authority through communication with the resident engineer to stop construction activities in the immediate area if a giant garter snake is encountered during construction until appropriate corrective measures have been completed or until the snake is determined to be unharmed. Snakes encountered during construction activities shall be allowed to move away from the area on their own volition. The biologist shall notify the USFWS immediately if any listed species are found on-site, and will submit a report, including date(s), location(s), habitat description, and any corrective measures taken to protect the species found. The biologist shall be required to report any take of listed species to the USFWS immediately by telephone at 916/ 414-6600 and by electronic mail or written letter addressed to the Chief, Endangered Species Division, within three (3) working days of the incident. The Service does not authorize any handling or moving of a giant garter snake by other than a USFWS-permitted biologist.
- A Worker Environmental Awareness Training Program for construction personnel shall be conducted by the USFWS-approved biologist for all construction workers, including contractors, prior to the commencement of construction activities. The program shall provide workers with information on their responsibilities with regard to the snake, an overview of the life-history of this species, information on take prohibitions, protections afforded this animal under the Act, and an explanation of the relevant terms and conditions of this biological opinion. Written documentation of the training must be submitted to the Sacramento Fish and Wildlife Office within 30 days of the completion of training. As needed, training shall be conducted in Spanish for Spanish language speakers.

- Prior to the commencement of construction activities, high visibility fencing will be erected around the habitats of federally listed species to identify and protect these designated ESAs from encroachment of personnel and equipment. These areas will be avoided by all construction personnel. The fencing shall be inspected by the Contractor before the start of each work day and maintained by the Contractor until completion of the project. The fencing may be removed only when the construction of the project is completed. Fencing will be established in upland immediately adjacent to aquatic snake habitat and extending up to 200 feet from construction activities. Silt fencing, if properly installed, may serve as suitable snake exclusion fencing.
- Signs will be posted by the Contractor every 50 feet along the edge of the ESAs, with the following information: “This area is habitat of federally-threatened and/or endangered species, and must not be disturbed. These species are protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment.” The signs should be clearly readable from a distance of 20 feet, and must be maintained by the Contractor for the duration of construction.
- Best Management Practices (BMPs), including a Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP), will be implemented to minimize effects to the snake during construction. Best management practices will be implemented to prevent sedimentation from entering ESAs and to reduce erosion, dust, noise, and other deleterious aspects of construction related activities. These BMPs may include, but are not limited to, silt fencing, temporary berms, restrictions on cleaning equipment in or near ESAs, installation of vegetative strips, and temporary sediment disposal. Runoff from dust control and hazardous materials will be retained on the construction site and prevented from flowing into the ESAs.
- Tightly woven fiber netting (mesh size less than 0.25 inch) or similar material shall be used for erosion control and other purposes at the ESA to ensure that the giant garter snake is not trapped or becomes entangled. This limitation shall be communicated to the contractor using special provisions included in the bid solicitation package.
- To eliminate an attraction to predators of the snake, all food-related trash items, such as wrappers, cans, bottles, and food scraps, must be disposed of in closed containers and removed at the end of each workday from the entire project site.
- The Contractor shall provide documentation that aggregate, fill, or borrow material provided for the proposed project was obtained in compliance with the State Mining and Reclamation Act (SMARA). Evidence of compliance with the Act shall be demonstrated by providing the resident engineer with one of the following: 1) a letter from the USFWS stating that the use of the borrow pit will not result in the incidental take of species; 2) an incidental take permit for contractor-related activities issued by the USFWS pursuant to section 10(a)(1)(B) of the Act; 3) a biological opinion or letter concurring with a “not likely to adversely affect” determination issued by the USFWS to the Federal agency

having jurisdiction over contractor-related services' 4) a letter from the USFWS concurring with the "no effect" determination for contractor-related activities; or 5) contractor submittal of information to the resident engineer indicating compliance with the SMARA and provision of County land use permits and California Environmental Quality Act (CEQA) clearance.

- After construction activities are complete, any temporary fill or construction debris shall be removed and disturbed areas restored to their pre-project conditions. An area subject to "temporary" disturbance includes any area that is disturbed during the project, but that, after project completion, will not be subject to further disturbance and has the potential to be re-vegetated. All ESA snake habitats subject to temporary ground disturbances, including storage and staging areas and temporary roads, will be restored to pre-project conditions. If appropriate, these areas shall also be re-contoured to pre-project conditions. A written report shall be submitted to the USFWS within ten (10) working days of the completion of construction at the project site and restoration of the site to pre-project conditions.
- An inspection of the site, with a photo documentation report showing pre- and post-project area photos, will be conducted and photos and a brief report will be submitted to USFWS one year from implementation of restoration to pre-project conditions.
- The Contractor shall minimize the potential for harm, harassment, and direct mortality of the snake resulting from project-related activities by implementation of the project. The Contractor shall ensure that the temporary loss of giant garter snake habitat is confined to the proposed project site.
- Aquatic habitat for the snake will be dewatered 15 days prior to the initiation of construction activities. If complete dewatering is not possible, potential snake prey (*i.e.*, fish and tadpoles) will be removed so that giant garter snakes and other wildlife are not attracted to the construction area.
- A USFWS-approved biologist shall inspect construction-related activities at the proposed project site to ensure that no unauthorized take of federally listed species or destruction of their habitat occurs. The biologist shall be available for monitoring throughout all phases of construction that may result in adverse effects to the giant garter snake. This includes clearing and grubbing and other construction activities in the areas of wetland vegetation/aquatic habitat, adjacent upland habitat, and during exclusion fence installation. Furthermore, the biologist shall have the authority through communication with the resident engineer to stop construction activities in the immediate area if a giant garter snake is encountered during construction until appropriate corrective measures have been completed or until the snake is determined to be unharmed. Snakes encountered during construction activities shall be allowed to move away from the area on their own volition. The biologist shall notify the USFWS immediately if any listed species are found on-site, and will submit a report, including date(s), location(s), habitat description, and any corrective measures taken to protect the species found. The biologist shall be required to

report any take of listed species to the USFWS immediately by telephone at 916/ 414-6600 and by electronic mail or written letter addressed to the Chief, Endangered Species Division, within three (3) working days of the incident. The Service does not authorize any handling or moving of a giant garter snake by other than a USFWS-permitted biologist.

- Prior to the commencement of construction activities, the project proponent shall compensate for the temporary and permanent loss habitat of the giant garter snake according to the Programmatic Guidelines.

**TABLE 2-3
CALFED MSCS SPECIES GOAL AND CONSERVATION MEASURES
FOR SPECIAL-STATUS SPECIES OCCURRING IN THE ACTION AREA**

Species (Scientific Name / Common Name)	Listing Status Federal/ State	MSCS Species Goal	Applicable MSCS Species Specific Conservation Measures
Fish			
<i>Acipenser medirostris</i> North American green sturgeon	FT/CSC	R	<ol style="list-style-type: none"> 1. Coordinate and maximize water supply system operations flexibility consistent with seasonal flow and water temperature needs of the green sturgeon; pursue opportunities to operate new and existing diversions to avoid and minimize adverse effects on green sturgeon, and, to the extent consistent with CALFED objectives, locate the diversion points to avoid the primary distribution of green sturgeon. 2. For all construction activities, limit construction to windows of minimal species vulnerability and implement best management practices (BMPs), including a stormwater pollution prevention plan (SWPPP), toxic materials control and spill response plan, and vegetation protection plan. 3. CALFED actions that have impacts on shallow water habitat will protect and restore in-kind habitat, including habitat features that minimize colonization by undesirable non-native species. 4. Avoid or minimize restrictions on the upward movement of green sturgeon to suitable spawning habitat. 5. Implement applicable conservation measures to avoid, minimize, and compensate for impacts on green sturgeon listed in MSCS Attachment D, "Summary of Potential Beneficial and Adverse Program Effects and Conservation Measures", Table D-19, "Anadromous Fish Group: Summary of Potential Beneficial and Adverse CALFED Effects and Conservation Measures".
<i>Oncorhynchus mykiss</i> Central Valley steelhead	FT/--	R	<ol style="list-style-type: none"> 1. Implement applicable conservation measures to avoid, minimize, and compensate for impacts on Central Valley steelhead listed in MSCS Attachment D, "Summary of Potential Beneficial and Adverse Program Effects and Conservation Measures", Table D-19, "Anadromous Fish Group: Summary of Potential Beneficial and Adverse CALFED Effects and Conservation Measures". 2. For all in-channel and near-channel construction activities, implement construction BMPs (such as erosion and sediment control measures) and conservation measures in the 404 NWP, GPs, and PL84-99 USACE flood relief BOs: <ol style="list-style-type: none"> a. Avoid or minimize channel modifications during time periods when steelhead are vulnerable to the direct and indirect adverse effects of construction activities. b. Avoid or minimize channel modifications in important natal, rearing, and migratory habitats that may result in habitat degradation and diminished habitat connectivity. c. Avoid, minimize, and compensate for all adverse impacts on instream, shallow-water,

**TABLE 2-3
CALFED MSCS SPECIES GOAL AND CONSERVATION MEASURES
FOR SPECIAL-STATUS SPECIES OCCURRING IN THE ACTION AREA**

Species (Scientific Name / Common Name)	Listing Status Federal/ State	MSCS Species Goal	Applicable MSCS Species Specific Conservation Measures
<i>Onchorhynchus tshawytscha</i> Central Valley spring-run Chinook salmon	FT/CT	R	<p>riparian, and shaded riverine aquatic habitats resulting from CALFED Actions, including bank protection of in-channel islands, construction of attached berms, and levee program actions.</p> <p>d. Compensate for adverse impacts on habitats by in-kind, onsite replacement of habitats and their functional values. Compensation shall result in a net increase in the extent and connectivity of these habitats for migrating, rearing, and spawning steelhead.</p> <p>3. Implementation of offsite, out-of-kind mitigation that reestablishes access to historical steelhead spawning and rearing habitat may be considered appropriate compensation:</p> <p>a. Remove or modify artificial barriers and diversion structures.</p> <p>4. Fish screens shall be installed in accordance with NMFS/DFG fish screening criteria on any new diversions, consolidated diversions, or on the intake of any existing diversions as a compensation measure.</p> <p>5. Fully adhere to the terms and conditions of all applicable CESA and FESA biological opinions and permits for CVP and SWP operations.</p> <p>6. Implement construction BMPs including stormwater pollution prevention plans, toxic materials control and spill response plans, vegetation protection plans, and restrictions on materials used in channel and on levee embankments:</p> <p>a. All materials that are used for construction of in-channel structures must meet applicable State and federal water quality criteria. Avoid or minimize the use of such materials that are deleterious to aquatic organisms.</p>
			<p>1. Implement applicable conservation measures to avoid, minimize, and compensate for impacts on Central Valley spring-run Chinook salmon listed in MSCS Attachment D, Table D-19.</p> <p>2. For all in-channel and near-channel construction activities, implement construction BMPs (such as erosion and sediment control measures) and conservation measures in the 404 NWP, GPs, and PL84-99 USACE flood relief BOs:</p> <p>a. Avoid or minimize channel modifications during time periods when spring-run Chinook are vulnerable to the direct and indirect adverse effects of construction activities.</p> <p>b. Avoid or minimize channel modifications in important natal, rearing, and migratory habitats</p>

**TABLE 2-3
CALFED MSCS SPECIES GOAL AND CONSERVATION MEASURES
FOR SPECIAL-STATUS SPECIES OCCURRING IN THE ACTION AREA**

Species (Scientific Name / Common Name)	Listing Status Federal/ State	MSCS Species Goal	Applicable MSCS Species Specific Conservation Measures
			<p>that may result in habitat degradation and diminished habitat connectivity.</p> <p>c. Avoid, minimize, and compensate for all adverse impacts on instream, shallow-water, riparian, and shaded riverine aquatic habitats resulting from CALFED Actions, including bank protection of in-channel islands, construction of attached berms, and levee program actions.</p> <p>d. Compensate for adverse impacts on habitats by in-kind, onsite replacement of habitats and their functional values. Compensation shall result in a net increase in the extent and connectivity of these habitats for migrating, rearing, and spawning spring-run Chinook salmon.</p> <p>3. Implementation of offsite, out-of-kind mitigation that reestablishes access to historical spring-run Chinook salmon spawning and rearing habitat may be considered appropriate compensation:</p> <p>a. Remove or modify artificial barriers and diversion structures.</p> <p>4. Fish screens shall be installed in accordance with NMFS/DFG fish screening criteria on any new diversions, consolidated diversions, or on the intake of any existing diversion that is either enlarged, modified, relocated, or for which the season of use is changed as a result of a CALFED action within the range of spring-run Chinook salmon. CALFED may also install fish screens on existing diversions as a compensation measure.</p> <p>5. Fully adhere to all terms and conditions in all applicable CESA and FESA biological opinions and permits for CVP and SWP operations.</p> <p>6. Implement construction BMPs including stormwater pollution prevention plans, toxic materials control and spill response plans, vegetation protection plans, and restrictions on materials used in channel and on levee embankments:</p> <p>a. All materials that are used for construction of in-channel structures must meet applicable State and federal water quality criteria. Avoid or minimize the use of such materials that are deleterious to aquatic organisms.</p>
<i>Onchorhynchus tshawytscha</i>	FE/CE	R	1. Implement applicable conservation measures to avoid, minimize, and compensate for impacts on

**TABLE 2-3
CALFED MSCS SPECIES GOAL AND CONSERVATION MEASURES
FOR SPECIAL-STATUS SPECIES OCCURRING IN THE ACTION AREA**

Species (Scientific Name / Common Name)	Listing Status Federal/ State	MSCS Species Goal	Applicable MSCS Species Specific Conservation Measures
Sacramento River winter-run Chinook salmon			<p>Sacramento River winter-run Chinook salmon listed in MSCS Attachment D, Table D-19.</p> <ol style="list-style-type: none"> 2. For all in-channel and near-channel construction activities, implement construction BMPs (such as erosion and sediment control measures) and conservation measures in the 404 NWP, GPs, and PL84-99 USACE flood relief BOs: <ol style="list-style-type: none"> a. Avoid or minimize channel modifications during time periods when winter-run Chinook are vulnerable to the direct and indirect adverse effects of construction activities. b. Avoid or minimize channel modifications in important natal, rearing, and migratory habitats that may result in habitat degradation and diminished habitat connectivity. c. Avoid, minimize, and compensate for all adverse impacts on instream, shallow-water, riparian, and shaded riverine aquatic habitats resulting from CALFED Actions, including bank protection of in-channel islands, construction of attached berms, and levee program actions. d. Compensate for adverse impacts on habitats by in-kind, onsite replacement of habitats and their functional values. Compensation shall result in a net increase in the extent and connectivity of these habitats for migrating, rearing, and spawning spring-run Chinook salmon. 3. Implementation of offsite, out-of-kind mitigation that reestablishes access to historical winter-run Chinook salmon spawning and rearing habitat may be considered appropriate compensation: <ol style="list-style-type: none"> a. Remove or modify artificial barriers and diversion structures. 4. Fish screens shall be installed in accordance with NMFS/DFG fish screening criteria on any new diversions, consolidated diversions, or on the intake of any existing diversion that is either enlarged, modified, relocated, or for which the season of use is changed as a result of a CALFED action within the range of spring-run Chinook salmon. CALFED may also install fish screens on existing diversions as a compensation measure. 5. Fully adhere to all terms and conditions in all applicable CESA and FESA biological opinions and permits for CVP and SWP operations. 6. Implement construction BMPs including stormwater pollution prevention plans, toxic materials control and spill response plans, vegetation protection plans, and restrictions on materials used in channel and on levee embankments:

**TABLE 2-3
CALFED MSCS SPECIES GOAL AND CONSERVATION MEASURES
FOR SPECIAL-STATUS SPECIES OCCURRING IN THE ACTION AREA**

Species (Scientific Name / Common Name)	Listing Status Federal/ State	MSCS Species Goal	Applicable MSCS Species Specific Conservation Measures
			a. All materials that are used for construction of in-channel structures must meet applicable State and federal water quality criteria. Avoid or minimize the use of such materials that are deleterious to aquatic organisms.
Reptiles			
<i>Thamnophis gigas</i> Giant garter snake	FT/CT	r	<ol style="list-style-type: none"> 1. Conduct surveys to determine the occupancy and distribution of the species within suitable habitat that CALFED actions could affect.¹ 2. Restore potentially occupied habitat that would be temporarily degraded by CALFED actions onsite immediately following project completion.
Birds			
<i>Athene cunicularia</i> Western burrowing owl	--/CSC	m	<ol style="list-style-type: none"> 1. Restore or enhance 1-2 acres of suitable nesting habitat for each acre of occupied nesting habitat that is converted to unsuitable nesting habitat as a result of CALFED actions. 2. To the extent consistent with ERP objectives, design and manage grassland and agricultural land habitat restorations and enhancements to provide suitable foraging habitat conditions. 3. Avoid or minimize disturbances that could be associated with implementing CALFED actions near active nest sites during the nesting period (March-August). 4. To the extent consistent with ERP objectives, manage restored or enhanced habitats to maintain desirable rodent populations and minimize impacts associated with rodent control.
<i>Branta hutchinsii leucopareia</i> Cackling (=Aleutian Canada) goose	FD/--/--	m	<ol style="list-style-type: none"> 1. To the extent consistent with ERP objectives, direct proposed actions for improving agricultural habitats for wildlife to protecting and improving traditional wintering habitat.

¹ Note that the Service does not have a 'protocol-level survey' for the giant garter snake to determine presence/absence. Determination of species presence is based on habitat characteristics, the most current information about the extant range of the species, surrounding locality records, and the biology and ecology of the snake, and not on presence/absence surveys, which are not effective for this cryptic and evasive species.

**TABLE 2-3
CALFED MSCS SPECIES GOAL AND CONSERVATION MEASURES
FOR SPECIAL-STATUS SPECIES OCCURRING IN THE ACTION AREA**

Species (Scientific Name / Common Name)	Listing Status Federal/ State	MSCS Species Goal	Applicable MSCS Species Specific Conservation Measures
<i>Buteo swainsoni</i> Swainson's hawk	--/CT/--	r	<ol style="list-style-type: none"> 1. Before implementing actions that could result in take or the loss or degradation of occupied habitat, conduct surveys in suitable habitat within portions of the species' range that CALFED actions could affect to determine the presence and distribution of the species. 2. Avoid or minimize actions near locations that support high densities of nesting pairs that could adversely affect high value foraging and nesting habitat. 3. Avoid or minimize actions within 5 miles of active nest sites that could result in disturbance during the breeding period (April-September). 4. To the extent consistent with CALFED objectives, adhere to DFG Region II mitigation guidelines for avoiding or minimizing impacts of actions of the Swainson's hawk.
<i>Pandion haliaetus</i> osprey	--/--/--	m	<ol style="list-style-type: none"> 1. Before implementing CALFED actions that could result in the loss nesting structures or disturbance to nesting pairs, conduct surveys to determine the presence and distribution of active nest sites along the Sacramento River and other major tributaries to the Bay-Delta. 2. Avoid or minimize disturbances that could be associated with implementing CALFED actions near active nest sites during the nesting period (March-August). 3. Avoid or minimize CALFED actions that could result in the degradation or loss of nesting structures.
<i>Riparia riparia</i> Bank swallow	--/CT/--	r	<ol style="list-style-type: none"> 1. Before implementing actions that could result in take or the loss or degradation of occupied habitat, conduct surveys in suitable habitat within portions of the species' range that CALFED actions could affect to determine the presence and distribution of the species. 1. Avoid or minimize actions that could adversely affect known colonies or unoccupied river reaches with eroding banks composed of soils that would provide suitable nesting substrate. 2. Avoid actions near active colonies from April through August.

**TABLE 2-4
CALFED MSCS CONSERVATION MEASURES FOR NCCPA NATURAL COMMUNITIES OCCURRING IN THE ACTION AREA**

NCCPA Natural Community	Applicable MSCS Conservation Measures
Valley Riverine Aquatic Habitat	<ol style="list-style-type: none"> 1. Avoid or minimize disturbance to existing shaded riverine aquatic overhead cover. 2. Restore or enhance 1-3 times the linear footage of affected shaded riverine aquatic overhead cover near where impacts are incurred. 3. To the extent practicable, include project design features that allow for onsite reestablishment and long-term maintenance of shaded riverine aquatic overhead cover following project construction. 4. Avoid or minimize implementing actions during the periods evaluated species are present and could be affected by the actions.
Valley/Foothill Riparian Habitat	<ol style="list-style-type: none"> 1. Avoid or minimize disturbance to existing habitat. 2. Restore or enhance 2-5 acres of additional in-kind habitat for every acre of affected habitat near where impacts are incurred before implementing actions that could result in the loss or degradation of habitat. 3. To the extent practicable, include project design features that allow for onsite reestablishment and long-term maintenance of riparian vegetation following project construction. 4. Avoid or minimize construction activities during the breeding period of evaluated species that could be affected by the actions.
Anadromous Fish Group	<ol style="list-style-type: none"> 1. Implement measures on an emergency basis during extended droughts to protect water supplies dedicated to meet Delta inflow and outflow criteria deemed essential in maintaining anadromous fish populations. Such measures would be implemented infrequently and would be used only to readjust water supplies to levels expected without this set of CALFED actions. Measures may include additional supplies, or emergency provisions that would reduce other water supply demands. Another measure is initially to implement the actions to the extent feasible to determine potential effects on seasonal and critical-year water supplies and develop a long-term water management plan that includes this and other actions to minimize effects of reallocation in other seasons and critical years. 2. Avoid or minimize in-channel construction activities during periods when anadromous fish species are present in high abundance or when life stages are present that are most susceptible to adverse effects associated with implementing actions. 3. To the extent consistent with CALFED objectives, confine additional winter pumping for flooding agricultural lands to times and areas of channels with low densities of anadromous fish. 4. To the extent consistent with CALFED objectives, place consolidated intakes in areas with minimal numbers of juvenile anadromous fish. 5. To the extent consistent with CALFED objectives, include project design features that allow for onsite reestablishment and long-term maintenance of aquatic, wetland, and riparian habitat following project construction. 6. Reductions in unnatural inputs of organic carbon could be replaced with increased natural organic inputs such as from restored tidal wetlands and riparian habitats. 7. Water transfers should be conducted so as not to increase exports during times of the year when anadromous fish are more vulnerable to damage or loss at project facilities or when their habitat may be adversely affected. 8. Design and operate proposed new diversions from the Sacramento River to minimize adverse effects on migrating anadromous fish, to avoid blocking upstream migration of fish to the Sacramento River, and to improve habitat conditions for anadromous fish.

TABLE 2-4
CALFED MSCS CONSERVATION MEASURES FOR NCCPA NATURAL COMMUNITIES OCCURRING IN THE ACTION AREA

NCCPA Natural Community	Applicable MSCS Conservation Measures
Estuarine Fish Group	<ol style="list-style-type: none"> 1. Implement measures on an emergency basis during extended droughts to protect water supplies dedicated to meet Delta inflow and outflow criteria deemed essential in maintaining anadromous fish populations. Such measures would be implemented infrequently and would be used only to readjust water supplies to levels expected without this set of CALFED actions. Measures may include additional supplies, or emergency provisions that would reduce other water supply demands. Another measure is initially to implement the actions to the extent feasible to determine potential effects on seasonal and critical-year water supplies and develop a long-term water management plan that includes this and other actions to minimize effects of reallocation in other seasons and critical years. 2. To the extent consistent with CALFED objectives, construct and operate in-channel barriers and restrictions to provide sufficient leeway to adjust hydraulics in various channels to ensure fish are not being drawn in greater numbers or proportions toward the pumps or being affected by poor water quality. Implement monitoring and testing necessary to design, construct, and operate barriers and restrictions. Develop and implement procedures and operating criteria for barrier systems to protect fish. Implement monitoring and testing necessary to ensure against excessive movement of fish toward the south-Delta pumping plants. 3. Avoid or minimize in-channel construction activities during periods estuarine fish species would be most susceptible to adverse effects that could be associated with implementing proposed actions. 4. Avoid or minimize implementing proposed actions in occupied habitat areas that could have a substantial adverse effect on the distribution or abundance estuarine fish species. 5. To the extent practicable, confine additional pumping to times and area to channels with minimal concentrations of fish. 6. Install screens on new diversions to avoid entrainment of juvenile and adult estuarine fish. 7. Include project design features that allow for onsite reestablishment and long-term maintenance of aquatic, wetland, and riparian habitat following project construction. 8. Reductions in unnatural inputs of organic carbon could be replaced with increased natural organic inputs such as from restored tidal wetlands and riparian habitats. 9. Water transfers should be conducted in a manner that avoids increased exports during periods when estuarine fish are more vulnerable to damage or loss at project facilities. 10. Design and operate proposed new diversions from the Sacramento River to minimize adverse effects on migrating native estuarine fishes, to avoid blocking upstream migration of fish to the Sacramento River, and to improve habitat conditions for native estuarine fish.

CHAPTER 3

Environmental Baseline

The following chapter presents species accounts for species assessed in detail in this ASIP. The species addressed in this ASIP are those special-status species that may be affected or whose habitat may be affected by the Proposed Project/Action.

Species selected for detailed analysis include those federal- and/or state-listed species, candidate species, and/or species of special concern covered by the CALFED MSCS and potentially affected by the Proposed Project/Action. The following table shows these selected species which are addressed in detail in the ASIP.

Designated Critical Habitat and delineated Essential Fish Habitat in the Action Area are also discussed.

TABLE 3-1
SPECIES, CRITICAL HABITAT, AND ESSENTIAL FISH HABITAT
ADDRESSED IN DETAIL IN THIS ASIP

Species
<ul style="list-style-type: none"> North American green sturgeon (Southern DPS) (<i>Acipenser medirostris</i>) Central Valley steelhead (<i>Oncorhynchus mykiss</i>) Central Valley spring-run Chinook (<i>Oncorhynchus tshawytscha</i>) Sacramento River winter-run Chinook (<i>Oncorhynchus tshawytscha</i>) Giant garter snake (<i>Thamnophis gigas</i>) Western burrowing owl (<i>Athene cunicularia</i>) Cackling (=Aleutian Canada) Goose (<i>Branta hutchinsii leucopareia</i>) Swainson's hawk (<i>Buteo swainsoni</i>) Osprey (<i>Pandion haliaetus</i>) Bank swallow (<i>Riparia riparia</i>)
Critical Habitat
<ul style="list-style-type: none"> North American green sturgeon (Southern DPS) Critical Habitat Central Valley steelhead Critical Habitat Central Valley spring-run Chinook salmon Critical Habitat Sacramento River winter-run Chinook salmon Critical Habitat
Essential Fish Habitat
<ul style="list-style-type: none"> Pacific salmon Essential Fish Habitat

3.1 Baseline Conditions for Species

The stretch of the Sacramento River that includes the Action Area is part of a migratory corridor for adult Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead, and provides migration and rearing habitat for juveniles of these species. A large proportion of all Federally listed Central Valley salmonids are expected to utilize aquatic habitat within the Sacramento River in the Action Area. The Sacramento River also functions as a migratory and holding corridor for adult and rearing and migratory habitat for juvenile Southern DPS of North American green sturgeon. The entire population of migrating adults and emigrating juvenile winter-, and Central Valley spring-run Chinook salmon, and a majority of Central Valley steelhead, must pass by/through the Action Area. The following section provides life history information for these special-status species with potentially affected by the Proposed Project/Action.

3.1.1 North American Green Sturgeon

On April 7, 2006, NMFS listed the Southern Distinct Population Segment (DPS) of the North American green sturgeon as threatened. Final Critical Habitat for the green sturgeon was designated on October 9, 2009. Sturgeon are an anadromous fish species, spending the majority of their life in marine waters and then moving into freshwater throughout the fall and winter to spawn in the spring. Upon hatching the young green sturgeon develop in the fresh water and are known to return to the ocean within one to four years (COSEWIC 2004). Historically, green sturgeon was found in the lower reaches of the San Joaquin River and Delta. Today, they occur in the upper Sacramento River and tributaries to the Sacramento River including the Feather, Yuba and American Rivers. Green sturgeon is frequently caught along the coast, but is present in limited numbers in the estuaries (COSEWIC 2004).

The green sturgeon has diverse habitat needs ranging from freshwater streams, rivers, estuarine habitat as well as marine waters depending upon their life stage. The specific habitat requirements for green sturgeon are poorly understood but are thought to resemble those of white sturgeon. Green sturgeon spawning is thought to occur in deep pools in areas of large cobbles, but can range from clean sand to bedrock in turbulent river mainstems. The larger eggs and higher growth rates of developing green sturgeon in comparison to white sturgeon suggest that a higher oxygen demand may be required for proper embryonic development. Therefore, green sturgeon may subsequently require colder, cleaner water for spawning relative to white sturgeon (COSEWIC 2004).

The spawning population of the Southern DPS of North American green sturgeon is currently restricted to the Sacramento River below Keswick Dam. This population is composed of a single breeding population which must pass by/through the Action Area. Adults migrate upstream by/through the Action Area primarily between March and June (Adams *et al.* 2002), and small groups of juveniles have been captured at various locations on the Sacramento River as well in the Delta (downstream of Sacramento) during all months of the year (IEP Database, Borthwick *et*

al. 1999). Therefore, within the Action Area, green sturgeon are likely to occur within the riverine aquatic habitat of the Sacramento River year-round (**Figure 2-1** and **Figure 2-2**).

3.1.2 Central Valley Steelhead

The Sacramento and San Joaquin Rivers offer the only migration route to the drainages of the Sierra Nevada and southern Cascade mountain ranges for steelhead. Information on migration and spawning tendencies of steelhead is difficult to determine due to the low abundance of spawners and the high flows and turbid waters occurring during winter spawning periods. NMFS reports limited data on the recent abundance of this ESU, but its present total run size based dam counts, hatchery returns, and past spawning surveys is probably less than 10,000 fish (NMFS 1996). The most widespread run type of steelhead is in the winter (ocean-maturing) steelhead. Winter steelhead occur in essentially all coastal rivers in California, while summer steelhead are far less common. In California, both winter and summer steelhead generally begin spawning in December. Spawning occurs December through April in the Sacramento River mainstem and tributaries. Eggs are buried by the females in the loose gravel, usually at the lower end of a pool. Newly hatched larvae (alevins) initially stay in the gravel nesting area until their yolk sacs are absorbed (about two weeks) and then move into adjacent shallow and quiet pools. Juvenile steelhead remain in freshwater streams from one to three years before entering the ocean. Downstream migration predominantly occurs during fall and spring. Generally, steelhead will return to their natal streams in one to three years.

Adult steelhead typically migrate upstream within the Sacramento River during the winter (November - January) to spawning areas upstream of the proposed diversion locations and juvenile smolts migrate downstream during the spring (March – May). Steelhead inhabit the upper Sacramento River and occur seasonally in the vicinity of the proposed diversion locations. The proportion of steelhead in this DPS that migrate through the Action Area is unknown; however, because of the relatively large amount of suitable habitat in the Sacramento River relative to the San Joaquin River, the proportion of steelhead is probably high. At the Proposed diversion locations, there is limited quality juvenile rearing habitat (aquatic riverine habitat) in the Sacramento River – the vegetation along the shore and on the levee bank consists of ruderal vegetation, and on the levee, the vegetation is maintained annually by burning. Riparian vegetation both upstream and downstream of the proposed diversions, and at the existing Grimes and Drexler Diversions, provide suitable shaded riverine aquatic likely to be suitable rearing habitat. However, when the majority of juvenile steelhead emigrate as yearlings, they are assumed to be primarily utilizing the center of the channel rather than the shoreline.

Adult steelhead may be present in the Action Area from June through March, with the peak occurring between August and October (Bailey 1954, Hallock *et al.* 1957). Juvenile steelhead emigrate through the Sacramento River from late fall to spring. Given the timing of migrations and emigrations of adults and juveniles, Central Valley steelhead may be expected to occur in the Sacramento River near and within the Action Area from June through March.

3.1.3 Central Valley Spring-Run Chinook Salmon

Chinook salmon runs (fall-run, late fall-run, winter-run, and spring-run) are named for the time of season that upstream spawning migration occurs, and are defined by the combined timing of adult migration, the amount of time juveniles reside in a stream, and the time of year the smolts migrate out to sea. Timing of adult upstream migration varies within individual runs depending upon the region (Yoshiyama 1998). Central Valley spring-run Chinook enter the Sacramento River system from March to July, and spawning occurs from late August through early October (Yoshiyama 1998). Due to the longer period of time between upstream migration and spawning, spring-run Chinook must hold out in the cold temperatures of mountain headwaters to avoid excessive summertime temperatures of the valley and foothills. Spring-run ascent to mountain elevations can only be accomplished if there are no obstructions within the drainage system preventing passage.

Life histories (migration, holding, spawning, rearing, and juvenile emigration) of Chinook salmon vary within the separate runs, but essential habitat requirements including substrate, temperature, dissolved oxygen, stream flow, and water quality are consistent throughout the runs. Chinook salmon require a water temperature from 43° to 56° F to successfully spawn (Boles 1988). Spawning can occur in habitats ranging from small tributaries to large river beds, and generally requires coarse gravel riffles. Chinook salmon eggs incubate in the gravel for approximately 35 to 50 days, depending on the temperature. The newly emerged fry remain in the gravel until most of the yolk sac is absorbed.

Successful rearing of juvenile Chinook requires cool streams/rivers with significant vegetative cover providing shade for protection from predation. Emigration strategies within the Sacramento-San Joaquin system can vary depending on the time of emergence. Spring-run emigration timing is dependant upon the tributaries of origin, and can occur through the period of November through June. Based upon Butte Creek research conducted by CDFG, over 95% of spring-run emigrate as fry/young-of-the-year. Only a small portion of the population will over-summer emigrating the subsequent fall as yearlings (McReynolds et al. 2006).

Adult Central Valley spring-run Chinook salmon are expected on the Sacramento River between March and July (Myers *et al.* 1998, Good *et al.* 2005). Peak presence is believed to be during February and March (CDFG 1998). In the Sacramento River, juveniles may begin migrating downstream almost immediately following emergence from the gravel with most emigration occurring from December through March (Moyle *et al.* 1989, Vogel and Marine 1991). Snider and Titus (2000) observed that up to 69 percent of spring-run Chinook salmon emigrate during the first migration phase between November and early January. The remainder of the Central Valley spring-run Chinook salmon emigrate during subsequent phases that extend into early June. The exact composition of the age structure is not known, although populations from Mill and Deer Creek primarily emigrate as yearlings (Colleen Harvey-Arrison, CDFG, pers. comm., 2004), and populations from Butte Creek primarily emigrate as fry (Ward *et al.* 2002). Younger juveniles are found closer to the shoreline than older individuals (Healey 1991).

Given the timing of migrations and emigrations of adults and juveniles, Central Valley spring-run Chinook may be expected to occur in the Sacramento River near and within the Action Area from November through June.

3.1.4 Sacramento River Winter-Run Chinook Salmon

Winter-run Chinook salmon generally begin migrating upstream from December through February and hold-over in the Sacramento River system for a couple of months before peak spawning occurs between May and July (Groot, p. 319, 1998). Temperatures must be suitable for the winter-run to hold over. Winter-run Chinook emigration to the Delta has been known to occur from November through April, after only four to seven months of river life (Groot, p. 319, 1998). Juveniles may exhibit a sustained residence in the middle or lower Sacramento River or Upper Delta prior to seaward migration. Juvenile Sacramento River winter-run Chinook salmon migration patterns in the Sacramento River can best be described by temporal migration characteristics found by the USFWS in beach seine captures along the lower Sacramento River between Sacramento and Princeton. Beach seining samples the shoreline rather than the center of the channel, as is often the case in rotary screw traps and trawls, and is considered the most accurate sampling effort in predicting the nearshore presence of juvenile salmonids. In the Sacramento River, between Princeton and Sacramento, juveniles are expected between September and mid-April, with highest densities between December and March. Rotary screw trap work at Knights Landing on the Sacramento River by Snider and Titus (2000) captured juveniles between August and April, with heaviest densities observed first during November and December, and second during January through March. The largest captures occurred during periods of sustained high flow, generally greater than 20,000 cfs.

Adult winter-run typically migrate to spawning areas upstream of the proposed diversion locations, and occur seasonally in the vicinity of the proposed diversion locations. Adult Sacramento River winter-run Chinook salmon are expected to be present in the Sacramento River near and within the Action Area between November and June (Myers *et al.* 1998, Good *et al.* 2005) as they migrate to spawning grounds. Juveniles are expected to occur within the Sacramento River near and within the Action Area from September through April. Suitable winter-run Chinook rearing habitat occurs in the vicinity of the existing diversions, although at the locations of the Proposed new diversions, rearing habitat is absent.

3.1.5 Giant Garter Snake

Giant garter snake preys primarily on aquatic species such as fish and amphibians; both native and introduced species are taken. Generally active from April through September, the giant garter snake breeds from March into May, and again briefly in September. Young are brooded internally by females, who give birth to 10 to 46 (average is 23) live young from late July into September. Young disperse into dense cover and reabsorb their yolk sacs, then begin feeding on their own. They reach sexual maturity in three to five years. From early October to April, the giant garter snake takes refuge in winter retreats and is generally not active (USFWS 1999).

The giant garter snake is endemic to wetlands of California's Central Valley. This snake inhabits irrigation and drainage canals, rice lands, marshes, sloughs, ponds, small lakes, low-gradient streams, and adjacent uplands. The snake requires enough water during their active season to maintain high densities of prey; emergent wetland vegetation for cover and foraging; and adjacent uplands and openings in streamside vegetation for basking sites. Higher uplands are used for cover and refuge from floodwaters during their non-active season. The giant garter snake is typically absent from wetlands with sand, gravel, or rock substrates, and from riparian woodlands.

The giant garter snake population was probably always disjunct, with a southern population occurring from the vicinity Buena Vista Lake in Kern County to Merced County, and a northern population occurring from San Joaquin County to Butte County. To the east and west, the populations were probably confined by the foothills of the Sierra Nevada Mountains and the Coast Ranges. There are 13 separate populations presently recognized by the USFWS, coinciding with historic flood basins and tributary streams in the Central Valley (USFWS 1999). These populations are discontinuously distributed from the Fresno area in the south to Butte Creek in the north. Dispersal corridors do not exist between the populations.

Several giant garter snakes records are listed in or near the Action Area. Some records are not location-specific, including one record that identifies an observation in the Grimes U.S. Geological Survey quadrangle, in which portions of the proposed project facilities are located, including the Drexler re-lift pumping plant. The Grimes quadrangle record is dated 2002 (CDFG 2012a).

No giant garter snakes were observed during field reconnaissance for this project; however, given the cryptic and evasive nature of this species, determination of presence more often relies on the habitat characteristics, the most current information about the extant range of the species, surrounding locality records, and the biology and ecology of the giant garter snake.

Agricultural land use within the region generally provides suitable giant garter snake habitat, with abundant rice fields and associated irrigation ditches, rodent burrows for upland refugia, and open upland areas for basking. Within the Action Area, there are several types of drainage ditches that border various types of crops (including rice). The availability of emergent or aquatic vegetation for cover and basking sites varies with each ditch, season, and the operations of MFWC within a given year. A description of the potential giant garter snake habitat within the Action Area is provided below and is depicted in **Figure 3-1**. Within the Action Area, all habitats within 200 feet of suitable giant garter snake aquatic habitat are considered upland habitat for the snake, except for upland areas that are unvegetated, heavily disturbed (such as road, and non-rice cultivated fields), or covered by a walled structure such as a building.

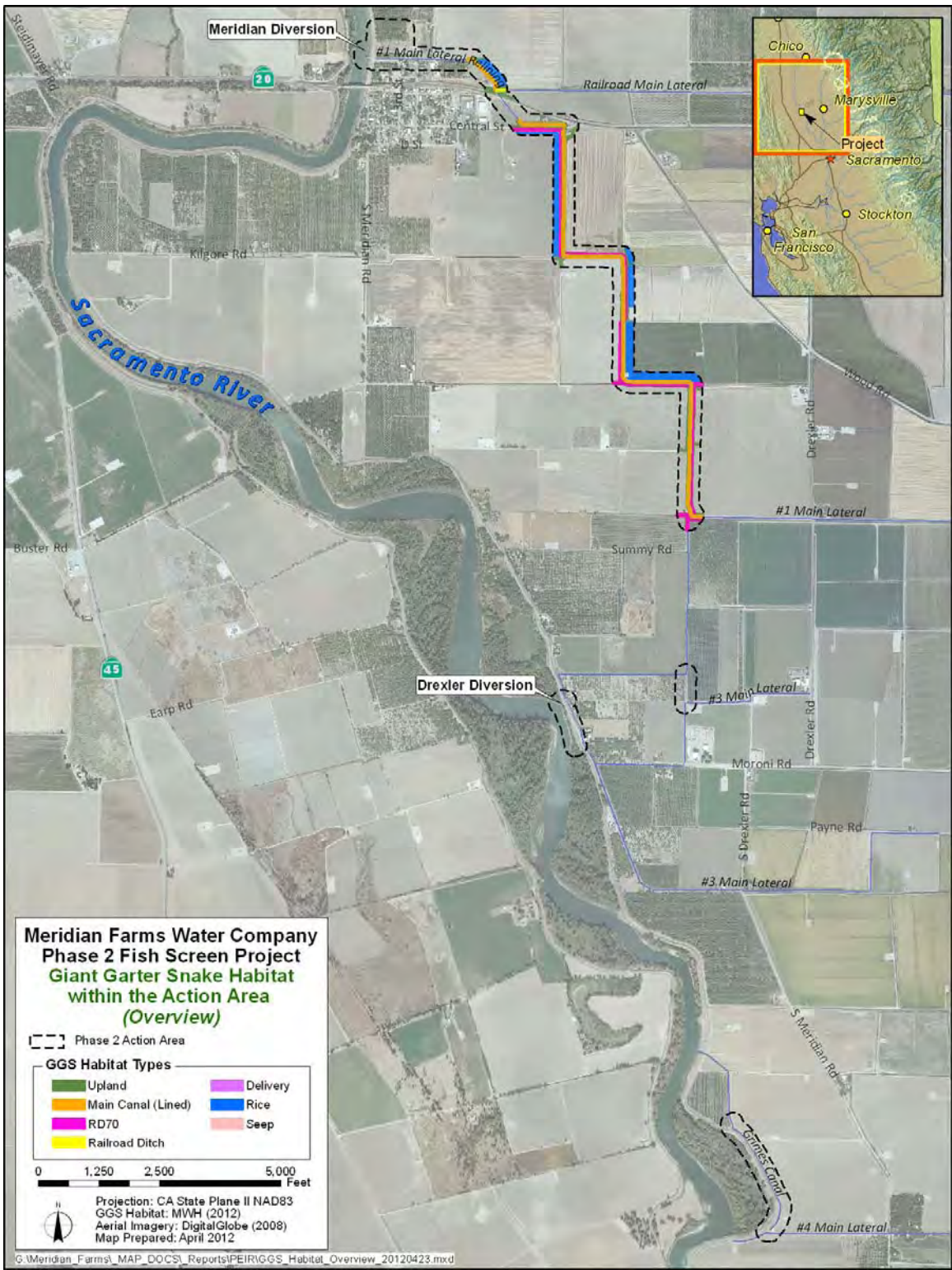


Figure 3-1. Giant Garter Snake Habitat in the Action Area

Aquatic Habitat

Rice Fields

Rice is a common crop grown within the Proposed Project/Action Area, and there are rice fields within the MFWC Service Area. In 2011 the Action Area intersected portions of eight rice fields. At the time this document was prepared, 2012 rice field locations in the Action Area were similar to those planted in 2011. Because rice fields are inundated through the spring and summer, during the giant garter snake's active period, and because rice provides suitable vegetative cover, rice fields within the Action Area provide suitable habitat for the giant garter snake.

Irrigation Drains, Ditches, and Canals

There are several types of conveyances within the Action Area, ranging from wide, concrete-lined canals for irrigation delivery to relatively shallow, unstructured seep ditches used to collect minor drainage from fields. As previously mentioned, the giant garter snake's specific habitat requirements include the presence of aquatic habitat during its active period, the availability of aquatic vegetative cover, basking sites, and prey during the active period, and the availability of upland refugia (generally within 200 feet of suitable aquatic habitat) during the inactive period. Each type of ditch may provide some, all, or none of the required elements that define giant garter snake habitat, depending on MFWC maintenance and operations, as well as the individual farmer's agricultural practices, including which crops are grown in the fields. Following field visits to the site, analysis of collected data, and informal consultation with USFWS biologists, it was determined that the only ditches that are suitable aquatic habitat for giant garter snake are select drains belonging to Reclamation District 70, and portions of the Main Canal that are within 200 feet of suitable aquatic habitat. These drains are described in further detail in this chapter. In addition, the other types of conveyances are also described to document why they were excluded as suitable giant garter snake habitat under current conditions. **Photos 3, 4, 5, 6, 8 and 9** in **Appendix B** show ditches within the Action Area with unsuitable habitat, and **Photo 7** in **Appendix B** shows a portion of the Reclamation District 70 canal considered suitable giant garter snake aquatic habitat. A summary of suitable aquatic habitat for giant garter snake is included in **Table 3-2**.

Reclamation District 70 Drains

Some of the Reclamation District 70 drains (Reclamation Drains) are suitable aquatic habitat for giant garter snake, as they provide all the criteria necessary to support giant garter snake during its active and inactive periods. The Reclamation Drains are larger drainage ditches that follow along and adjacent to the Main Canal and are used by MFWC for water delivery or drainage. The locations of the Reclamation drains within the Action Area are shown in **Figure 2-1** and **Figure 2-2**. See **Photo 7** in Appendix A taken near the proposed Drexler re-lift pumping plant site. These are unlined ditches up to 30 feet wide and five to six feet deep, and are typically vegetated with common tule (*Scirpus acutus*) and cattail (*Typha latifolia*). The Reclamation District maintains the drains for vegetation removal by burning and/or baling, on average approximately every three to five years, depending on how much the drain is used and whether or not siltation washes in from adjacent fields. Some drains may go without maintenance for longer periods if they do not

receive significant drainage flows or siltation. The Reclamation Drains in the Action Area were last maintained approximately three years ago.

Reclamation Drains in the Action Area typically hold at least a small amount of water year round (as little as 1 to 2" deep), and may hold water to a depth of several feet during the irrigation season of approximately May through September. They can therefore presumably support aquatic invertebrates, amphibians, and small fish species.

Main Canal

The aquatic habitat of the Main Canal is not suitable for giant garter snake, except for where it is 200 feet or less from otherwise suitable giant garter snake aquatic habitat, be it a Reclamation Drain, natural suitable wetlands, or rice field. The Main Canal is a concrete-lined ditch for the majority of its alignment. It is used to convey and deliver water from the Meridian Diversion/Pumping Plant south to the central portion of the MFWC Service Area during the spring and summer. The Main Canal in the Action Area begins at the Meridian Diversion to its intersection with Summy Road as shown in **Figure 2-1** and **Figure 2-2**. Approximately 12 feet wide and 6 feet deep, the Main Canal typically does not support vegetation along its banks. Ruderal vegetation may grow along the unlined freeboard of the canal or along unlined portions of the canal, but this vegetation is regularly removed several times during the spring and summer. Control methods include application of herbicide three times per year and mowing three times per year. Although an aquatic grass grows within portions of the Main Canal during the summer, it is sparsely distributed and does not provide adequate structure or cover for giant garter snake. During the fall and winter, the Main Canal is no longer used for conveyance and remains dry until the next spring. Portions of the Main Canal are shown in **Photos 3, 4, 5, 6** and **8** in **Appendix B**.

Another concrete-lined ditch in the northern portion of the Action Area, called the "Railroad Ditch" has the same characteristics as the Main Canal and does not provide suitable aquatic habitat for giant garter snake because it does not provide the necessary cover. It is located within 200 feet of suitable aquatic habitat, however (rice field), and could therefore be used by the snake.

Water Delivery Ditches

Ditches used for water delivery are generally not considered suitable aquatic habitat for giant garter snake due to the lack of emergent aquatic vegetation for cover and basking, and/or lack of consistent water within the ditches during the snake's active period. However, some delivery ditches within 200 feet or less from suitable giant garter snake aquatic habitat may be used by the snake. In addition to the Main Canal, these smaller (3-4 feet wide), unlined, earthen ditches are used to deliver irrigation water throughout the MFWC Service Area. Within the Action Area, these delivery ditches are located along the conveyance improvements in the Proposed Project/Action. Similar to the Main Canal, the delivery ditches receive regular maintenance to remove all vegetation that grows within the ditches and along its banks. The vegetation removal occurs several times during the spring and summer – usually at least once and up to six times per year, depending on how often the maintenance is needed. Control methods include herbicide treatment, burning, and/or baling. These delivery ditches convey water at specified times during the spring and summer months and are controlled by MFWC operations. A few ditches hold

water throughout the growing season, but the majority of the delivery ditches only hold water for one week during each month during the growing season while MFWC delivers water to its clients. Therefore, although there may be water in these ditches during the snake's active period, it is not of sufficient duration to support giant garter snake aquatic habitat.

Seep Ditches

Seep ditches within the Action Area generally do not provide suitable aquatic habitat for giant garter snake, except where they are sufficiently wet, vegetated, unmaintained and/or in proximity to other aquatic habitat, including rice fields. Seep ditches, if not in a condition to be aquatic habitat for giant garter snake, are upland habitat for the snake if they are within 200 feet of suitable giant garter snake aquatic habitat. These earthen, unlined ditches are on the edges of crop fields and serve to drain excess moisture from the fields (**Photo 8, Appendix B**). Seep ditches are dug by farmers within their fields; therefore, the maintenance and even existence of these ditches is up to the farmers' discretion. These ditches are on average three to four feet wide and are located throughout the Action Area. Unmaintained seep ditches support ruderal species such as Johnsongrass, prickly lettuce, and Italian thistle up to three feet tall. Because these ditches are not used for water delivery or large-flow drainage, they do not consistently hold water during the spring and summer unless they are adjacent to a rice field, for which the entire field is flooded. The ditches only receive rainwater in the winter, during the giant garter snake's inactive period. The only places where the ditches might be inundated during the snake's active period are where these ditches are located adjacent to rice fields, which are flooded during the spring and summer.

Upland Habitat

Within the Action Area, upland areas mapped as potential giant garter snake habitat included vegetated areas on the margins of fields and waterways. Unvegetated roadways and cultivated (non-rice) fields were not considered suitable upland habitat for the giant garter snake. Upland refugia for the giant garter snake exist primarily as burrows made by small burrowing mammals such as ground squirrels and gophers. Upland burrows up to 200 feet from aquatic habitat are considered to be suitable refugia for giant garter snake. Open areas within 200 feet from aquatic habitat may also provide suitable basking habitat for giant garter snake during its active season. Small mammal burrows and basking habitat vary in location and quantity, but are generally available along the upper banks of ditches and unpaved areas, along and including roads or cultivated fields (the widths vary from five to 20 feet). Earthen berms along agricultural fields may also support small mammal burrows. Few rodent burrows were observed in the study area. Although optimal habitat for giant garter snake hibernation was not observed, there is some potential for snakes to remain in the Action Area during the inactive season.

Summary of Giant Garter Snake Habitat

Table 3-2 below summarizes the potential habitats available in the Action Area for the giant garter snake. The calculations were based on mapped locations of the crop types for 2011 and the projected crop types for 2012; and the locations of the drains, ditches, and canals within the Action Area. It should be noted that a few projections for crop types in 2012 may change, as the type of crop planted is up to the individual farmer's discretion. Reclamation Drains and rice fields were the only suitable aquatic habitat types identified in the Action Area. Other canals were

mapped as aquatic habitat for the giant garter snake if they were within 200 feet of Reclamation Drains or rice fields. Upland habitats were determined to include all lands within 200 feet of suitable aquatic habitat. Although rodent burrows were not observed to be common in the Action Area, all upland habitats with rodent burrows are suitable refugia for the giant garter snake during their inactive season, and all other upland habitats without refugia may be used by the giant garter snake for basking. Cropland is also included as upland habitat, although its utility to the giant garter snake may be limited and highly variable, depending on the type of crop.

**TABLE 3-2
SUMMARY OF GIANT GARTER SNAKE HABITAT IN THE ACTION AREA**

Habitat Type	Lineal feet	Acres
AQUATIC:		38.9
Rice Fields	--	29.2
Reclamation Drains		6.0
Main Canal		3.4
Seep		0.1
Delivery Ditches		<0.1
Private drain		<0.1
Railroad Ditch		<0.1
UPLAND	--	21.3

3.1.6 Western Burrowing Owl

The western burrowing owl inhabits open grasslands and shrub lands with perches and burrows. These owls eat mainly insects, with small mammals, reptiles, and birds making up a portion of the diet as well. For cover and breeding, old rodent burrows, as well as debris piles are used. The western burrowing owl generally breeds from March through August, peaking in April and May.

In the Action Area, potential nest/burrow sites occur in unpaved and relatively undisturbed upland areas, such as along earthen berms and unpaved roads and turnouts. The relatively-exposed banks and levees of the Sacramento River and drainage canals may also provide suitable habitat.

3.1.7 Cackling (=Aleutian Canada) Goose

The cackling goose is a small, island-nesting subspecies of the Canada goose. This subspecies nests on the Aleutian Islands and winters in the Central Valley where it forages in meadows, agricultural fields, pastures, and moist grasslands near open water (lakes and ponds) and wetlands. The cackling goose was federal-listed endangered in 1967 due to a severe decline in populations. Hunting and loss of migration and wintering habitat contributed to this species' decline, although the introduction of Arctic and red foxes to the breeding islands was the main reason for population decline. However, due to reintroductions of wild geese onto fox-free islands and other conservation efforts, populations of cackling goose have recovered from approximately 6,300 individuals in 1989 to 37,000 individuals in 1999. The cackling goose was reduced to federal-listed threatened status in 1989, and finally delisted in 2001 (FR 66:54, 15642-15656, March 2001). Monitoring of goose populations will continue for 5 years after delisting, as required by the Endangered Species Act to ensure full recovery of the species. The cackling goose is still protected under the Migratory Bird Treaty Act, and is a federal species of concern.

Within the Action Area, suitable foraging habitat exists in the surrounding agricultural fields along the Sacramento River and the MFWC Service Area. Several occurrences are reported in the Meridian U.S. Geological Survey quadrangle dating between 1978 and 1987 (CDFG 2012a).

3.1.8 Swainson's Hawk

The Swainson's hawk is a migratory raptor listed as threatened by the State of California, and federally as a species of special concern. It breeds in western North America and winters for the most part in South America. It nests in trees, usually in riparian areas, but forages over pasturelands and open agricultural fields. In the Central Valley it is associated with riparian corridors adjacent to field crops and grasslands and subsists largely on small mammals, especially California vole, California ground squirrel, and large insects. Suitable foraging habitat within an energetically efficient flight distance from active Swainson's hawk nests has been found to be of great importance. Because the prey base for Swainson's hawk is highly variable from year to year, depending on cycles of agriculture, rainfall, and other natural cycles, large acreages of potential foraging habitat must be allotted per breeding pair.

The decline of the species in the Central Valley has been associated with extensive reduction of Swainson's hawk habitat. Suitable foraging habitat is present within the Action Area in agricultural fields, where populations of prey species are supported. Suitable nesting habitat occurs within the riparian woodland habitats adjacent with the Proposed Project/Action site. Large valley oak and cottonwood trees occur adjacent to the river on the bank opposite from the proposed intake structures and fish screens. Several recent occurrences (as recent as 2003) are recorded within three miles of project facilities (CDFG 2012a).

3.1.9 Osprey

The osprey is a migratory raptor that occurs in northern California from Cascade Ranges south to Lake Tahoe and along the coast south to Marin County. The osprey arrives in California around mid-March to early April and begins breeding activities until September. Ospreys use large trees, snags, and dead-topped trees in open forest habitats for cover and nesting. Nests are platforms of sticks located high above ground, sometimes reaching as much as 250 feet tall. Breeding population was estimated in 1975 at 350-400 pairs in Northern California; numbers of breeding pairs have increased in recent years (CDFG 2012b).

The osprey preys primarily on fish; sometimes mammals, birds, reptiles, amphibians, and invertebrates. This species require open, clear waters for foraging. Suitable foraging habitat includes rivers, lakes, reservoirs, bays, estuaries, and surf zones (CDFG 2012b).

In the general proposed project/Action Area there is potential for nesting along the banks of the Sacramento River. There are no CNDDDB occurrences of osprey within the MFWC service area. The nearest osprey record is from 2004 and is located approximately 10 miles northwest of the Meridian Diversion (CDFG 2012a).

3.1.10 Bank Swallow

The bank swallow is the smallest North American swallow, with a body length of about 4.75 inches. The bank swallow nests in colonies and creates nests by burrowing into vertical banks consisting of fine-texture soils. Bank swallows breed in California from April to August and spend the winter months in South America. Currently, bank swallows are locally common only in restricted portions of California where sandy, vertical bluffs or riverbanks are available for the birds to dig their burrows and nest in colonies. Most of California's remaining populations nest along the upper Sacramento River where it still meanders in a somewhat natural manner. In this alluvial plain, the river system provides suitable soil types and erosion needed for prime nesting habitat. Seventy-five percent of the State's population is concentrated on the banks of Central Valley streams, including several colonies on the Sacramento River.

Since 1900, the range of bank swallows in California has been reduced by approximately 50 percent largely attributed to habitat loss. The rip-rapping of natural stream banks is the single most serious, human-caused threat to the long-term survival of the bank swallow in California. Existing colonies and areas of potential habitat may be lost over the next several years if current planning is implemented. Rip-rap installed by the COE under the Sacramento River Bank Protection Project has already affected almost 150 miles of Sacramento River bank since 1960. Additional rip-rap proposed under this project may result in extensive loss of essential, eroding bank habitat.

On the Sacramento River, bank swallow populations continue to decline. Based on an average occupancy rate of about 45 percent of all burrows dug into river banks, an estimated population of 13,170 pairs of bank swallows nested in Sacramento River habitats in 1986. In 1998 the population reached its lowest level of 4,990 pairs and then rebounded dramatically in 1999 to 8,210 pairs regaining some habitat from which it was extirpated (in 1998) on the lower end of its Sacramento

River range. The significance of the apparent turnaround may not be known for a few years if it continues. The 1999 result may be a beginning of an expanding population boom for the species or just a momentary upswing. Further monitoring will be necessary to determine the true population trend, if any. Currently, the status of the bank swallow is still considered declining (CDFG 2000b).

The State Recovery Plan for bank swallow includes identifying habitat preserves and a return to a natural, meandering riverine ecosystem as the two primary strategies for recovering the bank swallow. A recovery planning team has cited the return to naturally functioning riparian ecosystems as the best way to preserve, recover, and conserve the many species, including the bank swallow, that are dependent on this unique ecosystem.

In the general Action Area there is potential for nesting along the banks of the Sacramento River. The CNDDDB documents several occurrences of bank swallow within the MFWC Service Area. The most recent observation is from 2004 and was recorded less than two miles from the Meridian Diversion (CDFG 2012a). The bank swallow prefers steep, open cliff-like banks for nesting. Where the proposed new intake will be located, however, the shore slopes gradually up to the levee and is largely vegetated with annual grasses.

3.2 Critical Habitat

The Action Area occurs within designated Critical Habitat for Southern DPS of the North American green sturgeon, Central Valley steelhead, Central Valley spring-run Chinook salmon, and Sacramento River winter-run Chinook salmon. Critical Habitat for threatened Central Valley steelhead and Central Valley spring-run Chinook salmon was issued by NMFS on September 2, 2005. Critical Habitat for endangered Sacramento River winter-run Chinook salmon was designated on June 16, 1993. Final Critical Habitat for the green sturgeon was designated on October 9, 2009.

The project vicinity is located within the Colusa Basin Hydrologic Unit (5520) of Critical Habitat for Central Valley steelhead and Central Valley spring-run Chinook. This unit includes the Sacramento River upstream to and including: Tisdale Bypass, Butte Creek, Butte Slough, Nelson Slough, Sacramento Slough, Sutter Bypass, Colusa Bypass, Little Chico Creek, and Little Dry Creek.

For the Sacramento winter-run Chinook, Critical Habitat is designated to include the Sacramento River from Keswick Dam, Shasta County (River Mile 302) to Chipps Island (River Mile 0) at the westward margin of the Sacramento-San Joaquin Delta, all waters from Chipps Island westward to Carquinez Bridge, including Honker Bay, Suisun Bay, and Carquinez Strait, all waters of San Pablo Bay westward of the Carquinez Bridge, and all waters of San Francisco Bay (north of the San Francisco/Oakland Bay Bridge) from San Pablo Bay to the Golden Gate Bridge.

These species share similar habitat requirements. The Primary Constituent Elements (PCE's) of salmonid habitat within the Action Area include: freshwater spawning and rearing habitat; freshwater migration corridors; and estuarine areas containing adequate substrate, water quality, water quantity, water temperature, water velocity, cover/shelter, food, riparian vegetation, space, and safe passage conditions. The Sacramento River provides freshwater habitat in the Action

Area and serves as an upstream and downstream salmonid migratory route, as well as juvenile salmonid rearing habitat.

The diversion and storage of natural flows by dams and diversion structures on Central Valley waterways have depleted streamflows and altered the natural cycles by which juvenile and adult salmonids have evolved. Changes in streamflows and diversions of water affect freshwater rearing habitat and freshwater migration corridor PCEs in the action area. Various land-use activities in the action area such as urbanization and agricultural encroachment have resulted in habitat simplification. Runoff from residential and industrial areas also contributes to water quality degradation. Urban stormwater runoff contains pesticides, oil, grease, heavy metals, polynuclear aromatic hydrocarbons, other organics and nutrients that contaminate drainage waters and destroy aquatic life necessary for salmonid survival (NMFS 1996). In addition, juvenile salmonids are exposed to increased water temperatures as a result of thermal inputs from municipal, industrial, and agricultural discharges in the action area. Accelerated predation as a result of habitat changes in the action area, such as the alteration of natural flow regimes and the installation of bank revetment structures such as dams, bridges, water diversions, and piers are likely a factor in the decline of Sacramento River winter-run Chinook salmon, CV spring-run Chinook salmon, and CV steelhead.

Within the action area, the freshwater rearing and migration PCEs have been transformed from a meandering waterway lined with a dense riparian corridor, to a highly leveed system under varying degrees of control over riverine erosional processes and flooding. In the reach from Colusa downstream to Verona (RMs 143 to 80) – which includes the Action Area – levees are generally constructed near the edge of the river. Severe long-term riparian vegetation losses have occurred in this part of the Sacramento River, and there are large open gaps without the presence of important habitat features due to the high amount of riprap. Overall, more than half of the Sacramento Rivers banks in the lower 194 miles have been riprapped.

1. Freshwater Rearing Habitat

Freshwater rearing sites are those with water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility; water quality and forage supporting juvenile development; and natural cover such as shade, submerged and overhanging large wood, log jams, beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks. Both spawning areas and migratory corridors comprise rearing habitat for juveniles, which feed and grow before and during their outmigration. Non-natal, intermittent tributaries also may be used for juvenile rearing. Rearing habitat condition is strongly affected by habitat complexity, food supply, and presence of predators of juvenile salmonids. Some complex, productive habitats with floodplains remain in the system (*e.g.*, the lower Cosumnes River, Sacramento River reaches with set-back levees [*i.e.*, primarily located upstream of the City of Colusa]). However, the channeled, leveed, and riprapped river reaches and sloughs that are common in the Sacramento-San Joaquin system typically have low habitat complexity, low abundance of food organisms, and offer little protection from either fish or avian predators. Freshwater rearing habitat also has a high conservation value as the juvenile life stage

of salmonids is dependant on the function of this habitat for successful survival and recruitment. Thus, although much of the rearing habitat is in poor condition, it is important to the species.

2. Freshwater Migration Corridors

Ideal freshwater migration corridors are free of obstruction with water quantity and quality conditions and contain natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility, survival and food supply. Migratory corridors are downstream of the spawning area and include the lower Sacramento River and the Delta. These corridors allow the upstream passage of adults, and the downstream emigration of outmigrant juveniles. Migratory habitat condition is strongly affected by the presence of barriers, which can include dams, unscreened or poorly- screened diversions, and degraded water quality. For successful survival and recruitment of salmonids, freshwater migration corridors must function sufficiently to provide adequate passage. For adults, upstream passage through the Delta and the much of the Sacramento River is not a problem, but problems exist on many tributary streams, and at the RBDD. For juveniles, unscreened or inadequately screen water diversions throughout their migration corridors, and a scarcity of complex in-river cover have degraded this PCE. However, since the primary migration corridors are used by numerous populations, and are essential for connecting early rearing habitat with the ocean even the degraded reaches are considered to have a high conservation value to the species. Thus, although much of the migration corridor is in poor condition, it is important to the species.

In the Action Area and vicinity, the adjacent riparian habitat has been modified by trails (both paved and unpaved), levees, and general recreation activities. These areas may be of poor quality but still provide cover for rearing juveniles. However, at the locations of the proposed new diversions (within the Action Area) suitable salmonid rearing habitat is low, lacking riparian-shaded riverine aquatic habitat. More suitable rearing habitat exists immediately upstream and downstream from the Proposed diversions, and at the existing diversion sites which will be removed. Based on unconsolidated sediments dominating the channel substrate, it is not likely that spawning habitat exists within Action Area.

3.3 Essential Fish Habitat

Essential Fish Habitat (EFH) is defined as those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity. For the purposes of interpreting the definition of EFH, “waters” includes aquatic areas and their associated physical, chemical, and biological properties that are used by fish, and may include areas historically used by fish where appropriate; “substrate” includes sediment, hard bottom, structures underlying the waters, and associated biological communities; “necessary” means habitat required to support a sustainable fishery and a healthy ecosystem; and “spawning, breeding, feeding, or growth to maturity” covers all habitat types used by a species throughout its life cycle. The Proposed Project/Action is located within the region identified as EFH for Pacific salmon, including Chinook salmon, in Amendment 14 of the Pacific Salmon FMP.

The Sacramento River provides freshwater habitat in the Action Area and serves as an upstream and downstream migratory route for Pacific salmon and green sturgeon, as well as juvenile salmonid rearing habitat. Although the adjacent riparian habitat has been modified by trails (both paved and unpaved), levees, and general recreation activities, it does in some areas provide cover for rearing juveniles. However, in the vicinity of the proposed new diversion locations (within the Action Area), suitable salmonid and sturgeon rearing habitat does not occur due to low quality shaded riverine aquatic habitat. Based on unconsolidated sediments dominating channel substrate, it is not likely that spawning habitat exists within the immediate vicinity of the Action Area.

CHAPTER 4

Effects of Proposed Project/Action on Special Status Species

This section describes the methods used to determine the potential effects of the Proposed Project/Action on special-status species potentially occurring in the Action Area. Species included in this analysis are federal- and state-listed, candidates for federal or state listing, and other species of special concern that are covered under the CALFED MSCS. These special-status species include:

- North American green sturgeon (Southern DPS) (*Acipenser medirostris*)
- Central Valley steelhead (*Oncorhynchus mykiss*)
- Central Valley spring-run Chinook (*Oncorhynchus tshawytscha*)
- Sacramento River winter-run Chinook (*Oncorhynchus tshawytscha*)
- Giant garter snake (*Thamnophis gigas*)
- Western burrowing owl (*Athene cunicularia*)
- Cackling (=Aleutian Canada) Goose (*Branta canadensis leucopareia*)
- Swainson's hawk (*Buteo swainsoni*)
- Osprey (*Pandion haliaetus*)
- Bank swallow (*Riparia riparia*)

Evaluating potential effects on species within the Action Area requires an understanding of the species' life histories and life stage specific environmental requirements. Ecological and status information on these species is provided in Chapter 3, Environmental Baseline – Special-Status Species Accounts and Status in the Action Area, of this ASIP.

The analysis of effects of a particular action on a biological resource can be composed of one or more types of effects. Direct and indirect effects, interrelated and interdependent effects, and cumulative effects are defined below.

4.1 Direct and Indirect Effects

Under FESA (16 USC 1531-1544), direct effects are those that are caused by the Proposed Project/Action and occur at the time of the action. According to the USFWS and NOAA Fisheries, indirect effects:

“...are caused by or result from the proposed action, are later in time, and are reasonably certain to occur, e.g., predators may follow ORV tracks into piping plover nesting habitat and destroy nests; the people moving into the housing unit may bring cats that prey on the mice left in the adjacent habitat. Indirect effects may occur outside of the area directly affected by the action.”

4.2 Interrelated and Interdependent Effects

According to FESA, interrelated and interdependent actions are defined as follows:

Effects of the action under consultation are analyzed together with the effects of other activities that are interrelated to, or interdependent with, that action. An interrelated activity is an activity that is part of the proposed action and depends on the proposed action for its justification. An interdependent activity is an activity that has no independent utility apart from the action under consultation.

According to the USFWS and NOAA Fisheries, interrelated actions are those that are part of the Proposed Project/Action and depend on the Proposed Project/Action for their justification - actions that would not occur “but for” the larger action of the action under consultation (Proposed Project/Action). Interdependent actions are those that have no significant utility apart from the action that is under consideration. There are no interrelated or interdependent actions associated with MFWC’s Proposed Project/Action.

4.3 Effects on Species

4.3.1 North American Green Sturgeon, Central Valley Steelhead and Spring-Run Chinook Salmon, and Sacramento River Winter-Run Chinook Salmon

The Proposed Project/Action would involve work within the Sacramento River; therefore, the important special-status species to consider in this habitat are the threatened North American green sturgeon (Southern DPS), threatened Central Valley steelhead, and endangered Sacramento River winter-run Chinook salmon.

Construction and operation of a surface water diversion in the Sacramento River has the potential to adversely impact various salmonids, sturgeon, and other fish species and their habitats through several mechanisms, including entrainment into the water diversion, impingement on the intake screen, increased vulnerability to predation mortality, and increased levels of turbidity and suspended solids, and underwater sound pressure waves. Direct mortality of fish species may also occur during cofferdam installation and dewatering. The following table summarizes potential effects to special-status fish species occurring in the Action Area (diversion footprints plus 200 feet).

As shown in **Table 4-1**, the effects of the Proposed Project/Action on special-status fish depend on whether the fish are exposed, which life stages are exposed, how long, how often, and when the fish are exposed. It can be inferred that with increasing distance from the stressor/source of stressor the effects to an individual are diminished. For many of the stressors, fish must be within the immediate vicinity of the Action Area to be affected. For example, a fish swimming a few hundred feet upstream of a diversion is not likely be pulled by suction into the diversion; however, if that fish approached within a few feet of the diversion intake, there is a much greater probability of entrainment. The following discussion analyzes the fish response to the potential stressors, and what kind of effects to the species would result.

**TABLE 4-1
SUMMARY OF SPECIAL-STATUS FISH EXPOSURE TO STRESSORS AS A RESULT OF THE
PROPOSED PROJECT/ACTION**

Potential Stressors:	Type of Exposure	Location of Exposure	Species (Life Stage) Exposed	Timing of Exposure	Duration of Exposure	Frequency of Exposure
Entrainment	Direct	Diversión Intake	GS (A, J); CVST (A); CVSR (A, J); SWR (A, J)	During normal operation	April to October	Constant
Impingement	Direct	Intake Screen	GS (A, J); CVST (A); CVSR (A); CVSR (A, J); SWR (A, J)	During normal operation	April to October	Constant
Increased Predation	Indirect	Local Vicinity of Diversión	All species (Both A and J stages)	Always	April to October	Constant
Increased turbidity and suspended solids	Indirect	Local Vicinity of Diversión	GS (A, J); CVST (A); CVSR (A); SWR (A)	During construction	June to October	One-time construction event
Sound pressure waves	Indirect	Vicinity of Diversión	GS (A, J); CVST (A); CVSR (A); SWR (A)	During installation of cofferdam	June to October	One-time construction event
*Stranding during dewatering	Indirect	Diversión (area within cofferdam)	GS (A, J); CVST (A); CVSR (A); SWR (A)	During installation of cofferdam	June to October	One-time construction event
*Cofferdam	Direct	Local Vicinity of Diversión	GS (A, J); CVST (A); CVSR (A); SWR (A)	During installation of cofferdam	June to October	One-time construction event

*Phase 2 only

A=Adults; J=Juveniles; GS=Green Sturgeon (Southern DPS); CVST= Central Valley Steelhead; CVSR=Central Valley Spring-run Chinook; SWR=Sacramento Winter-run Chinook

Entrainment and Impingement

All of the special-status fish species considered are at risk of being entrained or impinged by a diversion in the Sacramento River. The risk of entrainment occurs when the pumps are drawing water; for the MFWC this is from April to October every year. Similarly, impingement or death by collision or entrapment against the intake screen is a hazard to the fish when the pumps are active. However, the design criteria outlined by the Proposed Project/Action will comply with CDFG and NOAA Fisheries fish screen criteria, and will reduce potential effects from fish entrainment and impingement substantially. Installation of the new diversions with fish screens would be a significant improvement over the current diversions which are not screened.

Increased Predation

Placement of structures within the Sacramento River, including a positive barrier fish screen, would modify local velocity and current patterns, create localized turbulence and eddies, and provide cover habitat for a variety of predatory fish species, such as striped and smallmouth bass. Structural components of the positive barrier fish screen may result in the potential for increased

localized predation mortality for all special-status species considered, as well as other fish species within the river. Juvenile fish are particularly vulnerable. However, placement of the Proposed Project/Action's new diversion structures is within areas with adequate flow velocities, thereby minimizing backwater eddy effects and potential impacts to salmonids and sturgeon from predatory species. Therefore, increased predation at these diversions is likely a stressor of low magnitude.

Sound Pressure Waves

Sound pressure waves or “noise” within the water would result from installation of support piles for the diversion facilities or installation of sheet piles and beams during construction of the cofferdam. Fish may be injured or killed by the impact sounds generated by percussive pile driving. Their hearing may also be affected or their behavior altered such that it constitutes harassment or harm. The specific effects of pile driving on fish depend on a wide range of factors including the type of pile, type of hammer, fish species, environmental setting, and many other factors (Popper et al. 2006). The Proposed Project/Action may require the use of vibratory or percussion hammer methods. Both methods produce underwater sound pressure waves that can be perceived by fish; however, while vibrating hammers do not produce sound pressure levels that would result in injury or mortality to fish, they may still impact the fish. The percussion hammer, if needed for cofferdam installation, would be used on an intermittent and short duration basis. Use of the percussion hammer would be minimized to the maximum extent possible. Fish species within the Action Area and vicinity are at risk of exposure to this stressor. The fish would likely respond to this stressor by swimming away from the noise. The pile-driving activity would only occur during the June 1 to October 1 period (to November 1 with NOAA Fisheries approval), when large numbers of special-status species are less likely to occur in the Action Area.

Cofferdam Construction

The construction of the proposed Meridian Diversion fish screen facility would require placement and removal of a sheet-pile cofferdam to isolate the work site from the rest of the river. Constructing a cofferdam would have a short-term, localized impact to water quality by causing an increase in turbidity and suspended solids. Increased sedimentation may cause reduced survival of eggs or alevins, reduce primary and secondary river productivity, interfere with feedings, cause behavioral avoidance, and cause a breakdown of social organization to native species downstream of the discharge area. In addition, the dewatering of the cofferdam would strand fish and other organisms trapped within the cofferdam. The physical placement of the cofferdam into the water may also cause direct mortality to fish.

Cofferdams generally lessen the impact of construction on the surrounding environment by isolating the construction area; however, the installation of the cofferdam does cause short-term localized impacts. In order to minimize impacts to fish species, the cofferdam installation would be limited to the in-water work period, from June 1 to October 1 (to November 1 with NOAA Fisheries approval). During this time, installation of the cofferdam would have the least impact on fish species. The abandonment of the existing diversions, which would require minimal in-river work to cap and seal the existing intake pipe manifold, would also occur during the in-water work period. Any fish trapped in the cofferdam during dewatering will be salvaged, and the implementation of measures detailed in the Project Description will minimize impacts to water quality. Once it is installed, the cofferdam is not likely to be a significant stressor to fish species.

Given the overall benefit to fish as a result of the Proposed Project/Action, as well as the use of a cofferdam, the fish salvage requirement for dewatered work sites, the localized and minimal in-river disturbances, and constructing within the June 1 to October 1 in-water work period (may be extended to November 1 with NOAA approval), the Proposed Project/Action is expected to result in minimal impacts to the fisheries resources of the Sacramento River. Implementation of 2008 IS/EA Mitigation Measures BIO-19, BIO-20 and proposed Mitigation Measures BIO-A through BIO-H² would minimize potential impacts.

Measure BIO-19: Pile Driving Activities. The contractor shall use vibrational pile driving to the greatest extent feasible. If percussive pile driving is necessary, its use shall be minimized to the maximum extent possible and comply with the following *Interim Criteria for Injury of Fish to Pile Driving Operations* (Popper et al. 2006):

- The Sound Exposure Level (SEL) shall not exceed 187 dB (re: 1 $\mu\text{Pa}^2 \cdot \text{sec}$) in any single strike, measured at a distance of 32.8 ft from the source;
- The peak sound pressure level should not exceed 208 dB (re: 1 $\mu\text{Pa}_{\text{peak}}$) in any single strike, measured at a distance of 32.8 ft from the source.

Measure BIO-20: Dewatering. Pump(s) used for dewatering the construction site will be screened according to NMFS fish screening criteria for anadromous salmonids (NMFS 1997) approved by NMFS. A qualified biologist will be on-site during such pumping activities to ensure that any fish that may be present within the construction area are relocated to suitable habitat near the project area.

Mitigation Measure BIO-A: Spoil Sites. Spoil sites shall be located so they do not drain directly into the waterways. If a spoil site drains into a water body, catch basins shall be constructed to intercept sediment before it reaches the channels. Spoil sites shall be graded to reduce the potential for erosion.

Mitigation Measure BIO-B: Hazardous Materials. A spill prevention plan for potentially hazardous materials shall be prepared and implemented. The plan shall include the proper handling and storage of all potentially hazardous materials, as well as the proper procedures for cleaning up and reporting of any spills. If necessary, containment berms shall be constructed to prevent spilled materials from reaching the creek channels.

Mitigation Measure BIO-C: Storage. Equipment and materials shall be stored at least 50 feet from waterways. No debris such as trash and spoils shall be deposited within 100 feet of waterways. Staging and storage areas for equipment, materials, fuels, lubricants and solvents, shall be located outside of the stream channel and banks. Stationary equipment such as motors, pumps, generators, compressors and welders, located within or adjacent to the stream shall be positioned over drip pans. Any equipment or vehicles driven and/or operated within or adjacent to the stream shall be checked and maintained daily, to prevent leaks of materials that if introduced to water could be deleterious to aquatic life. Vehicles shall be moved away from the stream prior to refueling and lubrication.

Mitigation Measure BIO-D: Vehicle Maintenance. Proper and timely maintenance for vehicles and equipment used during construction shall be provided to reduce the potential for mechanical breakdowns leading to a spill of materials into or around the creeks. Maintenance and fueling shall be conducted in an area that meets the criteria set forth in the spill prevention plan (i.e., away from sensitive drainages).

² Mitigation measures BIO-A through BIO-H are identified with alphabetical letters instead of numbers to avoid confusion with mitigation measures from the 2008 IS/EA. See also Appendix A, Mitigation and Monitoring Reporting Program

Mitigation Measure BIO-E: Dust Prevention. Water used for dust abatement, if necessary, shall be acquired from an authorized off-site source. Water shall be a clean water source in accordance with California Regional Water Quality Control Board RWQCB Construction Storm Water Program and/or as authorized under a separate National Pollutant Discharge Elimination System (NPDES) permit.

Mitigation Measure BIO-F: Daily Monitoring. A qualified biological monitor shall be on site during in-water construction activities. The biological monitor shall be authorized to halt construction if impacts to special-status salmonid species are evident.

Mitigation Measure BIO-G: Riparian Habitat. Current riparian vegetation shall be retained to extent feasible.

Mitigation Measure BIO-H: Fish Rescue Plan. A fish rescue plan shall be prepared by MFWC prior to the implementation of the project and provided for review and comment to NMFS, USFWS and CDFG as appropriate. A qualified fisheries biologist will design and conduct a fish rescue and relocation effort to collect fish from the area within the cofferdam involving the capture and return of those fish to suitable habitat within the Sacramento River. To ensure compliance, a fisheries biologist shall provide observation during initial dewatering activities within the cofferdam. Following the fish rescue effort, a report shall be prepared by the fisheries biologist and submitted to NMFS within 30 days.

There is potential for “incidental take” of special-status fish associated with installation of the cofferdam, and the Proposed Project/Action may affect and is likely to adversely affect special status fish species.

4.3.2 Giant Garter Snake

The effects to giant garter snake habitat are those areas of habitat that would be permanently and/or temporarily affected by the activity within a Work Area. The Work Area is defined to include the construction footprint of all the diversion and pumping plant facilities, the conveyance facility improvements, and the Drexler Relift station. In addition to the footprints of all facilities, the Work Area includes construction easements and potential staging areas where construction activity may occur. Habitat conditions for giant garter snake are largely dependent upon agricultural practices within the Action Area. The projected cropping pattern for 2012 is expected to be similar to that in 2011 and was used to determine available habitat to giant garter snake. However, because cropping patterns may change season to season, the estimated future availability of habitat for and the estimated effects to the giant garter snake are tentative.

Phase 2 includes the construction of the New Meridian Diversion/Pumping Plant, Main Canal Modifications, Drexler Relift, removal of the existing Meridian and Drexler Diversions, and the expansion of the Drexler Pipeline as well. The defined Work Area will avoid Reclamation Drains and rice fields that are suitable aquatic habitat for the giant garter snake. Effects to giant garter snake aquatic habitat occur only in the Main Canal and an adjacent seep in the area of the proposed Drexler Relift station, both of which support marginal giant garter snake aquatic habitat. Widening the Main Canal would increase the amount of potential aquatic habitat, but it would also mean a subsequent permanent loss of potential upland habitat for the giant garter snake. This conversion was not considered to result in an overall negative effect for giant garter snake and was therefore not quantified.

Construction activities associated with the Main Canal modifications and the construction of the Drexler Re-lift Pumping Plant would potentially temporarily impact 6.4 acres of giant garter snake upland habitat and 3.4 acres of giant garter snake aquatic habitat in the Main Canal (**Table 4-2, Figure 4-1**). In order to construct the Drexler Re-lift Pumping Plant, an existing drainage ditch would be replaced with a new 24-inch storm drain to allow for placement of a concrete pad. Construction of the pumping plant, storm drain, and spillway would result in permanent effects to approximately 2,512 square feet of giant garter snake upland habitat (**Figure 4-2**). An additional minimal area of the Reclamation District 70 canal would be disturbed temporarily when the storm drain is connected. The total permanent impacts are <0.1 acre.

**TABLE 4-2
SUMMARY OF GIANT GARTER SNAKE
IMPACTS**

Habitat Type	Acres
Aquatic Temporary	3.4
Upland Temporary	6.4
Aquatic Permanent	<0.1
Upland Permanent	<0.1

Because the operation of the Main Canal is essential for MFWC water delivery in the spring and summer, the Proposed Project/Action improvements to the Main Canal must occur during the fall and winter (October 1st through April 30th), during the giant garter snake inactive period of October 1st to May 1st. Upland giant garter snake habitat in the Action Area is primarily composed of frequently disturbed agricultural lands and relatively shallow canal berms with few evident rodent burrows. These areas are not optimal habitat for giant garter snake hibernation; however, there is some potential for snakes to remain in the Action Area during the inactive season. Construction activities, either permanent or temporary in nature, from October 1 to May 1 are assumed to likely result in take (injury or death) of giant garter snakes that may be hibernating in the area, rather than harm and harassment. Thus, mitigation for the take of GGS in the form of restoration or replacement of affected habitat through the purchase of mitigation credits may be required by the USFWS; the specific mitigation bank and number of credits required to be purchased in advance of the implementation of the project shall be determined in consultation with the USFWS according to guidelines outlined in the *Programmatic Formal Consultation for the U.S. Army of Engineers 404 Permitted Projects with Relatively Small Effects on the Giant Garter snake within Butte, Colusa, Glenn, Fresno, Merced, Sacramento, San Joaquin, Solano, Stanislaus, Sutter and Yolo Counties, California* (USFWS 1997). Implementation of mitigation measures and fulfillment of habitat compensation for construction activities occurring during the October 1 to May 1 period would avoid potentially significant impacts to giant garter snake.

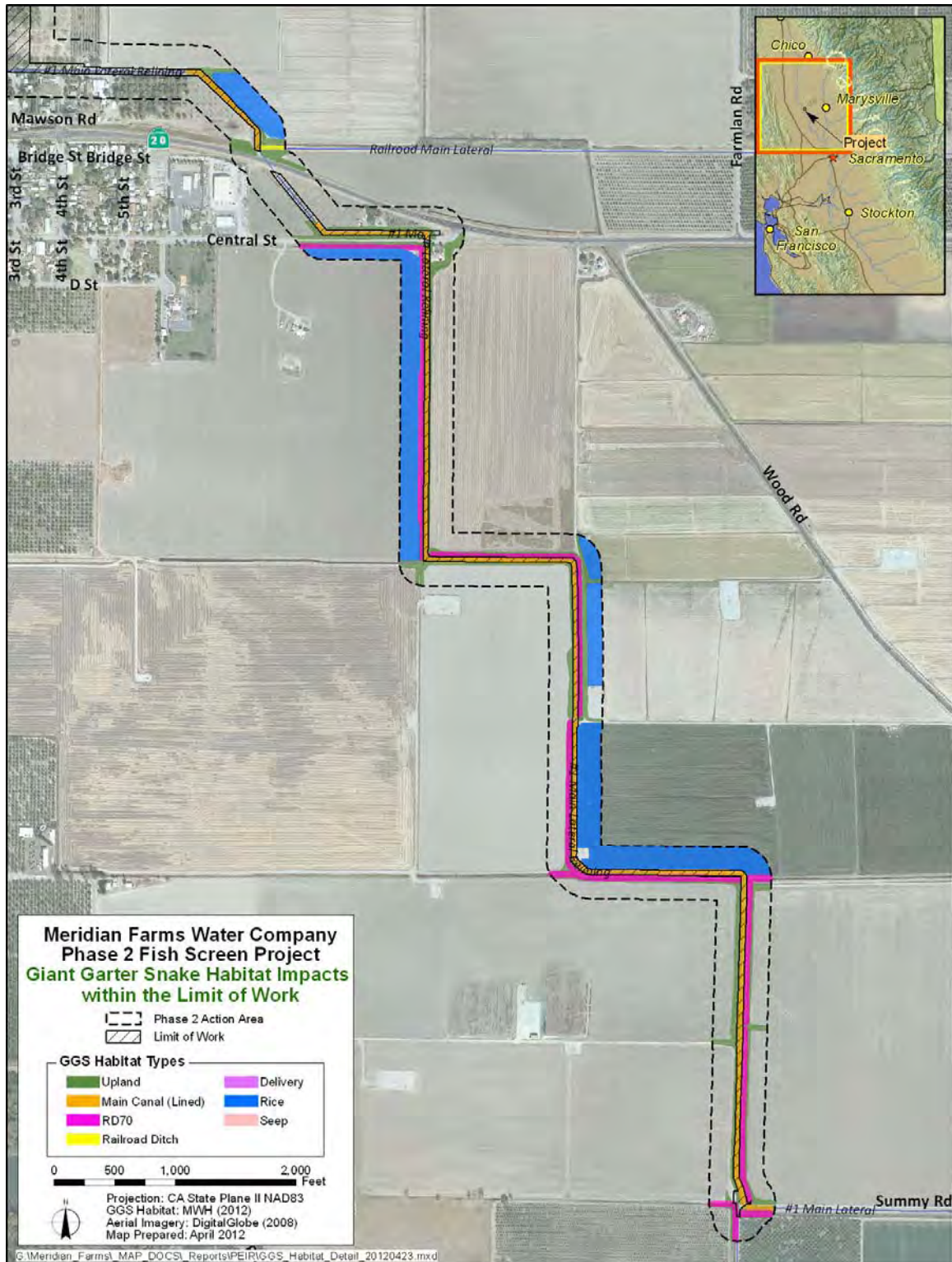


Figure 4-1. Location of Temporary Giant Garter Snake Habitat Impacts in the Limit of Work Area

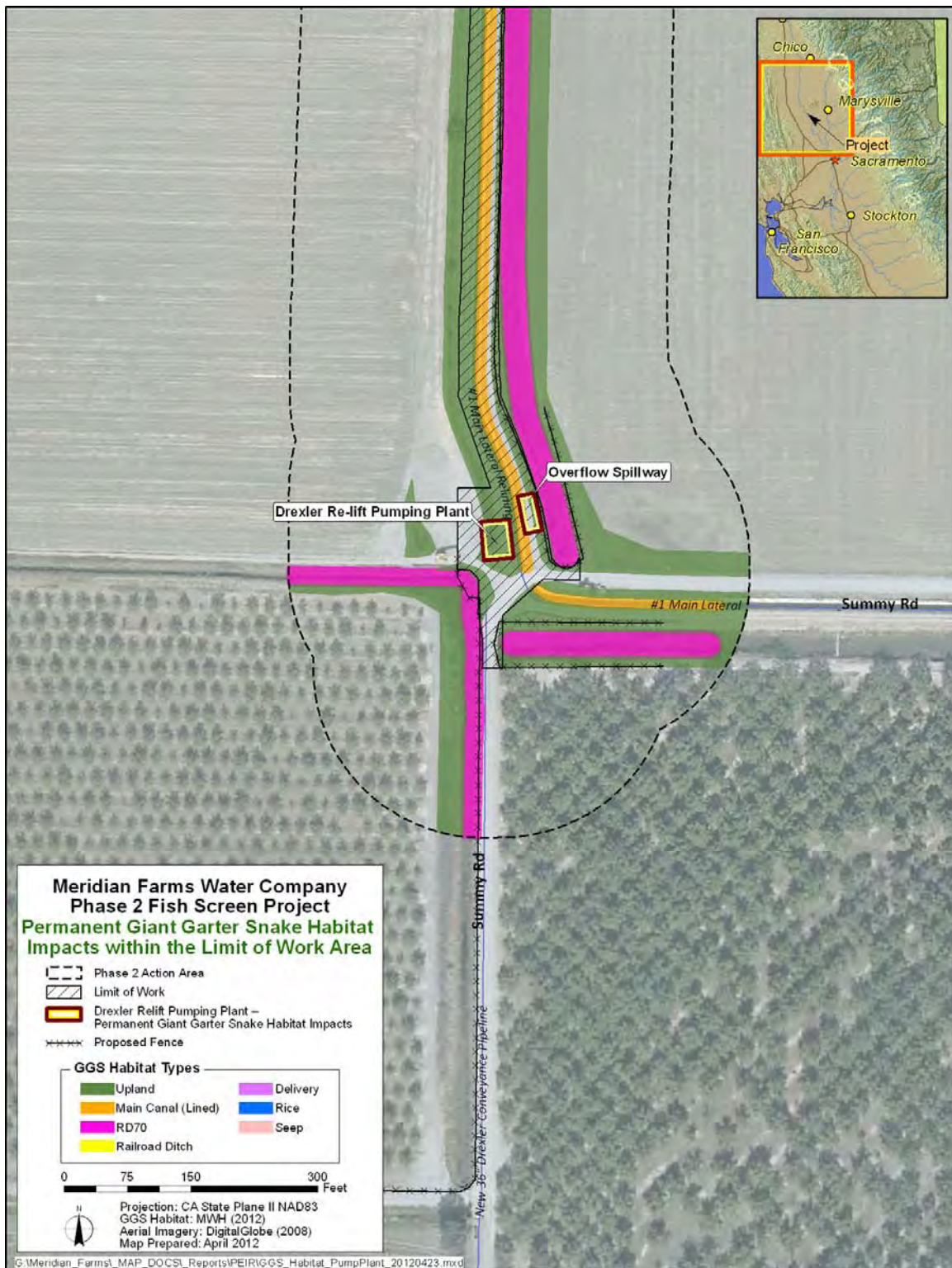


Figure 4-2. Location of Permanent Giant Garter Snake Habitat Impacts in the Limit of Work Area – Drexler Relift Pumping Plant

To reduce and minimize impacts to giant garter snake as a result of the implementation of the Proposed Project/Action, the Programmatic BO measures (USFWS 1997) and those described below would be implemented as appropriate. As mentioned above, compensation would be required for permanent loss of giant garter snake habitat. With implementation of 2008 IS/EA Mitigation Measures BIO-1, BIO-4, BIO-6 through BIO-14, and modified 2008 IS/EA Mitigation Measures BIO-2, BIO-3, and BIO-15 through BIO-17 impacts to giant garter snake would be less than significant. These measures are presented below.

Measure BIO-1: Traffic Routing, and Movement. During construction operations, the number of access routes, number and size of staging areas, and the total area of the proposed project activity will be limited to the minimum necessary. Routes and boundaries will be clearly demarcated. Movement of heavy equipment to and from the project site will be restricted to established roadways to minimize habitat disturbance. Project-related vehicles shall observe a 20-mile-per-hour speed limit within construction areas, except on County roads and on State and Federal highways. This is particularly important during periods when the snake may be sunning or moving on roadways. All heavy equipment, vehicles, and supplies will be stored at the designated staging area at the end of each work period.

Measure BIO-2: Staging Areas. During construction operations, stockpiling of construction materials, portable equipment, vehicles, and supplies will be restricted to the designated construction staging areas and exclusive of the Environmentally Sensitive Areas (ESAs). A clear and solid barrier fence, such as a combination of exclusionary and silt fencing, will be installed along the boundaries of the staging area to prevent contamination of ESAs during such operations.

Measure BIO-3: Pre-construction Surveys. No more than 24-hours prior to the commencement of construction activities, a USFWS-approved biologist shall survey areas deemed suitable giant garter snake habitat for the presence of giant garter snakes. The biologist will provide the USFWS with a written report that adequately documents the methodology and results of the pre-construction survey within three days of the survey. These areas shall be re-inspected by the biologist whenever a lapse in construction activity of two and removed at the end of each workday from the entire project site.

Measure BIO-4: Timing of Construction. Construction activity on the Main Canal must occur during the snake's inactive period in order to avoid interrupting deliveries during the growing season. All other construction activities within giant garter snake habitat (*e.g.* aquatic, upland, and rice habitat) shall be conducted between May 1 and October 1 whenever possible. This is the active period for the snake and direct mortality is lessened, because snakes are expected to actively move and avoid danger. If it appears that construction activity may go beyond October 1, the project proponents shall contact the USFWS as soon as possible, but not later than September 15 of the year in question, to determine if additional measures are necessary to minimize take. Construction activities within 200 feet from the banks of snake aquatic habitat will be avoided during the snake's inactive season. **If this is not feasible, the Project Proponent must consult with USFWS to determine measures to avoid impacts to giant garter snake.**

Measure BIO-5: Monitoring During Construction. A USFWS-approved biologist shall inspect construction-related activities at the ESA to ensure that no unauthorized take of federally listed species or destruction of their habitat occurs. The biologist shall be available for monitoring throughout all phases of construction that may result in adverse effects to the giant garter snake. This includes clearing and grubbing activities and installation of exclusion fence in giant garter snake upland habitat. Furthermore, the biologist shall have the authority through communication with the resident engineer to stop construction activities in the immediate area if a giant garter snake is encountered during construction until appropriate corrective measures have been completed or until the snake is determined to be unharmed. Snakes encountered during construction activities shall be allowed to move away from the area on their own volition. The biologist shall notify the USFWS immediately if any listed species are found on-site, and will submit a report, including date(s), location(s), habitat description, and any corrective measures taken to protect the species found. The biologist shall be required to report any take of listed species to the USFWS immediately by telephone at 916/ 414-6600 and by electronic mail or written letter addressed to the Chief, Endangered Species Division, within three (3) working days of the incident. The Service does not authorize any handling or moving of a giant garter snake by other than a USFWS-approved biologist.

Measure BIO-6: Worker Awareness Training. A Worker Environmental Awareness Training Program for construction personnel shall be conducted by the USFWS-approved biologist for all construction workers, including contractors, prior to the commencement of construction activities. The program shall provide workers with information on their responsibilities with regard to the snake, an overview of the life-history of this species, information on take prohibitions, protections afforded this animal under the Act, and an explanation of the relevant terms and conditions of this biological opinion. Written documentation of the training must be submitted to the Sacramento Fish and Wildlife Office within 30 days of the completion of training. As needed, training shall be conducted in Spanish for Spanish language speakers.

Measure BIO-7: Install Snake Exclusion Fencing. Prior to the commencement of construction activities, high visibility fencing will be erected around the habitats of federally listed species to identify and protect these designated ESAs from encroachment of personnel and equipment. These areas will be avoided by all construction personnel. The fencing shall be inspected by the Contractor before the start of each work day and maintained by the Contractor until completion of the project. The fencing may be removed only when the construction of the project is completed. Fencing will be established in upland immediately adjacent to aquatic snake habitat and extending up to 200 feet from construction activities. Silt fencing, if properly installed, may serve as suitable snake exclusion fencing.

Measure BIO-8: Provide Adequate Signage. Signs will be posted by the Contractor every 50 feet along the edge of the ESAs, with the following information: "This area is habitat of federally-threatened and/or endangered species, and must not be disturbed. These species are protected by the Endangered Species Act of 1973, as amended. Violators are subject to

prosecution, fines, and imprisonment.” The signs should be clearly readable from a distance of 20 feet, and must be maintained by the Contractor for the duration of construction.

Measure BIO-9: Implement BMPs. Best Management Practices (BMPs), including a Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP), will be implemented to minimize effects to the snake during construction. Best management practices will be implemented to prevent sedimentation from entering ESAs and to reduce erosion, dust, noise, and other deleterious aspects of construction related activities. These BMPs may include, but are not limited to, silt fencing, temporary berms, restrictions on cleaning equipment in or near ESAs, installation of vegetative strips, and temporary sediment disposal. Runoff from dust control and hazardous materials will be retained on the construction site and prevented from flowing into the ESAs.

Measure BIO-10: Erosion Control Materials. Tightly woven fiber netting (mesh size less than 0.25 inch) or similar material shall be used for erosion control and other purposes at the ESA to ensure that the giant garter snake is not trapped or becomes entangled. This limitation shall be communicated to the contractor using special provisions included in the bid solicitation package.

Measure BIO-11: Properly Dispose of Garbage. To eliminate an attraction to predators of the snake, all food-related trash items, such as wrappers, cans, bottles, and food scraps, must be disposed of in closed containers and removed at the end of each workday from the entire project site.

Measure BIO-12: Use Approved Aggregate, Fill, or Borrow Materials. The Contractor shall provide documentation that aggregate, fill, or borrow material provided for the proposed project was obtained in compliance with the State Mining and Reclamation Act (SMARA). Evidence of compliance with the Act shall be demonstrated by providing the resident engineer with one of the following: 1) a letter from the USFWS stating that the use of the borrow pit will not result in the incidental take of species; 2) an incidental take permit for contractor-related activities issued by the USFWS pursuant to section 10(a)(1)(B) of the Act; 3) a biological opinion or letter concurring with a “not likely to adversely affect” determination issued by the USFWS to the Federal agency having jurisdiction over contractor-related services; 4) a letter from the USFWS concurring with the “no effect” determination for contractor-related activities; or 5) contractor submittal of information to the resident engineer indicating compliance with the SMARA and provision of County land use permits and California Environmental Quality Act (CEQA) clearance.

Measure BIO-13: Restore Temporarily Affected Habitat. After construction activities are complete, any temporary fill or construction debris shall be removed and disturbed areas restored to their pre-project conditions. An area subject to “temporary” disturbance includes any area that is disturbed during the project, but that, after project completion, will not be subject to further disturbance and has the potential to be re-vegetated. All ESA snake habitats subject to temporary ground disturbances, including storage and staging areas and temporary roads, will be restored to pre-project conditions. If appropriate, these areas shall also be re-contoured to pre-project conditions. A written report shall be submitted to the

USFWS within ten (10) working days of the completion of construction at the project site and restoration of the site to pre-project conditions.

Measure BIO-14: Post-construction Monitoring. An inspection of the site, with a photo documentation report showing pre- and post-project area photos, will be conducted and photos and a brief report will be submitted to USFWS one year from implementation of restoration to pre-project conditions.

Measure BIO-15: De-watering Giant Garter Snake Habitat. During the giant garter snake active period (May 1-September 31), giant garter snake aquatic habitat may be dewatered starting on April 15. Any dewatered habitat must remain dry for at least 15 consecutive days after April 15 and prior to excavating or filling the dewatered habitat.

Measure BIO-16: Monitoring During Construction. A USFWS-approved biologist shall inspect construction-related activities at the proposed project site to ensure that no unauthorized take of federally listed species or destruction of their habitat occurs. The biologist shall be available for monitoring throughout all phases of construction that may result in adverse effects to the giant garter snake. This includes clearing and grubbing and other construction activities in the areas of wetland vegetation/aquatic habitat, adjacent upland habitat, and during exclusion fence installation. Furthermore, the biologist shall have the authority through communication with the resident engineer to stop construction activities in the immediate area if a giant garter snake is encountered during construction until appropriate corrective measures have been completed or until the snake is determined to be unharmed.

Snakes encountered during construction activities shall be allowed to move away from the area on their own volition. The biologist shall notify the USFWS immediately if any listed species are found on-site, and will submit a report, including date(s), location(s), habitat description, and any corrective measures taken to protect the species found. The biologist shall be required to report any take of listed species to the USFWS immediately by telephone at 916/ 414-6600 and by electronic mail or written letter addressed to the Chief, Endangered Species Division, within three (3) working days of the incident. The Service does not authorize any handling or moving of a giant garter snake by other than USFWS-permitted biologist.

Measure BIO-17: Compensation. Temporary impacts shall be restored to pre-project conditions. Areas subject to temporary impacts shall be limited to one season (the calendar year period between May 1 and October 1) and be restored within two seasons. Permanent impacts to giant garter snake habitat shall be replaced at a 3:1 ratio which must include both upland and aquatic habitat components. A portion of the mitigation for permanent loss of wetlands at a ratio no less than 1:1 may fulfill a portion of the 3:1 mitigation obligation for permanent impacts to giant garter snake habitat. This mitigation may be fulfilled through in-kind, onsite or off-site, out-of-kind mitigation as approved by the USFWS and the Corps.

4.3.3 Swainson's Hawk

No known Swainson's hawk nesting habitat is proposed to be modified or eliminated by the Proposed Project/Action. Suitable nesting habitat is found adjacent to the Sacramento River within the valley riparian habitat. Habitat in this area includes riparian woodlands with large diameter (i.e., greater than 30 inches diameter at breast height) valley oak (*Quercus lobata*), cottonwood (*Populus fremontii*) and black willow (*Salix goodingii*). These overstory trees provide moderate to high (i.e., greater than 50%) canopy closure in this area.

This riparian habitat will not be impacted by project activities. A few domestic trees and one isolated valley oak will be removed as a result of the Project Action. Minimal disturbances to potential foraging habitat (i.e., annual grassland and agricultural areas) will be temporary and are not expected to impact this species based on the overall regional abundance of these habitat types. This species is listed as threatened by the State of California. With numerous records of Swainson's hawk nests occurring within one mile of the project site along the Sacramento River (CDFG 2012a) there is a moderate to high potential this area may be used by this species for nesting. To compensate potential disturbance and to avoid active nest sites, the following conservation measures are proposed:

Measure BIO-22: Swainson's Hawk Nest Survey, Nesting Raptors and Other Nesting Bird Survey. For any construction activities that will occur between March 1 and August 31 of any given year, the applicant shall conduct preconstruction surveys in suitable nesting habitat within 0.5 mile of the construction area for nesting raptors. Surveys shall be conducted by a qualified biologist. In addition, all trees slated for removal during the nesting season shall be surveyed by a qualified biologist no more than 48-hours before removal to ensure that no nesting birds are occupying the tree.

If active nests are found during the survey, the applicant shall implement appropriate mitigation measures to ensure that the species will not be adversely affected, which will include establishing a no-work buffer zone as, approved by the California Department of Fish and Game (CDFG), around the active nest. The no-work buffer may vary depending on species and site specific conditions as approved by CDFG. Appropriate mitigation measures include delaying construction activities until a qualified biologist determines that juveniles have fledged the nest(s), or establishing a "no construction" zone buffer around the nest.

The results of the survey shall be documented in a letter report that is distributed to the CDFG. These measures would ensure compliance with the Migratory Bird Treaty Act and California Department of Fish and Game Code 3503.5.

Measure BIO-23: Riparian Habitat Exclusion. Where construction work occurs adjacent to riparian habitat (i.e., at the existing Drexler Diversion and Pumping Plant and the Grimes Canal modifications), there shall be no encroachment by construction equipment or personnel into existing riparian habitat areas located along the Sacramento

River. Storage or parking of equipment shall be restricted within 100 feet of riparian habitat.

4.3.4 Osprey

Osprey nesting period and habitat requirement are similar to the Swainson's hawk; therefore, the same conservation measures would be implemented for osprey as are listed above. There are fewer records of osprey in the study area, and the species is less likely to occur than Swainson's hawk.

4.3.5 Western Burrowing Owl

The western burrowing owl is a year-round resident in the Central Valley, and may nest along the levee bank where the proposed screened intake is located, and along the edges of cropland along the pipeline alignment. The burrowing owl may use the surrounding cropland for foraging as well. No cropland is proposed to be modified or eliminated by the Proposed Project/Action, however noise and construction activities associated with the proposed project/action may potentially disturb nesting burrowing owls in the vicinity. If burrowing owl nests occur within the construction footprint along the levee, or along the pipeline alignment near cropland, implementation of the proposed project/action may result in the destruction of nesting birds or an active nest, which may reduce the success of this species and potentially affect the stability of the local population. To avoid potential disturbances to nesting and foraging habitat, the following conservation measures are proposed:

Mitigation Measure BIO-H: Pre-construction surveys for burrowing owls shall be conducted by a qualified biologist as approved by the California Department of Fish and Game (CDFG) within 30-days prior to the start of work activities where land construction is planned in known or suitable habitat. If construction activities are delayed for more than 30 days after the initial preconstruction surveys, then a new preconstruction survey shall be required. All surveys shall be conducted in accordance with the CDFG/California Burrowing Owl Consortium survey protocols. This survey can be conducted concurrently with Mitigation Measure BIO-22.

If burrowing owls are discovered in the proposed project site vicinity during construction, the onsite biologist shall be notified immediately. Occupied burrows should not be disturbed during the nesting season (February 1 through August 31) unless a qualified biologist approved by the CDFG verifies through non-invasive methods that either: (1) the birds have not begun egg-laying and incubation; or (2) that juveniles from the occupied burrows are foraging independently and are capable of independent survival.

If this criteria is not met, occupied burrows during the nesting season will be avoided by establishment of a no-work buffer of 250-foot around the occupied/active burrow. Where maintenance of a 250-foot no-work buffer zone is not practical, the applicant shall consult with the CDFG to determine appropriate avoidance measures. Burrows occupied during the breeding season (February 1 to August 31) will be closely monitored by the biologist

until the young fledge/leave the nest. The onsite biologist shall have the authority to stop work if it is determined that construction related activities are disturbing the owls.

If criterion 1 or 2 above are met and as approved by CDFG, the biologist shall undertake passive relocation techniques by installing one-way doors in active and suitable burrows allowing owls to escape but not re-enter. Owls should be excluded from the immediate impact zone and within a 160-foot buffer zone by having one-way doors placed over the entrance to prevent owls from inhabiting those burrows.

After nesting season ends (August 31) and the burrow is deemed unoccupied by the biologist, passive relocation techniques shall take place. Construction activities may occur once a qualified biologist has deemed the burrows are unoccupied.

4.3.6 Cackling (=Aleutian Canada) Goose

The cackling goose winters in the Central Valley, and may use the cropland in the proposed project/action vicinity for foraging or cover. No potential foraging habitat is proposed to be modified or eliminated by the Proposed Project/Action, however noise and construction activities associated with the proposed project/action may potentially disturb geese that may use the surrounding croplands. This disturbance may cause the geese to avoid foraging in the croplands in the vicinity and forage elsewhere. Due to the abundance of agriculture in the area it is unlikely that the geese would be subject to starvation or predation due to temporary disturbance from the proposed project/action. To compensate for potential disturbances to foraging habitat, the following conservation measures are proposed:

Modified 2008 IS/EA Mitigation Measure BIO-22: Swainson's Hawk, Nesting Raptors and Other Nesting Bird Survey. For any construction activities that will occur between March 1 and August 31 of any given year, the applicant shall conduct preconstruction surveys in suitable nesting habitat within 0.5 mile of the construction area for nesting raptors. Surveys shall be conducted by a qualified biologist. In addition, all trees slated for removal during the nesting season shall be surveyed by a qualified biologist no more than 48-hours before removal to ensure that no nesting birds are occupying the tree.

If active nests are found during the survey, the applicant shall implement appropriate mitigation measures to ensure that the species will not be adversely affected, which will include establishing a no-work buffer zone as, approved by the CDFG, around the active nest. The no-work buffer may vary depending on species and site specific conditions as approved by CDFG. Appropriate mitigation measures include delaying construction activities until a qualified biologist determines that juveniles have fledged the nest(s), or establishing a "no construction" zone buffer around the nest.

The results of the survey shall be documented in a letter report that is distributed to the CDFG. These measures would ensure compliance with the Migratory Bird Treaty Act and California Department of Fish and Game Code 3503.5.

4.3.7 Bank Swallow

Although the bank swallow is known to nest along the Sacramento River, the immediate Action Area does not provide suitable nesting habitat for bank swallow. The gradual grassy slope of the riverbank that would be affected by the proposed screened intake is not suitable for nesting. The bank swallow may occur both upstream and downstream from the Action Area, however, and may potentially be disturbed by construction activities related to the Proposed Project/Action. Disturbance to nesting bank swallows may cause abandonment or failure of the nest, reduced productivity, and possibly a decline of the local population.

To avoid potential disturbances to nearby breeding bank swallows, implementation of modified 2008 IS/EA Mitigation Measure BIO-22 is proposed (see above).

4.4 Effects on Critical Habitat

Construction activities associated with both phases of the Proposed Project/Action would result in temporary disturbances – including increased turbidity and sedimentation, cofferdam installation, and dewatering – to designated Critical Habitat for Central Valley steelhead, Central Valley spring-run Chinook salmon, and Sacramento River winter-run Chinook salmon. These potential effects are mitigated through measures incorporated in the project (see Chapter 2). Furthermore, the proposed fish screens would permanently alter designated Critical Habitat within the Action Area. However, the overall benefit of the Proposed Project on fish species outweighs the minor modifications to designated Critical Habitat.

4.5 Effects on Essential Fish Habitat

Construction activities associated with both phases of the Proposed Project/Action would result in temporary disturbances, including increased turbidity and sedimentation, cofferdam installation, and dewatering, to delineated EFH for Chinook salmon. These potential effects are mitigated through measures incorporated in the project (see Chapter 2). Furthermore, the proposed fish screens would permanently alter delineated EFH within the Action Area. However, the overall benefit of the Proposed Project on fish species outweigh the minor modifications to delineated EFH.

CHAPTER 5

Environmental Baseline – NCCPA Communities

NCCPA Communities includes both habitats and ecologically-based fish groups which are defined in the MSCS. Two NCCPA habitats and two fish groups occur within the Action Area, have potential to be affected by the Action, and are therefore included within this ASIP. These communities are listed below, and their MSCS definitions are included in the following sections.

Valley Riverine Aquatic

- Valley/Foothill Riparian
- Anadromous Fish Group
- Estuarine Fish Species Group

5.1 NCCPA Habitats

There are 18 NCCPA habitats evaluated in the MSCS. These habitats were evaluated based on certain criteria: the level of acceptance of habitat nomenclature within the scientific community; consistency with existing CALFED habitat nomenclature from the ERP; consistency with existing electronically-mapped habitat data; and the potential for habitat types to be affected by CALFED actions.

5.1.1 Valley Riverine Aquatic

Valley riverine aquatic habitat includes the water column of flowing streams and rivers in low-gradient channel reaches below 300 feet in elevation. These waters are not tidally-influenced and include features such as pools, riffles, runs, and unvegetated channel beds and banks, as well as sloughs, backwaters, and flood bypasses.

In the Action Area, valley riverine aquatic habitat exists in the Sacramento River. The Sacramento River riverine habitat is characterized by fresh-water aquatic and shaded riparian. Flows are relatively slow within the Action Area, exhibiting deep channel characteristics with levied banks. Channel substrate generally consists of fine sandy-loam with sparse areas imported rip-rap along the banks used to reinforce the adjacent levees. At both proposed new diversion locations the channelized river bank habitat is exposed and dominated by annual grassland, exhibiting a deep, cold and slow moving flow.

5.1.2 Valley/Foothill Riparian

Valley/foothill riparian habitat includes all successional stages of woody vegetation, commonly dominated by willow, Fremont cottonwood, valley oak, or sycamore. This habitat occurs within the current and historical floodplains of low-gradient reaches of streams and rivers generally below 300 feet in elevation.

The valley riparian and riparian forest habitats are located adjacent to the Sacramento River system as it winds south along the western boundary of the Meridian Farms Service Area, and is usually located within the flood plain and levee system. Valley riparian habitats provide food, water, migration and dispersal corridors, and escape, nesting, and thermal cover for an abundance of wildlife. At least 50 amphibians and reptiles and 147 bird species occur in lowland riparian systems. Additionally, 55 species of mammals are known to use California's Central Valley riparian communities.

This habitat type is not within the immediate vicinity of proposed activities near or in the Sacramento River. Riparian forest habitat occurs along the opposite bank of the Meridian and Drexler diversion locations as shown in **Figure 2-2**, and a few non-contiguous patches of mixed willow riparian habitat occurs approximately 440 feet north of the proposed New Grimes Diversion.

5.2 NCCPA Fish Groups

There are two NCCPA Fish Groups which are evaluated in the MSCS: anadromous and estuarine fish species. These fishes are associated with several of the NCCPA habitats but are assessed separately because factors that support fish populations are not sufficiently addressed in the NCCPA habitats which are based on vegetation, land use, and geography. Instead, each fish group addresses the effects CALFED actions may have on factors important to fish ecology such as water flow, depth, temperature, quality, and seasonal fluctuations in stage and flow.

The fish species included in the NCCPA fish groups are those that will be most affected by CALFED actions, depend on the health of the Bay-Delta ecosystem, and are subject to existing USFWS, NOAA Fisheries, and DFG recovery goals. The following section describes the NCCPA Fish Groups potentially affected by the Project.

5.2.1 Anadromous Fish Species

Anadromous fish are those that are born in fresh water, migrate to the ocean where they mature into adults, and return to their native fresh waters to spawn. Anadromous fish species that are included in this fish group are Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, Central Valley steelhead, Central California Coast steelhead ESUs, and green sturgeon. These species are associated with the following NCCPA habitat types: tidal perennial aquatic, valley riverine aquatic, montane riverine aquatic, lacustrine, saline emergent, and tidal freshwater emergent.

5.2.2 Estuarine Fish Species

Estuarine fish are those that spend most or all of their lives in euryhaline conditions, or at various salinities. Estuarine fish that are included in this fish group are the tidewater goby, delta smelt, longfin smelt, and Sacramento perch. These species are associated with the following NCCPA habitat types: tidal perennial aquatic, valley riverine aquatic, lacustrine, saline emergent, and tidal freshwater emergent.

CHAPTER 6

Effects of the Proposed Project/Action on NCCPA Communities

This chapter analyzes the direct, indirect, and cumulative effects on NCCPA communities that exist within the Action Area and that may result from implementation of both phases of the Proposed Project/Action, as well as actions related to and dependent on those actions. The Proposed Project/Action is considered to have an effect on NCCPA communities if it could result in “take” of a species, or if it would decrease the quality or extent of habitat potentially occupied by a species.

This analysis also includes a discussion of the conservation measures to avoid, minimize, and compensate for such effects, as appropriate. For descriptions of the NCCPA communities addressed in this ASIP, refer to Chapter 5.

6.1 Proposed Project/Action Effects and Conservation Measures

The following text contains an analysis of potential direct, indirect, and cumulative effects on NCCPA communities and the appropriate compensation measures:

6.1.1 Valley Riverine Aquatic

The one sensitive natural community that may be impacted by the Proposed Project/Action is the valley riverine aquatic habitat in the Sacramento River. As shown in **Figure 2-2**, the Work Area includes valley riverine aquatic habitat in the vicinity of the Meridian and Drexler diversions. Construction of the new Meridian Diversion and removal of the existing diversions would require the use of a cofferdam.

Approximately 0.2 acre of valley riverine aquatic habitat in the Action Area would be affected by Proposed Project/Action. However, with avoidance, minimization, and erosion control measures outlined in Chapter 2 (Project Description), impacts to the Sacramento River are considered minimal.

6.1.2 Valley Riparian

Because of the proximity of the valley riparian and cottonwood riparian habitat in the vicinity of the existing Meridian and Drexler diversion, these habitats may also be impacted by water quality effects resulting from in-water work. Both communities provide habitat for a range of terrestrial

wildlife species, including several species of songbirds, small mammals, mesocarnivores, reptiles and amphibians. Incorporation of **2008 IS/EA Mitigation Measures BIO-19, BIO-20** and proposed **Mitigation Measures BIO-A through BIO-H** will ensure no disturbance and encroachment into these sensitive riparian habitat areas, thereby reducing potential effects.

6.1.3 Anadromous and Estuarine Fish Groups

Within the Action Area, effects to valley riverine aquatic habitat in the Sacramento River may subsequently affect special-status fish species from both fish groups. The Sacramento River in the vicinity of the proposed intake locations serves as a migratory corridor for the upstream migration of adult salmon and steelhead, and the downstream migration of juvenile salmon and steelhead. Other fish species in the Sacramento River near the proposed intake locations include North American green sturgeon, striped bass, threadfin shad, American shad, catfish, Sacramento pikeminnow, tule perch, sculpin, bullhead, and a variety of other resident fish species. The Sacramento River near Sacramento also provides habitat for a variety of invertebrates, including planktonic species such as copepods, and epibenthic species such as crawfish and amphipods. With avoidance, minimization, and erosion control measures outlined in Chapter 2 (Project Description), and implementation of **2008 IS/EA Mitigation Measures BIO-19, BIO-20** and proposed **Mitigation Measures BIO-A through BIO-H**, impacts to the Fish Groups in the Sacramento River will be minimized.

CHAPTER 7

Interrelated, Interdependent, and Cumulative Effects

This chapter assesses the interrelated, interdependent and cumulative effects of the Proposed Project/Action.

7.1 Interrelated and Interdependent Effects

The Proposed Project/Action is considered to be an action that is independent and has a function apart from other projects. Installation of the proposed diversion facilities would not increase water diversions or lead to any future water use not already feasible under existing baseline conditions. Thus the Proposed Project/Action is not part of a single, larger project, and therefore no interdependent or interrelated effects will occur.

7.2 Cumulative Effects

One new diversion facility will be installed and two existing facilities will be removed as part of this MFWC Project. The capacity of water diverted from the Sacramento River would not increase or decrease. These continuing baseline diversions as well as the implementation of BMP's and conservation measures will ensure no cumulative effects to water quality (water resources). The placement and design of the new permanent water diversion facilities in the Sacramento River is not likely to result in any obstruction of fishery migration and will likely decrease the mortality of emigrating juvenile fish species (in particular steelhead and Chinook salmon), thus not contributing to a cumulative effect on fishery resources.

Placement of the cofferdam and associated dewatering activities may potentially contribute to the loss of native fish trapped within the structure. However, the timing of proposed dewatering activities is likely to avoid special-status native fish species known to inhabit the Sacramento River based on known migratory requirements and the unlikely occurrence of these species in the vicinity of the Proposed Project/Action outside of migratory periods.

Existing surrounding land-use (i.e., agricultural) will continue to provide foraging opportunities for Swainson's hawk and other raptor species. With the implementation of Conservation measures for Swainson's hawk, suitable habitat will be preserved for future nesting opportunities, and thus will not contribute to a cumulative effect to Swainson's hawk and other species associated with riparian habitat.

CHAPTER 8

Monitoring Needs

A list of monitoring needs from the 2008 IS/EA and Phase 2 IS/EA Mitigation Monitoring and Reporting Plan (Appendix A) are described below. Monitoring is necessary in order to monitor the effects and the implementation and effectiveness of the conservation measures. These are identified as measures that the implementing entity will undertake.

Mitigation Measure BIO-3: Pre-construction Surveys:

- 24-hours prior to the commencement of construction activities, the ESA shall be surveyed for giant garter snakes by a USFWS-approved biologist.
- The biologist will provide the USFWS with a written report that adequately documents the monitoring efforts within 24-hours of commencement of construction activities.
- The project area shall be re-inspected by the monitoring biologist whenever a lapse in construction activity of two weeks or greater has occurred.

Mitigation Measure BIO-5: Monitoring During Construction:

- A USFWS-approved biologist shall inspect construction-related activities at the ESA to ensure that no unauthorized take of federally listed species or destruction of their habitat occurs.
- The biologist shall be available for monitoring throughout all phases of construction that may result in adverse effects to the giant garter snake. This includes clearing and grubbing activities and installation of exclusion fence in giant garter snake upland habitat.
- The biologist shall have the authority through communication with the resident engineer to stop construction activities in the immediate area if a giant garter snake is encountered during construction until appropriate corrective measures have been completed or until the snake is determined to be unharmed.
- Giant garter snakes encountered during construction activities shall be allowed to move away from the area on their own volition. The biologist shall notify the USFWS immediately if any listed species are found on-site, and will submit a report, including date(s), location(s), habitat description, and any corrective measures taken to protect the species found.

- The biologist shall be required to report any take of listed species to the USFWS immediately by telephone at 916/ 414-6600 and by electronic mail or written letter addressed to the Chief, Endangered Species Division, within three (3) working days of the incident. The Service does not authorize any handling or moving of a giant garter snake by other than a USFWS-permitted biologist.

Mitigation Measure BIO-14: Post-construction Monitoring:

An inspection of the site, with a photo documentation report showing pre- and post-project area photos, will be conducted and photos and a brief report will be submitted to USFWS one year from implementation of restoration to pre-project conditions.

Mitigation Measure BIO-17: Giant Garter Snake Monitoring During Construction:

- A USFWS approved biologist shall inspect construction-related activities at the proposed project site to ensure that no unauthorized take of federally listed species or destruction of their habitat occurs. The biologist shall be available for monitoring throughout all phases of construction that may result in adverse effects to the giant garter snake. This includes clearing and grubbing and other construction activities in the areas of wetland vegetation/aquatic habitat, adjacent upland habitat, and during exclusion fence installation.
- The biologist shall have the authority through communication with the resident engineer to stop construction activities in the immediate area if a giant garter snake is encountered during construction until appropriate corrective measures have been completed or until the snake is determined to be unharmed. Snakes encountered during construction activities shall be allowed to move away from the area on their own volition. The biologist shall notify the USFWS immediately if any listed species are found on-site, and will submit a report, including date(s), location(s), habitat description, and any corrective measures taken to protect the species found.
- The biologist shall be required to report any take of listed species to the USFWS immediately by telephone at 916/ 414-6600 and by electronic mail or written letter addressed to the Chief, Endangered Species Division, within three (3) working days of the incident. The Service does not authorize any handling or moving of a giant garter snake by other than a USFWS-permitted biologist.

Mitigation Measure BIO-22: Swainson's Hawk Nest Survey:

- If construction is proposed to take place during the nesting season, then a qualified biologist shall survey the project site and all habitats within 0.5 mile of the site for Swainson's hawk nests.
- Should an active nest site occur within 0.5 mile of the project site, the CDFG shall be consulted to develop measures that will protect the nest site from project-generated disturbance. Measures may include implementing a limited operating period surrounding the nest site until young have fledged.

Mitigation Measures BIO-24: Pre-Construction Avian Surveys:

- Implement all mitigation measures listed for the Swainson's hawk. Preconstruction avian surveys shall also target the following species:
 - Bank Swallow – *Riparia riparia*
 - Western burrowing owl – *Athene cunicularia*
 - Cackling (=Aleutian Canada Goose) – *Branta canadensis leucopareia*

Mitigation Measures BIO-25: Pre-Construction Avian Surveys:

- Implement all mitigation measures listed for the Swainson's hawk. Preconstruction avian surveys shall also target the Bank Swallow. Should active nests be found within 0.25 mile of the project site, CDFG shall be consulted to develop appropriate mitigation and avoidance measures.

Mitigation Measures BIO-26: Pre-Construction Avian Surveys:

- Implement all mitigation measures listed for the Swainson's hawk. Preconstruction avian surveys shall also target the Western Burrowing Owl. Should active nests be found within 50 meters of the project site, CDFG shall be consulted to develop appropriate mitigation and avoidance measures.

CHAPTER 9

Changed Circumstances

There are no anticipated changed circumstances that would affect implementation of the Proposed Project/Action.

CHAPTER 10

Effects Determination Conclusion

The purpose of this ASIP is to review the Meridian Farms Water Company's Proposed Fish Screen Project in sufficient detail to determine to what extent the Proposed Project/Action may affect any threatened, endangered, proposed, or sensitive species within the Action Area. This chapter summarizes the environmental setting, analysis, and effects determination presented in Chapters 3 and 4.

10.1 Summary of Effects

A determination of effects based on the Proposed Project/Action on the following five species is summarized below:

- North American green sturgeon (Southern DPS) (*Acipenser medirostris*)
- Central Valley steelhead (*Oncorhynchus mykiss*)
- Central Valley spring-run Chinook salmon (*Oncorhynchus tshawytscha*)
- Sacramento River winter-run Chinook salmon (*Oncorhynchus tshawytscha*)
- Giant garter snake (*Thamnophis gigas*)

In addition, a determination of effects based on the Proposed Project/Action on designated Critical Habitat for the following three species is summarized below:

- Central Valley steelhead (*Oncorhynchus mykiss*)
- Central Valley spring-run Chinook salmon (*Oncorhynchus tshawytscha*)
- Sacramento River winter-run Chinook salmon (*Oncorhynchus tshawytscha*)

Furthermore, a determination of effects based on the Proposed Project/Action on delineated EFH for species is summarized below:

- Pacific salmon, specifically Chinook salmon (*Oncorhynchus tshawytscha*)

Lastly, a determination of effects based on the Proposed Project/Action on the following four NCCPA Communities is summarized below:

- Valley Riverine Aquatic Habitat
- Valley/Foothill Riparian Habitat
- Anadromous Fish Species
- Estuarine Fish Species

These species and communities have been selected from a broad list of species compiled from USFWS lists and database searches from the CNDDDB and CNPS. The five species are federal-listed. The NCCPA communities were selected from 20 communities defined in the MSCS. These species and communities have the potential to be affected by the Proposed Project/Action and are therefore included in this ASIP.

10.1.1 North American Green Sturgeon (Southern DPS)

The Proposed Project Action occurs within and adjacent to the Sacramento River which provides habitat for several special-status anadromous fish species. Based on the Proposed/Project Actions described in Chapter 2, these fish species are most likely to be affected by a decrease in water quality due to construction-related activities, underwater sound pressure effects generated by pile driving activities associated with cofferdam installation, and direct mortality as a result of cofferdam installation and dewatering. Included within the Proposed Project/Action are measures to minimize such impacts; these include following the Central Valley RWQCB regulations to minimize construction-related effects, installing silt screens to filter out sediment before water re-enters the river, installing a cofferdam to contain most construction activities in the water, minimizing sound pressure effects, screening of dewatering pumps, and relocation of individuals trapped within the dewatered cofferdam. With the implementation of these measures and with the incorporation of seasonal in-channel construction restrictions, it is unlikely that construction of the Proposed Project/Action would significantly affect green sturgeon populations. Moreover, the proposed project will result in avoidance of future entrainment of green sturgeon at the diversion sites. This is a beneficial effect is expected to outweigh the temporary construction-related effects.

There is potential for “incidental take” of special-status fish associated with installation of the cofferdam, and the Proposed Project/Action may affect and is likely to adversely affect special status fish species.

10.1.2 Central Valley Steelhead

The Project Action occurs within and adjacent to the Sacramento River which provides habitat for several special-status anadromous fish species. Based on the Proposed/Project Actions described in Chapter 2, these fish species are most likely to be affected by a decrease in water quality due to construction-related activities, underwater sound pressure effects generated by pile driving activities associated with cofferdam installation, and direct mortality as a result of cofferdam installation and dewatering. Included within the Proposed Project/Action are measures to minimize such impacts; these include following the Central Valley RWQCB regulations to minimize construction-related effects, installing silt screens to filter out sediment before water re-enters the river, and installing a cofferdam to contain most construction activities in the water, minimizing sound pressure effects, screening of dewatering pumps, and relocation of individuals trapped within the dewatered cofferdam. With the implementation of these measures and with the incorporation of seasonal in-channel construction restrictions, it is unlikely that construction of the Proposed Project/Action would significantly affect Central Valley steelhead populations. Moreover, the proposed project will

result in avoidance of future entrainment of Central Valley steelhead at the diversion sites. This is a beneficial effect is expected to outweigh the temporary construction-related effects.

There is potential for “incidental take” of special-status fish associated with installation of the cofferdam, and the Proposed Project/Action may affect and is likely to adversely affect special status fish species.

10.1.3 Central Valley Spring-Run Chinook Salmon

The Project Action occurs within and adjacent to the Sacramento River which provides habitat for several special-status anadromous fish species. Based on the Proposed/Project Actions described in Chapter 2, these fish species are most likely to be affected by a decrease in water quality due to construction-related activities, underwater sound pressure effects generated by pile driving activities associated with cofferdam installation, and direct mortality as a result of cofferdam installation and dewatering. Included within the Proposed Project/Action are measures to minimize such impacts; these include following the Central Valley RWQCB regulations to minimize construction-related effects, installing silt screens to filter out sediment before water re-enters the river, and installing a cofferdam to contain most construction activities in the water, minimizing sound pressure effects, screening of dewatering pumps, and relocation of individuals trapped within the dewatered cofferdam. With the implementation of these measures and with the incorporation of seasonal in-channel construction restrictions, it is unlikely that construction of the Proposed Project/Action would significantly affect Central Valley spring-run Chinook salmon populations. Moreover, the proposed project will result in avoidance of future entrainment of Central Valley spring-run Chinook salmon at the diversion sites. This is a beneficial effect is expected to outweigh the temporary construction-related effects.

There is potential for “incidental take” of special-status fish associated with installation of the cofferdam, and the Proposed Project/Action may affect and is likely to adversely affect special status fish species.

10.1.4 Sacramento River Winter-Run Chinook Salmon

The Project Action occurs within and adjacent to the Sacramento River which provides habitat for several special-status anadromous fish species. Based on the Proposed/Project Actions described in Chapter 2, these fish species are most likely to be affected by a decrease in water quality due to construction-related activities, underwater sound pressure effects generated by pile driving activities associated with cofferdam installation, and direct mortality as a result of cofferdam installation and dewatering. Included within the Proposed Project/Action are measures to minimize such impacts; these include following the Central Valley RWQCB regulations to minimize construction-related effects, installing silt screens to filter out sediment before water re-enters the river, and installing a cofferdam to contain most construction activities in the water, minimizing sound pressure effects, screening of dewatering pumps, and relocation of individuals trapped within the dewatered cofferdam. With the implementation of these measures and with the incorporation of seasonal in-channel construction restrictions, it is unlikely that construction of the Proposed Project/Action would significantly affect Sacramento River winter-run Chinook

salmon populations. Moreover, the proposed project will result in avoidance of future entrainment of Sacramento River winter-run Chinook salmon at the diversion sites. This is a beneficial effect is expected to outweigh the temporary construction-related effects.

There is potential for “incidental take” of special-status fish associated with installation of the cofferdam, and the Proposed Project/Action may affect and is likely to adversely affect special status fish species.

10.1.5 Giant Garter Snake

The giant garter snake has a low to moderate potential to occur in the Action Area and is an important species in the Central Valley region. The aquatic giant garter snake inhabits slow-moving waters, such as backwaters and sloughs, and requires some aquatic vegetation for basking and cover.

The anticipated effects to giant garter snake include: temporary effects to aquatic habitat resulting from the Main Canal improvements; temporary and permanent effects to upland habitat along the Main Canal improvements; permanent effects to upland habitat in association with the Drexler Relift; and possible incidental “take” during the snake’s inactive period. To avoid and minimize the anticipated effects to giant garter snake, conservation measures from the Programmatic BO will be implemented. Compensation for permanent loss of habitat in Phase 2 is anticipated at a 3:1 replacement ratio.

It is anticipated that the Proposed Project/Action ‘may affect, but is not likely to adversely affect’ the giant garter snake.

10.2 Critical Habitat

Construction activities associated with the Proposed Project/Action would result in temporary disturbances, including increased turbidity and sedimentation, cofferdam installation, and dewatering, to designated Critical Habitat for Central Valley steelhead, Central Valley spring-run Chinook salmon, and Sacramento River winter-run Chinook salmon. These potential effects are mitigated through measures incorporated in the project (see Chapter 2). Furthermore, the proposed fish screens would permanently alter designated Critical Habitat within the Action Area. However, the overall benefit of the proposed project on fish species outweighs the minor modifications to designated Critical Habitat.

Therefore, the Proposed Project/Action may affect, but is not likely to adversely affect Critical Habitat identified in this ASIP.

10.3 Essential Fish Habitat

Construction activities associated with the proposed project/action would result in temporary disturbances, including increased turbidity and sedimentation, cofferdam installation, and dewatering, to delineated EFH for Chinook salmon. These potential effects are mitigated through

measures incorporated in the project (see Chapter 2). Furthermore, the proposed fish screens would permanently alter delineated EFH within the Action Area. However, the overall benefit of the Proposed Project/Action on fish species outweigh the minor modifications to delineated EFH.

Therefore, the Proposed Project/Action may affect, but is not likely to adversely affect Essential Fish Habitat identified in this ASIP.

10.4 NCCPA Communities

This section summarizes the environmental setting, analysis, and effects determination presented in Chapters 5. The NCCPA communities that may be affected by the Proposed Project/Action include Valley Riverine Aquatic and Valley/Foothill Riparian habitats, and the Anadromous and Estuarine Fish Groups, which are associated with these habitats in the Action Area. Effects to the fishes are largely related to water quality, which was addressed in the Proposed Project/Action description. Water quality control measures are included in the Proposed Project/Action, and reduce the effects to the fishes to less-than-significant levels.

Effects to the two habitats are addressed in conservation measures in Chapter 5, which include avoidance of riparian areas, and the implementation of Swainson's hawk conservation and water quality measures. With the implementation of these measures, effects to Valley Riverine Aquatic and Valley/Foothill Riparian habitats are not likely. Adverse effects to Anadromous and Estuarine Fish Groups are expected to be minor and are outweighed by the overall beneficial effects of the Proposed Project.

Therefore, both the Proposed Project/Action may affect, but is not likely to adversely affect NCCPA Communities identified in this ASIP.

CHAPTER 11

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Appendix A

Species Lists

Appendix B

Photos



Photo 1. Riparian vegetation at Meridian Diversion, facing south, November 7, 2011.



Photo 2. Riparian vegetation at Drexler Diversion, facing northeast, November 7, 2011.



Photo 3. Main Canal near Meridian Diversion, facing east, November 7, 2011.



Photo 4. Main Canal north of Highway 20, facing north, November 7, 2011. Canal is lined in this area, but there are some areas of cracking and missing concrete.



Photo 5. Main Canal south of Highway 20, facing northwest, November 7, 2011. Canal is lined in this area, but there are some areas of cracking and missing concrete.



Photo 6. Southern Terminus of Main Canal near Proposed Drexler Re-Lift Pumping Plant, facing north, November 7, 2011.



Photo 7. Reclamation District 70 Canal near Proposed Drexler Re-Lift Pumping Plant, facing north, November 7, 2011. Main Canal is across road on left side (not visible).



Photo 8. Proposed Drexler Re-Lift Pumping Plant, facing north, November 7, 2011. Main Canal is across road on right side of photo.



Photo 9. Grimes Canal, facing north, November 7, 2011.

PHASE 2 MERIDIAN FARMS FISH SCREEN PROJECT
Final Initial Study/Mitigated Negative Declaration
Environmental Assessment/Finding of No Significant Impact

Prepared for:
U.S. Bureau of Reclamation
California Department of Fish and Game

October 2012

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SECTION 1

Introduction

1.1 Introduction

The United States Department of Interior (DOI) Bureau of Reclamation (Reclamation) and the United States Fish and Wildlife Service (USFWS) jointly manage the Anadromous Fish Screen Program (AFSP). The AFSP was established in 1994 to help meet the fish restoration objectives required in the Central Valley Project Improvement Act (CVPIA) Section 3406 (b)(21). The AFSP has provided cost share funding for several fish screen construction projects in California. Fish screens are designed to protect juvenile anadromous fish from water diversion entrainment along the Sacramento and San Joaquin rivers, their tributaries, and the Sacramento-San Joaquin Delta.

In accordance with the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA) this Initial Study/Environmental Assessment (IS/EA) discloses potential environmental impacts associated with the construction and operation of the following elements by the Meridian Farms Water Company (MFWC): (1) a new 135 cubic feet per second (cfs) diversion with fish screen and pumping plant adjacent to the existing Meridian Diversion; (2) increased capacity of the Main Canal to convey flows to the Drexler Service Area; (3) a new 35 cfs re-lift pump station to deliver flows to the Drexler Service Area via the new Drexler Pipeline; (4) extension of the Drexler Pipeline; (5) removal of the existing Meridian Diversion/Pumping Plant; (6) removal of the existing Drexler Pumping Plant; and (7) lining of approximately 2,500 feet of the Grimes Canal. For the purposes of CEQA, the project is the Proposed Project; for the purposes of NEPA, it is the Proposed Action. The project is referred to as the Proposed Project/Action throughout this document. Additional information on specific project facilities and components is included in Chapter 2.

This document was prepared as a joint CEQA/NEPA document because the Proposed Project/Action is a discretionary project of a local lead agency with federal involvement. Because MFWC is a private water distribution company and cannot act as lead agency under CEQA, the California Department of Fish and Game (CDFG) has agreed to be the CEQA lead agency. Reclamation is the federal lead agency under NEPA, because design and construction of the Proposed Project/Action involves federal funds through the AFSP. A list of other state and federal agencies that may have discretionary approval over the proposed project is provided in Section 1.6.

This IS/EA is a public document that analyzes the environmental impacts of the Proposed Project/Action, presents feasible measures to reduce or avoid potential environmental impacts,

and evaluates alternatives to the project. It complies with environmental requirements established by both CEQA and NEPA. This IS/EA serves as an informational document to be used in the decision-making process and does not recommend either approval or denial of the Proposed Project/Action.

This section provides a description of the study area, a summary of the project background, identification of the purpose and need and objectives for the proposed project, discussion of anticipated regulatory requirements and permits for construction and implementation of the proposed project, and the scope and organization for this IS/EA.

1.2 Study Area

MFWC is located in Sutter County, California, between Interstate 5 and Highway 99 east of the Sacramento River and southwest of the Sutter Bypass. **Figure 1-1** depicts the approximate limits of MFWC's service area. MFWC provides irrigation water to three separate service areas encompassing 9,150 total acres, with an estimated annual water delivery of 35,000 acre-feet (af).

1.3 Project Background

MFWC has diverted water from the Sacramento River under the provisions of a License for Diversion and Use of Water with a priority date of September 10, 1918. The existing Sacramento River diversions are located near the communities of Meridian, Drexler, and Grimes. These diversions presently utilize unscreened diversions, and may have entrained Chinook salmon, steelhead trout, and other anadromous fish species that pass by the intake. These diversions fall within the criteria established by the CVPIA, passed in 1992, for the protection and recovery of fisheries and fish habitat.

In March of 2002, MFWC's engineers (MWH Americas, Inc. [MWH]) completed a *Surface Water Diversion and Fish Screening Feasibility Study* that evaluated alternatives for improvements to the existing MFWC diversion facilities to provide a positive barrier fish screen for anadromous fish at each pump intake. The alternative selected by the MFWC Board of Directors (MFWC Board) for further design and environmental analysis was a plan to consolidate the three existing diversions into two new pump station facilities with positive barrier fish screens.

In 2008 the plan was divided into two phases for construction (Phase 1 and Phase 2) and an IS/MND and Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) was prepared that addressed both Phase 1 and Phase 2 elements (2008 IS/EA). Funds were available to construct one of the planned diversions and fish screen and providing some benefit to fish species. The MND was certified (for Phase 1 and Phase 2) and FONSI was adopted for Phase 1 only. Phase 1 was completed in 2010 and included the following elements:

- New Grimes Diversion/Pumping Plant. Construction of a new 30 cfs diversion with fish screen and pumping plant installed north of the existing Grimes Diversion/Pumping Plant.

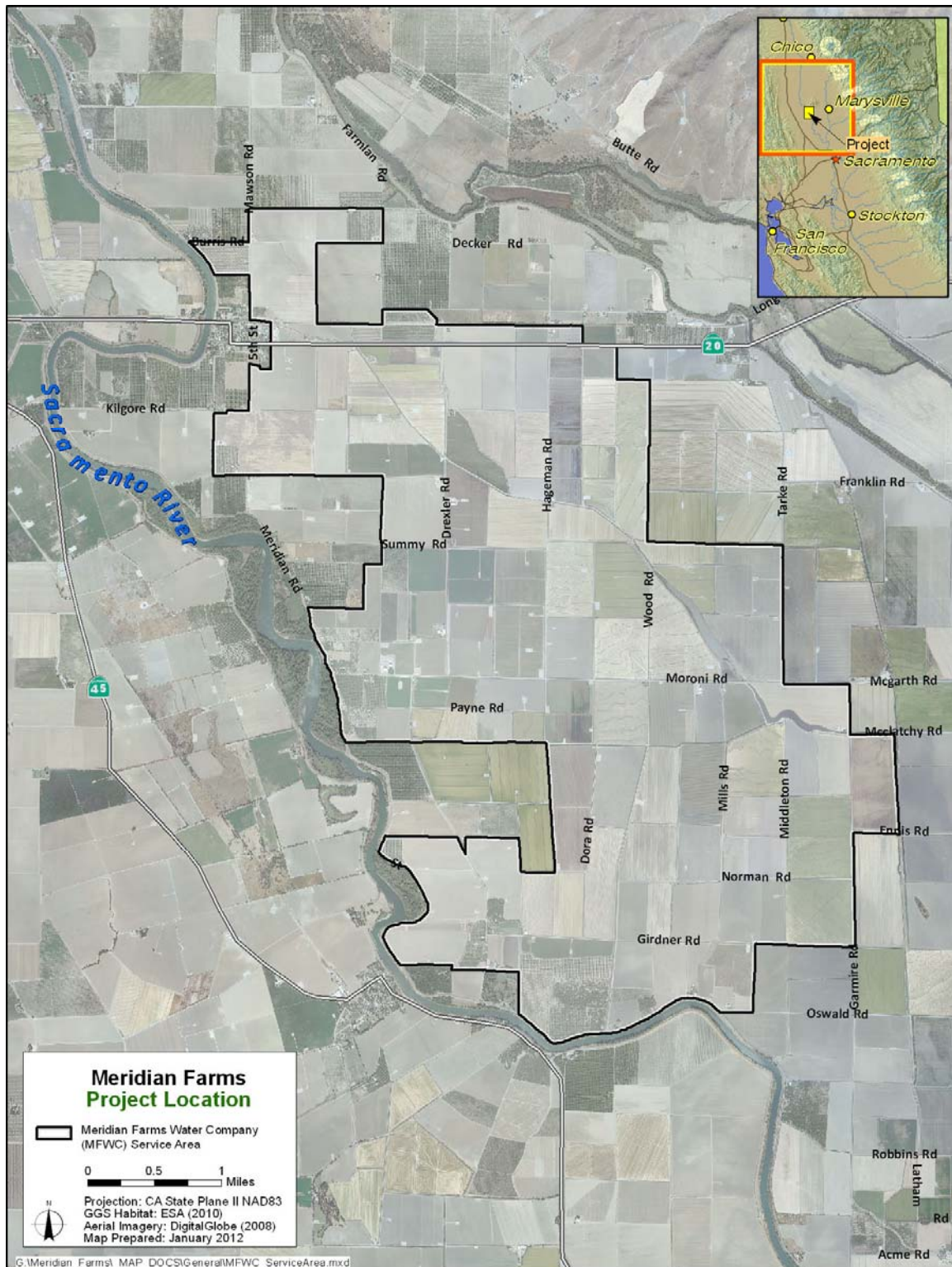


Figure 1-1. Meridian Farms Water Company Service Area

- New Grimes Pipeline and Modifications to the existing Main Canal. Approximately 650 lineal feet of 36-inch diameter pipeline was installed and approximately 3,800 lineal feet of the existing earthen canal was modified to deliver flows from the New Grimes Diversion/Pumping Plant to the Grimes Service Area. Approximately 1,200 linear feet of ditch was concrete lined and approximately 3,250 feet of earthen ditch was left unlined.
- Drexler Pipeline. Approximately 6,500 lineal feet of a 36-inch diameter pipeline was installed beginning at the Drexler Pumping Plant and terminating at the intersection of Summy Road and the Main Canal.
- Existing Grimes Diversion/Pumping Plant. The existing pumping facility was removed.

Phase 2 described in the 2008 plan included the following elements:

- New Meridian Diversion/Pumping Plant. A new 135 cfs diversion with fish screen and pumping plant would be installed adjacent to and would replace the existing Meridian Diversion.
- Main Canal Modifications. The capacity of approximately 15,200 lineal feet of the Main Canal would be increased to convey flows over to the Drexler Service Area in order to accommodate the consolidation of the Meridian and Drexler diversions.
- New Drexler Re-lift Pumping Plant. A new 35 cfs pumping plant would be installed at the end of the Main Canal modifications to deliver flows to the Drexler Service Area via the new Drexler Pipeline.
- Removal of Existing Meridian Diversion/Pumping Plant. The existing diversion/pumping facility would be removed after the new Meridian Diversion/Pumping Plant was constructed and operational.
- Removal of the Existing Drexler Pumping Plant. The existing pumping facility would be removed after the new pumping plant was constructed.

The new diversion with fish screen proposed as part of Phase 2 would increase diversion capacity at the existing Meridian Diversion to compensate for the abandonment and removal of the Drexler Diversion while reducing fish entrainment in the pumps. Note that the increase in capacity at the Meridian diversion would not exceed the existing allowable capacity of the Meridian and Drexler diversion combined. The Main Canal modifications would increase conveyance capacity in order to handle increased flows resulting from the consolidation of the existing Drexler and Meridian diversions. A relift pump station would be constructed to deliver flows to the Drexler Service Area via the Drexler Pipeline.

As stated in Section 1.1, this document will evaluate the Proposed Project/Action which includes the construction and operation of Phase 2 which has been modified to include the following additional elements. A complete description of the Proposed Project/Action is included in Section 2.

- Drexler Pipeline. Phase 2 would include the possible extension of the Drexler Pipeline to improve service to a portion of the Drexler Service Area and to reduce pumping costs.
- Grimes Canal. Phase 1 of the Project included concrete lining of 1,080 linear feet of the Grimes Canal while the remaining 2,500 linear feet were re-graded, but not lined. When the canal was put in operation, it was found that significant leakage was occurring in the unlined portion. Phase 2 may include concrete lining of the remaining portion of the canal. (Note: this element of the Proposed Project/Action has independent utility and the

adequacy of environmental compliance for the remaining portions of the project would not be affected if this component is not funded.)

1.4 Purpose and Need

Under NEPA, the federal purpose of the Proposed Project/Action is to screen existing unscreened diversions owned by the MFWC with a state-of-the-art fish screen that meets current National Marine Fisheries Service (NMFS) and California Department of Fish and Game (CDFG) fish screen design criteria, thereby reducing fish entrainment associated with MFWC diversions (CDFG, 2000; NMFS, 1997). The Proposed Project/Action is needed to provide long-term water supply reliability for MFWC and to minimize diversion impacts to outmigrating anadromous fish on the Sacramento River.

1.5 Project Objectives

Under CEQA, MFWC and CDFG have two primary project objectives for the Proposed Project/Action:

1. To construct a new screened intake facility that meets current NMFS and CDFG fish screen design criteria, and
2. To protect MFWC's existing water rights so that it can maintain a reliable long-term supply to its service area while reducing impacts to listed species in the vicinity of the intake facility.

1.6 Anticipated Regulatory Requirements and Permits for the Project

The permits and approvals that may be required for the Proposed Project/Action, as well as the regulatory agencies that may rely on this document and the aforementioned permits and/or approvals for consideration, are identified in **Table 1-1**. Some state and federal agencies will use this document for compliance with NEPA and CEQA, to the extent applicable, to issue necessary federal and state permits and approvals.

**TABLE 1-1
ANTICIPATED REGULATORY REQUIREMENTS AND PERMITS
FOR PROJECT IMPLEMENTATION**

Agency	Type of Approval
Federal Agencies	
U.S. Bureau of Reclamation	NEPA Lead Agency
U.S. Army Corps of Engineers	NEPA Lead Agency Clean Water Act Section 404 Permit Rivers & Harbors Act Section 10 Permit Federal Endangered Species Act compliance (Section 7)
U.S. Fish and Wildlife Service	Federal Endangered Species Act compliance (Section 7)
National Marine Fisheries Service	Federal Endangered Species Act compliance (Section 7)
State Agencies	
California Department of Fish & Game	CEQA Lead Agency State Endangered Species Act compliance Section 1601 Streambed Alteration Agreement Consistency Determination or Incidental Take Permit
Central Valley Flood Protection Board	Encroachment Permit
Central Valley Regional Water Quality Control Board	National Pollutant Discharge Elimination System General Construction Storm Water Permit (Section 402) Clean Water Act Section 401 Water Quality Certification General Order for Dewatering and Other Low Threat Discharge to Surface Waters Permit
State Historic Preservation Office	National Historic Preservation Act Section 106
Local/Other Agencies	
Feather River Air Quality Management District	Authority to Construct Permit to Operate
County of Sutter	Building Permit County Road Encroachment Permit

1.7 Scope and Organization

This IS/EA describes the affected environment, identifies and discloses potential environmental impacts of the Proposed Project/Action, and describes mitigation measures to avoid, minimize, or compensate for potentially significant impacts. Chapter 2 describes the Proposed Project/Action. Chapter 3 describes the affected environment of the project area. Chapter 4 describes the resources that would be affected by implementation of the Proposed Project/Action, including impacts, and mitigation measures to reduce these impacts. This Environmental Checklist presented in Chapter 4 is based on the checklist suggested in Appendix G of the CEQA Guidelines. The checklist has been modified to address both CEQA and NEPA requirements, including NEPA requirements to evaluate Indian Trust Assets, Environmental Justice, and Socioeconomic Effects.

MFWC would ensure that construction and operation of the Proposed Project/Action would be implemented consistent with the mitigation, monitoring and enforcement requirements of the 2008 IS/EA Mitigation Monitoring and Reporting Program (MMRP) (Appendix A). These measures are included along with all new mitigation measures proposed as part of implementation of Phase 2.

This IS/EA was circulated for review and comment by the public and other interested parties, agencies, and organizations for a 30-day review period beginning on August 8, 2012 and ending at 5 pm on September 7, 2012.

SECTION 2

Description of Proposed Project/Action

2.1 Background

As described in Subsection 1.1 of Section 1, in 2008 the plan was divided into two phases for construction (Phase 1 and Phase 2). A MND and FONSI were signed for the Phase 1 which was completed in 2010. The Proposed Project/Action includes the construction and operation of Phase 2 elements as described in the 2008 Plan, as modified. A complete description of the Proposed Project/Action is provided in subsection 2.3.

2.2 No Action Alternative

Under the No Action Alternative, construction and operation of Phase 2 facilities would not occur. Operation of the existing unscreened Meridian Diversion/Pumping Plant and Drexler Diversion/Pumping Plant would continue to put migrating salmon, steelhead, and other native fish species at risk of entrainment associated with operations.

2.3 Proposed Project/Action

The Proposed Project/Action would include the construction and operation of: (1) a new 135 cfs diversion with fish screen and pumping plant adjacent to the existing Meridian Diversion; (2) increased capacity of the Main Canal to convey flows to the Drexler Service Area; (3) a new 35 cfs re-lift pump station to deliver flows to the Drexler Service Area via the new Drexler Pipeline; (4) extension of the Drexler Pipeline; (5) removal of the existing Meridian Diversion/Pumping Plant; (6) removal of the existing Drexler Pumping Plant; and (7) if funding is available, the lining of approximately 2,500 feet of the Grimes Canal (**Figure 2-1**). The new Meridian Diversion with fish screen would increase diversion capacity to compensate for the abandonment and removal of the existing Drexler Diversion while reducing fish entrainment in the pumps, but would not increase the amount of diversion capacity overall. The Main Canal modifications would increase conveyance capacity in order to handle increased flows resulting from the consolidation of the existing Drexler and Meridian diversions. A re-lift pump station would be constructed to deliver flows to the Drexler Service Area via the Drexler Pipeline. The 2,500 linear feet of the Grimes Canal that was re-graded as part of Phase 1 will be lined with concrete to prevent leakage on to adjacent fields. Operation of the Phase 2 facilities would be the responsibility of MFWC.

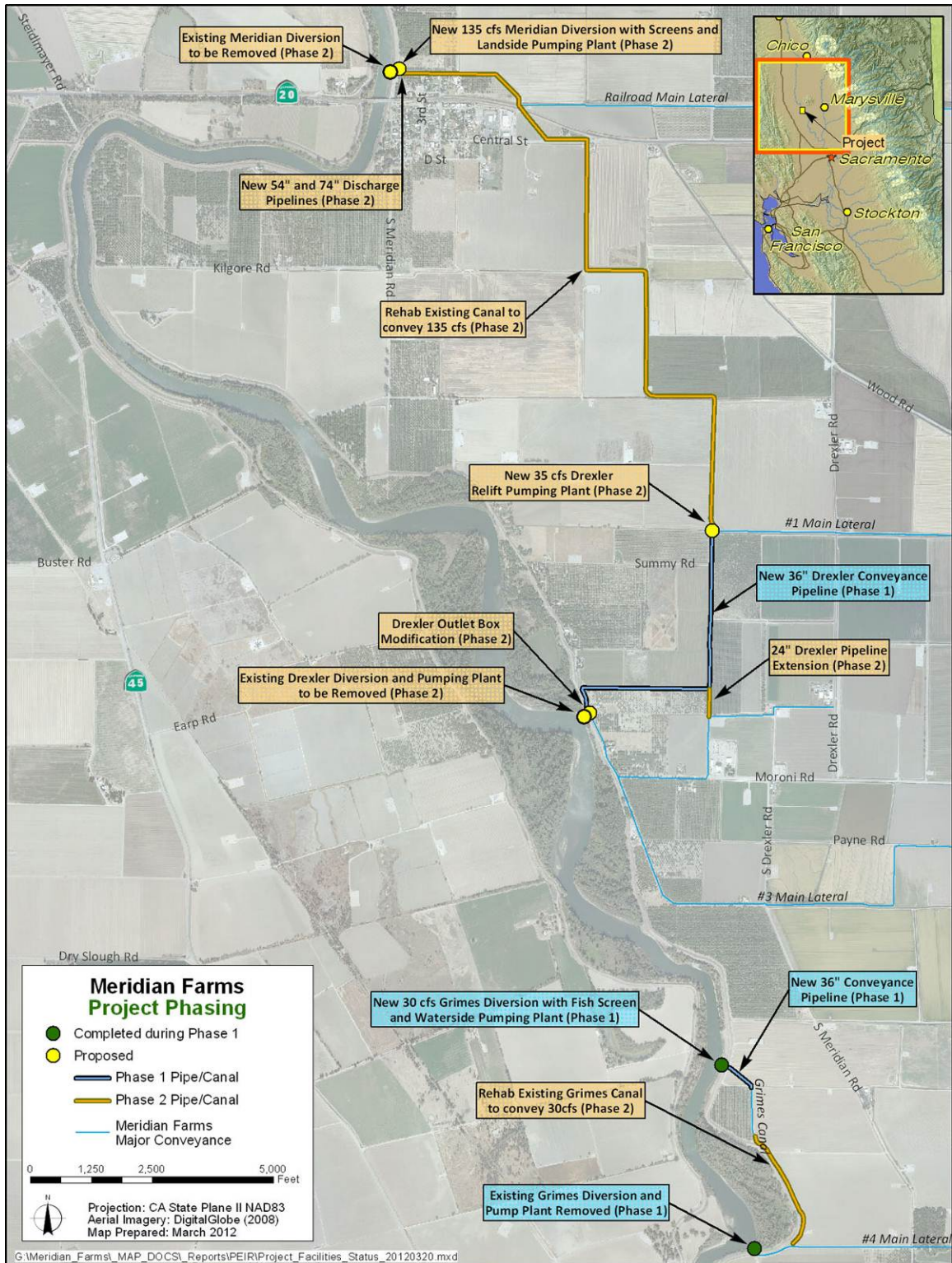


Figure 2-1. Phase 1 and 2 Project Components

The Proposed Project/Action would not increase MFWC's overall diversion capacity from the Sacramento River. Once the new diversions are completed at the new Meridian and Grimes site locations, the existing diversions at Meridian and Drexler would be removed in compliance with Central Valley Flood Protection Board (CVFPB), CDFG, National Marine Fisheries Service (NMFS), USFWS, and U.S. Army Corps of Engineers (Corps) requirements.

Specifically, the Proposed Project/Action includes the following elements:

- **New Meridian Diversion/Pumping Plant.** A new 135 cfs diversion with fish screen and pumping plant would be installed adjacent to the existing Meridian Diversion.
- **New Drexler Re-lift Pumping Plant.** A new 35 cfs pumping plant would be installed at the end of the Main Canal modifications to deliver flows to the Drexler Service Area via the new Drexler Pipeline.
- **Main Canal Modifications.** Approximately 15,200 linear feet of the Main Canal would be widened up to three feet, depending on the location, to provide adequate capacity to convey flows to the Drexler Service Area in order to accommodate the consolidation of the Meridian and Drexler diversions.
- **Drexler Pipeline Extension.** The Drexler Pipeline would be extended by approximately 500 feet to improve service to a portion of the Drexler Service Area and reduce pumping costs. The outlet box at the end of the Drexler Pipeline could be modified to reduce pumping costs.
- **Removal of Existing Meridian Diversion/Pumping Plant.** The existing diversion/pumping facility would be removed after the new Meridian Diversion/Pumping Plant is constructed and operational.
- **Removal of the Existing Drexler Diversion/Pumping Plant.** The existing pumping facility would be removed after the new Drexler Re-Lift Pumping Plant is construction and operational.
- **Grimes Canal Modifications.** Concrete lining of approximately 2,500 linear feet of the Grimes canal. (Note: this element of the Proposed Project/Action has not yet been funded, and implementation is to be determined based on funding support. The adequacy of environmental compliance for the remaining portions of the project would not be affected if this component is not funded.)

Each of the Proposed Project/Action elements are described in more detail below.

2.3.1 Meridian Diversion/Pumping Plant

The Meridian Diversion/Pumping Plant would consist of a new 135 cfs diversion and pumping plant that would be installed immediately upstream of the existing Meridian Diversion. The pumping plant would be located on the land-side of the levee.

Meridian Diversion Fish Screen

The retractable cylindrical fish screen with brush cleaning system would consist of two 20-foot long, 60-inch-diameter cylindrical screens. The total capacity of the screens would be 135 cfs. Pile-supported retrieval tracks that parallel the riverside levee face would be installed for screen removal during periodic maintenance or in the irrigation off-season. The pile-supported tracks would allow the screens to be removed out of the water via a motorized hoist and cable system.

The screens would be designed to have a minimum of 3 feet of submergence during low river levels (Water Surface Elevation 32.6 feet). When in operation, the screen mounts to a docking inlet. The docking inlet is covered by a trash-rack to prevent debris from entering the manifold when the screens are out of the water. This docking inlet would be part of an approximately 20-foot-long header manifold fabricated by the system manufacturer. This header manifold would connect to the 72-inch intake pipeline that runs through the levee to the pump station. The header manifold would either be supported on a concrete slab and H piles, similar to the stationary cylindrical design, or be mounted directly to the piles. A platform would be constructed at the top of the tracks to provide access to the screens when in a retracted position, as well as to mount the system control panel. **Figure 2-2** provides an overall site plan of the retractable cylindrical fish screen structure and pumping plant.

The brush cleaning system would consist of cylindrical screens equipped with hydraulic motors that rotate the screen against fixed external and internal brushes (see **Figure 2-3**).

Conveyance from River Inlet to Sump

The inlet structure would consist of two 66-inch steel tees, each with two fish screens mounted on top. The tees would be connected to a short segment of 84-inch steel pipeline. The 84-inch pipeline would then be reduced to a 72-inch steel pipeline, which would transition to a reinforced concrete pipe before passing through the levee and underneath North Meridian Road to the pump station wet-well. The fish screens, tees and the segment of 84-inch pipe would be supported by a three-foot six-inch thick concrete pad supported on piles.

The layout of the screens could change to allow the motors to be spaced properly and removed from the river for inspection and maintenance. This would require tracks mounted on piles for the screens to be pulled from the river by a winch. Short lengths of pipe would convey the intake water from the individual fish screens to the 84-inch intake pipe.

Deflection Piles

If necessary, approximately 10 steel deflection piles would be installed just upstream of the fish screens in the river. The flanges on the piles would be approximately 15 inches wide and 14 inches deep, with a steel weight of 89 pounds per foot. The purpose of the deflection piles would be to protect the fish screens from large debris floating down the river. The top of the piles would be submerged a minimum of three feet as required for navigable waterways. The use of deflection piles may not be necessary with use of a retractable screen.

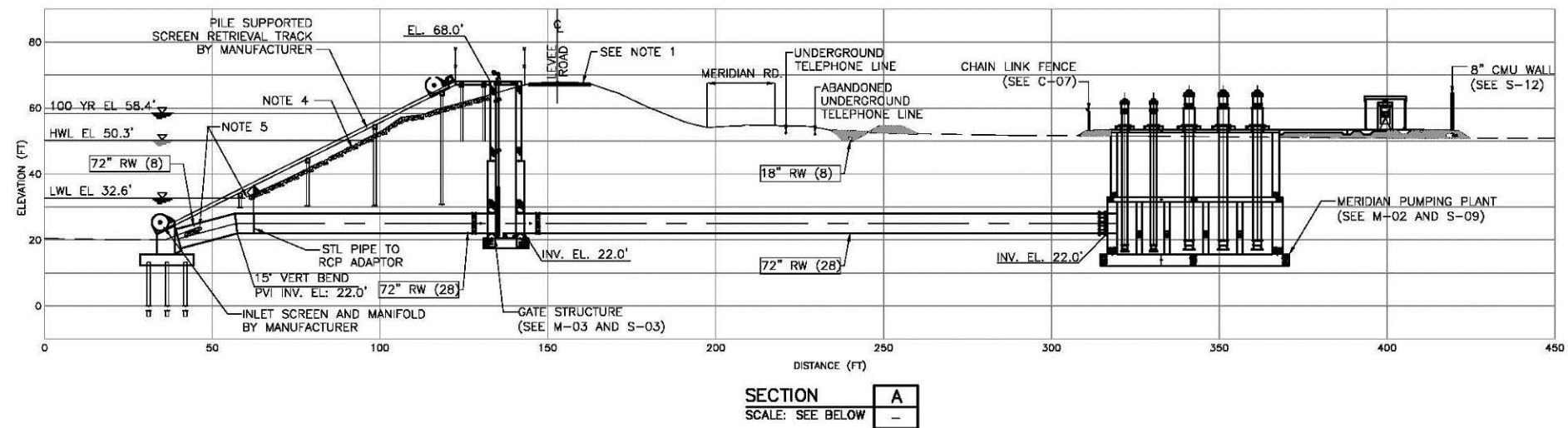
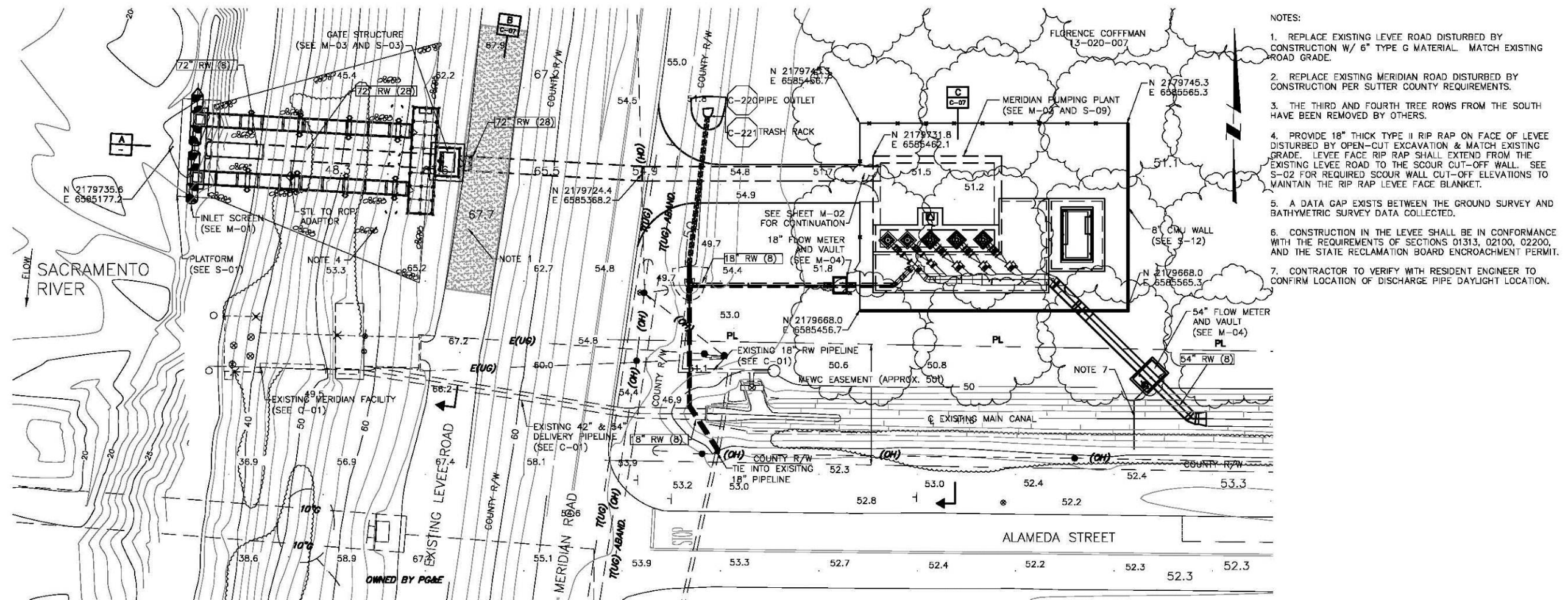
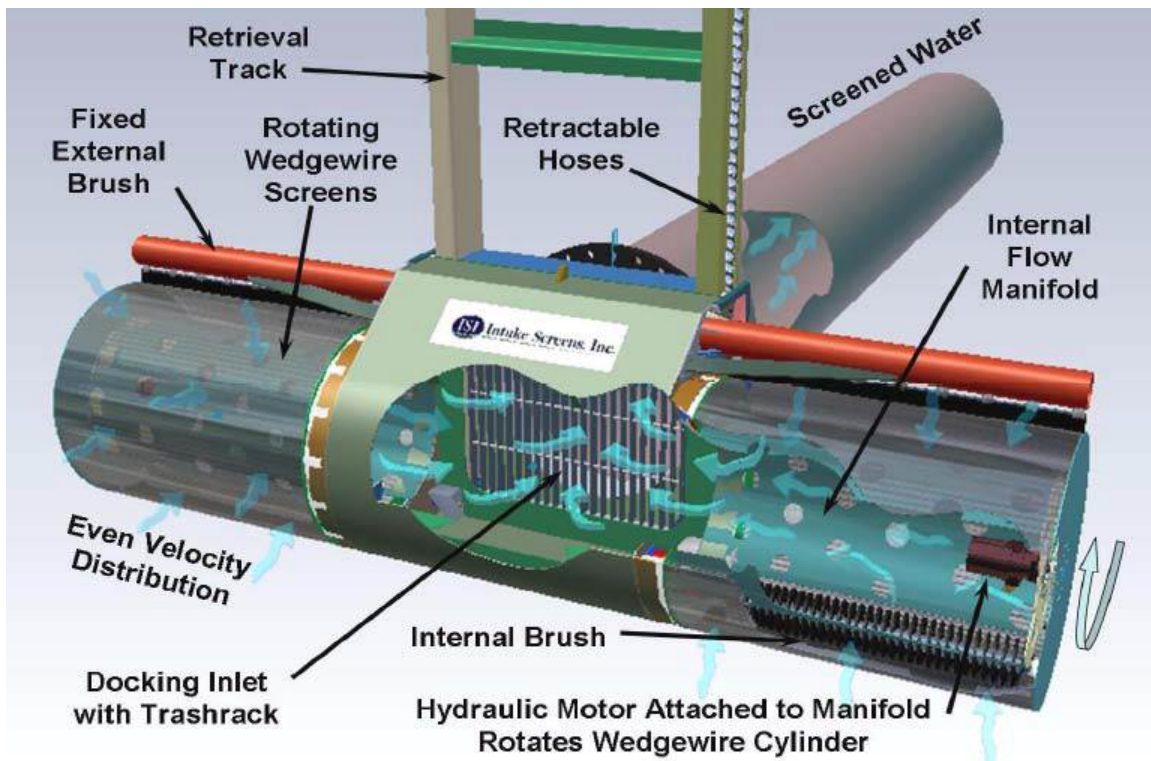


Figure 2-2. Retractable Cylindrical Fish Screen

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**Figure 2-3. Typical Rotating Cylinder Brush Cleaning System
(Image by Intake Screens, Inc.)**

Gate Structure

The gate structure would provide a means for positive closure of the levee penetration by the 72-inch inlet pipeline. A sluice gate with 72-inch diameter thimbles would be mounted in a concrete structure on the water-side of the levee.

Wet Well

The pumping plant wet well structure would be constructed on the east side of the Sacramento River at the northeast corner of North Meridian Road and Alameda Street near the community of Meridian. The inside dimensions of the sump are 35-feet wide by 46-feet long. The inlet pipeline would enter the sump with the pipe invert approximately 30 feet below grade. The wet well would direct the intake water to the five vertical turbine pumps.

Meridian Diversion Pumping Plant

The pumping plant would be equipped with two 16.5 cfs and three 34 cfs mixed flow pumps. The pumps would be mixed flow, vertical shaft pumps, with the electric motors mounted on the concrete deck, directly above the wet well described above. The concrete deck is at approximately the same elevation as the existing surrounding grade (elevation 53.5 feet).

The pumping plant site would be surrounded by a chain link fence on the north and west sides of the site and a masonry wall on the east and south sides. The masonry wall would provide a visual barrier between the pumping plant and nearby residences. The wet well, pumping pad, pumps, air compressor, air tank, and an electrical building would be located within the fenced site. A driveway and 15-foot access gate would allow vehicle access into the site off North Meridian Road. A three-foot gate would be located at the southeast corner of the site just off Alameda Street.

Pumps

Two 16.5 cfs and three 34 cfs mixed flow pumping units would be installed to pump the total design flow of 135 cfs into MFWC's Main Canal. At minimum speed, the low capacity pumps would be able to pump at a rate of 8.3 cfs. This provides MFWC the same pumping flexibility they have at their existing Meridian and Drexler pumping plants. The pumping plant would operate up to capacity when the Sacramento River water surface elevations vary between 32.6 and 50.3 feet.

Discharge Piping

The 16.5 cfs pumps and 34 cfs pumps would discharge into their respective 20-inch and 30-inch, above ground, pump discharge header pipes. The water would be conveyed from the discharge header into a common 54-inch, above ground, manifold pipeline. The 54-inch pipeline would drop underground just before exiting the fenced area of the pumping plant site. Underground, the pipeline would transition to a 72-inch discharge pipeline that would eventually discharge into the Main Canal near Mawson Road.

A separate 18-inch discharge would connect to the most westerly 16.5 cfs pump and would branch off and head both north and south to existing irrigation ditches. The north branch would serve the existing walnut orchard located next to the pumping plant. The south branch would serve the property located immediately south of the pumping plant on the other side of Alameda Street.

Flow Measurement

The water pumped from the Sacramento River would be measured with a 54-inch flowmeter just downstream from the pumping plant, and an 18-inch flowmeter located just west of the most westerly 16.5 cfs pump. The 54-inch flowmeter would measure the amount of water being diverted and pumped into the Main Canal. The 18-inch meter would be used to measure the water being pumped into the 18-inch waterline serving the north and south properties. The meter would be either above ground inside the pumping plant wall or housed in a concrete vault below ground. Flow measurements would be used by MFWC and Reclamation to log and report diversions.

Construction Considerations

Diversion and Fish Screen

Construction of the fish screen, intake piping and valve vault must be inside a sheet pile coffer dam to protect the site from flooding. Interlocking sheet piles would be driven into the river bottom using a vibratory or impact hammer attached to a crane. The crane would be floated to the

site on a barge. The sheet piles would be driven one at a time to form the coffer dam. This work would begin after July 1 to minimize impacts to listed aquatic species.

After completion of the coffer dam, the river bottom would be excavated to a level approximately five feet below the top of the H piles that would support the fish screen foundation. The piles would then be driven and a concrete tremie seal poured. These piles must be driven with an impact hammer to verify they are properly imbedded and providing required support. All this work must be done without dewatering the site. Before the concrete in the tremie seal sets, there is a danger the difference in water pressure inside and outside the coffer dam could cause the river bottom to rise; therefore, the concrete tremie seal must be in place before water inside the dam is pumped out. Prior to cofferdam dewatering, a fish rescue and salvage plan would be implemented to minimize potential construction-related effects to species present in the project area (see Appendix B). The contractor will have a contingency plan in place to prevent water contamination in the event of concrete tremie seal failure. Sump pumps inside the coffer dam would pump the river water out and then operate continuously to keep seepage from flooding the work site.

The reinforced concrete support pad would then be poured above the support piles and the screens themselves and intake piping would be mounted on the pad. The levee would be excavated at this time allowing placement of the intake to the pumping plant and the valve vault.

Alternatively, the levee could be excavated first. This would provide a way to move equipment and material to the fish screen installation site without a barge. The contractor would need to compare the cost of the additional excavation and backfill of the levee material versus the time saved by not need to work from a barge. This would also allow the contractor to install the sheet piles for the intake pipe trench construction at the same time, saving overall construction time. The levee would then be replaced with the excavated material, if it meets requirements for levee use. The material would be placed in 6-inch lifts and compacted to 90% relative density in accordance with CVFPB requirements.

Pumping Plant

The proposed site for the pumping plant, on the land side of the levee, is currently a walnut orchard and several walnut trees would be removed to accommodate construction. The depth of the wet well (approximately 40 feet to the bottom of the concrete bottom slab) would require sheet piling to support the excavation and protect workers. The sheet piles would be driven by vibratory or impact methods. Sump pumps would be installed to remove groundwater and keep the excavation dry. Once the vertical walls of the wet well are in place the excavation would be backfilled and the sheet piles would be removed or abandoned in place. The pumps, piping and electrical equipment would be installed and a perimeter fence constructed.

After placement through the levee, the 72-inch RCP intake pipe would be placed in an approximately 30-foot deep by 10-foot wide sheet pile supported trench. Material excavated from the trench would be placed adjacent to the trench and used as backfill after pipe installation. The intake pipe would also be placed under North Meridian Road. To accommodate its installation, North Meridian Road would be closed for approximately one month and traffic would be detoured to Mawson Road and Burriss Road to access areas north of the construction site.

Following pipe installation, the trench would be backfilled and the road repaved to repair any damage done during construction activities.

The pumping plant 54-inch steel discharge pipe would be placed in a trench approximately 50-foot long by 10-foot deep by 8 feet wide. The contractor could opt to slope walls back in lieu of using sheet piles for trench support. At the end of the trench the pipe would transition to a 72-inch RCP and would be placed in the bottom of the existing canal for approximately 1,050 feet. The soil in the bottom of the canal would be wet and unusable for pipe support, so it would be removed and replaced with gravel. The discharge pipe would be placed beneath Mawson Road which would require a road closure and detour. The closure of North Meridian Road, described above and Mawson Road would not be done at the same time to allow traffic to access areas north of Meridian.

2.3.2 Main Canal Modifications

The Proposed Project/Action would increase the capacity of approximately 15,200 lineal feet of the Main Canal to convey flows to the Drexler service area needed as a result of the consolidation of the Meridian and Drexler diversions. The current maximum capacity of the Main Canal is estimated at 120 cfs from the outlet of the existing pumping plant to Siphon 2 (State Highway 20) which is not large enough to convey the new maximum flow (135 cfs) from the proposed new Meridian Pumping Plant; therefore, the canal would be widened and relined as shown in **Figure 2-4**.

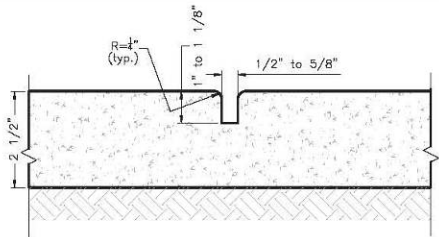
The concrete lined canal would have a trapezoidal shape and side slopes of 1.5 horizontal to 1 vertical (1.5:1). The canal section would be lined with four-inch-thick un-reinforced, cast-in-place concrete. The maximum bottom width would be 5.5 feet and the minimum bottom width would be 3.5 feet depending on the capacity requirements of the reach. The new canal invert elevation would be the same as the current elevation in order to continue utilizing existing siphons wherever hydraulic capacity is available. See **Table 2-1** for a summary of the Main Canal Modifications.

**TABLE 2-1
PROPOSED CANAL MODIFICATIONS**

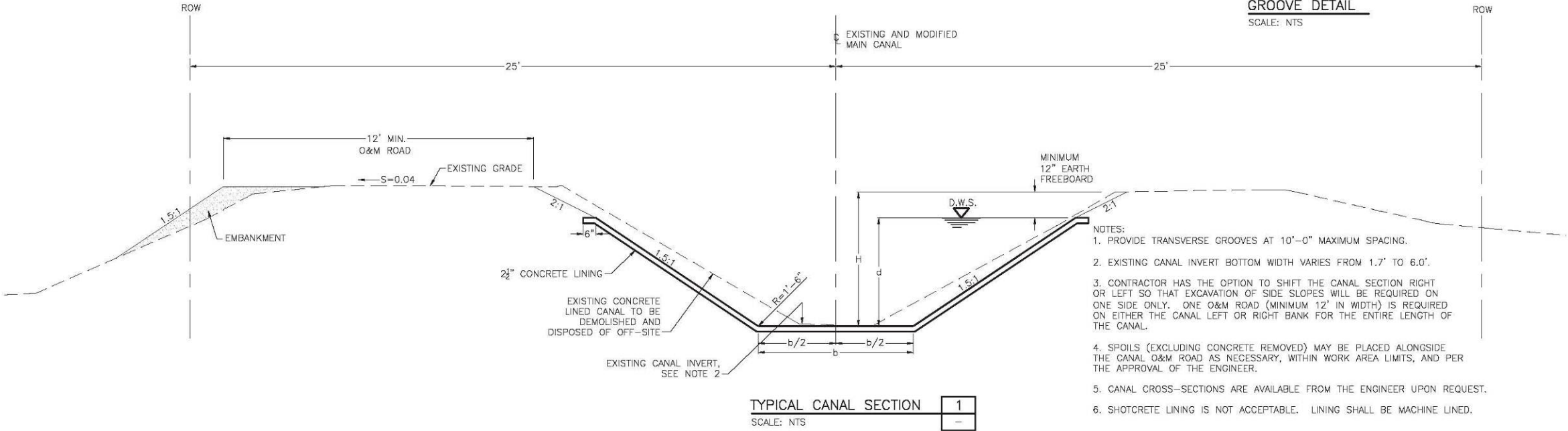
Description	Existing Bottom Width (ft)	Proposed Bottom Width (ft)	Flow (cfs)	Velocity (ft/s)
End of 54-inch Manifold pipe to Siphon 1	6.0-6.5	6 Pipe	135	4.8
Check Structure (moved from original location before Siphon)	5.2-7.9	5.5	135	2.5
Siphon 2 to Siphon 3	1.7-3.6	5.5	120	2.9
Siphon 3 to Bend Transition	2.6-3.5	5.5	120	2.7
Bend Transition to Check Structure	2.6-3.1	5.5	70	2.0
Check Structure to Siphon 4	3.1-3.3	3.5	70	2.0
Siphon 4 to Siphon 5	2.6-3.4	3.5	70	2.2

SOURCE: MWH Americas, Inc., 2004

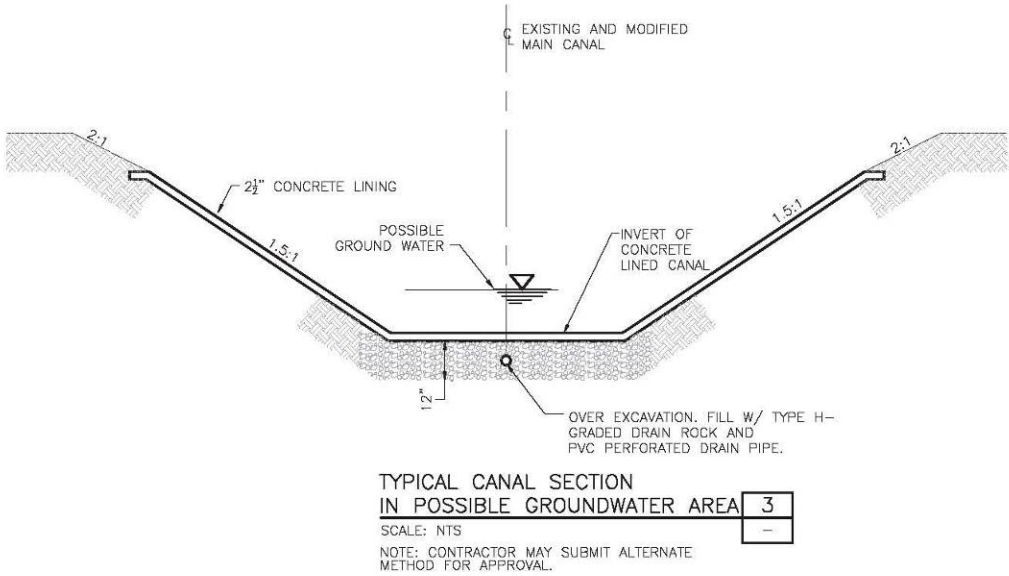
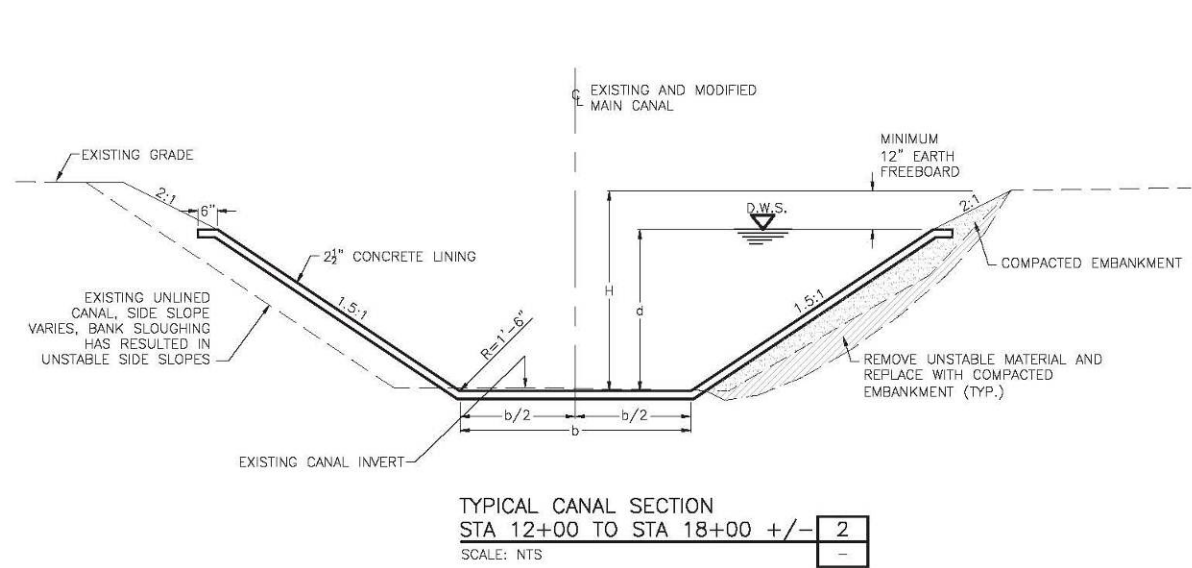
CANAL DIMENSIONS AND HYDRAULIC PROPERTIES										
REACH	A (sq. ft.)	V (ft./sec.)	Q (cfs)	n	s (ft./ft.)	b (ft.)	d (ft.)	H (ft.)(min.)	s:s (ft:ft)	Begin STA
1	46	2.9	135	0.015	0.0004	5.5	4.0	5.0	1.5:1	11+50, MAWSON RD. PIPE OUTLET TRANSITION
2	46	2.6	120	0.015	0.0002	5.5	4.0	5.0	1.5:1	30+09, HWY 20 SIPHON OUTLET TRANSITION
3	38	1.8	70	0.015	0.0002	3.5	4.0	5.0	1.5:1	72+13, EXISTING 24" CMP CULVERT
End STA										
27+13, HWY 20 SIPHON INLET TRANSITION										
72+09, EXISTING 24" CMP CULVERT										
149+82, SIPHON 5 INLET TRANSITION										



GROOVE DETAIL
SCALE: NTS



- NOTES:
1. PROVIDE TRANSVERSE GROOVES AT 10'-0" MAXIMUM SPACING.
 2. EXISTING CANAL INVERT BOTTOM WIDTH VARIES FROM 1.7' TO 6.0'.
 3. CONTRACTOR HAS THE OPTION TO SHIFT THE CANAL SECTION RIGHT OR LEFT SO THAT EXCAVATION OF SIDE SLOPES WILL BE REQUIRED ON ONE SIDE ONLY. ONE O&M ROAD (MINIMUM 12' IN WIDTH) IS REQUIRED ON EITHER THE CANAL LEFT OR RIGHT BANK FOR THE ENTIRE LENGTH OF THE CANAL.
 4. SPOILS (EXCLUDING CONCRETE REMOVED) MAY BE PLACED ALONGSIDE THE CANAL O&M ROAD AS NECESSARY, WITHIN WORK AREA LIMITS, AND PER THE APPROVAL OF THE ENGINEER.
 5. CANAL CROSS-SECTIONS ARE AVAILABLE FROM THE ENGINEER UPON REQUEST.
 6. SHOTCRETE LINING IS NOT ACCEPTABLE. LINING SHALL BE MACHINE LINED.



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The close proximity of the open canal to traffic on Alameda Street between the pumping plant and Mawson Road presents a safety hazard. The 72-inch discharge pipe would be extended to Mawson Road and backfilled to address the safety hazard. A two-foot deep drainage ditch would be constructed along Alameda Street to convey surface runoff that previously discharged to the canal.

The existing canal would be demolished and widened from one side or the other depending on the needed expanded width and the availability of right-of-way. The Operations and Maintenance (O&M) road would be widened, as necessary, to a width of 12-feet, as shown in **Figure 2-3**. Typical construction of the canal widening would involve a backhoe moving along the O&M road to remove the existing concrete lining by breaking the lining with the bucket into pieces which could be removed and placed into dump trucks. Due to the narrow work area, one dump truck at a time would need to back in from the nearest access point. At this time, the only access to the canal work area are from Mawson Road, Highway 20, Central Street, Blackmer Road and Summy Road. The next truck would need to wait for the previous truck to pull off the access road. The contractor may try to bring a second dump truck on the opposite side of the canal and load it while waiting for a dump truck on the near side of the canal. Or a second excavator could start at the other end of the Main Canal and load dump trucks accessing the site from Summy Road. The old concrete lining would be landfilled.

It has been estimated that approximately 550 dump truck trips will be required to remove the old concrete lining. At 15 minutes per truck, it will take 24 working hours or about 3 days to remove the concrete. If truck access can maintain that rate, it should take about 4 weeks to remove all the concrete with one excavator working.

The same backhoe used to remove concrete or a second backhoe would then excavate the sides of the canal to the required dimensions. A surveyor would need to work with the excavator operator. The soil removed would be used to widen or raise the O&M road. Where the soil along the side of the canal is not suitable for supporting the concrete lining, it would be removed and replaced.

The existing canal width varies, but is generally between 16 feet and 20 feet wide. North of the transition at Station 72+09 the canal must be widened to approximately 21.5 feet wide. South of the transition it must be widened to approximately 19.5 feet wide. The width of the limits of work available to the contractor vary between approximately 40 feet and 50 feet. The canal is generally in the center of the limits of work with an access road on one side or the other. However, the levee on the side opposite of the access road is generally not wide enough for trucks. Small backhoes or excavators are 8 to 10 feet wide, and the access road would be too narrow in some locations to allow access. It would also not be wide enough to allow other trucks with equipment and work crews to move around the work area, so access along both sides of the canal will be needed. Therefore, the access road will need to be widened before the start of work in some locations.

Once the canal is widened, it would be lined with four inches of concrete. It is expected that the new concrete lining would be shotcrete. However, the contractor could opt to use a concrete lining machine. In either case, concrete delivery trucks with a 10 cubic yard capacity would need to access the shotcrete crew or lining machine. At an estimated rate of 400 feet per day, the lining

would require 35 working days or 7 weeks. Approximately 105 cubic yards of concrete or about 10 concrete truck deliveries would be required per day. One concrete truck every 45 minutes would need to access the site.

Check Structures and Turnouts

Seven reinforced concrete check structures and 15 turnouts to local irrigation ditches exist at various locations along the existing Main Canal. Of the seven check structures two would remain in place, one is no longer needed and would be demolished and the remaining four would be demolished and then replaced to accommodate the canal widening. Of the 15 existing turnouts, three would be maintained in place, two are no longer needed and would be demolished, 10 would be demolished and replaced to accommodate the canal widening. One new turnout is required in a new location, so a total of 11 turnouts would be constructed. It may be necessary to install a small pump in the canal to provide the required flow through the turnout and into the irrigation ditch at the Mawson Road crossing. Turnouts would be installed within the canal and would not increase the canal footprint.

Construction of the turnouts would likely not be initiated until the completion of the old lining removal. The turnout construction could take place concurrently with canal widening. An excavator would excavate the area for the new turnout and remove the old pipe. Then forms and rebar are placed and concrete poured. The gate mechanism would be installed at the end of the job. This work should not take more than a week per structure. More than one crew may be required.

The estimated duration of construction activities during the Main Canal widening is 5 months. This includes 4 weeks for removal of old concrete, 8 weeks for canal widening and turnout construction, and 8 weeks for canal lining.

Siphons

Two siphons (Siphon 1 and Siphon 3) would be replaced as part of the canal modifications. Siphon 1 under Mawson Road would be removed and replaced with the 72-inch diameter RCP which is part of the Pumping Plant discharge piping. The replacement of Siphon 1 would require a closure of Mawson Road to facilitate the pipe installation. Mawson Road would be restored and repaved following the pipe installation.

Siphon 3 would be replaced by a 72-inch diameter RCP. Replacement of Siphon 3 would require a shutdown and replacement of Central Road and would be subject to Sutter County Public Works' design standards. Siphon 3 would be lengthened to 200 feet (is currently 44-feet long) to extend it past a home on Central road that is situated next to the canal.

The remaining siphons (2, 4, and 5) provide adequate capacity and would be left in-place. Upstream and downstream transitions at each siphon would be constructed of four-inch thick cast-in-place concrete.

2.3.3 Drexler Re-Lift Pumping Plant

The Drexler Re-Lift Pumping Plant would be installed on the main canal, just upstream of the existing Siphon 5 and Pump #10. The purpose of the pumping plant would be to divert 35 cfs from the main canal to the Drexler Service Area. The existing Drexler Diversion would be abandoned. Water would be pumped up to a new turnout structure via the Drexler Pipeline installed under Phase 1. This pipeline consists of approximately 6,500 feet of 36-inch pipe and a turnout structure. From the turnout structure, the water would gravity flow to the original Drexler canal outfall via approximately 600 feet of 36-inch pipe.

Figure 2-5 provides a general schematic of the proposed Drexler Re-Lift Pumping Plant. The pumping plant would include a 14-foot wide by 32-foot long forebay that would draw water off the Main Canal to two vertical turbine pumps. The forebay would be 10 feet deep and would be divided into two individual bays by a concrete wall with the pumps set at the end of each bay. The pump motors and discharge piping would be supported above a concrete slab that also forms the roof of the forebay. The individual pump discharge pipes would connect to a below ground 36-inch pipeline that would tie into the beginning of the Drexler Pipeline about 200 feet south of the Re-Lift Pumping Plant. An existing drainage ditch that parallels the Main Canal to the west would be filled to allow the construction of the pumping plant, and a new 24-inch storm drain would convey drainage from the ditch to the existing Reclamation District 70 canal to the south. The site construction also includes a 50-foot long by 21-foot wide concrete spillway in the O&M road opposite the Re-Lift Plant location. A 36-inch flow meter would be located in a below ground vault or sited above ground on the concrete pad.

Construction of the wet well and the overflow spillway must be done when the Main Canal is empty. However, the relocation of the drain from the seep to the ditch west of Summy Road and the connection to the Drexler Pipeline could be done during summer months.

2.3.4 Drexler Pipeline Extension

The Drexler Pipeline was connected to an existing 18-inch corrugated metal pipe (CMP) that discharges to an existing outlet box. The connection to the CMP was made with a concrete collar that would likely leak when under pressure. An alternative to replace the CMP and outlet box is being considered to provide a permanent connection and improve pump hydraulics.

A 24-inch branch of the Drexler Pipeline could be extended by approximately 500 feet to connect to the #3 Lateral Canal. This would improve pumping hydraulics by by-passing 3,000 feet of pipe and 3,000 feet of canals. Service to the Drexler Service Area would be improved and pumping costs would be reduced.

2.3.5 Removal of Existing Meridian Diversion/Pumping Plant and Drexler Pumping Plant

Once the New Meridian Diversion/Pumping Plant and Drexler Relift pumping plant are constructed and operational, the existing Meridian and Drexler Diversion/Pumping Plants would be removed.

At a minimum, removal of these facilities would include the removal of the pumps, equipment platforms, electrical equipment, gauging stations, pile supports to required level, and river side-piping. It would also include the excavation of the levee so the discharge pipe through the levee could be removed. The replacement levee section would be constructed to Corps and CVFPB requirements. Sheet pile coffer dams would likely be required to protect the work in the levee and landside flooding.

Removal of the existing diversions would require a large crane sited on the top of the levee or on a barge in the river. As the pumps, piping and support structures are cut into manageable sections, they would be lifted and removed to a stockpile on the landside and hauled away by trucks. Some of the equipment such as the pumps could be reused, but most of the scrap would be landfilled. The contractor would attempt to pull the support piles out of the river, but most likely they would be cut three feet below river bottom and abandoned, in accordance with CVFPB requirements. The concrete vaults would be difficult and costly to remove. If CVFPB requires removal, the vaults would need to be demolished with jackhammers or a wrecking ball. The debris would then need to be removed from the river bank and bottom with a backhoe and hauled to a landfill.

Removal of the pipes through the levee would require excavation of the levee by backhoe down to the pipe. A cofferdam should not be required if the construction is done during low river flow periods. CVFPB requires excavations in the levee to have trench walls sloped back at 1.5 to 1.0 side slopes. This means the trench would be approximately 80 feet wide at the top. If the pipe sections are welded together, it would need to be cut into sections with a cutting torch. A crane would then lift the sections out of the trench to trucks for recycling or landfilling. The soil removed to uncover the pipe would be stockpiled at a nearby staging area. If the soil meets minimum requirements for use in a levee, it would be hauled back, placed in six-inch lifts and compacted to 90 percent relative density, in accordance with CVFPB requirements. The levee would be restored to pre-existing grades.

2.3.6 Grimes Canal Modifications

Under Phase 1 the existing unlined canal was widened and the banks were raised to accommodate a change in the how the canal is used. Previously, the canal flowed from south to north because the old diversion was at the south end of the canal. With the relocation of the New Grimes Diversion to the north end of the canal, the water would flow from north to south resulting in a higher water surface along most of the canal. New check structures and turnouts were also installed under Phase 1, and about 1,080 feet of the canal was lined with concrete. Under Phase 2, it is proposed that the remaining 2,500 linear feet of canal be lined with a 4 inches of concrete (shotcrete). The canal was widened under Phase 1, so the only work necessary is to remove and silt in the bottom of the canal and apply the shotcrete. The proposed Phase 2 Grimes Canal modifications are an optional component of the Phase 2 Proposed Project/Action; implementation of this component will be determined at a later date based on available funding.

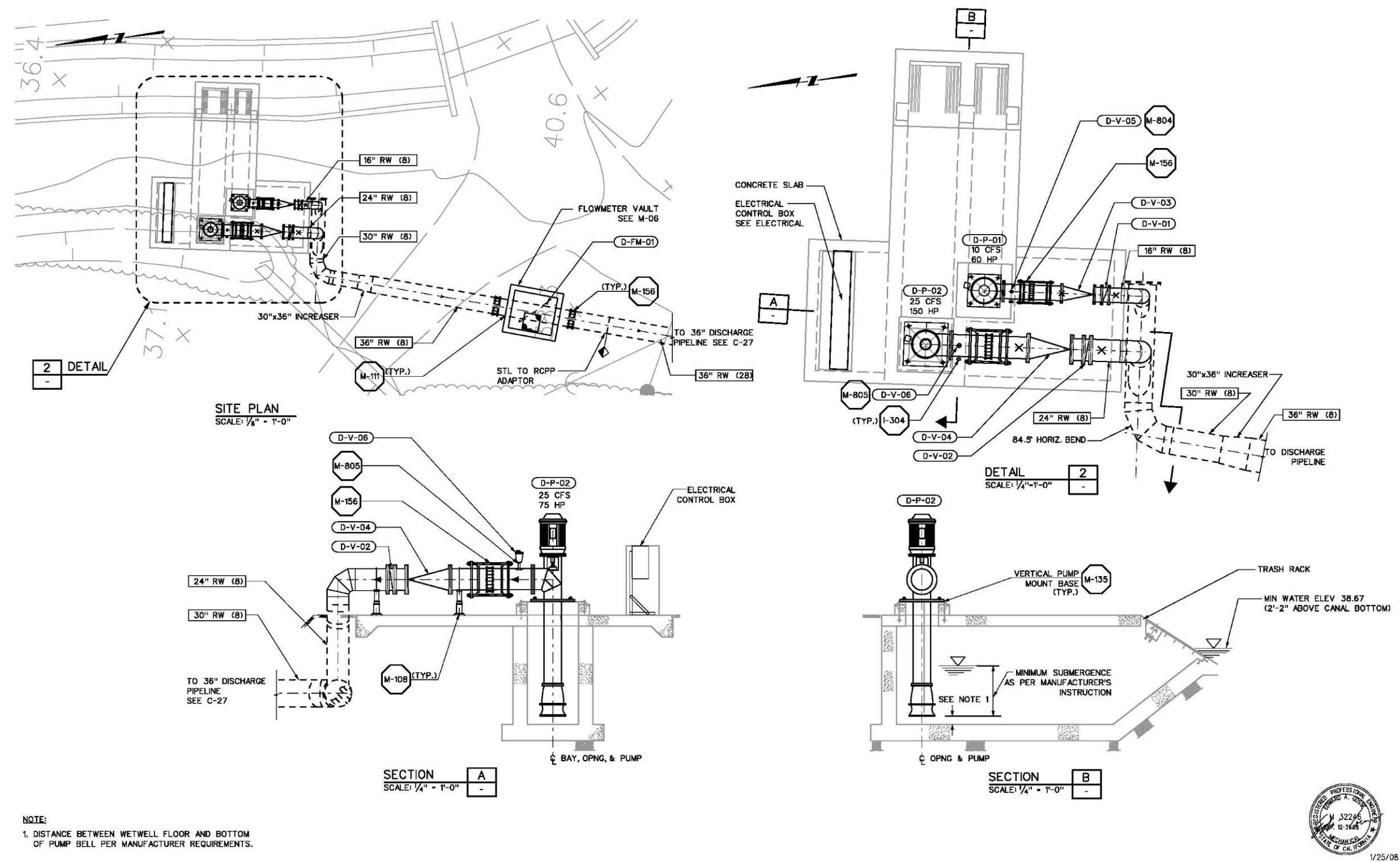


Figure 2-5. Drexler Re-Lift Pumping Plant

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2.4 Construction Phase

Construction Personnel and Equipment

The estimated construction personnel and equipment for the Proposed Project/Action is shown in **Table 2-2**. The actual equipment used during construction would be determined by the contractor and the construction schedule. Listed equipment includes all aspects of construction for facility construction and materials handling.

The specific routes to transport equipment, dispose excavated materials, or to obtain imported fill and other materials would likely vary for each project component. Because a number of construction materials sources are located in the surrounding area and urban centers, the selected routes use a combination of highways (e.g., Interstate-5 (I-5), State Route (SR)-99, SR-20, and SR-45), arterials and designated truck routes in the project vicinity. Construction worker trips are assumed to originate from the major urban areas in the project region and nearby communities primarily within Sutter County, Sacramento County, and Yolo County.

**TABLE 2-2
ESTIMATED CONSTRUCTION EQUIPMENT AND PERSONNEL**

Activity	Personnel	Equipment/Quantity
Meridian Diversion and Pumping Plant	20	Excavator, large (1), Excavator small (1), Loader (1), Crane (1), Backhoe/loader (1), Bulldozer (1), Compactor (1), Portable Generator (1), Concrete Pumper (1), Welder truck w/generator (1), Equipment truck (1) Dump trucks (4) Concrete trucks
Main Canal Modifications	8	Excavator (1), Dump truck (2), Concrete lining machine (1), Concrete pumper (1), Concrete trucks, Equipment truck (1)
New Drexler Re-Lift Pumping Plant	15	Excavator (1), Crane (1), Backhoe/loader (1), Portable Generator (1), Concrete Pumper (1), Welder truck w/generator (1), Equipment truck (1) Dump trucks (1) Concrete trucks
Drexler Pipeline Extension	6	Excavator (1), Loader (1), Equipment truck (1)

**TABLE 2-2
ESTIMATED CONSTRUCTION EQUIPMENT AND PERSONNEL**

Activity	Personnel	Equipment/Quantity
Removal of Existing Meridian Diversion/Pumping Plant	8	Excavator (1), Bulldozer (1), Crane (1), Loader (1) Dump trucks (4), Equipment truck (1)
Removal of Existing Drexler Pumping Plant	8	Excavator (1), Bulldozer (1), Crane (1), Loader (1) Dump trucks (4), Equipment truck (1)
Grimes Canal Modification	6	Shotcrete pumper (1), Equipment truck (1), Backhoe (1)
SOURCE: MWH, 2011; ESA 2011		

Staging Areas

Main staging areas would be located in an easily accessible area adjacent to the construction footprint. The staging area for the Meridian Diversion would be located east of the diversion. A linear area south of the Drexler Diversion would be used for storing material from the levee to remove the diversion discharge pipe. These staging areas are included in the analysis area and are encompassed in the ASIP Action Area (see Figure 2-1 in Appendix B). Arrangements would be made between the contractor and property owner for all stored construction and equipment materials. Temporary staging of raw materials could occur in existing rights-of-way when short-term storage is needed. Site preparation for staging areas would incorporate appropriate measures to prevent unnecessary vegetation removal. Ingress and egress roads would be covered with rock base at a minimum to prevent off-tracking of dirt.

Main staging areas would be large enough to safely store heavy equipment, work crew vehicles, long-term storage of construction materials, and job site trailer(s). The long-term staging area(s) would be used for storage of construction equipment and materials, as a reporting location for workers, and as the location of the job site trailer and parking area for vehicles and equipment.

The contractor would be responsible for securing the job site with temporary chain link fencing or other fencing acceptable to the project engineer. Power to the job site will be provided by existing electrical utilities, if needed.

Affected Roadways

The roadways identified in **Table 2-3** will be affected during construction. All roadways would be restored to original condition or better and subject to Sutter County Public Works' design standards.

**TABLE 2-3
AFFECTED ROADWAY SEGMENTS**

Segment	Anticipated Level of Disruption
North Meridian Road	Temporary closure and detour (6 months)
Mawson Road	Temporary closure and detour (1 month)
Central Road	Temporary closure and detour (1 month)
South Meridian Road	Temporary closure and detour (1 month)

Construction Considerations

Construction activities would comply with the requirements set by the Central Valley Regional Water Quality Control Board (CVRWQCB) to minimize construction-related impacts to water quality. In addition, silt screens and/or silt fences would be used where construction activities could possibly cause sediment to enter the river. All water-side construction activities, with the exception of riprap installation, would be confined within a sheet-pile cofferdam, which would be put in place and removed during the “dry” season from July 1 to October 1, although this could be extended to November 1 with NMFS approval. In addition, canal modifications would occur between October 1 and April 30 to avoid disruption to the irrigation delivery schedule and growing season.

All construction contracts would specify staging areas for heavy equipment on the land-side of the Sacramento River so that spills of oil, grease, or other petroleum by-products would not be discharged in the Sacramento River. All machinery would be properly maintained and cleaned to prevent spills and leaks. Any spills and leaks from equipment would be reported immediately and cleaned up in accordance with applicable local, state, and/or federal regulations.

Construction contracts would note the location of staging areas for stockpiling material and would be required to maintain Storm Water Pollution Prevention Plan (SWPP) Best Management Practices (BMPs) to prevent the migration of material off site.

2.5 Environmental Commitments

Measures to protect sensitive environmental resources during the construction have been incorporated into the proposed project. These environmental commitments are consistent with those incorporated into the 2008 Meridian Farms Fish Screen Project IS/MND EA/FONSI. The following are the environmental commitments that are part of the Proposed Project/Action:

2.5.1 Biological Resources

- Project construction and operations will result in no net loss of wetland resources.

- Construction of the temporary cofferdam will only take place after July 1 and prior to October 1. The in-water work period may be extended to November 1 with approval from NOAA Fisheries.
- Pump(s) used for dewatering the cofferdam during Phase 2 construction will be screened according to NMFS fish screening criteria for anadromous salmonids (NMFS, 1997b). After installation of the cofferdam and any time the cofferdam is flooded during construction, a fish rescue and salvage plan will be implemented to minimize potential construction-related effects to species present in the project area (see Appendix B). A qualified biologist will be on-site during such pumping activities to ensure that any fish that may be present within the construction area are relocated to suitable habitat near the project area.
- Additional measures to avoid impacts to sensitive biological resources, including special-status fish and the giant garter snake, are included in Chapter 4.

2.5.2 Cultural Resources

- All construction contracts would inform the contractor(s) of the potential for accidental discovery of subsurface archaeological, paleontological, and/or significant cultural resources artifacts or human remains. In the event of the discovery of any buried archeological or paleontological deposits, construction activities in the vicinity (within 50 feet) of the find will be temporarily halted and a Reclamation cultural resources staff will be contacted and provide direction on how to proceed to the next step. Possible management recommendations for important resources could include resource avoidance or data recovery excavations.

In the event that human remains are discovered, the discovery will be treated in accordance with the requirements of §750.5(b) of the California Health and Safety Code (CHSC). Pursuant to §7050.5(c) of the CHSC, if the County Coroner determines that the human remains are, or may be of Native American origin, then the District will ensure that the discovery shall be treated in accordance with the provisions of §5097.98(a)-(d) of the California Public Resources Code.

No Project Personnel will be allowed to collect cultural resources.

2.5.3 Land Use

- Unless the affected landowner and the District mutually agree to another solution, the District will compensate for any temporary or permanent easements, property loss, and/or damage to third-parties. Compensation will be at fair market value, determined by qualified and objective third-party real estate appraisers.

2.5.4 Air Quality

- The District will coordinate with the Feather River Air Quality Management District (FRAQMD) to determine the need for preparation of a construction-generated emissions control plan or to identify measures that would be implemented during construction to

control fugitive dust or other vehicle or equipment emissions. At a minimum, fugitive dust will be controlled by watering the soil surface and covering haul vehicles and exposed dirt piles. All construction contracts will specify such dust and emission control requirements and any additional controls as required by FRAQMD.

2.5.5 Hazards and Hazardous Materials

- Construction, welding and other areas where spark-producing equipment will be used will be cleared of dried vegetation or other materials that could serve as fire fuel. Any construction equipment that normally includes a spark arrester will be equipped with an arrester in good working order.
- All construction-related hazardous materials will be transported, stored, and handled in a manner consistent with relevant regulations and guidelines, including those recommended and enforced by the state and federal Departments of Transportation, CVRWQCB, Sutter County, the local Fire District and other appropriate fire districts, among others as appropriate.
- A Hazardous Materials Management Plan (or equivalent) will be prepared and/or followed to provide specific emergency response protocols for the accidental release or threatened release of hazardous materials used as part of the construction and operation of the Proposed Project/Action. In the event a release was to occur, this emergency response plan will provide emergency responders with a protocol for continuing and disposing of the release.

2.5.6 Noise

- Standard noise abatement measures will be implemented during construction to reduce noise impacts from construction activities. Construction activities will be limited to the hours between 7:00 a.m. and 5:00 p.m. on weekdays to reduce potential noise impacts to area residents. In addition, staging areas and stationary noise generating construction equipment will be located as far as possible from sensitive receptors, and all construction equipment will be maintained with the manufacturer's specified noise-muffling devices.
- Final design of the facilities in the Proposed Project/Action will incorporate noise attenuating technologies and/or noise barriers to mitigate that noise emanating from the facilities at maximum operational load will not exceed applicable standards or lead to cumulative increases in ambient noise levels.

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SECTION 3

Environmental Setting/Affected Environment

This section provides an overview of the environmental setting and affected environment, which represents the baseline condition for assessing the potential for the Proposed Project/Action to impact the environment.

3.1 Aesthetics

The project area is characterized by relatively flat terrain with generally expansive viewsheds. The Sutter Buttes, remnant volcanoes with a peak elevation approximately 2,000 feet above the surrounding valley floor, are located within two miles of the project area (Sutter County, 2008). Much of the land in the project area is agricultural with the exception being the town of Meridian. The project area is also located adjacent to the Sacramento River which provides scenic views along the western border of the County and project area. Also in the project area is the existing Grimes Pumping Plant and existing Main Canal and Grimes Canal which contribute to the existing viewshed in the project area.

3.2 Agricultural and Forest Resources

The project area is located along the western edge of Sutter County. The project area is zoned for agriculture with the exception of the Town of Meridian, a rural community. In 2011, approximately 57 percent of the irrigated agricultural land comprised of rice, which was the predominant grain crop. Tomatoes, wheat, and sunflower are also important crops, with each comprising six to seven percent of the cropping pattern during the same year. Permanent tree crops (orchards) encompass about 10 percent of the planted area, with walnuts being the predominant crop.

The land within the project area is zoned as Prime Farmland and also includes several Williamson Act parcels. No forest resources are located within the project area (Sutter County, 2008).

3.3 Air Quality

Sutter County is located within the Sacramento Valley Air Basin (SVAB) which consists of the northern half of the Central Valley and approximates the drainage basin for the Sacramento River and its tributaries. Regionally, some portions of the SVAB have fewer air quality problems than others. Only the southern portion of the SVAB is in non-attainment for federal ozone standards, which includes the southern portion of Sutter County. Regarding State standards, the entire SVAB is in nonattainment for ozone and PM standards.

3.4 Biological Resources

Biological communities in the study area include valley foothill riparian, ruderal/annual grassland, agricultural land, and riverine habitat (the Sacramento River). The Sacramento River provides freshwater habitat for fish, amphibians, reptiles, and waterfowl. Roads, levees, and agricultural activities have modified the adjacent riparian habitat. Inland project areas, beyond the Sacramento River and associated habitats, are characterized as agricultural (field crops and orchards). Human presence within the project area is minimal based on the surrounding land use; however river recreation activities increase during the late spring, summer and fall. **Figure 3-1** presents the general habitat types surrounding the project components, including the proposed Meridian diversion and pumping plant, as well as around the proposed Drexler re-lift pumping plant.

3.4.1 Habitats

Valley Foothill Riparian

Valley foothill riparian habitat in the study area occurs in small strips adjacent to the Sacramento River system as it winds south along the western boundary of the Meridian Farms service area, and is usually located within the flood plain and levee system. In the areas of the diversions, habitat is disturbed and density and structure vary. Some relatively open areas are interspersed with multi-layer areas containing, and can include large trees, dense shrubs, California grape vines (*Vitis californica*), and a well-developed herbaceous layer. Trees and shrubs include narrowleaf willow (*Salix exigua*) and black willow (*Salix gooddingii*), Himalayan blackberry (*Rubus discolor*), poison oak (*Toxicodendron diversilobum*), cottonwood (*Populus fremontii*), ash (*Fraxinus latifolia*), and boxelder (*Acer negundo*). The herbaceous layer contains native and non-native species, including black mustard (*Brassica nigra*), Canada horseweed (*Conyza canadensis*), tall amaranth (*Amaranthus rudis*), epazote (*Chenopodium ambrosioides*), and barnyard grass (*Echinochloa crusgalli*). Mature cottonwood stands dominate the closed canopy overstory and characterize the riparian forest areas adjacent to and within the riverine environment (during high flow season).

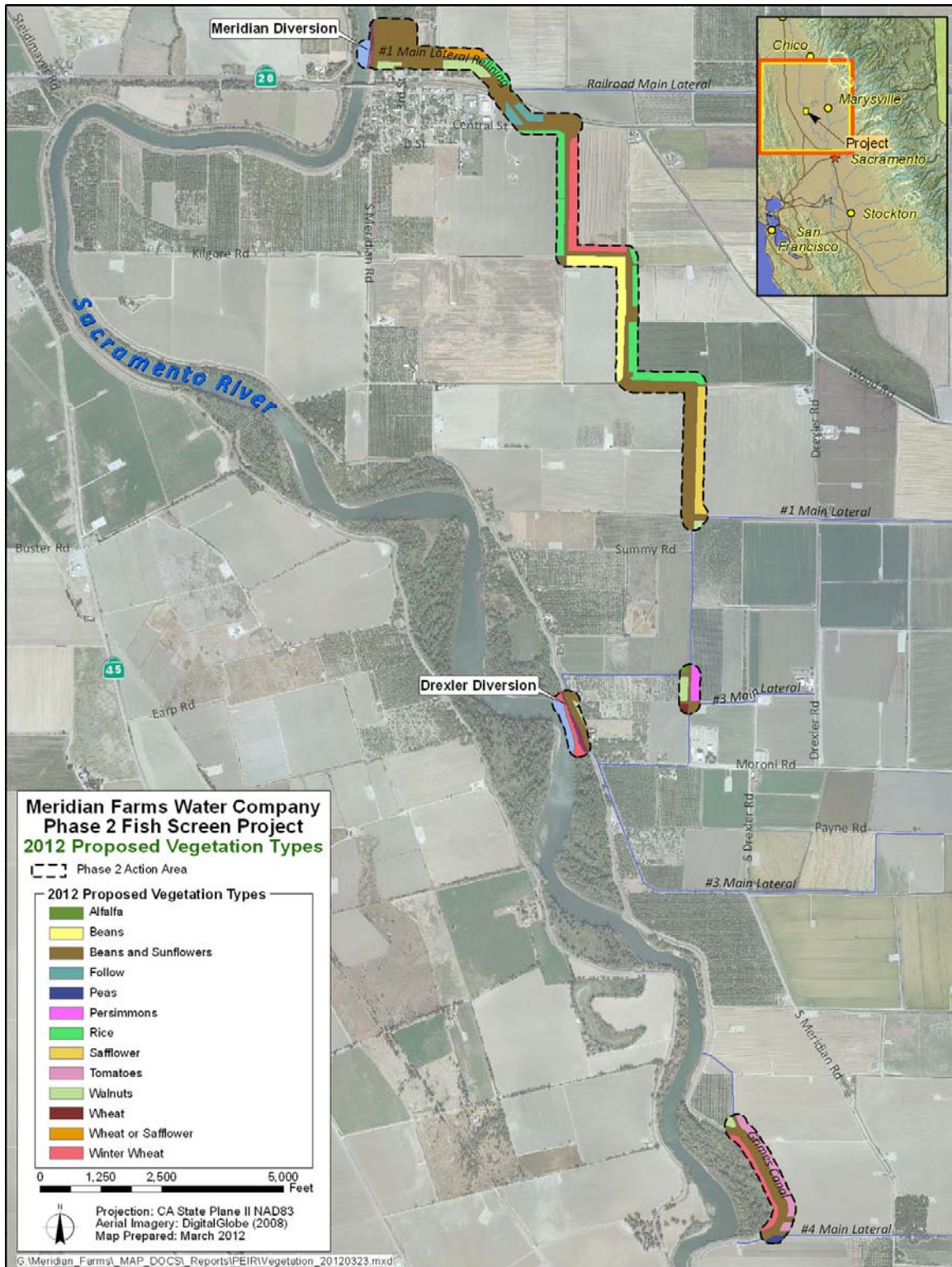


Figure 3-1

Valley riparian habitats provide food, water, migration and dispersal corridors, and escape, nesting, and thermal cover for an abundance of wildlife. At least 50 amphibians and reptiles and 147 bird species occur in lowland riparian systems. Additionally, 55 species of mammals are known to use California's Central Valley riparian communities.

Mature riparian habitat is not located within the immediate vicinity of proposed activities near or in the Sacramento River. However, disturbed valley foothill riparian habitat does occur along the opposite bank of the existing Drexler Diversion pumping plant, which is proposed to be demolished. Mature riparian habitat also occurs in the vicinity (west) of a segment of the Grimes Canal proposed to be concrete lined.

Ruderal/Annual Grassland

In the study area, ruderal habitats dominated by non-native annual grasses occur in narrow strips adjacent to roads, canals, and the Sacramento River levee. Species in these areas include ripgut brome (*Bromus diandrus*), and wild oats (*Avena barbata*). Other common species include Johnson grass (*Sorghum halepense*), wild rye (*Leymus triticoides*), sow thistle (*Sonchus asper*), filaree (*Erodium moschatum*), mugwort (*Artemisia douglasiana*), and cocklebur (*Xanthium strumarium*). Many of these species are also found in the disturbed understory of the valley foothill riparian habitat along the Sacramento River.

Sacramento River

Within the vicinity of the project area the Sacramento River riverine habitat is characterized by fresh-water aquatic and shaded riparian. The adjacent riparian habitat has been modified by trails (both paved and unpaved), levees, and general recreation activities. The river is approximately 800 feet wide and flows year-round. Flows are relatively slow within the project area, exhibiting deep channel characteristics with levied banks. Vegetative cover/shading along the channel banks is dependant upon the adjacent habitat (i.e., exposed annual grassland or riparian habitat). Channel substrate generally consists of fine sandy-loam with sparse areas imported rip-rap along the banks used to reinforce the adjacent levees. At the proposed new diversion location the channelized river bank habitat is exposed and dominated by annual grassland, exhibiting a deep, cold and slow moving flow.

The Sacramento River in the vicinity of the proposed intake location serves as a migratory corridor for the upstream migration of adult salmon and steelhead, and the downstream migration of juvenile salmon and steelhead. Other fish species common in the Sacramento River near the proposed intake location include striped bass, threadfin shad, American shad, catfish, Sacramento pikeminnow, tule perch, sculpin, bullhead, white and green sturgeon, Sacramento splittail, and a variety of other resident fish species. The Sacramento River near Sacramento also provides habitat for a variety of invertebrates, including planktonic species such as copepods, and epibenthic species such as crawfish and amphipods.

Agricultural

The predominant land use within the project area is agriculture. Although the specific crop cultivated on a parcel of land may vary annually, the general types of crops grown in the region remain relatively consistent. The major crops include rice, safflower, sunflower, tomatoes, and beans. Hay crops, such as alfalfa, are widely grown, and orchards in the area grow walnuts and persimmons. These crops are irrigated by a series of canals that deliver water from the Sacramento River. The delivery canals within the project area are generally well maintained and concrete lined, and support minimal vegetation. There are unlined overflow ditches characterized by emergent aquatic vegetation such as cattails (*Typha latifolia*) and tules (*Scripus californicus*) that occur in the vicinity, adjacent or perpendicular to the Main Canal. All ditches owned and managed by MFWC are maintained annually, and generally lack dense upland or aquatic vegetation. A few ditches that are owned by the local Reclamation District are not maintained as regularly and support denser stands of tules and cattail. Agricultural crops and irrigation drainages provide foraging and cover habitat for a variety of wildlife such as birds, mammals, and some reptiles.

All project components are located in or adjacent to agriculture. The Main Canal and other delivery canals that are proposed for widening (increased conveyance) are surrounded by lands in active crop production. These canals are generally concrete-lined; although, in some locations, the concrete bed is damaged and there are places where the canals are unlined. The proposed Drexler Re-Lift Pumping Plant is adjacent to existing canals and ditches. Irrigation ditches lateral to the Main Canal in the vicinity of the project support emergent aquatic vegetation. Canals and ditches may provide habitat for fish, aquatic invertebrates, and aquatic snakes.

3.4.2 Special Status Species

Table 3-1 lists the species of concern, their preferred habitats, and whether, based on the activities the project proposes, a given species has the potential of being affected. Species that may be affected by the Proposed Project/Action (and are therefore addressed in detail in this document) are in bold type.

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**TABLE 3-1
SPECIAL STATUS SPECIES THAT MAY OCCUR IN THE PROJECT AREA**

Scientific Name Common Name	Federal Status	State Status	CNPS Listing	Habitat Description / Blooming Period	Potential to Occur in the Action Area
Fish					
<i>Acipenser medirostris</i> North American green Sturgeon (Southern DPS)	FT	CSC	--	Spawns in large cobble in deep and turbulent river mainstem. The Southern DPS spawns in the Sacramento River basin and in the Sacramento-San Joaquin Delta and Estuary.	High. Migratory route in the Sacramento River; also provides suitable rearing habitat in riparian bank areas.
<i>Hypomesus transpacificus</i> Delta smelt	FT	CT	--	Found in the Sacramento-San Joaquin delta, Suisun bay, Carquinez Straight, and San Pablo Bay.	Unlikely. Project site outside area designated as Critical Habitat and does not have habitat required for reproduction or cover. Project site likely outside of the upstream migratory extent.
<i>Oncorhynchus mykiss</i> Central Valley steelhead	FT	--	--	Spawns in Sacramento River and tributaries where gravelly substrate and suitable water conditions occur.	High. Migratory route in the Sacramento River; also provides suitable rearing habitat in riparian bank areas.
<i>Oncorhynchus tshawytscha</i> Central Valley spring-run Chinook	FT	CT	--	Spawns in Sacramento River and few select tributaries where gravelly substrate and suitable water conditions occur.	High. Migratory route in the Sacramento River; also provides suitable rearing habitat in riparian bank areas.
<i>Oncorhynchus tshawytscha</i> Sacramento River winter-run Chinook	FE	CE	--	Spawns primarily in upper reaches of the mainstem Sacramento River.	High. Migratory route in the Sacramento River; also provides suitable rearing habitat in riparian bank areas.
Reptiles					
<i>Emys marmorata</i> Western pond turtle	--	CSC	--	Ponds, marshes, rivers, streams, and irrigation ditches with aquatic vegetation. Requires basking sites and suitable upland habitat for egg-laying. Nest sites most often characterized as having gentle slopes (<15%) with little vegetation or sandy banks.	Unlikely. No suitable habitat within or adjacent to the project site.
<i>Thamnophis gigas</i> Giant garter snake	FT	CT	--	Generally inhabits marshes, sloughs, ponds, slow-moving streams, ditches, and rice fields which have water from early spring through mid-fall, emergent vegetation (such as cattails and bulrushes), open areas for sunning, and high ground for hibernation and escape cover.	Moderate. Limited aquatic habitat in Main Canal, in adjacent Reclamation Drains or within adjacent seasonally inundated rice fields. Potential upland habitat in unpaved areas up to 200 feet from aquatic habitat.
Amphibians					
<i>Ambystoma californiense</i> California tiger salamander	FT	CSC	--	Annual grassland and grassy understory of valley-foothill hardwood habitats in central and northern California. Needs underground refuges and vernal pools or other seasonal water sources.	Unlikely. No suitable habitat within or adjacent to the project site.
<i>Rana aurora draytonii</i> California red-legged frog	FT	CSC	--	Breeds in slow moving streams with deep pools, ponds, and marshes with emergent vegetation.	Unlikely. No suitable habitat within or adjacent to the project site.

**TABLE 3-1
SPECIAL STATUS SPECIES THAT MAY OCCUR IN THE PROJECT AREA**

Scientific Name Common Name	Federal Status	State Status	CNPS Listing	Habitat Description / Blooming Period	Potential to Occur in the Action Area
<i>Spea (=Scaphiopus) hammondi</i> Western spadefoot toad	--	CSC	--	Occurs seasonally in grasslands, prairies, chaparral, and woodlands, in and around wet sites. Breeds in shallow, temporary pools formed by winter rains. Takes refuge in burrows.	Unlikely. No suitable habitat within or adjacent to the project site.
Birds					
<i>Agelaius tricolor</i> Tricolored blackbird	--	CSC	--	Nests in dense thickets of cattails, tules, willow, blackberry, wild rose, wheat and barley crops, and other tall herbs near fresh water.	Unlikely. Marginal riparian nesting habitat along Sacramento River banks. However, no suitable nesting habitat in the immediate vicinity of the project.
<i>Ardea alba</i> (nesting) Great egret	--	--	--	Colonial nester in large trees. Rookery sites located near marshes, tideflats, irrigated pastures and margins of rivers and lakes.	Low. No suitable nesting habitat in the immediate vicinity of the project. Potential for species to forage within or in the vicinity of the project.
<i>Ardea herodias</i> (nesting) Great blue heron	--	--	--	Colonial nester in tall trees, cliff sides and isolated marsh habitats.	Low. No suitable nesting habitat in the immediate vicinity of the project. Potential for species to forage within or in the vicinity of the project.
<i>Athene cunicularia</i> Western burrowing owl	--	CSC	--	Utilizes ground squirrel (or other mammal) burrows within open grasslands, prairies, savanna, or agricultural fields.	Moderate. Potential nesting habitat along the perimeter of agricultural fields and along the banks/levees of the Sacramento River.
<i>Branta hutchinsii leucopareia</i> Cackling (=Aleutian Canada) Goose	FD	--	--	Breeds in open or forested areas near water. Often found in wetlands, grasslands, or cultivated fields during migration.	Moderate. The CNDDDB (2011) records an occurrence near the project site. Marginal foraging habitat occurs in agricultural fields adjacent to project.
<i>Buteo swainsoni</i> Swainson's hawk	--	CT	--	Breeds in California's Central Valley. Winters primarily in Mexico. Typically nests in scattered trees or along riparian systems adjacent to agricultural fields or pastures.	Moderate. The CNDDDB (2011) records an occurrence near the project site. Suitable nesting habitat occurs within trees along the Sacramento River and within the Action Area. The Action Area also provides foraging for this species.
<i>Carduelis (Spinus) lawrencei</i> Lawrence's goldfinch	--	--	--	Dry grassy slopes with weed patches, chaparral, and open woodlands; nests in trees or shrubs.	Unlikely. No suitable habitat within or adjacent to the project site.
<i>Charadrius montanus</i> Mountain plover (wintering)	--	CSC	--	In California, winters in open short grasslands and plowed agricultural fields in the Central Valley and in foothill valleys west of San Joaquin Valley, and in Imperial Valley. Winters below 1000 m (3200 ft).	Unlikely. Project area is outside of known species range.
<i>Circus cyaneus</i> Northern harrier	--	CSC	--	Forages over open ground. Nests on ground in shrubby vegetation, usually at marsh edge in emergent wetland or along rivers or lakes, but also in grasslands, grain fields, or on sagebrush flats several miles from water.	Unlikely. Forages over open ground. Nests on ground in shrubby vegetation, usually at marsh edge in emergent wetland or along rivers or lakes, but also in grasslands, grain fields, or on sagebrush flats several miles from water
<i>Coccyzus americanus occidentalis</i> Western yellow-billed cuckoo	FC	CE	--	Nests in extensive riparian forests (at least 40 hectares).	Unlikely. Riparian area surrounding project site is highly fragmented.

**TABLE 3-1
SPECIAL STATUS SPECIES THAT MAY OCCUR IN THE PROJECT AREA**

Scientific Name Common Name	Federal Status	State Status	CNPS Listing	Habitat Description / Blooming Period	Potential to Occur in the Action Area
<i>Grus canadensis tabida</i> Greater sandhill crane	--	CSC	--	Open habitats, shallow lakes, and emergent wetlands. In winter also uses dry grasslands and croplands near wetlands.	Low. Potential foraging and roosting habitat within farm fields in the vicinity of the project, particularly rice fields and croplands near wetlands. Species is known to occur in the region during winter months.
<i>Laterallus jamaicensis coturniculus</i> California black rail	--	CT	--	Freshwater, brackish, or tidal salt marshes.	Unlikely. No suitable habitat within or adjacent to the project site. Project area is outside of known species range.
<i>Pandion haliaetus</i> Osprey	--	WL	--	Habitat varies greatly and usually includes adequate supply of accessible fish, shallow waters, open and elevated nest sites (10-60 feet in height), and artificial structures such as towers. Builds large platform stick nests near or in open waters such as lakes, estuaries, bays, reservoirs, and within the surf zone.	Moderate. Potential nesting habitat along the banks of the Sacramento River in the vicinity of the project.
<i>Plegadis chihi</i> White-faced ibis	--	CSC	--	Nest and forages in freshwater marshes and rivers, respectively.	Unlikely. No suitable nesting habitat within or adjacent to the project site.
<i>Riparia riparia</i> (nesting) Bank swallow	--	CT	--	Nests in holes dug in sandy cliffs and river banks near water.	Low. Potential nesting habitat along the banks of the Sacramento River in the vicinity of the project.
<i>Spinus lawrencei</i> Lawrence's goldfinch	--	--	--	Breeds in open oak or other arid woodland and chaparral, near water. Requires open woodland or shrubland, a nearby source of water, and forb and shrub seeds.	Unlikely. Project area is outside of known species range.
Mammals					
<i>Antrozous pallidus</i> Pallid bat	--	CSC	--	Prefers caves, crevices, hollow trees, or buildings in areas adjacent to open space for foraging. Associated with lower elevations in California.	Unlikely. No suitable roost or maternity sites occur in the immediate vicinity of the project.
<i>Dipodomys californicus eximius</i> Marysville California kangaroo rat	--	CSC	--	Needs friable soil, grass stages of chaparral. Only found in the area of the Sutter Buttes.	Unlikely. No suitable habitat within or adjacent to the project site.
<i>Lasiurus blossevillei</i> western red bat	--	--	--	Roosts primarily in trees, 2-40 feet above ground, from sea level up through mixed conifer forests. Prefers habitat edges and mosaics with trees that are protected from above and open below with open areas for foraging.	Unlikely. No suitable roost or maternity sites occur in the immediate vicinity of the project.
<i>Lasiurus cinereus</i> hoary bat	--	CSC	--	Prefers open habitats or habitat mosaics, with access to trees for cover and open areas or habitat edges for feeding. Roosts in dense foliage of medium to large trees. Feeds primarily on moths; requires water.	Unlikely. Limited roosting habitat within forested areas along the Sacramento River; however, dense foliage for roosting is not available in the Action Area.

**TABLE 3-1
SPECIAL STATUS SPECIES THAT MAY OCCUR IN THE PROJECT AREA**

Scientific Name Common Name	Federal Status	State Status	CNPS Listing	Habitat Description / Blooming Period	Potential to Occur in the Action Area
<i>Myotis ciliolabrum</i> western small-footed myotis	--	--	--	In association with steep limestone outcrops and talus slopes. Forages over a wide range of habitats, mostly open, arid wooded and brushy uplands near water. Seeks cover in caves, buildings, mines and crevices.	Unlikely. No suitable roost or maternity sites occur in the immediate vicinity of the project.
<i>Myotis yumanensis</i> Yuma myotis	--	--	--	Often near reservoirs, optimal habitats are open forests and woodlands with water sources to feed over. Roosts in buildings, trees, mines, caves, bridges, and rock crevices. Maternity colonies active May through July.	Unlikely. Limited roosting habitat within forested areas along the Sacramento River; however, dense foliage for roosting is not available in the Action Area.
<i>Perognathus inornatus inornatus</i> San Joaquin Pocket Mouse	--	--	--	Uses arid annual grassland, savanna, and desert scrub, with sandy washes, fine soils, and scattered vegetation between 1,100 and 2,000 feet in elevation.	Unlikely. Marginal vegetation along irrigation ditch and not within the required elevation range.
Invertebrates					
<i>Branchinecta conservatio</i> Conservancy fairy shrimp	FE	--	--	Lifecycle restricted to large, cool-water vernal pools with moderately turbid water.	Unlikely. No suitable habitat within or adjacent to the project site.
<i>Branchinecta lynchi</i> Vernal pool fairy shrimp	FT	--	--	Lifecycle restricted to vernal pools.	Unlikely. No suitable habitat within or adjacent to the project site.
<i>Lepidurus packardii</i> Vernal pool tadpole shrimp	FE	--	--	Found in vernal pools, swales, ephemeral drainages, stock ponds, reservoirs, or ditches.	Unlikely. No suitable habitat within or adjacent to the project site.
<i>Cicindela hirticollis abrupta</i> Sacramento Valley (Hairy-necked) tiger beetle	--	--	--	Larvae and usually adults occur on sand bars, sandy shores, flood scours etc. immediately associated with rivers. Requires fine sand that is damp at, or a few centimeters below, the surface, and sparse or absent vegetation. Habitats must also not be subject to inundation for more than a few days at a time.	Unlikely. The project site habitat conditions are not suitable for this species.
<i>Desmocerus californicus dimorphus</i> Valley elderberry longhorn beetle	FT	--	--	Breeds and forages exclusively on blue elderberry shrubs (<i>Sambucus mexicana</i>) below 3,000 feet in elevation.	Unlikely. No elderberry shrubs with stems measuring at least one inch in diameter occur within 100 feet of the Proposed Project/Action.
Vascular Plants					
<i>Astragalus tener</i> var. <i>ferrisiae</i> Ferris's milk-vetch	--	--	1B.1	Vernally mesic meadow and seeps, and sub alkaline flats in valley and foothill grasslands. 5-75 meters elevation / April-May	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Atriplex cordulata</i> Heartscale	--	--	1B.2	Chenopod scrub, alkali seasonal wetlands, and grassland. Often found in the sandy soils of alkaline flats and scalds in the Central Valley / April-October	Unlikely. No suitable habitat within the immediate vicinity of the project site.

**TABLE 3-1
SPECIAL STATUS SPECIES THAT MAY OCCUR IN THE PROJECT AREA**

Scientific Name Common Name	Federal Status	State Status	CNPS Listing	Habitat Description / Blooming Period	Potential to Occur in the Action Area
<i>Atriplex depressa</i> Brittlescale	--	--	1B.2	Chenopod scrub, valley and foothill grasslands, meadows and seeps / May-October	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Atriplex joaquiniana</i> San Joaquin saltbrush	--	--	1B.2	Chenopod scrub, valley and foothill grasslands, meadows and seeps / April-October	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Atriplex minuscula</i> Lesser saltscale	--	--	1B.1	Annual herb occurring in chenopod scrub, playas, and in valley and foothill grassland with sandy, alkaline substrate. Found at 15-200 meters elevation / May-October	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Atriplex persistens</i> Vernal pool smallscale	--	--	1B.2	Found in alkaline vernal pools, 10-115 m elevation / June-October	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Atriplex subtilis</i> Subtle orache	--	--	1B.2	Valley and foothill grassland up to 400 feet in elevation.	Unlikely. Project is outside of known species range. No records of species occurrence within Sutter County.
<i>Brasenia schreberi</i> Watershield	--	--	2.3	Freshwater marshes and swamps. 30-2200 m elevation / June-September	Unlikely. No suitable habitat within the immediate vicinity of the project site. No records of species occurrence within Sutter County.
<i>California macrophylla</i> Round-leaved filaree	--	--	1B.1	Valley grasslands and foothill woodlands, 0-3937 feet in elevation / March – May.	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Castilleja rubicundula</i> ssp. <i>rubicundula</i> Pink creamsacs	--	--	1B.2	Annual herb occurring in open areas of chaparral, in cismontane woodland, in meadows and seeps, and on serpentinite substrate in valley and foothill grassland. Found at 20-900 m elevation / April-June	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Centromadia parryi</i> ssp. <i>parryi</i> Pappose tarplant	--	--	1B.2	Vernally mesic, often alkaline sites in coastal prairies, meadows and seeps, coastal salt marshes, and valley and foothill grasslands. 2-420m.	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Chloropyron palmatum</i> Palmate-bracted bird's-beak	FE	CE	1B.1	Chenopod scrub, valley and foothill grassland, often alkaline sites.	Unlikely. No suitable habitat within the immediate vicinity of the project site. No records of species occurrence within Sutter County.
<i>Cuscuta obtusiflora</i> var. <i>glandulosa</i> Peruvian dodder	--	--	2.2	Freshwater marshes and swamps at 15-280 meters / July-October	Unlikely. No suitable habitat within the immediate vicinity of the project site. No records of species occurrence within Sutter County.
<i>Hibiscus lasiocarpus</i> var. <i>occidentalis</i> Rose mallow	--	--	1B.2	Marshes and freshwater swamps / June-September	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Lasthenia glabrata</i> ssp. <i>coulteri</i> Coulter's goldfields	--	--	1B.1	Annual herb occurring in coastal salt marshes and swamps, playas, and vernal pools. 1-1220 m elevation. / February-June	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Layia septentrionalis</i> Colusa layia	--	--	1B.2	Annual herb occurring in chaparral, cismontane woodland, and valley and foothill grassland on sandy, serpentine substrate. 100-1095 m elevation / April-May	Unlikely. No suitable habitat within the immediate vicinity of the project site.

**TABLE 3-1
SPECIAL STATUS SPECIES THAT MAY OCCUR IN THE PROJECT AREA**

Scientific Name Common Name	Federal Status	State Status	CNPS Listing	Habitat Description / Blooming Period	Potential to Occur in the Action Area
<i>Navarretia leucocephala</i> ssp. <i>bakeri</i> Baker's navarretia	--	--	1B.1	Annual herb occurring in cismontane woodland, lower montane coniferous forest, meadows and seeps, Valley and foothill grassland, and vernal pools / May-July	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Silene verecunda</i> San Francisco campion	--	--	1B.2	Perennial herb occurring in coastal bluff scrub, chaparral, coastal prairie, coastal scrub, and in Valley foothill grassland in sandy substrate. 30-645 m elevation / March-June (uncommon in August)	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Trichocoronis wrightii</i> var. <i>wrightii</i> Wright's Trichocoronis	--	--	2.1	Primarily associated with alkali floodplains of the San Jacinto River in association with Willows, Domino, and Traver soils.	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Wolffia brasiliensis</i> Brazilian watermeal	--	--	2.3	Shallow freshwater marshes and swamps at 30-100 meter elevation / April-December	Unlikely. No suitable habitat within the immediate vicinity of the project site.

SOURCE: USFWS (12/2011), CDFG (12/2011), CNPS (12/2011).

Notes:

The "Potential for Effect" category is defined as follows:

Unlikely:	The project site and/or immediate area do not support suitable habitat for a particular species. Project site is outside of the species known range.
Low Potential:	The project site and/or immediate area only provide limited habitat for a particular species. In addition, the known range for a particular species may be outside of the Proposed Project/Action Area.
Moderate Potential:	The project site and/or immediate area provide suitable habitat for a particular species.
High Potential:	The project site and/or immediate area provide ideal habitat conditions for a particular species.

Species that have medium or high potential to be impacted by the proposed project are shown in boldface type.

STATUS CODES:

FEDERAL:

FE	=	Listed as "endangered" under the federal Endangered Species Act
FT	=	Listed as "threatened" under the federal Endangered Species Act
FSC	=	NMFS designated "species of concern"
FPD	=	Proposed delisted
FD	=	Delisted

STATE:

CE	=	Listed as "endangered" under the California Endangered Species Act
CT	=	Listed as "threatened" under the California Endangered Species Act
CSC	=	California Department of Fish and Game designated "species of special concern"
CFP	=	California Department of Fish and Game designated "fully protected"
WL	=	California Department of Fish and Game designated "watch list"

CNPS:

List 1B	=	Plants rare, threatened, or endangered in California and elsewhere
List 2	=	Plants rare, threatened, or endangered in California, but more common elsewhere
List 3	=	Plants about which we need more information--a review list
List 4	=	Plants of limited distribution--a watch list

North American Green Sturgeon

Sturgeon are an anadromous fish species, spending the majority of their life in marine waters and then moving into freshwater throughout the fall and winter to spawn in the spring. Upon hatching the young green sturgeon develop in the fresh water and are known to return to the ocean within one to four years (COSEWIC, 2004). Historically, green sturgeon were found in the lower reaches of the San Joaquin River and Delta. Today, they occur in the upper Sacramento River and tributaries to the Sacramento River including the Feather, Yuba and American Rivers. Green sturgeon are frequently caught along the coast; but are present in limited numbers in the estuaries (COSEWIC, 2004).

Green sturgeon have diverse habitat needs ranging from freshwater streams, rivers, estuarine habitat as well as marine waters depending upon their life stage. The specific habitat requirements for green sturgeon are poorly understood but are thought to resemble those of white sturgeon. Green sturgeon spawning is thought to occur in deep pools in areas of large cobbles, but can range from clean sand to bedrock in turbulent river mainstems. The larger eggs and higher growth rates of developing green sturgeon in comparison to white sturgeon suggest that a higher oxygen demand may be required for proper embryonic development. Therefore, green sturgeon may subsequently require colder, cleaner water for spawning relative to white sturgeon (COSEWIC, 2004).

On April 7, 2006, National Oceanic and Atmospheric Administration /U.S. National Marine Fisheries Service (NMFS) listed the Southern Distinct Population Segment (DPS) of the North American green sturgeon as threatened. Final Critical Habitat for the green sturgeon was designated on October 9, 2009.

Central Valley Steelhead

The Sacramento and San Joaquin Rivers offer the only migration route to the drainages of the Sierra Nevada and southern Cascade mountain ranges for steelhead. Information on migration and spawning tendencies of steelhead is difficult to determine due to the low abundance of spawners and the high flows and turbid waters occurring during winter spawning periods. NMFS reports limited data on the recent abundance of this evolutionarily significant unit (ESU), but its present total run size based dam counts, hatchery returns, and past spawning surveys is probably less than 10,000 fish (NMFS, 1996). The most widespread run type of steelhead is in the winter (ocean-maturing) steelhead. Winter steelhead occurs in essentially all coastal rivers in California, while summer steelhead is far less common. In California, both winter and summer steelhead generally begin spawning in December. Spawning occurs December through April in the Sacramento River mainstem and tributaries. Eggs are buried by the females in the loose gravel, usually at the lower end of a pool. Newly hatched larvae initially stay in the gravel nesting area until their yolk sacs are absorbed (about two weeks) and then move into adjacent shallow and quiet pools. Juvenile steelhead remain in freshwater streams from one to three years before entering the ocean. Downstream migration predominantly occurs during fall and spring. Generally, steelhead will return to their natal streams in one to three years.

Adult steelhead typically migrate upstream within the Sacramento River during the winter (November - January) to spawning areas upstream of the proposed diversion location and juvenile smolts migrate downstream during the spring (March – May). Steelhead inhabit the upper Sacramento River and occur seasonally in the vicinity of the proposed diversion location. Within the immediate vicinity of the Proposed Project/Action, there is limited quality juvenile rearing habitat (riverine aquatic habitat) in the Sacramento River. Areas of shaded riverine aquatic are most likely to provide rearing habitat. Riparian habitat occurring along the river banks in the area provides more suitable rearing opportunities, and is located at the existing Drexler Diversion and west of the Grimes canal within the Action Area.

On September 2, 2005, NMFS issued the final designated critical habitat for Central Valley steelhead. The project area is located within the Colusa Basin Hydrologic Unit (5520) of Critical habitat for Central Valley steelhead. This unit includes the Sacramento River upstream to and including: Tisdale Bypass, Butte Creek, Butte Slough, Nelson Slough, Sacramento Slough, Sutter Bypass, Colusa Bypass, Little Chico Creek, and Little Dry Creek.

Central Valley Spring-Run Chinook Salmon

Chinook salmon runs (fall-run, late fall-run, winter-run, and spring-run) are named for the time of season that upstream spawning migration occurs, and are defined by the combined timing of adult migration, the amount of time juveniles reside in a stream, and the time of year the smolts migrate out to sea. Timing of adult upstream migration varies within individual runs depending upon the region (Yoshiyama, 1998). Central Valley spring-run Chinook enter the Sacramento River system from March to July, and spawning occurs from late August through early October (Yoshiyama, 1998). Due to the longer period of time between upstream migration and spawning, spring-run Chinook must hold out in the cold temperatures of mountain headwaters to avoid excessive summertime temperatures of the valley and foothills. Spring-run ascent to mountain elevations can only be accomplished if there are no obstructions within the drainage system preventing passage.

Life histories (migration, holding, spawning, rearing, and juvenile emigration) of Chinook salmon vary within the separate runs, but essential habitat requirements including substrate, temperature, dissolved oxygen, stream flow, and water quality are consistent throughout the runs. Chinook salmon require a water temperature from 43° to 56° F to successfully spawn (Boles, 1988). Spawning can occur in habitats ranging from small tributaries to large river beds, and generally requires coarse gravel riffles. Chinook salmon eggs incubate in the gravel for approximately 35 to 50 days, depending on the temperature. The newly emerged fry remain in the gravel until most of the yolk sac is absorbed.

Successful rearing of juvenile Chinook requires cool streams/ivers with significant vegetative cover providing shade for protection from predation. Emigration strategies within the Sacramento-San Joaquin system can vary depending on the time of emergence. Spring-run emigration timing is dependant upon the tributaries of origin, and can occur through the period of November through June. Based upon Butte Creek research conducted by CDFG, over 95% of spring-run emigrate as

fry/young-of-the-year. Only a small portion of the population will over-summer emigrating the subsequent fall as yearlings (McReynolds et al., 2006).

Sacramento River Winter-Run Chinook Salmon

Winter-run Chinook salmon generally begin migrating upstream from December through February and hold-over in the river system (Sacramento River) for a couple of months before peak spawning occurs between May and July (Groot 1998). Temperatures must be suitable for the winter-run to hold over. Winter-run Chinook emigration to the Delta has been known to occur from November through April, after only four to seven months of river life (Groot 1998). Juveniles may exhibit a sustained residence in the middle or lower Sacramento River or Upper Delta prior to seaward migration.

Adult winter-run typically migrate to spawning areas upstream of the proposed diversion location, and occur seasonally in the vicinity of the proposed diversion location. In the immediate vicinity of the proposed new diversion location, suitable winter-run Chinook rearing habitat does not occur.

Critical habitat for the endangered Sacramento River winter-run Chinook ESU was designated on June 16, 1993. Critical habitat is designated to include the Sacramento River from Keswick Dam, Shasta County (River Mile 302) to Chipps Island (River Mile 0) at the westward margin of the Sacramento-San Joaquin Delta, all waters from Chipps Island westward to Carquinez Bridge, including Honker Bay, Suisun Bay, and Carquinez Strait, all waters of San Pablo Bay westward of the Carquinez Bridge, and all waters of San Francisco Bay (north of the San Francisco/Oakland Bay Bridge) from San Pablo Bay to the Golden Gate Bridge. Major river basins containing spawning and rearing habitat for this ESU comprise approximately 9,329 square miles in California.

Adult winter-run typically migrate to spawning areas upstream of the proposed diversion location, and occur seasonally in the vicinity of the proposed diversion location. In the immediate vicinity of the proposed new diversion location, suitable winter-run Chinook rearing habitat does not occur.

Giant Garter Snake

Giant garter snake preys primarily on aquatic species such as fish and amphibians. Generally active from April through September, the giant garter snake breeds from March into May, and again briefly in September. Young are brooded internally by females, who give birth to 10 to 46 (average is 23) live young from late July into September. Young disperse into dense cover and reabsorb their yolk sacs, then begin feeding on their own. They reach sexual maturity in three to five years. From early October to April, the giant garter snake takes refuge in winter retreats and is generally not active (USFWS, 1999).

The giant garter snake is endemic to wetlands of California's Central Valley. This snake inhabits irrigation and drainage canals, rice lands, marshes, sloughs, ponds, small lakes, low-gradient streams, and adjacent uplands. The snake requires enough water during their active season to maintain high densities of prey; emergent wetland vegetation for cover and foraging; and adjacent uplands and openings in streamside vegetation for basking sites. Higher uplands are used for cover and refuge

from floodwaters during their non-active season. The giant garter snake is typically absent from wetlands with sand, gravel, or rock substrates, and from riparian woodlands.

The giant garter snake population was probably always disjunct, with a southern population occurring from the vicinity Buena Vista Lake in Kern County to Merced County, and a northern population occurring from San Joaquin County to Butte County. To the east and west, the populations were probably confined by the foothills of the Sierra Nevada Mountains and the Coast Ranges. There are 13 separate populations presently recognized by the USFWS, coinciding with historic flood basins and tributary streams in the Central Valley (USFWS, 1999). These populations are discontinuously distributed from the Fresno area in the south to Butte Creek in the north. Dispersal corridors do not exist between the populations.

Giant garter snakes have been recorded in one location near the Proposed Project/Action Area. The record dates back to 1983 and is approximately six miles southwest of the Proposed Project/Action Area (CNDDDB, 2011). No giant garter snakes were observed during field reconnaissance for this project; however, given the cryptic and evasive nature of this species, determination of presence more often relies on the habitat characteristics, the most current information about the extant range of the species, surrounding locality records, and the biology and ecology of the giant garter snake.

Agricultural land use within the region generally provides suitable giant garter snake habitat, with abundant rice fields and associated irrigation ditches, rodent burrows for upland refugia, and open upland areas for basking. Within the project area, there are several types of drainage ditches that border various types of crops and in rice fields as well. Available emergent or aquatic vegetation for cover and basking varies with each ditch, the season, and the operations of MFWC. Also, installation of fish screens may reduce available fish prey for the giant garter snake by preventing fish entrainment into the irrigation system. Potential giant garter snake habitats are described in detail within the ASIP in Appendix B (see ASIP Section 3.1.5). Within the Action Area, all habitats within 200 feet of suitable giant garter snake aquatic habitat are considered either aquatic or upland habitat for the snake. However, upland areas that are covered by a walled structure such as a building or more than 200 feet from suitable aquatic habitat are generally not considered suitable habitat for giant garter snake.

Western Burrowing Owl

Western burrowing owls inhabit open grasslands and shrub lands with perches and burrows. These owls eat mainly insects, with small mammals, reptiles, and birds making up a portion of the diet as well. For cover and breeding, old rodent burrows, as well as debris piles are used. The western burrowing owl generally breeds from March through August, peaking in April and May.

In the Proposed Project/Action vicinity, potential nest/burrow sites occur along the adjacent agricultural fields as well as the exposed banks and levees of the Sacramento River and drainage canals.

Cackling (=Aleutian Canada) Goose

The cackling goose is a small, island-nesting subspecies of the Canada goose. This subspecies nests on the Aleutian Islands and winters in the Central Valley where it forages in meadows, agricultural fields, pastures, and moist grasslands near open water (lakes and ponds) and wetlands. The cackling goose was federal-listed endangered in 1967 due to a severe decline in populations. Hunting and loss of migration and wintering habitat contributed to this species' decline, although the introduction of Arctic and red foxes to the breeding islands was the main reason for population decline. However, due to reintroductions of wild geese onto fox-free islands and other conservation efforts, populations of cackling goose have recovered from approximately 6,300 individuals in 1989 to 37,000 individuals in 1999 (Kraege, 2005). The cackling goose was reduced to federal-listed threatened status in 1989, and finally delisted in 2001 (FR 66:54, 15642-15656, March 2001). Monitoring of goose populations will continue for 5 years after delisting, as required by the Endangered Species Act to ensure full recovery of the species. The cackling goose is still protected under the Migratory Bird Treaty Act, and is a federal species of concern.

Within the Proposed Project/Action Area, suitable foraging habitat exists in the surrounding agricultural fields along the Sacramento River and the MFWC Service Area. The only occurrence in the CNDDDB (2011) is from 1978, documenting this species at Davis Ranch, 5 miles north of Grimes and within two miles of the MFWC service boundary.

Swainson's Hawk

The Swainson's hawk is a migratory raptor listed as threatened by the State of California, and federally as a species of special concern. It breeds in western North America and winters for the most part in South America. It nests in trees, usually in riparian areas, but forages over pasturelands and open agricultural fields. In the Central Valley it is associated with riparian corridors adjacent to field crops and grasslands and subsists largely on small mammals, especially California vole, California ground squirrel, and large insects. Suitable foraging habitat within an energetically efficient flight distance from active Swainson's hawk nests has been found to be of great importance. Because the prey base for Swainson's hawk is highly variable from year to year, depending on cycles of agriculture, rainfall, and other natural cycles, large acreages of potential foraging habitat must be allotted per breeding pair.

The decline of the species in the Central Valley has been associated with extensive reduction of Swainson's hawk habitat. Suitable foraging habitat is present within the Proposed Project/Action Area in agricultural fields, where populations of prey species are supported. Suitable nesting habitat occurs within the riparian woodland habitats adjacent with the Proposed Project/Action site. Large valley oak and cottonwood trees occur adjacent to the river on the bank opposite from the proposed intake structures and fish screens. The most recent CNDDDB (2011) occurrence for Swainson's hawk within the MFWC service boundary was observed in 1989 within riparian forest along the Sacramento River, approximately 0.5-mile north of Grimes. Within two miles of the MFWC service area, an active nest was observed in a strip of riparian forest on the north bank of the Sacramento River, east of Colusa. One active nest was observed in 2003, located on the west side of the Sacramento

River at Twenty Mile Bar, 2.3 miles north of Grimes. The active nest was approximately 0.5 miles south of the existing Drexler Diversion and Pumping Plant.

Osprey

The osprey is a migratory raptor that occurs in northern California from Cascade Ranges south to Lake Tahoe and along the coast south to Marin County. The osprey arrives in California around mid-March to early April and begins breeding activities until September. Ospreys use large trees, snags, and dead-topped trees in open forest habitats for cover and nesting. Nests are platforms of sticks located high above ground, sometimes reaching as much as 250 feet tall. Breeding population was estimated in 1975 at 350-400 pairs in Northern California; numbers of breeding pairs have increased in recent years (Zeiner et al., 1988-1990).

The osprey preys primarily on fish; sometimes mammals, birds, reptiles, amphibians, and invertebrates. This species require open, clear waters for foraging. Suitable foraging habitat includes rivers, lakes, reservoirs, bays, estuaries, and surf zones (Zeiner et al., 1988-1990).

In the general Proposed Project/Action Area there is potential for nesting along the banks of the Sacramento River. There are no CNDDDB occurrences of osprey within the MFWC service area.

Bank Swallow

The bank swallow is the smallest North American swallow, with a body length of about 4.75 inches. The bank swallow nests in colonies and creates nests by burrowing into vertical banks consisting of fine-texture soils. Bank swallows breed in California from April to August and spend the winter months in South America. Currently, bank swallows are locally common only in restricted portions of California where sandy, vertical bluffs or riverbanks are available for the birds to dig their burrows and nest in colonies. Most of California's remaining populations nest along the upper Sacramento River where it still meanders in a somewhat natural manner. In this alluvial plain, the river system provides suitable soil types and erosion needed for prime nesting habitat. Seventy-five percent of the State's population is concentrated on the banks of Central Valley streams, including several colonies on the Sacramento River.

Since 1900, the range of bank swallows in California has been reduced by approximately 50 percent largely attributed to habitat loss. The rip-rapping of natural stream banks is the single most serious, human-caused threat to the long-term survival of the bank swallow in California. Existing colonies and areas of potential habitat may be lost over the next several years if current planning is implemented. Rip-rap installed by the U.S. Corps of Engineers (Corps) under the Sacramento River Bank Protection Project has already affected almost 150 miles of Sacramento River bank since 1960. Additional rip-rap proposed under this project may result in extensive loss of essential, eroding bank habitat.

On the Sacramento River, bank swallow populations continue to decline. Based on an average occupancy rate of about 45 percent of all burrows dug into river banks, an estimated population of 13,170 pairs of bank swallows nested in Sacramento River habitats in 1986. In 1998 the population reached its lowest level of 4,990 pairs and then rebounded dramatically in 1999 to 8,210 pairs

regaining some habitat from which it was extirpated (in 1998) on the lower end of its Sacramento River range. The significance of the apparent turnaround may not be known for a few years if it continues. The 1999 result may be a beginning of an expanding population boom for the species or just a momentary upswing. Further monitoring will be necessary to determine the true population trend, if any. Currently, the status of the bank swallow is still considered declining (CDFG, 2000).

In the general Proposed Project/Action Area there is potential for nesting along the banks of the Sacramento River. The CNDDDB documents two occurrences of bank swallow within the MFWC service area. The most recent observation is from 1987; approximately 0.5-mile north of Grimes a colony of bank swallows was observed nesting in the river bank. There are three more observations, dated 1986-1987, of nesting colonies within two miles outside of the MFWC service area. The bank swallow prefers steep, open cliff-like banks for nesting. However, at the location of the proposed Meridian diversion and pumping plant, the shore slopes gradually up to the levee and is largely vegetated with annual grasses.

3.5 Cultural Resources

3.5.1 Prehistory

Central California archaeology has been described as a series of patterns. Fredrickson (1973) defines pattern as an essentially nontemporal, integrative cultural unit — the general life way shared by people within a given geographic region. Specifically, three such patterns which overlap somewhat in adjoining areas are recognized for central California: the Windmill, Berkeley, and Augustine Patterns.

The Windmill Pattern, which may represent the advent of early Penutian speaking populations extends from approximately 4,500 to 3,000 B.P. This pattern was focused primarily on the lower Central Valley and Delta regions and reflects the influence of a lacustrine or marsh adaptation. This economic stance may have preadapted them for the environment of the lower Sacramento-San Joaquin Valley and Delta and may have entered the region with this adaptation more or less fully developed.

The Berkeley Pattern extends roughly from 3,000 to 1,500 B.P. and became more widespread or at least more archaeologically visible than the antecedent complex. The Berkeley Pattern has a greater emphasis on the exploitation of the acorn as a staple. The Berkeley Pattern initially may represent the spread of proto Miwok and Costanoans, collectively known as Utians, from their hypothesized lower Sacramento Valley/Delta homeland.

The last complex in this sequence is the Augustine Pattern which extended temporally from circa 1,500 B.P. to European contact. Augustine initially appears to be largely an outgrowth of the Berkeley Pattern but may have become a blend of Berkeley traits with those carried into the state by the migration of Wintuan populations from the north (Moratto, 1984).

3.5.2 Ethnographic Background

The project area was once inhabited by the Patwin Indians, who held an extensive region within north-central California. Patwin territory included the lower portion of the west side of the Sacramento Valley west of the Sacramento River from about the location of the town of Princeton in the north to Benicia in the south (Kroeber, 1925). The Patwin were bounded to the north, northeast, and east by other Penutian-speaking peoples (the Nomlaki, Wintu, and Maidu, respectively), and to the west by the Pomo and other coastal groups. Within this large territory, the Patwin have traditionally been divided into River, Hill and Southern Patwin groups, although in actuality a more complex set of linguistic and cultural differences existed than is indicated by these three geographic divisions. Near the project area, the Patwin are believed to have reached the Carquinez/Suisun area by about 1,500 B.P. (Whistler, 1977; McCarthy, 1985).

As with most of the hunting-gathering groups of California, the “tribelet” represented the basic social and political unit. Typically, a tribelet chief would reside in a major village where ceremonial events were also typically held. The status of such individuals was inherited patrilineally among the Patwin, although village elders had considerable power in determining who actually succeeded to particular positions. The chief’s main responsibilities involved administration of ceremonial and economic activities. Such individuals often decided when and where various fishing, hunting or gathering expeditions would occur, and similarly made the critical decisions concerning the more elaborate ceremonial activities. He also played a central role in resolving conflicts within the community or during wars which occasionally broke out with neighboring groups. Apparently, a Patwin chief had more authority than his counterparts among many of the other central California groups (McKern, 1922; Kroeber, 1925).

The onslaught of Euro-American culture brought the end of Patwin culture. By 1871–72, when Stephen Powers surveyed the state gathering ethnographic information, the Patwin culture appeared to him to be virtually extinct.

3.5.3 Historic Setting

The first European to see the Sutter Buttes was Gabriel Moraga, a Spaniard trying to locate mission sites in 1808. Another Spaniard, Luis Arguello, led an expedition in 1817 to explore Northern California by water and called the Buttes *Los Picacho* or “the peaks.” He also named the Feather River *El Rio de las Plumas*, due to the quantities feathers he observed in the river. In 1828, the renowned mountain man Jedediah Smith trapped in the vicinity of the Buttes. It was in 1833 a brigade of French fur trappers from the Hudson Bay Company first referred to these mountains as the “buttes.” This group is purportedly responsible for the introduction of the small pox virus to the Native American population. This had a decimating effect on the local indigenous populations (Sutter County, 1996).

The town of Meridian was founded in 1852 by Lewis O’Neill who built a crude cabin to the south of present-day Main Street. In 1857, a settler named John F. Fouts came to Meridian and, in 1860, established a ferry over the Sacramento River. By 1862, the settlement became known as Fout’s

Ferry. “However, W. C. Smith arrived and the growing town was renamed Meridian, being barely one-fourth mile from the Meridian Line of the U.S. Survey of California, which stretches from Mt. Diablo baseline through the Sacramento Valley. In 1879 there were 120 residents of the town which was a regular stop for the stage and mail pick-up station between Marysville and Colusa which continued through the early 1900’s with the addition of the Sacramento Northern Railroad line. Meridian was also the center for riverboats to load and unload cargo for the rich farming area” (Sutter County, 1996).

The Sacramento Valley remained relatively isolated and sparsely populated until the advent of the Gold Rush period. But, with Sacramento’s proximity to mining areas, and its accessibility to maritime traffic, the area quickly became a trading and economic center. Sutter County itself experienced little mining, but was attractive for its agricultural potential and was primarily settled by former miners who became interested in agriculture after 1860. The burgeoning commerce along the Sacramento River encouraged continued population growth, with many of the miners and farmers settling along the natural levees of the Sacramento River. The settlements recognized that the active flood plain deposited fertile soils in the lands nearest to the river, which supported bountiful crops and provided easy access to transportation corridors along the river itself. When floods continued to beset agricultural activities in the area, a comprehensive flood control plan was designed and implemented by 1912 and irrigation projects were initiated and continue to the present time.

3.5.4 Known Cultural Resources

The effort to identify cultural resources in the area of the Proposed Project/Action included a cultural resources records search, contacts with Native Americans, and a field reconnaissance conducted by Registered Professional Archaeologists. The records search, which consisted of a review of all pertinent survey and site data was conducted at the Northeast Information Center at California State University, Chico on April 7, 2004 (IC File # D04-20). The records were accessed by utilizing the Meridian and Grimes USGS 7.5-minute quadrangle maps, T14N, R1E; T15N, R1E; and T15N, R1W in Sutter County. The review included the Proposed Project/Action footprint (proposed pump locations, existing pump locations, and proposed pipelines and canals) as well as a ¼ mile around the Proposed Project/Action locations. The records search included a review of the Directory of Properties in the Historic Property Data File for Sutter County for information on sites of recognized historical significance within the National Register of Historic Places, the California Register of Historic Resources, the California Inventory of Historic Resources (1976), the California Historical Landmarks (1996), and the California Points of Historical Interest (1992). The records search indicated that no archaeological or historical resources have been previously recorded within the boundaries of the Proposed Project/Action, but that most of the area has not been previously inspected for the presence of these resources. The records search also indicated that one historical resource (the Meridian Railroad Depot) has been recorded within ¼ mile of the Proposed Project/Action.

The Native American Heritage Commission was contacted on March 11, 2004 and again on November 7, 2007 to request a search of their Sacred Lands File and for a list of Native Americans that should be contacted concerning the Proposed Project/Action. A letter was sent to each individual

or organization on the list on March 26, 2004 and again in November, 2007. To date, no responses have been received.

An archaeological field inspection of the project area was conducted on May 7, 2004 by two ESA Registered Professional Archaeologists. The surface of the locations of proposed pump facilities, existing pump facilities that would be removed, and proposed pipeline and canal alignments were inspected using systematic survey transects spaced approximately 10 to 15 meters apart. Segments of the existing canal that will be rehabilitated were inspected using cursory survey techniques.

The cultural resources field reconnaissance conducted for the Proposed Project/Action resulted in the identification of no potentially significant historical or archaeological resources in the project area. A small, concrete-lined irrigation canal extending south from the existing Meridian pumping facility was noted. Although an exact date of construction of this canal is not known, available information indicated that it was built in 1964 (Hargrove Personal Communication) and is not yet 50 years old. Other existing facilities that were examined included the existing Meridian pumping facility, also built in 1964; the existing Drexler pumping facility, a minimal structure which was moved to its present location; and the existing Grimes pumping facility, also a minimal structure that has been modified several times since its original construction in the 1920s. No archaeological remains were identified as a result of the field reconnaissance.

On January 23, 2008, Reclamation initiated National Historic Preservation Action (NHPA) Section 106 Consultation with the California State Historic Preservation Officer (SHPO). Reclamation concluded that both Phase 1 and Phase 2 of the Proposed Project/Action would not result in an affect to historic properties. On February 5, 2008, SHPO concurred with these findings.

3.6 Geology, Soils, and Seismicity

Published geologic mapping indicates that the project area is underlain by Quaternary age natural levee and river deposits within the floodplain of the Sacramento River. No faults are shown on published mapping to pass through the project area. The nearest mapped faults are the Coast Ranges-Sierran Block Boundary Zone (or Great Valley fault) to the west and elements of the Foothill fault system to the east. The project area is within Seismic Zone 3 and peak ground acceleration is anticipated to be 0.14g with 10 percent chance of exceedance in 50 years (MWH, 2008).

Soils encountered in the test borings consist mostly of clay with silty and sandy zones – identifiable with Sacramento River basin deposits. The consistency of these soils is typically soft to stiff with relatively common zones of very soft consistency and one occasion of “hard” materials. In sandy zones, native soils were found to be persistently very loose. Soils along the project area are considered adequately stable and capable of supporting the proposed improvements. No site specific geologic hazards (landslides, active faults, etc.) are indicated. The primary geotechnical considerations for design and construction are expected to include shallow groundwater and the potential compressibility, low strength and shrink/swell characteristics of native soils (MWH, 2008).

3.7 Greenhouse Gas Emissions/Climate Change

Gases that trap heat in the atmosphere are referred to as greenhouse gases (GHGs) because they capture heat radiated from the sun as it is reflected back into the atmosphere, similar to a greenhouse. The accumulation of GHGs has been implicated as a driving force for Global Climate Change. Definitions of climate change vary between and across regulatory authorities and the scientific community, but in general can be described as the changing of the earth's climate caused by natural fluctuations and the impact of human activities that alter the composition of the global atmosphere. Both natural processes and human activities emit GHGs. Global Climate Change is a change in the average weather on earth that can be measured by wind patterns, storms, precipitation and temperature. Although there is disagreement as to the speed of global warming and the extent of the impacts attributable to human activities, the vast majority of the scientific community now agrees that there is a direct link between increased emission of GHGs and long term global temperature. Potential global warming impacts in California may include, but are not limited to, loss in snow pack, sea level rise, more extreme heat days per year, more high ozone days, more large forest fires, and more drought years. Secondary effects are likely to include a global rise in sea level, impacts to agriculture, changes in disease vectors, and changes in habitat and biodiversity. GHG impacts are considered to be exclusively cumulative impacts; there are no non-cumulative GHG emission impacts from a climate change perspective (California Air Pollution Control Officers Association, 2008).

Carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O) are the principal GHGs, and when concentrations of these gases exceed natural concentrations in the atmosphere, the greenhouse effect may be enhanced. CO₂, CH₄ and N₂O occur naturally, but are also generated through human activity. Emissions of CO₂ are largely by-products of fossil fuel combustion, whereas CH₄ results from off-gassing associated with agricultural practices and landfills. Other human generated GHGs, which have much higher heat-absorption potential than CO₂, include fluorinated gases such as hydrofluorocarbons (HFCs), perfluorocarbons (PFC), and sulfur hexafluoride (SF₆) which are byproducts of certain industrial processes. The effect each GHG has on climate change is measured as a combination of the volume of its emissions, and its global warming potential (GWP),¹ and is expressed as a function of how much warming would be caused by the same mass of CO₂. Thus, GHG emissions are typically measured in terms of pounds or tons of CO₂e.

3.8 Hazards/Hazardous Materials

Information about hazardous materials sites in the Proposed Project Area was collected by conducting a review of the California Environmental Protection Agency's (Cal EPA) Cortese List Data Resources (Cortese List). The Cortese list includes the following data resources that provide information regarding the facilities or sites identified as meeting the Cortese list requirements: the list of Hazardous Waste and Substances sites from Department of Toxic Substances Control (DTSC) EnviroStor database; the list of Leaking Underground Storage Tank (LUST) sites from GeoTracker database; the list of solid waste disposal sites identified by Water Board; the list of active Cease and Desist Orders and Cleanup and Abatement Orders from Water Board; and the list of hazardous waste

¹The potential of a gas or aerosol to trap heat in the atmosphere.

facilities subject to corrective action pursuant to Section 25187.5 of the Health and Safety Code identified by DTSC. The Cortese List is a reporting document used by the state, local agencies, and developers to comply with CEQA requirements in providing information about the location of hazardous materials release sites. The Cortese List is updated at least annually, in compliance with California regulations (California Code Section 65964.6(a)(4)). The Cortese List includes federal superfund sites, state response sites, non-operating hazardous waste sites, voluntary cleanup sites, and school cleanup sites.

Only one open site was found within one mile of the Proposed Project/Action. The site is listed as inactive. Potential contaminants of concern are listed as: other inorganic/salt. Two other sites listed sites were related to leaking underground storage tanks (LUST); however, cleanup has been completed and the cases are now closed (DTSC, 2011).

3.9 Hydrology and Water Quality

MFWC received a License (No. 4676-B) from the State of California, State Water Rights Board in 1955 to divert water from the Sacramento River under the provisions of a License for Diversion and Use of Water. This license recognizes a priority date of September 10, 1918. The License, as amended in 1992, provides for the irrigation on approximately 9,150 acre service area, and allows for a diversion flow of 138 cfs from a period of about March 1 through about November 1. Historical monthly diversion usage for MFWC for the years 1982 to 2000 based upon the Water Account Record data as recorded by Reclamation indicate that diversion demands reach levels of 165 cfs on a short-term basis primarily due to the need to accommodate flood-up deliveries for rice fields and to meet peak short-term demands.

MFWC diverts water from the Sacramento River under the terms of a Contract for Project Water Service and Agreement on Diversion Water (Contract No. 14-06-200-838A) with Reclamation. The contract with Reclamation provides MFWC with a total annual water supply of 35,000 af, consisting of 23,000 af base supply and 12,000 af project water supply.

Surrounding land uses largely affect surface water quality, with both point-source and nonpoint-source discharges contributing contaminants to surface waters. A majority of the surrounding land area consists of agricultural land, vineyards and a small residential community to the south. Pollutant sources in residential areas include streets, roof tops, exposed earth at construction sites, automobiles and landscaped areas. Water quality impacts from construction are of particular concern. Grading for construction activity removes vegetation and exposes soil to erosion from wind and water. Erosion can result in sedimentation that ultimately flows into surface waters. Other contaminants in urban runoff include sediment, hydrocarbons, metals, pesticides, bacteria, and trash. Runoff from agricultural areas is characterized by constituents such as fertilizers, herbicides, and pesticides, and often contains bacteria, high nutrient content and dissolved solids.

3.10 Land Use and Land Use Planning

As depicted in **Figure 1-1** in Section 1, the project area is located in unincorporated Sutter County, between Interstate 5 and Highway 99, east of the Sacramento River and southwest of the Sutter Bypass. The overall project area covers the MFWC service areas near Meridian, Grimes, and Drexler. Access to the project area is provided via State Route (SR) 20 (see **Figure 2-1**). The Sacramento River depicts the western edge of the project area. Land use to the east of the Sacramento River is predominantly agricultural with scattered rural residences (see **Figure 2-1**). Denser residential clusters are located in the vicinities of Meridian and Drexler. The closest recreational facility to the Proposed Project/Action is Lovey's Landing located 2.7 miles north of Meridian on Levee Road along the Sacramento River. It provides recreational facilities including a boat launch ramp and RV campground (Sutter County General Plan, 2008).

3.11 Mineral Resources

The Sutter County Surface Mining Code and the Zoning Code provide for the extraction of mineral resources from unincorporated lands. The extraction of mineral resources in Sutter County has historically been limited to the extraction of clay, sand, soils, and rock. Construction aggregate, consisting primarily of sand, gravel, and crushed stone, is currently the County's main mining resource. No active mining operations are within the project area (Sutter County, 2008).

3.12 Noise and Vibration

Noise

Sound is mechanical energy transmitted by pressure waves through the air. Noise can be defined as unwanted sound. Sound is characterized by various parameters that include the rate of oscillation of sound waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude). In particular, the sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound level. The decibel (dB) scale is used to quantify sound intensity. Since the human ear is not equally sensitive to all frequencies within the entire spectrum, noise measurements are weighted more heavily within those frequencies of maximum human sensitivity in a process called "A-weighting," referred to as dBA. In general, a difference of more than three dBA is a perceptible change in environmental noise, while a five dBA difference typically causes a change in community reaction. An increase of 10 dBA is perceived by people as a doubling of loudness (USEPA, 1974).

Cumulative noise levels from two or more sources will combine logarithmically, rather than linearly. For example, if two identical noise sources produce a noise level of 50 dBA each, the combined noise level would be 53 dBA, not 100 dBA.

Time variation in noise exposure is typically expressed in terms of the average energy over time (L_{eq}), or alternatively, as a statistical description of the sound level that is exceeded over some fraction of a given period of time. For example, the L_{50} noise level represents the noise level that is exceeded 50 percent of the time – half the time the noise level exceeds this level and half the time

the noise level is less than this level. This level is also representative of the level that is exceeded 30 minutes in an hour. Similarly, the L_8 and L_{25} represent the noise levels that are exceeded eight and 25 percent of the time, respectively, or for five and 15 minutes during a 1-hour period, respectively.

Several methods have been devised to relate noise exposure over time to human response. The Day-Night Noise Level (L_{dn}) is a 24-hour L_{eq} that adds a 10 dBA penalty to sounds occurring between 10 PM to 7 AM to account for the increased sensitivity to noise events that occur during the quiet late evening and nighttime periods. A commonly used noise metric for this type of study is the Community Noise Equivalent Level (CNEL). The CNEL, originally developed for use in the California Airport Noise Regulation, adds a five dBA penalty to noise occurring during evening hours from 7 PM to 10 PM, and a 10 dBA penalty to sounds occurring between the hours of 10 PM and 7 AM to account for the increased sensitivity to noise events that occur during the quiet late evening and nighttime periods. Thus, the CNEL noise metric provides a 24-hour average of A-weighted noise levels at a particular location, with an evening and a nighttime adjustment, which reflects increased sensitivity to noise during these times of the day.

Vibration

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. There are several different methods that are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe vibration impacts to buildings. The root mean square (RMS) amplitude is most frequently used to describe the affect of vibration on the human body. The RMS amplitude is defined as the average of the squared amplitude of the signal. Decibel notation (Vdb) is commonly used to measure RMS. The decibel notation acts to compress the range of numbers required to describe vibration (FTA, 2006). Typically, groundborne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration. Man-made vibration issues are therefore usually confined to short distances (i.e., 500 feet or less) from the source. Sensitive receptors for vibration include structures (especially older masonry structures), people (especially residents, the elderly and sick), and vibration sensitive equipment. Fragile buildings can be exposed to ground-borne vibration levels of 0.5 PPV without experiencing structural damage. The FTA measure of the threshold of architectural damage for conventional sensitive structures is 0.2 in/sec PPV. The human annoyance response level is 80 RMS.

3.13 Public Services

The Sutter County Sheriff's Department has the responsibility for providing law enforcement services to the unincorporated county area as well as being contracted to provide service to the City of Live Oak. The CHP provides traffic enforcement on all highways and roadways in the unincorporated area. Additional law enforcement services are provided to the county through the District Attorney's office. The Sutter County Sheriff's Department is authorized to staff 58 sworn deputies, 54 correctional officers, and 34 civilian staff (Sutter County, 2008).

The project area is within the Meridian Fire District, an independent district covering approximately 93 square miles providing fire protection to areas bounded by the Sacramento River, Tisdale Weir, Sutter Bypass and County Service Area-F. One fire station is located within this district. The Meridian Fire Station Number 65 is located in the community of Meridian and is a part time station staffed with 1 paid firefighter during the week. The station is supplemented with 18 or more volunteer firefighters during high fire season. Seven fire station vehicles are housed on site for use in the service area (Sutter County, 2008).

The project area lies within the Meridian Elementary School District. Elementary education (K-8) is provided for students within the district, at a single school. Following eighth grade, Meridian students attend middle school and high school in the Sutter Union High School District (Sutter County, 2008).

3.14 Recreation

The closest recreational facility to the project area is Lovey's Landing. The facility is approximately 2.7 miles north of Meridian on Levee Road along the Sacramento River. It provides recreational facilities such as a boat launch ramp and a RV campground (Sutter County General Plan, 2008). The Sacramento River provides for water recreation in the area.

3.15 Transportation and Traffic

State Routes 20, 99 and 113 provide regional access to the project area (Sutter County, 2008). State Route 20 is a two, four and six lane roadway which extends through Sutter County from Colusa County to Yuba County. This roadway is one of the two roadways that cross the Sacramento River in Sutter County. State Route 99 extends from the Sacramento County line north through Sutter County to the Butte County line. The roadway has two and four lanes over its length and provides regional access to the Sacramento metropolitan area in the south and the cities of Gridley and Chico in the north and beyond. State Route 113 within the county extends from the Yolo County line over the Sacramento River to SR 99 near the community of Tudor. This two-lane roadway is one of the two roadways that cross the Sacramento River in Sutter County. The project area is served locally by rural roadways. Rural Collectors typically serve intra-county rather than regional or statewide circulation needs. Their primary function is to provide access to adjacent properties and connections between rural local roads and other roadways that are higher in the classification hierarchy. Rural local roads provide access to adjacent properties and distribute traffic to rural collectors. They differ from their urban counterparts in their design cross section and location.

3.16 Utilities and Service Systems

Potable water in the project area is provided by groundwater sources. The groundwater is pumped by privately owned wells. Groundwater supplies provide adequate supply; however, the quality of the groundwater supplies is at risk. Two areas within the project area have elevated levels of naturally occurring arsenic. The groundwater around Meridian also has elevated levels of iron and manganese. Sutter County is currently preparing a groundwater management plan that will help

protect the County's groundwater resources. Wastewater within the project area is treated and disposed of through privately owned septic systems. Stormwater drainage is provided by open channel systems. Minor flooding may occur rarely and flood damage from local runoff to homes and other structures occurs very rarely. Solid waste services are provided by the Yuba-Sutter Regional Waste Management Authority. The Ostrom Landfill is the primary disposal site for the County and has enough capacity to remain open through 2066 (Sutter County, 2008). PG&E provides electrical and gas services with the project area.

3.17 Indian Trust Assets

Indian Trust Assets (ITAs) are legal interests in property rights held by the United States for Indian Tribes or individuals. Trust status originates from rights imparted by treaties, statutes, or executive orders. ITAs are lands, including reservations and public domain allotments, minerals, water rights, hunting and fishing rights, or other natural resources, money or claims. Assets include real property, physical assets, or intangible property rights. ITAs cannot be sold, leased, or otherwise alienated without Federal approval. ITAs do not include things in which a tribe or individuals have no legal interest, such as off-reservation sacred lands or archaeological sites in which a tribe has no legal property interest. There are no ITAs within the vicinity of the project area.

3.18 Environmental Justice and Socioeconomics

Executive 12898 requires each federal agency to achieve environmental justice as part of its mission, by identifying and addressing disproportionately high and adverse human health on environmental effects, including social and economic effects of its programs, policies, and activities on minority populations and low-income populations of the United States. The Proposed Project/Action would involve the construction and operation of a replacement diversion system that would help protect and enhance the anadromous fisheries in the Sacramento River and ensure that MFWC continues to divert water from Sacramento River for irrigation purposes without regulatory restrictions. The Proposed Project/Action does not propose any features that would result in adverse human health or environmental effects, have any physical effects on minority or low-income populations, and/or alter socioeconomic conditions of populations that reside or work in the vicinity of the project site.

SECTION 4

Environmental Consequences/Initial Study

4.1 Introduction

The following sections describe effects of the Proposed Project/Action. To maintain consistency with the 2008 Meridian Farms Fish Screen Project IS/MND (2008 IS/EA), the format of this chapter is based on the CEQA Environmental Checklist; however this analysis also satisfied the requirements of NEPA. This Environmental Checklist identifies the project-specific effects of the Proposed Project/Action, and whether or not those effects were adequately addressed in the 2008 IS/EA. Consistent with CEQA Guidelines Section 15150, the 2008 IS/EA is incorporated by reference into this Environmental Checklist, including applicable environmental setting and impact analysis.

4.2 Public Agency Approvals

Detailed below are other public agencies whose approval is required prior to construction of the Proposed Project/Action. Types of approval include permits, financing approval, or participation agreement.

**TABLE 4-1
ANTICIPATED REGULATORY REQUIREMENTS AND PERMITS
FOR PROJECT IMPLEMENTATION**

Agency	Type of Approval
Federal Agencies	
U.S. Bureau of Reclamation	NEPA Lead Agency
U.S. Army Corps of Engineers	NEPA Lead Agency Clean Water Act Section 404 Permit Rivers & Harbors Act Section 10 Permit Federal Endangered Species Act compliance (Section 7)
U.S. Fish and Wildlife Service	Federal Endangered Species Act compliance (Section 7)
National Marine Fisheries Service	Federal Endangered Species Act compliance (Section 7)
State Agencies	
California Department of Fish & Game	CEQA Lead Agency State Endangered Species Act compliance, 2081 Incidental Take Permit Section 1600 Lake and Streambed Alteration Application, 1601 Streambed Alteration Agreement Consistency Determination or Incidental Take Permit

Central Valley Flood Protection Board	Encroachment Permit
Central Valley Regional Water Quality Control Board	National Pollutant Discharge Elimination System General Construction Storm Water Permit (Section 402)
	Clean Water Act Section 401 Water Quality Certification
	General Order for Dewatering and Other Low Threat Discharge to Surface Waters Permit
State Historic Preservation Office	National Historic Preservation Act Section 106
Local/Other Agencies	
Feather River Air Quality Management District	Authority to Construct
	Permit to Operate
County of Sutter	Building Permit
	County Road Encroachment Permit

4.3 Environmental Checklist

This Environmental Checklist is based on the checklist suggested in Appendix G of the CEQA Guidelines. The checklist has been adapted to assist in evaluating the environmental effects of the proposed project under CEQA and NEPA with respect to the analysis in the Phase 1 Meridian Farms Fish Screen Project IS/Ea as well as specific NEPA topics related to Indian Trust Assets, Environmental Justice, and Socioeconomic Effects.

Each environmental issue includes a discussion applicable 2008 IS/Ea mitigation measures; and discussion of environmental checklist items, including findings for potential project effects. The Environmental Checklist identifies potential project effects as corresponding to the following categories of environmental impacts:

- Potentially Significant Impact.** Adverse environmental consequence that has the potential to be significant according to the threshold criteria identified for each resource, even after mitigation strategies are applied. This classification also applies to adverse effects that could be significant and for which no mitigation has been identified. If any potentially significant impacts are identified, an Environmental Impact Report (EIR) and/or an Environmental Impact Statement (EIS) must be prepared to meet CEQA and/or NEPA requirements, respectively.
- Less-than-Significant Impact with Mitigation.** Adverse environmental consequence that has the potential to be significant, but can be reduced to less-than-significant levels through incorporation of mitigation measures adopted by the CDFG in the 2008 IS/Ea. MFWC would ensure that construction and operation of the Proposed Project/Action would be implemented consistent with the mitigation, monitoring and enforcement requirements of the 2008 IS/Ea Mitigation Monitoring and Reporting Program (MMRP) **AND/OR** new or modified mitigation measures would reduce potentially significant impacts to a less-than-significant level (Appendix A).
- Less-than-Significant Impact.** Adverse environmental consequence has been identified; however, the level of significance does not meet or exceed the significance threshold for that resource.

- **No Impact.** No adverse environmental consequences have been identified for the resource or the consequences are negligible, undetectable and/or not applicable.

4.3.1 Aesthetics

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
1. AESTHETICS — Would the project:				
a) Have a substantial adverse effect on a scenic vista?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d) Create a new source of substantial light or glare which would adversely affect daytime or nighttime views in the area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion

- a) **Less-than-Significant Impact.** The proposed improvements for the Proposed Project/Action are not located in areas within local or state-designated scenic vistas. Additionally, as the Proposed Project/Action would entail the consolidation of existing water diversion structures, views along the Sacramento River would not substantially change following project construction. In this context, the Proposed Project/Action would not result in substantial adverse impacts to a scenic vista and the impact would be less than significant.
- b) **No Impact.** The proposed improvements for the Proposed Project/Action are not located in close proximity to a state-designated scenic highway. Review of the 2010 Sutter County General Plan and Department of Transportation's list of designated scenic highways indicates that there are no officially designated scenic highways in Sutter County (DOT, 2012). For this reason, the Proposed Project/Action would not damage any scenic resources within a state highway and no impact would occur.
- c) **Less-than-Significant Impact.** Construction equipment and activities would be visible from the Sacramento River during construction of the Meridian Diversion and during demolition of the existing Meridian Diversion and Drexler diversion. Construction equipment and activities would also be visible from rural roads and agricultural areas during construction of all project facilities. However, construction would occur over no more than two seasons, and aesthetics impacts associated with construction activities would be temporary and less than significant.

Once completed, the new Meridian Diversion and Pumping Plant and Drexler re-lift Pumping Plant would be visible to the several residences located in the project vicinity. However, given that the project represents the consolidation of existing diversions structures, the overall visual character of the riverfront area of the project would experience a desired benefit. In this

context, the Proposed Project/Action would not substantially degrade the existing visual character or quality of the project area and the impact would be less than significant.

- d) **No Impact.** Given that the project would not include the installation of any exterior lighting and that any new internal lighting would be comparable to existing conditions, impacts resulting from light and glare would be less than significant.

4.3.2 Agricultural and Forest Resources

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
2. AGRICULTURAL AND FOREST RESOURCES —				
In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board.				
Would the project:				
a) 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?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Result in the loss of forest land or conversion of forest land to non-forest use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion

- a) **Less-than-Significant Impact.** With exception of the town of Meridian, the entire land base within the project area is designated as Prime Farmland according to Important Farmland maps prepared by the Department of Conservation (DOC, 2011). Project facilities that could affect local agricultural lands include the proposed Meridian Diversion and Pumping Plant located to the north of the town of Meridian, the new Drexler re-lift Pumping Plant, and the Drexler pipeline extension. Construction of the land-side Meridian Pumping Plant north of the town of Meridian in the southwest corner of a walnut orchard may require removal of two to five trees. The Drexler re-lift Pumping Plant would be located at the edge of an agricultural parcel and the Drexler pipeline extension would cross a small portion

of the agricultural land. However, the pipeline would be buried deep enough, where appropriate, so it would not preclude future agricultural activities. Other temporary construction related impacts to important farm land would be associated with materials staging areas. In these instances where temporary and permanent disruption to agricultural operations would occur, (MFWD) would compensate affected land owners in accordance with State and local laws and ordinances related to compensation for impacts to agricultural lands. As a result, the Proposed Project/Action would not result in the conversion of Prime Farmland to non-agricultural use and the impact would be less than significant.

- b) **No Impact.** The overall project area contains numerous agriculturally zoned properties as well as parcels listed under Williamson Act contracts. However, construction of permanent Proposed Project/Action facilities would be confined to existing disturbed facilities, including existing roadways, canal rights-of-way, and levees along the Sacramento River. For this reason, the Proposed Project/Action would not conflict with any existing Williamson Act Contracts and no impact would occur.
- c-e) **No Impact.** The Proposed Project/Action is not located in an area zoned as forest, timberland or used for timber production. Therefore, the Proposed Project/Action would not convert timber or forest lands to other uses or conflict with existing forest and timberland zoning. The Proposed Project/Action would continue to serve existing agricultural uses and would not result in the conversion of existing agricultural lands to non-agricultural use. As a result, there would be no conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use. No impact would occur.

4.3.3 Air Quality

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
3. AIR QUALITY —				
Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations.				
Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d) Expose sensitive receptors to substantial pollutant concentrations?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
e) Create objectionable odors affecting a substantial number of people?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

The following mitigation measures from 2008 IS/EA were adopted by CDFG and would mitigate air quality impacts associated with implementation of the Proposed Project/Action. CDFG and MFWC would ensure that construction and operation of the Proposed Project/Action would be implemented consistent with the mitigation, monitoring and enforcement requirements for the 2008 IS/EA MMRP (See Appendix A).

Mitigation Measure AIR-1. Implement FRAQMD Best Available Mitigation Measures For Construction Activity:

- (A) Implement PM₁₀ control measures outlined in the FRAQMD Fugitive Dust Control Plan.
- (B) MFWC shall require its construction contractor(s) to assemble a comprehensive inventory list (i.e., make, model, engine year, horsepower, 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 both Phases 1 and 2 construction activities and apply the following mitigation measure:

Reducing NOx emissions from off-road diesel powered equipment

MFWC or its construction contractor(s) 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 construction of Phases 1 and 2, including owned, leased and subcontractor vehicles, will achieve a project wide fleet-average 20 percent NOx reduction and 45 percent particulate reduction 1 compared to the most recent CARB fleet average at time of construction. A Construction Mitigation Calculator (MS Excel) may be downloaded from the SMAQMD web site to perform the fleet average evaluation <http://www.airquality.org/ceqa/index.shtml>.

Acceptable options for reducing emissions may include use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, perform offsite mitigation projects, provide funds for air district offsite mitigation projects, and/or other options as they become available. The District should be contacted to discuss alternative measures.

- (C) Construction equipment exhaust emissions shall not exceed FRAQMD Regulation III, Rule 3.0, Visible Emissions limitations (40 percent 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.

- (D) The primary contractor shall be responsible to ensure that all construction equipment is properly tuned and maintained.
- (E) Minimize idling time to 10 minutes – saves fuel and reduces emissions.
- (F) No open burning of removed vegetation during infrastructure improvements. Vegetative material should be chipped or delivered as waste to energy facilities.
- (G) 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 California Air Resources Board (CARB) Portable Equipment Registration with the State or a local district permit. The owner/operator shall be responsible for arranging appropriate consultations with the CARB or the District to determine registration and permitting requirements prior to equipment operation at the site.

Discussion

- a) **Less-than-Significant Impact.** The project area is located near the center of the Sacramento Valley Air Basin (SVAB) and under the jurisdiction of the Feather River Air Quality Management District (FRAQMD). The SVAB is designated non-attainment for several ambient air quality standards established under the federal and state Clean Air Acts¹. Pollutants of particular concern in the project region include ozone² and respirable particulate matter (PM₁₀)³. Areas within the SVAB are designated as being in nonattainment for these standards during warmer times of the year when climatic conditions are favorable for their development.

The Proposed Project/Action would take place in an area for which ozone and PM₁₀ plans have been developed. These plans describe how the project area will achieve the national and state standards and how the area will continue to make progress towards achieving more stringent state standards. Based on the nature of the Proposed Project/Action, construction would not alter existing land use designations in the project area and would not facilitate any new growth not previously envisioned in the County's currently adopted General Plan. At the completion of the Proposed Project/Action, operational vehicle trips would be similar to existing conditions. Consequently, construction and operation of the

¹ An "ambient air quality standard" represents the level of air pollutant in the outdoor (ambient) air necessary to protect public health. The Federal Clean Air Act (FCAA) requires the USEPA to identify National Ambient Air Quality Standards (national standards) to protect public health and welfare. National standards have been established for ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter, and lead. These pollutants are called "criteria" air pollutants because standards have been established for each of them to meet specific public health and welfare criteria.

² Ozone is a reactive pollutant, which is not emitted directly into the atmosphere, but is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving reactive organic gases (ROG) and oxides of nitrogen (NOx). ROG and NOx are precursor compounds for ozone. Significant ozone production generally requires ozone precursors to be present in a stable atmosphere with strong sunlight for approximately three hours.

³ "Respirable" particulate matter (PM₁₀) and "fine" particulate matter (PM_{2.5}) consist of particulate matter that is 10 microns or less in diameter and 2.5 microns or less in diameter, respectively (A micron is one-millionth of a meter). PM₁₀ and PM_{2.5} represent fractions of particulate matter that can be inhaled into the air passages and the lungs and can cause adverse health effects.

Proposed Project/Action would not conflict with or obstruct implementation of any applicable air quality regulation, plan, or policy and the impact would be less than significant.

- b) **Less-than-Significant Impact with Mitigation.** Construction-related activities resulting from the Proposed Project/Action would result in emissions of air pollutants from construction equipment, truck exhaust, soil disturbance, and wind erosion. **Table 4-2** estimates the typical daily construction emissions for the project assuming a total of three work crews working simultaneously (e.g., trenching and one boring).

The air pollutants of primary concern during construction projects are generally particulate matter less than 10 microns (PM_{10}), fine particulate matter ($PM_{2.5}$) and oxides of nitrogen (NO_x). Reactive organic gasses (ROG) are generated by the use of gasoline-powered vehicles (and, to a lesser extent, diesel-fueled vehicles); however, this type of construction project is likely to generate only minor amounts of ROG. Diesel fuel would generate primarily NO_x emissions, but also ROG, PM_{10} and $PM_{2.5}$ in varying amounts depending largely on fuel oil grade and existing emission controls. PM_{10} and $PM_{2.5}$ represent fractions of particulate matter that can be inhaled into the air passages and the lungs and that can cause adverse health effects. Particulate matter in the atmosphere results from many kinds of dust- and fume-producing industrial and agricultural operations, grading and construction, and motor vehicle use. Some sources of particulate matter, such as wood burning in fireplaces, demolition, and construction activities, are more local in nature, while others, such as vehicular traffic, have a more regional effect. Very small particles of certain substances (e.g., sulfates and nitrates) can cause lung damage directly or can contain adsorbed gases (e.g., chlorides or ammonium) that may be injurious to health. Particulates also can damage materials and reduce visibility.

PM_{10} and $PM_{2.5}$ is less of a concern for linear projects, such as the Proposed Project/Action, within existing streets and canals and the minimal demolition expected during the dismantling of the existing diversions. Major PM_{10} problems generally occur during mass grading, when several acres of ground are simultaneously stripped bare of vegetation and thus are subject to wind erosion or disturbance from vehicles traveling on the site.

As shown in **Table 4-2**, the projected construction-related emissions for NO_x exceed significance thresholds established by the FRAQMD. Consequently, the FRAQMD will require implementation of its best available mitigation for construction activity to reduce impacts associated with NO_x to a less-than-significant level.

Earth moving and construction activities may also result in short-term localized increases in ambient concentrations of dust or Particulate Matter PM_{10} . As mentioned above, these dust emissions are expected to be minor, but would vary from day to day, depending on the level and type of activity, silt content of the soil, type of equipment used, and the prevailing weather. On days when construction would involve extensive site preparation activities, earth-moving activities, or during periods when these activities would occur when wind speeds are relatively high, construction dust could be substantial and could violate the state standard for PM_{10} without proper controls. Several residences are located adjacent to proposed construction areas and may experience visibility and nuisance

effects associated with construction-related dust. However, implementation of the 2008 IS/EA Mitigation Measure AIR-1 would reduce impacts associated with construction air quality emissions to a less-than-significant level.

**TABLE 4-2
ESTIMATED UNMITIGATED CONSTRUCTION-PHASE EMISSIONS FOR TRENCHING AND BORING
(POUNDS/DAY)**

Pollutant	Maximum Daily Construction Scenario ^{a, b}			Significance Criteria ^c	
	1 Crew Trenching (pounds / day)	1 Crew Boring (pounds / day)	Total Emissions 2 Crew Trenching + 1 Crew Boring (pounds/day)	FRAQMD (pounds / day)	Significant? (Yes or No)
Reactive Organic Gases (ROG)	3	5	11	25	No
Nitrogen Oxides (NO _x)	26	16	68	25	Yes
Particulate Matter (PM ₁₀) ^d	3	2	7	80	No

a Maximum daily construction scenario would involve no more than three construction crews (e.g., 2 trenching crews and 1 boring crew).

b Calculations based on street trenching and boring 1-crew daily totals.

c Significance criteria are from FRAQMD Air Quality Thresholds of Significance.

d No established significance criteria for PM_{2.5}.

SOURCE: Meridian Farms Water Company, 2007

- c) **Less-than-Significant Impact.** Operation of the Proposed Project/Action would be similar to existing conditions however, with the operation of one less water diversion. Additionally, the new pumps are proposed to operate via electricity and would not lead to any cumulative increase of criteria air pollutant. As a result, implementation and operation of the Proposed Project/Action would not generate air emissions in excess of existing condition and therefore would not result in a cumulatively considerable net increase of any criteria pollutant. Thus, the impact would be less than significant.
- d) **Less-than-Significant Impact with Mitigation.** Residential areas tend to be sensitive areas for air pollution because residents (children and the elderly) tend to be at home for extended periods of time resulting in sustained exposure to any pollutants present. However, the Proposed Project/Action would be located in a predominately rural area with few sensitive receptors that could be exposed construction-related emissions. There is a residential neighborhood in the vicinity of the land-side pump station in Meridian, and a few residences in the proximity of the re-lift pump station in Drexler. Additionally, a few residences are interspersed along the Main Canal right-of-way. With the implementation of 2008 IS/EA Mitigation Measure AIR-1, construction of the Proposed Project/Action would not significantly affect local sensitive receptors and the impact would be less than significant.
- e) **No Impact.** Implementation of the Proposed Project/Action would not involve the storage and/or spreading of materials or involve activities such as prescribed burns or sewage treatment that would generate objectionable odors. Consequently, operation of the Proposed

Project/Action would not generate any objectionable odors that would adversely affect sensitive receptors located near the proposed facility improvements and no impact would occur.

4.3.4 Biological Resources

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
4. BIOLOGICAL RESOURCES — Would the project:				
a) Adverse impact, either directly or through habitat modifications, any endangered, rare, or threatened species, as listed in Title 14 of the California Code of Regulations (Sections 670.2 or 670.5) or in Title 50, Code of Federal Regulations (Sections 17.11 or 17.12)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) 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 the California Department of Fish and Game or U.S. Fish and Wildlife Service?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
f) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
g) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

The following mitigation measures from 2008 IS/EA were adopted by CDFG and would mitigate biological resources impacts associated with implementation of the Proposed Project/Action. CDFG and MFWC would ensure that construction and operation of the Proposed Project/Action would be implemented consistent with the mitigation, monitoring and enforcement requirements for the 2008 IS/EA MMRP (See Appendix A).

2008 IS/EA MITIGATION MEASURES

Biological Resources	
BIO-1	Traffic Routing and Movement. During construction operations, the number of access routes, number and size of staging areas, and the total area of the proposed project activity will be limited to the minimum necessary. Routes and boundaries will be clearly demarcated. Movement of heavy equipment to and from the project site will be restricted to established roadways to minimize habitat disturbance. Project-related vehicles shall observe a 20-mile-per-hour speed limit within construction areas, except on County roads and on State and Federal highways. This is particularly important during periods when the snake may be sunning or moving on roadways. All heavy equipment, vehicles, and supplies will be stored at the designated staging area at the end of each work period.
BIO-4	Timing of Construction. Construction activity within giant garter snake habitat (e.g. aquatic, upland, and rice habitat) shall be conducted between May 1 and October 1. This is the active period for the snake and direct mortality is lessened, because snakes are expected to actively move and avoid danger. If it appears that construction activity may go beyond October 1, the project proponents shall contact the USFWS as soon as possible, but not later than September 15 of the year in question, to determine if additional measures are necessary to minimize take. Construction activities within 200 feet from the banks of snake aquatic habitat will be avoided during the snake's inactive season. If this is not feasible, the Project Proponent must consult with USFWS to determine measures to avoid impacts to giant garter snake.
BIO-6	Worker Awareness Training. A Worker Environmental Awareness Training Program for construction personnel shall be conducted by the USFWS-approved biologist for all construction workers, including contractors, prior to the commencement of construction activities. The program shall provide workers with information on their responsibilities with regard to the snake, an overview of the life-history of this species, information on take prohibitions, protections afforded this animal under the Act, and an explanation of the relevant terms and conditions of this biological opinion. Written documentation of the training must be submitted to the Sacramento Fish and Wildlife Office within 30 days of the completion of training. As needed, training shall be conducted in Spanish for Spanish language speakers.
BIO-7	Install Snake Exclusion Fencing. Prior to the commencement of construction activities, high visibility fencing will be erected around the habitats of federally listed species to identify and protect these designated ESAs from encroachment of personnel and equipment. These areas will be avoided by all construction personnel. The fencing shall be inspected by the Contractor before the start of each work day and maintained by the Contractor until completion of the project. The fencing may be removed only when the construction of the project is completed. Fencing will be established in upland immediately adjacent to aquatic snake habitat and extending up to 200 feet from construction activities. Silt fencing, if properly installed, may serve as suitable snake exclusion fencing.
BIO-8	Provide Adequate Signage. Signs will be posted by the Contractor every 50 feet along the edge of the ESAs, with the following information: "This area is habitat of federally-threatened and/or endangered species, and must not be disturbed. These species are protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment." The signs should be clearly readable from a distance of 20 feet, and must be maintained by the Contractor for the duration of construction.
BIO-9	Implement BMPs. Best Management Practices (BMPs), including a Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP), will be implemented to minimize effects to the snake during construction. Best management practices will be implemented to prevent sedimentation from entering ESAs and to reduce erosion, dust, noise, and other deleterious aspects of construction related activities. These BMPs may include, but are not limited to, silt fencing, temporary berms, restrictions on cleaning equipment in or near ESAs, installation of vegetative strips, and temporary sediment disposal. Runoff from dust control and hazardous materials will be retained on the construction site and prevented from flowing into the ESAs.
BIO-10	Erosion Control Materials. Tightly woven fiber netting (mesh size less than 0.25 inch) or similar material shall be used for erosion control and other purposes at the ESA to ensure that the giant garter snake is not trapped or becomes entangled. This limitation shall be communicated to the contractor using special provisions included in the bid solicitation package.
BIO-11	Properly Dispose of Garbage. To eliminate an attraction to predators of the snake, all food-related trash items, such as wrappers, cans, bottles, and food scraps, must be disposed of in closed containers and removed at the end of each workday from the entire project site.
BIO-12	Use Approved Aggregate, Fill or Borrow Materials. The Contractor shall provide documentation that aggregate, fill, or borrow material provided for the proposed project was obtained in compliance with the State Mining and Reclamation Act (SMARA). Evidence of compliance with the Act shall be demonstrated by providing the resident engineer with one of the following: 1) a letter from the USFWS stating that the use of the borrow pit will not result in the incidental take of species; 2) an incidental take permit for contractor-related activities issued by the USFWS pursuant to section 10(a)(1)(B) of the Act;

	3) a biological opinion or letter concurring with a “not likely to adversely affect” determination issued by the USFWS to the Federal agency having jurisdiction over contractor-related services’ 4) a letter from the USFWS concurring with the “no effect” determination for contractor-related activities; or 5) contractor submittal of information to the resident engineer indicating compliance with the SMARA and provision of County land use permits and California Environmental Quality Act (CEQA) clearance.
BIO-13	Restore Temporarily Affected Habitat. After construction activities are complete, any temporary fill or construction debris shall be removed and disturbed areas restored to their pre-project conditions. An area subject to “temporary” disturbance includes any area that is disturbed during the project, but that, after project completion, will not be subject to further disturbance and has the potential to be re-vegetated. All ESA snake habitats subject to temporary ground disturbances, including storage and staging areas and temporary roads, will be restored to pre-project conditions. If appropriate, these areas shall also be re-contoured to pre-project conditions. A written report shall be submitted to the USFWS within ten (10) working days of the completion of construction at the project site and restoration of the site to pre-project conditions.
BIO-14	Post-construction Monitoring. An inspection of the site, with a photo documentation report showing pre- and post-project area photos, will be conducted and photos and a brief report will be submitted to USFWS one year from implementation of restoration to pre-project conditions.
BIO-17	A USFWS-approved biologist shall inspect construction-related activities at the proposed project site to ensure that no unauthorized take of federally listed species or destruction of their habitat occurs. The biologist shall be available for monitoring throughout all phases of construction that may result in adverse effects to the giant garter snake. This includes clearing and grubbing and other construction activities in the areas of wetland vegetation/aquatic habitat, adjacent upland habitat, and during exclusion fence installation. Furthermore, the biologist shall have the authority through communication with the resident engineer to stop construction activities in the immediate area if a giant garter snake is encountered during construction until appropriate corrective measures have been completed or until the snake is determined to be unharmed. Snakes encountered during construction activities shall be allowed to move away from the area on their own volition. The biologist shall notify the USFWS immediately if any listed species are found on-site, and will submit a report, including date(s), location(s), habitat description, and any corrective measures taken to protect the species found. The biologist shall be required to report any take of listed species to the USFWS immediately by telephone at 916/ 414-6600 and by electronic mail or written letter addressed to the Chief, Endangered Species Division, within three (3) working days of the incident. The Service does not authorize any handling or moving of a giant garter snake by other than USFWS-permitted biologist.
BIO-19	Pile Driving Activities. For Phases 1 and 2, the contractor shall use vibrational pile driving to the greatest extent feasible. If percussive pile driving is necessary, its use shall be minimized to the maximum extent possible and comply with the following <i>Interim Criteria for Injury of Fish to Pile Driving Operations</i> (Popper et al., 2006): <ul style="list-style-type: none"> • The Sound Exposure Level (SEL) shall not exceed 187 dB (re: 1 μPa² •sec) in any single strike, measured at a distance of 32.8 ft from the source; • The peak sound pressure level should not exceed 208 dB (re: 1 μPapeak) in any single strike, measured at a distance of 32.8 ft from the source.
BIO-20	Dewatering. For Phase 2 only, pump(s) used for dewatering the construction site will be screened according to NMFS fish screening criteria for anadromous salmonids (NMFS, 1997b). A qualified biologist will be on-site during such pumping activities to ensure that any fish that may be present within the construction area are relocated to suitable habitat near the project area.
BIO-21	Tree Removal Period. Some trees will be removed on the Chesney property for the Drexler pipeline, and some walnut trees removed on the Coffman property for the Meridian Pumping Plant. All of these trees are outside the Sacramento River riparian areas. If possible, trees required for removal shall be removed outside of the nesting period (nesting period = March 1st through August 31st).

Discussion

A field reconnaissance of the Project Site was conducted in 2006 by Environmental Science Associates (ESA), which covered both Phase 1 and Phase 2 Action areas (Phase 2 is known as the Proposed Project/Action), to determine the potential for Project impacts on endangered, threatened, and/or rare plant and wildlife species (special-status species) or their habitats. In addition, a wetland delineation was performed by MWH on November 7, 2011 to identify features within the Proposed Project/Action area that could be considered waters of the United States (U.S.) and that would therefore be subject to Section 404 of the Clean Water Act (CWA). Concurrently, MWH also identified giant garter snake (GGS) upland and aquatic habitats within the Proposed Project/Action

Area. Updated species lists were obtained from the U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Game (CDFG), California Natural Diversity Database (CNDBB), and the California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants (December 2011). These lists are included as **Table 3-3** in Section 3. The following analysis summarizes potential effects to special status species and habitats. Please refer to the ASIP (Appendix B) for detailed analysis.

- a) **Less-than-Significant with Mitigation.** The Proposed Project/Action may have potentially significant adverse impacts, either directly or through habitat modifications, to GGS, an endangered, rare, or threatened species, as listed in Title 14 of the California Code of Regulations (Sections 670.2 or 670.5) or in Title 50, Code of Federal Regulations (Sections 17.11 or 17.12). The Proposed Project/Action would have a less-than-significant impact to other special-status species within the Action Area. Impacts to GGS and other special-status species are described below.

Giant Garter Snake

The Proposed Project/Action includes the construction of the New Meridian Diversion/Pumping Plant, Main Canal Modifications, Drexler Re-lift Pumping Plant, Drexler Pipeline Extension, and removal of the existing Meridian Diversion/Pumping Plant and Drexler Pumping Plant as described in Section 2.2 of this IS/EA. Construction activities associated with the Main Canal modifications and the construction of the Drexler Re-lift Pumping Plant would potentially impact suitable habitat for GGS. 38.9 acres of GGS aquatic habitat and 21.3 acres of GGS upland habitat were mapped within the Proposed Project/Action Area in the ASIP (Section 3.1.5). Of this area, approximately 6.4 acres of GGS upland habitat and 3.4 acres of GGS aquatic habitat in the Main Canal would be temporarily impacted when the existing canal is demolished and widened. The Main Canal provides marginal habitat for the giant garter snake, with the only suitable habitat value being as a possible movement corridor between other drains and rice fields. As a result of the proposed widening modifications, there would be some conversion of GGS upland habitat to GGS aquatic habitat.

In order to construct the Drexler Re-lift Pumping Plant, an existing drainage ditch would be replaced with a new 24-inch storm drain to allow for placement of a concrete pad. Construction of the pumping plant and storm drain would result in permanent effects to approximately 512 square feet of GGS upland habitat. An additional minimal area of the Reclamation District 70 canal would be disturbed temporarily when the storm drain is connected. The total permanent impacts are 0.05 acre. (ASIP, Section 4.3.2).

Because the operation of the Main Canal is essential for MFWC water delivery in the spring and summer, the Proposed Project/Action improvements to the Main Canal must occur during the fall and winter (October 1st through April 30th), during the GGS inactive period of October 1st to May 1st. Upland GGS habitat in the Action Area is primarily composed of frequently disturbed agricultural lands and relatively shallow canal berms with few evident rodent burrows. These areas are not optimal habitat for GGS hibernation;

however, there is some potential for snakes to remain in the Project Area/Action Area during the inactive season. Construction activities, either permanent or temporary in nature, from October 1 to May 1 are assumed to likely result in take (injury or death) of GGS that may be hibernating in the area, rather than harm and harassment. Therefore, the applicant proposes restoration and 1:1 replacement of 6.4 acres of upland habitat through the purchase of conservation credits from a Service-approved GGS bank. Permanent impacts related to construction of the pumping plant and associated structures are very minimal (0.05 acre) and would occur during the GGS active period; therefore, no additional compensation measures are proposed.

The level of compensation specified for temporary impacts associated with the modifications of the Main Canal is comparable to the requirements for level 2 mitigation outlined in the *Programmatic Formal Consultation for the U.S. Army of Engineers 404 Permitted Projects with Relatively Small Effects on the Giant Garter snake within Butte, Colusa, Glenn, Fresno, Merced, Sacramento, San Joaquin, Solano, Stanislaus, Sutter and Yolo Counties, California* (USFWS 1997). The Programmatic Consultation specifies level 2 mitigation for projects that have less than 20 acres of temporary disturbance during two active GGS seasons. Although the work on the Main Canal is expected to occur within one calendar year, it cannot be conducted during the GGS active season; therefore, the disturbance could be considered similar to impacts spanning more than one active GGS season.

To reduce and minimize impacts to GGS as a result of the implementation of the Proposed Project/Action, the Programmatic BO measures and those described below would be implemented as appropriate. As mentioned above, compensation would be required for permanent loss of GGS habitat. With implementation of 2008 IS/EA Mitigation Measures BIO-1, BIO-4, BIO-6 through BIO-14, and BIO-17, and modified 2008 IS/EA Mitigation Measures BIO-2, BIO-3, BIO-16 and BIO-18, presented below, impacts to GGS would be less than significant.

Mitigation Measure BIO-2: Staging Areas. During construction operations, stockpiling of construction materials, portable equipment, vehicles, and supplies will be restricted to the designated construction staging areas and exclusive of the Environmentally Sensitive Areas (ESAs). A solid barrier fence, such as silt fencing, will be installed along the boundaries of the staging area to prevent contamination of ESAs during such operations.

Mitigation Measure BIO-3: Pre-construction Surveys. No more than 24-hours prior to the commencement of construction activities, a USFWS-approved biologist shall survey areas deemed suitable GGS habitat for the presence of GGS. The biologist will provide the USFWS with a written report that adequately documents the methodology and results of the pre-construction survey within three days of the survey. These areas shall be re-inspected by the biologist whenever a lapse in construction activity of two and removed at the end of each workday from the entire project site.

Mitigation Measure BIO-16: De-watering GGS Habitat. During the GGS active period (May 1-September 31), GGS aquatic habitat may be dewatered starting on

April 15. Any dewatered habitat must remain dry for at least 15 consecutive days after April 15 and prior to excavating or filling the dewatered habitat.

Mitigation Measure BIO-18: Compensation. Compensation for temporary and permanent impacts to GGS habitat is the responsibility of MFWC. Temporary impacts shall be restored to pre-project conditions. Areas subject to temporary impacts shall be limited to one season (the calendar year period between May 1 and October 1) and be restored within two seasons. . In addition, GGS habitats temporarily disturbed during the inactive season (3.4 acres of aquatic habitat and 6.4 acres of upland habitat) will be replaced at a level of 1:1 by purchasing credits in a USFWS-approved mitigation bank prior to project construction.

Fish Species: The Proposed Project/Action would involve work within the Sacramento River; therefore, the special-status species to consider in this habitat are the threatened North American green sturgeon (Southern DPS), threatened Central Valley steelhead, threatened Central Valley spring-run Chinook salmon and endangered Sacramento River winter-run Chinook salmon.

Construction and operation of a surface water diversion in the Sacramento River has the potential to adversely impact various salmonid and other fish species and their habitats through several mechanisms, including entrainment into the water diversion, impingement on the intake screen, increased vulnerability to predation mortality, increased levels of turbidity and suspended solids, and underwater sound pressure waves. Direct mortality of fish species may also occur during cofferdam installation and dewatering.

Fish screen design criteria outlined by the Proposed Project/Action would reduce potential effects from entrainment and impingement substantially. Placement of structures within the Sacramento River, including a positive barrier fish screen, would modify local velocity and current patterns, create localized turbulence and eddies, and provide cover habitat for a variety of predatory fish species, such as striped and smallmouth bass. Structural components of the positive barrier fish screen may result in the potential for increased localized predation mortality for juvenile Chinook salmon, steelhead, and other fish species within the river. However, placement of the new diversion structures is within areas with adequate flow velocities, thereby minimizing backwater eddy effects and potential impacts to salmonids from predatory species. And ultimately, construction of the proposed new facilities fitted with fish screens would benefit these and all fish species.

In-water construction activities would take place during the construction period that would impact the least number of individuals of special-status fish. This in-water work period is June 1 to October 1, for this stretch of the Sacramento River; however, with NMFS approval, the work period may be extended through November 1. This period coincides with when Central Valley steelhead, and Chinook salmon are least likely to be present in the vicinity of the Action Area. Green sturgeon, however, may occur in the Action Area on a year-round basis. The construction of the proposed Meridian Diversion fish screen facility would require placement and removal of a sheet-pile cofferdam to isolate the work site from the rest of the river. This would result in a temporary localized disturbance with minor siltation of the

water. Increased sedimentation may cause reduced survival of eggs or alevins, reduce primary and secondary river productivity, interfere with feedings, cause behavioral avoidance, and cause a breakdown of social organization to native species downstream of the discharge area. Furthermore, installation of sheet piles and beams during construction of the cofferdam may require the use of vibratory or percussion (impact) hammer methods. Both methods produce underwater sound pressure waves that can be perceived by fish. However, while vibrating hammers do not produce sound pressure levels that would result in injury or mortality to fish, fish may be injured or killed by the impact sounds generated by percussive pile driving. Their hearing may also be affected or their behavior altered such that it constitutes harassment or harm. The specific effects of pile driving on fish depend on a wide range of factors including the type of pile, type of hammer, fish species, environmental setting, and many other factors (Popper et al., 2006). The percussion hammer, if needed for cofferdam installation, would be used on an intermittent and short duration basis. Use of the percussion hammer would be minimized to the maximum extent possible. All these impacts to special status fish are considered potentially significant.

The construction of the Meridian Diversion and Pump Station would span 6 and 10 months, respectively; however, all in-water construction (including the cofferdam) would be completed within the in-water work period to avoid effects to salmonids and special-status fish. The Proposed Project/Action also includes abandonment of the existing Meridian Diversion and the Drexler Diversion, which would require minimal in-river to cap and seal the existing intake pipe manifold. Any in-water activities involved in removal of these facilities would also occur within the in-water work period to reduce impacts to fish.

Given the overall benefit to fish as a result of the Proposed Project/Action, as well as the use of a cofferdam, the fish salvage requirement for dewatered work sites, the localized and minimal in-river disturbances, and constructing within the work period when fish would least likely be in the area, the Proposed Project/Action is expected to result in minimal impacts to the fisheries resources of the Sacramento River. With the implementation of 2008 IS/EA Mitigation Measures BIO-19, BIO-20 and proposed Mitigation Measures BIO-A through BIO-H⁴, presented below, impacts to listed and special-concern fish species would be reduced to a less-than-significant level.

Mitigation Measure BIO-A: Spoil Sites. Spoil sites shall be located so they do not drain directly into the waterways. If a spoil site drains into a water body, catch basins shall be constructed to intercept sediment before it reaches the channels. Spoil sites shall be graded to reduce the potential for erosion.

Mitigation Measure BIO-B: Hazardous Materials. A spill prevention plan for potentially hazardous materials shall be prepared and implemented. The plan shall include the proper handling and storage of all potentially hazardous materials, as well as the proper procedures for cleaning up and reporting of any spills. If necessary,

⁴ Mitigation measures BIO-A through BIO-H are identified with alphabetical letters instead of numbers to avoid confusion with mitigation measures from the 2008 IS/EA.

containment berms shall be constructed to prevent spilled materials from reaching the creek channels.

Mitigation Measure BIO-C: Storage. Equipment and materials shall be stored at least 50 feet from waterways. No debris such as trash and spoils shall be deposited within 100 feet of waterways. Staging and storage areas for equipment, materials, fuels, lubricants and solvents, shall be located outside of the stream channel and banks. Stationary equipment such as motors, pumps, generators, compressors and welders, located within or adjacent to the stream shall be positioned over drip pans. Any equipment or vehicles driven and/or operated within or adjacent to the stream shall be checked and maintained daily, to prevent leaks of materials that if introduced to water could be deleterious to aquatic life. Vehicles shall be moved away from the stream prior to refueling and lubrication.

Mitigation Measure BIO-D: Vehicle Maintenance. Proper and timely maintenance for vehicles and equipment used during construction shall be provided to reduce the potential for mechanical breakdowns leading to a spill of materials into or around the creeks. Maintenance and fueling shall be conducted in an area that meets the criteria set forth in the spill prevention plan (i.e., away from sensitive drainages).

Mitigation Measure BIO-E: Dust Prevention. Water used for dust abatement, if necessary, shall be acquired from an authorized off-site source. Water shall be a clean water source in accordance with California RWQCB Construction Storm Water Program and/or as authorized under a separate National Pollutant Discharge Elimination System (NPDES) permit.

Mitigation Measure BIO-F: Daily Monitoring. A qualified biological monitor shall be on site during in-water construction activities. The biological monitor shall be authorized to halt construction if impacts to special-status salmonid species are evident.

Mitigation Measure BIO-G: Riparian Habitat. Current riparian vegetation shall be retained to extent feasible.

Mitigation Measure BIO-H: Fish Rescue Plan. A fish rescue plan shall be prepared by MFWC prior to the implementation of the project and provided for review and comment to NMFS, USFWS and CDFG as appropriate. A qualified fisheries biologist will design and conduct a fish rescue and relocation effort to collect fish from the area within the cofferdam involving the capture and return of those fish to suitable habitat within the Sacramento River. To ensure compliance, a fisheries biologist shall provide observation during initial dewatering activities within the cofferdam. Following the fish rescue effort, a report shall be prepared by the fisheries biologist and submitted to NMFS within 30 days.

Valley Elderberry Longhorn Beetle (VELB). The Project site was surveyed for the presence of suitable habitat for the federally threatened valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*, VELB). No elderberry shrubs were observed within 100 feet of the project site. Based on this survey, no impacts to VELB would result from the Proposed Project/Action.

Swainson's Hawk. No known Swainson's hawk nesting habitat is proposed to be modified or eliminated by the Proposed Project/Action. Suitable nesting habitat is found adjacent to the Sacramento River within the valley riparian habitat. Habitat in this area includes riparian woodlands with large diameter (i.e., greater than 30 inches diameter at breast height) valley oak (*Quercus lobata*), cottonwood (*Populus fremontii*) and black willow (*Salix goodingii*). These overstory trees provide moderate to high (i.e., greater than 50%) canopy closure in this area. However, this riparian habitat would not be impacted by project activities. Scattered native trees also occur sparsely throughout the Action Area, and a few may be suitable for Swainson's hawk nesting. Disturbances to potential foraging habitat (i.e., annual grassland and agricultural areas) would be minimal and temporary, and are not expected to impact this species based on the overall regional abundance of these habitat types.

The Swainson's hawk is listed as threatened by the State of California. With numerous records of Swainson's hawk nests occurring within one mile of the project site along the Sacramento River (CNDDDB, 2011) there is a moderate to high potential this area may be used by this species for nesting. Impacts to an active Swainson's hawk nest would be potentially significant. To compensate potential disturbance and to avoid impacts to active nest sites, the following mitigation measures are proposed. With implementation of 2008 IS/EA Mitigation Measures BIO-21, and modified 2008 IS/EA Mitigation Measures BIO-22 and BIO-23, presented below, potential impacts to Swainson's hawk would be reduced to a less-than-significant level.

Mitigation Measure BIO-22: Swainson's Hawk, Nesting Raptors and Other Nesting Bird Survey. For any construction activities that will occur between March 1 and August 31 of any given year, the applicant shall conduct preconstruction surveys in suitable nesting habitat within 0.5 mile of the construction area for nesting raptors. Surveys shall be conducted by a qualified biologist. In addition, all trees slated for removal during the nesting season shall be surveyed by a qualified biologist no more than 48-hours before removal to ensure that no nesting birds are occupying the tree.

If active nests are found during the survey, the applicant shall implement appropriate mitigation measures to ensure that the species will not be adversely affected, which will include establishing a no-work buffer zone as, approved by the CDFG, around the active nest. The no-work buffer may vary depending on species and site specific conditions as approved by CDFG. Appropriate mitigation measures include delaying construction activities until a qualified biologist determines that juveniles have fledged the nest(s), or establishing a "no construction" zone buffer around the nest.

The results of the survey shall be documented in a letter report that is distributed to the CDFG. These measures would ensure compliance with the Migratory Bird Treaty Act and California Department of Fish and Game Code 3503.5.

Mitigation Measure BIO-23: Riparian Habitat Exclusion. Where construction work occurs adjacent to riparian habitat (i.e., at the existing Drexler Diversion and

Pumping Plant and the Grimes Canal modifications), there shall be no encroachment by construction equipment or personnel into existing riparian habitat areas located along the Sacramento River. Storage or parking of equipment shall be restricted within 100 feet of riparian habitat.

- b) **Less-than-Significant with Mitigation.** Based on the habitats present in the project site, the following special-status species may be impacted by the Proposed Project/Action:

- Western burrowing owl
- Bank Swallow
- Cackling (Aleutian Canada Goose)
- Osprey

Western burrowing owl, bank swallow, cackling goose, and osprey. Potential nest sites for these birds may be directly or indirectly affected by project construction. In addition, other nesting birds such as migratory birds protected by the Migratory Bird Treaty Act may also be impacted by the Proposed Project/Action. To compensate for these potential impacts, the following mitigation measure is proposed. With implementation of 2008 IS/EA Mitigation Measures BIO-21, modified 2008 IS/EA Mitigation Measures BIO-22, and proposed Mitigation Measure BIO-H potential impacts to these species would be reduced to a less-than-significant level.

Mitigation Measure BIO-I: Pre-construction surveys for burrowing owls shall be conducted by a qualified biologist as approved by the California Department of Fish and Game (CDFG) within 30-days prior to the start of work activities where land construction is planned in known or suitable habitat. If construction activities are delayed for more than 30 days after the initial preconstruction surveys, then a new preconstruction survey shall be required. All surveys shall be conducted in accordance with the CDFG/California Burrowing Owl Consortium survey protocols. This survey can be conducted concurrently with Mitigation Measure BIO-22.

If burrowing owls are discovered in the proposed project site vicinity during construction, the onsite biologist shall be notified immediately. Occupied burrows should not be disturbed during the nesting season (February 1 through August 31) unless a qualified biologist approved by the CDFG verifies through non-invasive methods that either: (1) the birds have not begun egg-laying and incubation; or (2) that juveniles from the occupied burrows are foraging independently and are capable of independent survival.

If this criteria is not met, occupied burrows during the nesting season will be avoided by establishment of a no-work buffer of 250-foot around the occupied/active burrow. Where maintenance of a 250-foot no-work buffer zone is not practical, the applicant shall consult with the CDFG to determine appropriate avoidance measures. Burrows occupied during the breeding season (February 1 to August 31) will be closely monitored by the biologist until the young fledge/leave the nest. The onsite biologist shall have the authority to stop work if it is determined that construction related activities are disturbing the owls.

If criterion 1 or 2 above are met and as approved by CDFG, the biologist shall undertake passive relocation techniques by installing one-way doors in active and suitable burrows

allowing owls to escape but not re-enter. Owls should be excluded from the immediate impact zone and within a 160-foot buffer zone by having one-way doors placed over the entrance to prevent owls from inhabiting those burrows.

After nesting season ends (August 31) and the burrow is deemed unoccupied by the biologist, passive relocation techniques shall take place. Construction activities may occur once a qualified biologist has deemed the burrows are unoccupied.

- c) **Less-than-Significant with Mitigation.** The sensitive natural community that would be potentially impacted by the Proposed Project/Action is the Sacramento River and associated Valley foothill riparian. However, with avoidance, minimization, and erosion control measures outlined in Section 2 (Project Description), impacts to the Sacramento River and riparian habitats are considered less-than significant. Both communities provide habitat for a range of terrestrial wildlife species, including several species of songbirds, small mammals, mesocarnivores, and herptiles. Implementation of 2008 IS/EA Mitigation Measure BIO-1, modified 2008 IS/EA Mitigation Measures BIO-2 and BIO-23 and Mitigation Measure BIO-G would ensure no disturbance and encroachment into these sensitive riparian habitat areas, and would reduce this impact to a less-than significant level.
- d) **Less-than-Significant with Mitigation.** The Proposed Project/Action would temporarily and permanently fill perennial stream channel (Sacramento River) with the proposed placement of the Meridian diversion facilities within the ordinary high water mark of the Sacramento River. These features are navigable and therefore regulated under Section 10 of the Rivers and Harbors Act. In addition, existing irrigation channels would be modified to improve conveyance from the proposed diversion facilities. These channels would likely be considered jurisdictional by the Corps per Section 404 of the Clean Water Act and RWQCB per Section 401 of the Clean Water Act. Lastly, alteration to the beds or banks of the Sacramento River would require entering into a Streambed Alteration Agreement with the CDFG as required per Section 1602 of the State Fish and Game Code. According to a wetland delineation prepared by MWH in 2011, the only feature that may qualify as a wetland and/or waters of the U.S. in the Proposed Project/Action area is the Sacramento River. The location and extent of wetlands or waters of the U.S., as identified in the wetland delineation, will be confirmed when the Corps verifies the wetland delineation. Therefore, implementation of BIO-I and modified 2008 IS/EA Mitigation Measure BIO-28 would reduce impacts to wetlands in the event that the potential fill of these features requires compensation to a less-than-significant level.

Mitigation Measure BIO-J: Wetlands. If it is determined that the Proposed Project/Action impacts waters of the U.S., the MFWC shall obtain all required permit approvals from the Corps, RWQCB, CDFG and any other agencies with permitting responsibilities for construction activities within jurisdictional features. Permit approvals and certifications would likely include the following:

Clean Water Act Section 404. Permit approval from the Corps shall be obtained for the placement of dredge or fill material in waters of the U.S. pursuant to Section 404 of the federal Clean Water Act. The Section 404 permit application would require a delineation of wetlands and other waters of the U.S., a jurisdictional determination

from the Corps, and preparation of a Pre-Construction Notification (PCN) and supporting documentation. A PCN outlines project activities, areas of impact, construction techniques, and methods for avoiding and reducing impacts to jurisdictional features. State and federal regulations require that the project applicant avoid or minimize impacts to wetlands and waters and develop appropriate protection for wetlands. Wetlands that cannot be avoided must be compensated to result in “no net loss” of wetlands to ensure that the project would maintain the current functions and values of onsite wetland habitats.

Clean Water Act Section 401 Water Quality Certification/Porter-Cologne Act. Approval of Water Quality Certification (WQC) under the CWA and/or Waste Discharge Requirements (WDRs) under the Porter-Cologne Act shall be obtained from the RWQCB for work within jurisdictional waters. Application for a WQC requires an application and supporting materials, including construction techniques, areas of impact, mitigation measures, project schedule, and proof of CEQA compliance. Application for a WDR requires an application and supporting materials, including a characterization of the discharge which includes but is not limited to: design and actual flows; a list of constituents and the discharge concentration of each constituent; a list of other appropriate waste discharge characteristics; a description and schematic drawing of all treatment process; a description of any BMPs used; and a description of disposal methods. Proof of CEQA compliance is also required.

California Fish and Game Code Section 1602. CDFG requires a Streambed Alteration Agreement for activities that result in alteration of the bed or bank of a stream (typically the top of bank or edge of riparian habitat, whichever is greater), or that adversely impact fish or wildlife resources. The notification package must include supporting materials, including construction techniques, areas of impact, mitigation measures, project schedule, and proof of CEQA compliance.

Mitigation Measure BIO-28: Compensation for Loss of Jurisdictional Wetlands.

If the Proposed Project/Action results in the permanent degradation of riverine and wetland habitat, those impacts shall be compensated for at a 1:1 ratio through the purchase of similar habitat value from a USFWS-approved conservation bank.

Compensation shall take the form of wetland and/or riverine preservation or creation in accordance with the Corps and CDFG mitigation requirements, as required under project permits. Preservation and creation may occur onsite through a conservation agreement or offsite through purchasing credits at a Corps approved mitigation bank.

- e) **Less-than-Significant Impact.** Construction of the Proposed Project/Action may have a temporary impact to the movements of some terrestrial wildlife during construction. In addition, salmonids and other fresh water fish species may be temporarily displaced during construction. However, construction of the Proposed Project/Action would not result in any permanent barriers to species movement, and migratory corridors for fish and wildlife would be unaffected. In addition, as part of the Fish Rescue Plan a fish-salvage program would be implemented during coffer dam construction as described in the Project Description (attached). Therefore, this impact would be less than significant.

- f) **No Impact.** The Proposed Project/Action is not anticipated to conflict with any local policies or ordinances protecting biological resources. No impact would occur.
- g) **No Impact.** The Proposed Project/Action is not located within a defined Habitat Conservation Area and therefore is not expected to conflict with the provisions of an adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, regional, or state habitat conservation plan. No impact would occur.

4.3.5 Cultural Resources

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
5. CULTURAL RESOURCES — Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d) Disturb any human remains, including those interred outside of formal cemeteries?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

A records search of all pertinent survey and site data was conducted at the Northeast Information Center at California State University, Chico on April 7, 2004 (IC File # D04-20). The records search covered the Phase 1 and Phase 2 project area (which included the Proposed Project/Action facilities). The records were accessed by using the Meridian and Grimes U.S. Geological Survey (USGS) 7.5-minute quadrangle maps, T14N, R1E; T15N, R1E; and T15N, R1W in Sutter County. The review included proposed Phase 1 and Phase 2 facilities footprints (proposed pump locations, existing pump locations, and proposed pipelines and canals) as well as a ¼ mile around the Phase 1 and Phase 2 facilities locations. The records search included a review of the *Directory of Properties in the Historic Property Data File for Sutter County* for information on sites of recognized historical significance within the *National Register of Historic Places*, the *California Register of Historic Resources*, the *California Inventory of Historic Resources* (1976), the *California Historical Landmarks* (1996), and the *California Points of Historical Interest* (1992).

An archaeological field inspection of the project area was conducted on May 7, 2004 by two ESA Registered Professional Archaeologists. The proposed Phase 1 and Phase 2 facilities sites inspected using systematic survey transects spaced approximately 10 to 20 meters apart. Segments of the existing canal that would be rehabilitated were inspected using cursory survey techniques.

On January 23, 2008, Reclamation initiated National Historic Preservation Action (NHPA) Section 106 Consultation with the California State Historic Preservation Officer (SHPO). Reclamation concluded that both Phase 1 and Phase 2 of the Proposed Project/Action would not result in an affect to historic properties. On February 5, 2008, SHPO concurred with these findings.

The January 2008 Cultural Resources Inventory Report includes the results of the records search and field inspection. The results of the January 2008 Report adequately cover the potential effects of the Proposed Project/Action and no further analysis was required. Therefore, the analysis of potential impacts to cultural resources resulting from implementation of the Proposed Project/Action is based on the findings included in that 2008 Report.

- a) **Less-than-Significant Impact.** The cultural resources inventory conducted for the proposed Phase I and Phase 2 facilities identified one potentially significant historical resource, the Main Canal, a small, concrete-lined irrigation canal extending south from the existing Meridian pumping facility. Although an exact date of construction of this canal is not known, available information indicated that it was built prior to 1952 but after 1912. Other existing facilities that would be modified under the Proposed Project/Action include: the existing Meridian pumping facility, built in 1964; and the existing Drexler pumping facility, also a minimal structure which was moved to its present location.

None of the facilities described above meet significance criteria established under CEQA and Section 106 of the NHPA; and therefore, are not considered to be significant resources and any alteration of these structures, including demolition, would be considered less than significant. In addition, as described in subsection 2.5, measures have been incorporated into the Proposed Project/Action that will be made conditions of approval which minimize potential damage or destruction of cultural resources discovered during construction activities. The measures state that if any potential historical resources should be encountered during construction of the Proposed Project/Action, all work within a 50-foot radius of the resource would stop until the resource can be evaluated and a determination made of its significance and need for additional studies. As a result, construction and operation the Proposed Project/Action would result in less-than-significant impacts to historical resources.

- b) **Less-than-Significant Impact.** According to the results of the records search, the Phase 1 and Phase 2 project area has never been previously inspected for the presence of archaeological remains and no archaeological remains have been identified within the project area or within a ¼ mile radius. The archaeological field survey conducted by ESA Registered Professional Archaeologists on May 7, 2004 did not result in the identification of any archaeological remains in or adjacent to the project area. The Native American Heritage Commission was contacted on March 11, 2004 and again on November 7, 2007 and requested to search their Sacred Lands File and requested to provide a list of Native American that should be contacted concerning the Proposed Project/Action. A letter was sent to each individual or organization on the list on March 26, 2004 and again in November of 2007. On December 27, 2007, ESA received a letter from the Enterprise Band of Maidu Indians requesting that if during ground disturbing activities, any resources are uncovered, all work cease within the area of the find pending an examination of the site and materials by a professional archaeologist. The contact information provided by the NAHC for the

Strawberry Valley Rancheria included only a mailing address, and on January 24, 2008, ESA sent a follow up letter to the Strawberry Rancheria requesting that they contact ESA if they had any questions or concerns. To date, no responses have been received.

Although no archaeological remains have been identified for the project area, there is a remote chance that construction activities could result in accidentally discovering previously unidentified archaeological resources. As described in subsection 2.5, measures have been incorporated into the Proposed Project/Action that will be made conditions of approval which minimize potential damage or destruction of cultural resources discovered during construction activities. The measures state that if any potential historical resources should be encountered during construction of the Proposed Project/Action, all work within a 50-foot radius of the resource would stop until the resource can be evaluated and a determination made of its significance and need for additional studies. As a result, construction and operation the Proposed Project/Action would result in less-than-significant impacts to archeological resources.

- c) **Less-than-Significant Impact.** No known paleontological resources or unique geologic features exist within the project area. Therefore, the Proposed Project/Action is not likely to destroy, either directly or indirectly, a unique paleontological resource or site, or geological feature. However, it is possible that previously unidentified paleontological resources could be uncovered during construction activities. As described in subsection 2.5, measures have been incorporated into the Proposed Project/Action that will be made conditions of approval which minimize potential damage or destruction of cultural resources discovered during construction activities. The measures state that if any potential historical resources should be encountered during construction of the Proposed Project/Action, all work within a 50-foot radius of the resource would stop until the resource can be evaluated and a determination made of its significance and need for additional studies. As a result, construction and operation the Proposed Project/Action would result in less-than-significant impacts to paleontological resources.
- d) **Less-than-Significant Impact.** Based upon a records search, contacts with Native Americans, and a field survey, no human remains are known to exist within the project area. However, As described in subsection 2.5, measures have been incorporated into the Proposed Project/Action that will be made conditions of approval which minimize potential damage or destruction of cultural resources or human remains discovered during construction activities. The measures state that in the unlikely event that human remains are discovered, work within the area would be stopped and Sutter County Sheriff-Coroner would be notified immediately. Work would only resume after the investigation and in accordance with any requirements and procedures imposed by the Sutter County Sheriff-Corner. In the event that the bone most likely represents a Native American interment, the Native American Heritage Commission would be notified so that the most likely descendents can be identified and appropriate treatment can be implemented. As a result, construction and operation the Proposed Project/Action would result in less-than-significant impacts to archeological resources.

4.3.6 Geology, Soils, and Seismicity

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
6. GEOLOGY, SOILS, AND SEISMICITY — Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? (Refer to Division of Mines and Geology Special Publication 42.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ii) Strong seismic ground shaking?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
iii) Seismic-related ground failure, including liquefaction?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
iv) Landslides?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Result in substantial soil erosion or the loss of topsoil?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) 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 on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion

a i.) **No Impact.** The project site is not located in an Alquist-Priolo Earthquake Fault Zone, as defined by the California State Department of Conservation, Geological Survey (CGS, formerly the Division of Mines and Geology), and no active or potentially active faults exist on, or in the immediate vicinity of the site (Sutter County, 2008). The Proposed Project/Action would involve trenching and excavating to a depth of no more than 25 feet on primarily level terrain and will incorporate the use of trench shoring measures consistent with the CBC and CAL/OSHA requirements for trenching and excavation activities. As a result the potential for slope instability hazards and landslides during construction and operation of the proposed project is not anticipated and no impact would occur.

aii-iv.) **Less-than-Significant Impact.** According to the Fault Activity Map for California (Jennings, 1994), the project area is located approximately 38 miles northeast of the Concord/Green Valley fault; 15 miles east of the Great Valley thrust fault (segments 4 and 5); 40 miles west of the Foothills Fault System; and 50 miles west of the Marsh Creek-Greenville fault system. It is likely that the project area would experience at least

one major earthquake, greater than Magnitude 6, within the next 30 years. In the event of an earthquake in the eastern San Francisco Bay Area or along the Coast Range-Central Valley, severe ground motion could occur within the project area. The intensity of such an event would depend on the active fault, the distance to the epicenter, the magnitude of the event, and the duration of shaking.

The project area is generally level with the exception of the levee in the vicinity of the Meridian Diversion and Drexler diversion. Levees within the project area are inspected and maintained by the various Reclamation Districts that have jurisdiction and the California Department of Water Resources (DWR). These levees could be susceptible to failure during excessive ground motion, and areas where earthen fills are present could experience differential settlement. Construction of the Meridian Diversion and the demolition of the existing Meridian and Drexler diversions have the potential to alter the structural integrity of the levee by placing additional structural stress on the levee during a seismic event. Settling of a levee during an earthquake could result in failure of the earthen structure and result in damage to Proposed Project/Action facilities and damage to areas being protected by levees.

Proposed Project/Action facilities would be designed and constructed to industry standards to protect against impacts from adverse geological impacts associated with seismic activity and other site specific soils and geology constraints, including compliance with Uniform Building Code (UBC) standards for Seismic Risk Zone 3, California Building Code (CBC), International Building Code (IBC), and American Society of Civil Engineers (ASCE) standards. With respect to the levee in the proposed project site, construction of new and removal of existing diversion would require compliance with Central Valley Flood Protection Board (CVFPB) and Corps requirements. As a result, impacts associated with strong seismic ground shaking and seismic related ground failure would be less than significant.

- b) **Less-than-Significant Impact.** During construction of the Proposed Project/Action, grading and other soil disturbing activities may introduce the potential for soil erosion. See the discussion under Checklist Item 8 a,f for a discussion of the effects of soil erosion on water quality. As discussed under Checklist item 8 a,f, the MFWC would be required to prepare and implement a Storm Water Pollution Prevention Plan (SWPPP) in accordance with Section 402 of the Clean Water Act. In addition, to the extent possible and practical, topsoil that is removed in the farmed areas as part of project construction would be stockpiled separately and then replaced at the conclusion of construction. Stockpiles that are to remain on the site would be protected to prevent wind and water erosion according to measures outlined in the SWPPP. As a result, any potential impacts related to soil erosion and loss of top soil associated with the Construction of the Proposed Project/Action would be less than significant.

- c,d) **Less-than-Significant Impact.** As described under Checklist Item aii-iv, construction and demolition activities associated with the Proposed Project/Action would be accomplished according to industry standards, including conformance with the CBC, UBC, IBC, and

ASCE standards to protect proposed project facilities against hazards associated with unstable soil conditions, expansive soils, landslides, lateral spreading, subsidence, and/or liquefaction. As a result, impacts related to unstable and expansive soils would be less than significant.

- e) **No Impact.** No additional new on-site wastewater treatment systems would be installed to support the Proposed Project/Action and no impact would occur.

4.3.7 Greenhouse Gas Emissions

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
7. GREENHOUSE GAS EMISSIONS — Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Discussion

- a,b) **Less-than Significant Impact.** The Proposed Project/Action would result in minor emissions of GHGs associated with construction and operational activities. During construction, the proposed project would generate short-term, less than significant CO₂ emissions associated with combustion of gasoline and diesel fuel during the trenching, grading, clearing, and other site preparation activities. Operation of the Proposed Project/Action would result in the consolidation of existing intake facilities and would likely result in similar to or less than operational emissions as existing conditions. Lastly, both construction and operational GHG emissions would be intermittent and would be less than the lower reporting limit for major stationary sources established by the California Air Resources Board and the EPA, which typically include fossil fuel burning power plants, petroleum refineries, petrochemical plants, and food processing plants. As a result, the Proposed Project/Action would not represent a major source of GHGs and would be less than significant.

4.3.8 Hazards and Hazardous Materials

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
8. HAZARDS AND HAZARDOUS MATERIALS — Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Discussion

- a,b) Construction and operation of the Proposed Project/Action could involve the use, storage and disposal of small quantities of hazardous materials. The use, storage, and transport of hazardous materials would be required to comply with applicable local, state, and federal regulations. Transportation of hazardous materials on area roadways is regulated by CHP and Caltrans, and use of these materials is regulated by DTSC, as outlined in Title 22 of the CCR. Any project facilities that would use or store hazardous materials would be required to obtain permits and comply with appropriate regulatory agency standards designed to avoid hazardous waste releases. Because the Proposed Project/Action is required by law to implement and comply with existing hazardous material regulations, impacts related to the creation of significant hazards to the public through routine, transport, use, disposal, and risk of upset are less than significant. In addition, measures described in subsection 2.5, have been incorporated into the Proposed Project/Action that will be made conditions of approval, which minimize potential impacts associated with hazards and hazardous materials during construction and operation. These measures include

- protocols for the handling and transportation of potentially hazardous materials and the preparation of a hazardous materials management plan in the event of an accidental release or threatened release of hazardous materials. As a result, construction and operation the Proposed Project/Action would result in less-than-significant impacts related to hazards and hazardous materials.
- c) **Less-than-Significant Impact.** Winship Elementary is located within one quarter mile of Proposed Project/Action facilities. However, construction and operation of the pump station would be confined to the land parcel at the intersection of Alameda Street and South Meridian Road and would not affect the school facility. In considering the distance of these schools from proposed facilities and minimal quantities and types of hazardous substances used during construction, there would be negligible impacts to existing schools. In addition, measures described in subsection 2.5, have been incorporated into the Proposed Project/Action that will be made conditions of approval, which minimize potential impacts associated with hazards and hazardous materials during construction and operation. These measures include protocols for the handling and transportation of potentially hazardous materials and the preparation of a hazardous materials management plan in the event of an accidental release or threatened release of hazardous materials. As a result, construction and operation the Proposed Project/Action would result in less-than-significant impacts to existing schools.
 - d) **Less-than-Significant Impact.** None of the Proposed Project/Action facilities are located on a site which is known to be included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5. As indicated in Section 3, one site was identified within one mile of the Proposed Project/Action; however, the site is a sufficient distance (e.g. > 400 feet) away from actual construction activities and; therefore, would not create a significant hazard to the public or the environment and this impact would be less than significant.
 - e,f) **No Impact.** The closest airport is Sutter County Airport, which is located over 10 miles to the east of the project area. The construction and operation of the Proposed Project/Action would have no effect on preexisting safety hazards relative to any nearby public airport operations; therefore, no impact would occur.
 - g) **Less-than-Significant Impact.** The Proposed Project/Action would not affect any roads identified in the Sutter County General Plan as primary evacuation routes. However, several other temporary lane or road closures may be required as identified in Table 2-3 in Proposed Project/Action Description. MFWC would be required to obtain encroachment permits for all temporary and permanent road closures for all County road rights-of-way (ROW). Compliance with the terms of the encroachment permits would ensure that construction and operation of the Proposed Project/Action does not physically interfere with any adopted emergency response plan or emergency evacuation plan. As a result, the impact would be less than significant.

- h) **Less-than-Significant Impact.** The project area is classified as primarily non-fuel in nature, with one area having a moderate risk for wildfire (CalFire, 2008). As described in the Proposed Project/Action description, during construction, staging areas, welding areas, or areas slated for development using spark-producing equipment would be cleared of dried vegetation and other materials that could serve as fire fuel. Any construction equipment that normally includes a spark arrester shall be equipped with an arrester in good working order. Therefore construction and operation of the Proposed Project/Action would not be expected to expose people or structures to a significant risk of loss, injury or death involving wildland fires and this impact would be less than significant.

4.3.9 Hydrology and Water Quality

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
9. HYDROLOGY AND WATER QUALITY —				
Would the project:				
a) Violate any water quality standards or waste discharge requirements?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) Substantially alter the existing drainage pattern of a site or area through the alteration of the course of a stream or river, or by other means, in a manner that would result in substantial erosion or siltation on- or off-site?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d) Substantially alter the existing drainage pattern of a site or area through the alteration of the course of a stream or river, or by other means, substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
f) Otherwise substantially degrade water quality?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
h) Place within a 100-year flood hazard area structures that would impede or redirect flood flows?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
i) Expose people or 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?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
j) Expose people or structures to a significant risk of loss, injury or death involving inundation by seiche, tsunami, or mudflow?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

The following mitigation measures from the 2008 IS/EA were adopted by CDFG and would mitigate hydrology and water quality associated with implementation of both Phase 1 and Phase 2 of Proposed Project/Action. CDFG and MFWC would ensure that construction and operation of the Proposed Project/Action would be implemented consistent with the mitigation, monitoring and enforcement requirements for the 2008 IS/EA MMRP (See Appendix A).

2008 IS/EA MITIGATION MEASURES

Hydrology and Water Quality

HYDRO-1 Identify Site Specific Control Measures

Discussion

- a,f) **Less-than-Significant.** At the onset of project construction, there would be a potential for surface runoff to transport upland construction spoils into the adjacent river, which could result in temporary increases in turbidity and sedimentation in downstream portions of the Sacramento River. Construction operations within the river channel during trenching operations would also result in increases in turbidity. Excessive sediment in the water column (increased turbidity) can reduce channel capacity, alter drainage characteristics, or affect aquatic organisms through reduced water quality.

The removal of riparian vegetation along drainages and disturbance of the riverbed, bank or levees could also result in increased erosion during construction activities. Disturbing the geomorphic characteristics and stability of the channel bed and banks could lead to chronic erosion problems in the river's channel. Such impacts could be exacerbated if the riparian vegetation is not reestablished and stabilized prior to the next high-flow or precipitation event or if appropriate stream channel restoration actions are not taken.

Prior to construction, MFWC would be required to obtain an National Pollutant Discharge Elimination System (NPDES) Permit for Discharges of Stormwater Associated with Construction Activities (NPDES General Stormwater Permit), from the CVRWQCB. Conditions of this permit would include adherence to requirements of the revised NPDES General Permit, effective July 1, 2010. Permit requirements would include:

- Preparation of hazardous material spill control and countermeasure programs;
- Stormwater quality sampling, monitoring, and compliance reporting;
- Development and adherence to a Rain Event Action Plan;
- Adherence to numeric action levels and effluent limits for pH and turbidity; monitoring of soil characteristics on site;
- Mandatory training under a specific curriculum; and
- Mandatory implementation of Best Management Practices (BMPs), which may include, but would not be limited to:

- Physical barriers to prevent erosion and sedimentation including setbacks and buffers, rooftop and impervious surface disconnection, rain gardens and cisterns, and other installations;
- Construction and maintenance of sedimentation basins;
- Limitations on construction work during storm events;
- Use of swales, mechanical, or chemical means of stormwater treatment during construction, including vegetated swales, bioretention cells, chemical treatments, and mechanical stormwater filters; and
- Implementation of spill control, sediment control, and pollution control plans and training.

The specific BMPs to be implemented would be determined prior to issuance of the NPDES General Permit, in coordination with the CVRWQCB. Adherence to these BMPs would be required as a condition of the permit, and would substantially reduce or prevent waterborne pollutants from entering natural waters, per CVRWQCB standards.

The project would also be required to obtain Clean Water Act Section 401 and 404 permits which include requirements for the preparation of a SWPPP. The SWPPP would include measures to minimize erosion and sediment transport to streams and identify best management practices (e.g., water diversion and sediment containment devices, protection of construction spoils, installation of water bars), site restoration, post-construction monitoring of the effectiveness of best management practices, contingency measures, responsible parties, and agency contacts.

Groundwater extracted during construction dewatering would be undertaken in accordance with RWQCB General Order No. 5-00-175 for NPDES General Permit No. CA G995001. This General Order and NPDES permit covers waste discharge requirements for dewatering and other low threat discharges to surface water.

Compliance with NPDES permit requirements and development and implementation of a SWPPP would reduce construction water quality impacts to less-than-significant level.

- b) **Less-than-Significant Impact.** The use of groundwater wells for potable or irrigation water is not proposed and no existing wells are located within the footprint of proposed facilities. It is recognized that dewatering operations would occur and may result in localized and temporary lowering of the water table. However, as described under Checklist Item 8a,f, these operations would implement standardized methods as required by the RWQCB and the MFWC's adopted NPDES General Dewatering Permit. Methods for treating this water would also be outlined in the MFWC's SWPPP. Consequently, impacts to groundwater quantity and quality during the construction and operation of the Proposed Project/Action would be less than significant.
- c) **Less-than-Significant Impact.** Construction activities would occur during periods of low flow (July through September) to minimize bank erosion. Once fully implemented, the Proposed Project/Action would result in a net reduction in the number of diversion

impoundment along the Sacramento River. In addition, implementation of 2008 IS/EA Mitigation Measure HYDRO-1 would minimize the exposure of sediments to runoff and would not result in the permanent alteration of the river's channel and this impact would be reduced to a less-than-significant level.

- d) **Less-than-Significant Impact.** Existing drainage patterns would be temporarily disrupted during project construction. Two small drainage ditches are located near the proposed Drexler re-lift pump station on the western side of the Main Canal. Berm widening and the placement of the pump pad would impact these two locations. These activities, however, are not likely to affect the overall capacity of the drainages. As a result, drainage related impacts would be less than significant.
- e) **Less-than-Significant Impact.** Implementation of the Proposed Project/Action would overall create up to a half acre of new impervious surface but is not expected to substantially create runoff that would exceed the capacity of an existing or planned stormwater drainage system; therefore, this impact would be areas of low permeability. Consequently, the amount of additional runoff expected to be generated by the project would be minimal. Therefore, the Proposed Project/Action is not expected to exceed the capacity of existing or planned storm water drainage systems, and impacts would be less than significant.
- g) **No Impact.** The Proposed Project/Action would include the construction or placement of housing within floodplains; therefore, no impact would occur.
- h) **Less-than-Significant Impact.** MWH engineers (2002) conducted a preliminary hydraulic analysis for sections of the Sacramento River in the vicinity of the project. Based upon the data from 1950 through 2000, the 90 percent and 10 percent exceedance flows at Meridian were used to calculate the stage elevations. The stage elevations used for the design at Meridian were 32.6 feet at 90% exceedance flows and 50.3 feet at 10% exceedance flows. Likewise, the stage elevations used for the design at the Grimes diversion were 27.7 feet at 90 % exceedance flows and 45.6 feet at 10% exceedance flows. The 90% exceedance flow elevation was used as a starting point to determine the upper limit of the fish screens that would lead to submergence. The pump motors at the proposed Meridian Diversion would be located on the land-side of the levee.

Control structures utilized during construction of the Proposed Project/Action would be used during the summer months when surface flows are at their minimum. It is the MFWD's intention to complete all river-side work during the lowest possible levels. In addition, the Proposed Project/Action would result in the consolidation of existing surface water diversions, thereby resulting in a net reduction in the number of diversion impoundments with the Sacramento River. Therefore, no new structures would be placed within a 100-year flood hazard that would redirect or impede flood flows and this impact would be less than significant.

- i) **Less-than-Significant Impact.** All structures constructed on or adjacent to the Sacramento River levee would be designed and built to Corps and CVFPB standards and requirements

to mitigate the risk of levee failure and flooding. Compliance with Corps and CVFPB standards would reduce impacts associated with flooding to less than significant.

- j) **No Impact.** The project area is located on and near flat topography remote from major water bodies capable of producing a seiche, tsunamis, or significant mudflows. No impact would occur.

4.3.10 Land Use and Land Use Planning

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
10. LAND USE AND LAND USE PLANNING — Would the project:				
a) Physically divide an established community?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion

- a,b) **No Impact.** Implementation of the Proposed Project/Action would not directly or indirectly physically divide an established community as there are no established communities in the project area. The Proposed Project/Action would continue to serve existing agricultural uses in the vicinity of the project area and would not conflict with or be incompatible with existing land use and zoning plans related to agriculture. Therefore, no impact would occur. Never the less, measures described in subsection 2.5, have been incorporated into the Proposed Project/Action that will be made conditions of approval, which would require compensation for temporary and permanent easements and for property loss and/or damage to property.
- c) **No Impact.** The Project/Action area is not within a defined Habitat Conservation Plan Area and therefore, construction and operation of the Proposed Project/Action is not expected to conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. No impact would occur.

4.3.11 Mineral Resources

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
11. MINERAL RESOURCES — Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion

- a,b) **No Impact.** As identified in the Sutter County General Plan, there are no active mines or sources of mineral extraction in the vicinity of the project site (Sutter County, 2008). Therefore, implementation of the Proposed Project/Action would not result in the loss of availability of a known mineral resource and would not result in the loss of availability of a locally-important mineral resource recovery site. No impact would occur.

4.3.12 Noise

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
12. NOISE — Would the project:				
a) Result in Exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Result in Exposure of persons to, or generation of, excessive groundborne vibration or groundborne noise levels?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Result in A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d) Result in A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) For a project located within an airport land use plan area, or, where such a plan has not been adopted, in an area within two miles of a public airport or public use airport, would the project expose people residing or working in the area to excessive noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) For a project located in the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

The following mitigation measures from the 2008 IS/EA were adopted by CDFG and would mitigate noise impacts associated with implementation of both Phase 1 and Phase 2 of Proposed Project/Action. CDFG and MFWC would ensure that construction and operation of the Proposed Project/Action would be implemented consistent with the mitigation, monitoring and enforcement requirements for the 2008 IS/EA MMRP (See Appendix A).

2008 IS/EA MITIGATION MEASURES

Noise

NOISE-1	Minimization of Construction and Operational Noise
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Discussion

- a) **Less-than-Significant Impact with Mitigation.** Sutter County does not have a community noise ordinance, but regulates noise and noise land use incompatibility through implementation of its General Plan Noise Element (Sutter County, 2011). Policy N 1.4 requires that all new non-transportation noise (e.g., stationary sources) be mitigated to levels in Table 11-3 of the Sutter County General Plan Noise Element (Sutter County, 2011). Table 11-3 establishes an hourly noise level of 55 dBA and maximum noise level of 70 dBA for non-transportation noises sources during daytime hours (7:00 am to 10:00 pm) (Sutter County, 2011). In addition, the Noise Element establishes noise level performance standards.

The project site is located in rural Sutter County. Sensitive receptors in the vicinity of the Proposed Project/Action area are generally limited to scattered rural residences and small residential areas in the town of Meridian. The Meridian pump station would generate noise comparable to that of the existing pump station facility; no long-term changes to the ambient noise environment are anticipated. The Drexler re-lift pump station is located over 3,000 feet from the closest resident and therefore would have little or no effect on the existing ambient noise environment. In addition, measures described in subsection 2.5, have been incorporated into the Proposed Project/Action that will be made conditions of approval, which would require noise attenuation during construction activities to minimize exposure of persons to noise levels in excess of applicable standards. In addition, implementation of 2008 IS/EA Mitigation Measure NOISE-1 would further minimize increases in noise levels. Therefore, this would be considered a less-than-significant impact.

- b,d) **Less-than-Significant Impact with Mitigation.** Construction activities could lead to temporary or periodic increases in ambient noise levels in the project vicinity above the existing ambient noise levels. Construction of the Proposed Project/Action would also involve the use of pile-driving activities which could generate noise in excess of 95 dBA at a distance of 50 feet, despite the incorporation of feasible noise control measures. The nearest residence to the proposed Meridian Diversion is located at a distance of approximately 630 feet.

Using this distance in conjunction with an attenuation rate of 6 dBA per doubling of distance from the source, noise at the nearest residence during pile driving activities could reach 74 dBA. This value is above the County's maximum standard of 70 dBA during daytime hours.

Measures described in subsection 2.5, have been incorporated into the Proposed Project/Action that would be made conditions of approval, which would require noise attenuation during construction activities to minimize exposure of receptors to increased noise levels. In addition, implementation of 2008 IS/EA Mitigation Measure NOISE-1 would further minimize increases in noise levels. Therefore, increases in noise levels associated with pile driving and other construction activities would be less than significant.

- c) **Less-than-Significant Impact.** As described in Checklist Item 11a, noise generated from the operation of the Proposed Project/Action would be comparable to the existing ambient noise environment once constructed. In addition, measures described in subsection 2.5, have been incorporated into the Proposed Project/Action that will be made conditions of approval, which would require noise attenuation be incorporated into final project design to minimize exposure of persons to increases in operational noise levels. Therefore, the Proposed Project/Action would not result in a substantial permanent increase in noise levels and this impact would be less than significant.
- e) **No Impact.** The closest airport, Sutter County Airport, is located at approximately 14 miles from the Proposed Project/Action. Furthermore, no new development of noise sensitive land uses is proposed as part of the Proposed Project/Action. For this reason, the Proposed Project/Action would not expose people residing or working in the project area to excessive noise levels associated with air traffic. No impact would occur.
- f) **No Impact.** The Proposed Project/Action is not located within the immediate vicinity of a private airstrip. No impact would occur

4.3.13 Population and Housing

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
13. POPULATION AND HOUSING — Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Displace substantial numbers of existing housing units, necessitating the construction of replacement housing elsewhere?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion

- a) **No Impact.** The Proposed Project/Action is designed to protect and enhance anadromous fisheries on the Sacramento River and comply with state and federal Endangered Species

Acts as MFWC continues to divert water from the Sacramento River for agricultural irrigation. The Proposed Project/Action would not increase the amount of entitled water diverted from the Sacramento River and all diverted water would continue to be used exclusively for agricultural irrigation. Therefore, construction and operation of the Proposed Project/Action would not contribute to an increase in regional or local populations and no impact would occur.

- b,c) **No Impact.** The Proposed Project/Action would not require the demolition of existing housing, thereby displacing substantial numbers of people necessitating the construction of housing elsewhere. As a result, no impacts related to population and housing would occur.

4.3.14 Public Services

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
14. PUBLIC SERVICES — Would the project:				
a) Result in substantial adverse physical impacts associated with the provision of, or the need for, new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services:				
i) Fire protection?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ii) Police protection?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
iii) Schools?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
iv) Parks?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
v) Other public facilities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion

- ai-v) **No Impact.** The Proposed Project/Action is designed to divert water from the Sacramento River for agricultural irrigation and would not increase the amount of entitled water diverted from the Sacramento River. Therefore, construction and operation of the Proposed Project/Action would not contribute to an increase in regional or local populations resulting in an increased demand for public services. No impact would occur.

4.3.15 Recreation

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
15. RECREATION — Would the project:				
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facilities would occur or be accelerated?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion

- a,b) **No Impact.** The Proposed Project/Action is the construction and operation of an agricultural water system to support existing agricultural uses. Implementation of the Proposed Project/Action would not contribute to an increased in demand for parks or other recreational facilities or require the construction or expansion of new recreational facilities. No impact to recreational resources would occur.

4.3.16 Transportation and Traffic

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
16. TRANSPORTATION AND TRAFFIC — Would the project:				
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Conflict with an applicable congestion management program, including, but not limited to, level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) 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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Result in inadequate emergency access?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion

- a,b) **Less-than-Significant Impact with Mitigation.** Construction of the Proposed Project/Action would intermittently and temporarily generate increases in vehicle trips by construction workers and construction vehicles on area roadways. Construction activities would also result in a temporary reduction in the number of, or the available width of, travel lanes on roads where full or partial closures are required, resulting in short-term traffic delays for vehicles traveling past the construction zones, and in some cases, temporary closure of road segment, with resulting disruption to access for adjacent land uses and streets for both general traffic and emergency vehicles.

Construction activities would also generate short-term increases in vehicle trips by construction workers and construction vehicles on area roadways to and from construction areas. Construction-generated traffic would be temporary and therefore would not result in any long-term degradation in operating conditions or level of service (LOS) on any local roadways. The primary off-site impacts from the movement of construction trucks, primarily any materials hauling trucks, would include short-term and intermittent lessening of roadway capacities due to slower movements and larger turning radii of the trucks compared to passenger vehicles.

Implementation of the following mitigation measures would reduce potential conflicts during construction activities to a less-than-significant level.

Mitigation Measure TRAFFIC-1: Following completion of construction activities, contractor(s) shall restore any damage to construction access routes to existing conditions or better.

Mitigation Measure TRAFFIC-2: Prior to and during construction activities, contractor(s) shall prepare and implement a Traffic Control Plan in accordance with professional engineering standards prior to construction. The Traffic Control Plan should include the following requirements, or equally effective measures:

- Emergency services access to local land uses shall be maintained at all times for the duration of construction activities. Local emergency service providers shall be informed of road closures and detours.
- For roadways requiring full closures, contractor(s), in coordination with Sutter County, shall develop circulation and detour plans to minimize impacts to local street circulation. This would include the use of signing to guide vehicles onto alternative roads around the construction zone.
- Advanced warning signs of construction activities shall be posted to allow motorists to select alternative routes in advance. This will include noticing of residents and businesses fronting the alignment at least two weeks prior to the commencement of construction activities.
- Access for local land uses including during construction activities shall be maintained.
- Roadside safety protocols shall be complied with, so as to reduce the risk of accident.
- A telephone resource shall be arranged to address public questions and complaints during project construction.

- c) **No Impact.** The proposed project would not involve aircraft, nor would the project structures intrude into aircraft flight paths or air traffic spaces. Therefore, the Proposed Project/Action would not impact on air traffic patterns that results in substantial safety risks. No impact would occur.
- d) **No impact.** The Proposed Project would not include the design, construction or operation of any roadways. Therefore, it would not substantially increase hazards due to sharp curves or dangerous intersections or incompatible uses. No impact would occur.
- e) **Less-than-Significant Impact with Mitigation.** Construction activities would affect access for emergency vehicles traveling past the construction zones. Construction within or across streets, and temporary reduction in travel lanes, could result in delays for emergency vehicle access in the vicinity of the worksites. In addition, access to driveways and to cross streets along the construction route could be temporarily blocked due to trenching and paving. This could be an inconvenience to some and a significant problem for others, particularly emergency service providers (e.g., police and fire). Travel through the construction zone by emergency vehicles would be maintained at all time. With the incorporation of Mitigation Measure TRAFFIC-2 impacts to emergency access would be less than significant.
- f) **No Impact.** The project area is not served by designated transit, bicycle, or pedestrian facilities. Therefore impacts to adopted plans or policies related to public transit, bicycle, or pedestrian facilities are not anticipated and no impact would occur.

4.3.17 Utilities and Service Systems

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
17. UTILITIES AND SERVICE SYSTEMS —				
Would the project:				
a) Conflict with wastewater treatment requirements of the applicable Regional Water Quality Control Board?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Require or result in the construction of new storm water drainage facilities, or expansion of existing facilities, the construction of which could cause significant environmental effects?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Result in a determination by the wastewater treatment provider that would serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
g) Comply with federal, state, and local statutes and regulations related to solid waste?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Discussion

- a,b,e) **No Impact.** The Proposed Project/Action is designed to divert water from the Sacramento River for agricultural irrigation and would not increase the amount of entitled water diverted from the Sacramento River. Therefore, construction and operation of the Proposed Project/Action would not contribute to an increase in regional or local populations resulting in the construction of new or expanded wastewater or water treatment facilities. Therefore, implementation of the Proposed Project/Action would not exceed wastewater treatment requirements of the CVRWQCB. Therefore, no impact would occur.
- c) **No Impact.** The Proposed Project/Action would not increase impervious surface cover over existing condition so that it would require the construction of a new storm drainage system or expansion of an existing stormwater drainage facility. Therefore, no impact would occur.
- d) **No Impact.** MFWC has sufficient water supplies and existing entitlements to serve the Proposed Project/Action. Therefore, no new or expanded entitlements would be required for the Proposed Project/Action and no impact would occur.
- f,g) **Less-than-Significant Impact.** Construction activities would not generate a significant amount of solid wastes. It is anticipated that solid wastes generated by construction activities would be disposed by the contractor(s) at the Ostrum Road Landfill in Yuba County, which has an expected closure date of 2066 (Sutter County, 2008). The Ostrum Road Landfill is the primary location for the disposal of waste by the Yuba Sutter Disposal, Inc. Once constructed, operation of the Proposed Project/Action would continue to produce solid wastes approximately equivalent to the existing operations and therefore would not substantially increase the amount of wastes to be collected, transported and disposed of at the YSDI landfill. As a result, the Proposed Project/Action is expected to have less-than-significant impact on solid waste disposal.

4.3.18 Environmental Justice, Socioeconomics, and Indian Trust Assets

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
18. Environmental Justice, Socioeconomics, and Indian Trust Assets — Would the project:				
a) Adversely affect minority or low-income populations and Indian Trust Assets?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Discussion

- a) Demographic analysis of the local population indicates that no minority or low-income communities of concern are located within the affected environment for the Proposed

Project/Action that warrant environmental justice analysis. Reclamation has determined that there are no ITAs within the vicinity of the project area. Consequently, no environmental justice, socioeconomic or Indian trust impacts are associated with the Proposed Project/Action.

4.3.19 Mandatory Findings of Significance

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
19. MANDATORY FINDINGS OF SIGNIFICANCE — Would the project:				
a) Have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Have environmental effects that would cause substantial adverse effects on human beings, either directly or indirectly?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Discussion

- a) **Less-than-Significant with Mitigation.** As discussed in the Air Quality, Geology Soils and Seismicity, Hydrology and Water Quality, Noise, and the Transportation and Traffic, sections of this Initial Study, the Proposed Project/Action would result in potentially significant temporary impacts as a result of construction of the Proposed Project/Action that would have the potential to degrade the quality of the environment. However, adoption and implementation of mitigation measures described in this Initial Study would reduce these individual impacts to less than significant levels.
- b) **Less-than-Significant with Mitigation.** The impacts of the Proposed Project/Action are individually limited and not considered "cumulatively considerable". Although incremental changes can be expected as a result of the implementation of the Proposed Project/Action, all environmental impacts that could potentially occur would be reduced to a less than significant level through implementation of the mitigation measures recommended in this Initial Study for the following resource areas: Air Quality, Geology Soils and Seismicity, Hydrology and Water Quality, Noise, and Transportation and Traffic.

- c) **Less-than-Significant with Mitigation.** Proposed Project/Action impacts include the potential for an accidental release of hazardous materials stored in the proposed project construction area that could enter nearby waterways, adjacent lands, or public roadways. With implementation of mitigation measures provided in the Hazards and Hazardous Materials section, the proposed project would not result in environmental effects that could cause adverse effects on human beings, either directly or indirectly. Temporary impacts to human beings through degradation of local air quality and noise could occur during construction. However, with implementation of mitigation measures provided in the Air Quality and Noise sections, these temporary impacts would be less than significant.
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APPENDIX A

Mitigation Monitoring and Reporting Program

This Mitigation Monitoring and Reporting Program (MMRP) has been prepared by the California Department of Fish and Game (CDFG) in conjunction with the Proposed Project/Action. The Proposed Project/Action has been evaluated in an Initial Study/Environmental Assessment and Mitigated Negative Declaration/Finding of No Significant Impact prepared in accordance with the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). The legislation requires public agencies to ensure that adequate mitigation measures are implemented and monitored for Mitigated Negative Declarations.

The legal basis for the development and implementation of the MMRP lies within both CEQA (including the California Public Resources Code) and NEPA. Sections 21002 and 21002.1 of the California Public Resources Code state:

- Public agencies are not to approve projects as proposed if there are feasible alternatives or feasible mitigation measures available that would substantially lessen the significant environmental effects of such projects; and each public agency shall mitigate or avoid the significant effects on the environment of projects that it carries out or approves whenever it is feasible to do so.
- Section 21081.6 of the California Public Resources Code further requires that the public agency shall adopt a reporting or monitoring program for the changes made to the project or conditions of project approval, adopted to mitigate or avoid significant effects on the environment. The reporting or monitoring program shall be designed to ensure compliance with mitigation measures during project implementation. The monitoring program must be adopted when a public agency makes its findings under CEQA so that the program can be made a condition of project approval in order to mitigate significant effects on the environment.

NEPA 40 CFR Sections 1502.14f requires:

- Agencies shall include appropriate mitigation measures not already included in the proposed action or alternatives.

This MMRP has been developed to ensure that project sponsor, Meridian Farms Water Company (MFWC), carries out the adopted measures to mitigate and/or avoid significant environmental impacts associated with the construction and operation of the Proposed Project/Action. This MMRP identifies new and/or modified mitigation measures specific to the Phase 2 Proposed Project/Action (Table C-1) as well as applicable 2008 IS/EA measures previously adopted by the CDFG (Table C-2). These 2008 IS/EA mitigation measures would be implemented, enforced, and

monitored consistent with the MMRP for the 2008 IS/EA and are included in the MMRP for the Proposed Project/Action for reference only.

TABLE C-1
MITIGATION MONITORING AND REPORTING PROGRAM
NEW AND/OR REVISED PHASE 2 MITIGATION MEASURES¹

Mitigation Measure	Implementing/ Funding Responsibility	Monitoring/Review Oversight	Timing	Verification of Compliance (Initials and Date)
Biological Resources				
Mitigation Measure BIO-2: Staging Areas. During construction operations, stockpiling of construction materials, portable equipment, vehicles, and supplies will be restricted to the designated construction staging areas and exclusive of the Environmentally Sensitive Areas (ESAs). A clear and solid barrier fence, such as a combination of exclusionary and silt fencing, will be installed along the boundaries of the staging area to prevent contamination of ESAs during such operations.	MFWC	CDFG/USBR	Prior to and throughout construction activities	
Mitigation Measure BIO-3: Pre-construction Surveys. No more than 24-hours prior to the commencement of construction activities, a USFWS-approved biologist shall survey areas deemed suitable giant garter snake (GGS) habitat for the presence of GGS. The biologist will provide the USFWS with a written report that adequately documents the methodology and results of the pre-construction survey. These areas shall be re-inspected by the biologist whenever a lapse in construction activity of two and removed at the end of each workday from the entire project site.	MFWC	CDFG/ USFWS	Prior to construction activities	
Mitigation Measure BIO-16: De-watering GGS Habitat. During the giant garter snake active period (May 1-September 31), giant garter snake aquatic habitat may be dewatered starting on April 15. Any dewatered habitat must remain dry for at least 15 consecutive days after April 15 and prior to excavating or filing the dewatered habitat.	MFWC	CDFG/USBR	15 consecutive days prior to construction in any dewatered areas after April 15.	
Mitigation Measure BIO-18: Compensation. Compensation for temporary and permanent impacts to GGS habitat is the responsibility of MFWC. Temporary impacts shall be restored to pre-project conditions. Areas subject to temporary impacts shall be limited to one season (the calendar year period between May 1 and October 1) and be restored within two seasons. In addition, GGS habitats temporarily disturbed during the inactive season (3.4 acres of aquatic habitat and 6.4 acres of upland habitat) will be replaced at a level of 1:1 by purchasing credits in a USFWS-approved mitigation bank prior to project construction.	MFWC	CDFG/USBR	After completion of construction activities	
Mitigation Measure BIO-A: Spoil Sites. Spoil sites shall be located so they do not drain directly into the waterways. If a spoil site drains into a water body, catch basins shall be constructed to intercept sediment before it reaches the channels. Spoil sites shall be graded to reduce the potential for erosion.	MFWC	CDFG/USBR	Prior to and throughout construction activities	
Mitigation Measure BIO-B: Hazardous Materials. A spill prevention plan for potentially hazardous materials shall be prepared and implemented. The plan shall include the proper handling and storage of all potentially hazardous materials, as well as the proper procedures for cleaning up and reporting of any spills. If necessary, containment berms shall be constructed to prevent spilled materials from reaching the creek channels.	MFWC	CDFG/USBR	Prior to construction activities	

Mitigation Measure	Implementing/ Funding Responsibility	Monitoring/Review Oversight	Timing	Verification of Compliance (Initials and Date)
Mitigation Measure BIO-C: Storage. Equipment and materials shall be stored at least 50 feet from waterways. No debris such as trash and spoils shall be deposited within 100 feet of waterways. Staging and storage areas for equipment, materials, fuels, lubricants and solvents, shall be located outside of the stream channel and banks. Stationary equipment such as motors, pumps, generators, compressors and welders, located within or adjacent to the stream shall be positioned over drip pans. Any equipment or vehicles driven and/or operated within or adjacent to the stream shall be checked and maintained daily, to prevent leaks of materials that if introduced to water could be deleterious to aquatic life. Vehicles shall be moved away from the stream prior to refueling and lubrication.	MFWC	CDFG/USBR	Throughout construction activities	
Mitigation Measure BIO-D: Vehicle Maintenance. Proper and timely maintenance for vehicles and equipment used during construction shall be provided to reduce the potential for mechanical breakdowns leading to a spill of materials into or around the creeks. Maintenance and fueling shall be conducted in an area that meets the criteria set forth in the spill prevention plan (i.e., away from sensitive drainages).	MFWC	CDFG/USBR	Throughout construction activities	
Mitigation Measure BIO-E: Dust Prevention. Water used for dust abatement, if necessary, shall be acquired from an authorized off-site source. Water shall be a clean water source in accordance with California RWQCB Construction Storm Water Program and/or as authorized under a separate National Pollutant Discharge Elimination System (NPDES) permit.	MFWC	CDFG/USBR	Throughout construction activities	
Mitigation Measure BIO-F: Daily Monitoring. A qualified biological monitor shall be on site during in-water construction activities. The biological monitor shall be authorized to halt construction if impacts to special-status salmonid species are evident.	MFWC	CDFG/USBR	Throughout construction activities	
Mitigation Measure BIO-G: Riparian Habitat. Current riparian vegetation shall be retained to extent feasible.	MFWC	CDFG/USBR	Throughout construction activities	
Mitigation Measure BIO-H: Fish Rescue Plan. A fish rescue plan shall be prepared by MFWC prior to the implementation of the project and provided for review and comment to U.S. National Marine Fisheries Service (NMFS), USFWS, and CDFG as appropriate. A qualified fisheries biologist will design and conduct a fish rescue and relocation effort to collect fish from the area within the cofferdam involving the capture and return of those fish to suitable habitat within the Sacramento River. To ensure compliance, a fisheries biologist shall provide observation during initial dewatering activities within the cofferdam. Following the fish rescue effort, a report shall be prepared by the fisheries biologist and submitted to NMFS within 30 days.	MFWC	NMFS	Prior to and during construction activities	
Mitigation Measure BIO-22: Swainson's Hawk, Nesting Raptors and Other Nesting Bird Survey. For any construction activities that will occur between March 1 and August 31 of any given year, the applicant shall conduct preconstruction surveys in suitable nesting habitat within 0.5 mile of the construction area for nesting raptors. Surveys shall be conducted by a qualified biologist. In addition, all trees slated for removal during the nesting season shall be surveyed by a qualified biologist no more than 48-hours before removal to ensure that no nesting birds are occupying the tree. If active nests are found during the survey, the applicant shall implement appropriate mitigation measures to ensure that the species will not be adversely affected, which will include establishing a	MFWC	CDFG/USBR	Prior to and throughout construction activities	

Mitigation Measure	Implementing/ Funding Responsibility	Monitoring/Review Oversight	Timing	Verification of Compliance (Initials and Date)
no-work buffer zone as, approved by the CDFG, around the active nest. The no-work buffer may vary depending on species and site specific conditions as approved by CDFG. Appropriate mitigation measures include delaying construction activities until a qualified biologist determines that juveniles have fledged the nest(s), or establishing a "no construction" zone buffer around the nest.				
The results of the survey shall be documented in a letter report that is distributed to the CDFG. These measures would ensure compliance with the Migratory Bird Treaty Act and CDFG Code 3503.5.				
Mitigation Measure BIO-23: Riparian Habitat Exclusion. Where construction work occurs adjacent to riparian habitat (i.e., at the existing Drexler Diversion and Pumping Plant and the Grimes Canal modifications), there shall be no encroachment by construction equipment or personnel into existing riparian habitat areas located along the Sacramento River. Storage or parking of equipment shall be restricted within 100 feet of riparian habitat.	MFWC	CDFG/USBR	Throughout construction activities	
Mitigation Measure BIO-I: Pre-construction surveys for burrowing owls shall be conducted by a qualified biologist as approved by the CDFG within 30-days prior to the start of work activities where land construction is planned in known or suitable habitat. If construction activities are delayed for more than 30 days after the initial preconstruction surveys, then a new preconstruction survey shall be required. All surveys shall be conducted in accordance with the CDFG/California Burrowing Owl Consortium survey protocols. This survey can be conducted concurrently with Mitigation Measure BIO-22.	MFWC	CDFG/USBR	Prior to and throughout construction activities	
If burrowing owls are discovered in the proposed project site vicinity during construction, the onsite biologist shall be notified immediately. Occupied burrows should not be disturbed during the nesting season (February 1 through August 31) unless a qualified biologist approved by the CDFG verifies through non-invasive methods that either: (1) the birds have not begun egg-laying and incubation; or (2) that juveniles from the occupied burrows are foraging independently and are capable of independent survival.				
If this criteria is not met, occupied burrows during the nesting season will be avoided by establishment of a no-work buffer of 250-foot around the occupied/active burrow. Where maintenance of a 250-foot no-work buffer zone is not practical, the applicant shall consult with the CDFG to determine appropriate avoidance measures. Burrows occupied during the breeding season (February 1 to August 31) will be closely monitored by the biologist until the young fledge/leave the nest. The onsite biologist shall have the authority to stop work if it is determined that construction related activities are disturbing the owls.				
If criterion 1 or 2 above are met and as approved by CDFG, the biologist shall undertake passive relocation techniques by installing one-way doors in active and suitable burrows allowing owls to escape but not re-enter. Owls should be excluded from the immediate impact zone and within a 160-foot buffer zone by having one-way doors placed over the entrance to prevent owls from inhabiting those burrows.				
After nesting season ends (August 31) and the burrow is deemed unoccupied by the biologist, passive relocation techniques shall take place. Construction activities may occur once a qualified biologist has deemed the burrows are unoccupied.				

Mitigation Measure	Implementing/ Funding Responsibility	Monitoring/Review Oversight	Timing	Verification of Compliance (Initials and Date)
<p>Mitigation Measure BIO-J: Wetlands. If it is determined that the Proposed Project/Action impacts waters of the U.S., the MFWC shall obtain all required permit approvals from the Corps, Regional Water Quality Control Board (RWQCB), CDFG and any other agencies with permitting responsibilities for construction activities within jurisdictional features. Permit approvals and certifications would likely include the following:</p> <p><u>Clean Water Act Section 404.</u> Permit approval from the Corps shall be obtained for the placement of dredge or fill material in waters of the U.S. pursuant to Section 404 of the federal Clean Water Act. The Section 404 permit application would require a delineation of wetlands and other waters of the U.S., a jurisdictional determination from the Corps, and preparation of a Pre-Construction Notification (PCN) and supporting documentation. A PCN outlines project activities, areas of impact, construction techniques, and methods for avoiding and reducing impacts to jurisdictional features. State and federal regulations require that the project applicant avoid or minimize impacts to wetlands and waters and develop appropriate protection for wetlands. Wetlands that cannot be avoided must be compensated to result in "no net loss" of wetlands to ensure that the project would maintain the current functions and values of onsite wetland habitats.</p> <p><u>Clean Water Act Section 401 Water Quality Certification/Porter-Cologne Act.</u> Approval of Water Quality Certification (WQC) under the CWA and/or Waste Discharge Requirements (WDRs) under the Porter-Cologne Act shall be obtained from the RWQCB for work within jurisdictional waters. Application for a WQC requires an application and supporting materials, including construction techniques, areas of impact, mitigation measures, project schedule, and proof of CEQA compliance. Application for a WDR requires an application and supporting materials, including a characterization of the discharge which includes but is not limited to: design and actual flows; a list of constituents and the discharge concentration of each constituent; a list of other appropriate waste discharge characteristics; a description and schematic drawing of all treatment process; a description of any BMPs used; and a description of disposal methods. Proof of CEQA compliance is also required.</p> <p><u>California Fish and Game Code Section 1602.</u> CDFG requires a Streambed Alteration Agreement for activities that result in alteration of the bed or bank of a stream (typically the top of bank or edge of riparian habitat, whichever is greater), or that adversely impact fish or wildlife resources. The notification package must include supporting materials, including construction techniques, areas of impact, mitigation measures, project schedule, and proof of CEQA compliance.</p>	MFWC	CDFG/USBR	Prior to construction activities	
<p>Mitigation Measure BIO-28: Compensation for Loss of Jurisdictional Wetlands. If the Proposed Project/Action results in the permanent degradation of riverine and wetland habitat, those impacts shall be compensated for at a 1:1 ratio through the purchase of similar habitat value from a USFWS-approved conservation bank. Compensation shall take the form of wetland and/or riverine preservation or creation in accordance with the Corps and CDFG mitigation requirements, as required under project permits. Preservation and creation may occur onsite through a conservation agreement or offsite through purchasing credits at a Corps approved mitigation bank.</p>	MFWC	CDFG/USBR	After completion of construction activities	
Transportation and Traffic				
<p>Mitigation Measure TRAFFIC-1: Following completion of construction activities, contractor(s) shall restore any damage to construction access routes to existing conditions or better.</p>	MFWC	CDFG/USBR	After completion of construction activities	

Mitigation Measure	Implementing/ Funding Responsibility	Monitoring/Review Oversight	Timing	Verification of Compliance (Initials and Date)
<p>Mitigation Measure TRAFFIC-2: Prior to and during construction activities, contractor(s) shall prepare and implement a Traffic Control Plan in accordance with professional engineering standards prior to construction. The Traffic Control Plan should include the following requirements, or equally effective measures:</p> <ul style="list-style-type: none"> • Emergency services access to local land uses shall be maintained at all times for the duration of construction activities. Local emergency service providers shall be informed of road closures and detours. • For roadways requiring full closures, contractor(s), in coordination with Sutter County, shall develop circulation and detour plans to minimize impacts to local street circulation. This would include the use of signing to guide vehicles onto alternative roads around the construction zone. • Advanced warning signs of construction activities shall be posted to allow motorists to select alternative routes in advance. This will include noticing of residents and businesses fronting the alignment at least two weeks prior to the commencement of construction activities. • Access for local land uses including during construction activities shall be maintained. • Roadside safety protocols shall be complied with, so as to reduce the risk of accident. • A telephone resource shall be arranged to address public questions and complaints during project construction. 	MFWC	CDFG/USBR	Prior to and throughout construction activities	

¹Measures modified from the 2008 IS/EA are identified by numerals (e.g. BIO-2), while new measures are identified by letters (e.g. BIO-A)

TABLE C-2
MITIGATION MONITORING AND REPORTING PROGRAM
2008 IS/EA ADOPTED MITIGATION MEASURES

Mitigation Measure	Implementing/ Funding Responsibility	Monitoring/Review Oversight	Timing	Verification of Compliance (Initials and Date)
Air Quality				
Mitigation Measure AIR-1. Implement FRAQMD Best Available Mitigation Measures For Construction Activity:	MFWC	CDFG/USBR	Prior to approval of dust control plan	
Implement PM10 control measures outlined in the FRAQMD Fugitive Dust Control Plan.				
MFWC shall require its construction contractor(s) to assemble a comprehensive inventory list (i.e., make, model, engine year, horsepower, 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 both Phases 1 and 2 construction activities and apply the following mitigation measure: <i>Reducing NOx emissions from off-road diesel powered equipment</i> MFWC or its construction contractor(s) 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 construction of Phases 1 and 2, including owned, leased and subcontractor vehicles, will achieve a project wide fleet-average 20 percent NOx reduction and 45 percent particulate reduction 1 compared to the most recent CARB fleet average at time of construction. A Construction Mitigation Calculator (MS Excel) may be downloaded from the SMAQMD web site to perform the fleet average evaluation http://www.airquality.org/ceqa/index.shtml . Acceptable options for reducing emissions may include use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, perform offsite mitigation projects, provide funds for air district offsite mitigation projects, and/or other options as they become available. The District should be contacted to discuss alternative measures.	MFWC	CDFG/USBR	Throughout construction activities	
Construction equipment exhaust emissions shall not exceed FRAQMD Regulation III, Rule 3.0, Visible Emissions limitations (40 percent 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.	MFWC	CDFG/USBR	Throughout construction activities	
The primary contractor shall be responsible to ensure that all construction equipment is properly tuned and maintained.	MFWC	CDFG/USBR	Throughout construction activities	
Minimize idling time to 10 minutes – saves fuel and reduces emissions.	MFWC	CDFG/USBR	Throughout construction activities	
No open burning of removed vegetation during infrastructure improvements. Vegetative material should be chipped or delivered as waste to energy facilities.	MFWC	CDFG/USBR	Throughout construction activities	
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 California Air Resources Board (CARB) Portable Equipment Registration with the State or a local district permit. The owner/operator shall be responsible for arranging appropriate consultations with the CARB or the District to	MFWC	CDFG/USBR	Throughout construction activities	

determine registration and permitting requirements prior to equipment operation at the site.

Biological Resources

Mitigation Measure BIO-1: Traffic Routing, and Movement:	MFWC	CDFG/USBR	Prior to and throughout construction activities
During construction operations, the number of access routes, number and size of staging areas, and the total area of the proposed project activity will be limited to the minimum necessary.			
Routes and boundaries will be clearly demarcated. Movement of heavy equipment to and from the project site will be restricted to established roadways to minimize habitat disturbance.	MFWC	CDFG/USBR	Prior to and throughout construction activities
Project-related vehicles shall observe a 20-mile-per-hour speed limit within construction areas, except on County roads and on State and Federal highways. This is particularly important during periods when the GGS may be sunning or moving on roadways. All heavy equipment, vehicles, and supplies will be stored at the designated staging area at the end of each work period.	MFWC	CDFG/USBR	Prior to and throughout construction activities
Mitigation Measure BIO-4: Timing of Construction:	MFWC	CDFG/USFWS	May 1 through October 1
Construction activity within GGS habitat (e.g. aquatic, upland, and rice habitat) shall be conducted between May 1 and October 1.			
If it appears that construction activity may go beyond October 1, the project proponents shall contact the USFWS as soon as possible, but not later than September 15 of the year in question, to determine if additional measures are necessary to minimize take.	MFWC	CDFG/USFWS	May 1 through September 15 (Conditionally).
Construction activities within 200 feet from the banks of snake aquatic habitat will be avoided during the snake's inactive season. If this is not feasible, the Project Proponent must consult with USFWS to determine measures to avoid impacts to GGS.	MFWC	CDFG/USFWS	May 1 through October 1 May 1 through September 15 (Conditionally)
Mitigation Measure BIO-6: Worker Awareness Training:	MFWC	CDFG/USBR /USFWS	Prior to and throughout construction activities
A Worker Environmental Awareness Training Program for construction personnel shall be conducted by the USFWS-approved biologist for all construction workers, including contractors, prior to the commencement of construction activities.			
The program shall provide workers with information on their responsibilities with regard to the snake, an overview of the life history of this species, information on take prohibitions, protections afforded this animal under the Act, and an explanation of the relevant terms and conditions of this biological opinion.	MFWC	CDFG/USBR /USFWS	Prior to and throughout construction activities
Written documentation of the training must be submitted to the Sacramento Fish and Wildlife Office within 30 days of the completion of training. As needed, training shall be conducted in Spanish for Spanish language speakers.	MFWC	CDFG/USBR /USFWS	Prior to and throughout construction activities
Mitigation Measure BIO-7: Install Snake Exclusion Fencing:	MFWC	CDFG/USBR	Prior to and throughout construction activities
Prior to the commencement of construction activities, high visibility fencing will be erected around the habitats of federally listed species to identify and protect these designated ESAs from encroachment of personnel and equipment. These areas will be avoided by all construction personnel.			
The fencing shall be inspected by the Contractor before the start of each work day and maintained by the Contractor until completion of the project. The fencing may be removed only when the construction of the project is completed.	MFWC	CDFG/USBR	Prior to the start of each work day
Fencing will be established in upland immediately adjacent to aquatic snake habitat and extending	MFWC	CDFG/USBR	Prior to and throughout

up to 200 feet from construction activities. Silt fencing, if properly installed, may serve as suitable snake exclusion fencing.

Mitigation Measure BIO-8: Provide Adequate Signage:

Signs will be posted by the Contractor every 50 feet along the edge of the ESAs, with the following information: "This area is habitat of federally-threatened and/or endangered species, and must not be disturbed. These species are protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment." The signs should be clearly readable from a distance of 20 feet, and must be maintained by the Contractor for the duration of construction.

MFWC

CDFG/USBR

construction activities

Prior to and throughout construction activities

Mitigation Measure BIO-9: Implement BMPs:

Best Management Practices (BMPs), including a Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP), will be implemented to minimize effects to the GGS during construction.

MFWC

CDFG/USBR

Prior to and throughout construction activities

Best management practices will be implemented to prevent sedimentation from entering ESAs and to reduce erosion, dust, noise, and other deleterious aspects of construction related activities. These BMPs may include, but are not limited to, silt fencing, temporary berms, restrictions on cleaning equipment in or near ESAs, installation of vegetative strips, and temporary sediment disposal. Runoff from dust control and hazardous materials will be retained on the construction site and prevented from flowing into the ESAs.

MFWC

CDFG/USBR

Prior to and throughout construction activities

Mitigation Measure BIO-10: Erosion Control Materials:

Tightly woven fiber netting (mesh size less than 0.25 inch) or similar material shall be used for erosion control and other purposes at the ESA to ensure that the GGS is not trapped or becomes entangled. This limitation shall be communicated to the contractor using special provisions included in the bid solicitation package.

MFWC

CDFG/USBR/NMFS

Prior to and throughout construction activities

Mitigation Measure BIO-11: Properly Dispose of Garbage:

To eliminate an attraction to predators of the snake, all food-related trash items, such as wrappers, cans, bottles, and food scraps, must be disposed of in closed containers and removed at the end of each workday from the entire project site.

MFWC

CDFG/USBR

Throughout construction activities

Mitigation Measure BIO-12: Use Approved Aggregate, Fill, or Borrow Materials:

The Contractor shall provide documentation that aggregate, fill, or borrow material provided for the proposed project was obtained in compliance with the State Mining and Reclamation Act (SMARA). Evidence of compliance with the Act shall be demonstrated by providing the resident engineer with one of the following: 1) a letter from the USFWS stating that the use of the borrow pit will not result in the incidental take of species; 2) an incidental take permit for contractor-related activities issued by the USFWS pursuant to section 10(a)(1)(B) of the Act; 3) a biological opinion or letter concurring with a "not likely to adversely affect" determination issued by the USFWS to the Federal agency having jurisdiction over contractor-related services; 4) a letter from the USFWS concurring with the "no effect" determination for contractor-related activities; or 5) contractor submittal of information to the resident engineer indicating compliance with the SMARA and provision of County land use permits and California Environmental Quality Act (CEQA) clearance.

MFWC

CDFG/USBR /USFWS

Prior to and throughout construction activities

Mitigation Measure BIO-13: Restore Temporarily Affected Habitat:

After construction activities are complete, any temporary fill or construction debris shall be removed and disturbed areas restored to their pre-project conditions. An area subject to "temporary" disturbance includes any area that is disturbed during the project, but that, after project completion, will not be subject to further disturbance and has the potential to be re-vegetated.

MFWC

CDFG/USBR /USFWS

After completion of construction activities

All ESA GGS habitats subject to temporary ground disturbances, including storage and staging areas and temporary roads, will be restored to pre-project conditions. If appropriate, these areas shall also be re-contoured to pre-project conditions. A written report shall be submitted to the USFWS within ten (10) working days of the completion of construction at the project site and restoration of the site to pre-project conditions.	MFWC	CDFG/USBR /USFWS	After completion of construction activities
A written report shall be submitted to the USFWS within ten (10) working days of the completion of construction at the project site and restoration of the site to pre-project conditions.	MFWC	CDFG/USBR /USFWS	10 days after completion of construction activities
Mitigation Measure BIO-14: Post-construction Monitoring: An inspection of the site, with a photo documentation report showing pre- and post-project area photos, will be conducted and photos and a brief report will be submitted to USFWS one year from implementation of restoration to pre-project conditions.	MFWC	CDFG/USBR /USFWS	After the completion of construction activities
Measure BIO-17: Giant Garter Snake Monitoring During Construction. A USFWS-approved biologist shall inspect construction-related activities at the proposed project site to ensure that no unauthorized take of federally listed species or destruction of their habitat occurs. The biologist shall be available for monitoring throughout all phases of construction that may result in adverse effects to the giant garter snake. This includes clearing and grubbing and other construction activities in the areas of wetland vegetation/aquatic habitat, adjacent upland habitat, and during exclusion fence installation. Furthermore, the biologist shall have the authority through communication with the resident engineer to stop construction activities in the immediate area if a giant garter snake is encountered during construction until appropriate corrective measures have been completed or until the snake is determined to be unharmed. Snakes encountered during construction activities shall be allowed to move away from the area on their own volition. The biologist shall notify the USFWS immediately if any listed species are found on-site, and will submit a report, including date(s), location(s), habitat description, and any corrective measures taken to protect the species found. The biologist shall be required to report any take of listed species to the USFWS immediately by telephone at 916/ 414-6600 and by electronic mail or written letter addressed to the Chief, Endangered Species Division, within three (3) working days of the incident. The Service does not authorize any handling or moving of a giant garter snake by other than USFWS-permitted biologist.	MFWC	CDFG/USFWS	Throughout construction activities
Mitigation Measure BIO- 19: Pile Driving Activities: For Phases 1 and 2, the contractor shall use vibrational pile driving to the greatest extent feasible. If percussive pile driving is necessary, its use shall be minimized to the maximum extent possible and comply with the following <i>Interim Criteria for Injury of Fish to Pile Driving Operations</i> (Popper et al., 2006): The Sound Exposure Level (SEL) shall not exceed 187 dB (re:1 $\mu\text{Pa}^2 \text{ sec}$) in any single strike, measured at a distance of 32.8 ft from the source; The peak sound pressure level should not exceed 208 dB (re:1 $\mu\text{Pa}_{\text{peak}}$) in any single strike, measured at a distance of 32.8 ft from the source.	MFWC	CDFG/USBR	Throughout construction activities
Mitigation Measure BIO-21: Tree Removal Period: If possible, trees required for removal shall be removed outside of the nesting period (nesting period = March 1st through August 31st).	MFWC	CDFG/USBR	March 1 through August 31
Mitigation Measure BIO-20: Dewatering: Pump(s) used for dewatering the construction site will be screened according to NMFS fish screening criteria for anadromous salmonids (NMFS, 1997b). A qualified biologist will be on-site	MFWC	CDFG/USBR/NMFS	Throughout construction activities

during such pumping activities to ensure that any fish that may be present within the construction area are relocated to suitable habitat near the project area.

Hydrology and Water Quality			
Mitigation Measure HYDRO-1: Identify Site-Specific Control Measures: To minimize the exposure of sediments to runoff, MFWC or its construction contractor(s) will identify and implement site-specific construction and post-construction water quality control measures for both Phase 1 and 2 of the Proposed Project/Action facilities. Control measures will include those contained in the Construction Contractor's Guide and Specification of the Caltrans Storm Water Quality Handbook (The Handbook; April 1997); Sutter County Code Section 5, Storm Drainage Design, and the State Water Resources Control Board (SWRCB) Water Quality Order 99-08-DWQ, NPDES, General Permit for Stormwater Discharge Associated with Construction Activity.	MFWC	CDFG/USBR	Prior to, throughout, and following construction activities
	MFWC	CDFG/USBR	Prior to, throughout, and following construction activities
Noise			
Mitigation Measure NOISE-1. Minimization of the Construction and Operational Noise: Standard noise abatement measures will be implemented during construction to reduce noise impacts from construction activities. Construction activities will be limited between 7:00 a.m. and 5:00 p.m. on weekdays to reduce potential noise impacts to area residents. In addition, staging areas and stationary noise generating construction equipment will be located as far as possible from sensitive receptors, and all construction equipment will be maintained with the manufacturer's specified noise-muffling devices. Final design of the facilities of the Proposed Project/Action will incorporate noise attenuating technologies and noise barriers to mitigate that noise emanating from the facilities at maximum operational load will not exceed applicable standards or lead to cumulative increases in ambient noise levels.	MFWC	CDFG/USBR	Prior to and throughout construction activities
	MFWC	CDFG/USBR	During operational activities

Appendix B

MERIDIAN FARMS FISH SCREEN PROJECT

Supplemental Action Specific Implementation Plan for Phase 2

Prepared for:
Meridian Farms Water Company

Action Agencies:
U.S. Bureau of Reclamation
California Department of Fish and Game

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CHAPTER 1

Introduction

This document is an Action Specific Implementation Plan (ASIP) which analyzes the potential environmental effects on aquatic and terrestrial species of the Meridian Farms Water Company (MFWC) proposed plan to construct positive barrier fish screen diversions on the Sacramento River and to modify their distribution system to accommodate the changed intakes. The MFWC Fish Screen and Diversion Project is divided into two phases, which are described in Chapter 2. An ASIP was prepared and distributed during Phase 1 of the project (see Section 1.2.3). This Supplemental ASIP is being prepared to provide updated ESA information for Phase 2 components of the project. The ASIP was a product of the CALFED Bay-Delta Program (CALFED) and was meant to streamline the regulatory process for CALFED Actions. The MFWC Fish Screen and Diversion Project were included as a CALFED Action.

The CALFED Bay-Delta Program was a collaborative effort of more than 20 Federal and State agencies that seek to resolve water supply and water quality issues as well as restore ecological health of the San Francisco Bay-Delta. After assessing the effects of potential CALFED Actions on the environment, the CALFED agencies developed initial conservation measures that, when implemented, would meet the overall CALFED Program objectives. These are contained within the Multi-Species Conservation Strategy (MSCS).

The MSCS explains how CALFED Program Actions will comply with the Federal Endangered Species Act (FESA), California Endangered Species Act (CESA), and Natural Communities Conservation Planning Act (NCCPA) requirements. The U.S. Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration (NOAA) Fisheries used the MSCS as the program-level biological assessment to develop the programmatic Biological Opinions (BOs) for the CALFED Preferred Program Alternative. The California Department of Fish and Game (CDFG) used the MSCS for compliance with the CESA and NCCPA.

The MSCS contains a two-tiered approach to FESA, CESA, and NCCPA compliance that corresponds to the CALFED Program's two-tiered approach to compliance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). The first tier of compliance is embodied in the MSCS itself. For the CALFED Program's Project Actions identified in the Programmatic Environmental Impact Statement / Environmental Impact Report (PEIS/EIR) and Record of Decision (ROD), an ASIP is developed to address the FESA, CESA, and NCCPA consultation requirements of Federal and State agencies. As a second tier document, this ASIP focuses on issues specific to MFWC's Fish Screen and Diversion Project (Proposed Project/Action). Therefore, this ASIP addresses the biological assessment requirements related to the Proposed Project/Action described in Chapter 2. The USFWS and NOAA Fisheries may use this ASIP for informal consultation and/or to develop action-specific BOs relative to the

Proposed Project/Action. The CDFG will use this ASIP to address compliance with the CESA and NCCPA.

The CALFED Bay-Delta Program transitioned to the Delta Stewardship Council, established by S.B. No. 1 (Ch. 5, Stats. 09-10, 7th Ex. Sess.), on February 3, 2010. In conjunction with this change, ASIPs are no longer being used by agencies to review new projects. Because Phase 2 is a continuation of the larger MFWC Fish Screen Project, and effects to species and habitat were evaluated through the ASIP process during Phase I, USFWS indicated that this format could be continued in Phase 2 (pers. comm. with T. Adelsbach, USFWS, January 5, 2012).

1.1 Project Background

The MFWC is located in Sutter County, between Interstate 5 and Highway 99, east of the Sacramento River and southwest of the Sutter Bypass. **Figure 1-1** depicts the approximate limits of the MFWC Service Area. MFWC provides irrigation water to three distinct Service Areas encompassing approximately 9,150 acres, with an estimated annual water delivery of 35,000 acre-feet (af). The water service is provided by surface water diversions from the Sacramento River, drain water reuse, and groundwater pumping. Both lined and unlined canals are used for water conveyance. As irrigation water circulates through the canals and laterals, drainage water is collected and pumped into the conveyance facilities via re-lift pumps, providing a blend with better quality irrigation water from the Sacramento River.

MFWC diverts surface water from the Sacramento River under the provisions of a License for Diversion and Use of Water with a priority date of September 10, 1918. Presently MFWC diversions are at three locations on the Sacramento River: Meridian, Drexler, and Grimes. These diversions utilize unscreened intakes which likely entrain juvenile Chinook salmon, steelhead trout, green sturgeon, and other anadromous fish species that pass by the intake. Improvements to these diversions would fulfill conservation goals established by the CVPIA, which passed in 1992 for the protection and recovery of fisheries and fish habitat.

1.1.1 Project Overview

The primary purpose of the Proposed Project/Action is to prevent entrainment of migrating, at-risk, native fish species at MFWC's existing diversion facilities by removing one intake and installing fish screen structures at the other two intakes. Each existing pump utilizes an unscreened intake which likely entrains juvenile Chinook salmon and steelhead trout, green sturgeon and other fish species. Consequently, the continued operation of the MFWC diversion facilities likely remove some of the salmonid and sturgeon out-migrants from the main stem of the Sacramento River. Under the CVPIA, the diversion pumps are now required to operate without causing detrimental effects to migrating fish; therefore, it is essential that fish screens be installed at the water intakes. As the existing diversion or pump station facilities cannot be retrofitted with a fish screen that would comply with CDFG and NOAA Fisheries criteria, MFWC will construct new positive barrier fish screen diversions that meet these criteria. Positive barrier fish screens will physically prevent fish from passing through the intake; these differ from behavioral barrier fish screens which encourage fish to swim away from a structure.

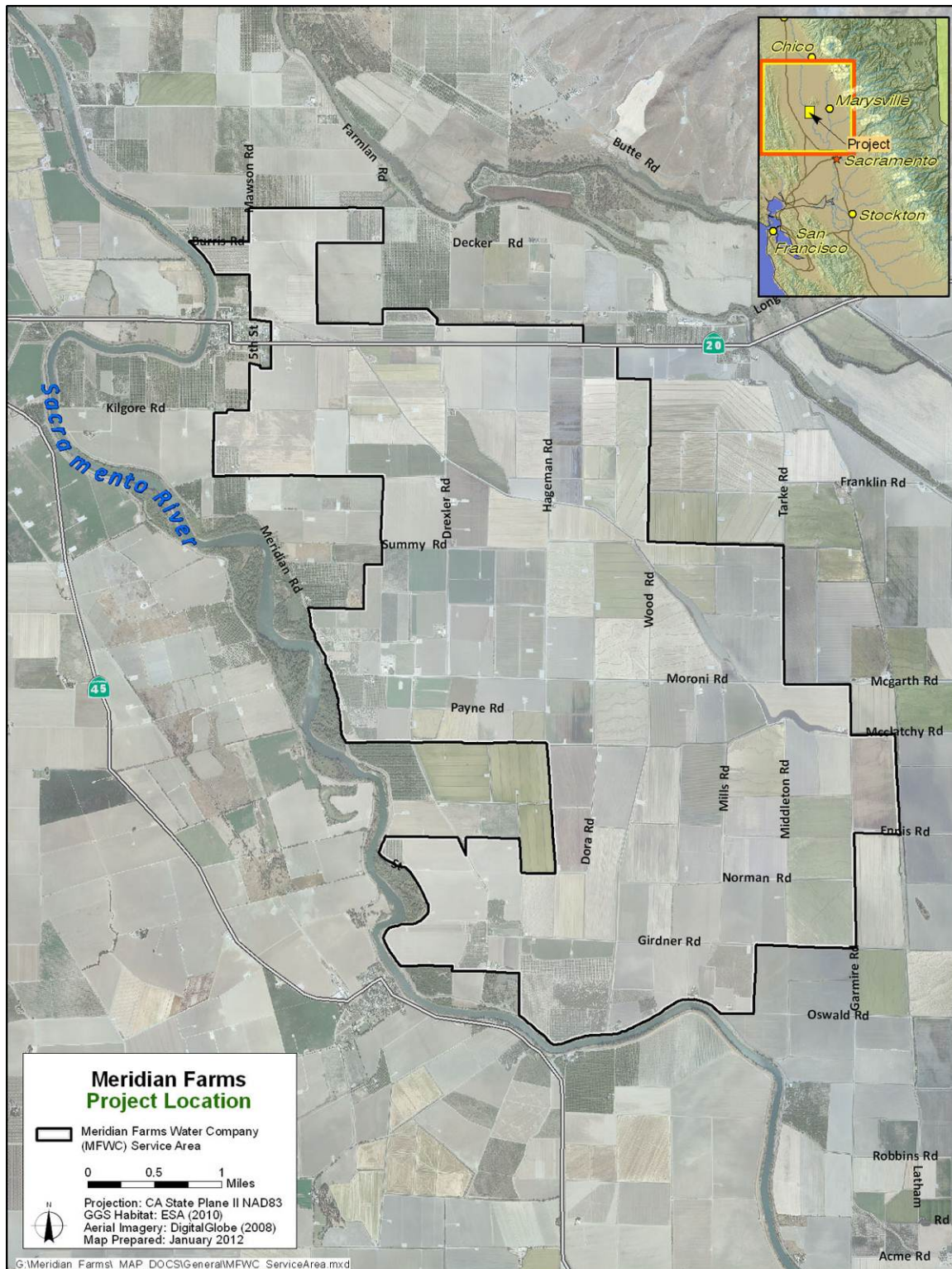


Figure 1-1. Project Location Map

The Proposed Project/Action will allow migrating Chinook salmon, steelhead trout, and green sturgeon to pass by the intake without risk of entrainment and, thus, contribute to the recovery of the anadromous and resident fish populations in the Sacramento River. The Proposed Project/Action will also allow MFWC to continue the diversions even while listed species are present in the vicinity of the diversion, enabling MFWC to provide a reliable long-term water supply to the MFWC Service Area in a manner that complies with present regulatory requirements.

The Proposed Project/Action is composed of several components, which were defined through a March 2002 Feasibility Study and subsequently selected as part the preferred project alternative by the MFWC Board of Directors. MFWC proposes to implement these components, which include the fish screen improvements and other associated conveyance improvements, in two separate phases. Each phase is independent of the other, and each will benefit fish species. The implementation of the Proposed Project/Action in two separate phases is more economically feasible and would coordinate better with MFWC operations. The components of these phases are listed in **Table 1-1** and each component is detailed in Chapter 2.

The Proposed Project/Action Area (Action Area) is defined to include all components of the Proposed Project/Action plus a 200-foot buffer of these components. On the landward side of the levee along the Sacramento River, no direct or indirect effects are anticipated outside this 200-foot zone due to the localized and temporary disturbance of the Proposed Project/Action upon the habitat. Similarly, on the riverside of the levee along the Sacramento River, no direct or indirect effects are anticipated within this 200-foot zone. The benefits resulting from implementation of the Proposed Project/Action, however, extend beyond the Action Area to include the entire Sacramento River migration corridor for fishes, from the Delta to spawning areas upstream from the Action Area. Implementation of the Proposed/Action would benefit fish populations by decreasing fish entrainment in diversions on the Sacramento River.

**TABLE 1-1
MFWC PROPOSED PROJECT/ACTION
COMPONENTS**

PHASE 2
New Meridian Diversion/Pumping Plant
Removal of Existing Meridian Diversion/Pumping Plant
Main Canal Modifications
Drexler Pipeline (option)
New Drexler Re-lift Pumping Plant
Removal of Existing Drexler Diversion/Pumping Plant

1.1.2 Current Management Direction

Currently, MFWC provides water to farmers for irrigation of their crops. There are 173 individual fields within the MFWC water Service Area. In the year 2011, approximately 57 percent of the irrigated area comprised of rice, which was the predominant grain crop. Tomatoes, wheat, and

sunflower are also important crops, with each comprising six to seven percent of the cropping pattern during the same year. Permanent tree crops (orchards) encompass about 10 percent of the planted area, with walnuts being the predominant crop.

MFWC's goals are to be able to maintain water diversion operations while avoiding entrainment of listed fish species present near the water intake. MFWC will achieve this goal by decommissioning and relocating the existing Grimes pumping plant and replacing the existing Meridian and Drexler facilities with a newly consolidated facility that complies with CDFG and NOAA Fisheries fish screen standards. The amount of water diverted from the Sacramento River will not increase as a result of the Proposed Project/Action to construct new facilities, as the existing facilities will be removed.

1.1.3 Implementing Entities

Both Federal and State agencies are involved in administering the MFWC Fish Screen Project. The U.S. Bureau of Reclamation (Reclamation) is the federal agency under NEPA, and the CDFG is the state lead under CEQA. The Project/Action may involve the use of federal funds from Reclamation, and Reclamation would be responsible for administering those funds.

The State and Federal agencies – USFWS, NOAA Fisheries, and CDFG – act as regulatory agencies and are responsible for making recommendations for actions to be taken to protect fish populations and special status wildlife and plant species. Reclamation, is the lead Action Agency under the Federal Endangered Species Action, and also has coordinated agency participation throughout the ASIP process. As MFWC would construct, own, and operate the new facilities in the Project, MFWC would be responsible for implementing operational changes based on the recommendations.

1.1.4 ASIP Contents

To fulfill the requirements of FESA Section 7 and California Fish and Game Code Sections 2835 and 2081, as applicable, the MFWC Fish Screen ASIP includes the following information pursuant to the November 2001 Guide to Regulatory Compliance for Implementing CALFED Actions (CALFED 2001a).

- A detailed project description (Proposed Project/Action – Chapter 2);
- A list of covered species and any other special-status species that may occur in the Action Area (Chapter 3);
- A discussion of essential habitat (Chapter 3);
- The analysis identifying the direct, indirect, and cumulative impacts on the covered species, other special-status species occurring in the Action Area (along with an analysis of impacts on any designated Critical Habitat) likely to result from the Proposed Fish Screen Project, as well as actions related to and dependent on the Proposed Project/Action (Chapter 4);
- The analysis identifying the direct, indirect, and cumulative impacts on Natural Community Conservation Planning (NCCPA) communities occurring in the Action Area likely to result

from the Proposed Fish Screen Project, as well as actions related to and dependent on the Proposed Project/Action (Chapter 6);

- The conservation measures that the Proposed Project/Action agencies will undertake to minimize adverse effects to species (Chapters 2 and 4), and as appropriate, measures to enhance the condition of NCCPA communities (Chapters 2 and 6) and covered species along with a discussion of:
 - A plan to monitor the impacts and the implementation and effectiveness of these measures (Chapter 8), and
 - The procedures to address changed circumstances (Chapter 9);
- The additional measures USFWS, NOAA Fisheries, and CDFG may require as necessary or appropriate for compliance with FESA, CESA, and NCCPA; and a description of how and to what extent the action or group of actions addressed in the ASIP will help the CALFED Program to achieve the MSCS's goals for the affected species (Chapters 4, 6, and 8).

1.2 ASIP Process

The ASIP process is directly related to the relationships between the FESA, CESA, and State NCCPA. If neither the programmatic BOs nor the programmatic NCCPA determination for the CALFED Program authorizes incidental take of MSCS-covered species, ASIPs, which serve as individual consultation documents, are required for each Project or Action. Take authorization for implementing CALFED Program Actions follow a simplified compliance process that tiers from the MSCS and programmatic determinations. CDFG may authorize incidental take of State-listed Endangered, Threatened, or Candidate species through a CDFG Consistency Determination (Fish and Game Code 2081(b)). The entity implementing CALFED Program Actions (Reclamation) will coordinate the development of the ASIP with USFWS, NOAA Fisheries, and CDFG to ensure that the ASIP incorporates appropriate conservation measures for the Proposed CALFED Program Actions consistent with the MSCS.

The CALFED Program MSCS evaluates 244 species and 20 natural communities. Included within the MSCS are species identified by USFWS, NOAA Fisheries, and CDFG that are covered under BOs and NCCPA determination. An ASIP is prepared for FESA-, CESA-, and NCCPA-covered species. In the case of the MFWC Project, the ASIP will be used for informal or formal consultation on CESA species. Effects to FESA- and CESA-covered species are addressed in this ASIP, and typically the species evaluated will be a subset of the overall 244 species included in the MSCS.

1.2.1 Informal and Formal Consultation Processes

ASIPs are developed for individual CALFED Program Actions or groups of Actions when enough detailed information about the actions is available to fully analyze their impacts on covered species and habitats. Informal consultation is conducted in coordination with the development of an ASIP. Pursuant to the FESA, the Fish and Wildlife Coordination Act, and the Magnuson-Stevens Fisheries Conservation and Management Act (MSFCMA) regarding Essential

Fish Habitat (EFH), the lead Project agency (Reclamation) has organized meetings throughout the development of the ASIP to (1) identify covered species and endangered, threatened, and proposed or candidate species that may occur in the Action Area; (2) develop an appropriate approach for assessing species listed and proposed for listing as part of the Section 7 consultations required by FESA; and (3) determine to what extent the action may affect any of the identified species, including impacts to EFH.

The MFWC Project ASIP is submitted on behalf of Reclamation to USFWS, NOAA Fisheries, and CDFG to consult with these agencies on the potential for the Proposed Project/Action to affect special-status species. USFWS and NOAA Fisheries will review the ASIP for compliance with FESA, under Section 7. NOAA Fisheries will also review the ASIP for compliance with the MSFCMA. The conclusion of the formal consultation process is for USFWS and NOAA Fisheries to prepare BOs on the species that the action is likely to adversely affect. As part of these BOs, USFWS and NOAA Fisheries may authorize incidental take of endangered and threatened species. For this project, a NCCP is not required by CDFG because the project would not result in a change in land use within the Water District Service Area. The ASIP will be used to meet its requirements under CESA, including consideration of species listed for protection under CESA and NCCPA. Acceptance of the ASIP will fulfill CDFG's requirements for a Consistency Determination under Fish and Game Code Section 2081.

1.2.3 Consultations to Date

For implementation of the Proposed Project/Action to be economically feasible and for ease of coordination, consultation on the project has occurred separately for each phase. During the Phase 1 consultation, an official list of threatened and endangered species that may occur within the Action Area and vicinity was generated online from the Sacramento Fish and Wildlife Office website. The California Natural Diversity Database (CNDDB) and California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants were also queried during the Phase 1 consultation for special-status species that may occur in the Proposed Project/Action and surrounding area. The USGS 7.5-minute quadrangles that were considered in the Phase 1 evaluation included: Grimes, Kirkville, Dunnigan, Arbuckle, Colusa, Wildwood School, Tisdale Weir, Sutter Buttes, and Meridian, CA.

The Phase 1 ASIP was submitted to USFWS and NOAA on February 22, 2008, initiating formal consultation. Analysis of potential effects to giant garter snake in the Phase 1 ASIP determined that 1.67 acres of upland habitat and 0.01 acres of aquatic habitat would be affected. On May 27, 2008, USFWS issued a Biological Opinion concluding that Phase 1 of the project was likely to adversely affect the snake through temporary loss of habitat, but that the level of anticipated take is not likely to result in jeopardy to the giant garter snake.

On May 1, 2008, NOAA issued a letter concurring with Reclamation's conclusion that the project is not likely to adversely affect Federally listed endangered Sacramento River winter-run Chinook salmon (*Oncorhynchus tshawytscha*), threatened Central Valley spring-run Chinook salmon (*O. tshawytscha*), threatened Central Valley steelhead (*O. mykiss*), threatened Southern Distinct Population Segment (DPS) of North American green sturgeon (*Acipenser medirostris*) or

designated critical habitat. NOAA also concluded that Phase 1 of the project would not adversely affect EFH for Pacific salmon.

This Supplemental ASIP document analyzes Phase 2 effects at the level of detail necessary for consultation. There has been informal consultation with both USFWS and NOAA Fisheries throughout development of both phases of the ASIP.

A new USFWS custom list and consultation letter were generated for the Phase 2 consultation (USFWS 2012). Only the USGS 7.5-minute quadrangles containing the Action Area were queried for federal species (Meridian and Grimes). New CNDDB (CDFG 2012a) and CNPS (CNPS 2012) queries were also generated during Phase 2. CNDDB and CNPS queries included the Action Area and immediately surrounding quadrangles (Moulton Weir, Sanborn Slough, Pennington, Colusa, Meridian, Sutter Buttes, Arbuckle, Grimes, Tisdale Weir, Wildwood School, Dunnigan, and Kirkville). The Phase 2 USFWS custom list and consultation letter, and results of the CNDDB and CNPS queries are included in **Appendix A**.

A pre-application meeting was held on January 5, 2012 with the U.S. Army Corps of Engineers to describe the Phase 2 project components and schedule. USFWS and NOAA Fisheries staff were in attendance at the meeting and indicated that an ASIP could be submitted for Phase 2 components of the project.

1.2.4 Compliance with Federal Endangered Species Act

USFWS and NOAA Fisheries share responsibility for administering FESA. NOAA Fisheries is primarily responsible for implementing FESA on behalf of marine fishes and mammals, including migratory or anadromous fish species such as salmon, steelhead, and green sturgeon. USFWS is primarily responsible for non-marine species. The FESA section 7(a)(2) consultation requirement is meant to ensure that any action authorized, funded, or carried out by any Federal agency is not likely to jeopardize the continued existence of any covered species or result in the destruction of Critical Habitat. Typically, in order to comply with this regulation, a biological assessment (BA) is prepared to analyze effects on listed and proposed species and designated and proposed Critical Habitat. This ASIP is intended to function as a BA and fulfill the requirements of the MFWC Action agencies pursuant to the FESA as amended.

1.2.5 Compliance with Magnuson-Stevens Fisheries

Conservation and Management Act

Public Law 104-297, the Sustainable Fisheries Act of 1996, amended the MSFCMA to establish new requirements for EFH descriptions in federal Fisheries Management Plans (FMPs). The MSFCMA, which was reissued in 2006, requires all fishery management councils to amend their FMPs to describe and identify EFH for each managed fishery. The EFH assessment is meant to determine whether a Proposed Project/Action may adversely affect a designated EFH for federally managed species in the Action Area. In California, there are three FMPs that cover coastal pelagic species, groundfish, and Pacific salmon. In consideration of the Proposed

Project/Action, the Pacific Chinook salmon and steelhead have potential to be affected. These effects will be addressed in this document.

In addition, the MSFCMA requires federal agencies to consult with NOAA Fisheries on activities that may adversely affect EFH. The MSFCMA contains procedures to identify, conserve, and enhance EFH. NOAA Fisheries is required to provide EFH conservation and enhancement recommendations to Federal and State agencies for actions that adversely affect EFH. This ASIP will meet all the compliance requirements that have been identified for consulting with NOAA Fisheries on effects to EFH.

1.2.6 Compliance with California Endangered Species Act and Natural Community Conservation Plan

The CESA (CDFG Code Sections 2050-2097) is similar to the FESA. The California Fish and Game Commission is responsible for maintaining lists of threatened and endangered species under the CESA, which prohibits the “take” of listed and candidate species. “Take” as defined under California law is to “hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill” (CDFG Code Section 86). To this date, there are several State-listed species – primarily salmonid fish species – that may occur within the Action Area; therefore, a CDFG Consistency Determination (CDFG code 2081) authorizing incidental take of State-listed species may be required for the Proposed Project/Action.

The California Natural Community Conservation Planning Act (NCCPA) (California Fish and Game Code, section 2800, et seq.) was enacted to form a basis for broad-based planning to provide for effective protection and conservation of the State’s wildlife heritage, while continuing to allow appropriate development and growth. State of California NCCPA General Process Guidelines define an NCCPA as “...a plan for the conservation of natural communities that takes an ecosystem approach and encourages cooperation between private and governmental interests. The plan identifies and provides for the regional or area-wide protection and perpetuation of plants, animals, and their habitats, while allowing compatible land use and economic activity. An NCCPA seeks to anticipate and prevent the controversies caused by species’ listings by focusing on the long-term stability of natural communities” (CDFG 2000a).

The purpose of natural community conservation planning is to sustain and restore those species and their habitat identified by CDFG that are necessary to maintain the continued viability of biological communities impacted by human changes to the landscape. An NCCPA identifies and provides for those measures necessary to conserve and manage natural biological diversity within the plan area while allowing compatible use of the land.

On February 2, 2002, SB 107 was signed by Governor Gray Davis, which repealed and replaced the NCCPA with a new NCCPA. Although SB 107 became effective on January 1, 2003, the MSCS will continue to be in-effect as an approved NCCP, in accordance with Section 2830 (c) of the same bill.

This ASIP is a multi-purpose project-level document that is intended to streamline the environmental regulatory process for CALFED Program Actions. The Proposed Project/Action is such an action, as it will protect species covered under the MSCS. This ASIP provides all the information necessary to initiate project-level compliance with the FESA and NCCPA. Not only will this ASIP fulfill CDFG's requirements under Fish and Game Code Sections 2835 and 2081, it will also include appropriate conservation measures relevant to the Proposed Project/Action.

1.3 Relationship to CALFED Program

The CALFED Program's purpose is to develop and implement a comprehensive, long-term plan that will restore ecological health to the Bay-Delta system and improve management of water for beneficial uses. The MFWC Project falls within one component of the overall CALFED Program strategy. CALFED agencies plan to address issues of the Bay-Delta region within the following categories: ecosystem quality, water quality, water supply reliability, and levee system integrity. CALFED agencies must consider important physical, ecological, and socioeconomic linkages between the problems and potential solutions in each of these resource categories. The CALFED planning effort was therefore divided into a three-phase cooperative planning process in order to facilitate determining the most appropriate strategy and actions to reduce conflicts in the Bay-Delta system.

The construction of fish screens that use the best available technology will eliminate fish passage barriers. The fish screens will be funded with federal funds from the CALFED Bay-Delta Authority (CBDA) and Reclamation would be responsible for administering those funds. Implementation of the Proposed Project/Action will help MFWC continue to draw water from the Sacramento River without entraining native fish species that may reside in the Sacramento River near, or which may pass by, the existing diversions.

1.4 Species Addressed in this ASIP

To comply with FESA, CESA, and NCCPA requirements, a list of special-status species is evaluated and presented in this ASIP. The following tables (**Table 1-2** and **Table 1-3**) list the species with potential to occur in the Action Area, their Federal and State status, and how likely they are to occur in the Proposed Project/Action Area. Those species with potential to be affected by the Proposed Project/Action are shown in bold text and are addressed in more detail in Chapter 3.

**TABLE 1-2
ANIMAL SPECIES WITH POTENTIAL TO OCCUR IN THE ACTION AREA**

Scientific Name Common Name	Federal Status	State Status	CNPS Listing	Habitat Description	Potential to Occur in the Action Area
Fish					
<i>Acipenser medirostris</i> North American green sturgeon (Southern DPS)	FT	CSC	--	Spawns in large cobble in deep and turbulent river main stem. The Southern DPS spawns in the Sacramento River basin and in the Sacramento-San Joaquin Delta and Estuary.	High. Migratory route in the Sacramento River; also provides suitable rearing habitat in riparian bank areas.
<i>Hypomesus transpacificus</i> Delta smelt	FT	CT	--	Found in the Sacramento-San Joaquin delta, Suisun bay, Carquinez Straight, and San Pablo Bay.	Unlikely. Project outside area designated as Critical Habitat project site does not have Critical Habitat for reproduction or cover. Project site likely outside of the upstream migratory extent.
<i>Oncorhynchus mykiss</i> Central Valley steelhead	FT	--	--	Spawns in Sacramento River and tributaries where gravelly substrate and suitable water conditions occur.	High. Migratory route in the Sacramento River; also provides suitable rearing habitat in riparian bank areas.
<i>Oncorhynchus tshawytscha</i> Central Valley spring-run Chinook	FT	CT	--	Spawns in Sacramento River and few select tributaries where gravelly substrate and suitable water conditions occur.	High. Migratory route in the Sacramento River; also provides suitable rearing habitat in riparian bank areas.
<i>Oncorhynchus tshawytscha</i> Sacramento River winter-run Chinook	FE	CE	--	Spawns primarily in upper reaches of the main stem Sacramento River.	High. Migratory route in the Sacramento River; also provides suitable rearing habitat in riparian bank areas.
Reptiles					
<i>Thamnophis gigas</i> giant garter snake	FT	CT	--	Generally inhabits marshes, sloughs, ponds, slow-moving streams, ditches, and rice fields which have water from early spring through mid-fall, emergent vegetation (such as cattails and bulrushes), open areas for sunning, and high ground for hibernation and escape cover.	Moderate. Limited aquatic habitat in the Main Canal, in adjacent Reclamation drains, or within adjacent seasonally inundated rice fields. Potential upland habitat in unpaved areas up to 200 feet from aquatic habitat.
<i>Emys marmorata</i> western pond turtle	--	CSC	--	Permanent ponds, lakes, streams, irrigation ditches or permanent pools along intermittent streams. Require basking sites such as partially submerged logs, rocks, mats of floating vegetation, or open mud banks	Unlikely. No suitable habitat within or adjacent to the project site.

**TABLE 1-2
ANIMAL SPECIES WITH POTENTIAL TO OCCUR IN THE ACTION AREA**

Scientific Name Common Name	Federal Status	State Status	CNPS Listing	Habitat Description	Potential to Occur in the Action Area
Amphibians					
<i>Ambystoma californiense</i> California tiger salamander	FT	CT	--	Annual grassland and grassy understory of valley-foothill hardwood habitats in central and northern California. Needs underground refuges and vernal pools or other seasonal water sources.	Unlikely. No suitable habitat within or adjacent to the project site.
<i>Rana aurora draytonii</i> California red-legged frog	FT	CSC	--	Breeds in slow moving streams with deep pools, ponds, and marshes with emergent vegetation.	Unlikely. No suitable habitat within or adjacent to the project site.
<i>Spea (=Scaphiopus) hammondi</i> western spadefoot toad	--	CSC	--	Occurs seasonally in grasslands, prairies, chaparral, and woodlands, in and around wet sites. Breeds in shallow, temporary pools formed by winter rains. Takes refuge in burrows.	Unlikely. No suitable habitat within or adjacent to the project site.
Birds					
<i>Agelaius tricolor</i> tricolored blackbird	--	CSC	--	Nests in dense thickets of cattails, tules, willow, blackberry, wild rose, wheat and barley crops, and other tall herbs near fresh water.	Unlikely. Marginal riparian nesting habitat along Sacramento River banks. However, no suitable nesting habitat in the immediate vicinity of the project.
<i>Ardea alba</i> (nesting) great egret	--	--	--	Colonial nester in large trees. Rookery sites located near marshes, tide flats, irrigated pastures and margins of rivers and lakes.	Unlikely. No suitable nesting habitat in the immediate vicinity of the project.
<i>Ardea herodias</i> (nesting) great blue heron	--	--	--	Colonial nester in tall trees, cliff sides and isolated marsh habitats.	Unlikely. No suitable nesting habitat in the immediate vicinity of the project.
<i>Athene cunicularia</i> western burrowing owl	--	CSC	--	Utilizes ground squirrel (or other mammal) burrows within open grasslands, prairies, savanna, or agricultural fields.	Moderate. Potential nesting habitat along the perimeter of agricultural fields and along the banks/levees of the Sacramento River.
<i>Branta hutchinsii leucopareia</i> cackling (=Aleutian Canada) goose	FD	--	--	Breeds in open or forested areas near water. Often found in wetlands, grasslands, or cultivated fields during migration.	Moderate. Marginal foraging habitat occurs in agricultural fields adjacent to project.

**TABLE 1-2
ANIMAL SPECIES WITH POTENTIAL TO OCCUR IN THE ACTION AREA**

Scientific Name Common Name	Federal Status	State Status	CNPS Listing	Habitat Description	Potential to Occur in the Action Area
<i>Buteo swainsoni</i> Swainson's hawk	--	CT	--	Breeds in California's Central Valley. Winters primarily in Mexico. Typically nests in scattered trees or along riparian systems adjacent to agricultural fields or pastures.	Moderate. The CNDDDB (CDFG 2012a) records several historic occurrences near the project site. Suitable nesting habitat occurs within trees along the Sacramento River and within the Action Area. The Action Area also provides foraging for this species.
<i>Charadrius montanus</i> mountain plover (wintering)	--	CSC	--	In California, winters in open short grasslands and plowed agricultural fields in the Central Valley and in foothill valleys west of San Joaquin Valley, and in Imperial Valley. Winters below 1000 m (3200 ft).	Unlikely. Project area is outside of known species range.
<i>Circus cyaneus</i> northern harrier	--	CSC	--	Forages over open ground. Nests on ground in shrubby vegetation, usually at marsh edge in emergent wetland or along rivers or lakes, but also in grasslands, grain fields, or on sagebrush flats several miles from water	Unlikely. Suitable nesting habitat does not occur within the Action Area or immediate vicinity.
<i>Coccyzus americanus occidentalis</i> western yellow-billed cuckoo	FC	CE	--	Nests in extensive riparian forests (at least 40 hectares).	Unlikely. Riparian area surrounding project site is highly fragmented.
<i>Grus canadensis tabida</i> greater sandhill crane	--	CSC	--	Open habitats, shallow lakes, and emergent wetlands. In winter also uses dry grasslands and croplands near wetlands.	Unlikely. No suitable habitat within or adjacent to the project site.
<i>Laterallus jamaicensis coturniculus</i> California black rail	--	CT	--	Occurs most commonly in tidal emergent wetlands dominated by pickleweed, or in brackish marshes supporting bulrushes in association with pickleweed. In freshwater, usually found in bulrushes, cattails, and saltgrass	Unlikely. No suitable habitat within or adjacent to the project site.
<i>Pandion haliaetus</i> osprey	--	--	--	Preys mostly on fish, requires open, clear waters for foraging. Uses large trees, snags, and dead-topped trees in open forest habitats for cover and nesting.	Moderate. Suitable nesting habitat occurs within trees along the Sacramento River and within the Action Area. The Action Area also provides foraging for this species.
<i>Plegadis chihi</i> white-faced ibis	--	--	--	Nest and forages in freshwater marshes and rivers, respectively.	Unlikely. No suitable nesting habitat within or adjacent to the project site.

**TABLE 1-2
ANIMAL SPECIES WITH POTENTIAL TO OCCUR IN THE ACTION AREA**

Scientific Name Common Name	Federal Status	State Status	CNPS Listing	Habitat Description	Potential to Occur in the Action Area
<i>Riparia riparia</i> (nesting) bank swallow	--	CT	--	Nests in holes dug in sandy cliffs and river banks near water.	Moderate. The CNDDDB (CDFG 2012a) records occurrence near the Drexler Diversion and Grimes Canal. Potential nesting habitat along the banks of the Sacramento River in the vicinity of the project.
<i>Spinus (=Carduelis) lawrencei</i> Lawrence's goldfinch	--	--	--	Dry grassy slopes with weed patches, chaparral, and open woodlands; nests in trees or shrubs.	Unlikely. No suitable habitat within or adjacent to the project site.
Mammals					
<i>Antrozous pallidus</i> pallid bat	--	CSC	--	Prefers caves, crevices, hollow trees, or buildings in areas adjacent to open space for foraging. Associated with lower elevations in California.	Unlikely. No suitable roost or maternity sites occur in the immediate vicinity of the project.
<i>Dipodomys californicus eximius</i> Marysville California kangaroo rat	--	CSC	--	Needs friable soil, grass stages of chaparral. Only found in the area of the Sutter Buttes.	Unlikely. No suitable habitat within or adjacent to the project site.
<i>Lasiurus blossevillei</i> western red bat	--	--	--	Roosts primarily in trees, 2-40 feet above ground, from sea level up through mixed conifer forests. Prefers habitat edges and mosaics with trees that are protected from above and open below with open areas for foraging.	Unlikely. No suitable roost or maternity sites occur in the immediate vicinity of the project.
<i>Lasiurus cinereus</i> hoary bat	--	CSC	--	Prefers open habitats or habitat mosaics, with access to trees for cover and open areas or habitat edges for feeding. Roosts in dense foliage of medium to large trees. Feeds primarily on moths; requires water.	Unlikely. Limited roosting habitat within forested areas along the Sacramento River; however, dense foliage for roosting is not available in the Action Area.
<i>Myotis ciliolabrum</i> western small-footed myotis	--	--	--	In association with steep limestone outcrops and talus slopes. Forages over a wide range of habitats, mostly open, arid wooded and brushy uplands near water. Seeks cover in caves, buildings, mines and crevices.	Unlikely. No suitable roost or maternity sites occur in the immediate vicinity of the project.

**TABLE 1-2
ANIMAL SPECIES WITH POTENTIAL TO OCCUR IN THE ACTION AREA**

Scientific Name Common Name	Federal Status	State Status	CNPS Listing	Habitat Description	Potential to Occur in the Action Area
<i>Myotis yumanensis</i> Yuma myotis	--	--	--	Roosts in buildings, mines, caves, crevices, or under bridges. Optimal habitats are open forests and woodlands with sources of water over which to feed.	Unlikely. Limited roosting habitat within forested areas along the Sacramento River; however, dense foliage for roosting is not available in the Action Area.
<i>Perognathus inornatus inornatus</i> San Joaquin pocket mouse	--	--	--	Uses arid annual grassland, savanna, and desert scrub, with sandy washes, fine soils, and scattered vegetation between 1,100 and 2,000 feet in elevation.	Unlikely. Marginal vegetation along irrigation ditch and not within the required elevation range.
Invertebrates					
<i>Branchinecta conservatio</i> Conservancy fairy shrimp	FE	--	--	Lifecycle restricted to large, cool-water vernal pools with moderately turbid water.	Unlikely. No suitable habitat within or adjacent to the project site.
<i>Branchinecta lynchi</i> vernal pool fairy shrimp	FT	--	--	Lifecycle restricted to vernal pools.	Unlikely. No suitable habitat within or adjacent to the project site.
<i>Cicindela hirticollis abrupta</i> Sacramento Valley (Hairy-necked) tiger beetle	--	--	--	Larvae and usually adults occur on sand bars, sandy shores, flood scours etc. immediately associated with rivers. Requires fine sand that is damp at, or a few centimeters below, the surface, and sparse or absent vegetation. Habitats must also not be subject to inundation for more than a few days at a time.	Unlikely. The project site habitat conditions are not suitable for this species.
<i>Desmocerus californicus dimorphus</i> Valley elderberry longhorn beetle	FT	--	--	Breeds and forages exclusively on blue elderberry shrubs (<i>Sambucus mexicana</i>) below 3,000 feet in elevation.	Unlikely. No elderberry shrubs with stems measuring at least one inch in diameter occur within 100 feet of the Proposed Project/Action.
<i>Lepidurus packardii</i> vernal pool tadpole shrimp	FE	--	--	Found in vernal pools, swales, ephemeral drainages, stock ponds, reservoirs, or ditches.	Unlikely. No suitable habitat within or adjacent to the project site.

**TABLE 1-2
ANIMAL SPECIES WITH POTENTIAL TO OCCUR IN THE ACTION AREA**

Scientific Name Common Name	Federal Status	State Status	CNPS Listing	Habitat Description	Potential to Occur in the Action Area
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SOURCE: USFWS (2012), CDFG (2011, 2012a, 2012b).

Notes:

The "Potential for Effect" category is defined as follows:

Unlikely:	The project site and/or immediate area do not support suitable habitat for a particular species. Project site is outside of the species known range.
Low Potential:	The project site and/or immediate area only provide limited habitat for a particular species. In addition, the known range for a particular species may be outside of the Proposed Project/Action Area.
Moderate Potential:	The project site and/or immediate area provide suitable habitat for a particular species.
High Potential:	The project site and/or immediate area provide ideal habitat conditions for a particular species.

Species that have medium or high potential to be impacted by the proposed project are shown in boldface type.

STATUS CODES:

FEDERAL:

FE	=	Listed as "endangered" under the federal Endangered Species Act
FT	=	Listed as "threatened" under the federal Endangered Species Act
FC	=	Candidate for listing under the federal Endangered Species Act
FD	=	Delisted
FSC	=	NOAA Fisheries designated "species of concern"

STATE:

CE	=	Listed as "endangered" under the California Endangered Species Act
CT	=	Listed as "threatened" under the California Endangered Species Act
CSC	=	California Department of Fish and Game designated "species of special concern"

**TABLE 1-3
PLANT SPECIES WITH POTENTIAL TO OCCUR IN THE ACTION AREA**

Scientific Name Common Name	Federal Status	State Status	CNPS Listing	Life Form	Habitat Description / Elevation Range (meters) / Blooming Period	Potential to Occur in the Action Area
<i>Astragalus tener</i> var. <i>ferrisiae</i> Ferris's milk-vetch	--	--	1B.1	annual herb	Meadows and seeps (vernally mesic), valley and foothill grasslands (subalkaline flats) / 5-75 m / April – May	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Atriplex cordulata</i> heartscale	--	--	1B.2	annual herb	Chenopod scrub, meadows and seeps, valley and foothill grassland (sandy/saline or alkaline) / 0-560 m / April – October	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Atriplex depressa</i> brittlescale	--	--	1B.2	annual herb	Chenopod scrub, meadows and seeps, playas, valley and foothill grasslands, vernal pools (alkaline, clay) / 1-321 m / May – October	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Atriplex joaquiniana</i> San Joaquin saltbrush	--	--	1B.2	annual herb	Chenopod scrub, meadows and seeps, playas, valley and foothill grasslands (alkaline) / 1-835 m / April – October	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Atriplex minúscula</i> lesser saltscale	--	--	1B.1	annual herb	Chenopod scrub, playas, valley and foothill grasslands / 15- 200 m / May – October	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Atriplex persistens</i> vernal pool smallscale	--	--	1B.2	annual herb	Vernal pools / 10-115 m / June – October	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Atriplex subtilis</i> subtle orache	--	--	1B.2	annual herb	Valley and foothill grasslands / 40-100 m / June – August (also October - uncommon)	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Brasenia schreberi</i> watershield	--	--	2.3	perennial rhizomatous herb aquatic	Marshes and swamps (freshwater) / 30-2200 m / June – September	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>California macrophylla</i> round-leaved filaree	--	--	1B.1	annual herb	Cismontaine woodland, valley and foothill grassland / 15-1200 m / March – May	Unlikely. No suitable habitat within the immediate vicinity of the project site.

**TABLE 1-3
PLANT SPECIES WITH POTENTIAL TO OCCUR IN THE ACTION AREA**

Scientific Name Common Name	Federal Status	State Status	CNPS Listing	Life Form	Habitat Description / Elevation Range (meters) / Blooming Period	Potential to Occur in the Action Area
<i>Castilleja rubicundula</i> ssp. <i>rubicundula</i> pink creamsacs	--	--	1B.2	annual herb	Chaparral (openings), cismontaine woodland, meadows and seeps, valley and foothill grassland / 20-910 m / April – June	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Centromadia parryi</i> ssp. <i>parryi</i> pappose tarplant	--	--	1B.2	annual herb	Chaparral, coastal prairie, meadows and seeps, marshes and swamps (coastal salt), valley and foothill grassland (vernally mesic, often alkaline) / 2-420 m / May – November	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Chloropyron palmatus</i> palmate-bracted bird's beak	FE	CE	1B.1	annual herb hemiparasitic	Chenopod scrub, valley and foothill grasslands (alkaline) / 5-155 m / May – October	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Cuscuta obtusiflora</i> var. <i>glandulosa</i> Peruvian dodder	--	--	2.2	annual vine parasitic	Marshes and swamps (freshwater) / 15-280 m / July – October	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Hibiscus lasiocarpus</i> rose mallow	--	--	1B.2	perennial rhizomatous herb emergent	Marshes and swamps (freshwater) / 0-120m / June – September	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Lasthenia glabrata</i> ssp. <i>coulteri</i> Coulter's goldfields	--	--	1B.1	annual herb	Marshes and swamps (coastal salt), playas, vernal pool / 1-1200 m / February – June	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Layia septentrionalis</i> Colusa layia	--	--	1B.2	annual herb	Chaparral, cismontane woodland, valley and foothill grassland (sandy, serpentine) / 100-1095 m / April – May	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Navarretia</i> <i>leucocephala</i> ssp. <i>bakeri</i> Baker's navarretia	--	--	1B.1	annual herb	Cismontane woodland, lower montane coniferous forest, meadows and seeps, valley and foothill grassland, vernal pools (mesic) / 5-1740 m / May – July	Unlikely. No suitable habitat within the immediate vicinity of the project site.

**TABLE 1-3
PLANT SPECIES WITH POTENTIAL TO OCCUR IN THE ACTION AREA**

Scientific Name Common Name	Federal Status	State Status	CNPS Listing	Life Form	Habitat Description / Elevation Range (meters) / Blooming Period	Potential to Occur in the Action Area
<i>Silene verecunda</i> ssp. <i>verecunda</i> San Francisco campion	--	--	1B .2	perennial herb	Coastal bluff scrub, chaparral, coastal prairie, coastal scrub, valley and foothill grassland (sandy) / 30- 645 m / March – June (also August - uncommon)	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Trichocoronis wrightii</i> var. <i>wrightii</i> Wright's trichocoronis	--	--	2.1	annual herb	Meadows and seeps, marshes and swamps, riparian forest, vernal pools (alkaline) / 5-435 m / May - September	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Wolffia brasiliensis</i> Brazilian watermeal	--	--	2.3	perennial herb aquatic	Marshes and swamps (assorted shallow freshwater) / 30-100 m / April - December	Unlikely. No suitable habitat within the immediate vicinity of the project site.

SOURCE: USFWS (2012), CDFG (2012a), CNPS (2012).

Notes:

The "Potential for Effect" category is defined as follows:

Unlikely: The project site and/or immediate area do not support suitable habitat for a particular species. Project site is outside of the species known range.

Species that have medium or high potential to be impacted by the proposed project are shown in boldface type.

STATUS CODES:

FEDERAL:

FE = Listed as "endangered" under the federal Endangered Species Act

STATE:

CE = Listed as "endangered" under the California Endangered Species Act

CNPS:

List 1B = Plants rare, threatened, or endangered in California and elsewhere

List 2 = Plants rare, threatened, or endangered in California, but more common elsewhere

List 3 = Plants about which we need more information--a review list

List 4 = Plants of limited distribution--a watch list

Extensions: .1 = Seriously endangered in California

.2 = Fairly endangered in California

.3 = Not very endangered in California

1.4.1 Identification of Species Analyzed in Detail in the ASIP

Pursuant to Section 7(c) of FESA, a species list was requested from USFWS regarding any species listed or proposed for listing as Threatened or Endangered, including designated or proposed Critical Habitats under FESA, that may be present in the Action Area (USFWS 2007, USFWS 2012). Additionally, a list of special-status species known to occur or with the potential to occur within the Action Area was compiled from a query of the California Natural Diversity Database (CNDDDB) (CDFG 2007, CDFG 2012a) and the California Native Plant Society's Inventory of Rare and Endangered Plants (CNPS 2007, CNPS 2012). Special-status fish, wildlife, and plant species considered in the MSCS (CALFED 2001b) combined with the results from the species request lists and the database searches were used to generate a preliminary species list.

Initial screening of the overall species list eliminated from further consideration those species that only inhabited areas outside of the general Action Area. The second level of screening was based on species that occasionally visited (their life cycles are not dependent on) habitats affected by the MFWC Project/Action. These included mostly migratory species that may be observed infrequently in areas where the Proposed Project will occur. Finally, a focused list of Federal- or State-listed, Special-concern, or CALFED MSCS-covered species was compiled for detailed analysis in this ASIP and is included in Chapter 3. There are no candidate species potentially occurring in the Action Area.

1.4.2 Critical Habitat

Critical Habitat is designated in the Sacramento River within the project area for the listed Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, Central Valley steelhead, and Southern Distinct Population Segment (DPS) of the North American Green Sturgeon which are presented in this ASIP. Critical Habitat for vernal pool tadpole shrimp is designated within the region, but it is not included within the Action Area. The nearest Critical Habitat Unit for vernal pool tadpole shrimp is located approximately 3 miles northwest of shrimp in the Action Area. Details on the Critical Habitat designations are included in the species descriptions in Chapter 3. There is no suitable habitat for vernal pool tadpole in the Meridian Farms Service Area boundary.

1.4.3 Essential Fish Habitat

The Action Area is within the region identified as Essential Fish Habitat (EFH) for Pacific salmon, including all Chinook salmon runs, in Amendment 14 of the Pacific Salmon FMP. This ASIP addresses potential effects of the MFWC Project on delineated EFH in the Sacramento River within the Action Area.

1.5 NCCPA Habitats

A total of 20 natural communities were analyzed on a broad, programmatic level in the MSCS – 18 habitats and 2 ecologically based fish groups. The term “NCCPA communities” refers to both habitats and fish groups. Of the 20 community types and fish groups, four are included in the

Action Area and are evaluated in this ASIP. The others were not considered either because there was no such habitat in the Action Area or because the Proposed Project/Action would not affect the habitat. Although there is no estuarine habitat within the Action Area, this NCCPA Fish Group is included in the analysis in order to consistently analyze effects to a few estuarine fish species which may migrate through the Action Area. Descriptions of the two NCCPA Habitats and two NCCPA fish group are listed below (**Table 1-4**) and detailed in Chapter 5.

TABLE 1-4
NCCPA COMMUNITIES ANALYZED IN THIS ASIP

NCCPA Habitats	NCCPA Fish Groups
Valley Riverine Aquatic	Anadromous Fish Species
Valley/Foothill Riparian	Estuarine Fish Species

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CHAPTER 2

Description of the Proposed Project/Action

The objective of the Proposed Project/Action is to ensure that no fish species are entrained in MFWC's diversion pumps, so that MFWC is in compliance with present regulatory requirements, including ESA compliance, and is able to continue to divert water for agricultural irrigation, avoiding effects to listed fisheries species that may be present near the diversions. Needed conveyance improvements related to the fish screen improvements are included within the Proposed Project/Action. This chapter describes the two phases of the Proposed Project/Action and existing conditions of Action Area, including the existing intake facilities. A description of the regulatory authorities that set the regulatory framework for the Proposed Project/Action is included. Conservation measures included with the Proposed Project/Action are described as well.

2.1 Authorities

2.1.1 Central Valley Improvement Act and Anadromous Fish Screen Program

On October 30, 1992, a multipurpose water law which contained 40 separate titles providing for water resource projects throughout the Western United States was established. Title 34, the CVPIA, mandates changes in management of the Central Valley Project, particularly for the protection, restoration, and enhancement of fish and wildlife. Under the CVPIA, a program dedicated to screening agricultural water diversions to protect anadromous fish in California's Central Valley was developed. The U.S. Department of the Interior established the Anadromous Fish Screen Program (AFSP) which satisfies section 3406(b)(21) of the CVPIA. CVPIA section 3406 (b)(21) states that the AFSP will "assist the State of California in efforts to develop and implement measures to avoid losses of juvenile anadromous fish resulting from unscreened or inadequately screened diversions on the Sacramento-San Joaquin Delta, and the Suisun Marsh. Such measures shall include but shall not be limited to construction of screens on unscreened diversions, rehabilitation of existing screens, replacement of existing non-functioning screens, and relocation of diversions to less fishery-sensitive areas. The Secretary's share of costs associated with activities authorized under this paragraph shall not exceed 50 percent of the total cost of any such activity." The Proposed MFWC Project is being proposed to meet the objectives of the CVPIA Anadromous Fish Screen Program.

2.1.2 Endangered Species Acts

This ASIP is intended to provide all the necessary elements to comply with the FESA and CESA. Currently, there are eight species addressed within this ASIP that are identified as a listed species or a candidate for listing, and two that have been delisted. The Central Valley steelhead is federal-

listed threatened, and the Central Valley spring-run Chinook is both federal- and state-listed threatened. The Sacramento River winter-run Chinook salmon is federal- and state-listed endangered. The North American green sturgeon (Southern DPS) is federal-listed threatened. The giant garter snake is both federal- and state-listed threatened, and the Swainson's hawk is state-listed threatened. The bank swallow is state-listed threatened. The cackling goose has been federally delisted, but still remains under scrutiny, and is therefore included in this ASIP. All of these species are covered in the MSCS.

2.2 Proposed Project/Action Area

The MFWC is located in Sutter County, between Interstate 5 and Highway 99, east of the Sacramento River and southwest of the Sutter Bypass. The approximate limits of MFWC Service Area are shown in **Figure 1-1**. MFWC provides irrigation water to three distinct Service Areas encompassing approximately 9,150 acres of mostly agricultural land, with an estimated annual water delivery of 35,000 acre-feet (af). Small areas of riparian forest, grassland, wetland and open water, as well as the small urban area of Meridian, are also included in the Service Area.

The Action Area includes the existing MFWC diversion facilities, locations of the proposed new and improved facilities, conveyance improvements, proposed construction equipment staging areas, and proposed grading and in-water construction locations. Areas within 200 feet of these project components are also included within the Action Area. Most of this area will not be affected by the Proposed Project/Action, but is included in order to analyze all potential effects resulting from the Proposed Project/Action. The Action Area is depicted in **Figure 2-1**.

Biological communities in the Action Area include valley riparian/Cottonwood riparian forest, annual grassland, and valley riverine habitat (Sacramento River). Agricultural land also provides habitat for wildlife. The Sacramento River provides freshwater habitat for fish, amphibians, reptiles, and waterfowl. Roads, levees, and agricultural activities have modified the adjacent riparian habitat. Inland project areas, beyond the Sacramento River and associated habitats, are characterized as agricultural (field crops and orchards). Human presence within the Action Area is minimal based on the surrounding land use, however river recreation activities increase during the late spring, summer and fall. **Figure 2-2** depicts the vegetation communities, including crop types, within the Action Area.

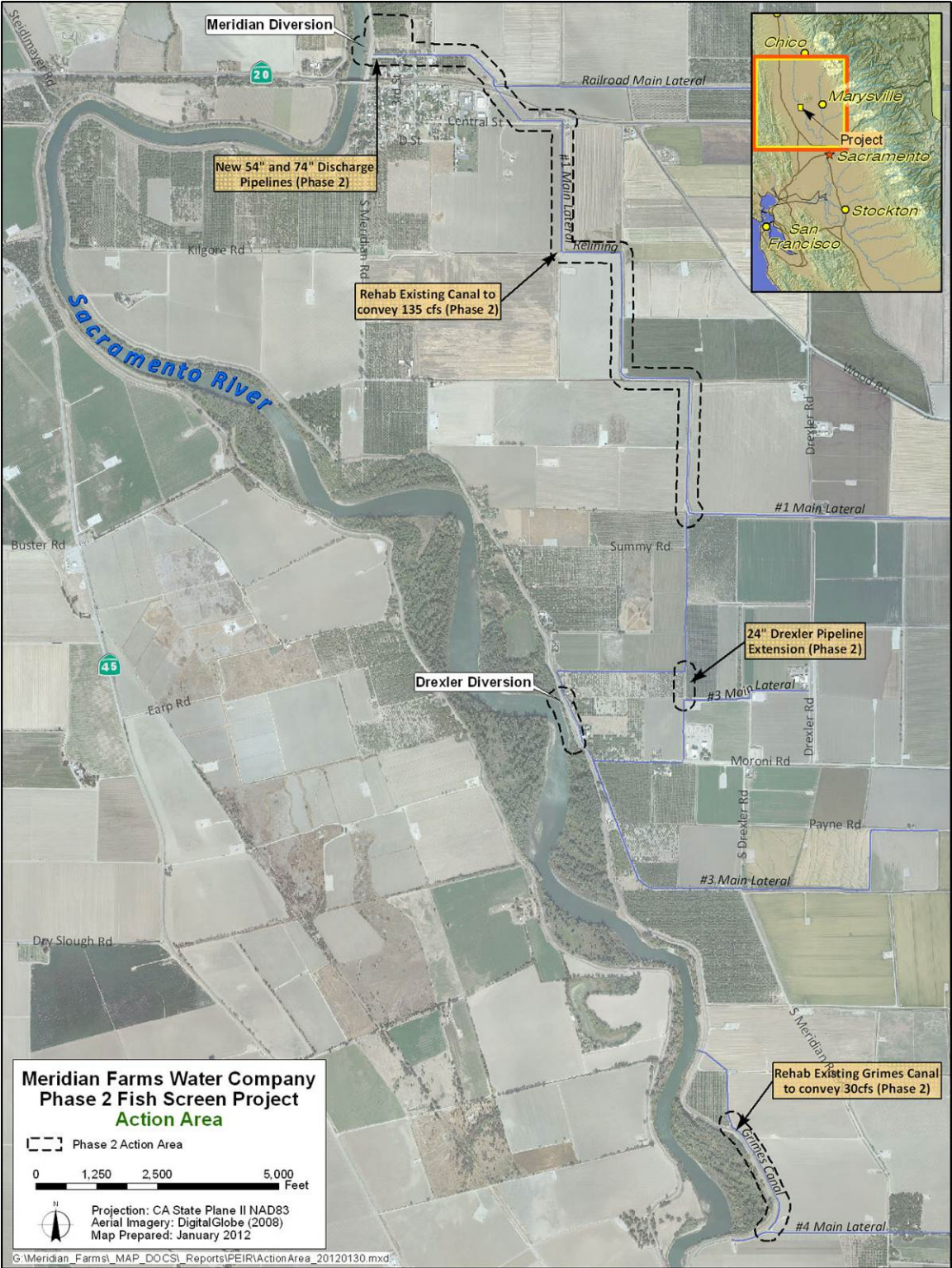


Figure 2-1. Action Area

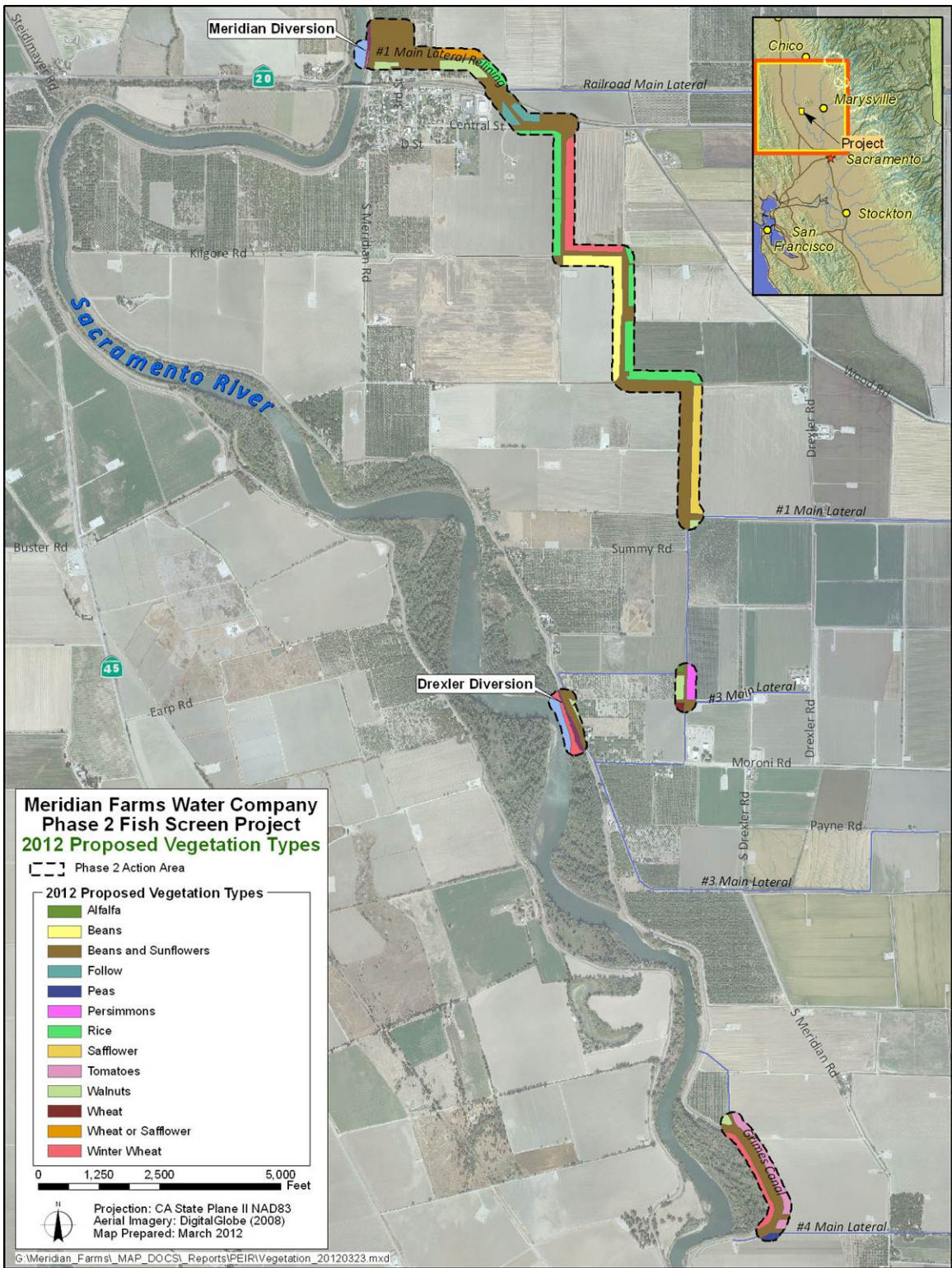


Figure 2-2. Vegetation in the Action Area

2.2.1 General Habitat

Valley Riparian/Cottonwood Riparian Forest

The valley riparian and riparian forest habitats are located adjacent to the Sacramento River system as it winds south along the western boundary of the MFWC Service Area, and much of the habitat is located within the flood plain of the levee system. Riparian areas with less mature canopy cover are dominated by narrow-leaf willow (*Salix exigua*) and black willow (*S. gooddingii*), with occurrences of valley oak (*Quercus lobata*) and cottonwood (*Populus fremontii*). Himalayan blackberry (*Rubus discolor*), California rose (*Rosa californica*), nutsedge (*Cyperus* spp.), curly dock (*Rumex crispus*), poison oak (*Toxicodendron diversilobum*) and several species of exotic grass characterize the shrub and herbaceous layers. Mature cottonwood stands dominate the closed canopy overstory and characterize the riparian forest areas adjacent to and within (during high flow season) the riverine environment. See **Photos 1 and 2** in **Appendix B** for a view of riparian habitat in the Action Area.

Valley Riparian/Cottonwood Riparian Forest habitats provide food, water, migration and dispersal corridors, and escape, nesting, and thermal cover for an abundance of wildlife. At least 50 amphibians and reptiles and 147 bird species occur in lowland riparian systems. Additionally, 55 species of mammals are known to use California's Central Valley riparian communities.

Valley Riparian/Cottonwood Riparian Forest occurs along the Sacramento River within the general vicinity of the Proposed Project/Action. Within the Action Area, riparian habitat is included along a portion of the proposed Grimes conveyance improvements and the existing diversion facility. In addition, disturbed patches of mixed willow riparian habitat occur in the vicinity of the Drexler and Meridian diversions. The area of the Meridian diversion primarily supports nonnative herbaceous and shrubby vegetation; vegetation is denser, with larger trees and shrubs in the vicinity of the Drexler Diversion. Riparian areas provide food, cover, and nesting for a variety of birds, mammals, amphibians, and even reptiles and fish. Riparian vegetation along the banks of the Sacramento River provide shaded aquatic riverine habitat for fish species.

Sacramento River

Within the vicinity of the Action Area the Sacramento River riverine habitat is characterized by freshwater aquatic and shaded riparian habitats. The adjacent riparian habitat has been modified by trails (both paved and unpaved), levees, and general recreation activities. Flows are relatively slow within the Action Area, exhibiting deep channel characteristics with levied banks. Channel substrate generally consists of fine sandy-loam with sparse areas of imported rip-rap along the banks used to reinforce the adjacent levees. At the proposed Meridian diversion location the river is channelized, exhibiting a deep, cold and slow moving flow. The Sacramento River in this vicinity is channelized, lacks aquatic vegetation, and has minimal streambank vegetative cover. The value of shaded riverine aquatic habitat in the Action Area near the diversions is minimal for fish (see **Photo 1** in **Appendix B**).

The Sacramento River in the vicinity of the proposed intake locations serves as a migratory corridor for the upstream migration of adult salmon and steelhead, and the downstream migration

of juvenile salmon and steelhead. North American green sturgeon may also utilize the Action Area as migratory habitat. Other fish species common in the Sacramento River near the proposed intake locations include striped bass, threadfin shad, American shad, catfish, Sacramento pikeminnow, tule perch, sculpin, bullhead, and a variety of other resident fish species. The Sacramento River near Sacramento also provides habitat for a variety of invertebrates, including planktonic species such as copepods, and epibenthic species such as crawfish and amphipods.

Agriculture

Agriculture, irrigated with water drawn from the Sacramento River, dominates the surrounding landscape. Although the specific crop cultivated on a parcel of land may vary annually, the general types of crops grown in the region remain relatively consistent. The major crops include rice, safflower, sunflower, tomatoes, and beans. Hay crops, such as alfalfa, are widely grown, and orchards in the area grow walnuts and persimmons. These crops are irrigated by a series of canals that deliver water from the Sacramento River (**Photos 3 through 9 in Appendix B**). The delivery canals within the Action Area are generally well maintained, typically concrete lined, and support minimal vegetation. There are unlined overflow ditches characterized by emergent aquatic vegetation such as cattails (*Typha latifolia*) and tules (*Scripus californicus*) that occur within the study area, adjacent or perpendicular to the Main Canal. All ditches owned and managed by MFWC are maintained annually, and generally lack dense upland or aquatic vegetation. A few ditches that are owned by the local Reclamation District are not maintained as regularly, and support denser stands of tules and cattail. Agricultural crops and irrigation drainages provide foraging and cover habitat for a variety of wildlife such as birds, mammals, and some reptiles.

All Proposed Project/Action components are located in or adjacent to agriculture. The Main Canal and other delivery canals that are proposed for widening (increased conveyance) are surrounded by lands in active crop production. These canals are generally concrete-lined; although, in some locations, the concrete bed is damaged and there are places where the canals are unlined. The proposed Drexler Re-Lift Station is adjacent to existing canals and ditches. Irrigation ditches lateral to the Main Canal in the vicinity of the Proposed Project/Action support emergent aquatic vegetation. The proposed Drexler pipeline is located adjacent to existing orchards and an irrigation ditch (seep). Canals and ditches may provide habitat for fish, aquatic invertebrates, and aquatic snakes.

Ruderal

In the study area, ruderal or disturbed habitats generally occur in narrow stretches adjacent to levees, roads, and along canals, ditches, river banks and agricultural land boundaries. Ruderal areas within the Action Area are located along the banks of the Sacramento River and are characterized by non-native annual grassland. Non-native annual grassland includes ripgut brome (*Bromus diandrus*), and wild oats (*Avena barbata*), and other common species including Johnson grass (*Sorghum halepense*), Leymus (*Leymus triticoides*), thistle (*Sonchus asper*), and filaree (*Erodium moschatum*). This habitat is also present in the understory of the riparian woodland habitat, and within the Action Area represents much of the vegetation growing within and along the banks of drainage ditches and irrigation canals. Ruderal grasslands provide important foraging, breeding, and resting habitat for many species of wildlife.

Developed / Disturbed

Developed and disturbed areas include major roads, highways, and buildings and structures within more urban areas, but also facilities and access roads which are located throughout agricultural areas within the Action Area. Also included within this category are the unpaved turnouts and shoulders of dirt access roads, and the regularly maintained banks of the levee, adjacent to the Sacramento River. Vegetation on these levees is removed through burning or by dragging a chain across its slopes.

2.2.2 Current Facilities

MFWC currently operates three surface water diversion/pumping plants on the Sacramento River at Meridian, Drexler, and Grimes in Sutter County. The diversions use pumps with unscreened intakes which likely entrain juvenile Chinook salmon, steelhead trout, and other native fishes that pass by the intake. Current facilities and improvements are described in more detail the following section which describes the Proposed Project/Action. The locations of the existing facilities are shown in **Figure 1-1**.

2.3 Proposed Project/Action Characteristics

2.3.1 Project Components

The MFWC Proposed Project/Action includes several components which were divided into two project phases (**Table 1-1**). The purpose for the phasing was to be able to implement the Proposed Project/Action in a way that was both economically feasible and practical for MFWC. The phases are independent of the other and were both designed to benefit fish species while allowing MFWC to more efficiently deliver water to its service areas. Consultation and implementation of Phase 1 is complete. Phase 2 components are the focus of this ASIP.

Phase 2 includes the construction of the New Meridian Diversion/Pumping Plant, removal of the Existing Meridian Diversion/Pumping Plant, modifications to the Main Canal, construction of the New Drexler Re-lift Pumping Plant, and removal of the Existing Drexler Diversion/Pumping Plant. The new diversion with fish screen will increase diversion capacity to compensate for the abandonment and removal of the existing Drexler Diversion while reducing fish entrainment in the pumps. The Main Canal modifications will increase conveyance capacity in order to handle increased flows resulting from the consolidation of the existing Drexler and Meridian diversions. A relift pump station will be constructed to deliver flows to the Drexler Service Area via the Drexler Pipeline.

The following is a summary of the Project facilities and proposed improvements in Phase 2 (also shown in **Figure 1-1**):

- **New Meridian Diversion/Pumping Plant.** A new 135 cfs diversion with fish screen and pumping plant will be located adjacent to and will replace the existing Meridian Diversion.

- **Main Canal Modifications.** Increase the capacity of approximately 15,200 lineal feet of the Main Canal to convey flows over to the Drexler Service Area in order to accommodate the consolidation of the Meridian and Drexler diversions.
- **New Drexler Re-lift Pumping Plant.** A new 35 cfs pumping plant will be located at the end of the Main Canal modifications to deliver flows to the Drexler Service Area via the new Drexler Pipeline.
- **Removal of Existing Meridian Diversion/Pumping Plant.** The existing diversion/pumping facility will be removed after the new pumping plant is constructed.
- **Removal of Existing Drexler Pumping Plant.** The existing pumping facility will be removed after the new pumping plant is constructed.

2.4 Proposed Project/Action Specifics

2.4.1 New Meridian Diversion/Pumping Plant

The Meridian Diversion/Pumping Plant would consist of a new 135 cfs diversion and pumping plant that would be installed immediately upstream of the existing Meridian Diversion on an approximately 10 acre site. The pumping plant would be located on the land-side of the levee.

2.4.1.1 Meridian Diversion Fish Screen

The retractable cylindrical fish screen with brush cleaning system would consist of two 20-foot long, 60-inch-diameter cylindrical screens. The total capacity of the screens would be 135 cfs. Pile-supported retrieval tracks would that parallel the riverside levee face would be installed for screen removal during periodic maintenance or in the irrigation off-season. The pile-supported tracks would allow the screens to be removed out of the water via a motorized hoist and cable system.

The screens would be designed to have a minimum of 3 feet of submergence during low river levels (Water Surface Elevation 32.6 feet). When in operation, the screen mounts to a docking inlet. The docking inlet is covered by a trash-rack to prevent debris from entering the manifold when the screens are out of the water. This docking inlet would be part of an approximately 20-foot-long header manifold fabricated by the system manufacturer. This header manifold would connect to the 72-inch intake pipeline that runs through the levee to the pump station. The header manifold would either be supported on a concrete slab and H piles, similar to the stationary cylindrical design, or be mounted directly to the piles. A platform would be constructed at the top of the tracks to provide access to the screens when in a retracted position, as well as to mount the system control panel.

The brush cleaning system would consist of cylindrical screens equipped with hydraulic motors that rotate the screen against fixed external and internal brushes.

2.4.1.2 Conveyance from River Inlet to Sump

The inlet structure would consist of two 66-inch steel tees, each with two fish screens mounted on top. The tees would be connected to a short segment of 84-inch steel pipeline. The 84-inch pipeline would then be reduced to a 72-inch steel pipeline, which would transition to a reinforced concrete pipe before passing through the levee and underneath North Meridian Road to the pump station wet-well. The fish screens, tees and the segment of 84-inch pipe would be supported by a three foot six-inch thick concrete pad supported on piles.

The layout of the screens could change to allow the motors to be spaced properly and removed from the river for inspection and maintenance. This would require tracks mounted on piles for the screens to be pulled from the river by a winch. Short lengths of pipe would convey the intake water from the individual fish screens to the 84-inch intake pipe.

2.4.1.3 Deflection Piles

If necessary, approximately 10 steel deflection piles would be installed just upstream of the fish screens in the river. The flanges on the piles would be approximately 15 inches wide and 14 inches deep, with a steel weight of 89 pounds per foot. The purpose of the deflection piles would be to protect the fish screens from large debris floating down the river. The top of the piles would be submerged a minimum of three feet as required for navigable waterways. The use of deflection piles may not be necessary with use of a retractable screen.

2.4.1.4 Gate Structure

The gate structure would provide a means for positive closure of the levee penetration by the 72-inch inlet pipeline. A sluice gate with 72-inch diameter thimbles would be mounted in a concrete structure on the water-side of the levee.

2.4.1.5 Wet Well

The pumping plant wet well structure would be constructed on the east side of the Sacramento River at the north east corner of North Meridian Road and Alameda Street near the community of Meridian. The inside dimensions of the sump are 35-feet wide by 46-feet long. The inlet pipeline would enter the sump with the pipe invert approximately 30 feet below grade). The wet well would direct the intake water to the five vertical turbine pumps.

2.4.1.6 Meridian Diversion Pumping Plant

The pumping plant would be equipped with two 16.5 cfs and three 34 cfs mixed flow pumps. The pumps would be mixed flow, vertical shaft pumps, with electric motors mounted on the concrete deck, directly above the wet well described above. The concrete deck is at approximately the same elevation as the existing surrounding grade (elevation 53.5 feet).

The pumping plant site would be surrounded by a chain link fence on the north and west sides of the site and a masonry wall on the east and south sides. The masonry wall would provide a visual barrier between the pumping plant and nearby residences. The wet well, pumping pad, pumps, air compressor, air tank, and an electrical building would be located within the fenced site. A driveway

and 15-foot access gate would allow vehicle access into the site off North Meridian Road. A three-foot gate would be located at the southeast corner of the site just off Alameda Street.

Pumps

Two 16.5 cfs and three 34 cfs mixed flow pumping units would be installed to pump the total design flow of 135 cfs into MFWC's Main Canal. At minimum speed, the low capacity pumps would be able to pump at a rate of 8.3 cfs. This provides MFWC the same pumping flexibility they have at their existing Meridian and Drexler pumping plants. The pumping plant would operate up to capacity when the Sacramento River water surface elevations vary between 32.6 and 50.3 feet.

Discharge Piping

The 16.5 cfs pumps and 34 cfs pumps would discharge into their respective 20-inch and 30-inch, above ground, pump discharge header pipes. The water would be conveyed from the discharge header into a common 54-inch, above ground, manifold pipeline. The 54-inch pipeline would drop underground just before exiting the fenced area of the pumping plant site. Underground, the pipeline would transition to a 72-inch discharge pipeline that would eventually discharge into the Main Canal near Mawson Road.

A separate 18-inch discharge would connect to the most westerly 16.5 cfs pump and would branch off and head both north and south to existing irrigation ditches. The north branch would serve the existing walnut orchard located next to the pumping plant. The south branch would serve the property located immediately south of the pumping plant on the other side of Alameda Street.

Flow Measurement

The water pumped from the Sacramento River would be measured with a 54-inch flowmeter just downstream from the pumping plant, and an 18-inch flowmeter located just west of the most westerly 16.5 cfs pump. The 54-inch flowmeter would measure the amount of water being diverted and pumped into the Main Canal. The 18-inch meter would be used to measure the water being pumped into the 18-inch waterline serving the north and south properties. The meter would be either above ground inside the pumping plant wall or housed in a concrete vault below ground. Flow measurements would be used by MFWC and Reclamation to log and report diversions.

2.4.1.7 Construction Considerations

Diversion and Fish Screen

Construction of the fish screen, intake piping and valve vault must be inside a sheet pile cofferdam to protect the site from flooding. Interlocking sheet piles would be driven into the river bottom using a vibratory or impact hammer attached to a crane. The crane would be floated to the site on a barge. The sheetpiles would be driven one at a time to form the cofferdam. This work would begin after July 1 to minimize impacts to listed aquatic species.

After completion of the cofferdam, the river bottom would be excavated to a level approximately five feet below the top of the H piles that would support the fish screen foundation. The piles

would then be driven, and a concrete tremie seal poured. These piles must be driven with an impact hammer to verify they are properly imbedded and providing required support. All this work must be done without dewatering the site. Before the concrete in the tremie seal sets, there is a danger the difference in water pressure inside and outside the cofferdam could cause the river bottom to rise; therefore, the concrete tremie seal must be in place before water inside the dam is pumped out. Prior to cofferdam dewatering, a fish rescue and salvage plan would be implemented to minimize potential construction-related effects to species present in the project area (see Appendix C). The contractor will have a contingency plan in place to prevent water contamination in the event of concrete tremie seal failure. Sump pumps inside the cofferdam would pump the river water out and then operate continuously to keep seepage from flooding the work site. Prior to cofferdam dewatering, a fish rescue and salvage plan would be implemented to minimize potential construction-related effects to species present in the project area.

The reinforced concrete support pad would then be poured above the support piles, and the screens themselves and intake piping would be mounted on the pad. The levee would be excavated at this time allowing placement of the intake to the pumping plant and the valve vault.

Alternatively, the levee could be excavated first. This would provide a way to move equipment and material to the fish screen installation site without a barge. The contractor would need to compare the cost of the additional excavation and backfill of the levee material versus the time saved by not needing to work from a barge. This would also allow the contractor to install the sheet piles for the intake pipe trench construction at the same time, saving overall construction time. The levee would then be replaced with the excavated material if it meets requirements for levee use. The material would be placed in 6 inch lifts and compacted to 90% relative density in accordance with CVFPB requirements.

Pumping Plant

The proposed site for the pumping plant, on the land side of the levee, is currently a walnut orchard and several walnut trees would be removed to accommodate construction. The depth of the wet well (approximately 40 feet to the bottom of the concrete bottom slab) would require sheet piling to support the excavation and protect workers. The sheet piles would be driven by vibratory or impact methods. Sump pumps would be installed to remove groundwater and keep the excavation dry. Once the vertical walls of the wet well are in place the excavation would be backfilled and the sheet piles would be removed or abandoned in place. The pumps, piping and electrical equipment would be installed, and a perimeter fence constructed.

After placement through the levee, the 7- inch reinforced concrete pipe (RCP) intake pipe would be placed in an approximately 30-foot deep by 10-foot wide sheet pile supported trench. Material excavated from the trench would be placed adjacent to the trench and used as backfill after pipe installation. The intake pipe would also be placed under North Meridian Road. To accommodate its installation, North Meridian Road would be closed for approximately one month, and traffic would be detoured to Mawson Road and Burris Road to access areas north of the construction site. Following pipe installation, the trench would be backfilled and the road repaved to repair any damage done during construction activities.

The pumping plant 54-inch steel discharge pipe would be placed in a trench approximately 50-foot long by 10-foot deep. The contractor could opt to slope walls back in lieu of using sheet piles for trench support. At the end of the trench the pipe would transition to a 72-inch RCP and would be placed in the bottom of the existing canal for approximately 1,050 feet. The soil in the bottom of the canal would be wet and unusable for pipe support, so it would be removed and replaced with gravel. The discharge pipe would be placed beneath Mawson Road, which would require a road closure and detour. The closure of North Meridian Road, described above and Mawson Road would not be done at the same time to allow traffic to access areas north of Meridian.

2.4.2 Main Canal Modifications

The Proposed Project/Action would increase the capacity of approximately 15,200 lineal feet of the Main Canal to convey flows to the Drexler service area needed as a result of the consolidation of the Meridian and Drexler diversions. The current maximum capacity of the Main Canal is estimated at 120 cfs from the outlet of the existing pumping plant to Siphon 2 (State Highway 20) which is not large enough to convey the new maximum flow (135 cfs) from the proposed new Meridian Pumping Plant; therefore, the canal would be widened and relined as described in **Table 2-1**.

**TABLE 2-1
PROPOSED CANAL MODIFICATIONS**

Description	Existing Bottom Width (ft)	Proposed Bottom Width (ft)	Flow (cfs)	Velocity (ft/s)
End of 54-inch Manifold pipe to Siphon 1	6.0-6.5	6 Pipe	135	4.8
Check Structure (moved from original location before Siphon)	5.2-7.9	5.5	135	2.5
Siphon 2 to Siphon 3	1.7-3.6	5.5	120	2.9
Siphon 3 to Bend Transition	2.6-3.5	5.5	120	2.7
Bend Transition to Check Structure	2.6-3.1	5.5	70	2.0
Check Structure to Siphon 4	3.1-3.3	3.5	70	2.0
Siphon 4 to Siphon 5	2.6-3.4	3.5	70	2.2

Source: MWH Americas, Inc., 2004

The concrete lined canal would have a trapezoidal shape and side slopes of 1.5 horizontal to 1 vertical (1.5:1). The canal section would be lined with four-inch-thick un-reinforced, cast-in-place concrete. The maximum bottom width would be 5.5 feet and the minimum bottom width would be 3.5 feet depending on the capacity requirements of the reach. The new canal invert elevation would be the same as the current elevation in order to continue utilizing existing siphons wherever hydraulic capacity is available.

The close proximity of the open canal to traffic on Alameda Street between the pumping plant and Mawson Road presents a safety hazard. The 72-inch discharge pipe would be extended to Mawson

Road and backfilled to address the safety hazard. A two foot deep drainage ditch would be constructed along Alameda Street to convey surface runoff that previously discharged to the canal.

The existing canal would be demolished and widened from one side or the other depending on the needed expanded width and the availability of right-of-way. The Operations and Maintenance (O&M) road would be widened, as necessary, to a width of 12-feet. Typical construction of the canal widening would involve a backhoe moving along the O&M road to remove the existing concrete lining by breaking the lining with the bucket into pieces which could be removed and placed into dump trucks. Due to the narrow work area, one dump truck at a time would need to back in from the nearest access point. At this time, the only access points to the canal work area are from Mawson Road, Highway 20, Central Street, Blackmer Road and Summy Road. The next truck would need to wait for the previous truck to pull off the access road. The contractor may try to bring a second dump truck on the opposite side of the canal and load it while waiting for a dump truck on the near side of the canal. Or a second excavator could start at the other end of the Main Canal and load dump trucks accessing the site from Summy Road. The old concrete lining would be landfilled.

It has been estimated that approximately 550 dump truck trips will be required to remove the old concrete lining. At 15 minutes per truck, it will take 24 working hours or about 3 days to remove the concrete. If truck access can maintain that rate, it should take about 4 weeks to remove all the concrete with one excavator working.

The same backhoe used to remove concrete or a second backhoe would then excavate the sides of the canal to the required dimensions. A surveyor would need to work with the excavator operator. The soil removed would be used to widen or raise the O&M road. Where the soil along the side of the canal is not suitable for supporting the concrete lining, it would be removed and replaced.

The existing canal width varies, but is generally between 16 feet and 20 feet wide. North of the transition at Station 72+09 the canal must be widened to approximately 21.5 feet wide. South of the transition it must be widened to approximately 19.5 feet wide. The widths of the limits of work available to the contractor vary between approximately 40 feet and 50 feet. The canal is generally in the center of the limits of work with an access road on one side or the other. However, the levee on the side opposite of the access road is generally not wide enough for trucks. Small backhoes or excavators are 8 to 10 feet wide, and the access road would be too narrow in some locations to allow access. It would also not be wide enough to allow other trucks with equipment and work crews to move around the work area, so access along both sides of the canal will be needed. Therefore, the access road will need to be widened before the start of work in some locations.

Once the canal is widened, it would be lined with four inches of concrete. It is expected that the new concrete lining would be shotcrete. However, the contractor could opt to use a concrete lining machine. In either case, concrete delivery trucks with a 10 cubic yard capacity would need to access the shotcrete crew or lining machine. At an estimated rate of 400 feet per day, the lining would require 35 working days or 7 weeks. Approximately 105 cubic yards of concrete or about 10 concrete truck deliveries would be required. One concrete truck every 45 minutes would need to access the site.

Check Structures and Turnouts

Seven reinforced concrete check structures and 15 turnouts to local irrigation ditches exist at various locations along the existing Main Canal. Of the seven check structures two would remain in place, one is no longer needed and would be demolished and the remaining four would be demolished and then replaced to accommodate the canal widening. Of the 15 existing turnouts, three would be maintained in place, two are no longer needed and would be demolished, 10 would be demolished and replaced to accommodate the canal widening. One new turnout is required in a new location, so a total of 11 turnouts would be constructed. It may be necessary to install a small pump in the canal to provide the required flow through the turnout and into the irrigation ditch at the Mawson Road crossing. Turnouts would be installed within the canal and would not increase the canal footprint.

Construction of the turnouts would likely not be initiated until the completion of the old lining removal. The turnout construction could take place concurrently with canal widening. An excavator would excavate the area for the new turnout and remove the old pipe. Then forms and rebar are placed and concrete poured. The gate mechanism would be installed at the end of the job. This work should not take more than a week per structure. More than one crew may be required.

The estimated duration of construction activities during the Main Canal widening is 5 months. This includes 4 weeks for removal of old concrete, 8 weeks for canal widening and turnout construction, and 8 weeks for canal lining.

Siphons

Two siphons (Siphon 1 and Siphon 3) would be replaced as part of the canal modifications. Siphon 1 under Mawson Road would be removed and replaced with the 72-inch diameter RCP which is part of the Pumping Plant discharge piping. The replacement of Siphon 1 would require a closure of Mawson Road to facilitate the pipe installation. Mawson Road would be restored and repaved following the pipe installation.

Siphon 3 would be replaced by a 72-inch diameter RCP. Replacement of Siphon 3 would require a shutdown and replacement of Central Road and would be subject to Sutter County Public Works' design standards. Siphon 3 would be lengthened to 200 feet (is currently 44-feet long) to extend it past a home on Central road that is situated next to the canal.

The remaining siphons (2, 4, and 5) provide adequate capacity and would be left in-place. Upstream and downstream transitions at each siphon would be constructed of four-inch thick cast-in-place concrete.

2.4.3 Drexler Re-Lift Pumping Plant

The Drexler Re-Lift Pumping Plant would be installed on the main canal, just upstream of the existing Siphon 5 and Pump #10. The purpose of the pumping plant would be to divert 35 cfs from the main canal to the Drexler service area. The existing Drexler Diversion would be abandoned. Water would be pumped up to a new turnout structure via the Drexler Pipeline

installed under Phase 1. This pipeline consists of approximately 6,500 feet of 36-inch pipe and a turnout structure. From the turnout structure, the water would gravity flow to the original Drexler canal outfall via approximately 600 feet of 36-inch pipe.

The pumping plant would include a 14-foot wide by 32-foot long forebay that would draw water off the Main Canal to two vertical turbine pumps. The forebay would be 10 feet deep and would be divided into two individual bays by a concrete wall with the pumps set at the end of each bay. The pump motors and discharge piping would be supported above a concrete slab that also forms the roof of the forebay. The individual pump discharge pipes would connect to a below ground 36-inch pipeline that would tie into the beginning of the Drexler Pipeline about 200 feet south of the Re-Lift Pumping Plant. An existing drainage ditch that parallels the Main Canal to the west would be filled to allow the construction of the pumping plant, and a new 24-inch storm drain would convey drainage from the ditch to the existing Reclamation District 70 canal to the south. The site construction also includes a 50-foot long by 21-foot wide concrete spillway in the O&M road opposite the Re-Lift Plant location. A 36 inch flow meter would be located in a below ground vault or sited above ground on the concrete pad.

Construction of the wet well and the overflow spillway must be done when the Main Canal is empty. However, the relocation of the drain from the seep to the ditch west of Summy Road and the connection to the Drexler Pipeline could be done during summer months.

2.4.4 Drexler Pipeline Extension

The Drexler Pipeline was connected to an existing 18-inch corrugated metal pipe (CMP) that discharges to an existing outlet box. The connection to the CMP was made with a concrete collar that would likely leak when under pressure. An alternative to replace the CMP and outlet box is being considered to provide a permanent connection and improve pump hydraulics.

A 24 inch branch of the Drexler Pipeline could be extended by approximately 500 feet to connect to a canal. This would improve pumping hydraulics by by-passing 3,000 feet of pipe and 3,000 feet of canals. Service to the Drexler Service Area would be improved and pumping costs would be reduced.

2.4.5 Removal of Existing Meridian and Drexler Diversions

Once the New Meridian Diversion/Pumping Plant and Drexler Relift pumping plant are constructed and operational, the existing Meridian and Drexler Diversion/Pumping Plants would be removed. At a minimum, removal of these facilities would include the removal of the pumps, equipment platforms, electrical equipment, gauging stations, pile supports to required level, and river side-piping. It would also include the excavation of the levee so the discharge pipe through the levee could be removed. The replacement levee section would be constructed to USACE and CVFPB requirements. Sheet pile cofferdams would likely be required to protect the work in the levee and landside flooding.

Removal of the existing diversions would require a large crane sited on the top of the levee or on a barge in the river. As the pumps, piping and support structures are cut into manageable sections,

they would be lifted and removed to a stockpile on the landside and hauled away by trucks. Some of the equipment such as the pumps could be reused, but most of the scrap would be landfilled. The contractor would attempt to pull the support piles out of the river, but most likely they would be cut three feet below river bottom and abandoned, in accordance with CVFPB requirements. The concrete vaults would be difficult and costly to remove. If CVFPB requires removal, the vaults would need to be demolished with jackhammers or a wrecking ball. The debris would then need to be removed from the river bank and bottom with a backhoe and hauled to a landfill.

Removal of the pipes passing through the levee would require excavation of the levee by backhoe down to and from around the pipe. A sheet pile cofferdam would be constructed to protect the construct site and the landside of the levee from flooding. CVFPB requires excavations in the levee to have trench walls sloped back at 1.5 to 1.0 side slopes. This means the trench would be the trench would be approximately 80 feet wide at the top. If the pipe sections are welded together, it would need to be cut into sections with a cutting torch. A crane would then lift the sections out of the trench to trucks for recycling or landfilling. The soil removed to uncover the pipe would be stockpiled at a nearby staging area. If the soil meets minimum requirements for use in a levee, it would be hauled back, placed in six-inch lifts and compacted to 90 percent relative density, in accordance with CVFPB requirements. The levee would be restored to pre-existing grades.

2.4.6 Grimes Canal Modifications

Under Phase 1 the existing unlined canal was widened and the banks were raised to accommodate a change in the how the canal is used. Previously, the canal flowed from south to north because the old diversion was at the south end of the canal. With the relocation of the New Grimes Diversion to the north end of the canal, the water would flow from north to south resulting in a higher water surface along most of the canal. New check structures and turnouts were also installed under Phase 1, and about 1,080 feet of the canal was lined with concrete. Under Phase 2, it is proposed that the remaining 2,500 linear feet of canal be lined with a 4 inches of concrete (shotcrete). The canal was widened under Phase 1, so the only work necessary is to remove and silt in the bottom of the canal and apply the shotcrete. The proposed Phase 2 Grimes Canal modifications are an optional component of the Phase 2 Proposed Project/Action; implementation of this component will be determined at a later date based on available funding.

2.5 Construction Phase

The specific routes to transport equipment, dispose excavated materials, or to obtain imported fill and other materials would likely vary for each project component. Because a number of construction materials sources are located in the surrounding area and urban centers, the selected routes use a combination of highways (e.g., Interstate-5 (I-5), State Route (SR)-99, SR-20, and SR-45), arterials and designated truck routes in the project vicinity. Construction worker trips are assumed to originate from the major urban areas in the project region and nearby communities primarily within Sutter County, Sacramento County, and Yolo County.

2.5.1 Staging Areas

Main staging areas would be located in an easily accessible area. Arrangements would be made between the contractor and property owner for all stored construction and equipment materials. Temporary staging of raw materials could occur in existing rights-of-way when short-term storage is needed. Site preparation for staging areas would incorporate appropriate measures to prevent unnecessary vegetation removal. Ingress and egress roads would be covered with rock base at a minimum to prevent off-tracking of dirt.

Main staging areas would be large enough to safely store heavy equipment, work crew vehicles, long-term storage of construction materials, and job site trailer(s). The long-term staging area(s) would be used for storage of construction equipment and materials, as a reporting location for workers, and as the location of the job site trailer and parking area for vehicles and equipment.

The contractor would be responsible for securing the job site with temporary chain link fencing or other fencing acceptable to the project engineer. Power to the job site will be provided by existing electrical utilities, if needed.

2.5.2 Affected Roadways

The roadways identified in **Table 2-2** will be affected during construction. All roadways would be restored to original condition or better and subject to Sutter County Public Works' design standards.

TABLE 2-2
AFFECTED ROADWAY SEGMENTS

Segment	Anticipated Level of Disruption
North Meridian Road	Temporary closure and detour (6 months)
Mawson Road	Temporary closure; Detour route (1 month)
Burris Road	Temporary closure; Detour route (1 month)
Central Road	Temporary closure and detour (1 month)

2.5.3 Construction Considerations

Construction activities would comply with the requirements set by the Central Valley Regional Water Quality Control Board (RWQCB) to minimize construction-related impacts to water quality. In addition, silt screens and/or silt fences would be used where construction activities could possibly cause sediment to enter the river. All water-side construction activities, with the exception of riprap installation, would be confined within a sheet-pile cofferdam, which would be put in place and removed during the "dry" season from July 1 to October 1, although this could be extended to November 1 with NMFS approval. In addition, canal modifications would occur between October 1 and April 30 to avoid disruption to the irrigation delivery schedule and growing season.

All construction contracts would specify staging areas for heavy equipment on the land-side of the Sacramento River so that spills of oil, grease, or other petroleum by-products would not be discharged in the Sacramento River. All machinery would be properly maintained and cleaned to prevent spills and leaks. Any spills and leaks from equipment would be reported immediately and cleaned up in accordance with applicable local, state, and/or federal regulations.

Construction contracts would note the location of staging areas for stockpiling material and would be required to maintain Storm Water Pollution Prevention Plan (SWPP) Best Management Practices (BMPs) to prevent the migration of material off site.

2.6 Actions Contributing to MSCS Goals

The MSCS contains a list of conservation goals for each species and NCCPA community evaluated in the MSCS. The three alternative goals for species are recovery (“R”), contribute to recovery (“r”), and maintain (“m”). The goal of “recovery” was assigned to those species whose recovery is dependent on restoration of the Delta and Suisan Bay/Marsh ecosystems and for which CALFED could reasonably be expected to undertake all or most of the actions necessary to recover the species. Recovery is achieved when the decline of a species is arrested or reversed, threats to the species are neutralized, and the species long-term survival in nature is assured. The goal “contribute to recovery” was assigned to species for which CALFED Actions affect only a limited portion of the species range and/or have limited effects on the species. To achieve the goal of contributing to a species recovery, CALFED is expected to undertake some of the actions under its control and within its scope that are necessary to recover the species. When a species has a recovery plan, CALFED may implement both plan measures that are within the CALFED Solution Area and some measures that are outside the Solution Area. For species without a recovery plan, CALFED will need to implement specific measures that will benefit the species. The goal “maintain” was assigned to species expected to be affected minimally by CALFED Actions. For this category, CALFED will avoid, minimize, and compensate for any adverse effects to the species commensurate with the level of effect on the species. Actions may not actually contribute to the recovery of the species; however, at a minimum, they will be expected to not contribute toward the need to list the species or degrade the status of a listed species. CALFED also will, to the extent practicable, improve habitat conditions for these species.

The CALFED Ecosystem Restoration Program (ERP) has adopted the CALFED MSCS goals related addressing “recovery”, “contribute to recovery”, and “maintain” for MSCS covered species as described above. The ERP has also adopted the MSCS conservation measures and would build upon those measures during the process of completing ERP studies and actions. The ERP focuses on measures to enhance NCCPA communities and has a goal related to the need to “enhance and/or conserve biotic communities” (“E”). A final ERP goal is to “maintain and/or enhance harvested species” (“H”), which relates to commercial/recreational use of native and non-native biological resources. The MFWC Project will fulfill the following milestone of the CALFED ERP to the benefit of all MSCS “R” and “r” covered fish:

- Install positive barrier fish screens on all diversions greater than 250 cfs in all Ecological Management Zones (EMZs) and 25% of all smaller unscreened diversions in the Sacramento River Basin.

2.7 Conservation Measures

The CALFED MSCS presents the basis for conservation measures developed to address CALFED Actions overall, as outlined in the Programmatic CALFED EIS/EIR. The CALFED MSCS follows the two-tiered approach to FESA, CESA, and NCCPA compliance initiated by the CALFED Programmatic EIS/EIR and MSCS. The MSCS provides the CALFED programmatic compliance with FESA, CESA, and NCCPA while this MFWC ASIP provides the project-level compliance with these acts. As such, this ASIP represents the project-level biological assessment for initiating consultation with USFWS and NOAA-Fisheries under the Section 7 of the FESA and the project-level NCCPA compliance.

The conservation measures summarized in **Table 2-3** are from a USFWS Programmatic Biological Opinion and will be incorporated into the Project Description. Conservation measures, as defined in this ASIP, include avoidance and minimization, compensation, and mitigation measures for giant garter snake. The following tables list the CALFED MSCS species specific conservation goals and measures, and habitat conservation measures for NCCPA habitats.

- The contractor shall use vibrational pile driving to the greatest extent feasible. If percussive pile driving is necessary, its use shall be minimized to the maximum extent possible and comply with the following *Interim Criteria for Injury of Fish to Pile Driving Operations* (Popper et al. 2006):
 - The Sound Exposure Level (SEL) shall not exceed 187 dB (re: 1 $\mu\text{Pa}^2 \cdot \text{sec}$) in any single strike, measured at a distance of 32.8 ft from the source;
 - The peak sound pressure level should not exceed 208 dB (re: 1 $\mu\text{Pa}_{\text{peak}}$) in any single strike, measured at a distance of 32.8 ft from the source.
- Pump(s) used for dewatering the cofferdam during Phase 2 construction will be screened according to NMFS fish screening criteria for anadromous salmonids (NMFS 1997). After installation of the cofferdam and any time the cofferdam is flooded during construction, a fish rescue and salvage plan will be implemented to minimize potential construction-related effects to species present in the project area (see Appendix C). A qualified biologist will be on-site during such pumping activities to ensure that any fish that may be present within the construction area are relocated to suitable habitat near the project area.
- During construction operations, the number of access routes, number and size of staging areas, and the total area of the proposed project activity will be limited to the minimum necessary. Routes and boundaries will be clearly demarcated. Movement of heavy equipment to and from the project site will be restricted to established roadways to minimize habitat disturbance. Project-related vehicles shall observe a 20-mile-per-hour speed limit within construction areas, except on County roads and on State and Federal highways. This is particularly important during periods when the snake may be sunning or moving on roadways. All heavy equipment, vehicles, and supplies will be stored at the designated staging area at the end of each work period.

- During construction operations, stockpiling of construction materials, portable equipment, vehicles, and supplies will be restricted to the designated construction staging areas and exclusive of the Environmentally Sensitive Areas (ESAs). The applicant will ensure contamination of habitat does not occur during such operations. All workers will be informed of the importance of preventing spills and appropriate measures to take should a spill occur.
- At most 24-hours prior to the commencement of construction activities, the ESA shall be surveyed for giant garter snakes by a USFWS-approved biologist. The biologist will provide the USFWS with a written report that adequately documents the monitoring efforts within 24-hours of commencement of construction activities. The project area shall be re-inspected by the monitoring biologist whenever a lapse in construction activity of two weeks or greater has occurred.
- Construction activity within giant garter snake habitat (*e.g.* aquatic, upland, and rice habitat) shall be conducted between May 1 and October 1. This is the active period for the snake and direct mortality is lessened, because snakes are expected to actively move and avoid danger. If it appears that construction activity may go beyond October 1, the project proponents shall contact the USFWS as soon as possible, but not later than September 15 of the year in question, to determine if additional measures are necessary to minimize take. Construction activities within 200 feet from the banks of snake aquatic habitat will be avoided during the snake's inactive season. **If this is not feasible, the Project Proponent must consult with USFWS to determine measures to avoid impacts to giant garter snake.**
- A USFWS-approved biologist shall inspect construction-related activities at the ESA to ensure that no unauthorized take of federally listed species or destruction of their habitat occurs. The biologist shall be available for monitoring throughout all phases of construction that may result in adverse effects to the giant garter snake. This includes clearing and grubbing activities and installation of exclusion fence in giant garter snake upland habitat. Furthermore, the biologist shall have the authority through communication with the resident engineer to stop construction activities in the immediate area if a giant garter snake is encountered during construction until appropriate corrective measures have been completed or until the snake is determined to be unharmed. Snakes encountered during construction activities shall be allowed to move away from the area on their own volition. The biologist shall notify the USFWS immediately if any listed species are found on-site, and will submit a report, including date(s), location(s), habitat description, and any corrective measures taken to protect the species found. The biologist shall be required to report any take of listed species to the USFWS immediately by telephone at 916/ 414-6600 and by electronic mail or written letter addressed to the Chief, Endangered Species Division, within three (3) working days of the incident. The Service does not authorize any handling or moving of a giant garter snake by other than a USFWS-permitted biologist.
- A Worker Environmental Awareness Training Program for construction personnel shall be conducted by the USFWS-approved biologist for all construction workers, including

contractors, prior to the commencement of construction activities. The program shall provide workers with information on their responsibilities with regard to the snake, an overview of the life-history of this species, information on take prohibitions, protections afforded this animal under the Act, and an explanation of the relevant terms and conditions of this biological opinion. Written documentation of the training must be submitted to the Sacramento Fish and Wildlife Office within 30 days of the completion of training. As needed, training shall be conducted in Spanish for Spanish language speakers.

- Prior to the commencement of construction activities, high visibility fencing will be erected around the habitats of federally listed species to identify and protect these designated ESAs from encroachment of personnel and equipment. These areas will be avoided by all construction personnel. The fencing shall be inspected by the Contractor before the start of each work day and maintained by the Contractor until completion of the project. The fencing may be removed only when the construction of the project is completed. Fencing will be established in upland immediately adjacent to aquatic snake habitat and extending up to 200 feet from construction activities. Silt fencing, if properly installed, may serve as suitable snake exclusion fencing.
- Signs will be posted by the Contractor every 50 feet along the edge of the ESAs, with the following information: “This area is habitat of federally-threatened and/or endangered species, and must not be disturbed. These species are protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment.” The signs should be clearly readable from a distance of 20 feet, and must be maintained by the Contractor for the duration of construction.
- Best Management Practices (BMPs), including a Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP), will be implemented to minimize effects to the snake during construction. Best management practices will be implemented to prevent sedimentation from entering ESAs and to reduce erosion, dust, noise, and other deleterious aspects of construction related activities. These BMPs may include, but are not limited to, silt fencing, temporary berms, restrictions on cleaning equipment in or near ESAs, installation of vegetative strips, and temporary sediment disposal. Runoff from dust control and hazardous materials will be retained on the construction site and prevented from flowing into the ESAs.
- Tightly woven fiber netting (mesh size less than 0.25 inch) or similar material shall be used for erosion control and other purposes at the ESA to ensure that the giant garter snake is not trapped or becomes entangled. This limitation shall be communicated to the contractor using special provisions included in the bid solicitation package.
- To eliminate an attraction to predators of the snake, all food-related trash items, such as wrappers, cans, bottles, and food scraps, must be disposed of in closed containers and removed at the end of each workday from the entire project site.

- The Contractor shall provide documentation that aggregate, fill, or borrow material provided for the proposed project was obtained in compliance with the State Mining and Reclamation Act (SMARA). Evidence of compliance with the Act shall be demonstrated by providing the resident engineer with one of the following: 1) a letter from the USFWS stating that the use of the borrow pit will not result in the incidental take of species; 2) an incidental take permit for contractor-related activities issued by the USFWS pursuant to section 10(a)(1)(B) of the Act; 3) a biological opinion or letter concurring with a “not likely to adversely affect” determination issued by the USFWS to the Federal agency having jurisdiction over contractor-related services; 4) a letter from the USFWS concurring with the “no effect” determination for contractor-related activities; or 5) contractor submittal of information to the resident engineer indicating compliance with the SMARA and provision of County land use permits and California Environmental Quality Act (CEQA) clearance.
- After construction activities are complete, any temporary fill or construction debris shall be removed and disturbed areas restored to their pre-project conditions. An area subject to “temporary” disturbance includes any area that is disturbed during the project, but that, after project completion, will not be subject to further disturbance and has the potential to be re-vegetated. All ESA snake habitats subject to temporary ground disturbances, including storage and staging areas and temporary roads, will be restored to pre-project conditions. If appropriate, these areas shall also be re-contoured to pre-project conditions. A written report shall be submitted to the USFWS within ten (10) working days of the completion of construction at the project site and restoration of the site to pre-project conditions.
- An inspection of the site, with a photo documentation report showing pre- and post-project area photos, will be conducted and photos and a brief report will be submitted to USFWS one year from implementation of restoration to pre-project conditions.
- The Contractor shall minimize the potential for harm, harassment, and direct mortality of the snake resulting from project-related activities by implementation of the project. The Contractor shall ensure that the temporary loss of giant garter snake habitat is confined to the proposed project site.
- Aquatic habitat for the snake will be dewatered 15 days prior to the initiation of construction activities. If complete dewatering is not possible, potential snake prey (*i.e.*, fish and tadpoles) will be removed so that giant garter snakes and other wildlife are not attracted to the construction area.
- A USFWS-approved biologist shall inspect construction-related activities at the proposed project site to ensure that no unauthorized take of federally listed species or destruction of their habitat occurs. The biologist shall be available for monitoring throughout all phases of construction that may result in adverse effects to the giant garter snake. This includes clearing and grubbing and other construction activities in the areas of wetland vegetation/aquatic habitat, adjacent upland habitat, and during exclusion fence installation. Furthermore, the biologist shall have the authority through communication with the

resident engineer to stop construction activities in the immediate area if a giant garter snake is encountered during construction until appropriate corrective measures have been completed or until the snake is determined to be unharmed. Snakes encountered during construction activities shall be allowed to move away from the area on their own volition. The biologist shall notify the USFWS immediately if any listed species are found on-site, and will submit a report, including date(s), location(s), habitat description, and any corrective measures taken to protect the species found. The biologist shall be required to report any take of listed species to the USFWS immediately by telephone at 916/ 414-6600 and by electronic mail or written letter addressed to the Chief, Endangered Species Division, within three (3) working days of the incident. The Service does not authorize any handling or moving of a giant garter snake by other than a USFWS-permitted biologist.

- Prior to the commencement of construction activities, the project proponent shall compensate for the temporary and permanent loss habitat of the giant garter snake according to the Programmatic Guidelines.

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**TABLE 2-3
CALFED MSCS SPECIES GOAL AND CONSERVATION MEASURES
FOR SPECIAL-STATUS SPECIES OCCURRING IN THE ACTION AREA**

Species (Scientific Name / Common Name)	Listing Status Federal/ State	MSCS Species Goal	Applicable MSCS Species Specific Conservation Measures
Fish			
<i>Acipenser medirostris</i> North American green sturgeon	FT/CSC	R	<ol style="list-style-type: none"> 1. Coordinate and maximize water supply system operations flexibility consistent with seasonal flow and water temperature needs of the green sturgeon; pursue opportunities to operate new and existing diversions to avoid and minimize adverse effects on green sturgeon, and, to the extent consistent with CALFED objectives, locate the diversion points to avoid the primary distribution of green sturgeon. 2. For all construction activities, limit construction to windows of minimal species vulnerability and implement best management practices (BMPs), including a stormwater pollution prevention plan (SWPPP), toxic materials control and spill response plan, and vegetation protection plan. 3. CALFED actions that have impacts on shallow water habitat will protect and restore in-kind habitat, including habitat features that minimize colonization by undesirable non-native species. 4. Avoid or minimize restrictions on the upward movement of green sturgeon to suitable spawning habitat. 5. Implement applicable conservation measures to avoid, minimize, and compensate for impacts on green sturgeon listed in MSCS Attachment D, "Summary of Potential Beneficial and Adverse Program Effects and Conservation Measures", Table D-19, "Anadromous Fish Group: Summary of Potential Beneficial and Adverse CALFED Effects and Conservation Measures".
<i>Oncorhynchus mykiss</i> Central Valley steelhead	FT/--	R	<ol style="list-style-type: none"> 1. Implement applicable conservation measures to avoid, minimize, and compensate for impacts on Central Valley steelhead listed in MSCS Attachment D, "Summary of Potential Beneficial and Adverse Program Effects and Conservation Measures", Table D-19, "Anadromous Fish Group: Summary of Potential Beneficial and Adverse CALFED Effects and Conservation Measures". 2. For all in-channel and near-channel construction activities, implement construction BMPs (such as erosion and sediment control measures) and conservation measures in the 404 NWP, GPs, and PL84-99 USACE flood relief BOs: <ol style="list-style-type: none"> a. Avoid or minimize channel modifications during time periods when steelhead are vulnerable to the direct and indirect adverse effects of construction activities. b. Avoid or minimize channel modifications in important natal, rearing, and migratory habitats that may result in habitat degradation and diminished habitat connectivity. c. Avoid, minimize, and compensate for all adverse impacts on instream, shallow-water,

**TABLE 2-3
CALFED MSCS SPECIES GOAL AND CONSERVATION MEASURES
FOR SPECIAL-STATUS SPECIES OCCURRING IN THE ACTION AREA**

Species (Scientific Name / Common Name)	Listing Status Federal/ State	MSCS Species Goal	Applicable MSCS Species Specific Conservation Measures
<i>Oncorhynchus tshawytscha</i> Central Valley spring-run Chinook salmon	FT/CT	R	<p>riparian, and shaded riverine aquatic habitats resulting from CALFED Actions, including bank protection of in-channel islands, construction of attached berms, and levee program actions.</p> <p>d. Compensate for adverse impacts on habitats by in-kind, onsite replacement of habitats and their functional values. Compensation shall result in a net increase in the extent and connectivity of these habitats for migrating, rearing, and spawning steelhead.</p> <p>3. Implementation of offsite, out-of-kind mitigation that reestablishes access to historical steelhead spawning and rearing habitat may be considered appropriate compensation:</p> <p>a. Remove or modify artificial barriers and diversion structures.</p> <p>4. Fish screens shall be installed in accordance with NMFS/DFG fish screening criteria on any new diversions, consolidated diversions, or on the intake of any existing diversions as a compensation measure.</p> <p>5. Fully adhere to the terms and conditions of all applicable CESA and FESA biological opinions and permits for CVP and SWP operations.</p> <p>6. Implement construction BMPs including stormwater pollution prevention plans, toxic materials control and spill response plans, vegetation protection plans, and restrictions on materials used in channel and on levee embankments:</p> <p>a. All materials that are used for construction of in-channel structures must meet applicable State and federal water quality criteria. Avoid or minimize the use of such materials that are deleterious to aquatic organisms.</p>
			<p>1. Implement applicable conservation measures to avoid, minimize, and compensate for impacts on Central Valley spring-run Chinook salmon listed in MSCS Attachment D, Table D-19.</p> <p>2. For all in-channel and near-channel construction activities, implement construction BMPs (such as erosion and sediment control measures) and conservation measures in the 404 NWP, GPs, and PL84-99 USACE flood relief BOs:</p> <p>a. Avoid or minimize channel modifications during time periods when spring-run Chinook are vulnerable to the direct and indirect adverse effects of construction activities.</p> <p>b. Avoid or minimize channel modifications in important natal, rearing, and migratory habitats</p>

**TABLE 2-3
CALFED MSCS SPECIES GOAL AND CONSERVATION MEASURES
FOR SPECIAL-STATUS SPECIES OCCURRING IN THE ACTION AREA**

Species (Scientific Name / Common Name)	Listing Status Federal/ State	MSCS Species Goal	Applicable MSCS Species Specific Conservation Measures
			<p>that may result in habitat degradation and diminished habitat connectivity.</p> <p>c. Avoid, minimize, and compensate for all adverse impacts on instream, shallow-water, riparian, and shaded riverine aquatic habitats resulting from CALFED Actions, including bank protection of in-channel islands, construction of attached berms, and levee program actions.</p> <p>d. Compensate for adverse impacts on habitats by in-kind, onsite replacement of habitats and their functional values. Compensation shall result in a net increase in the extent and connectivity of these habitats for migrating, rearing, and spawning spring-run Chinook salmon.</p> <p>3. Implementation of offsite, out-of-kind mitigation that reestablishes access to historical spring-run Chinook salmon spawning and rearing habitat may be considered appropriate compensation:</p> <p>a. Remove or modify artificial barriers and diversion structures.</p> <p>4. Fish screens shall be installed in accordance with NMFS/DFG fish screening criteria on any new diversions, consolidated diversions, or on the intake of any existing diversion that is either enlarged, modified, relocated, or for which the season of use is changed as a result of a CALFED action within the range of spring-run Chinook salmon. CALFED may also install fish screens on existing diversions as a compensation measure.</p> <p>5. Fully adhere to all terms and conditions in all applicable CESA and FESA biological opinions and permits for CVP and SWP operations.</p> <p>6. Implement construction BMPs including stormwater pollution prevention plans, toxic materials control and spill response plans, vegetation protection plans, and restrictions on materials used in channel and on levee embankments:</p> <p>a. All materials that are used for construction of in-channel structures must meet applicable State and federal water quality criteria. Avoid or minimize the use of such materials that are deleterious to aquatic organisms.</p>
<i>Oncorhynchus tshawytscha</i>	FE/CE	R	1. Implement applicable conservation measures to avoid, minimize, and compensate for impacts on

**TABLE 2-3
CALFED MSCS SPECIES GOAL AND CONSERVATION MEASURES
FOR SPECIAL-STATUS SPECIES OCCURRING IN THE ACTION AREA**

Species (Scientific Name / Common Name)	Listing Status Federal/ State	MSCS Species Goal	Applicable MSCS Species Specific Conservation Measures
Sacramento River winter-run Chinook salmon			<p>Sacramento River winter-run Chinook salmon listed in MSCS Attachment D, Table D-19.</p> <ol style="list-style-type: none"> 2. For all in-channel and near-channel construction activities, implement construction BMPs (such as erosion and sediment control measures) and conservation measures in the 404 NWP, GPs, and PL84-99 USACE flood relief BOs: <ol style="list-style-type: none"> a. Avoid or minimize channel modifications during time periods when winter-run Chinook are vulnerable to the direct and indirect adverse effects of construction activities. b. Avoid or minimize channel modifications in important natal, rearing, and migratory habitats that may result in habitat degradation and diminished habitat connectivity. c. Avoid, minimize, and compensate for all adverse impacts on instream, shallow-water, riparian, and shaded riverine aquatic habitats resulting from CALFED Actions, including bank protection of in-channel islands, construction of attached berms, and levee program actions. d. Compensate for adverse impacts on habitats by in-kind, onsite replacement of habitats and their functional values. Compensation shall result in a net increase in the extent and connectivity of these habitats for migrating, rearing, and spawning spring-run Chinook salmon. 3. Implementation of offsite, out-of-kind mitigation that reestablishes access to historical winter-run Chinook salmon spawning and rearing habitat may be considered appropriate compensation: <ol style="list-style-type: none"> a. Remove or modify artificial barriers and diversion structures. 4. Fish screens shall be installed in accordance with NMFS/DFG fish screening criteria on any new diversions, consolidated diversions, or on the intake of any existing diversion that is either enlarged, modified, relocated, or for which the season of use is changed as a result of a CALFED action within the range of spring-run Chinook salmon. CALFED may also install fish screens on existing diversions as a compensation measure. 5. Fully adhere to all terms and conditions in all applicable CESA and FESA biological opinions and permits for CVP and SWP operations. 6. Implement construction BMPs including stormwater pollution prevention plans, toxic materials control and spill response plans, vegetation protection plans, and restrictions on materials used in channel and on levee embankments:

TABLE 2-3
CALFED MSCS SPECIES GOAL AND CONSERVATION MEASURES
FOR SPECIAL-STATUS SPECIES OCCURRING IN THE ACTION AREA

Species (Scientific Name / Common Name)	Listing Status Federal/ State	MSCS Species Goal	Applicable MSCS Species Specific Conservation Measures
			a. All materials that are used for construction of in-channel structures must meet applicable State and federal water quality criteria. Avoid or minimize the use of such materials that are deleterious to aquatic organisms.
Reptiles			
<i>Thamnophis gigas</i> Giant garter snake	FT/CT	r	<ol style="list-style-type: none"> 1. Conduct surveys to determine the occupancy and distribution of the species within suitable habitat that CALFED actions could affect.¹ 2. Restore potentially occupied habitat that would be temporarily degraded by CALFED actions onsite immediately following project completion.
Birds			
<i>Athene cunicularia</i> Western burrowing owl	--/CSC	m	<ol style="list-style-type: none"> 1. Restore or enhance 1-2 acres of suitable nesting habitat for each acre of occupied nesting habitat that is converted to unsuitable nesting habitat as a result of CALFED actions. 2. To the extent consistent with ERP objectives, design and manage grassland and agricultural land habitat restorations and enhancements to provide suitable foraging habitat conditions. 3. Avoid or minimize disturbances that could be associated with implementing CALFED actions near active nest sites during the nesting period (March-August). 4. To the extent consistent with ERP objectives, manage restored or enhanced habitats to maintain desirable rodent populations and minimize impacts associated with rodent control.
<i>Branta hutchinsii leucopareia</i>	FD/--/--	m	<ol style="list-style-type: none"> 1. To the extent consistent with ERP objectives, direct proposed actions for improving agricultural habitats

¹ Note that the Service does not have a 'protocol-level survey' for the giant garter snake to determine presence/absence. Determination of species presence is based on habitat characteristics, the most current information about the extant range of the species, surrounding locality records, and the biology and ecology of the snake, and not on presence/absence surveys, which are not effective for this cryptic and evasive species.

**TABLE 2-3
CALFED MSCS SPECIES GOAL AND CONSERVATION MEASURES
FOR SPECIAL-STATUS SPECIES OCCURRING IN THE ACTION AREA**

Species (Scientific Name / Common Name)	Listing Status Federal/ State	MSCS Species Goal	Applicable MSCS Species Specific Conservation Measures
Cackling (=Aleutian Canada) goose			for wildlife to protecting and improving traditional wintering habitat.
<i>Buteo swainsoni</i> Swainson's hawk	--/CT/--	r	<ol style="list-style-type: none"> Before implementing actions that could result in take or the loss or degradation of occupied habitat, conduct surveys in suitable habitat within portions of the species' range that CALFED actions could affect to determine the presence and distribution of the species. Avoid or minimize actions near locations that support high densities of nesting pairs that could adversely affect high value foraging and nesting habitat. Avoid or minimize actions within 5 miles of active nest sites that could result in disturbance during the breeding period (April-September). To the extent consistent with CALFED objectives, adhere to DFG Region II mitigation guidelines for avoiding or minimizing impacts of actions of the Swainson's hawk.
<i>Pandion haliaetus</i> osprey	--/--/--	m	<ol style="list-style-type: none"> Before implementing CALFED actions that could result in the loss nesting structures or disturbance to nesting pairs, conduct surveys to determine the presence and distribution of active nest sites along the Sacramento River and other major tributaries to the Bay-Delta. Avoid or minimize disturbances that could be associated with implementing CALFED actions near active nest sites during the nesting period (March-August). Avoid or minimize CALFED actions that could result in the degradation or loss of nesting structures.
<i>Riparia riparia</i> Bank swallow	--/CT/--	r	<ol style="list-style-type: none"> Before implementing actions that could result in take or the loss or degradation of occupied habitat, conduct surveys in suitable habitat within portions of the species' range that CALFED actions could affect to determine the presence and distribution of the species. Avoid or minimize actions that could adversely affect known colonies or unoccupied river reaches with eroding banks composed of soils that would provide suitable nesting substrate. Avoid actions near active colonies from April through August.

**TABLE 2-4
CALFED MSCS CONSERVATION MEASURES FOR NCCPA NATURAL COMMUNITIES OCCURRING IN THE ACTION AREA**

NCCPA Natural Community	Applicable MSCS Conservation Measures
Valley Riverine Aquatic Habitat	<ol style="list-style-type: none"> 1. Avoid or minimize disturbance to existing shaded riverine aquatic overhead cover. 2. Restore or enhance 1-3 times the linear footage of affected shaded riverine aquatic overhead cover near where impacts are incurred. 3. To the extent practicable, include project design features that allow for onsite reestablishment and long-term maintenance of shaded riverine aquatic overhead cover following project construction. 4. Avoid or minimize implementing actions during the periods evaluated species are present and could be affected by the actions.
Valley/Foothill Riparian Habitat	<ol style="list-style-type: none"> 1. Avoid or minimize disturbance to existing habitat. 2. Restore or enhance 2-5 acres of additional in-kind habitat for every acre of affected habitat near where impacts are incurred before implementing actions that could result in the loss or degradation of habitat. 3. To the extent practicable, include project design features that allow for onsite reestablishment and long-term maintenance of riparian vegetation following project construction. 4. Avoid or minimize construction activities during the breeding period of evaluated species that could be affected by the actions.
Anadromous Fish Group	<ol style="list-style-type: none"> 1. Implement measures on an emergency basis during extended droughts to protect water supplies dedicated to meet Delta inflow and outflow criteria deemed essential in maintaining anadromous fish populations. Such measures would be implemented infrequently and would be used only to readjust water supplies to levels expected without this set of CALFED actions. Measures may include additional supplies, or emergency provisions that would reduce other water supply demands. Another measure is initially to implement the actions to the extent feasible to determine potential effects on seasonal and critical-year water supplies and develop a long-term water management plan that includes this and other actions to minimize effects of reallocation in other seasons and critical years. 2. Avoid or minimize in-channel construction activities during periods when anadromous fish species are present in high abundance or when life stages are present that are most susceptible to adverse effects associated with implementing actions. 3. To the extent consistent with CALFED objectives, confine additional winter pumping for flooding agricultural lands to times and areas of channels with low densities of anadromous fish. 4. To the extent consistent with CALFED objectives, place consolidated intakes in areas with minimal numbers of juvenile anadromous fish. 5. To the extent consistent with CALFED objectives, include project design features that allow for onsite reestablishment and long-term maintenance of aquatic, wetland, and riparian habitat following project construction. 6. Reductions in unnatural inputs of organic carbon could be replaced with increased natural organic inputs such as from restored tidal wetlands and riparian habitats. 7. Water transfers should be conducted so as not to increase exports during times of the year when anadromous fish are more vulnerable to damage or loss at project facilities or when their habitat may be adversely affected. 8. Design and operate proposed new diversions from the Sacramento River to minimize adverse effects on migrating anadromous fish, to avoid blocking upstream migration of fish to the Sacramento River, and to improve habitat conditions for anadromous fish.
Estuarine Fish Group	<ol style="list-style-type: none"> 1. Implement measures on an emergency basis during extended droughts to protect water supplies dedicated to meet Delta

TABLE 2-4
CALFED MSCS CONSERVATION MEASURES FOR NCCPA NATURAL COMMUNITIES OCCURRING IN THE ACTION AREA

NCCPA Natural Community	Applicable MSCS Conservation Measures
	<p>inflow and outflow criteria deemed essential in maintaining anadromous fish populations. Such measures would be implemented infrequently and would be used only to readjust water supplies to levels expected without this set of CALFED actions. Measures may include additional supplies, or emergency provisions that would reduce other water supply demands. Another measure is initially to implement the actions to the extent feasible to determine potential effects on seasonal and critical-year water supplies and develop a long-term water management plan that includes this and other actions to minimize effects of reallocation in other seasons and critical years.</p> <ol style="list-style-type: none"> 2. To the extent consistent with CALFED objectives, construct and operate in-channel barriers and restrictions to provide sufficient leeway to adjust hydraulics in various channels to ensure fish are not being drawn in greater numbers or proportions toward the pumps or being affected by poor water quality. Implement monitoring and testing necessary to design, construct, and operate barriers and restrictions. Develop and implement procedures and operating criteria for barrier systems to protect fish. Implement monitoring and testing necessary to ensure against excessive movement of fish toward the south-Delta pumping plants. 3. Avoid or minimize in-channel construction activities during periods estuarine fish species would be most susceptible to adverse effects that could be associated with implementing proposed actions. 4. Avoid or minimize implementing proposed actions in occupied habitat areas that could have a substantial adverse effect on the distribution or abundance estuarine fish species. 5. To the extent practicable, confine additional pumping to times and area to channels with minimal concentrations of fish. 6. Install screens on new diversions to avoid entrainment of juvenile and adult estuarine fish. 7. Include project design features that allow for onsite reestablishment and long-term maintenance of aquatic, wetland, and riparian habitat following project construction. 8. Reductions in unnatural inputs of organic carbon could be replaced with increased natural organic inputs such as from restored tidal wetlands and riparian habitats. 9. Water transfers should be conducted in a manner that avoids increased exports during periods when estuarine fish are more vulnerable to damage or loss at project facilities. 10. Design and operate proposed new diversions from the Sacramento River to minimize adverse effects on migrating native estuarine fishes, to avoid blocking upstream migration of fish to the Sacramento River, and to improve habitat conditions for native estuarine fish.

CHAPTER 3

Environmental Baseline

The following chapter presents species accounts for species assessed in detail in this ASIP. The species addressed in this ASIP are those special-status species that may be affected or whose habitat may be affected by the Proposed Project/Action.

Species selected for detailed analysis include those federal- and/or state-listed species, candidate species, and/or species of special concern covered by the CALFED MSCS and potentially affected by the Proposed Project/Action. The following table shows these selected species which are addressed in detail in the ASIP.

Designated Critical Habitat and delineated Essential Fish Habitat in the Action Area are also discussed.

**TABLE 3-1
SPECIES, CRITICAL HABITAT, AND ESSENTIAL FISH HABITAT
ADDRESSED IN DETAIL IN THIS ASIP**

Species
<ul style="list-style-type: none"> North American green sturgeon (Southern DPS) (<i>Acipenser medirostris</i>) Central Valley steelhead (<i>Oncorhynchus mykiss</i>) Central Valley spring-run Chinook (<i>Oncorhynchus tshawytscha</i>) Sacramento River winter-run Chinook (<i>Oncorhynchus tshawytscha</i>) Giant garter snake (<i>Thamnophis gigas</i>) Western burrowing owl (<i>Athene cunicularia</i>) Cackling (=Aleutian Canada) goose (<i>Branta hutchinsii leucopareia</i>) Swainson's hawk (<i>Buteo swainsoni</i>) Osprey (<i>Pandion haliaetus</i>) Bank swallow (<i>Riparia riparia</i>)
Critical Habitat
<ul style="list-style-type: none"> North American green sturgeon (Southern DPS) Critical Habitat Central Valley steelhead Critical Habitat Central Valley spring-run Chinook salmon Critical Habitat Sacramento River winter-run Chinook salmon Critical Habitat
Essential Fish Habitat
<ul style="list-style-type: none"> Pacific salmon Essential Fish Habitat

3.1 Baseline Conditions for Species

The stretch of the Sacramento River that includes the Action Area is part of a migratory corridor for adult Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead, and provides migration and rearing habitat for juveniles of these species. A large proportion of all Federally listed Central Valley salmonids are expected to utilize aquatic habitat within the Sacramento River in the Action Area. The Sacramento River also functions as a migratory and holding corridor for adult and rearing and migratory habitat for juvenile Southern DPS of North American green sturgeon. The entire population of migrating adults and emigrating juvenile winter-, and Central Valley spring-run Chinook salmon, and a majority of Central Valley steelhead, must pass by/through the Action Area. The following section provides life history information for these special-status species with potentially affected by the Proposed Project/Action.

3.1.1 North American Green Sturgeon

On April 7, 2006, NMFS listed the Southern Distinct Population Segment (DPS) of the North American green sturgeon as threatened. Final Critical Habitat for the green sturgeon was designated on October 9, 2009. Sturgeon are an anadromous fish species, spending the majority of their life in marine waters and then moving into freshwater throughout the fall and winter to spawn in the spring. Upon hatching the young green sturgeon develop in the fresh water and are known to return to the ocean within one to four years (COSEWIC 2004). Historically, green sturgeon was found in the lower reaches of the San Joaquin River and Delta. Today, they occur in the upper Sacramento River and tributaries to the Sacramento River including the Feather, Yuba and American Rivers. Green sturgeon is frequently caught along the coast, but is present in limited numbers in the estuaries (COSEWIC 2004).

The green sturgeon has diverse habitat needs ranging from freshwater streams, rivers, estuarine habitat as well as marine waters depending upon their life stage. The specific habitat requirements for green sturgeon are poorly understood but are thought to resemble those of white sturgeon. Green sturgeon spawning is thought to occur in deep pools in areas of large cobbles, but can range from clean sand to bedrock in turbulent river mainstems. The larger eggs and higher growth rates of developing green sturgeon in comparison to white sturgeon suggest that a higher oxygen demand may be required for proper embryonic development. Therefore, green sturgeon may subsequently require colder, cleaner water for spawning relative to white sturgeon (COSEWIC 2004).

The spawning population of the Southern DPS of North American green sturgeon is currently restricted to the Sacramento River below Keswick Dam. This population is composed of a single breeding population which must pass by/through the Action Area. Adults migrate upstream by/through the Action Area primarily between March and June (Adams *et al.* 2002), and small groups of juveniles have been captured at various locations on the Sacramento River as well in the Delta (downstream of Sacramento) during all months of the year (IEP Database, Borthwick *et al.* 1999). Therefore, within the Action Area, green sturgeon are likely to occur within the riverine aquatic habitat of the Sacramento River year-round (**Figure 2-1** and **Figure 2-2**).

3.1.2 Central Valley Steelhead

The Sacramento and San Joaquin Rivers offer the only migration route to the drainages of the Sierra Nevada and southern Cascade mountain ranges for steelhead. Information on migration and spawning tendencies of steelhead is difficult to determine due to the low abundance of spawners and the high flows and turbid waters occurring during winter spawning periods. NMFS reports limited data on the recent abundance of this ESU, but its present total run size based dam counts, hatchery returns, and past spawning surveys is probably less than 10,000 fish (NMFS 1996). The most widespread run type of steelhead is in the winter (ocean-maturing) steelhead. Winter steelhead occur in essentially all coastal rivers in California, while summer steelhead are far less common. In California, both winter and summer steelhead generally begin spawning in December. Spawning occurs December through April in the Sacramento River main stem and tributaries. Eggs are buried by the females in the loose gravel, usually at the lower end of a pool. Newly hatched larvae (alevins) initially stay in the gravel nesting area until their yolk sacs are absorbed (about two weeks) and then move into adjacent shallow and quiet pools. Juvenile steelhead remain in freshwater streams from one to three years before entering the ocean. Downstream migration predominantly occurs during fall and spring. Generally, steelhead will return to their natal streams in one to three years.

Adult steelhead typically migrate upstream within the Sacramento River during the winter (November - January) to spawning areas upstream of the proposed diversion locations and juvenile smolts migrate downstream during the spring (March – May). Steelhead inhabit the upper Sacramento River and occur seasonally in the vicinity of the proposed diversion locations. The proportion of steelhead in this DPS that migrate through the Action Area is unknown; however, because of the relatively large amount of suitable habitat in the Sacramento River relative to the San Joaquin River, the proportion of steelhead is probably high. At the Proposed diversion locations, there is limited quality juvenile rearing habitat (aquatic riverine habitat) in the Sacramento River – the vegetation along the shore and on the levee bank consists of ruderal vegetation, and on the levee, the vegetation is maintained annually by burning. Riparian vegetation both upstream and downstream of the proposed diversions, and at the existing Grimes and Drexler Diversions, provide suitable shaded riverine aquatic likely to be suitable rearing habitat. However, when the majority of juvenile steelhead emigrate as yearlings, they are assumed to be primarily utilizing the center of the channel rather than the shoreline.

Adult steelhead may be present in the Action Area from June through March, with the peak occurring between August and October (Bailey 1954, Hallock *et al.* 1957). Juvenile steelhead emigrate through the Sacramento River from late fall to spring. Given the timing of migrations and emigrations of adults and juveniles, Central Valley steelhead may be expected to occur in the Sacramento River near and within the Action Area from June through March.

3.1.3 Central Valley Spring-Run Chinook Salmon

Chinook salmon runs (fall-run, late fall-run, winter-run, and spring-run) are named for the time of season that upstream spawning migration occurs, and are defined by the combined timing of adult migration, the amount of time juveniles reside in a stream, and the time of year the smolts migrate

out to sea. Timing of adult upstream migration varies within individual runs depending upon the region (Yoshiyama 1998). Central Valley spring-run Chinook enter the Sacramento River system from March to July, and spawning occurs from late August through early October (Yoshiyama 1998). Due to the longer period of time between upstream migration and spawning, spring-run Chinook must hold out in the cold temperatures of mountain headwaters to avoid excessive summertime temperatures of the valley and foothills. Spring-run ascent to mountain elevations can only be accomplished if there are no obstructions within the drainage system preventing passage.

Life histories (migration, holding, spawning, rearing, and juvenile emigration) of Chinook salmon vary within the separate runs, but essential habitat requirements including substrate, temperature, dissolved oxygen, stream flow, and water quality are consistent throughout the runs. Chinook salmon require a water temperature from 43° to 56° F to successfully spawn (Boles 1988). Spawning can occur in habitats ranging from small tributaries to large river beds, and generally requires coarse gravel riffles. Chinook salmon eggs incubate in the gravel for approximately 35 to 50 days, depending on the temperature. The newly emerged fry remain in the gravel until most of the yolk sac is absorbed.

Successful rearing of juvenile Chinook requires cool streams/rivers with significant vegetative cover providing shade for protection from predation. Emigration strategies within the Sacramento-San Joaquin system can vary depending on the time of emergence. Spring-run emigration timing is dependent upon the tributaries of origin, and can occur through the period of November through June. Based upon Butte Creek research conducted by CDFG, over 95% of spring-run emigrate as fry/young-of-the-year. Only a small portion of the population will over-summer emigrating the subsequent fall as yearlings (McReynolds et al. 2006).

Adult Central Valley spring-run Chinook salmon are expected on the Sacramento River between March and July (Myers *et al.* 1998, Good *et al.* 2005). Peak presence is believed to be during February and March (CDFG 1998). In the Sacramento River, juveniles may begin migrating downstream almost immediately following emergence from the gravel with most emigration occurring from December through March (Moyle *et al.* 1989, Vogel and Marine 1991). Snider and Titus (2000) observed that up to 69 percent of spring-run Chinook salmon emigrate during the first migration phase between November and early January. The remainder of the Central Valley spring-run Chinook salmon emigrate during subsequent phases that extend into early June. The exact composition of the age structure is not known, although populations from Mill and Deer Creek primarily emigrate as yearlings (Colleen Harvey-Arrison, CDFG, pers. comm., 2004), and populations from Butte Creek primarily emigrate as fry (Ward *et al.* 2002). Younger juveniles are found closer to the shoreline than older individuals (Healey 1991).

Given the timing of migrations and emigrations of adults and juveniles, Central Valley spring-run Chinook may be expected to occur in the Sacramento River near and within the Action Area from November through June.

3.1.4 Sacramento River Winter-Run Chinook Salmon

Winter-run Chinook salmon generally begin migrating upstream from December through February and hold-over in the Sacramento River system for a couple of months before peak spawning occurs between May and July (Groot, p. 319, 1998). Temperatures must be suitable for the winter-run to hold over. Winter-run Chinook emigration to the Delta has been known to occur from November through April, after only four to seven months of river life (Groot, p. 319, 1998). Juveniles may exhibit a sustained residence in the middle or lower Sacramento River or Upper Delta prior to seaward migration. Juvenile Sacramento River winter-run Chinook salmon migration patterns in the Sacramento River can best be described by temporal migration characteristics found by the USFWS in beach seine captures along the lower Sacramento River between Sacramento and Princeton. Beach seining samples the shoreline rather than the center of the channel, as is often the case in rotary screw traps and trawls, and is considered the most accurate sampling effort in predicting the near shore presence of juvenile salmonids. In the Sacramento River, between Princeton and Sacramento, juveniles are expected between September and mid-April, with highest densities between December and March. Rotary screw trap work at Knights Landing on the Sacramento River by Snider and Titus (2000) captured juveniles between August and April, with heaviest densities observed first during November and December, and second during January through March. The largest captures occurred during periods of sustained high flow, generally greater than 20,000 cfs.

Adult winter-run typically migrate to spawning areas upstream of the proposed diversion locations, and occur seasonally in the vicinity of the proposed diversion locations. Adult Sacramento River winter-run Chinook salmon are expected to be present in the Sacramento River near and within the Action Area between November and June (Myers *et al.* 1998, Good *et al.* 2005) as they migrate to spawning grounds. Juveniles are expected to occur within the Sacramento River near and within the Action Area from September through April. Suitable winter-run Chinook rearing habitat occurs in the vicinity of the existing diversions, although at the locations of the Proposed new diversions, rearing habitat is absent.

3.1.5 Giant Garter Snake

Giant garter snake preys primarily on aquatic species such as fish and amphibians; both native and introduced species are taken. Generally active from April through September, the giant garter snake breeds from March into May, and again briefly in September. Young are brooded internally by females, who give birth to 10 to 46 (average is 23) live young from late July into September. Young disperse into dense cover and reabsorb their yolk sacs, then begin feeding on their own. They reach sexual maturity in three to five years. From early October to April, the giant garter snake takes refuge in winter retreats and is generally not active (USFWS 1999).

The giant garter snake is endemic to wetlands of California's Central Valley. This snake inhabits irrigation and drainage canals, rice lands, marshes, sloughs, ponds, small lakes, low-gradient streams, and adjacent uplands. The snake requires enough water during their active season to maintain high densities of prey; emergent wetland vegetation for cover and foraging; and adjacent uplands and openings in streamside vegetation for basking sites. Higher uplands are used for

cover and refuge from floodwaters during their non-active season. The giant garter snake is typically absent from wetlands with sand, gravel, or rock substrates, and from riparian woodlands.

The giant garter snake population was probably always disjunct, with a southern population occurring from the vicinity Buena Vista Lake in Kern County to Merced County, and a northern population occurring from San Joaquin County to Butte County. To the east and west, the populations were probably confined by the foothills of the Sierra Nevada Mountains and the Coast Ranges. There are 13 separate populations presently recognized by the USFWS, coinciding with historic flood basins and tributary streams in the Central Valley (USFWS 1999). These populations are discontinuously distributed from the Fresno area in the south to Butte Creek in the north. Dispersal corridors do not exist between the populations.

Several giant garter snakes records are listed in or near the Action Area. Some records are not location-specific, including one record that identifies an observation in the Grimes U.S. Geological Survey quadrangle, in which portions of the proposed project facilities are located, including the Drexler re-lift pumping plant. The Grimes quadrangle record is dated 2002 (CDFG 2012a).

No giant garter snakes were observed during field reconnaissance for this project; however, given the cryptic and evasive nature of this species, determination of presence more often relies on the habitat characteristics, the most current information about the extant range of the species, surrounding locality records, and the biology and ecology of the giant garter snake.

Agricultural land use within the region generally provides suitable giant garter snake habitat, with abundant rice fields and associated irrigation ditches, rodent burrows for upland refugia, and open upland areas for basking. Within the Action Area, there are several types of drainage ditches that border various types of crops (including rice). The availability of emergent or aquatic vegetation for cover and basking sites varies with each ditch, season, and the operations of MFWC within a given year. A description of the potential giant garter snake habitat within the Action Area is provided below and is depicted in **Figure 3-1**. Within the Action Area, all habitats within 200 feet of suitable giant garter snake aquatic habitat are considered upland habitat for the snake, except for upland areas that are unvegetated, heavily disturbed (such as road, and non-rice cultivated fields), or covered by a walled structure such as a building.

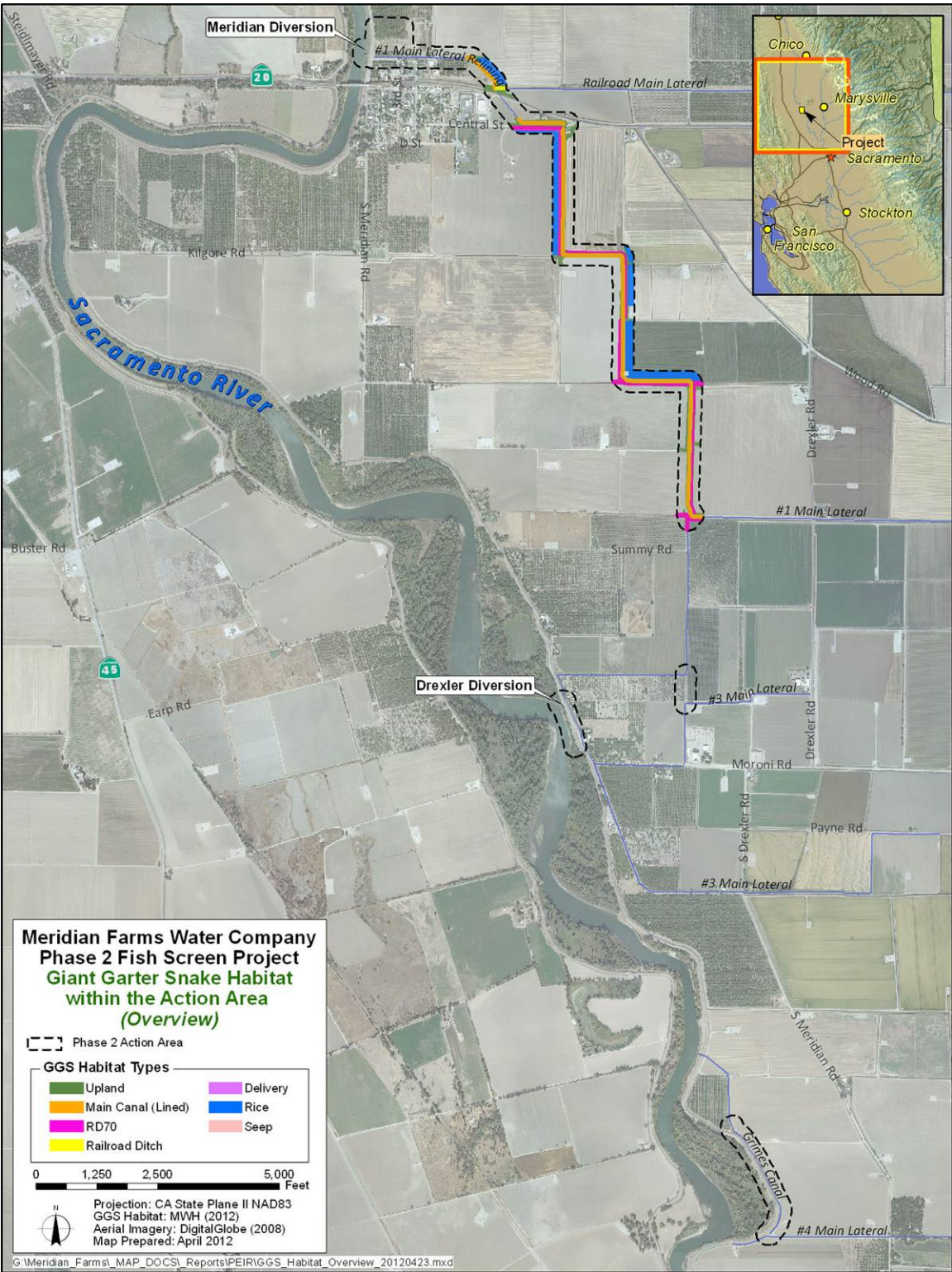


Figure 3-1. Giant Garter Snake Habitat in the Action Area

Aquatic Habitat

Rice Fields

Rice is a common crop grown within the Proposed Project/Action Area, and there are rice fields within the MFWC Service Area. In 2011 the Action Area intersected portions of eight rice fields. At the time this document was prepared, 2012 rice field locations in the Action Area were similar to those planted in 2011. Because rice fields are inundated through the spring and summer, during the giant garter snake's active period, and because rice provides suitable vegetative cover, rice fields within the Action Area provide suitable habitat for the giant garter snake.

Irrigation Drains, Ditches, and Canals

There are several types of conveyances within the Action Area, ranging from wide, concrete-lined canals for irrigation delivery to relatively shallow, unstructured seep ditches used to collect minor drainage from fields. As previously mentioned, the giant garter snake's specific habitat requirements include the presence of aquatic habitat during its active period, the availability of aquatic vegetative cover, basking sites, and prey during the active period, and the availability of upland refugia (generally within 200 feet of suitable aquatic habitat) during the inactive period. Each type of ditch may provide some, all, or none of the required elements that define giant garter snake habitat, depending on MFWC maintenance and operations, as well as the individual farmer's agricultural practices, including which crops are grown in the fields. Following field visits to the site, analysis of collected data, and informal consultation with USFWS biologists, it was determined that the only ditches that are suitable aquatic habitat for giant garter snake are select drains belonging to Reclamation District 70, and portions of the Main Canal that are within 200 feet of suitable aquatic habitat. These drains are described in further detail in this chapter. In addition, the other types of conveyances are also described to document why they were excluded as suitable giant garter snake habitat under current conditions. **Photos 3, 4, 5, 6, 8 and 9** in **Appendix B** show ditches within the Action Area with unsuitable habitat, and **Photo 7** in **Appendix B** shows a portion of the Reclamation District 70 canal considered suitable giant garter snake aquatic habitat. A summary of suitable aquatic habitat for giant garter snake is included in **Table 3-2**.

Reclamation District 70 Drains

Some of the Reclamation District 70 drains (Reclamation Drains) are suitable aquatic habitat for giant garter snake, as they provide all the criteria necessary to support giant garter snake during its active and inactive periods. The Reclamation Drains are larger drainage ditches that follow along and adjacent to the Main Canal and are used by MFWC for water delivery or drainage. The locations of the Reclamation drains within the Action Area are shown in **Figure 2-1** and **Figure 2-2**. See **Photo 7** in Appendix A taken near the proposed Drexler re-lift pumping plant site. These are unlined ditches up to 30 feet wide and five to six feet deep, and are typically vegetated with common tule (*Scirpus acutus*) and cattail (*Typha latifolia*). The Reclamation District maintains the drains for vegetation removal by burning and/or baling, on average approximately every three to five years, depending on how much the drain is used and whether or not siltation washes in from adjacent fields. Some drains may go without maintenance for longer periods if they do not

receive significant drainage flows or siltation. The Reclamation Drains in the Action Area were last maintained approximately three years ago.

Reclamation Drains in the Action Area typically hold at least a small amount of water year round (as little as 1 to 2" deep), and may hold water to a depth of several feet during the irrigation season of approximately May through September. They can therefore presumably support aquatic invertebrates, amphibians, and small fish species.

Main Canal

The aquatic habitat of the Main Canal is not suitable for giant garter snake, except for where it is 200 feet or less from otherwise suitable giant garter snake aquatic habitat, be it a Reclamation Drain, natural suitable wetlands, or rice field. The Main Canal is a concrete-lined ditch for the majority of its alignment. It is used to convey and deliver water from the Meridian Diversion/Pumping Plant south to the central portion of the MFWC Service Area during the spring and summer. The Main Canal in the Action Area begins at the Meridian Diversion to its intersection with Summy Road as shown in **Figure 2-1** and **Figure 2-2**. Approximately 12 feet wide and 6 feet deep, the Main Canal typically does not support vegetation along its banks. Ruderal vegetation may grow along the unlined freeboard of the canal or along unlined portions of the canal, but this vegetation is regularly removed several times during the spring and summer. Control methods include application of herbicide three times per year and mowing three times per year. Although an aquatic grass grows within portions of the Main Canal during the summer, it is sparsely distributed and does not provide adequate structure or cover for giant garter snake. During the fall and winter, the Main Canal is no longer used for conveyance and remains dry until the next spring. Portions of the Main Canal are shown in **Photos 3, 4, 5, 6** and **8** in **Appendix B**.

Another concrete-lined ditch in the northern portion of the Action Area, called the "Railroad Ditch" has the same characteristics as the Main Canal and does not provide suitable aquatic habitat for giant garter snake because it does not provide the necessary cover. It is located within 200 feet of suitable aquatic habitat, however (rice field), and could therefore be used by the snake.

Water Delivery Ditches

Ditches used for water delivery are generally not considered suitable aquatic habitat for giant garter snake due to the lack of emergent aquatic vegetation for cover and basking, and/or lack of consistent water within the ditches during the snake's active period. However, some delivery ditches within 200 feet or less from suitable giant garter snake aquatic habitat may be used by the snake. In addition to the Main Canal, these smaller (3-4 feet wide), unlined, earthen ditches are used to deliver irrigation water throughout the MFWC Service Area. Within the Action Area, these delivery ditches are located along the conveyance improvements in the Proposed Project/Action. Similar to the Main Canal, the delivery ditches receive regular maintenance to remove all vegetation that grows within the ditches and along its banks. The vegetation removal occurs several times during the spring and summer – usually at least once and up to six times per year, depending on how often the maintenance is needed. Control methods include herbicide treatment, burning, and/or baling. These delivery ditches convey water at specified times during

the spring and summer months and are controlled by MFWC operations. A few ditches hold water throughout the growing season, but the majority of the delivery ditches only hold water for one week during each month during the growing season while MFWC delivers water to its clients. Therefore, although there may be water in these ditches during the snake's active period, it is not of sufficient duration to support giant garter snake aquatic habitat.

Seep Ditches

Seep ditches within the Action Area generally do not provide suitable aquatic habitat for giant garter snake, except where they are sufficiently wet, vegetated, unmaintained and/or in proximity to other aquatic habitat, including rice fields. Seep ditches, if not in a condition to be aquatic habitat for giant garter snake, are upland habitat for the snake if they are within 200 feet of suitable giant garter snake aquatic habitat. These earthen, unlined ditches are on the edges of crop fields and serve to drain excess moisture from the fields (**Photo 8, Appendix B**). Seep ditches are dug by farmers within their fields; therefore, the maintenance and even existence of these ditches is up to the farmers' discretion. These ditches are on average three to four feet wide and are located throughout the Action Area. Unmaintained seep ditches support ruderal species such as Johnsongrass, prickly lettuce, and Italian thistle up to three feet tall. Because these ditches are not used for water delivery or large-flow drainage, they do not consistently hold water during the spring and summer unless they are adjacent to a rice field, for which the entire field is flooded. The ditches only receive rainwater in the winter, during the giant garter snake's inactive period. The only places where the ditches might be inundated during the snake's active period are where these ditches are located adjacent to rice fields, which are flooded during the spring and summer.

Upland Habitat

Within the Action Area, upland areas mapped as potential giant garter snake habitat included vegetated areas on the margins of fields and waterways. Unvegetated roadways and cultivated (non-rice) fields were not considered suitable upland habitat for the giant garter snake. Upland refugia for the giant garter snake exist primarily as burrows made by small burrowing mammals such as ground squirrels and gophers. Upland burrows up to 200 feet from aquatic habitat are considered to be suitable refugia for giant garter snake. Open areas within 200 feet from aquatic habitat may also provide suitable basking habitat for giant garter snake during its active season. Small mammal burrows and basking habitat vary in location and quantity, but are generally available along the upper banks of ditches and unpaved areas, along and including roads or cultivated fields (the widths vary from five to 20 feet). Earthen berms along agricultural fields may also support small mammal burrows. Few rodent burrows were observed in the study area. Although optimal habitat for giant garter snake hibernation was not observed, there is some potential for snakes to remain in the Action Area during the inactive season.

Summary of Giant Garter Snake Habitat

Table 3-2 below summarizes the potential habitats available in the Action Area for the giant garter snake. The calculations were based on mapped locations of the crop types for 2011 and the projected crop types for 2012; and the locations of the drains, ditches, and canals within the Action Area. It should be noted that a few projections for crop types in 2012 may change, as the

type of crop planted is up to the individual farmer's discretion. Reclamation Drains and rice fields were the only suitable aquatic habitat types identified in the Action Area. Other canals were mapped as aquatic habitat for the giant garter snake if they were within 200 feet of Reclamation Drains or rice fields. Upland habitats were determined to include all lands within 200 feet of suitable aquatic habitat. Although rodent burrows were not observed to be common in the Action Area, all upland habitats with rodent burrows are suitable refugia for the giant garter snake during their inactive season, and all other upland habitats without refugia may be used by the giant garter snake for basking. Cropland is also included as upland habitat, although its utility to the giant garter snake may be limited and highly variable, depending on the type of crop.

**TABLE 3-2
SUMMARY OF GIANT GARTER SNAKE HABITAT IN THE ACTION AREA**

Habitat Type	Lineal feet	Acres
AQUATIC:		38.9
Rice Fields	--	29.2
Reclamation Drains		6.0
Main Canal		3.4
Seep		0.1
Delivery Ditches		<0.1
Private drain		<0.1
Railroad Ditch		<0.1
UPLAND	--	21.3

3.1.6 Western Burrowing Owl

The western burrowing owl inhabits open grasslands and shrub lands with perches and burrows. These owls eat mainly insects, with small mammals, reptiles, and birds making up a portion of the diet as well. For cover and breeding, old rodent burrows, as well as debris piles are used. The western burrowing owl generally breeds from March through August, peaking in April and May.

In the Action Area, potential nest/burrow sites occur in unpaved and relatively undisturbed upland areas, such as along earthen berms and unpaved roads and turnouts. The relatively-exposed banks and levees of the Sacramento River and drainage canals may also provide suitable habitat.

3.1.7 Cackling (=Aleutian Canada) Goose

The cackling goose is a small, island-nesting subspecies of the Canada goose. This subspecies nests on the Aleutian Islands and winters in the Central Valley where it forages in meadows, agricultural fields, pastures, and moist grasslands near open water (lakes and ponds) and wetlands. The cackling goose was federal-listed endangered in 1967 due to a severe decline in populations. Hunting and loss of migration and wintering habitat contributed to this species' decline, although the introduction of Arctic and red foxes to the breeding islands was the main reason for population decline. However, due to reintroductions of wild geese onto fox-free islands and other conservation efforts, populations of cackling goose have recovered from approximately 6,300 individuals in 1989 to 37,000 individuals in 1999. The cackling goose was reduced to federal-listed threatened status in 1989, and finally delisted in 2001 (FR 66:54, 15642-15656, March 2001). Monitoring of goose populations will continue for 5 years after delisting, as required by the Endangered Species Act to ensure full recovery of the species. The cackling goose is still protected under the Migratory Bird Treaty Act, and is a federal species of concern.

Within the Action Area, suitable foraging habitat exists in the surrounding agricultural fields along the Sacramento River and the MFWC Service Area. Several occurrences are reported in the Meridian U.S. Geological Survey quadrangle dating between 1978 and 1987 (CDFG 2012a).

3.1.8 Swainson's Hawk

The Swainson's hawk is a migratory raptor listed as threatened by the State of California, and federally as a species of special concern. It breeds in western North America and winters for the most part in South America. It nests in trees, usually in riparian areas, but forages over pasturelands and open agricultural fields. In the Central Valley it is associated with riparian corridors adjacent to field crops and grasslands and subsists largely on small mammals, especially California vole, California ground squirrel, and large insects. Suitable foraging habitat within an energetically efficient flight distance from active Swainson's hawk nests has been found to be of great importance. Because the prey base for Swainson's hawk is highly variable from year to year, depending on cycles of agriculture, rainfall, and other natural cycles, large acreages of potential foraging habitat must be allotted per breeding pair.

The decline of the species in the Central Valley has been associated with extensive reduction of Swainson's hawk habitat. Suitable foraging habitat is present within the Action Area in agricultural fields, where populations of prey species are supported. Suitable nesting habitat occurs within the riparian woodland habitats adjacent with the Proposed Project/Action site. Large valley oak and cottonwood trees occur adjacent to the river on the bank opposite from the proposed intake structures and fish screens. Several recent occurrences (as recent as 2003) are recorded within three miles of project facilities (CDFG 2012a).

3.1.9 Osprey

The osprey is a migratory raptor that occurs in northern California from Cascade Ranges south to Lake Tahoe and along the coast south to Marin County. The osprey arrives in California around mid-March to early April and begins breeding activities until September. Ospreys use large trees, snags, and dead-topped trees in open forest habitats for cover and nesting. Nests are platforms of sticks located high above ground, sometimes reaching as much as 250 feet tall. Breeding population was estimated in 1975 at 350-400 pairs in Northern California; numbers of breeding pairs have increased in recent years (CDFG 2012b).

The osprey preys primarily on fish; sometimes mammals, birds, reptiles, amphibians, and invertebrates. This species require open, clear waters for foraging. Suitable foraging habitat includes rivers, lakes, reservoirs, bays, estuaries, and surf zones (CDFG 2012b).

In the general proposed project/Action Area there is potential for nesting along the banks of the Sacramento River. There are no CNDDDB occurrences of osprey within the MFWC service area. The nearest osprey record is from 2004 and is located approximately 10 miles northwest of the Meridian Diversion (CDFG 2012a).

3.1.10 Bank Swallow

The bank swallow is the smallest North American swallow, with a body length of about 4.75 inches. The bank swallow nests in colonies and creates nests by burrowing into vertical banks consisting of fine-texture soils. Bank swallows breed in California from April to August and spend the winter months in South America. Currently, bank swallows are locally common only in restricted portions of California where sandy, vertical bluffs or riverbanks are available for the birds to dig their burrows and nest in colonies. Most of California's remaining populations nest along the upper Sacramento River where it still meanders in a somewhat natural manner. In this alluvial plain, the river system provides suitable soil types and erosion needed for prime nesting habitat. Seventy-five percent of the State's population is concentrated on the banks of Central Valley streams, including several colonies on the Sacramento River.

Since 1900, the range of bank swallows in California has been reduced by approximately 50 percent largely attributed to habitat loss. The rip-rapping of natural stream banks is the single most serious, human-caused threat to the long-term survival of the bank swallow in California. Existing colonies and areas of potential habitat may be lost over the next several years if current planning is implemented. Rip-rap installed by the COE under the Sacramento River Bank Protection Project has already affected almost 150 miles of Sacramento River bank since 1960. Additional rip-rap proposed under this project may result in extensive loss of essential, eroding bank habitat.

On the Sacramento River, bank swallow populations continue to decline. Based on an average occupancy rate of about 45 percent of all burrows dug into river banks, an estimated population of 13,170 pairs of bank swallows nested in Sacramento River habitats in 1986. In 1998 the population reached its lowest level of 4,990 pairs and then rebounded dramatically in 1999 to 8,210 pairs regaining some habitat from which it was extirpated (in 1998) on the lower end of its Sacramento

River range. The significance of the apparent turnaround may not be known for a few years if it continues. The 1999 result may be a beginning of an expanding population boom for the species or just a momentary upswing. Further monitoring will be necessary to determine the true population trend, if any. Currently, the status of the bank swallow is still considered declining (CDFG 2000b).

The State Recovery Plan for bank swallow includes identifying habitat preserves and a return to a natural, meandering riverine ecosystem as the two primary strategies for recovering the bank swallow. A recovery planning team has cited the return to naturally functioning riparian ecosystems as the best way to preserve, recover, and conserve the many species, including the bank swallow, that are dependent on this unique ecosystem.

In the general Action Area there is potential for nesting along the banks of the Sacramento River. The CNDDDB documents several occurrences of bank swallow within the MFWC Service Area. The most recent observation is from 2004 and was recorded less than two miles from the Meridian Diversion (CDFG 2012a). The bank swallow prefers steep, open cliff-like banks for nesting. Where the proposed new intake will be located, however, the shore slopes gradually up to the levee and is largely vegetated with annual grasses.

3.2 Critical Habitat

The Action Area occurs within designated Critical Habitat for Southern DPS of the North American green sturgeon, Central Valley steelhead, Central Valley spring-run Chinook salmon, and Sacramento River winter-run Chinook salmon. Critical Habitat for threatened Central Valley steelhead and Central Valley spring-run Chinook salmon was issued by NMFS on September 2, 2005. Critical Habitat for endangered Sacramento River winter-run Chinook salmon was designated on June 16, 1993. Final Critical Habitat for the green sturgeon was designated on October 9, 2009.

The project vicinity is located within the Colusa Basin Hydrologic Unit (5520) of Critical Habitat for Central Valley steelhead and Central Valley spring-run Chinook. This unit includes the Sacramento River upstream to and including: Tisdale Bypass, Butte Creek, Butte Slough, Nelson Slough, Sacramento Slough, Sutter Bypass, Colusa Bypass, Little Chico Creek, and Little Dry Creek.

For the Sacramento winter-run Chinook, Critical Habitat is designated to include the Sacramento River from Keswick Dam, Shasta County (River Mile 302) to Chipps Island (River Mile 0) at the westward margin of the Sacramento-San Joaquin Delta, all waters from Chipps Island westward to Carquinez Bridge, including Honker Bay, Suisun Bay, and Carquinez Strait, all waters of San Pablo Bay westward of the Carquinez Bridge, and all waters of San Francisco Bay (north of the San Francisco/Oakland Bay Bridge) from San Pablo Bay to the Golden Gate Bridge.

These species share similar habitat requirements. The Primary Constituent Elements (PCE's) of salmonid habitat within the Action Area include: freshwater spawning and rearing habitat; freshwater migration corridors; and estuarine areas containing adequate substrate, water quality, water quantity, water temperature, water velocity, cover/shelter, food, riparian vegetation, space, and safe passage conditions. The Sacramento River provides freshwater habitat in the Action

Area and serves as an upstream and downstream salmonid migratory route, as well as juvenile salmonid rearing habitat.

The diversion and storage of natural flows by dams and diversion structures on Central Valley waterways have depleted streamflows and altered the natural cycles by which juvenile and adult salmonids have evolved. Changes in streamflows and diversions of water affect freshwater rearing habitat and freshwater migration corridor PCEs in the action area. Various land-use activities in the action area such as urbanization and agricultural encroachment have resulted in habitat simplification. Runoff from residential and industrial areas also contributes to water quality degradation. Urban stormwater runoff contains pesticides, oil, grease, heavy metals, polynuclear aromatic hydrocarbons, other organics and nutrients that contaminate drainage waters and destroy aquatic life necessary for salmonid survival (NMFS 1996). In addition, juvenile salmonids are exposed to increased water temperatures as a result of thermal inputs from municipal, industrial, and agricultural discharges in the action area. Accelerated predation as a result of habitat changes in the action area, such as the alteration of natural flow regimes and the installation of bank revetment structures such as dams, bridges, water diversions, and piers are likely a factor in the decline of Sacramento River winter-run Chinook salmon, CV spring-run Chinook salmon, and CV steelhead.

Within the action area, the freshwater rearing and migration PCEs have been transformed from a meandering waterway lined with a dense riparian corridor, to a highly leveed system under varying degrees of control over riverine erosional processes and flooding. In the reach from Colusa downstream to Verona (RMs 143 to 80) – which includes the Action Area – levees are generally constructed near the edge of the river. Severe long-term riparian vegetation losses have occurred in this part of the Sacramento River, and there are large open gaps without the presence of important habitat features due to the high amount of riprap. Overall, more than half of the Sacramento Rivers banks in the lower 194 miles have been ripped.

1. Freshwater Rearing Habitat

Freshwater rearing sites are those with water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility; water quality and forage supporting juvenile development; and natural cover such as shade, submerged and overhanging large wood, log jams, beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks. Both spawning areas and migratory corridors comprise rearing habitat for juveniles, which feed and grow before and during their outmigration. Non-natal, intermittent tributaries also may be used for juvenile rearing. Rearing habitat condition is strongly affected by habitat complexity, food supply, and presence of predators of juvenile salmonids. Some complex, productive habitats with floodplains remain in the system (*e.g.*, the lower Cosumnes River, Sacramento River reaches with set-back levees [*i.e.*, primarily located upstream of the City of Colusa]). However, the channeled, leveed, and ripped river reaches and sloughs that are common in the Sacramento-San Joaquin system typically have low habitat complexity, low abundance of food organisms, and offer little protection from either fish or avian predators. Freshwater rearing habitat also has a high conservation value as the juvenile life stage of salmonids is dependent on the function of this habitat for successful survival and recruitment. Thus, although much of the rearing habitat is in poor condition, it is important to the species.

2. Freshwater Migration Corridors

Ideal freshwater migration corridors are free of obstruction with water quantity and quality conditions and contain natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility, survival and food supply. Migratory corridors are downstream of the spawning area and include the lower Sacramento River and the Delta. These corridors allow the upstream passage of adults, and the downstream emigration of outmigrant juveniles. Migratory habitat condition is strongly affected by the presence of barriers, which can include dams, unscreened or poorly- screened diversions, and degraded water quality. For successful survival and recruitment of salmonids, freshwater migration corridors must function sufficiently to provide adequate passage. For adults, upstream passage through the Delta and the much of the Sacramento River is not a problem, but problems exist on many tributary streams, and at the RBDD. For juveniles, unscreened or inadequately screen water diversions throughout their migration corridors, and a scarcity of complex in-river cover have degraded this PCE. However, since the primary migration corridors are used by numerous populations, and are essential for connecting early rearing habitat with the ocean even the degraded reaches are considered to have a high conservation value to the species. Thus, although much of the migration corridor is in poor condition, it is important to the species.

In the Action Area and vicinity, the adjacent riparian habitat has been modified by trails (both paved and unpaved), levees, and general recreation activities. These areas may be of poor quality but still provide cover for rearing juveniles. However, at the locations of the proposed new diversions (within the Action Area) suitable salmonid rearing habitat is low, lacking riparian-shaded riverine aquatic habitat. More suitable rearing habitat exists immediately upstream and downstream from the Proposed diversions, and at the existing diversion sites which will be removed. Based on unconsolidated sediments dominating the channel substrate, it is not likely that spawning habitat exists within Action Area.

3.3 Essential Fish Habitat

Essential Fish Habitat (EFH) is defined as those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity. For the purposes of interpreting the definition of EFH, “waters” includes aquatic areas and their associated physical, chemical, and biological properties that are used by fish, and may include areas historically used by fish where appropriate; “substrate” includes sediment, hard bottom, structures underlying the waters, and associated biological communities; “necessary” means habitat required to support a sustainable fishery and a healthy ecosystem; and “spawning, breeding, feeding, or growth to maturity” covers all habitat types used by a species throughout its life cycle. The Proposed Project/Action is located within the region identified as EFH for Pacific salmon, including Chinook salmon, in Amendment 14 of the Pacific Salmon FMP.

The Sacramento River provides freshwater habitat in the Action Area and serves as an upstream and downstream migratory route for Pacific salmon and green sturgeon, as well as juvenile

salmonid rearing habitat. Although the adjacent riparian habitat has been modified by trails (both paved and unpaved), levees, and general recreation activities, it does in some areas provide cover for rearing juveniles. However, in the vicinity of the proposed new diversion locations (within the Action Area), suitable salmonid and sturgeon rearing habitat does not occur due to low quality shaded riverine aquatic habitat. Based on unconsolidated sediments dominating channel substrate, it is not likely that spawning habitat exists within the immediate vicinity of the Action Area.

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CHAPTER 4

Effects of Proposed Project/Action on Special Status Species

This section describes the methods used to determine the potential effects of the Proposed Project/Action on special-status species potentially occurring in the Action Area. Species included in this analysis are federal- and state-listed, candidates for federal or state listing, and other species of special concern that are covered under the CALFED MSCS. These special-status species include:

- North American green sturgeon (Southern DPS) (*Acipenser medirostris*)
- Central Valley steelhead (*Oncorhynchus mykiss*)
- Central Valley spring-run Chinook (*Oncorhynchus tshawytscha*)
- Sacramento River winter-run Chinook (*Oncorhynchus tshawytscha*)
- Giant garter snake (*Thamnophis gigas*)
- Western burrowing owl (*Athene cunicularia*)
- Cackling (=Aleutian Canada) goose (*Branta canadensis leucopareia*)
- Swainson's hawk (*Buteo swainsoni*)
- Osprey (*Pandion haliaetus*)
- Bank swallow (*Riparia riparia*)

Evaluating potential effects on species within the Action Area requires an understanding of the species' life histories and life stage specific environmental requirements. Ecological and status information on these species is provided in Chapter 3, Environmental Baseline – Special-Status Species Accounts and Status in the Action Area, of this ASIP.

The analysis of effects of a particular action on a biological resource can be composed of one or more types of effects. Direct and indirect effects, interrelated and interdependent effects, and cumulative effects are defined below.

4.1 Direct and Indirect Effects

Under FESA (16 USC 1531-1544), direct effects are those that are caused by the Proposed Project/Action and occur at the time of the action. According to the USFWS and NOAA Fisheries, indirect effects:

“...are caused by or result from the proposed action, are later in time, and are reasonably certain to occur, e.g., predators may follow ORV tracks into piping plover nesting habitat and destroy nests; the people moving into the housing unit may bring cats that prey on the mice left in the adjacent habitat. Indirect effects may occur outside of the area directly affected by the action.”

4.2 Interrelated and Interdependent Effects

According to FESA, interrelated and interdependent actions are defined as follows:

Effects of the action under consultation are analyzed together with the effects of other activities that are interrelated to, or interdependent with, that action. An interrelated activity is an activity that is part of the proposed action and depends on the proposed action for its justification. An interdependent activity is an activity that has no independent utility apart from the action under consultation.

According to the USFWS and NOAA Fisheries, interrelated actions are those that are part of the Proposed Project/Action and depend on the Proposed Project/Action for their justification - actions that would not occur “but for” the larger action of the action under consultation (Proposed Project/Action). Interdependent actions are those that have no significant utility apart from the action that is under consideration. There are no interrelated or interdependent actions associated with MFWC’s Proposed Project/Action.

4.3 Effects on Species

4.3.1 North American Green Sturgeon, Central Valley Steelhead and Spring-Run Chinook Salmon, and Sacramento River Winter-Run Chinook Salmon

The Proposed Project/Action would involve work within the Sacramento River; therefore, the important special-status species to consider in this habitat are the threatened North American green sturgeon (Southern DPS), threatened Central Valley steelhead, and endangered Sacramento River winter-run Chinook salmon.

Construction and operation of a surface water diversion in the Sacramento River has the potential to adversely impact various salmonids, sturgeon, and other fish species and their habitats through several mechanisms, including entrainment into the water diversion, impingement on the intake screen, increased vulnerability to predation mortality, and increased levels of turbidity and suspended solids, and underwater sound pressure waves. Direct mortality of fish species may also occur during cofferdam installation and dewatering. The following table summarizes potential effects to special-status fish species occurring in the Action Area (diversion footprints plus 200 feet).

As shown in **Table 4-1**, the effects of the Proposed Project/Action on special-status fish depend on whether the fish are exposed, which life stages are exposed, how long, how often, and when the fish are exposed. It can be inferred that with increasing distance from the stressor/source of stressor the effects to an individual are diminished. For many of the stressors, fish must be within the immediate vicinity of the Action Area to be affected. For example, a fish swimming a few hundred feet upstream of a diversion is not likely be pulled by suction into the diversion; however, if that fish approached within a few feet of the diversion intake, there is a much greater probability of entrainment. The following discussion analyzes the fish response to the potential stressors, and what kind of effects to the species would result.

**TABLE 4-1
SUMMARY OF SPECIAL-STATUS FISH EXPOSURE TO STRESSORS AS A RESULT OF THE
PROPOSED PROJECT/ACTION**

Potential Stressors:	Type of Exposure	Location of Exposure	Species (Life Stage) Exposed	Timing of Exposure	Duration of Exposure	Frequency of Exposure
Entrainment	Direct	Diversion Intake	GS (A, J); CVST (A); CVSR (A, J); SWR (A, J)	During normal operation	April to October	Constant
Impingement	Direct	Intake Screen	GS (A, J); CVST (A); CVSR (A); CVSR (A, J); SWR (A, J)	During normal operation	April to October	Constant
Increased Predation	Indirect	Local Vicinity of Diversion	All species (Both A and J stages)	Always	April to October	Constant
Increased turbidity and suspended solids	Indirect	Local Vicinity of Diversion	GS (A, J); CVST (A); CVSR (A); SWR (A)	During construction	June to October	One-time construction event
Sound pressure waves	Indirect	Vicinity of Diversion	GS (A, J); CVST (A); CVSR (A); SWR (A)	During installation of cofferdam	June to October	One-time construction event
*Stranding during dewatering	Indirect	Diversion (area within cofferdam)	GS (A, J); CVST (A); CVSR (A); SWR (A)	During installation of cofferdam	June to October	One-time construction event
*Cofferdam	Direct	Local Vicinity of Diversion	GS (A, J); CVST (A); CVSR (A); SWR (A)	During installation of cofferdam	June to October	One-time construction event

*Phase 2 only

A=Adults; J=Juveniles; GS=Green Sturgeon (Southern DPS); CVST= Central Valley Steelhead; CVSR=Central Valley Spring-run Chinook; SWR=Sacramento Winter-run Chinook

Entrainment and Impingement

All of the special-status fish species considered are at risk of being entrained or impinged by a diversion in the Sacramento River. The risk of entrainment occurs when the pumps are drawing water; for the MFWC this is from April to October every year. Similarly, impingement or death by collision or entrapment against the intake screen is a hazard to the fish when the pumps are active. However, the design criteria outlined by the Proposed Project/Action will comply with CDFG and NOAA Fisheries fish screen criteria, and will reduce potential effects from fish

entrainment and impingement substantially. Installation of the new diversions with fish screens would be a significant improvement over the current diversions which are not screened.

Increased Predation

Placement of structures within the Sacramento River, including a positive barrier fish screen, would modify local velocity and current patterns, create localized turbulence and eddies, and provide cover habitat for a variety of predatory fish species, such as striped and smallmouth bass. Structural components of the positive barrier fish screen may result in the potential for increased localized predation mortality for all special-status species considered, as well as other fish species within the river. Juvenile fish are particularly vulnerable. However, placement of the Proposed Project/Action's new diversion structures is within areas with adequate flow velocities, thereby minimizing backwater eddy effects and potential impacts to salmonids and sturgeon from predatory species. Therefore, increased predation at these diversions is likely a stressor of low magnitude.

Sound Pressure Waves

Sound pressure waves or "noise" within the water would result from installation of support piles for the diversion facilities or installation of sheet piles and beams during construction of the cofferdam. Fish may be injured or killed by the impact sounds generated by percussive pile driving. Their hearing may also be affected or their behavior altered such that it constitutes harassment or harm. The specific effects of pile driving on fish depend on a wide range of factors including the type of pile, type of hammer, fish species, environmental setting, and many other factors (Popper et al. 2006). The Proposed Project/Action may require the use of vibratory or percussion hammer methods. Both methods produce underwater sound pressure waves that can be perceived by fish; however, while vibrating hammers do not produce sound pressure levels that would result in injury or mortality to fish, they may still impact the fish. The percussion hammer, if needed for cofferdam installation, would be used on an intermittent and short duration basis. Use of the percussion hammer would be minimized to the maximum extent possible. Fish species within the Action Area and vicinity are at risk of exposure to this stressor. The fish would likely respond to this stressor by swimming away from the noise. The pile-driving activity would only occur during the June 1 to October 1 period (to November 1 with NOAA Fisheries approval), when large numbers of special-status species are less likely to occur in the Action Area.

Cofferdam Construction

The construction of the proposed Meridian Diversion fish screen facility would require placement and removal of a sheet-pile cofferdam to isolate the work site from the rest of the river. Constructing a cofferdam would have a short-term, localized impact to water quality by causing an increase in turbidity and suspended solids. Increased sedimentation may cause reduced survival of eggs or alevins, reduce primary and secondary river productivity, interfere with feedings, cause behavioral avoidance, and cause a breakdown of social organization to native species downstream of the discharge area. In addition, the dewatering of the cofferdam would strand fish and other organisms trapped within the cofferdam. The physical placement of the cofferdam into the water may also cause direct mortality to fish.

Cofferdams generally lessen the impact of construction on the surrounding environment by isolating the construction area; however, the installation of the cofferdam does cause short-term localized impacts. In order to minimize impacts to fish species, the cofferdam installation would be limited to the in-water work period, from June 1 to October 1 (to November 1 with NOAA Fisheries approval). During this time, installation of the cofferdam would have the least impact on fish species. The abandonment of the existing diversions, which would require minimal in-river work to cap and seal the existing intake pipe manifold, would also occur during the in-water work period. Any fish trapped in the cofferdam during dewatering will be salvaged, and the implementation of measures detailed in the Project Description will minimize impacts to water quality. Once it is installed, the cofferdam is not likely to be a significant stressor to fish species.

Given the overall benefit to fish as a result of the Proposed Project/Action, as well as the use of a cofferdam, the fish salvage requirement for dewatered work sites, the localized and minimal in-river disturbances, and constructing within the June 1 to October 1 in-water work period (may be extended to November 1 with NOAA approval), the Proposed Project/Action is expected to result in minimal impacts to the fisheries resources of the Sacramento River. Implementation of 2008 IS/EA Mitigation Measures BIO-19, BIO-20 and proposed Mitigation Measures BIO-A through BIO-H² would minimize potential impacts.

Measure BIO-19 (same as 2008 IS/ES Measure BIO-19): Pile Driving Activities. The contractor shall use vibrational pile driving to the greatest extent feasible. If percussive pile driving is necessary, its use shall be minimized to the maximum extent possible and comply with the following *Interim Criteria for Injury of Fish to Pile Driving Operations* (Popper et al. 2006):

- The Sound Exposure Level (SEL) shall not exceed 187 dB (re: 1 $\mu\text{Pa}^2 \cdot \text{sec}$) in any single strike, measured at a distance of 32.8 ft from the source;
- The peak sound pressure level should not exceed 208 dB (re: 1 $\mu\text{Pa}_{\text{peak}}$) in any single strike, measured at a distance of 32.8 ft from the source.

Measure BIO-20 (same as 2008 IS/ES Measure BIO-20): Dewatering. Pump(s) used for dewatering the construction site will be screened according to NMFS fish screening criteria for anadromous salmonids (NMFS 1997) approved by NMFS. A qualified biologist will be on-site during such pumping activities to ensure that any fish that may be present within the construction area are relocated to suitable habitat near the project area.

Mitigation Measure BIO-A (new measure in Phase 2 analysis): Spoil Sites. Spoil sites shall be located so they do not drain directly into the waterways. If a spoil site drains into a water body, catch basins shall be constructed to intercept sediment before it reaches the channels. Spoil sites shall be graded to reduce the potential for erosion.

² Mitigation measures BIO-A through BIO-H are identified with alphabetical letters instead of numbers to avoid confusion with mitigation measures from the 2008 IS/EA. See also Appendix A, Mitigation and Monitoring Reporting Program

Mitigation Measure BIO-B (new measure in Phase 2 analysis): Hazardous Materials.

A spill prevention plan for potentially hazardous materials shall be prepared and implemented. The plan shall include the proper handling and storage of all potentially hazardous materials, as well as the proper procedures for cleaning up and reporting of any spills. If necessary, containment berms shall be constructed to prevent spilled materials from reaching the creek channels.

Mitigation Measure BIO-C (new measure in Phase 2 analysis): Storage. Equipment and materials shall be stored at least 50 feet from waterways. No debris such as trash and spoils shall be deposited within 100 feet of waterways. Staging and storage areas for equipment, materials, fuels, lubricants and solvents, shall be located outside of the stream channel and banks. Stationary equipment such as motors, pumps, generators, compressors and welders, located within or adjacent to the stream shall be positioned over drip pans. Any equipment or vehicles driven and/or operated within or adjacent to the stream shall be checked and maintained daily, to prevent leaks of materials that if introduced to water could be deleterious to aquatic life. Vehicles shall be moved away from the stream prior to refueling and lubrication.

Mitigation Measure BIO-D (new measure in Phase 2 analysis): Vehicle Maintenance.

Proper and timely maintenance for vehicles and equipment used during construction shall be provided to reduce the potential for mechanical breakdowns leading to a spill of materials into or around the creeks. Maintenance and fueling shall be conducted in an area that meets the criteria set forth in the spill prevention plan (i.e., away from sensitive drainages).

Mitigation Measure BIO-E (new measure in Phase 2 analysis): Dust Prevention. Water used for dust abatement, if necessary, shall be acquired from an authorized off-site source. Water shall be a clean water source in accordance with California Valley RWQCB Construction Storm Water Program and/or as authorized under a separate National Pollutant Discharge Elimination System (NPDES) permit.

Mitigation Measure BIO-F (new measure in Phase 2 analysis): Daily Monitoring.

A qualified biological monitor shall be on site during in-water construction activities. The biological monitor shall be authorized to halt construction if impacts to special-status salmonid species are evident.

Mitigation Measure BIO-G (new measure in Phase 2 analysis): Riparian Habitat.

Current riparian vegetation shall be retained to extent feasible.

Mitigation Measure BIO-H (new measure in Phase 2 analysis): Fish Rescue Plan.

A fish rescue plan shall be prepared by MFWC prior to the implementation of the project and provided for review and comment to NMFS, USFWS and CDFG as appropriate. A qualified fisheries biologist will design and conduct a fish rescue and relocation effort to collect fish from the area within the cofferdam involving the capture and return of those fish to suitable habitat within the Sacramento River. To ensure compliance, a fisheries biologist shall provide observation during initial dewatering activities within the cofferdam.

Following the fish rescue effort, a report shall be prepared by the fisheries biologist and submitted to NMFS within 30 days.

There is potential for “incidental take” of special-status fish associated with installation of the cofferdam, and the Proposed Project/Action may affect and is likely to adversely affect special status fish species.

4.3.2 Giant Garter Snake

The effects to giant garter snake habitat are those areas of habitat that would be permanently and/or temporarily affected by the activity within a Work Area. The Work Area is defined to include the construction footprint of all the diversion and pumping plant facilities, the conveyance facility improvements, and the Drexler Relift station. In addition to the footprints of all facilities, the Work Area includes construction easements and potential staging areas where construction activity may occur. Habitat conditions for giant garter snake are largely dependent upon agricultural practices within the Action Area. The projected cropping pattern for 2012 is expected to be similar to that in 2011 and was used to determine available habitat to giant garter snake. However, because cropping patterns may change season to season, the estimated future availability of habitat for and the estimated effects to the giant garter snake are tentative.

Phase 2 includes the construction of the New Meridian Diversion/Pumping Plant, Main Canal Modifications, Drexler Relift, removal of the existing Meridian and Drexler Diversions, and the expansion of the Drexler Pipeline as well. The defined Work Area will avoid Reclamation Drains and rice fields that are suitable aquatic habitat for the giant garter snake. Effects to potential giant garter snake aquatic habitat during the inactive season occur only in the Main Canal. The Main Canal provides marginal habitat for the giant garter snake, with the only suitable habitat value being as a possible movement corridor between other drains and rice fields. Widening the Main Canal would increase the amount of potential aquatic habitat, but it would also mean a subsequent permanent loss of potential upland habitat for the giant garter snake. This modification to the canal was not considered to result in any adverse effects to the giant garter snake. Therefore no compensation is proposed for the temporary loss of aquatic habitat resulting from the proposed action.

Construction activities associated with the Main Canal modifications (3.4 acres) and the construction of the Drexler Re-lift Pumping Plant (0.05 acre) would potentially temporarily impact 6.4 acres of giant garter snake upland habitat (**Table 4-2, Figure 4-1**). In order to construct the Drexler Re-lift Pumping Plant, an existing drainage ditch would be replaced with a new 24-inch storm drain to allow for placement of a concrete pad. Construction of the pumping plant, storm drain, and spillway would result in permanent effects to approximately 2,512 square feet (0.05 acre) of giant garter snake upland habitat (**Figure 4-2**). An additional minimal area of the Reclamation District 70 canal would be disturbed temporarily when the storm drain is connected. The total permanent impacts are <0.1 acre.

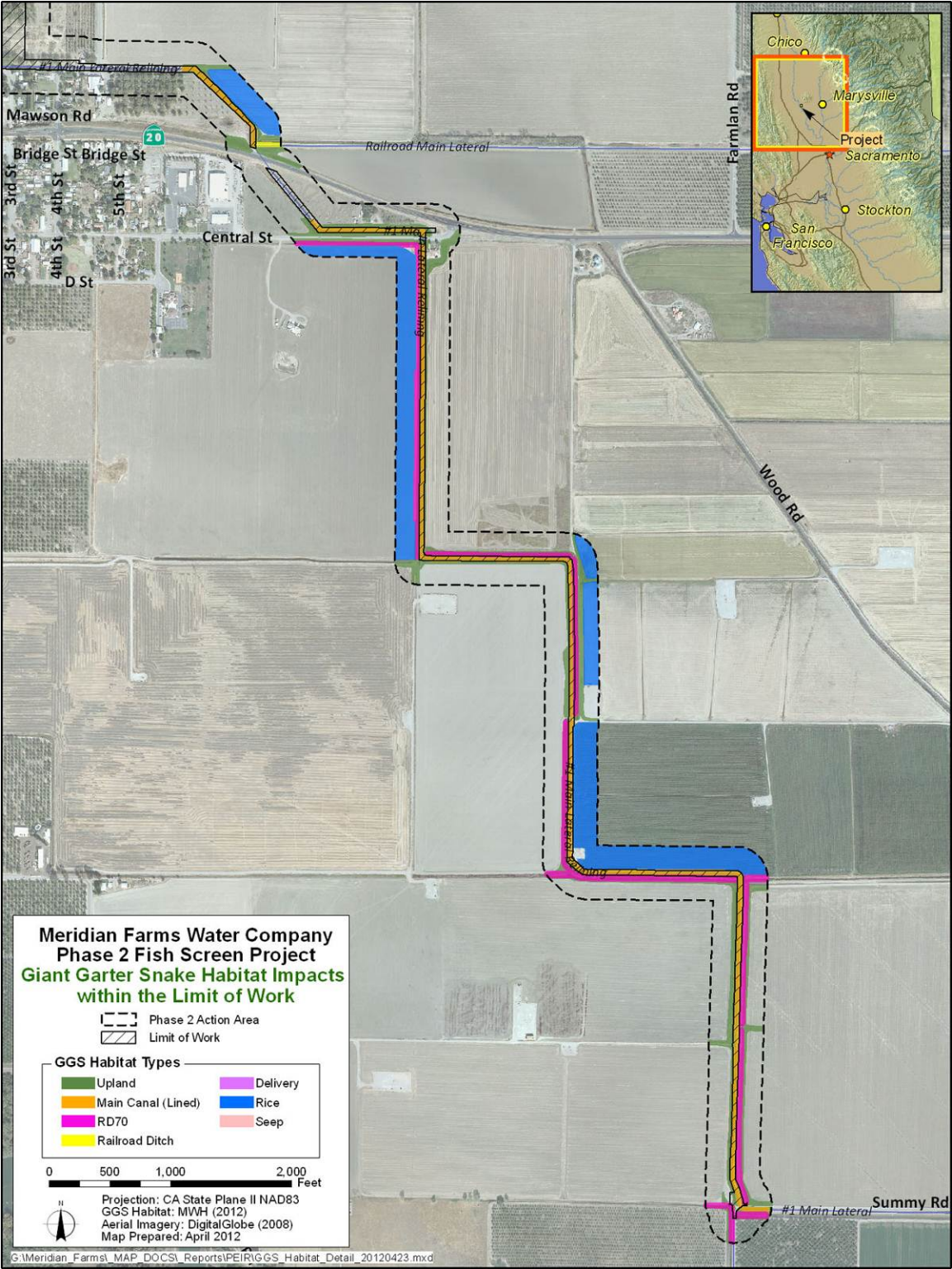
**TABLE 4-2
SUMMARY OF GIANT GARTER SNAKE
IMPACTS**

Habitat Type	Acres
Upland Temporary	6.4
Aquatic Permanent	<0.1
Upland Permanent	<0.1

Because the operation of the Main Canal is essential for MFWC water delivery in the spring and summer, the Proposed Project/Action improvements to the Main Canal must occur during the fall and winter (October 1st through April 30th), during the giant garter snake inactive period of October 1st to May 1st. Upland giant garter snake habitat in the Action Area is primarily composed of frequently disturbed agricultural lands and relatively shallow canal berms with few evident rodent burrows. These areas are not optimal habitat for giant garter snake hibernation; however, there is some potential for snakes to remain in the Action Area during the inactive season. Construction activities, either permanent or temporary in nature, from October 1 to May 1 are assumed to likely result in take (injury or death) of giant garter snakes that may be hibernating in the area, rather than harm and harassment. Therefore, the applicant proposes restoration and 1:1 replacement of 6.4 acres of upland habitat through the purchase of conservation credits from a Service-approved giant garter snake bank. Permanent impacts related to construction of the pumping plant and associated structures are very minimal (0.05 acre) and would occur during the GGS active period; therefore, no additional compensation measures are proposed.

The level of compensation specified for temporary impacts associated with the modifications of the Main Canal is comparable to the requirements for level 2 mitigation outlined in the *Programmatic Formal Consultation for the U.S. Army of Engineers 404 Permitted Projects with Relatively Small Effects on the Giant Garter snake within Butte, Colusa, Glenn, Fresno, Merced, Sacramento, San Joaquin, Solano, Stanislaus, Sutter and Yolo Counties, California* (USFWS 1997). The Programmatic 404 Consultation specifies level 2 mitigation for projects that have less than 20 acres of temporary disturbance during two active GGS seasons. Although the work on the Main Canal is expected to occur within one calendar year, it cannot be conducted during the GGS active season; therefore, the disturbance could be considered similar to impacts spanning more than one active GGS season.

Compensation will be purchased prior to ground-disturbing activities. Replacement habitat will include both upland and aquatic habitat components.



**Figure 4-1. Location of Temporary Giant Garter Snake Habitat Impacts in the
Limit of Work Area**

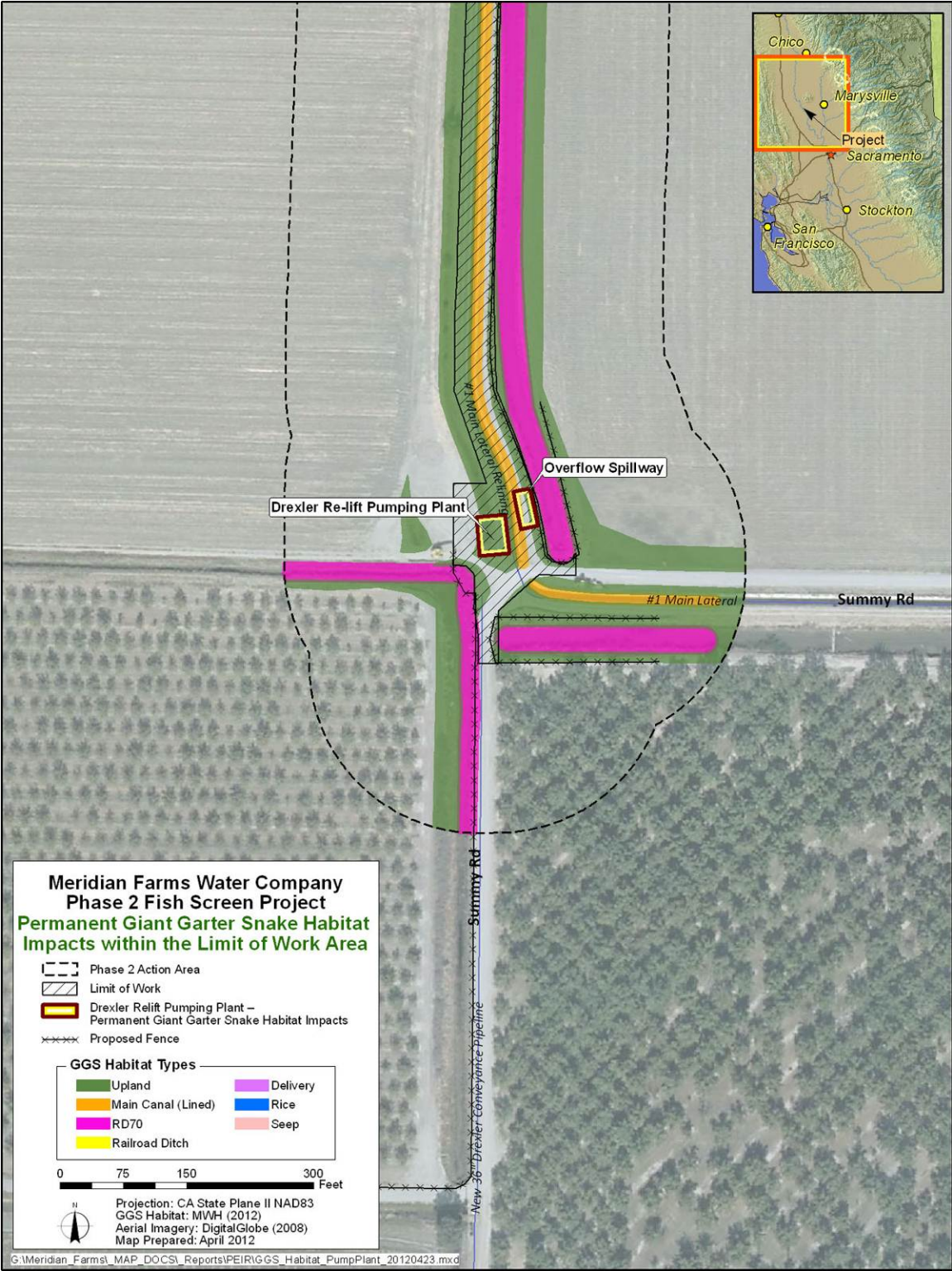


Figure 4-2. Location of Permanent Giant Garter Snake Habitat Impacts in the Limit of Work Area – Drexler Relift Pumping Plant

Implementation of mitigation measures and fulfillment of habitat compensation for construction activities occurring during the October 1 to May 1 period would avoid potentially significant impacts to giant garter snake. The specific 2008 IS/EA Mitigation Measures (BIO-1, BIO-4, BIO-6 through BIO-14, and BIO-17) and modified 2008 IS/EA Mitigation Measures (BIO-2, BIO-3, BIO-16, and BIO-18) related to GGS are presented below.

Measure BIO-1 (same as 2008 IS/ES Measure BIO-1): Traffic Routing, and Movement.

During construction operations, the number of access routes, number and size of staging areas, and the total area of the proposed project activity will be limited to the minimum necessary. Routes and boundaries will be clearly demarcated. Movement of heavy equipment to and from the project site will be restricted to established roadways to minimize habitat disturbance. Project-related vehicles shall observe a 20-mile-per-hour speed limit within construction areas, except on County roads and on State and Federal highways. This is particularly important during periods when the snake may be sunning or moving on roadways. All heavy equipment, vehicles, and supplies will be stored at the designated staging area at the end of each work period.

Measure BIO-2 (modified from Measure BIO-2 in the 2008 IS/ES): Staging Areas.

During construction operations, stockpiling of construction materials, portable equipment, vehicles, and supplies will be restricted to the designated construction staging areas and exclusive of the Environmentally Sensitive Areas (ESAs). A clear and solid barrier fence, such as a combination of exclusionary and silt fencing, will be installed along the boundaries of the staging area to prevent contamination of ESAs during such operations.

Measure BIO-3 (modified from Measure BIO-3 in the 2008 IS/ES): Pre-construction Surveys.

No more than 24-hours prior to the commencement of construction activities, a USFWS-approved biologist shall survey areas deemed suitable giant garter snake habitat for the presence of giant garter snakes. The biologist will provide the USFWS with a written report that adequately documents the methodology and results of the pre-construction survey within three days of the survey. These areas shall be re-inspected by the biologist whenever a lapse in construction activity of two and removed at the end of each workday from the entire project site.

Measure BIO-4 (same as 2008 IS/ES Measure BIO-4): Timing of Construction.

Construction activity on the Main Canal must occur during the snake's inactive period in order to avoid interrupting deliveries during the growing season. All other construction activities within giant garter snake habitat (*e.g.* aquatic, upland, and rice habitat) shall be conducted between May 1 and October 1 whenever possible. This is the active period for the snake and direct mortality is lessened, because snakes are expected to actively move and avoid danger. If it appears that construction activity may go beyond October 1, the project proponents shall contact the USFWS as soon as possible, but not later than September 15 of the year in question, to determine if additional measures are necessary to minimize take. Construction activities within 200 feet from the banks of snake aquatic habitat will be avoided during the snake's inactive season. **If this is not feasible, the Project Proponent must consult with USFWS to determine measures to avoid impacts to giant garter snake.**

Measure BIO-6 (same as 2008 IS/ES Measure BIO-6): Worker Awareness Training. A Worker Environmental Awareness Training Program for construction personnel shall be conducted by the USFWS-approved biologist for all construction workers, including contractors, prior to the commencement of construction activities. The program shall provide workers with information on their responsibilities with regard to the snake, an overview of the life-history of this species, information on take prohibitions, protections afforded this animal under the Act, and an explanation of the relevant terms and conditions of this biological opinion. Written documentation of the training must be submitted to the Sacramento Fish and Wildlife Office within 30 days of the completion of training. As needed, training shall be conducted in Spanish for Spanish language speakers.

Measure BIO-7 (same as 2008 IS/ES Measure BIO-7): Install Snake Exclusion Fencing. Prior to the commencement of construction activities, high visibility fencing will be erected around the habitats of federally listed species to identify and protect these designated ESAs from encroachment of personnel and equipment. These areas will be avoided by all construction personnel. The fencing shall be inspected by the Contractor before the start of each work day and maintained by the Contractor until completion of the project. The fencing may be removed only when the construction of the project is completed. Fencing will be established in upland immediately adjacent to aquatic snake habitat and extending up to 200 feet from construction activities. Silt fencing, if properly installed, may serve as suitable snake exclusion fencing.

Measure BIO-8 (same as 2008 IS/ES Measure BIO-8): Provide Adequate Signage. Signs will be posted by the Contractor every 50 feet along the edge of the ESAs, with the following information: "This area is habitat of federally-threatened and/or endangered species, and must not be disturbed. These species are protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment." The signs should be clearly readable from a distance of 20 feet, and must be maintained by the Contractor for the duration of construction.

Measure BIO-9 (same as 2008 IS/ES Measure BIO-9): Implement BMPs. Best Management Practices (BMPs), including a Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP), will be implemented to minimize effects to the snake during construction. Best management practices will be implemented to prevent sedimentation from entering ESAs and to reduce erosion, dust, noise, and other deleterious aspects of construction related activities. These BMPs may include, but are not limited to, silt fencing, temporary berms, restrictions on cleaning equipment in or near ESAs, installation of vegetative strips, and temporary sediment disposal. Runoff from dust control and hazardous materials will be retained on the construction site and prevented from flowing into the ESAs.

Measure BIO-10 (same as 2008 IS/ES Measure BIO-10): Erosion Control Materials. Tightly woven fiber netting (mesh size less than 0.25 inch) or similar material shall be used for erosion control and other purposes at the ESA to ensure that the giant garter snake is not trapped or becomes entangled. This limitation shall be communicated to the contractor using special provisions included in the bid solicitation package.

Measure BIO-11 (same as 2008 IS/ES Measure BIO-11): Properly Dispose of Garbage.

To eliminate an attraction to predators of the snake, all food-related trash items, such as wrappers, cans, bottles, and food scraps, must be disposed of in closed containers and removed at the end of each workday from the entire project site.

Measure BIO-12 (same as 2008 IS/ES Measure BIO-12): Use Approved Aggregate, Fill, or Borrow Materials. The Contractor shall provide documentation that aggregate, fill, or borrow material provided for the proposed project was obtained in compliance with the State Mining and Reclamation Act (SMARA). Evidence of compliance with the Act shall be demonstrated by providing the resident engineer with one of the following: 1) a letter from the USFWS stating that the use of the borrow pit will not result in the incidental take of species; 2) an incidental take permit for contractor-related activities issued by the USFWS pursuant to section 10(a)(1)(B) of the Act; 3) a biological opinion or letter concurring with a “not likely to adversely affect” determination issued by the USFWS to the Federal agency having jurisdiction over contractor-related services; 4) a letter from the USFWS concurring with the “no effect” determination for contractor-related activities; or 5) contractor submittal of information to the resident engineer indicating compliance with the SMARA and provision of County land use permits and California Environmental Quality Act (CEQA) clearance.

Measure BIO-13 (same as 2008 IS/ES Measure BIO-13): Restore Temporarily Affected Habitat. After construction activities are complete, any temporary fill or construction debris shall be removed and disturbed areas restored to their pre-project conditions. An area subject to “temporary” disturbance includes any area that is disturbed during the project, but that, after project completion, will not be subject to further disturbance and has the potential to be re-vegetated. All ESA snake habitats subject to temporary ground disturbances, including storage and staging areas and temporary roads, will be restored to pre-project conditions. If appropriate, these areas shall also be re-contoured to pre-project conditions. A written report shall be submitted to the USFWS within ten (10) working days of the completion of construction at the project site and restoration of the site to pre-project conditions.

Measure BIO-14 (same as 2008 IS/ES Measure BIO-14): Post-construction Monitoring.

An inspection of the site, with a photo documentation report showing pre- and post-project area photos, will be conducted and photos and a brief report will be submitted to USFWS one year from implementation of restoration to pre-project conditions.

Measure BIO-16 (modified from Measure BIO-16 in the 2008 IS/ES): De-watering Giant Garter Snake Habitat. During the giant garter snake active period (May 1-September 31), giant garter snake aquatic habitat may be dewatered starting on April 15. Any dewatered habitat must remain dry for at least 15 consecutive days after April 15 and prior to excavating or filing the dewatered habitat.

Measure BIO-17 (same as 2008 IS/ES Measure BIO-17): Giant Garter Snake Monitoring During Construction. A USFWS-approved biologist shall inspect construction-related activities at the proposed project site to ensure that no unauthorized take of federally listed species or destruction of their habitat occurs. The biologist shall be available for monitoring throughout all phases of construction that may result in adverse effects to the

giant garter snake. This includes clearing and grubbing and other construction activities in the areas of wetland vegetation/aquatic habitat, adjacent upland habitat, and during exclusion fence installation. Furthermore, the biologist shall have the authority through communication with the resident engineer to stop construction activities in the immediate area if a giant garter snake is encountered during construction until appropriate corrective measures have been completed or until the snake is determined to be unharmed. Snakes encountered during construction activities shall be allowed to move away from the area on their own volition. The biologist shall notify the USFWS immediately if any listed species are found on-site, and will submit a report, including date(s), location(s), habitat description, and any corrective measures taken to protect the species found. The biologist shall be required to report any take of listed species to the USFWS immediately by telephone at 916/ 414-6600 and by electronic mail or written letter addressed to the Chief, Endangered Species Division, within three (3) working days of the incident. The Service does not authorize any handling or moving of a giant garter snake by other than USFWS-permitted biologist.

Measure BIO-18 (modified from Measure BIO-18 in the 2008 IS/ES): Compensation.

Compensation for temporary and permanent impacts to GGS habitat is the responsibility of MFWC. Temporary impacts shall be restored to pre-project conditions. Areas subject to temporary impacts shall be limited to one season (the calendar year period between May 1 and October 1) and be restored within two seasons. In addition, GGS habitats temporarily disturbed during the inactive season (3.4 acres of aquatic habitat and 6.4 acres of upland habitat) will be replaced at a level of 1:1 by purchasing credits in a USFWS-approved mitigation bank prior to project construction.

4.3.3 Swainson's Hawk

No known Swainson's hawk nesting habitat is proposed to be modified or eliminated by the Proposed Project/Action. Suitable nesting habitat is found adjacent to the Sacramento River within the valley riparian habitat. Habitat in this area includes riparian woodlands with large diameter (i.e., greater than 30 inches diameter at breast height) valley oak (*Quercus lobata*), cottonwood (*Populus fremontii*) and black willow (*Salix goodingii*). These overstory trees provide moderate to high (i.e., greater than 50%) canopy closure in this area.

This riparian habitat will not be impacted by project activities. A few domestic trees and one isolated valley oak will be removed as a result of the Project Action. Minimal disturbances to potential foraging habitat (i.e., annual grassland and agricultural areas) will be temporary and are not expected to impact this species based on the overall regional abundance of these habitat types. This species is listed as threatened by the State of California. With numerous records of Swainson's hawk nests occurring within one mile of the project site along the Sacramento River (CDFG 2012a) there is a moderate to high potential this area may be used by this species for nesting. To compensate potential disturbance and to avoid active nest sites, the following conservation measures are proposed:

Measure BIO-22 (modified from Measure BIO-22 in the 2008 IS/ES): Swainson's Hawk Nest Survey, Nesting Raptors and Other Nesting Bird Survey. For any construction activities that will occur between March 1 and August 31 of any given year, the applicant

shall conduct preconstruction surveys in suitable nesting habitat within 0.5 mile of the construction area for nesting raptors. Surveys shall be conducted by a qualified biologist. In addition, all trees slated for removal during the nesting season shall be surveyed by a qualified biologist no more than 48-hours before removal to ensure that no nesting birds are occupying the tree.

If active nests are found during the survey, the applicant shall implement appropriate mitigation measures to ensure that the species will not be adversely affected, which will include establishing a no-work buffer zone as, approved by CDFG, around the active nest. The no-work buffer may vary depending on species and site specific conditions as approved by CDFG. Appropriate mitigation measures include delaying construction activities until a qualified biologist determines that juveniles have fledged the nest(s), or establishing a “no construction” zone buffer around the nest.

The results of the survey shall be documented in a letter report that is distributed to the CDFG. These measures would ensure compliance with the Migratory Bird Treaty Act and California Department of Fish and Game Code 3503.5.

Measure BIO-23: Riparian Habitat Exclusion (modified from Measure BIO-23 in the 2008 IS/ES). Where construction work occurs adjacent to riparian habitat (i.e., at the existing Drexler Diversion and Pumping Plant and the Grimes Canal modifications), there shall be no encroachment by construction equipment or personnel into existing riparian habitat areas located along the Sacramento River. Storage or parking of equipment shall be restricted within 100 feet of riparian habitat.

4.3.4 Osprey

Osprey nesting period and habitat requirement are similar to the Swainson’s hawk; therefore, the same conservation measures would be implemented for osprey as are listed above. There are fewer records of osprey in the study area, and the species is less likely to occur than Swainson’s hawk.

4.3.5 Western Burrowing Owl

The western burrowing owl is a year-round resident in the Central Valley, and may nest along the levee bank where the proposed screened intake is located, and along the edges of cropland along the pipeline alignment. The burrowing owl may use the surrounding cropland for foraging as well. No cropland is proposed to be modified or eliminated by the Proposed Project/Action, however noise and construction activities associated with the proposed project/action may potentially disturb nesting burrowing owls in the vicinity. If burrowing owl nests occur within the construction footprint along the levee, or along the pipeline alignment near cropland, implementation of the proposed project/action may result in the destruction of nesting birds or an active nest, which may reduce the success of this species and potentially affect the stability of the local population. To avoid potential disturbances to nesting and foraging habitat, the following conservation measures are proposed:

Mitigation Measure BIO-I (new measure in Phase 2 analysis): Pre-construction surveys for burrowing owls shall be conducted by a qualified biologist as approved by CDFG within 30-days prior to the start of work activities where land construction is planned in known or suitable habitat. If construction activities are delayed for more than 30 days after the initial preconstruction surveys, then a new preconstruction survey shall be required. All surveys shall be conducted in accordance with the CDFG/California Burrowing Owl Consortium survey protocols. This survey can be conducted concurrently with Mitigation Measure BIO-22.

If burrowing owls are discovered in the proposed project site vicinity during construction, the onsite biologist shall be notified immediately. Occupied burrows should not be disturbed during the nesting season (February 1 through August 31) unless a qualified biologist approved by the CDFG verifies through non-invasive methods that either: (1) the birds have not begun egg-laying and incubation; or (2) that juveniles from the occupied burrows are foraging independently and are capable of independent survival.

If this criteria is not met, occupied burrows during the nesting season will be avoided by establishment of a no-work buffer of 250-foot around the occupied/active burrow. Where maintenance of a 250-foot no-work buffer zone is not practical, the applicant shall consult with the CDFG to determine appropriate avoidance measures. Burrows occupied during the breeding season (February 1 to August 31) will be closely monitored by the biologist until the young fledge/leave the nest. The onsite biologist shall have the authority to stop work if it is determined that construction related activities are disturbing the owls.

If criterion 1 or 2 above are met and as approved by CDFG, the biologist shall undertake passive relocation techniques by installing one-way doors in active and suitable burrows allowing owls to escape but not re-enter. Owls should be excluded from the immediate impact zone and within a 160-foot buffer zone by having one-way doors placed over the entrance to prevent owls from inhabiting those burrows.

After nesting season ends (August 31) and the burrow is deemed unoccupied by the biologist, passive relocation techniques shall take place. Construction activities may occur once a qualified biologist has deemed the burrows are unoccupied.

4.3.6 Cackling (=Aleutian Canada) Goose

The cackling goose winters in the Central Valley, and may use the cropland in the proposed project/action vicinity for foraging or cover. No potential foraging habitat is proposed to be modified or eliminated by the Proposed Project/Action, however noise and construction activities associated with the proposed project/action may potentially disturb geese that may use the surrounding croplands. This disturbance may cause the geese to avoid foraging in the croplands in the vicinity and forage elsewhere. Due to the abundance of agriculture in the area it is unlikely that the geese would be subject to starvation or predation due to temporary disturbance from the proposed project/action. Potential disturbances to foraging habitat would be compensated by implementation of Mitigation Measure BIO-22 (see Section 4.3.3).

4.3.7 Bank Swallow

Although the bank swallow is known to nest along the Sacramento River, the immediate Action Area does not provide suitable nesting habitat for bank swallow. The gradual grassy slope of the riverbank that would be affected by the proposed screened intake is not suitable for nesting. The bank swallow may occur both upstream and downstream from the Action Area, however, and may potentially be disturbed by construction activities related to the Proposed Project/Action. Disturbance to nesting bank swallows may cause abandonment or failure of the nest, reduced productivity, and possibly a decline of the local population.

To avoid potential disturbances to nearby breeding bank swallows, implementation of modified 2008 IS/EA Mitigation Measure BIO-22 is proposed (see Section 4.3.3).

4.4 Effects on Critical Habitat

Construction activities associated with both phases of the Proposed Project/Action would result in temporary disturbances – including increased turbidity and sedimentation, cofferdam installation, and dewatering – to designated Critical Habitat for Central Valley steelhead, Central Valley spring-run Chinook salmon, and Sacramento River winter-run Chinook salmon. These potential effects are mitigated through measures incorporated in the project (see Chapter 2). Furthermore, the proposed fish screens would permanently alter designated Critical Habitat within the Action Area. However, the overall benefit of the Proposed Project on fish species outweighs the minor modifications to designated Critical Habitat.

4.5 Effects on Essential Fish Habitat

Construction activities associated with both phases of the Proposed Project/Action would result in temporary disturbances, including increased turbidity and sedimentation, cofferdam installation, and dewatering, to delineated EFH for Chinook salmon. These potential effects are mitigated through measures incorporated in the project (see Chapter 2). Furthermore, the proposed fish screens would permanently alter delineated EFH within the Action Area. However, the overall benefit of the Proposed Project on fish species outweigh the minor modifications to delineated EFH.

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CHAPTER 5

Environmental Baseline - NCCPA Communities

NCCPA Communities includes both habitats and ecologically-based fish groups which are defined in the MSCS. Two NCCPA habitats and two fish groups occur within the Action Area, have potential to be affected by the Action, and are therefore included within this ASIP. These communities are listed below, and their MSCS definitions are included in the following sections. Valley Riverine Aquatic.

- Valley/Foothill Riparian
- Anadromous Fish Group
- Estuarine Fish Species Group

5.1 NCCPA Habitats

There are 18 NCCPA habitats evaluated in the MSCS. These habitats were evaluated based on certain criteria: the level of acceptance of habitat nomenclature within the scientific community; consistency with existing CALFED habitat nomenclature from the ERP; consistency with existing electronically-mapped habitat data; and the potential for habitat types to be affected by CALFED actions.

5.1.1 Valley Riverine Aquatic

Valley riverine aquatic habitat includes the water column of flowing streams and rivers in low-gradient channel reaches below 300 feet in elevation. These waters are not tidally-influenced and include features such as pools, riffles, runs, and unvegetated channel beds and banks, as well as sloughs, backwaters, and flood bypasses.

In the Action Area, valley riverine aquatic habitat exists in the Sacramento River. The Sacramento River riverine habitat is characterized by fresh-water aquatic and shaded riparian. Flows are relatively slow within the Action Area, exhibiting deep channel characteristics with levied banks. Channel substrate generally consists of fine sandy-loam with sparse areas imported rip-rap along the banks used to reinforce the adjacent levees. At both proposed new diversion locations the channelized river bank habitat is exposed and dominated by annual grassland, exhibiting a deep, cold and slow moving flow.

5.1.2 Valley/Foothill Riparian

Valley/foothill riparian habitat includes all successional stages of woody vegetation, commonly dominated by willow, Fremont cottonwood, valley oak, or sycamore. This habitat occurs within the current and historical floodplains of low-gradient reaches of streams and rivers generally below 300 feet in elevation.

The valley riparian and riparian forest habitats are located adjacent to the Sacramento River system as it winds south along the western boundary of the Meridian Farms Service Area, and is usually located within the flood plain and levee system. Valley riparian habitats provide food, water, migration and dispersal corridors, and escape, nesting, and thermal cover for an abundance of wildlife. At least 50 amphibians and reptiles and 147 bird species occur in lowland riparian systems. Additionally, 55 species of mammals are known to use California's Central Valley riparian communities.

This habitat type is not within the immediate vicinity of proposed activities near or in the Sacramento River. Riparian forest habitat occurs along the opposite bank of the Meridian and Drexler diversion locations as shown in **Figure 2-2**, and a few non-contiguous patches of mixed willow riparian habitat occurs approximately 440 feet north of the proposed New Grimes Diversion.

5.2 NCCPA Fish Groups

There are two NCCPA Fish Groups which are evaluated in the MSCS: anadromous and estuarine fish species. These fishes are associated with several of the NCCPA habitats but are assessed separately because factors that support fish populations are not sufficiently addressed in the NCCPA habitats which are based on vegetation, land use, and geography. Instead, each fish group addresses the effects CALFED actions may have on factors important to fish ecology such as water flow, depth, temperature, quality, and seasonal fluctuations in stage and flow.

The fish species included in the NCCPA fish groups are those that will be most affected by CALFED actions, depend on the health of the Bay-Delta ecosystem, and are subject to existing USFWS, NOAA Fisheries, and CDFG recovery goals. The following section describes the NCCPA Fish Groups potentially affected by the Project.

5.2.1 Anadromous Fish Species

Anadromous fish are those that are born in fresh water, migrate to the ocean where they mature into adults, and return to their native fresh waters to spawn. Anadromous fish species that are included in this fish group are Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, Central Valley steelhead, Central California Coast steelhead ESUs, and green sturgeon. These species are associated with the following NCCPA habitat types: tidal perennial aquatic, valley riverine aquatic, montane riverine aquatic, lacustrine, saline emergent, and tidal freshwater emergent.

5.2.2 Estuarine Fish Species

Estuarine fish are those that spend most or all of their lives in euryhaline conditions, or at various salinities. Estuarine fish that are included in this fish group are the tidewater goby, delta smelt, longfin smelt, and Sacramento perch. These species are associated with the following NCCPA habitat types: tidal perennial aquatic, valley riverine aquatic, lacustrine, saline emergent, and tidal freshwater emergent.

CHAPTER 6

Effects of the Proposed Project/Action on NCCPA Communities

This chapter analyzes the direct, indirect, and cumulative effects on NCCPA communities that exist within the Action Area and that may result from implementation of both phases of the Proposed Project/Action, as well as actions related to and dependent on those actions. The Proposed Project/Action is considered to have an effect on NCCPA communities if it could result in “take” of a species, or if it would decrease the quality or extent of habitat potentially occupied by a species.

This analysis also includes a discussion of the conservation measures to avoid, minimize, and compensate for such effects, as appropriate. For descriptions of the NCCPA communities addressed in this ASIP, refer to Chapter 5.

6.1 Proposed Project/Action Effects and Conservation Measures

The following text contains an analysis of potential direct, indirect, and cumulative effects on NCCPA communities and the appropriate compensation measures:

6.1.1 Valley Riverine Aquatic

The one sensitive natural community that may be impacted by the Proposed Project/Action is the valley riverine aquatic habitat in the Sacramento River. As shown in **Figure 2-2**, the Work Area includes valley riverine aquatic habitat in the vicinity of the Meridian and Drexler diversions. Construction of the new Meridian Diversion and removal of the existing diversions would require the use of a cofferdam.

Approximately 0.2 acre of valley riverine aquatic habitat in the Action Area would be affected by Proposed Project/Action. However, with avoidance, minimization, and erosion control measures outlined in Chapter 2 (Project Description), impacts to the Sacramento River are considered minimal.

6.1.2 Valley Riparian

Because of the proximity of the valley riparian and cottonwood riparian habitat in the vicinity of the existing Meridian and Drexler diversion, these habitats may also be impacted by water quality effects resulting from in-water work. Both communities provide habitat for a range of terrestrial wildlife species, including several species of songbirds, small mammals, mesocarnivores, reptiles and amphibians. Incorporation of **2008 IS/EA Mitigation Measures BIO-19, BIO-20** and proposed **Mitigation Measures BIO-A through BIO-H** will ensure no disturbance and encroachment into these sensitive riparian habitat areas, thereby reducing potential effects.

6.1.3 Anadromous and Estuarine Fish Groups

Within the Action Area, effects to valley riverine aquatic habitat in the Sacramento River may subsequently affect special-status fish species from both fish groups. The Sacramento River in the vicinity of the proposed intake locations serves as a migratory corridor for the upstream migration of adult salmon and steelhead, and the downstream migration of juvenile salmon and steelhead. Other fish species in the Sacramento River near the proposed intake locations include North American green sturgeon, striped bass, threadfin shad, American shad, catfish, Sacramento pikeminnow, tule perch, sculpin, bullhead, and a variety of other resident fish species. The Sacramento River near Sacramento also provides habitat for a variety of invertebrates, including planktonic species such as copepods, and epibenthic species such as crawfish and amphipods. With avoidance, minimization, and erosion control measures outlined in Chapter 2 (Project Description), and implementation of **2008 IS/EA Mitigation Measures BIO-19, BIO-20** and proposed **Mitigation Measures BIO-A through BIO-H**, impacts to the Fish Groups in the Sacramento River will be minimized.

CHAPTER 7

Interrelated, Interdependent, and Cumulative Effects

This chapter assesses the interrelated, interdependent and cumulative effects of the Proposed Project/Action.

7.1 Interrelated and Interdependent Effects

The Proposed Project/Action is considered to be an action that is independent and has a function apart from other projects. Installation of the proposed diversion facilities would not increase water diversions or lead to any future water use not already feasible under existing baseline conditions. Thus the Proposed Project/Action is not part of a single, larger project, and therefore no interdependent or interrelated effects will occur.

7.2 Cumulative Effects

One new diversion facility will be installed and two existing facilities will be removed as part of this MFWC Project. The capacity of water diverted from the Sacramento River would not increase or decrease. These continuing baseline diversions as well as the implementation of BMP's and conservation measures will ensure no cumulative effects to water quality (water resources). The placement and design of the new permanent water diversion facilities in the Sacramento River is not likely to result in any obstruction of fishery migration and will likely decrease the mortality of emigrating juvenile fish species (in particular steelhead and Chinook salmon), thus not contributing to a cumulative effect on fishery resources.

Placement of the cofferdam and associated dewatering activities may potentially contribute to the loss of native fish trapped within the structure. However, the timing of proposed dewatering activities is likely to avoid special-status native fish species known to inhabit the Sacramento River based on known migratory requirements and the unlikely occurrence of these species in the vicinity of the Proposed Project/Action outside of migratory periods.

Existing surrounding land-use (i.e., agricultural) will continue to provide foraging opportunities for Swainson's hawk and other raptor species. With the implementation of Conservation measures for Swainson's hawk, suitable habitat will be preserved for future nesting opportunities, and thus will not contribute to a cumulative effect to Swainson's hawk and other species associated with riparian habitat.

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CHAPTER 8

Monitoring Needs

A list of monitoring needs from the 2008 IS/EA and Phase 2 IS/EA Mitigation Monitoring and Reporting Plan (Appendix C) are described below. Monitoring is necessary in order to monitor the effects and the implementation and effectiveness of the conservation measures. These are identified as measures that the implementing entity will undertake.

Mitigation Measure BIO-3: Pre-construction Surveys:

- 24-hours prior to the commencement of construction activities, the ESA shall be surveyed for giant garter snakes by a USFWS-approved biologist.
- The biologist will provide the USFWS with a written report that adequately documents the monitoring efforts within 24-hours of commencement of construction activities.
- The project area shall be re-inspected by the monitoring biologist whenever a lapse in construction activity of two weeks or greater has occurred.

Mitigation Measure BIO-14: Post-construction Monitoring:

- An inspection of the site, with a photo documentation report showing pre- and post-project area photos, will be conducted and photos and a brief report will be submitted to USFWS one year from implementation of restoration to pre-project conditions.

Mitigation Measure BIO-17: Giant Garter Snake Monitoring During Construction:

- A USFWS approved biologist shall inspect construction-related activities at the proposed project site to ensure that no unauthorized take of federally listed species or destruction of their habitat occurs. The biologist shall be available for monitoring throughout all phases of construction that may result in adverse effects to the giant garter snake. This includes clearing and grubbing and other construction activities in the areas of wetland vegetation/aquatic habitat, adjacent upland habitat, and during exclusion fence installation.
- The biologist shall have the authority through communication with the resident engineer to stop construction activities in the immediate area if a giant garter snake is encountered during construction until appropriate corrective measures have been completed or until the snake is determined to be unharmed. Snakes encountered during construction activities shall be allowed to move away from the area on their own volition. The biologist shall notify the USFWS immediately if any listed species are found on-site, and will submit a report, including date(s), location(s), habitat description, and any corrective measures taken to protect the species found.

- The biologist shall be required to report any take of listed species to the USFWS immediately by telephone at 916/ 414-6600 and by electronic mail or written letter addressed to the Chief, Endangered Species Division, within three (3) working days of the incident. The Service does not authorize any handling or moving of a giant garter snake by other than a USFWS-permitted biologist.

Mitigation Measure BIO-22: Swainson's Hawk Nest Survey, Nesting Raptors and Other Nesting Bird Survey:

- For any construction activities that will occur between March 1 and August 31 of any given year, the applicant shall conduct preconstruction surveys in suitable nesting habitat within 0.5 mile of the construction area for nesting raptors. Surveys shall be conducted by a qualified biologist. In addition, all trees slated for removal during the nesting season shall be surveyed by a qualified biologist no more than 48-hours before removal to ensure that no nesting birds are occupying the tree.
- If active nests are found during the survey, the applicant shall implement appropriate mitigation measures to ensure that the species will not be adversely affected, which will include establishing a no-work buffer zone as approved by the California Department of Fish and Game (CDFG), around the active nest. The no-work buffer may vary depending on species and site specific conditions as approved by CDFG. Appropriate mitigation measures include delaying construction activities until a qualified biologist determines that juveniles have fledged the nest(s), or establishing a "no construction" zone buffer around the nest.
- The results of the survey shall be documented in a letter report that is distributed to the CDFG. These measures would ensure compliance with the Migratory Bird Treaty Act and California Department of Fish and Game Code 3503.5..

Mitigation Measure BIO-H:

- Pre-construction surveys for burrowing owls shall be conducted by a qualified biologist as approved by CDFG within 30-days prior to the start of work activities where land construction is planned in known or suitable habitat. If construction activities are delayed for more than 30 days after the initial preconstruction surveys, then a new preconstruction survey shall be required. All surveys shall be conducted in accordance with the CDFG/California Burrowing Owl Consortium survey protocols. This survey can be conducted concurrently with Mitigation Measure BIO-22.

CHAPTER 9

Changed Circumstances

There are no anticipated changed circumstances that would affect implementation of the Proposed Project/Action.

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CHAPTER 10

Effects Determination Conclusion

The purpose of this ASIP is to review the Meridian Farms Water Company's Proposed Fish Screen Project in sufficient detail to determine to what extent the Proposed Project/Action may affect any threatened, endangered, proposed, or sensitive species within the Action Area. This chapter summarizes the environmental setting, analysis, and effects determination presented in Chapters 3 and 4.

10.1 Summary of Effects

A determination of effects based on the Proposed Project/Action on the following five species is summarized below:

- North American green sturgeon (Southern DPS) (*Acipenser medirostris*)
- Central Valley steelhead (*Oncorhynchus mykiss*)
- Central Valley spring-run Chinook salmon (*Oncorhynchus tshawytscha*)
- Sacramento River winter-run Chinook salmon (*Oncorhynchus tshawytscha*)
- Giant garter snake (*Thamnophis gigas*)

In addition, a determination of effects based on the Proposed Project/Action on designated Critical Habitat for the following three species is summarized below:

- Central Valley steelhead (*Oncorhynchus mykiss*)
- Central Valley spring-run Chinook salmon (*Oncorhynchus tshawytscha*)
- Sacramento River winter-run Chinook salmon (*Oncorhynchus tshawytscha*)

Furthermore, a determination of effects based on the Proposed Project/Action on delineated EFH for species is summarized below:

- Pacific salmon, specifically Chinook salmon (*Oncorhynchus tshawytscha*)

Lastly, a determination of effects based on the Proposed Project/Action on the following four NCCPA Communities is summarized below:

- Valley Riverine Aquatic Habitat
- Valley/Foothill Riparian Habitat

- Anadromous Fish Species
- Estuarine Fish Species

These species and communities have been selected from a broad list of species compiled from USFWS lists and database searches from the CNDDDB and CNPS. The five species are federal-listed. The NCCPA communities were selected from 20 communities defined in the MSCS.

These species and communities have the potential to be affected by the Proposed Project/Action and are therefore included in this ASIP.

10.1.1 North American Green Sturgeon (Southern DPS)

The Proposed Project Action occurs within and adjacent to the Sacramento River which provides habitat for several special-status anadromous fish species. Based on the Proposed/Project Actions described in Chapter 2, these fish species are most likely to be affected by a decrease in water quality due to construction-related activities, underwater sound pressure effects generated by pile driving activities associated with cofferdam installation, and direct mortality as a result of cofferdam installation and dewatering. Included within the Proposed Project/Action are measures to minimize such impacts; these include following the Central Valley RWQCB regulations to minimize construction-related effects, installing silt screens to filter out sediment before water re-enters the river, installing a cofferdam to contain most construction activities in the water, minimizing sound pressure effects, screening of dewatering pumps, and relocation of individuals trapped within the dewatered cofferdam. With the implementation of these measures and with the incorporation of seasonal in-channel construction restrictions, it is unlikely that construction of the Proposed Project/Action would significantly affect green sturgeon populations. Moreover, the proposed project will result in avoidance of future entrainment of green sturgeon at the diversion sites. This is a beneficial effect is expected to outweigh the temporary construction-related effects.

There is potential for “incidental take” of special-status fish associated with installation of the cofferdam, and the Proposed Project/Action may affect and is likely to adversely affect special status fish species.

10.1.2 Central Valley Steelhead

The Project Action occurs within and adjacent to the Sacramento River which provides habitat for several special-status anadromous fish species. Based on the Proposed/Project Actions described in Chapter 2, these fish species are most likely to be affected by a decrease in water quality due to construction-related activities, underwater sound pressure effects generated by pile driving activities associated with cofferdam installation, and direct mortality as a result of cofferdam installation and dewatering. Included within the Proposed Project/Action are measures to minimize such impacts; these include following the Central Valley RWQCB regulations to minimize construction-related effects, installing silt screens to filter out sediment before water re-enters the river, and installing a cofferdam to contain most construction activities in the water, minimizing sound pressure effects, screening of dewatering pumps, and relocation of individuals trapped within the dewatered cofferdam. With the implementation of these measures and with the incorporation of seasonal in-channel construction restrictions, it is unlikely that construction of the Proposed Project/Action

would significantly affect Central Valley steelhead populations. Moreover, the proposed project will result in avoidance of future entrainment of Central Valley steelhead at the diversion sites. This is a beneficial effect is expected to outweigh the temporary construction-related effects.

There is potential for “incidental take” of special-status fish associated with installation of the cofferdam, and the Proposed Project/Action may affect and is likely to adversely affect special status fish species.

10.1.3 Central Valley Spring-Run Chinook Salmon

The Project Action occurs within and adjacent to the Sacramento River which provides habitat for several special-status anadromous fish species. Based on the Proposed/Project Actions described in Chapter 2, these fish species are most likely to be affected by a decrease in water quality due to construction-related activities, underwater sound pressure effects generated by pile driving activities associated with cofferdam installation, and direct mortality as a result of cofferdam installation and dewatering. Included within the Proposed Project/Action are measures to minimize such impacts; these include following the Central Valley RWQCB regulations to minimize construction-related effects, installing silt screens to filter out sediment before water re-enters the river, and installing a cofferdam to contain most construction activities in the water, minimizing sound pressure effects, screening of dewatering pumps, and relocation of individuals trapped within the dewatered cofferdam. With the implementation of these measures and with the incorporation of seasonal in-channel construction restrictions, it is unlikely that construction of the Proposed Project/Action would significantly affect Central Valley spring-run Chinook salmon populations. Moreover, the proposed project will result in avoidance of future entrainment of Central Valley spring-run Chinook salmon at the diversion sites. This is a beneficial effect is expected to outweigh the temporary construction-related effects.

There is potential for “incidental take” of special-status fish associated with installation of the cofferdam, and the Proposed Project/Action may affect and is likely to adversely affect special status fish species.

10.1.4 Sacramento River Winter-Run Chinook Salmon

The Project Action occurs within and adjacent to the Sacramento River which provides habitat for several special-status anadromous fish species. Based on the Proposed/Project Actions described in Chapter 2, these fish species are most likely to be affected by a decrease in water quality due to construction-related activities, underwater sound pressure effects generated by pile driving activities associated with cofferdam installation, and direct mortality as a result of cofferdam installation and dewatering. Included within the Proposed Project/Action are measures to minimize such impacts; these include following the Central Valley RWQCB regulations to minimize construction-related effects, installing silt screens to filter out sediment before water re-enters the river, and installing a cofferdam to contain most construction activities in the water, minimizing sound pressure effects, screening of dewatering pumps, and relocation of individuals trapped within the dewatered cofferdam. With the implementation of these measures and with the incorporation of seasonal in-channel construction restrictions, it is unlikely that construction of the Proposed Project/Action would significantly affect Sacramento River winter-run Chinook

salmon populations. Moreover, the proposed project will result in avoidance of future entrainment of Sacramento River winter-run Chinook salmon at the diversion sites. This is a beneficial effect is expected to outweigh the temporary construction-related effects.

There is potential for “incidental take” of special-status fish associated with installation of the cofferdam, and the Proposed Project/Action may affect and is likely to adversely affect special status fish species.

10.1.5 Giant Garter Snake

The giant garter snake has a low to moderate potential to occur in the Action Area and is an important species in the Central Valley region. The aquatic giant garter snake inhabits slow-moving waters, such as backwaters and sloughs, and requires some aquatic vegetation for basking and cover.

The anticipated effects to giant garter snake include: temporary effects to aquatic habitat resulting from the Main Canal improvements; temporary and permanent effects to upland habitat along the Main Canal improvements; permanent effects to upland habitat in association with the Drexler Relift; and possible incidental “take” during the snake’s inactive period. To avoid and minimize the anticipated effects to giant garter snake, conservation measures from the Programmatic BO will be implemented. Compensation for permanent loss of habitat in Phase 2 is anticipated at a 3:1 replacement ratio.

It is anticipated that the Proposed Project/Action ‘may affect, but is not likely to adversely affect’ the giant garter snake.

10.2 Critical Habitat

Construction activities associated with the Proposed Project/Action would result in temporary disturbances, including increased turbidity and sedimentation, cofferdam installation, and dewatering, to designated Critical Habitat for Central Valley steelhead, Central Valley spring-run Chinook salmon, and Sacramento River winter-run Chinook salmon. These potential effects are mitigated through measures incorporated in the project (see Chapter 2). Furthermore, the proposed fish screens would permanently alter designated Critical Habitat within the Action Area. However, the overall benefit of the proposed project on fish species outweighs the minor modifications to designated Critical Habitat.

Therefore, the Proposed Project/Action may affect, but is not likely to adversely affect Critical Habitat identified in this ASIP.

10.3 Essential Fish Habitat

Construction activities associated with the proposed project/action would result in temporary disturbances, including increased turbidity and sedimentation, cofferdam installation, and dewatering, to delineated EFH for Chinook salmon. These potential effects are mitigated through measures incorporated in the project (see Chapter 2). Furthermore, the proposed fish screens would permanently alter delineated EFH within the Action Area. However, the overall benefit of the Proposed Project/Action on fish species outweigh the minor modifications to delineated EFH.

Therefore, the Proposed Project/Action may affect, but is not likely to adversely affect Essential Fish Habitat identified in this ASIP.

10.4 NCCPA Communities

This section summarizes the environmental setting, analysis, and effects determination presented in Chapters 5. The NCCPA communities that may be affected by the Proposed Project/Action include Valley Riverine Aquatic and Valley/Foothill Riparian habitats, and the Anadromous and Estuarine Fish Groups, which are associated with these habitats in the Action Area. Effects to the fishes are largely related to water quality, which was addressed in the Proposed Project/Action description. Water quality control measures are included in the Proposed Project/Action, and reduce the effects to the fishes to less-than-significant levels.

Effects to the two habitats are addressed in conservation measures in Chapter 5, which include avoidance of riparian areas, and the implementation of Swainson's hawk conservation and water quality measures. With the implementation of these measures, effects to Valley Riverine Aquatic and Valley/Foothill Riparian habitats are not likely. Adverse effects to Anadromous and Estuarine Fish Groups are expected to be minor and are outweighed by the overall beneficial effects of the Proposed Project.

Therefore, both the Proposed Project/Action may affect, but is not likely to adversely affect NCCPA Communities identified in this ASIP.

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CHAPTER 11

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Appendix A

Species Lists

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United States Department of the Interior



FISH AND WILDLIFE SERVICE

**Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825**



January 12, 2012

Document Number: 120112010227

Cynthia Jones
MWH
806 SW Broadway, Suite 200
Portland, OR 97205

Subject: Species List for Meridian Farms Water Company Phase 2 Fish Screen Project

Dear: Ms. Jones

We are sending this official species list in response to your January 12, 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 April 11, 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



These buttons will not appear on your list.

Revise Selection

Print this page

Print species list before going on to letter.

Make Official Letter

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: 120112010227

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
 - Critical habitat, vernal pool tadpole shrimp (X)
 - 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)
 - Critical habitat, winter-run chinook salmon (X) (NMFS)
 - winter-run chinook salmon, Sacramento River (E) (NMFS)

Amphibians

- *Ambystoma californiense*
 - California tiger salamander, central population (T)
- *Rana draytonii*
 - California red-legged frog (T)

Reptiles

- *Thamnophis gigas*
 - giant garter snake (T)

Plants

- *Cordylanthus palmatus*
 - palmate-bracted bird's-beak (E)

Candidate Species**Birds**

- *Coccyzus americanus occidentalis*
 - Western yellow-billed cuckoo (C)

Quads Containing Listed, Proposed or Candidate Species:

MERIDIAN (545B)

GRIMES (545C)

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](http://www.noaa.gov). 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 April 11, 2012.



Selected Elements by Scientific Name

California Department of Fish and Game

California Natural Diversity Database



Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFG SSC or FP
<i>Agelaius tricolor</i> tricolored blackbird	ABPBXB0020	None	None	G2G3	S2	SSC
<i>Ambystoma californiense</i> California tiger salamander	AAAAA01180	Threatened	Threatened	G2G3	S2S3	SSC
<i>Antrozous pallidus</i> pallid bat	AMACC10010	None	None	G5	S3	SSC
<i>Ardea alba</i> great egret	ABNGA04040	None	None	G5	S4	
<i>Ardea herodias</i> great blue heron	ABNGA04010	None	None	G5	S4	
<i>Astragalus tener var. ferrisiae</i> Ferris' milk-vetch	PDFAB0F8R3	None	None	G1T1	S1	1B.1
<i>Athene cunicularia</i> burrowing owl	ABNSB10010	None	None	G4	S2	SSC
<i>Atriplex cordulata</i> heartscale	PDCHE040B0	None	None	G2?	S2.2?	1B.2
<i>Atriplex depressa</i> brittlescale	PDCHE042L0	None	None	G2Q	S2.2	1B.2
<i>Atriplex joaquiniana</i> San Joaquin spearscale	PDCHE041F3	None	None	G2	S2	1B.2
<i>Atriplex minuscula</i> lesser saltscale	PDCHE042M0	None	None	G1	S1.1	1B.1
<i>Atriplex persistens</i> vernal pool smallscale	PDCHE042P0	None	None	G2	S2.2	1B.2
<i>Atriplex subtilis</i> subtle orache	PDCHE042T0	None	None	G2	S2.2	1B.2
<i>Branchinecta lynchi</i> vernal pool fairy shrimp	ICBRA03030	Threatened	None	G3	S2S3	
<i>Branta hutchinsii leucopareia</i> cackling (=Aleutian Canada) goose	ABNJB05035	Delisted	None	G5T4	S2	
<i>Brasenia schreberi</i> watershield	PDCAB01010	None	None	G5	S2	2.3
<i>Buteo swainsoni</i> Swainson's hawk	ABNKC19070	None	Threatened	G5	S2	
<i>California macrophylla</i> round-leaved filaree	PDGER01070	None	None	G2	S2	1B.1
<i>Castilleja rubicundula ssp. rubicundula</i> pink creamsacs	PDSCR0D482	None	None	G5T2	S2	1B.2
<i>Centromadia parryi ssp. parryi</i> pappose tarplant	PDAST4R0P2	None	None	G4T1	S1	1B.2
<i>Charadrius montanus</i> mountain plover	ABNNB03100	Proposed Threatened	None	G2	S2?	SSC



Selected Elements by Scientific Name

California Department of Fish and Game

California Natural Diversity Database



Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFG SSC or FP
<i>Chloropyron palmatum</i> palmate-bracted bird's-beak	PDSCR0J0J0	Endangered	Endangered	G1	S1	1B.1
<i>Cicindela hirticollis abrupta</i> Sacramento Valley tiger beetle	IICOL02106	None	None	G5TH	SH	
<i>Circus cyaneus</i> northern harrier	ABNKC11010	None	None	G5	S3	SSC
<i>Coastal and Valley Freshwater Marsh</i> Coastal and Valley Freshwater Marsh	CTT52410CA	None	None	G3	S2.1	
<i>Coccyzus americanus occidentalis</i> western yellow-billed cuckoo	ABNRB02022	Candidate	Endangered	G5T3Q	S1	
<i>Cuscuta obtusiflora var. glandulosa</i> Peruvian dodder	PDCUS01111	None	None	G5T4T5	SH	2.2
<i>Desmocerus californicus dimorphus</i> valley elderberry longhorn beetle	IICOL48011	Threatened	None	G3T2	S2	
<i>Dipodomys californicus eximius</i> Marysville California kangaroo rat	AMAFD03071	None	None	G4T1	S1	SSC
<i>Emys marmorata</i> western pond turtle	ARAAD02030	None	None	G3G4	S3	SSC
<i>Great Valley Cottonwood Riparian Forest</i> Great Valley Cottonwood Riparian Forest	CTT61410CA	None	None	G2	S2.1	
<i>Great Valley Mixed Riparian Forest</i> Great Valley Mixed Riparian Forest	CTT61420CA	None	None	G2	S2.2	
<i>Great Valley Willow Scrub</i> Great Valley Willow Scrub	CTT63410CA	None	None	G3	S3.2	
<i>Grus canadensis tabida</i> greater sandhill crane	ABNMK01014	None	Threatened	G5T4	S2	FP
<i>Hibiscus lasiocarpus var. occidentalis</i> woolly rose-mallow	PDMAL0H0R3	None	None	G4	S2.2	1B.2
<i>Lasiurus blossevillii</i> western red bat	AMACC05060	None	None	G5	S3?	SSC
<i>Lasiurus cinereus</i> hoary bat	AMACC05030	None	None	G5	S4?	
<i>Lasthenia glabrata ssp. coulteri</i> Coulter's goldfields	PDAST5L0A1	None	None	G4T3	S2.1	1B.1
<i>Laterallus jamaicensis coturniculus</i> California black rail	ABNME03041	None	Threatened	G4T1	S1	FP
<i>Layia septentrionalis</i> Colusa layia	PDAST5N0F0	None	None	G2	S2.2	1B.2
<i>Lepidurus packardii</i> vernal pool tadpole shrimp	ICBRA10010	Endangered	None	G3	S2S3	
<i>Myotis ciliolabrum</i> western small-footed myotis	AMACC01140	None	None	G5	S2S3	




Selected Elements by Scientific Name
California Department of Fish and Game
California Natural Diversity Database



Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFG SSC or FP
<i>Myotis yumanensis</i> Yuma myotis	AMACC01020	None	None	G5	S4?	
<i>Navarretia leucocephala ssp. bakeri</i> Baker's navarretia	PDPLM0C0E1	None	None	G4T2	S2	1B.1
<i>Northern Hardpan Vernal Pool</i> Northern Hardpan Vernal Pool	CTT44110CA	None	None	G3	S3.1	
<i>Pandion haliaetus</i> osprey	ABNKC01010	None	None	G5	S3	WL
<i>Perognathus inornatus inornatus</i> San Joaquin pocket mouse	AMAFD01061	None	None	G4T2T3	S2S3	
<i>Plegadis chihi</i> white-faced ibis	ABNGE02020	None	None	G5	S1	WL
<i>Riparia riparia</i> bank swallow	ABPAU08010	None	Threatened	G5	S2S3	
<i>Silene verecunda ssp. verecunda</i> San Francisco campion	PDCAR0U213	None	None	G5T2	S2.2	1B.2
<i>Spea hammondi</i> western spadefoot	AAABF02020	None	None	G3	S3	SSC
<i>Spinus lawrencei</i> Lawrence's goldfinch	ABPBY06100	None	None	G3G4	S3	
<i>Thamnophis gigas</i> giant garter snake	ARADB36150	Threatened	Threatened	G2G3	S2S3	
<i>Trichocoronis wrightii var. wrightii</i> Wright's trichocoronis	PDAST9F031	None	None	G4T3	S1.1	2.1
<i>Wolffia brasiliensis</i> Brazilian watermeal	PMLEM03020	None	None	G5	S1.3	2.3

Record Count: 55



Inventory of Rare and Endangered Plants

v7-12jan 1-11-12

Status: search results - Tue, Jan. 17, 2012 20:05 c

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



























Tip: Lathyrus Astragalus returns species from both genera.[\[all tips and help.\]](#)[\[search history\]](#)

Hits 1 to 20 of 20

Requests that specify topo quads will return only Lists 1-3.

To save selected records for later study, click the ADD button.





Selections will appear in a new window.


open	save	hits	scientific	common	family	CNPS
	<input type="checkbox"/>	1	Astragalus tener var. ferrisiae	Ferris' milk-vetch	Fabaceae	List 1B.1
	<input type="checkbox"/>	1	Atriplex cordulata 	heartscale	Chenopodiaceae	List 1B.2
	<input type="checkbox"/>	1	Atriplex depressa 	brittscale	Chenopodiaceae	List 1B.2
	<input type="checkbox"/>	1	Atriplex joaquiniana 	San Joaquin spearscale	Chenopodiaceae	List 1B.2
	<input type="checkbox"/>	1	Atriplex minuscula 	lesser saltscale	Chenopodiaceae	List 1B.1
	<input type="checkbox"/>	1	Atriplex persistens 	vernal pool smallscale	Chenopodiaceae	List 1B.2
	<input type="checkbox"/>	1	Atriplex subtilis 	subtle orache	Chenopodiaceae	List 1B.2
	<input type="checkbox"/>	1	Brasenia schreberi 	watershield	Cabombaceae	List 2.3
	<input type="checkbox"/>	1	California macrophylla 	round-leaved filaree	Geraniaceae	List 1B.1
	<input type="checkbox"/>	1	Castilleja rubicundula ssp. rubicundula 	pink creamsacs	Orobanchaceae	List 1B.2
	<input type="checkbox"/>	1	Centromadia parryi ssp. parryi 	pappose tarplant	Asteraceae	List 1B.2
	<input type="checkbox"/>	1	Chloropyron palmatum	palmate-bracted bird's-beak	Orobanchaceae	List 1B.1
	<input type="checkbox"/>	1	Cuscuta obtusiflora var. glandulosa	Peruvian dodder	Convolvulaceae	List 2.2
	<input type="checkbox"/>	1	Hibiscus lasiocarpus var. occidentalis	woolly rose-mallow	Malvaceae	List 1B.2
	<input type="checkbox"/>	1	Lasthenia glabrata ssp. coulteri 	Coulter's goldfields	Asteraceae	List 1B.1
	<input type="checkbox"/>	1	Layia septentrionalis 	Colusa layia	Asteraceae	List 1B.2
	<input type="checkbox"/>	1	Navarretia leucocephala ssp. bakeri 	Baker's navarretia	Polemoniaceae	List 1B.1
	<input type="checkbox"/>	1	Silene verecunda ssp. verecunda 	San Francisco champion	Caryophyllaceae	List 1B.2
	<input type="checkbox"/>	1	Trichocoronis wrightii var. wrightii	Wright's trichocoronis	Asteraceae	List 2.1
	<input type="checkbox"/>	1	Wolffia brasiliensis	Brazilian watermeal	Lemnaceae	List 2.3

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Appendix B

Photos

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Photo 1. Riparian vegetation at Meridian Diversion, facing south, November 7, 2011.



Photo 2. Riparian vegetation at Drexler Diversion, facing northeast, November 7, 2011.

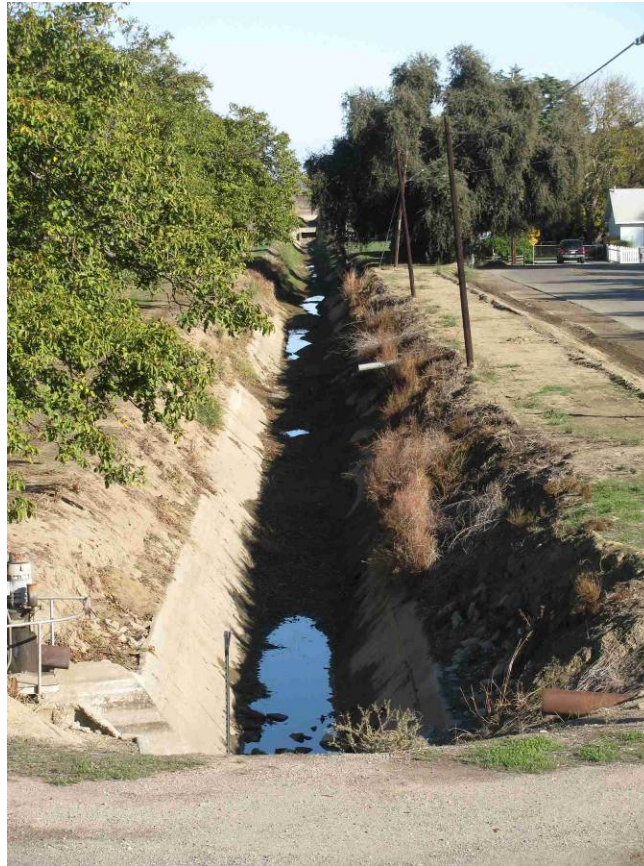


Photo 3. Main Canal near Meridian Diversion, facing east, November 7, 2011.



Photo 4. Main Canal north of Highway 20, facing north, November 7, 2011. Canal is lined in this area, but there are some areas of cracking and missing concrete.



Photo 5. Main Canal south of Highway 20, facing northwest, November 7, 2011. Canal is lined in this area, but there are some areas of cracking and missing concrete.



Photo 6. Southern Terminus of Main Canal near Proposed Drexler Re-Lift Pumping Plant, facing north, November 7, 2011.



Photo 7. Reclamation District 70 Canal near Proposed Drexler Re-Lift Pumping Plant, facing north, November 7, 2011. Main Canal is across road on left side (not visible).



Photo 8. Proposed Drexler Re-Lift Pumping Plant, facing north, November 7, 2011. Main Canal is across road on right side of photo.



Photo 9. Grimes Canal, facing north, November 7, 2011.

Appendix C

Fish Rescue Plan

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PHASE 2 MERIDIAN FARMS FISH SCREEN PROJECT

Fish Rescue Plan

Prepared for:

October 2012

U.S. Bureau of Reclamation

California Department of Fish and Game

Introduction

Meridian Farms Water Company (MFWC) is located in Sutter County, between Interstate 5 and Highway 99, east of the Sacramento River and southwest of the Sutter Bypass. MFWC provides irrigation water to three distinct Service Areas encompassing approximately 9,150 acres, with an estimated annual water delivery of 35,000 acre-feet (af). MFWC diverts surface water from the Sacramento River under the provisions of a License for Diversion and Use of Water with a priority date of September 10, 1918. Presently MFWC has two unscreened diversions on the Sacramento River at Meridian and Drexler.

The primary purpose of the Meridian Farms Water Company (MFWC) Phase 2 Fish Screen Project is to prevent entrainment of migrating, at-risk, native fish species at MFWC's existing diversion facilities by replacing unscreened intakes on the Sacramento River with screened diversions. MFWC will construct new positive barrier fish screen diversions that meet CDFG and NOAA Fisheries fish screen design criteria. Positive barrier fish screens will physically prevent fish from passing through the intake; these differ from behavioral barrier fish screens which encourage fish to swim away from a structure. MFWC Phase 2 work components that would occur in the Sacramento River are construction of a new Meridian Diversion/Pumping Plant, removal of the existing Meridian Diversion/Pumping Plant, and removal of the existing Drexler Diversion/Pumping Plant.

In order to complete construction of the new diversion/pumping plant and remove the existing diversions/pumping plants, sheet pile cofferdam enclosures must be installed to create access to the work site in the Sacramento River. Fish inhabiting the work areas on the Sacramento River could potentially become trapped by construction of the cofferdam. To reduce harm, harassment and mortality of fish entrapped in the cofferdam area, the following Fish Rescue Plan will be implemented.

This Fish Rescue Plan has been developed in part, based on the informal recommendations of the U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), and the California Department of Fish and Game (CDFG). This plan has also been developed based on the guidelines that have been approved for other intake projects, including the plan approved and used in construction of the Patterson Irrigation District Fish Screen Intake Project and the Victoria Canal Alternative Intake Project constructed by ProVen Management, Inc.

A fish rescue will be needed at the time the cofferdam is initially installed, and additionally if the cofferdam is flooded during construction and a fish rescue is determined to be feasible. All fish species that become entrapped in the cofferdam will be rescued and returned to the Sacramento River; however the primary focus of this effort is protection of special status species, specifically the following federally-listed species potentially inhabiting the project site on the Sacramento River:

- Sacramento River winter-run Chinook (federally-listed as endangered)
- Central Valley spring-run Chinook (federally-listed as threatened)

- Central Valley Steelhead (federally-listed as threatened)
- North American Green Sturgeon (federally-listed as threatened)

Fish rescue and relocation will be performed under the supervision of a qualified fishery biologist. NMFS and the CDFG shall be notified at minimum 48 hours prior to execution of fish seining. Upon completion of fish seining, the supervising fishery biologist will prepare a written report summarizing the results and documenting any rescue, relocation, and mortality that may have occurred. This report will be made available for submission to NMFS, CDFG, and USFWS.

Methods

Fish seining will be implemented following completion of the cofferdam, prior to removal of water. During cofferdam installation at least one pair of sheet piles will be left in the open position, allowing fish to exit the enclosure. The location of the open pair of sheet piles will be selected to allow maximum structural integrity of the cofferdam. With the pair of sheet piles in the open position, the area within the cofferdam enclosure will be swept using a beach seine and/or dip nets to catch and relocate or herd any fish out the opening in the cofferdam. This will be repeated several times as need and to the satisfaction of the supervising fishery biologist. The cofferdam will be closed once the supervising fishery biologist has determined that all fish are likely to have been removed. Electrofishing methods will not be allowed.

Upon closure of the cofferdam, pumps will be installed to remove impounded water from within the enclosure. Pumps used to remove impounded water will be outfitted with a mesh screen and water will be drawn down at a slow enough rate to prevent fish impingement. When the water level is drawn down to a depth of approximately two feet, a final check of the impounded area will be performed. Should any fish remain, they will be collected using nets and returned to the Sacramento River. As a final check, the area sweep will be repeated with nets until three consecutive runs yield no additional fish. At this time the fish seining operation will be complete.

Fish will be collected and placed immediately into aerated vessels of river water for holding prior to release in order to minimize handling and reduce stress. Species and life stage of all fish collected during seining will be documented prior to release. Once documented, fish will be immediately transported to a location between 200 feet and 600 feet downstream of the cofferdam and released back into the Sacramento River. Fish will be released intermittently and at random locations to prevent habituation of predatory fish. Damage or mortality of fish as a result of the seining operation will be noted and included in the supervising fishery biologist summary report.

Measures including the aeration of holding vessels, minimization of holding time, and addition of bacteria reducing chemicals will be implemented in order to reduce the stress on collected fish. All fish collected in the seining operation will be handled in accordance with local and federal law, including the Federal Endangered Species Act. Standard protocol for

fish rescue and relocation stipulates that no fish (dead or alive) is to be removed for personal use. All efforts will be made to minimize the amount of time collected fish spend out of the river. Use of anesthetics may occur during the handling of federally-listed species in order to minimize injury or possible mortality.

Handling of Dead Fish

Despite all precaution outlined in this plan, potential for fish mortality still exists. If a federally-listed fish suffers mortality, the individual shall be labeled and preserved or frozen for identification. Information regarding water temperature, location, method of take, and any other information deemed relevant will be collected and recorded. Any specimens collected will be held for pick-up by the local NMFS office in Sacramento, along with additional relevant information, including color photographs, a description of the cause of death, and the name and affiliation of the person who collected the specimen.

Reporting

After completion of fish seining operations, the supervising fishery biologist shall complete a summary report documenting the methods used, the personnel conducting the operation, the numbers of each fish species collected and relocated, an estimate of the survival of fish released, and summary information regarding any fish mortalities. This report shall be accompanied by color photographs of the seining operation and site. The report shall be made available within 30 days for distribution to interested agencies, including CDFG, NMFS, USFWS and the AFSP Program Managers.

APPENDIX C

Responses to Comments on the Draft Initial Study/Environmental Assessment

C.1 Introduction

The California Department of Fish and Game (CDFG), and the United States Department of Interior (DOI) Bureau of Reclamation (Reclamation) circulated a Draft Initial Study/Environmental Assessment (IS/EA) to disclose the potential impacts of constructing and operating the Meridian Farms Water Company (MFWC) Phase 2 Meridian Farms Fish Screen Project (Proposed Project/Action). The Draft IS/EA was circulated for public and agency review and comment beginning August 7, 2012 and ending on September 7, 2012. At the end of the comment period, three written letters were received addressing the content and analysis contained in the Draft IS/EA.

C.2 Public Participation and Environmental Review Process

The following actions took place during the preparation, distribution and review of the Draft IS/EA.

- The Draft IS/EA was filed with the State Clearinghouse on August 7, 2012 (SCH# 2012082032). The public comment period ended September 7, 2012.
- The availability of the Draft IS/EA was noticed in the following newspapers:
 - Sacramento Bee (August 8, 2012)
- The Draft IS/EA was made available for review on the Reclamation website: http://www.usbr.gov/mp/nepa/nepa_projdetails.cfm?Project_ID=10330
- The Draft IS/EA was also made available for review at the following locations:
 - U.S. Bureau of Reclamation, 2800 Cottage Way, MP-410, Sacramento, CA 95825
 - Sutter County Library Main Branch, 750 Forbes Avenue, Yuba City, CA 95991

C.3 List of Comment Letters Received

This section provides individual responses to written comments received from agencies and interested persons commenting on the Draft IS/EA. Each comment letter was assigned a number (i.e., 1, 2, etc). Individual comments within each letter have been bracketed based on issue and have

been assigned a number. For example, the first comment in Letter 1 is Comment 1-1. Each comment letter received has been reproduced in its entirety followed by the responses to the individual bracketed comment within each letter. Comments received on the Draft IS/EA did not result in any revisions to the text of the document. The comment letters received on the Draft IS/EA are listed below in Table C-1.

TABLE C-1
LIST OF COMMENT LETTERS AND COMMENTS RECEIVED

Commenter		Comment Letter
California State Lands Commission	Cy R. Oggins, Chief Division of Environmental Planning	1
Central Valley Regional Water Quality Control Board	Trevor Cleak, Environmental Scientist	2
California Department of Transportation, District #3	Eric Fredricks, Chief Office of Transportation Planning South	3

Letter 1

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STATE OF CALIFORNIA

EDMUND G. BROWN JR., Governor

CALIFORNIA STATE LANDS COMMISSION
100 Howe Avenue, Suite 100-South
Sacramento, CA 95825-8202



CURTIS L. FOSSUM, Executive Officer
(916) 574-1800 FAX (916) 574-1810
California Relay Service From TDD Phone 1-800-735-2929
from Voice Phone 1-800-735-2922

Contact Phone: (916) 574-1900
Contact FAX: (916) 574-1885

September 6, 2012

Department of Fish and Game
Attn: Tracy McReynolds
2545 Zanella Way, Suite F
Chico, CA 95928



File Ref: SCH # 2012082032

**Subject: Initial Study/Mitigated Negative Declaration/Environmental Assessment/
Finding of No Significant Impact (MND) for Phase 2 Meridian Farms Fish
Screen Project, Sacramento River, Sutter County**

Dear Ms. McReynolds:

The California State Lands Commission (CSLC) staff has reviewed the subject MND for the Phase 2 Meridian Farms Fish Screen Project (Project), which was prepared by the California Department of Fish and Game (CDFG), as lead agency under the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.), and the U.S. Bureau of Reclamation (USBR), as lead agency under the National Environmental Policy Act (NEPA) (42 U.S.C. § 4321 et seq.). The CSLC provides these comments as one of the four trustee agencies under the State CEQA Guidelines¹ section 15386 being given authority by law over natural resources affected by a project which are held in trust for the people of the State of California.

1-1

CSLC Jurisdiction and Public Trust Lands

The CSLC has jurisdiction and management authority over all ungranted tidelands, submerged lands, and the beds of navigable lakes and waterways. The CSLC also has certain residual and review authority for tidelands and submerged lands legislatively granted in trust to local jurisdictions (Pub. Resources Code, §§ 6301, 6306). All tidelands and submerged lands, granted or ungranted, as well as navigable lakes and waterways, are subject to the protections of the Common Law Public Trust.

As general background, the State of California acquired sovereign ownership of all tidelands and submerged lands and beds of navigable lakes and waterways upon its admission to the United States in 1850. The State holds these lands for the benefit of all people of the State for statewide Public Trust purposes, which include but are not limited to waterborne commerce, navigation, fisheries, water-related recreation, habitat preservation, and open space. On tidal waterways, the State's sovereign fee ownership extends landward to the mean high tide line, except for areas of fill or artificial accretion

¹ The State CEQA Guidelines are found in California Code of Regulations, Title 14, section 15000 et seq.

• Tracy McReynolds

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or where the boundary has been fixed by agreement or a court. On navigable non-tidal waterways, including lakes, the State holds fee ownership of the bed of the waterway landward to the ordinary low water mark and a Public Trust easement landward to the ordinary high water mark, except where the boundary has been fixed by agreement or a court. Such boundaries may not be readily apparent from present day site inspections.

1-1
cont.

CSLC staff has determined that the Sacramento River (River) at the Project location is State-owned sovereign land. Upon review of available materials, CSLC staff has made the following additional determinations:

- Pursuant to Public Resources Code section 6327, the CSLC will not require a lease for building facilities for procurement of fresh water as proposed in the Project if the necessary permits are obtained for such use from the local reclamation district, U.S. Army Corps of Engineers, or other Federal and State agencies.
- The Project may lie in an area that is subject to the public navigation easement in the River. This easement provides that members of the public have the right to navigate and exercise the incidences of navigation in a lawful manner on State waters that are capable of being physically navigated by oar or motor-propelled small craft. Such uses may include, but not be limited to, boating, rafting, sailing, rowing, fishing, fowling, bathing, skiing, and other water-related public uses. The Project must not restrict or impede the easement right of the public.

In the interest of all Public Trust values of the sovereign land underlying the River, CSLC staff offers the following comments and will continue to participate in the development of the MND.

Project Description

The Project is located between Interstate 5 and Highway 99, to the east of the Sacramento River and southwest of the Sutter Bypass near the Town of Meridian and Grimes. The existing and proposed River diversions, referred to as the Meridian and Drexler diversions, are owned by the Meridian Farms Water Company (Meridian Farms). The intakes currently in use are unscreened, and may have entrained Chinook salmon, steelhead trout, and other anadromous fish species that pass by the intake. Therefore, the National Marine Fisheries Service (NMFS) proposes to remove these current unscreened diversions and replace them with new state-of-the-art fish screens that meet current NMFS and CDFG fish screen criteria. All work would be performed in compliance with CDFG, NMFS, USBR, and U.S. Fish and Wildlife Service (USFWS) requirements and would not increase Meridian Farms' overall water diversion capacity from the River. The Project is described as having the following primary objectives:

1. To construct a new screened intake facility that meets current NMFS and CDFG fish screen design criteria.
2. To protect Meridian Farms' existing water rights so that it can maintain a reliable long-term supply to its service area while reducing impacts to listed species in the vicinity of the intake facility.

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Environmental Review

CSLC staff requests that the CDFG and USBR consider the following comments when preparing the final MND.

Demolition of Existing Facilities

The MND on pages 2-15 and 2-16 states that the existing facilities will be demolished once the new structures are operational. However, it is not clear when these old structures will be decommissioned. The MND could benefit from providing adequate explanation on ensuring decommissioning of the old intakes to prevent further water diversions from the River resulting in lowering water flows downstream from these facilities. Low water levels may result in increased water temperatures in the streams resulting in impacts to fish and other wildlife.

Furthermore, the MND on page 2-16 states that "The contractor would attempt to pull the support piles out of the river, but most likely they would be cut three feet below river bottom and abandoned, in accordance with CVFPB [Central Valley Flood Protection Board] requirements.... If CVFPB requires removal, the vaults would need to be demolished with jackhammers or a wrecking ball...." CSLC staff recommends that if the details of these structure removals have not been finalized, the MND should discuss and evaluate both potential scenarios and the environmental impacts that could be expected from each option. Absent such an assessment, the MND may not adequately characterize the types and severity of potential impacts on the aquatic environment.

Biological Resources

- Invasive Species. The MND on page 2-19 lists construction equipment and personnel expected for the Project. However, there appears to be little discussion of appropriate preventative measures to be taken during Project-related activities to prevent introduction of invasive species that may affect surrounding Public Trust lands and could degrade Public Trust uses and values in and/or around the Project site. Without this discussion, the MND may not adequately disclose all the environmental impacts that could result from Project implementation. Therefore, CSLC staff recommends the following:
 - The MND should consider the Project's potential to encourage the establishment or proliferation of aquatic invasive species such as the quagga mussel, or other nonindigenous, invasive species including, but not limited to, aquatic and terrestrial plants, and identify avoidance or minimization measures as appropriate.
 - In light of the recent decline of native pelagic organisms and in order to protect at-risk fish species, the MND should examine if any elements of the Project (e.g., changes in bankside, vegetative cover, and construction-related activities) would favor non-native fisheries in the River.
 - The MND should also discuss implementation of plans which may include the following provisions:
 - * Environmental training of operational and maintenance personnel to inform them about invasive species;

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- Actions to be taken to prevent the release and spread of marine and/or terrestrial invasive species;
- Procedures for safe removal and disposal of any invasive taxa observed; and
- A post-operations and maintenance report identifying what, if any, invasive species were found attached to and/or removed from equipment and materials, as well as the treatment/handling/disposal of identified invasive species.

1-3
cont

- Underwater Noise and Vibration. The MND on page 76 states that "The Proposed Project/Action may require the use of vibratory or percussion hammer methods. Both methods produce underwater sound pressure waves that can be perceived by fish; however, while vibrating hammers do not produce sound pressure levels that would result in injury or mortality to fish, they may still impact the fish...." For additional clarity, it may be helpful to cross-reference the underwater noise and vibration effects in the Noise-related discussions on pages 2-23, 4-35, and 3-25.

1-4

The MND on page 77 explains that even if a percussion hammer will be used, the underwater sound exposure levels will not exceed 187 decibels (db), which is the identified threshold for impacts to fish. However, it is not apparent how this sound level will be monitored. Additionally, page 75 states that special-status fish will be indirectly exposed to sound pressure waves and cofferdam building as potential stressors. While these factors are identified individually, the MND should describe whether they would adversely affect fish in combination. CSLC staff recommends the MND clearly state how sound levels will be monitored to keep below 187 db and what actions would be taken if the monitoring indicated that the threshold had been exceeded, and provide mitigation measures for impacts to fish from the above-described effects, which, when taken together, appear to be potentially significant.

- Fish Rescue (Plan). The MND on pages 78 and 4-17 states that a Plan "shall be prepared" prior to the implementation of the Project and provided for review and comment to USFWS, CDFG, and Meridian Farms as appropriate. However, Appendix C, pages C-1 to C-3, includes a Plan dated August 2012. CSLC staff recommends that the MND clarify the Plan's status (i.e., is it the Plan in Appendix C). If the Plan will be developed later, the MND should identify what measures the Plan must contain to mitigate for potential impacts so that such the effectiveness of such measures can be adequately assessed before the Project is approved.

1-5

Water Quality and Toxicology

The MND on page 3-24 briefly states that water quality impacts from construction of the Project are of particular concern. However, the MND does not appear to discuss the possibility of construction-related activities that could result in sediment or other pollutants entering waterways and impacting downstream resources. Even though building a cofferdam would reduce potential pollutants from entering waterways and impacting downstream resources, Project construction activities could still stir up sediments at the bottom of the River resulting in releases of toxins such as mercury and methylmercury. Therefore, CSLC staff recommends implementation of avoidance and minimization measures to reduce potential release of toxins from all Project-related

1-6

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activities, and development and implementation of monitoring and reporting protocols to inform agencies of the amount of mercury disturbance.

1-6
cont.

Moreover, page 4-16 of MND states that a spill prevention plan for potentially hazardous materials "shall be prepared and implemented" with proper procedures for cleaning up and reporting of any spills as well as proper handling and storage of all hazardous materials. However, it is not clear when this plan will be prepared and whether or not it will include potential hazardous materials spills or construction and deconstruction debris in the River. CSLC staff recommends the MND more thoroughly describe the required contents and enforcement criteria for the plan in order to facilitate independent review and avoid improper mitigation deferral.

Cultural Resources

1-7

The MND on page 3-21 states that no archaeological or historical resources have been previously recorded in the area and that a field survey occurred in 2004. Due to the passage of time, CSLC staff recommends an updated cultural resources data search and archaeological field inspection be conducted.

The MND on page 4-22 does not indicate that the CSLC Shipwreck Database was searched to locate potential submerged cultural resources in the Project area. The database includes known and potential vessels located on the State's tide and submerged lands. CSLC staff searched the database and found one vessel that potentially may be in the Project area. This vessel is the *Varuna*, a steamship that reportedly burned in the Sacramento River near Meridian, California, on March 19, 1903. Our files contain no additional information. The vessel may have been salvaged or re-floated. You may wish to check local records or consult with individuals knowledgeable about local history to determine what happened to this vessel, and include this information in the MND. It is also possible that other shipwrecks may be in the area since the locations of many shipwrecks remain unknown. CSLC staff requests to be notified immediately if unanticipated resources are discovered on lands under the CSLC's jurisdiction. Should any cultural resources be discovered during Project construction, please consult with Pam Griggs at the contact information noted at the end of this letter.

Greenhouse (GHG) Emissions

1-8

The MND does not appear to have a finalized list of equipment to be used for this Project; as stated on page 2-19, "The actual equipment used during construction would be determined by the contractor and the construction schedule." Because the equipment to be used has not yet been finalized, CSLC recommends recalculating GHG emissions once equipment has been finalized, or including as part of the final MND a provision that such specific equipment would conform to the levels in the analysis presented in the MND. Moreover, the MND may benefit from including other related activities from demolition as well as all vehicle trips to the total GHG emissions values. Therefore, CSLC recommends including a more robust discussion of GHG emissions from all possible Project related activities prior to concluding GHG emissions impacts are less-than-significant.

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Recreation

The MND on pages 3-27 and 4-39 does not seem to thoroughly evaluate Project impacts to recreational activities such as walking, swimming, canoeing, or kayaking on and around the Project site in the River. Moreover, there is no apparent discussion of the potential for blocking off areas during Project implementation. For example, pages 2-8 and 2-9 indicate that a crane would be floated to the site on a barge, and then a vibratory or impact hammer would be attached to the crane to drive the necessary pilings into the River. Since the barge could impede public access or the public's use and enjoyment of the River or the area surrounding the Project site, in conflict with the Public Trust Doctrine or the public navigation easement, the MND should provide both an explanation of these potential impacts, and if appropriate, require measures such as notification or signage to reduce the effects on public use of the area.

1-9

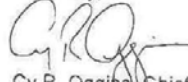
Cumulative Impacts

While the MND contains a brief discussion of cumulative impacts on page 4-43, CSLC staff recommends the lead agency consider incorporating a more robust discussion of cumulative impacts or a stand-alone cumulative impacts section to more fully support the less-than-significant with mitigation conclusion. As part of these improvements, CSLC staff recommends revisiting the several resource sections commented on in this letter to allow for a more complete understanding of the Project's cumulative impacts.

1-10

Thank you for the opportunity to comment on the MND for the Project. As a trustee Agency, we request that you consider CSLC staff comments prior to adoption of the MND. Please send copies of future Project-related documents, including electronic copies of the final MND and Notice of Determination when they become available. Please refer any questions concerning the environmental review to Afifa Awan, Environmental Scientist, at (916) 574-1891 or via e-mail at afifa.awan@slc.ca.gov. For questions concerning archaeological or historic resources under CSLC jurisdiction, please contact Senior Staff Counsel Pam Griggs at (916) 574-1854 or via email at pamela.griggs@slc.ca.gov. For questions concerning CSLC leasing jurisdiction, please contact Reid Boggiano, with the Land Management Division, at (916) 574-0450, or via email at reid.boggiano@slc.ca.gov.

Sincerely,



Cy R. Oggins, Chief
Division of Environmental Planning
and Management

cc: Office of Planning and Research
A. Awan, DEPM, CSLC
R. Boggiano, LMD, CSLC
P. Griggs, LEGAL, CSLC
E. Milstein, LEGAL, CSLC

Letter 1: California State Lands Commission

Response to Comment 1-1

The comment provides a summary of the jurisdiction of the California State Lands Commission (CSLC) and the potential permits and approvals that may be required. The comment also provides a summary of the project background, project description, and project objectives provided in the Draft IS/EA. No response is necessary.

Response to Comment 1-2

During construction of the proposed new Meridian Diversion, the existing Meridian and Drexler Diversions would remain in operation to allow for uninterrupted water deliveries to the MFWC service area. Once construction of the proposed new diversion is complete and operational, the pumps on the existing diversion would be turned off, the valves would be closed, and the facility would be removed (as noted on page 2-15 of the Draft IS/EA). Concurrent operation of the new and old diversion facilities is not proposed.

As described on page 2-16 of the Draft IS/EA, installation of coffer dams would be required during demolition of the existing Meridian and Drexler Diversions to protect the work in the levee and landside flooding. The potential environmental impacts of either demolition option (use of jackhammer or wrecking ball) would be contained to the area within the installed coffer dam and result in similar construction phase impacts described throughout the Draft IS/EA (water quality, noise, air quality, biological resources, etc.) and associated mitigation measures identified construction phase impacts would mitigate impacts attributed to either demolition option to a less than significant level. No additional analysis or mitigation is required.

Response to Comment 1-3

Literature research indicates that the water quality of the Sacramento River may not be conducive to the survival of invasive mollusks, such as the quagga mussel. According to the Center for Invasive Species at the University of California-Riverside, some surface waters associated with the Sierra Nevada may not sustain invasive mollusks due to insufficient calcium levels.¹ A 2008 report to the California CDFG also noted that the general vicinity of the project area was “not vulnerable to colonization” due to a combination of factors, including temperature, calcium, pH, dissolved oxygen, and salinity.² Therefore, the likelihood of colonization of these species and other invasive species in the Sacramento River limited.

The Proposed Project/Action involves the construction and operation of a new diversion with fish screen and associated distribution facilities which would not be anticipated to result in the introduction of invasive species, such as the quagga mussel, into the project area. Never the

¹ Hoddle, M.S. (2009) Quagga and Zebra Mussels. Center for Invasive Species Research. University of California Riverside. http://civr.ucr.edu/quagga_zebra_mussels.html.

² Cohen, A.N. (2008) Potential distribution of Zebra Mussels (*Dreissena polymorpha*) and Quagga Mussels (*Dreissena bugensis*) in California. Phase 1 Report to the California Department of Fish and Game. <http://www.dfg.ca.gov/invasives/quaggamussel/>.

less, compliance with NPDES permit requirements, which include the reestablishment vegetation in areas disturbed by construction, including bankside vegetation, and vegetative cover for fish species, as well as measures to avoid the disturbance of native riparian vegetation (Mitigation Measure BIO-G: Riparian Habitat), would further minimize the risk of introducing and/or the proliferation of invasive species. No additional analysis or mitigation is required.

Response to Comment 1-4

Mitigation Measure BIO-19 adopted by the CDFG to mitigate vibration impacts to fish during pile driving activities and will be implemented for the proposed project. Mitigation Measure BIO-19 requires that the contractor use vibrational pile driving to the greatest extent feasible and that if percussive pile driving is necessary, that its use shall be minimized to the maximum extent possible and that it be accomplished in compliance with criteria established in the 2006 Interim Criteria for Injury of Fish to Pile Driving Operations. To satisfy the criteria, the contractor will need to show that the chosen construction (single-strike pile driving) is not likely to produce noise exposure in excess of 187 dB SEL/208 dB L_{peak} at 10 meters. In this case, the contractor would choose the combination of pile type and diameter that satisfies the construction and noise level criteria by referencing the noise level data in Appendix I of the 2009 Caltrans study (Technical Guidance for Assessment and Mitigation of the Hydroacoustic Effects of Pile Driving on Fish) or other reputable study data. Therefore, the method selected would need to be one that would comply with the criteria and no further noise monitoring would be required. However, qualified monitors will be on site during in-water construction activities. These monitors have the authority to stop construction if impacts to special-status salmonid species if evident (Mitigation Measure BIO-F).

It should also be noted that as described on page 4-16, in-water construction activities would occur when the least number of individual special-status fish species would be effected (June 1 to Oct 1). This period coincides with when Central Valley steelhead and Chinook salmon are least likely to be present in the project vicinity. Furthermore, as described on page 4-16, given the overall benefit to fish, as well as the use of a cofferdam, the fish salvage requirement for dewatered work sites, the localized and minimal in-river disturbances, and the construction occurring during a time when fish would least likely be in the area, and with implementation of Mitigation Measures BIO-19, BIO-20, and BIO-A through BIO-H, impacts to the fisheries resources of the Sacramento River would be less than significant.

Lastly, potential take of state and federally listed species, including listed fish that may be caught or harmed during construction activities or during implementation of the fish rescue and salvage plan (see Mitigation Measure BIO-H), would be permitted through an incidental take permit issued by the United States Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), and CDFG, consistent with Section 7 of the Endangered Species act and Section 2081 of the California Fish and Game Code.

Response to Comment 1-5

Mitigation Measure BIO-H includes a requirement to prepare and implement a Fish Rescue Plan

prior to implementation of the project subject to review and comment by NMFS, USFWS and CDFG, as appropriate. Results of the fish rescue effort during initial dewatering efforts shall be provided to NMFS within 30 days. The proposed fish rescue plan is provided in Appendix C of the Action Specific Implementation Plan which is included as Appendix B of the Draft EA/IS.

Response to Comment 1-6

As discussed on page 4-31 of the Draft IS/EA, prior to construction, MFWC would obtain a National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges associated with construction activities (NPDES General Storm Water Permit), from the Central Valley Regional Water Quality Control Board (CVRWQCB). Specific Best Management Practices (BMPs) to be implemented during construction activities would be determined prior to issuance of the NPDES General Permit, in coordination with the CVRWQCB. Adherence to these BMPs would be required as a condition of the permit, and would substantially reduce or prevent waterborne pollutants from entering natural waters, per CVRWQCB standards.

The project would also be required to obtain Clean Water Act Section 401 and 404 permits which include requirements for the preparation of a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP would include measures to minimize erosion and sediment transport to streams and identify other BMPs (e.g., water diversion and sediment containment devices, protection of construction spoils, installation of water bars), site restoration, post-construction monitoring of the effectiveness of best management practices, contingency measures, responsible parties, and agency contacts.

Compliance with NPDES permit requirements and development and implementation of a SWPPP would minimize the potential erosion of soils and the release of sediment and hazardous materials, including sediment contaminated with mercury and methylmercury, into watercourses. As a result, temporary construction activities would not violate applicable water quality standards, and potential impacts associated with existing mercury and methylmercury contamination would be less than significant. No additional analysis or mitigation is required.

The Mitigation Monitoring and Reporting Program (MMRP), provided as Appendix A to the Draft IS/EA, indicates that the spill prevention plan will be prepared prior to the commencement of construction activities and will be reviewed by CDFG and Reclamation (Mitigation Measure BIO-B: Hazardous Materials).

Response to Comment 1-7

On January 23, 2008, Reclamation initiated National Historic Preservation Action (NHPA) Section 106 Consultation with the California State Historic Preservation Officer (SHPO). Reclamation concluded that both Phase 1 and Phase 2 of the Proposed Project/Action would not result in an effect to historic properties. Additionally, MFWC would be required to implement Mitigation Measure 2.5.2, identified on Page 2-22 of the Draft IS/EA, that includes measures for the accidental discovery of subsurface resources, such as ships, and requirements for monitoring and reporting of such discoveries. No additional analysis or mitigation is required.

Response to Comment 1-8

The list of equipment and personnel provided in Table 2-2 of the Draft IS/EA is based on the best available information at the time of preparation of the Draft IS/EA and was developed for planning purposes to model construction emissions. The exact requirements for construction personnel and equipment for the construction phase will likely not be known until the completion of construction activities. As a result, the emissions modeling described on page 4-9 of the Draft IS/EA represents a good faith effort in determining the air quality impacts of project construction activities based on the best available information. Therefore, additional modeling of construction emissions is not required.

Page 4-27 of the Draft IS/EA provides an analysis of greenhouse gas (GHG) emissions. It is noted that the Proposed Project/Action would result in minor emissions of GHGs associated with construction and operational activities. Construction phase emissions would result in short term less than significant CO₂ emissions associated with combustion of gasoline and diesel fuel during the trenching, grading, clearing, and other site preparation activities. Operation of the Proposed Project/Action would result in the consolidation of existing intake facilities and would likely result in similar to, or less than, operational emissions when compared to existing conditions. Lastly, both construction and operational GHG emissions would be intermittent and would be less than the lower reporting limit for major stationary sources established by the California Air Resources Board and the EPA, which typically include fossil fuel burning power plants, petroleum refineries, petrochemical plants, and food processing plants. As a result, the Proposed Project/Action does not represent a major source of GHG emissions.

Response to Comment 1-9

Page 3-27 of the Draft IS/EA provides a discussion of the recreational setting of the project area. The closest recreational facility to the project area is Lovey's Landing. The facility is approximately 2.7 miles north of Meridian on Levee Road along the Sacramento River. It provides recreational facilities such as a boat launch ramp and a RV campground (Sutter County General Plan, 2008).

In-water construction activities would include the use of a temporary sheetpiles for the installation of the coffer dams and floating equipment, such as barges, along the east bank of the river. In river construction could temporarily restrict Sacramento River recreational use but would not restrict use across the entire width of the river. Because of the limited and temporary nature of construction activities within the Sacramento River, recreational impacts would be less than significant.

Installation and operation of the proposed diversion may restrict recreational boating in the area of the proposed diversion but would not eliminate access to the Sacramento River. Additionally, because the project represents the consolidation existing diversions, there would be no increase in any reduction of recreational boating access in the project vicinity.

Pedestrian access to levee banks directly adjacent to the proposed diversion could be restricted by project-related security fencing and/or other barriers. However, this is consistent

with operational conditions at existing facilities, where public access is prohibited. As a result, project operations would not interfere with existing recreational opportunities or facilities and would be less than significant. No additional analysis or mitigation is required.

Response to Comment 1-10

CEQA Guidelines Section 15130(a) states where a lead agency is examining a project with an incremental effect that is not “cumulatively considerable,” a lead agency need not consider that effect significant, but shall briefly describe its basis for concluding that the incremental effect is not cumulatively considerable. The basis for this finding is described under Checklist Item 19b on page 4-43 of the Draft IS/MND. CEQA Guidelines § 15355 defines cumulative impacts as “two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts.” Because all potentially significant environmental impacts that could occur as a result of the Proposed Project/Action would be reduced to a less than significant level through implementation mitigation measures, there are no incremental effects that are cumulatively considerable. No additional analysis is required.

Letter 2



Central Valley Regional Water Quality Control Board

27 August 2012

Tracy McReynolds
Department of Fish and Game
629 Entler Avenue, Suite 12
Chico, CA 95928

CERTIFIED MAIL
7011 2970 0003 8939 2283

COMMENTS TO THE DRAFT MITIGATED NEGATIVE DECLARATION, PHASE 2 MERIDIAN FARMS FISH SCREEN PROJECT, SCH NO. 2012082032, SUTTER COUNTY

Pursuant to the State Clearinghouse's 8 August 2012 request, the Central Valley Regional Water Quality Control Board (Central Valley Water Board) has reviewed the *Draft Mitigated Negative Declaration* for the Phase 2 Meridian Farms Fish Screen Project, located in Sutter County.

Our agency is delegated with the responsibility of protecting the quality of surface and groundwaters of the state; therefore our comments will address concerns surrounding those issues.

Construction Storm Water General Permit

Dischargers whose project disturb one or more acres of soil or where projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the General Permit for Storm Water Discharges Associated with Construction Activities (Construction General Permit), Construction General Permit Order No. 2009-009-DWQ. Construction activity subject to this permit includes clearing, grading, grubbing, disturbances to the ground, such as stockpiling, or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility. The Construction General Permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP).

For more information on the Construction General Permit, visit the State Water Resources Control Board website at:
http://www.waterboards.ca.gov/water_issues/programs/stormwater/constpermits.shtml.

2-1

KARL E. LONGLEY ScD, P.E., CHAIR | PAMELA C. CREEDON P.E., BCEE, EXECUTIVE OFFICER
11020 Sun Center Drive #200, Rancho Cordova, CA 95670 | www.waterboards.ca.gov/centralvalley

♻️ RECYCLED PAPER

Letter 2

Phase 2 Meridian Farms Fish Screen Project
Butte County

- 2 -

27 August 2012

Phase I and II Municipal Separate Storm Sewer System (MS4) Permits¹

The Phase I and II MS4 permits require the Permittees reduce pollutants and runoff flows from new development and redevelopment using Best Management Practices (BMPs) to the maximum extent practicable (MEP). MS4 Permittees have their own development standards, also known as Low Impact Development (LID)/post-construction standards that include a hydromodification component. The MS4 permits also require specific design concepts for LID/post-construction BMPs in the early stages of a project during the entitlement and CEQA process and the development plan review process.

For more information on which Phase I MS4 Permit this project applies to, visit the Central Valley Water Board website at:

http://www.waterboards.ca.gov/centralvalley/water_issues/storm_water/municipal_permits/.

2-2

Industrial Storm Water General Permit

Storm water discharges associated with industrial sites must comply with the regulations contained in the Industrial Storm Water General Permit Order No. 97-03-DWQ.

For more information on the Industrial Storm Water General Permit, visit the Central Valley Water Board website at:

http://www.waterboards.ca.gov/centralvalley/water_issues/storm_water/industrial_general_permits/index.shtml.

2-3

Clean Water Act Section 404 Permit

If the project will involve the discharge of dredged or fill material in navigable waters or wetlands, a permit pursuant to Section 404 of the Clean Water Act may be needed from the United States Army Corps of Engineers (USACOE). If a Section 404 permit is required by the USACOE, the Central Valley Water Board will review the permit application to ensure that discharge will not violate water quality standards. If the project requires surface water drainage realignment, the applicant is advised to contact the Department of Fish and Game for information on Streambed Alteration Permit requirements.

If you have any questions regarding the Clean Water Act Section 404 permits, please contact the Regulatory Division of the Sacramento District of USACOE at (916) 557-5250.

2-4

Clean Water Act Section 401 Permit – Water Quality Certification

If an USACOE permit, or any other federal permit, is required for this project due to the disturbance of waters of the United States (such as streams and wetlands), then a Water Quality Certification must be obtained from the Central Valley Water Board prior to initiation of project activities. There are no waivers for 401 Water Quality Certifications.

¹ Municipal Permits = The Phase I Municipal Separate Storm Water System (MS4) Permit covers medium sized Municipalities (serving between 100,000 and 250,000 people) and large sized municipalities (serving over 250,000 people). The Phase II MS4 provides coverage for small municipalities, including non-traditional Small MS4s, which include military bases, public campuses, prisons and hospitals.

Letter 2

Phase 2 Meridian Farms Fish Screen Project - 3 -
Butte County

27 August 2012

Waste Discharge Requirements

If USACOE determines that only non-jurisdictional waters of the State (i.e., "non-federal" waters of the State) are present in the proposed project area, the proposed project will require a Waste Discharge Requirement (WDR) permit to be issued by Central Valley Water Board. Under the California Porter-Cologne Water Quality Control Act, discharges to all waters of the State, including all wetlands and other waters of the State including, but not limited to, isolated wetlands, are subject to State regulation.

2-5

For more information on the Water Quality Certification and WDR processes, visit the Central Valley Water Board website at:

http://www.waterboards.ca.gov/centralvalley/help/business_help/permit2.shtml.

If you have questions regarding these comments, please contact me at (916) 464-4684 or tcleak@waterboards.ca.gov.



Trevor Cleak
Environmental Scientist

cc: State Clearinghouse Unit, Governor's Office of Planning and Research, Sacramento

Letter 2: Central Valley Regional Water Quality Control Board

Response to Comment 2-1

Comment noted. As described on under Checklist Item 9a,f on page 4-31 of the Draft IS/EA, prior to construction MFWC would obtain a NPDES General Stormwater Permit, from the CVRWQCB. See also Response to Comment 1-6.

Response to Comment 2-2

The Proposed Project/Action would not discharge storm water into a MS4 conveyance or system and; therefore, a Phase 1 MS4 permit would not be required for project operation.

Response to Comment 2-3

The Proposed Project/Action is located on agricultural land; therefore, an Industrial Storm Water General Permit would not be required for project operation.

Response to Comment 2-4

Comment noted. As described under Checklist Item 9 a,f on page 4-32, and under Checklist Item 4d on page 4-20 and 4-21 (Mitigation Measure BIO-J), MFWC would obtain CWA Section 401 and 404 permits. See also Response to Comment 1-6.

Response to Comment 2-5

As described under Mitigation Measure BIO-J on page 4-20 and 4-21 of the Draft IS/EA, MFWC would obtain approval of Water Quality Certification under Section 401 of the CWA and/or Waste Discharge Requirements under the Porter-Cologne Act from the CVRWQCB for work within jurisdictional waters and/or waters of the state. See also Response to Comment 1-6.

Letter 3

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY

EDMUND G. BROWN Jr., Governor

DEPARTMENT OF TRANSPORTATION
DISTRICT 3—SACRAMENTO AREA OFFICE
2379 GATEWAY OAKS DRIVE, SUITE 150
SACRAMENTO, CA 95833
PHONE (916) 274-0635
FAX (916) 274-0602
TTY 711
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September 6, 2012

03-2012-SUT-0011
SUT-20-VAR
SCH#2012082032

Ms. Tracy McReynolds
Department of Fish and Game
629 Entler Ave. Suite 12
Chico, CA 95928

Draft Initial Study/Mitigated Negative Declaration (IS/MND) for Phase 2 Meridian Farm Fish Screen Project

Dear Ms. McReynolds:

Thank you for including the California Department of Transportation (Caltrans) in the environmental review process for the project referenced above. The proposed project proposes to remove the existing Meridian Diversion/Pumping Plant along the Sacramento River in the vicinity of the Town of Meridian, and replace it with a new diversion/pumping plant equipped with retractable cylindrical fish screens to preventing entrainment of migrating, at-risk, native fish species. The project would also include improvement of the Main Canal to increase flow capacity to the Drexler Service area. We have reviewed the Draft IS/MND and have the following comments to offer:

Drainage, Hydrology, and Water Quality

The Draft IS/MND document identifies that Siphon #2 is located within the Caltrans right of way (ROW) along State Route (SR) 20 (at approximately PM 0.57), however, it is unclear whether the Siphon #2 pipeline, headwall and endwall fully extends outside of Caltrans ROW.

The Draft IS/MND states the Main Channel will be widened both upstream and downstream of Siphon #2. Please clarify whether any work will be required within Caltrans ROW during the channel widening.

The IS/MND also states that the capacity of the channel upstream of Siphon #2 will be increased from 120 cubic feet per second (cfs) up to 135 cfs. However, Siphon #2 will not be replaced with a larger siphon pipeline to increase the capacity of the siphon.

3-1

"Caltrans improves mobility across California"

Letter 3

Ms. Tracy McReynolds/Department of Fish and Game
September 6, 2012
Page 2

Please provide more details for the proposed work in the "Main Channel", near SR 20 at Siphon #2. Also, please provide details indicating how the increase in discharge in the Main Channel will be controlled and or distributed so it does not create adverse hydraulic conditions at the SR 20 siphon (Siphon #2).

3-1
cont.

Transportation Management Plan (TMP)

If it is determined that traffic restrictions and detours are needed on or affecting State highways, a TMP or construction Traffic Impact Study may be required of the project proponent for approval by Caltrans prior to construction. TMPs must be prepared in accordance with Caltrans' *Manual on Uniform Traffic Control Devices*. Further information is available for download at the following web address:

<http://www.dot.ca.gov/hq/traffops/signtech/mutcdsupp/pdf/camutcd2012/Part6.pdf>

Please ensure that such plans are also prepared in accordance with the transportation management plan requirements of the corresponding jurisdictions. For further TMP assistance, please contact Bob McNew at (916) 859-7979.

3-2

Encroachment Permit

Please be advised that any work or traffic control that encroaches onto the State ROW requires an encroachment permit that is issued by Caltrans. To apply, a completed encroachment permit application, environmental documentation, and five (5) sets of plans clearly indicating State ROW must be submitted to the following address. Bruce Capaul, District Office Chief, Office of Permits, California Department of Transportation, District 3, 703 B Street, Marysville, CA 95901 or contact at (530) 741-4403. Traffic-related mitigation measures should be incorporated into the construction plans prior to the encroachment permit process. See the website linked below for more information.

<http://www.dot.ca.gov/hq/traffops/developserv/permits/>

If you have any questions regarding this letter, please contact Sukhi Johal of my staff by telephone at (530) 740-4843, or by email: sukhi.johal@dot.ca.gov.

3-3

Sincerely,



ERIC FREDERICKS, Chief
Office of Transportation Planning –South

"Caltrans improves mobility across California"

Letter 3: California Department of Transportation, District #3

Response to Comment 3-1

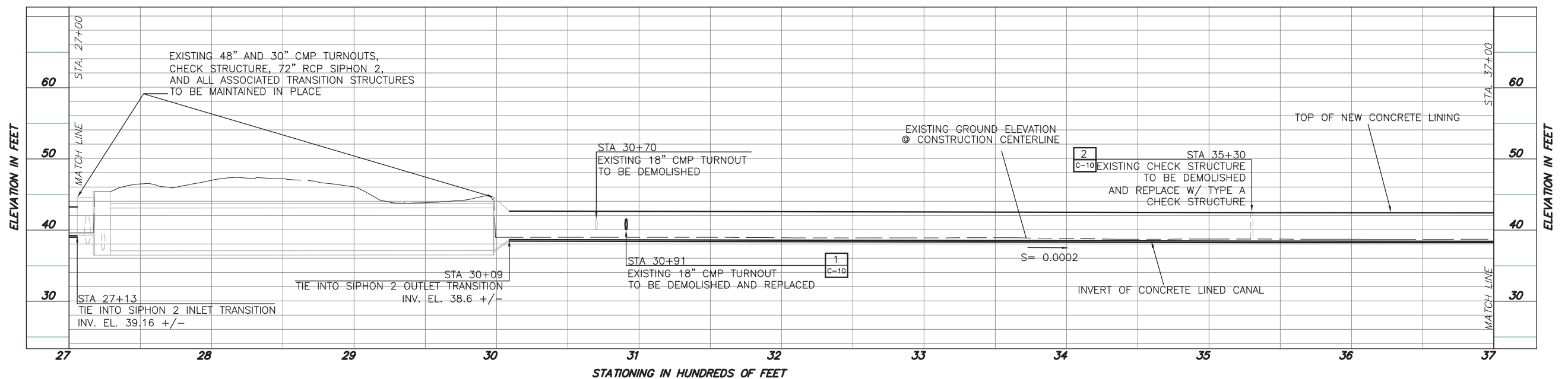
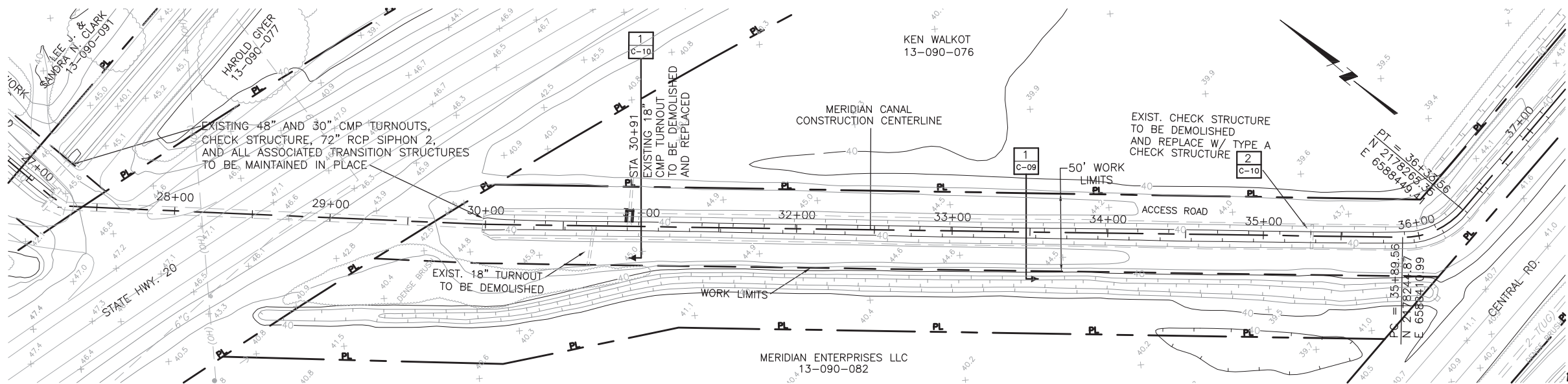
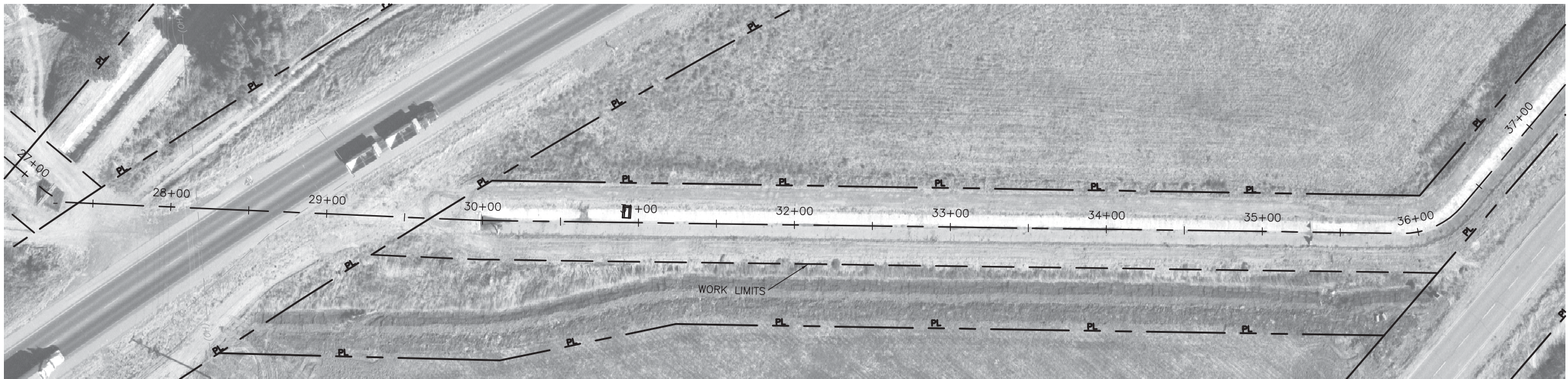
Siphon #2 would not be replaced and no work is needed within the Caltrans right of way. The siphon extends past the edge of the right of way on both ends. The attached figure shows planned work in the vicinity of Siphon #2.

Response to Comment 3-2

While no construction is proposed to occur within Caltrans right of way, Mitigation Measure TRAFFIC-2 on page 4-40 of the Draft IS/EA requires MFWC to prepare a Traffic Control Plan prior to the commencement of construction activities. The Traffic Control Plan would ensure uninterrupted access for emergency services vehicles, coordination with Sutter County for road closures, standards for the placement of construction signs, access for local land uses during construction, roadside safety, and a telephone resource to address public questions and complaints during project construction. No additional analysis or mitigation is required.

Response to Comment 3-3

No construction is proposed to occur within the Caltrans right of way.



Job No: 00000000
File:

REV	DATE	BY	DESCRIPTION

SCALE
HORIZ.: 1" = 40'
VERT.: 1" = 8'

WARNING
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

DESIGNED E. CLYDE
DRAWN B. FEDAK
CHECKED J. ATKINSON

SUBMITTED BY
(PROJECT MANAGER'S NAME)
J. ATKINSON
(COMPANY OFFICER'S NAME)
48630
LICENSE NO.
1/25/08
DATE

MWH
Sacramento, California

MERIDIAN FARMS WATER COMPANY
FISH SCREEN PROJECT

CIVIL
MAIN CANAL
PLAN AND PROFILE
SHEET
C-15



Phase 2 Meridian Farms Fish Screen Project

SCH Number: 2012082032

Document Type: NOD - Notice of Determination

Project Lead Agency: Fish & Game #2

Project Description

MFWC is proposing to remove the existing Meridian Diversion/Pumping Plant along the Sacramento River in the vicinity of the Town of Meridian, Sutter County CA and replace it with a new diversion/pumping plant equipped with retractable cylindrical fish screens to preventing entrainment of migrating, at-risk, native fish species. The project would also include improvement of the Main Canal to increase flow capacity to the Drexler Service area, extension of the Drexler Pipeline, and construction of a new Drexler re-lift pump station on the Main Canal east of the Sacramento River. The existing Drexler Diversion/Pumping Plant located south of the Meridian Diversion on the Sacramento River would be removed. The Proposed Project/Action would not increase MFWC's overall diversion capacity from the Sacramento River. All work would be performed in compliance with Reclamation Board, CDFG, NMFS, and the U.S. Fish and Wildlife Service requirements.

Contact Information

Primary Contact:

Tracy McReynolds
California Department of Fish and Game
530 895 5111
629 Entler Ave Suite 12
Chico, CA 95928

Project Location

County: Sutter
City:
Region:
Cross Streets: Multiple
Latitude/Longitude:
Parcel No: Multiple
Township:
Range:
Section:
Base:
Other Location Info: City/Nearest Community: Meridian

Determinations

This is to advise that the ☒ Lead Agency ☐ Responsible Agency California Department of Fish and Game has approved the project described above on 10/9/2012 and has made the following determinations regarding the project described above.

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 Statement of Overriding Considerations ☐ was ☒ was not adopted for this project.
5. Findings ☒ were ☐ were not made pursuant to the provisions of CEQA.

Final EIR Available at: 629 Enter Ave, Suite 12, Chico, CA 95928

Date Received: 10/11/2012

[CEQAnet HOME](#) | [NEW SEARCH](#)

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

From:

Public Agency: CA Department of Fish & Game

Address: 629 Entler Ave, Suite 12

Chico, CA 95928

Contact: Tracy McReynolds

Phone: 530-895-5111

☒ County Clerk

County of: Sutter

Address: 433 2nd Street, Yuba City, CA 95991

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): 2012082032

Project Title: Phase 2 Meridian Farms Fish Screen Project

Project Applicant: Meridian Farms Water Company

Project Location (include county): Sutter County

Project Description:

See attached.

This is to advise that the California Department of Fish and Game has approved the above
(☒ Lead Agency or ☐ Responsible Agency)described project on 10/9/2012 and has made the following determinations regarding the above
(date)
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:

629 Entler Ave, Suite 12, Chico, CA 95928

Signature (Public Agency):



Title: EPM I

Date: 10/9/12

Date Received for filing at OPR:

RECEIVED

Authority cited: Sections 21083, Public Resources Code.
Reference Section 21000-21174, Public Resources Code.

OCT 11 2012

Revised 2011

STATE CLEARING HOUSE

Meridian Farms Fish Screen Project, Phase 2 – Project Description

MFWC is proposing to remove the existing Meridian Diversion/Pumping Plant along the Sacramento River in the vicinity of the Town of Meridian, Sutter County CA and replace it with a new diversion/pumping plant equipped with retractable cylindrical fish screens to preventing entrainment of migrating, at-risk, native fish species. The project would also include improvement of the Main Canal to increase flow capacity to the Drexler Service area, extension of the Drexler Pipeline, and construction of a new Drexler re-lift pump station on the Main Canal east of the Sacramento River. The existing Drexler Diversion/Pumping Plant located south of the Meridian Diversion on the Sacramento River would be removed. The Proposed Project/Action would not increase MFWC's overall diversion capacity from the Sacramento River. All work would be performed in compliance with Reclamation Board, CDFG, NMFS, and the U.S. Fish and Wildlife Service requirements.

MERIDIAN FARMS FISH SCREEN PROJECT

Action Specific Implementation Plan

Prepared for
Meridian Farms Water Company

February 2008

MERIDIAN FARMS FISH SCREEN PROJECT

Action Specific Implementation Plan

Prepared for
Meridian Farms Water Company

February 2008

8950 Cal Center Drive
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www.esassoc.com

Los Angeles

Oakland

Petaluma

Portland

San Diego

San Francisco

Seattle

Tampa

Woodland Hills



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CHAPTER 1

Introduction

This document is an Action Specific Implementation Plan (ASIP) which analyzes the potential environmental effects on aquatic and terrestrial species of the Meridian Farms Water Company (MFWC) proposed plan to construct positive barrier fish screen diversions on the Sacramento River and to modify their distribution system to accommodate the changed intakes. The MFWC Fish Screen and Diversion Project is divided into two phases, which are described in detail in Chapter 2. The ASIP is a product of the CALFED Bay-Delta Program (CALFED) and is meant to streamline the regulatory process for CALFED Actions. The MFWC Fish Screen and Diversion Project is included as a CALFED Action.

The CALFED Bay-Delta Program is a collaborative effort of more than 20 Federal and State agencies that seek to resolve water supply and water quality issues as well as restore ecological health of the San Francisco Bay-Delta. After assessing the effects of potential CALFED Actions on the environment, the CALFED agencies developed initial conservation measures that, when implemented, would meet the overall CALFED Program objectives. These are contained within the Multi-Species Conservation Strategy (MSCS).

The MSCS explains how CALFED Program Actions will comply with the Federal Endangered Species Act (FESA), California Endangered Species Act (CESA), and Natural Communities Conservation Planning Act (NCCPA) requirements. The U.S. Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration (NOAA) Fisheries used the MSCS as the program-level biological assessment to develop the programmatic Biological Opinions (BOs) for the CALFED Preferred Program Alternative. The California Department of Fish and Game (CDFG) used the MSCS for compliance with the CESA and NCCPA.

The MSCS contains a two-tiered approach to FESA, CESA, and NCCPA compliance that corresponds to the CALFED Program's two-tiered approach to compliance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). The first tier of compliance is embodied in the MSCS itself. For the CALFED Program's Project Actions identified in the Programmatic Environmental Impact Statement / Environmental Impact Report (PEIS/EIR) and Record of Decision (ROD), an ASIP is developed to address the FESA, CESA, and NCCPA consultation requirements of Federal and State agencies. As a second tier document, this ASIP focuses on issues specific to MFWC's Fish Screen and Diversion Project (Proposed Project/Action). Therefore, this ASIP addresses the biological assessment requirements related to the Proposed Project/Action described in Chapter 2. The USFWS and NOAA Fisheries may use this ASIP for informal consultation and/or to develop action-specific BOs relative to the Proposed Project/Action. The CDFG will use this ASIP to address compliance with the CESA and NCCPA.

1.1 Project Background

The MFWC is located in Sutter County, between Interstate 5 and Highway 99, east of the Sacramento River and southwest of the Sutter Bypass. **Figure 1-1** depicts the approximate limits of the MFWC Service Area. MFWC provides irrigation water to three distinct Service Areas encompassing approximately 9,150 acres, with an estimated annual water delivery of 35,000 acre-feet (af). The water service is provided by surface water diversions from the Sacramento River, drain water reuse, and groundwater pumping. Both lined and unlined canals are used for water conveyance. As irrigation water circulates through the canals and laterals, drainage water is collected and pumped into the conveyance facilities via re-lift pumps, providing a blend with better quality irrigation water from the Sacramento River.

MFWC diverts surface water from the Sacramento River under the provisions of a License for Diversion and Use of Water with a priority date of September 10, 1918. Presently MFWC diversions are at three locations on the Sacramento River: Meridian, Drexler, and Grimes. These diversions utilize unscreened intakes which likely entrain juvenile Chinook salmon, steelhead trout, green sturgeon, and other anadromous fish species that pass by the intake. Improvements to these diversions would fulfill conservation goals established by the CVPIA, which passed in 1992 for the protection and recovery of fisheries and fish habitat.

1.1.1 Project Overview

The primary purpose of the Proposed Project/Action is to prevent entrainment of migrating, at-risk, native fish species at MFWC's existing diversion facilities by removing one intake and installing fish screen structures at the other two intakes. Each existing pump utilizes an unscreened intake which likely entrains juvenile Chinook salmon and steelhead trout, green sturgeon and other fish species. Consequently, the continued operation of the MFWC diversion facilities likely remove some of the salmonid and sturgeon out-migrants from the mainstem of the Sacramento River. Under the CVPIA, the diversion pumps are now required to operate without causing detrimental effects to migrating fish; therefore, it is essential that fish screens be installed at the water intakes. As the existing diversion or pump station facilities cannot be retrofitted with a fish screen that would comply with CDFG and NOAA Fisheries criteria, MFWC will construct new positive barrier fish screen diversions that meet these criteria. Positive barrier fish screens will physically prevent fish from passing through the intake; these differ from behavioral barrier fish screens which encourage fish to swim away from a structure.

The Proposed Project/Action will allow migrating Chinook salmon, steelhead trout, and green sturgeon to pass by the intake without risk of entrainment and, thus, contribute to the recovery of the anadromous and resident fish populations in the Sacramento River. The Proposed Project/Action will also allow MFWC to continue the diversions even while listed species are present in the vicinity of the diversion, enabling MFWC to provide a reliable long-term water supply to the MFWC Service Area in a manner that complies with present regulatory requirements.

The Proposed Project/Action is composed of several components, which were defined through a March 2002 Feasibility Study and subsequently selected as part the preferred project alternative by the MFWC Board of Directors. MFWC proposes to implement these components, which include the fish screen improvements and other associated conveyance improvements, in two separate phases. Each phase is independent of the other, and each will benefit fish species. The implementation of the Proposed Project/Action in two separate phases is more economically feasible and would coordinate better with MFWC operations. The components of these phases are listed in **Table 1-1** and each component is detailed in Chapter 2.

The Proposed Project/Action Area (Action Area) is defined to include all components of the Proposed Project/Action plus a 200' buffer of these components. On the landward side of the levee along the Sacramento River, no direct or indirect effects are anticipated outside this 200' zone due to the localized and temporary disturbance of the Proposed Project/Action upon the habitat. Similarly, on the riverside of the levee along the Sacramento River, no direct or indirect effects are anticipated within this 200' zone. The benefits resulting from implementation of the Proposed Project/Action, however, extend beyond the Action Area to include the entire Sacramento River migration corridor for fishes, from the Delta to spawning areas upstream from the Action Area. Implementation of the Proposed/Action would benefit fish populations by decreasing fish entrainment in diversions on the Sacramento River.

**TABLE 1-1
MFWC PROPOSED PROJECT/ACTION
COMPONENTS**

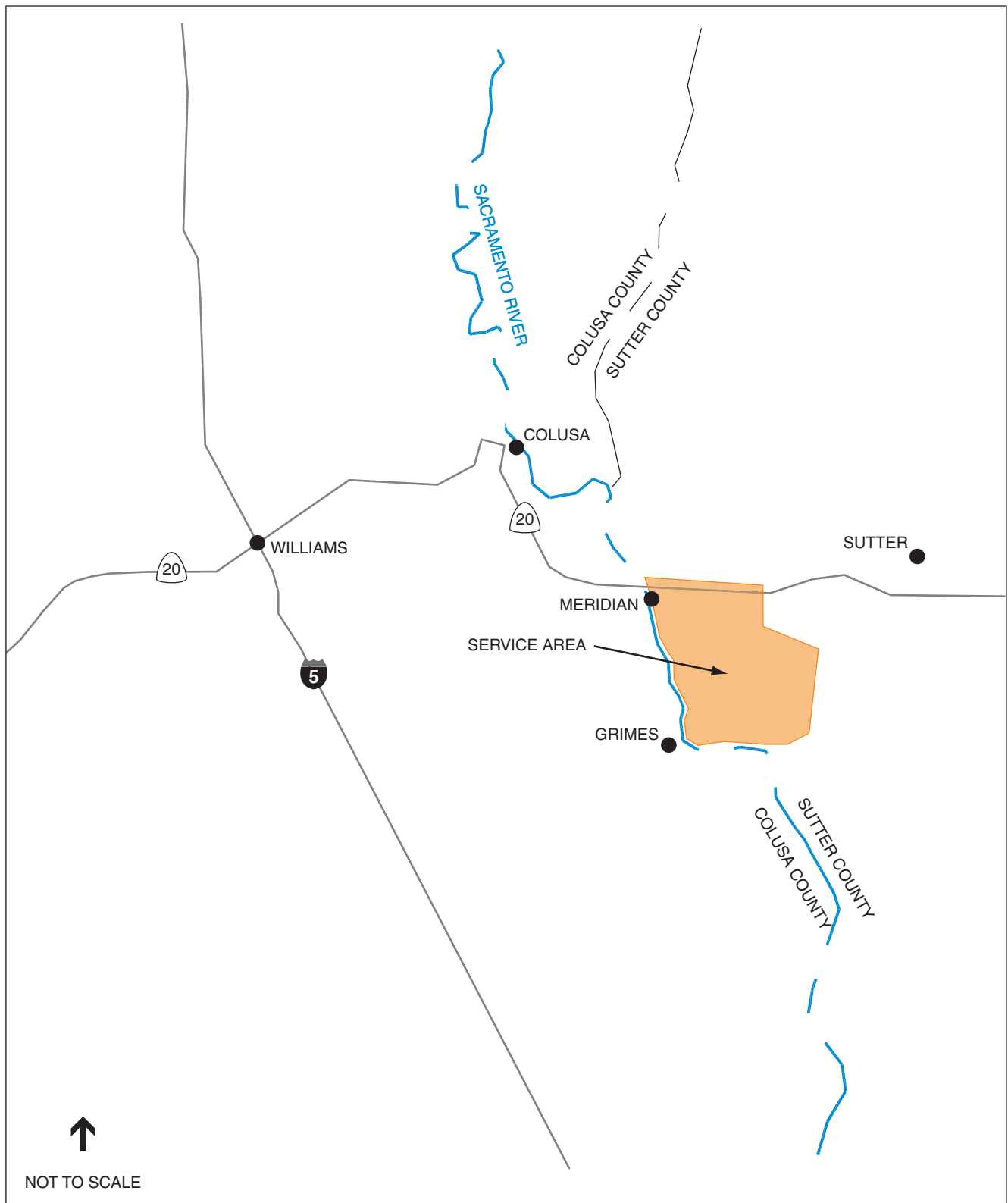
PHASE 1
New Grimes Diversion/Pumping Plant
New Grimes Pipeline and Canal Modifications
Removal of Existing Grimes Diversion/Pumping Plant
Drexler Pipeline
PHASE 2
New Meridian Diversion/Pumping Plant
Removal of Existing Meridian Diversion/Pumping Plant
Main Canal Modifications
Drexler Pipeline (option)
New Drexler Re-lift Pumping Plant
Removal of Existing Drexler Diversion/Pumping Plant

1.1.2 Current Management Direction

Currently, MFWC provides water to farmers for irrigation of their crops. There are 146 individual fields within the MFWC water Service Area. In the year 2000, approximately 63 percent of the irrigated area comprised of rice, which was the predominant grain crop. Safflower and tomatoes are also important crops with each comprising approximately 10 percent of the cropping pattern during

the same year. Permanent tree crops (orchards) encompass about eight percent of the planted area, with walnuts being the predominant crop. In 2007, the predominant crops were wheat, rice, walnuts, and tomatoes. Other crops included beans, alfalfa, hay, and persimmon and chestnut orchards.

MFWC's goals are to be able to maintain water diversion operations while avoiding entrainment of listed fish species present near the water intake. MFWC will achieve this goal by decommissioning and relocating the existing Grimes pumping plant and replacing the existing Meridian and Drexler facilities with a newly consolidated facility that complies with CDFG and NOAA Fisheries fish screen standards. The amount of water diverted from the Sacramento River will not increase as a result of the Proposed Project/Action to construct new facilities, as the existing facilities will be removed.



SOURCE: MWH, 2004; and ESA, 2007

Meridian Farms Water Company – Fish Screen Project . 203104

Figure 1-1
Project Location Map

1.1.3 Implementing Entities

Both Federal and State agencies are involved in administering the MFWC Fish Screen Project. The U.S. Bureau of Reclamation (Reclamation) is the federal agency under NEPA, and the California Department of Fish and Game (CDFG) is the state lead under CEQA. The Project/Action may involve the use of federal funds from Reclamation, and Reclamation would be responsible for administering those funds.

The State and Federal agencies – USFWS, NOAA Fisheries, and CDFG – act as regulatory agencies and are responsible for making recommendations for actions to be taken to protect fish populations and special status wildlife and plant species. Reclamation, as the lead agency implementing CALFED, helps to coordinate agency consultation throughout the ASIP process. As MFWC would construct, own, and operate the new facilities in the Project, MFWC would be responsible for implementing operational changes based on the recommendations.

1.1.4 ASIP Contents

To fulfill the requirements of FESA Section 7 and California Fish and Game Code Sections 2835 and 2081, as applicable, the MFWC Fish Screen ASIP includes the following information pursuant to the November 2001 Guide to Regulatory Compliance for Implementing CALFED Actions (CALFED, 2001b).

- A detailed project description (Proposed Project/Action – Chapter 2);
- A list of covered species and any other special-status species that may occur in the Action Area (Chapter 3);
- A discussion of essential habitat (Chapter 3);
- The analysis identifying the direct, indirect, and cumulative impacts on the covered species, other special-status species occurring in the Action Area (along with an analysis of impacts on any designated Critical Habitat) likely to result from the Proposed Fish Screen Project, as well as actions related to and dependent on the Proposed Project/Action (Chapter 4);
- The analysis identifying the direct, indirect, and cumulative impacts on Natural Community Conservation Planning (NCCPA) communities occurring in the Action Area likely to result from the Proposed Fish Screen Project, as well as actions related to and dependent on the Proposed Project/Action (Chapter 5);
- The conservation measures that the Proposed Project/Action agencies will undertake to minimize adverse effects to species (Chapters 2 and 4), and as appropriate, measures to enhance the condition of NCCPA communities (Chapters 2 and 6) and covered species along with a discussion of:
 - A plan to monitor the impacts and the implementation and effectiveness of these measures (Chapter 7), and
 - The procedures to address changed circumstances (Chapter 8);

- The measures that the Proposed Project/Action agencies will undertake to provide commitments to cooperating landowners that the Proposed Project/Action will not alter their land classification (Chapter 9);
- The alternative Actions considered by the Proposed Project/Action agencies that would not result in adverse effects, and the reasons why such alternatives are not being utilized (Chapter ?);
- The additional measures USFWS, NOAA Fisheries, and CDFG may require as necessary or appropriate for compliance with FESA, CESA, and NCCPA; and a description of how and to what extent the action or group of actions addressed in the ASIP will help the CALFED Program to achieve the MSCS's goals for the affected species (Chapters 4, 6, and 8).

1.2 ASIP Process

The ASIP process is directly related to the relationships between the FESA, CESA, and State NCCPA. If neither the programmatic BOs nor the programmatic NCCPA determination for the CALFED Program authorizes incidental take of MSCS-covered species, ASIPs, which serve as individual consultation documents, are required for each Project or Action. Take authorization for implementing CALFED Program Actions follow a simplified compliance process that tiers from the MSCS and programmatic determinations. CDFG may authorize incidental take of State-listed Endangered, Threatened, or Candidate species through a CDFG Consistency Determination (Fish and Game Code 2081(b)). The entity implementing CALFED Program Actions (Reclamation) will coordinate the development of the ASIP with USFWS, NOAA Fisheries, and CDFG to ensure that the ASIP incorporates appropriate conservation measures for the Proposed CALFED Program Actions consistent with the MSCS.

The CALFED Program MSCS evaluates 244 species and 20 natural communities. Included within the MSCS are species identified by USFWS, NOAA Fisheries, and CDFG that are covered under BOs and NCCPA determination. An ASIP is prepared for FESA-, CESA-, and NCCPA-covered species. In the case of the MFWC Project, the ASIP will be used for informal or formal consultation on CESA species. Effects to FESA- and CESA-covered species are addressed in this ASIP, and typically the species evaluated will be a subset of the overall 244 species included in the MSCS.

1.2.1 Informal and Formal Consultation Processes

ASIPs are developed for individual CALFED Program Actions or groups of Actions when enough detailed information about the actions is available to fully analyze their impacts on covered species and habitats. Informal consultation is conducted in coordination with the development of an ASIP. Pursuant to the FESA, the Fish and Wildlife Coordination Act, and the Magnuson-Stevens Fisheries Conservation and Management Act (MSFCMA) regarding Essential Fish Habitat (EFH), the lead Project agency (Reclamation) has organized meetings throughout the development of the ASIP to (1) identify covered species and endangered, threatened, and proposed or candidate species that may occur in the Action Area; (2) develop an appropriate approach for assessing species listed and proposed for listing as part of the Section 7 consultations required by FESA; and (3) determine to what extent the action may affect any of the identified species, including impacts to EFH.

The MFWC Project ASIP is submitted on behalf of Reclamation to USFWS, NOAA Fisheries, and CDFG to consult with these agencies on the potential for the Proposed Project/Action to affect special-status species. USFWS and NOAA Fisheries will review the ASIP for compliance with FESA, under Section 7. NOAA Fisheries will also review the ASIP for compliance with the MSFCMA. The conclusion of the formal consultation process is for USFWS and NOAA Fisheries to prepare BOs on the species that the action is likely to adversely affect. As part of these BOs, USFWS and NOAA Fisheries may authorize incidental take of endangered and threatened species. For this project, a NCCP is not required by CDFG because the project would not result in a change in land use within the Water District Service Area. The ASIP will be used to meet its requirements under CESA, including consideration of species listed for protection under CESA and NCCPA. Acceptance of the ASIP will fulfill CDFG's requirements for a Consistency Determination under Fish and Game Code Section 2081.

1.2.3 Consultation to Date

An official list of threatened and endangered species that may occur within the Action Area and vicinity was generated online from the Sacramento Fish and Wildlife Office website. The California Natural Diversity Database (CNDDB) and California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants were also queried for special-status species that may occur in the Proposed Project/Action and surrounding area. The USGS 7.5-minute quadrangles that were considered include: Grimes, Kirkville, Dunnigan, Arbuckle, Colusa, Wildwood School, Tisdale Weir, Sutter Buttes, and Meridian, CA. The USFWS custom list and consultation letter (USFWS, 2007), and the CNDDB (CDFG, 2007) and CNPS (CNPS, 2007) species lists are included in **Appendix A**. There has been informal consultation with both USFWS and NOAA Fisheries throughout the development of the ASIP.

For implementation of the Proposed Project/Action to be economically feasible and for ease of coordination, consultation on the project will occur separately for each phase. This ASIP analyzes Phase 1 effects in the level of detail necessary for consultation on Phase 1. Consultation for Phase 2 will require more project specific analysis and will occur at a later date. No consultation on Phase 2 is requested at this time.

1.2.4 Compliance with Federal Endangered Species Act

USFWS and NOAA Fisheries share responsibility for administering FESA. NOAA Fisheries is primarily responsible for implementing FESA on behalf of marine fishes and mammals, including migratory or anadromous fish species such as salmon, steelhead, and green sturgeon. USFWS is primarily responsible for non-marine species. The FESA section 7(a)(2) consultation requirement is meant to ensure that any action authorized, funded, or carried out by any Federal agency is not likely to jeopardize the continued existence of any covered species or result in the destruction of Critical Habitat. Typically, in order to comply with this regulation, a biological assessment (BA) is prepared to analyze effects on listed and proposed species and designated and proposed Critical Habitat. This ASIP is intended to function as a BA and fulfill the requirements of the MFWC Action agencies pursuant to the FESA as amended.

1.2.5 Compliance with Magnuson-Stevens Fisheries Conservation and Management Act

Public Law 104-297, the Sustainable Fisheries Act of 1996, amended the MSFCMA to establish new requirements for EFH descriptions in federal Fisheries Management Plans (FMPs). The MSFCMA, which was reissued in 2006, requires all fishery management councils to amend their FMPs to describe and identify EFH for each managed fishery. The EFH assessment is meant to determine whether a Proposed Project/Action may adversely affect a designated EFH for federally managed species in the Action Area. In California, there are three FMPs that cover coastal pelagic species, groundfish, and Pacific salmon. In consideration of the Proposed Project/Action, the Pacific Chinook salmon and steelhead have potential to be affected. These effects will be addressed in this document.

In addition, the MSFCMA requires federal agencies to consult with NOAA Fisheries on activities that may adversely affect EFH. The MSFCMA contains procedures to identify, conserve, and enhance EFH. NOAA Fisheries is required to provide EFH conservation and enhancement recommendations to Federal and State agencies for actions that adversely affect EFH. This ASIP will meet all the compliance requirements that have been identified for consulting with NOAA Fisheries on effects to EFH.

1.2.6 Compliance with California Endangered Species Act and Natural Community Conservation Plan

The CESA (CDFG Code Sections 2050-2097) is similar to the FESA. The California Fish and Game Commission is responsible for maintaining lists of threatened and endangered species under the CESA, which prohibits the “take” of listed and candidate species. “Take” as defined under California law is to “hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill” (CDFG Code Section 86). To this date, there are several State-listed species – primarily salmonid fish species – that may occur within the Action Area; therefore, a CDFG Consistency Determination (CDFG code 2081) authorizing incidental take of State-listed species may be required for the Proposed Project/Action.

The California Natural Community Conservation Planning Act (NCCPA) (California Fish and Game Code, section 2800, et seq.) was enacted to form a basis for broad-based planning to provide for effective protection and conservation of the State’s wildlife heritage, while continuing to allow appropriate development and growth. State of California NCCPA General Process Guidelines define an NCCPA as “...a plan for the conservation of natural communities that takes an ecosystem approach and encourages cooperation between private and governmental interests. The plan identifies and provides for the regional or area-wide protection and perpetuation of plants, animals, and their habitats, while allowing compatible land use and economic activity. An NCCPA seeks to anticipate and prevent the controversies caused by species’ listings by focusing on the long-term stability of natural communities” (CDFG, 2000b).

The purpose of natural community conservation planning is to sustain and restore those species and their habitat identified by CDFG that are necessary to maintain the continued viability of biological communities impacted by human changes to the landscape. An NCCPA identifies and provides for those measures necessary to conserve and manage natural biological diversity within the plan area while allowing compatible use of the land.

On February 2, 2002, SB 107 was signed by Governor Gray Davis, which repealed and replaced the NCCPA with a new NCCPA. Although SB 107 became effective on January 1, 2003, the MSCS will continue to be in-effect as an approved NCCP, in accordance with Section 2830 (c) of the same bill.

This ASIP is a multi-purpose project-level document that is intended to streamline the environmental regulatory process for CALFED Program Actions. The Proposed Project/Action is such an action, as it will protect species covered under the MSCS. This ASIP provides all the information necessary to initiate project-level compliance with the FESA and NCCPA. Not only will this ASIP fulfill CDFG's requirements under Fish and Game Code Sections 2835 and 2081, it will also include appropriate conservation measures relevant to the Proposed Project/Action.

1.3 Relationship to CALFED Program

The CALFED Program's purpose is to develop and implement a comprehensive, long-term plan that will restore ecological health to the Bay-Delta system and improve management of water for beneficial uses. The MFWC Project falls within one component of the overall CALFED Program strategy. CALFED agencies plan to address issues of the Bay-Delta region within the following categories: ecosystem quality, water quality, water supply reliability, and levee system integrity. CALFED agencies must consider important physical, ecological, and socioeconomic linkages between the problems and potential solutions in each of these resource categories. The CALFED planning effort was therefore divided into a three-phase cooperative planning process in order to facilitate determining the most appropriate strategy and actions to reduce conflicts in the Bay-Delta system.

The construction of fish screens that use the best available technology will eliminate fish passage barriers. The fish screens will be funded with federal funds from the CALFED Bay-Delta Authority (CBDA) and Reclamation would be responsible for administering those funds. Implementation of the Proposed Project/Action will help MFWC continue to draw water from the Sacramento River without entraining native fish species that may reside in the Sacramento River near, or which may pass by, the existing diversions.

1.4 Species Addressed in this ASIP

To comply with FESA, CESA, and NCCPA requirements, a list of special-status species is evaluated and presented in this ASIP. The following table (**Table 1-2**) lists the species with potential to occur in the Action Area, their Federal and State status, and how likely they are to occur in the Proposed Project/Action Area. Those species with potential to be affected by the Proposed Project/Action are shown in bold text and are addressed in more detail in Chapter 3.

**TABLE 1-2
SPECIES WITH POTENTIAL TO OCCUR IN THE ACTION AREA**

Scientific Name Common Name	Federal Status	State Status	CNPS Listing	Habitat Description / Blooming Period	Potential to Occur in the Action Area
Fish					
<i>Acipenser medirostris</i> North American green Sturgeon (Southern DPS)	FT	CSC	--	Spawns in large cobble in deep and turbulent river mainstem. The Southern DPS spawns in the Sacramento River basin and in the Sacramento-San Joaquin Delta and Estuary.	High. Migratory route in the Sacramento River; also provides suitable rearing habitat in riparian bank areas.
<i>Hypomesus transpacificus</i> Delta smelt	FT	CT	--	Found in the Sacramento-San Joaquin delta, Suisun bay, Carquinez Straight, and San Pablo Bay.	Unlikely. Project outside area designated as Critical Habitat project site does not have Critical Habitat for reproduction or cover. Project site likely outside of the upstream migratory extent.
<i>Oncorhynchus tshawytscha</i> Central Valley fall/late fall-run Chinook	FSC	CSC	--	Spawning in Sacramento River and associated tributaries, and in the San Joaquin River tributaries.	High. Migratory route in the Sacramento River; also provides suitable rearing habitat in riparian bank areas.
<i>Oncorhynchus mykiss</i> Central Valley steelhead	FT	--	--	Spawns in Sacramento River and tributaries where gravelly substrate and suitable water conditions occur.	High. Migratory route in the Sacramento River; also provides suitable rearing habitat in riparian bank areas.
<i>Oncorhynchus tshawytscha</i> Central Valley spring-run Chinook	FT	CT	--	Spawns in Sacramento River and few select tributaries where gravelly substrate and suitable water conditions occur.	High. Migratory route in the Sacramento River; also provides suitable rearing habitat in riparian bank areas.
<i>Oncorhynchus tshawytscha</i> Sacramento River winter-run Chinook	FE	CE	--	Spawns primarily in upper reaches of the mainstem Sacramento River.	High. Migratory route in the Sacramento River; also provides suitable rearing habitat in riparian bank areas.
<i>Pogonichthys macrolepidotus</i> Sacramento splittail	FSC	CSC	--	Endemic to the Central Valley. Spawns in freshwater in areas with submerged vegetation. Tolerant of moderate salinities, adults are found primarily in the Delta and Suisun Bay and Marsh, but have been found as far upstream as Red Bluff Diversion Dam on the Sacramento River.	Moderate. May migrate through project area during years of high flows.

**TABLE 1-2
SPECIES WITH POTENTIAL TO OCCUR IN THE ACTION AREA**

Scientific Name Common Name	Federal Status	State Status	CNPS Listing	Habitat Description / Blooming Period	Potential to Occur in the Action Area
Reptiles					
<i>Thamnophis gigas</i> Giant garter snake	FT	CT	--	Generally inhabits marshes, sloughs, ponds, slow-moving streams, ditches, and rice fields which have water from early spring through mid-fall, emergent vegetation (such as cattails and bulrushes), open areas for sunning, and high ground for hibernation and escape cover.	Moderate. Limited aquatic habitat in the Main Canal, in adjacent Reclamation drains, or within adjacent seasonally inundated rice fields. Potential upland habitat in unpaved areas up to 200' from aquatic habitat.
Amphibians					
<i>Ambystoma californiense</i> California tiger salamander	FT	CSC	--	Annual grassland and grassy understory of valley-foothill hardwood habitats in central and northern California. Needs underground refuges and vernal pools or other seasonal water sources.	Unlikely. No suitable habitat within or adjacent to the project site.
<i>Rana aurora draytonii</i> California red-legged frog	FT	CSC	--	Breeds in slow moving streams with deep pools, ponds, and marshes with emergent vegetation.	Unlikely. No suitable habitat within or adjacent to the project site.
<i>Spea (=Scaphiopus) hammondi</i> Western spadefoot toad	--	CSC	--	Occurs seasonally in grasslands, prairies, chaparral, and woodlands, in and around wet sites. Breeds in shallow, temporary pools formed by winter rains. Takes refuge in burrows.	Unlikely. No suitable habitat within or adjacent to the project site.
Birds					
<i>Agelaius tricolor</i> Tricolored blackbird	--	CSC	--	Nests in dense thickets of cattails, tules, willow, blackberry, wild rose, wheat and barley crops, and other tall herbs near fresh water.	Unlikely. Marginal riparian nesting habitat along Sacramento River banks. However, no suitable nesting habitat in the immediate vicinity of the project.
<i>Ardea alba</i> (nesting) Great egret	--	--	--	Colonial nester in large trees. Rookery sites located near marshes, tideflats, irrigated pastures and margins of rivers and lakes.	Unlikely. No suitable nesting habitat in the immediate vicinity of the project.
<i>Ardea herodias</i> (nesting) Great blue heron	--	--	--	Colonial nester in tall trees, cliff sides and isolated marsh habitats.	Unlikely. No suitable nesting habitat in the immediate vicinity of the project.

**TABLE 1-2
SPECIES WITH POTENTIAL TO OCCUR IN THE ACTION AREA**

Scientific Name Common Name	Federal Status	State Status	CNPS Listing	Habitat Description / Blooming Period	Potential to Occur in the Action Area
<i>Athene cunicularia</i> Western burrowing owl	--	CSC	--	Utilizes ground squirrel (or other mammal) burrows within open grasslands, prairies, savanna, or agricultural fields.	Moderate. Potential nesting habitat along the perimeter of agricultural fields and along the banks/levees of the Sacramento River.
<i>Branta hutchinsii leucopareia</i> Cackling (=Aleutian Canada) Goose	FD	--	--	Breeds in open or forested areas near water. Often found in wetlands, grasslands, or cultivated fields during migration.	Moderate. The CNDDB (2006) records an occurrence near the project site. Marginal foraging habitat occurs in agricultural fields adjacent to project.
<i>Buteo swainsoni</i> Swainson's hawk	--	CT	--	Breeds in California's Central Valley. Winters primarily in Mexico. Typically nests in scattered trees or along riparian systems adjacent to agricultural fields or pastures.	Moderate. The CNDDB (2006) records an occurrence near the project site. Suitable nesting habitat occurs within trees along the Sacramento River and within the Action Area. The Action Area also provides foraging for this species.
<i>Carduelis lawrencei</i> Lawrence's goldfinch	--	--	--	Dry grassy slopes with weed patches, chaparral, and open woodlands; nests in trees or shrubs.	Unlikely. No suitable habitat within or adjacent to the project site.
<i>Charadrius montanus</i> Mountain plover (wintering)	--	CSC	--	In California, winters in open short grasslands and plowed agricultural fields in the Central Valley and in foothill valleys west of San Joaquin Valley, and in Imperial Valley. Winters below 1000 m (3200 ft).	Unlikely. Project area is outside of known species range.
<i>Coccyzus americanus occidentalis</i> Western yellow-billed cuckoo	FC	CE	--	Nests in extensive riparian forests (at least 40 hectares).	Unlikely. Riparian area surrounding project site is highly fragmented.
<i>Grus canadensis tabida</i> Greater sandhill crane	--	CSC	--	Open habitats, shallow lakes, and emergent wetlands. In winter also uses dry grasslands and croplands near wetlands.	Unlikely. No suitable habitat within or adjacent to the project site.
<i>Plegadis chihi</i> White-faced ibis	--	CSC	--	Nest and forages in freshwater marshes and rivers, respectively.	Unlikely. No suitable nesting habitat within or adjacent to the project site.
<i>Riparia riparia</i> (nesting) Bank swallow	--	CT	--	Nests in holes dug in sandy cliffs and river banks near water.	Low. Potential nesting habitat along the banks of the Sacramento River in the vicinity of the project.

Mammals

**TABLE 1-2
SPECIES WITH POTENTIAL TO OCCUR IN THE ACTION AREA**

Scientific Name Common Name	Federal Status	State Status	CNPS Listing	Habitat Description / Blooming Period	Potential to Occur in the Action Area
<i>Antrozous pallidus</i> Pallid bat	--	CSC	--	Prefers caves, crevices, hollow trees, or buildings in areas adjacent to open space for foraging. Associated with lower elevations in California.	Unlikely. No suitable roost or maternity sites occur in the immediate vicinity of the project.
<i>Dipodomys californicus eximius</i> Marysville California kangaroo rat	--	CSC	--	Needs friable soil, grass stages of chaparral. Only found in the area of the Sutter Buttes.	Unlikely. No suitable habitat within or adjacent to the project site.
<i>Lasiurus blossevillii</i> western red bat	--	--	--	Roosts primarily in trees, 2-40 feet above ground, from sea level up through mixed conifer forests. Prefers habitat edges and mosaics with trees that are protected from above and open below with open areas for foraging.	Unlikely. No suitable roost or maternity sites occur in the immediate vicinity of the project.
<i>Lasiurus cinereus</i> hoary bat	--	CSC	--	Prefers open habitats or habitat mosaics, with access to trees for cover and open areas or habitat edges for feeding. Roosts in dense foliage of medium to large trees. Feeds primarily on moths; requires water.	Unlikely. Limited roosting habitat within forested areas along the Sacramento River; however, dense foliage for roosting is not available in the Action Area.
<i>Myotis ciliolabrum</i> western small-footed myotis	--	--	--	In association with steep limestone outcrops and talus slopes. Forages over a wide range of habitats, mostly open, arid wooded and brushy uplands near water. Seeks cover in caves, buildings, mines and crevices.	Unlikely. No suitable roost or maternity sites occur in the immediate vicinity of the project.
<i>Perognathus inornatus inornatus</i> San Joaquin Pocket Mouse	--	--	--	Uses arid annual grassland, savanna, and desert scrub, with sandy washes, fine soils, and scattered vegetation between 1,100 and 2,000 feet in elevation.	Unlikely. Marginal vegetation along irrigation ditch and not within the required elevation range.
Invertebrates					
<i>Branchinecta conservatio</i> Conservancy fairy shrimp	FE	--	--	Lifecycle restricted to large, cool-water vernal pools with moderately turbid water.	Unlikely. No suitable habitat within or adjacent to the project site.
<i>Branchinecta lynchi</i> Vernal pool fairy shrimp	FT	--	--	Lifecycle restricted to vernal pools.	Unlikely. No suitable habitat within or adjacent to the project site.

**TABLE 1-2
SPECIES WITH POTENTIAL TO OCCUR IN THE ACTION AREA**

Scientific Name Common Name	Federal Status	State Status	CNPS Listing	Habitat Description / Blooming Period	Potential to Occur in the Action Area
<i>Cicindela hirticollis abrupta</i> Sacramento Valley (Hairy-necked) tiger beetle	--	--	--	Larvae and usually adults occur on sand bars, sandy shores, flood scours etc. immediately associated with rivers. Requires fine sand that is damp at, or a few centimeters below, the surface, and sparse or absent vegetation. Habitats must also not be subject to inundation for more than a few days at a time.	Unlikely. The project site habitat conditions are not suitable for this species.
<i>Desmocerus californicus dimorphus</i> Valley elderberry longhorn beetle	FT	--	--	Breeds and forages exclusively on blue elderberry shrubs (<i>Sambucus mexicana</i>) below 3,000 feet in elevation.	Unlikely. No elderberry shrubs with stems measuring at least one inch in diameter occur within 100 feet of the Proposed Project/Action.
<i>Lepidurus packardii</i> Vernal pool tadpole shrimp	FE	--	--	Found in vernal pools, swales, ephemeral drainages, stock ponds, reservoirs, or ditches.	Unlikely. No suitable habitat within or adjacent to the project site.
Vascular Plants					
<i>Astragalus tener</i> var. <i>ferrisiae</i> <i>Ferris's milk-vetch</i>	--	--	1B / (3-3-3)	Vernally mesic meadow and seeps, and sub alkaline flats in valley and foothill grasslands. 5-75 meters elevation. / April – May.	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Atriplex depressa</i> Brittlescale	--	--	1B / (2-2-3)	Chenopod scrub, valley and foothill grasslands, meadows and seeps / May – October.	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Atriplex joaquiniana</i> San Joaquin saltbrush	--	--	1B / (2-2-3)	Chenopod scrub, valley and foothill grasslands, meadows and seeps / April – October.	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>California macrophylla</i> Round-leaved filaree	--	--	2 / (2-3-1)	Valley grasslands and foothill woodlands, 0-3937 feet in elevation. / March – May.	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Cordylanthus palmatus</i> Palmate-bracted bird's beak	FE	CE	1B / (3-3-3)	Chenopod scrub, valley and foothill grasslands (alkaline) / May – October.	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Hibiscus lasiocarpus</i> Rose mallow	--	--	2 / (2-2-1)	Marshes and freshwater swamps / June – September.	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Lasthenia glabrata</i> ssp. <i>coulteri</i> Coulter's goldfields	--	--	1B / (2-3-2)	Annual herb occurring in coastal salt marshes and swamps, playas, and vernal pools. 1-1220 m elevation. / February – June.	Unlikely. No suitable habitat within the immediate vicinity of the project site.

**TABLE 1-2
SPECIES WITH POTENTIAL TO OCCUR IN THE ACTION AREA**

Scientific Name Common Name	Federal Status	State Status	CNPS Listing	Habitat Description / Blooming Period	Potential to Occur in the Action Area
<i>Layia septentrionalis</i> Colusa layia	--	--	1B / (2-2-3)	Annual herb occurring in chaparral, cismontane woodland, and valley and foothill grassland on sandy, serpentine substrate. 100-1095 m elevation / April – May.	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Navarretia leucocephala</i> ssp. <i>bakeri</i> Baker's navarretia	--	--	1B / (2-2-3)	Annual herb occurring in cismontane woodland, lower montane coniferous forest, meadows and seeps, Valley and foothill grassland, and vernal pools / May – July.	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Silene verecunda</i> ssp. <i>verecunda</i> San Francisco campion	--	--	1B / (3-2-3)	Perennial herb occurring in coastal bluff scrub, chaparral, coastal prairie, coastal scrub, and in Valley foothill grassland in sandy substrate. 30-645 m elevation / March – June (uncommon in August).	Unlikely. No suitable habitat within the immediate vicinity of the project site.
<i>Trichocoronis wrightii</i> var. <i>wrightii</i> Wright's Trichocoronis	--	--	2 / (3-3-1)	Primarily associated with alkali floodplains of the San Jacinto River in association with Willows, Domino, and Traver soils.	Unlikely. No suitable habitat within the immediate vicinity of the project site.

SOURCE: USFWS (07/2007), CDFG (07/2007), CNPS (07/2007).

Notes:

The "Potential for Effect" category is defined as follows:

Unlikely:	The project site and/or immediate area do not support suitable habitat for a particular species. Project site is outside of the species known range.
Low Potential:	The project site and/or immediate area only provide limited habitat for a particular species. In addition, the known range for a particular species may be outside of the Proposed Project/Action Area.
Moderate Potential:	The project site and/or immediate area provide suitable habitat for a particular species.
High Potential:	The project site and/or immediate area provide ideal habitat conditions for a particular species.

Species that have medium or high potential to be impacted by the proposed project are shown in boldface type.

STATUS CODES:

FEDERAL:

FE	=	Listed as "endangered" under the federal Endangered Species Act
FT	=	Listed as "threatened" under the federal Endangered Species Act
FSC	=	NOAA Fisheries designated "species of concern"
FPD	=	Proposed delisted
FD	=	Delisted

STATE:

CE	=	Listed as "endangered" under the California Endangered Species Act
CT	=	Listed as "threatened" under the California Endangered Species Act
CSC	=	California Department of Fish and Game designated "species of special concern"
CFP	=	California Department of Fish and Game designated "fully protected"

CNPS:

List 1B	=	Plants rare, threatened, or endangered in California and elsewhere
List 2	=	Plants rare, threatened, or endangered in California, but more common elsewhere
List 3	=	Plants about which we need more information--a review list
List 4	=	Plants of limited distribution--a watch list

1.4.1 Identification of Species Analyzed in Detail in the ASIP

Pursuant to Section 7(c) of FESA, a species list was requested from USFWS regarding any species listed or proposed for listing as Threatened or Endangered, including designated or proposed Critical Habitats under FESA, that may be present in the Action Area (USFWS, 2007). Additionally, a list of special-status species known to occur or with the potential to occur within the Action Area was compiled from a query of the California Natural Diversity Database (CNDDB) (CDFG, 2007) and the California Native Plant Society's Inventory of Rare and Endangered Plants (CNPS, 2007). Special-status fish, wildlife, and plant species considered in the MSCS (CALFED, 2001c) combined with the results from the species request lists and the database searches were used to generate a preliminary species list.

Initial screening of the overall species list eliminated from further consideration those species that only inhabited areas outside of the general Action Area. The second level of screening was based on species that occasionally visited (their life cycles are not dependent on) habitats affected by the MFWC Project/Action. These included mostly migratory species that may be observed infrequently in areas where the Proposed Project will occur. Finally, a focused list of Federal- or State-listed, Special-concern, or CALFED MSCS-covered species was compiled for detailed analysis in this ASIP and is included in Chapter 3. There are no candidate species potentially occurring in the Action Area.

1.4.2 Critical Habitat

Critical Habitat is designated in the Sacramento River within the project area for the listed Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead, which are presented in this ASIP. Although the Southern Distinct Population Segment (DPS) of the North American Green Sturgeon is federal-listed Threatened, Critical Habitat for this species has not yet been determined. Critical Habitat for vernal pool tadpole shrimp is designated within the region, but it is not included within the Action Area. The nearest Critical Habitat Unit for vernal pool tadpole shrimp is located approximately 3 miles northwest of shrimp in the Action Area. Details on the Critical Habitat designations are included in the species the Meridian Farms Service Area boundary. There is no suitable habitat for vernal pool tadpole descriptions in Chapter 3.

1.4.3 Essential Fish Habitat

The Action Area is within the region identified as Essential Fish Habitat (EFH) for Pacific salmon, including all Chinook salmon runs, in Amendment 14 of the Pacific Salmon FMP. This ASIP addresses potential effects of the MFWC Project on delineated EFH in the Sacramento River within the Action Area.

1.5 NCCPA Habitats

A total of 20 natural communities were analyzed on a broad, programmatic level in the MSCS – 18 habitats and 2 ecologically based fish groups. The term “NCCPA communities” refers to both habitats and fish groups. Of the 20 community types and fish groups, four are included in the Action Area and are evaluated in this ASIP. The others were not considered either because there was no such habitat in the Action Area or because the Proposed Project/Action would not affect the habitat. Although there is no estuarine habitat within the Action Area, this NCCPA Fish Group is included in the analysis in order to consistently analyze effects to a few estuarine fish species which may migrate through the Action Area. Descriptions of the two NCCPA Habitats and two NCCPA fish group are listed below (**Table 1-3**) and detailed in Chapter 5.

TABLE 1-3
NCCPA COMMUNITIES ANALYZED IN THIS ASIP

NCCPA Habitats	NCCPA Fish Groups
Valley Riverine Aquatic	Anadromous Fish Species
Valley/Foothill Riparian	Estuarine Fish Species

CHAPTER 2

Description of the Proposed Project/Action

The objective of the Proposed Project/Action is to ensure that no fish species are entrained in MFWC's diversion pumps, so that MFWC is in compliance with present regulatory requirements, including ESA compliance, and is able to continue to divert water for agricultural irrigation, avoiding effects to listed fisheries species that may be present near the diversions. Needed conveyance improvements related to the fish screen improvements are included within the Proposed Project/Action. This chapter describes the two phases of the Proposed Project/Action and existing conditions of Action Area, including the existing intake facilities. A description of the regulatory authorities that set the regulatory framework for the Proposed Project/Action is included. Conservation measures included with the Proposed Project/Action are described as well.

2.1 Authorities

2.1.1 Central Valley Improvement Act and Anadromous Fish Screen Program

On October 30, 1992, a multipurpose water law which contained 40 separate titles providing for water resource projects throughout the Western United States was established. Title 34, the CVPIA, mandates changes in management of the Central Valley Project, particularly for the protection, restoration, and enhancement of fish and wildlife. Under the CVPIA, a program dedicated to screening agricultural water diversions to protect anadromous fish in California's Central Valley was developed. The U.S. Department of the Interior established the Anadromous Fish Screen Program (AFSP) which satisfies section 3406(b)(21) of the CVPIA. CVPIA section 3406 (b)(21) states that the AFSP will "assist the State of California in efforts to develop and implement measures to avoid losses of juvenile anadromous fish resulting from unscreened or inadequately screened diversions on the Sacramento-San Joaquin Delta, and the Suisun Marsh. Such measures shall include but shall not be limited to construction of screens on unscreened diversions, rehabilitation of existing screens, replacement of existing non-functioning screens, and relocation of diversions to less fishery-sensitive areas. The Secretary's share of costs associated with activities authorized under this paragraph shall not exceed 50 percent of the total cost of any such activity."

The Proposed MFWC Project is consistent with the CVPIA Anadromous Fish Screen Program.

2.1.2 Endangered Species Acts

This ASIP is intended to provide all the necessary elements to comply with the FESA and CESA. Currently, there are eight species addressed within this ASIP that are identified as a listed species

or a candidate for listing, and two that have been delisted. The Central Valley steelhead is federal-listed threatened, and the Central Valley spring-run Chinook is both federal- and state-listed threatened. The Sacramento River winter-run Chinook salmon is federal- and state-listed endangered. The North American green sturgeon (Southern DPS) is federal-listed threatened. The giant garter snake is both federal- and state-listed threatened, and the Swainson's hawk is state-listed threatened. The bank swallow is state-listed threatened. The Central Valley fall/late fall-run Chinook salmon is a candidate for listing. The cackling goose and Sacramento splittail have been federally delisted, but the species still remain under scrutiny, and are therefore included in this ASIP. All of these species are covered in the MSCS.

2.2 Proposed Project/Action Area

The MFWC is located in Sutter County, between Interstate 5 and Highway 99, east of the Sacramento River and southwest of the Sutter Bypass. The approximate limits of MFWC Service Area are shown in **Figure 1-1**. MFWC provides irrigation water to three distinct Service Areas encompassing approximately 9,150 acres of mostly agricultural land, with an estimated annual water delivery of 35,000 acre-feet (af). Small areas of riparian forest, grassland, wetland and open water, as well as the small urban area of Meridian, are also included in the Service Area.

The Action Area includes the existing MFWC diversion facilities, locations of the proposed new and improved facilities, conveyance improvements, proposed construction equipment staging areas, and proposed grading and in-water construction locations. Areas within 200 feet of these project components are also included within the Action Area. Most of this area will not be affected by the Proposed Project/Action, but is included in order to analyze all potential effects resulting from the Proposed Project/Action. The Action Area is depicted in **Figure 2-1**.

Biological communities in the Action Area include valley riparian/Cottonwood riparian forest, annual grassland, and valley riverine habitat (Sacramento River). Agricultural land also provides habitat for wildlife. The Sacramento River provides freshwater habitat for fish, amphibians, reptiles, and waterfowl. Roads, levees, and agricultural activities have modified the adjacent riparian habitat. Inland project areas, beyond the Sacramento River and associated habitats, are characterized as agricultural (field crops and orchards). Human presence within the Action Area is minimal based on the surrounding land use, however river recreation activities increase during the late spring, summer and fall. **Figure 2-2**, **Figure 2-3**, and **Figure 2-4** depict the vegetation communities, including crop types, within the Action Area.

2.2.1 General Habitat

Valley Riparian/Cottonwood Riparian Forest

The valley riparian and riparian forest habitats are located adjacent to the Sacramento River system as it winds south along the western boundary of the MFWC Service Area, and much of the habitat is located within the flood plain of the levee system. Riparian areas with less mature canopy cover are dominated by narrow-leaf willow (*Salix exigua*) and black willow (*Salix gooddingii*), with occurrences of valley oak (*Quercus lobata*) and cottonwood (*Populus*

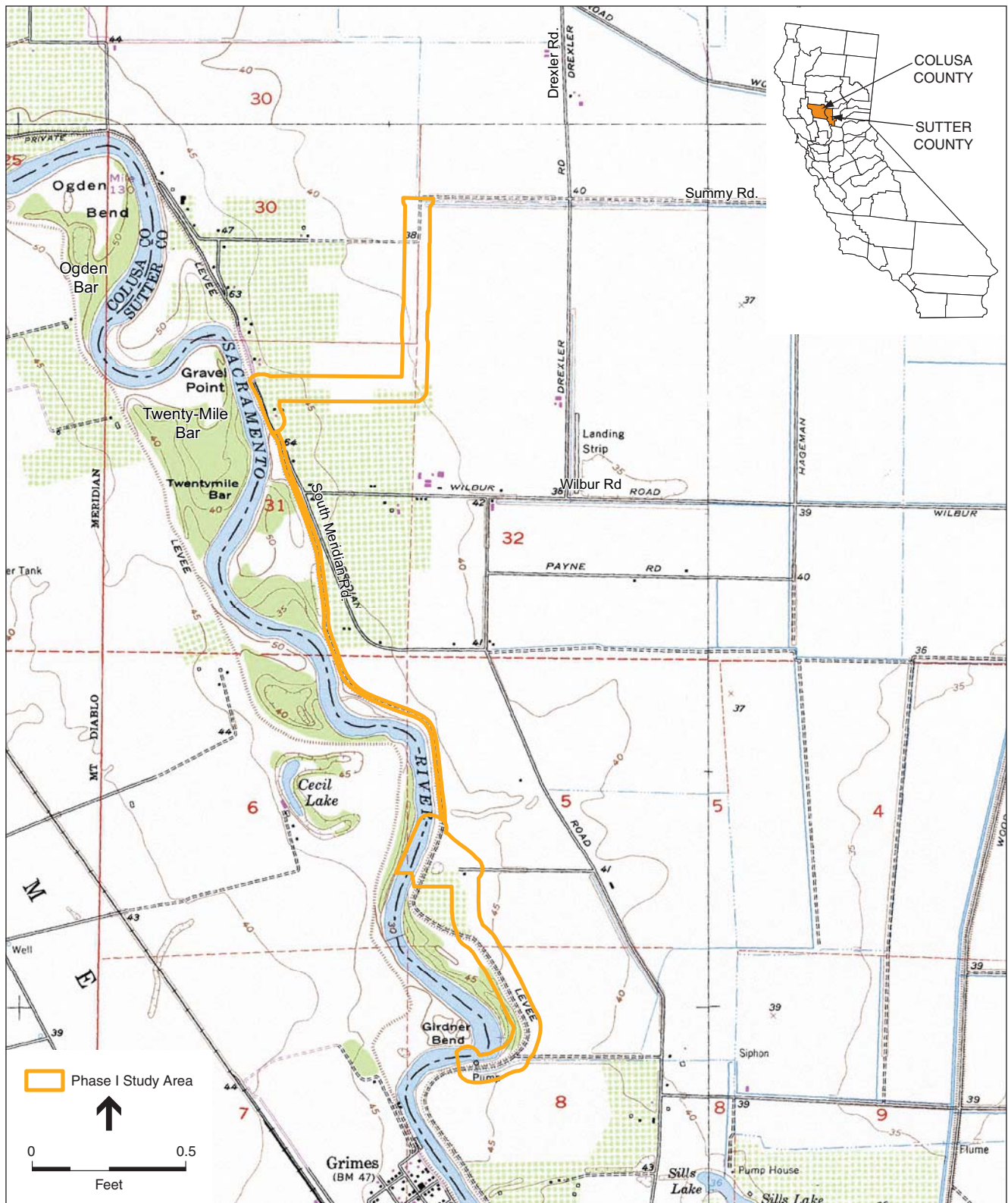
fremontii). Himalayan blackberry (*Rubus discolor*), California rose (*Rosa californica*), nutsedge (*Cyperus* spp.), curly dock (*Rumex crispus*), poison oak (*Toxicodendron diversilobum*) and several species of exotic grass characterize the shrub and herbaceous layers. Mature cottonwood stands dominate the closed canopy overstory and characterize the riparian forest areas adjacent to and within (during high flow season) the riverine environment. See **Photo 1 in Appendix B** for a view of riparian habitat in the Action Area.

Valley Riparian/Cottonwood Riparian Forest habitats provide food, water, migration and dispersal corridors, and escape, nesting, and thermal cover for an abundance of wildlife. At least 50 amphibians and reptiles and 147 bird species occur in lowland riparian systems. Additionally, 55 species of mammals are known to use California's Central Valley riparian communities.

Valley Riparian/Cottonwood Riparian Forest occurs along the Sacramento River within the general vicinity of the Proposed Project/Action. Within the Action Area, riparian habitat is included along a portion of the proposed Grimes conveyance improvements and the existing diversion facility. In addition, a few non-contiguous patches of mixed willow riparian habitat occur approximately 440 feet north of the proposed New Grimes Diversion location. Riparian areas provide food, cover, and nesting for a variety of birds, mammals, amphibians, and even reptiles and fish. Riparian vegetation along the banks of the Sacramento River provide shaded aquatic riverine habitat for fish species.

Sacramento River

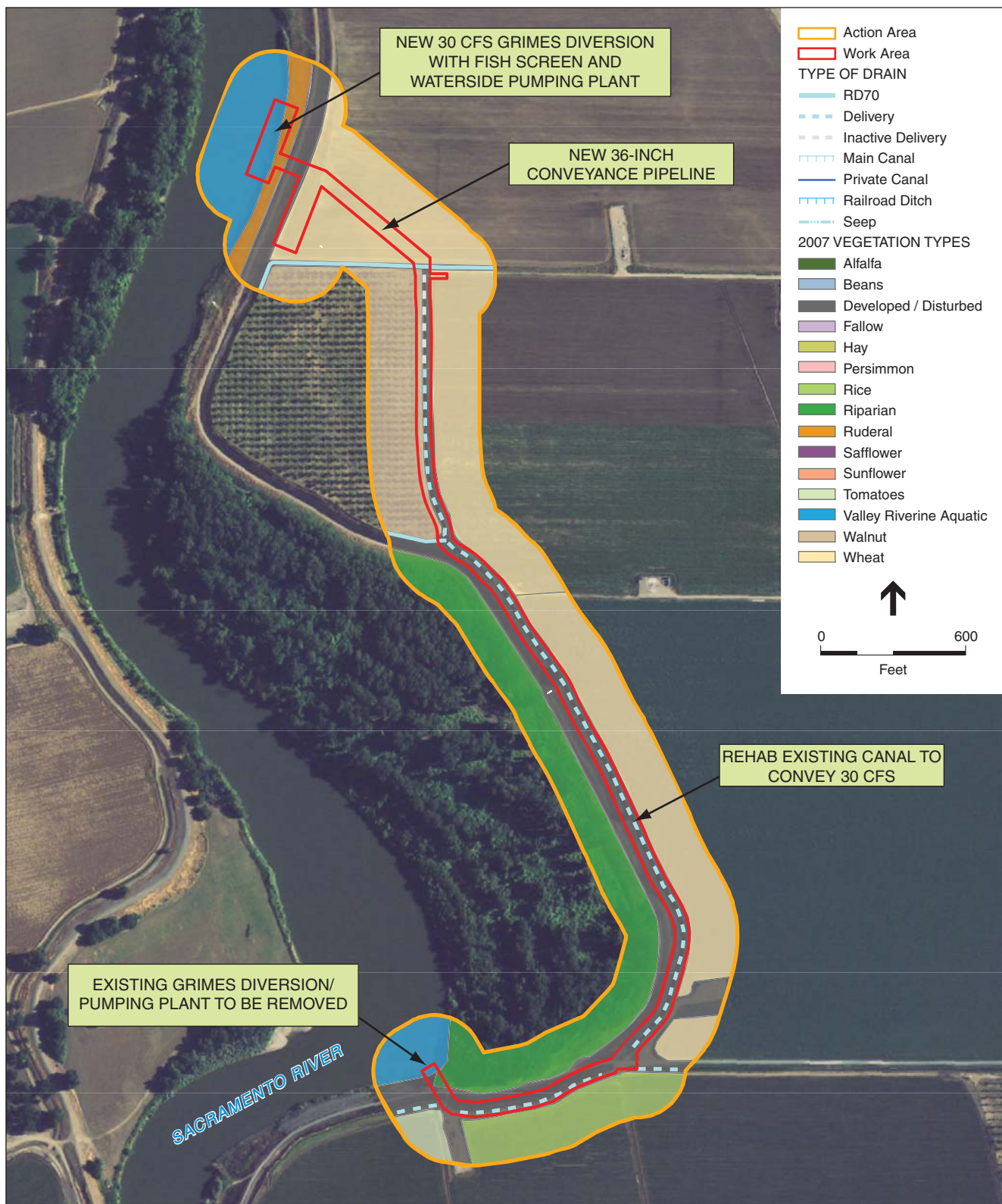
Within the vicinity of the Action Area the Sacramento River riverine habitat is characterized by freshwater aquatic and shaded riparian habitats. The adjacent riparian habitat has been modified by trails (both paved and unpaved), levees, and general recreation activities. Flows are relatively slow within the Action Area, exhibiting deep channel characteristics with levied banks. Channel substrate generally consists of fine sandy-loam with sparse areas imported rip-rap along the banks used to reinforce the adjacent levees. At both the proposed new diversion locations (Meridian and Grimes) the river is channelized, exhibiting a deep, cold and slow moving flow. The Sacramento River in the vicinity of the both proposed diversions is channelized and lacks aquatic vegetation and has minimal streambank vegetative cover. The river bank in the vicinity of the proposed Grimes Diversion is generally considered ruderal, with few sparsely distributed medium-sized shrubs. The levee banks are regularly maintained by the local Reclamation District to remove weedy vegetation. This area is burned every year in the late summer, leaving the banks free of vegetation (**Photo 2 and Photo 3, Appendix B**). On the land-side the levee near the Grimes Diversion, slopes are maintained by dragging a chain across the face of slope. This reduces unwanted vegetation and leaves only low-growing groundcover for erosion protection. The value of shaded riverine aquatic habitat in the Action Area of both diversions is minimal for fish. The area around the proposed Meridian Diversion is more vegetated with annual grasses, but still offers limited shaded riverine aquatic habitat for fish.



SOURCE: USGS 7.5' Topographic Map (Grimes, CA - T 14N, R 1E, Sec. 5, 8, 30, 31 [1973]); MWH, 2007; and ESA, 2008

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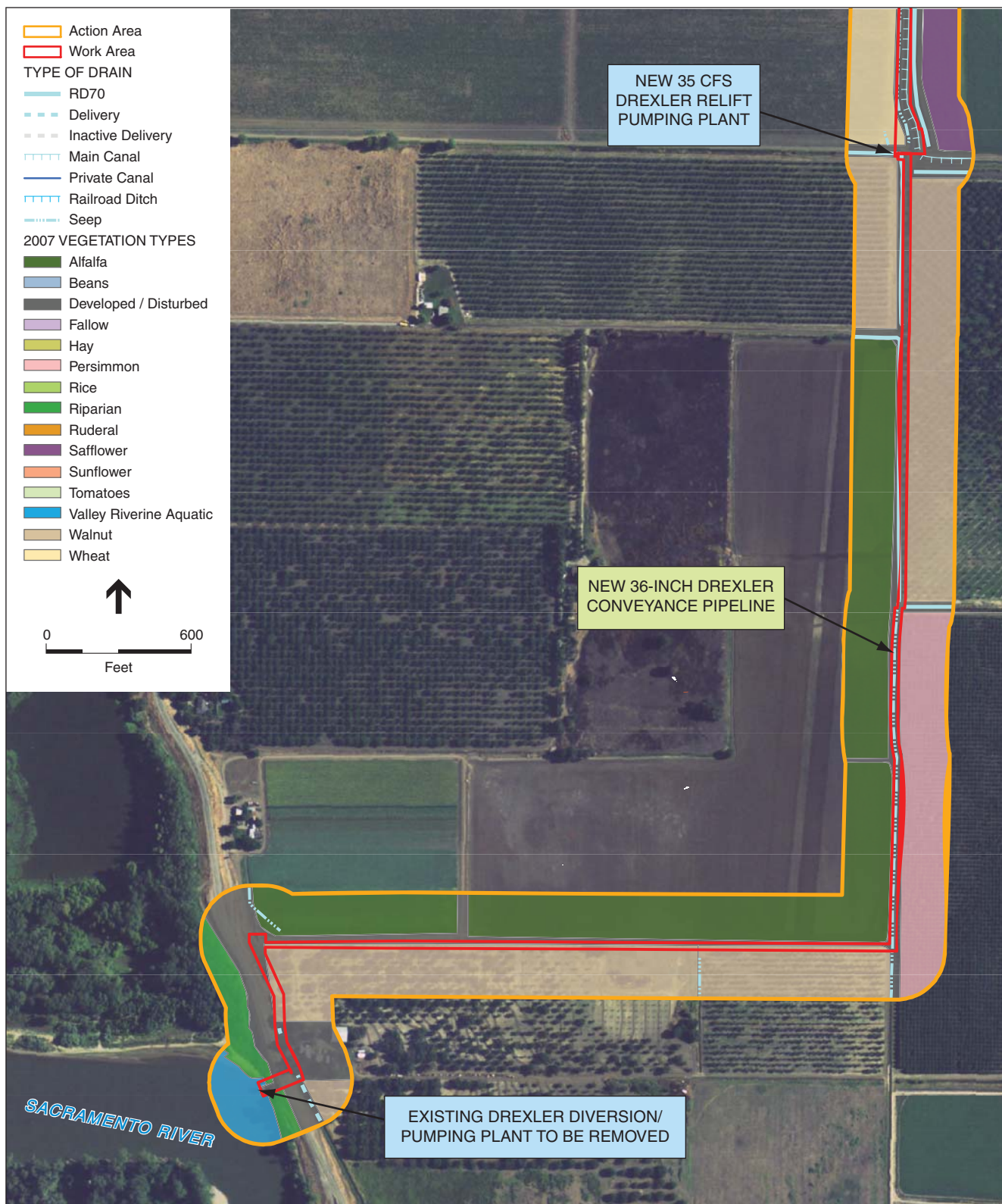
Figure 2-1
Wetland Delineation Study Area



SOURCE: USDA, 2005; MWH, 2007; MFWC, 2007; and ESA, 2007

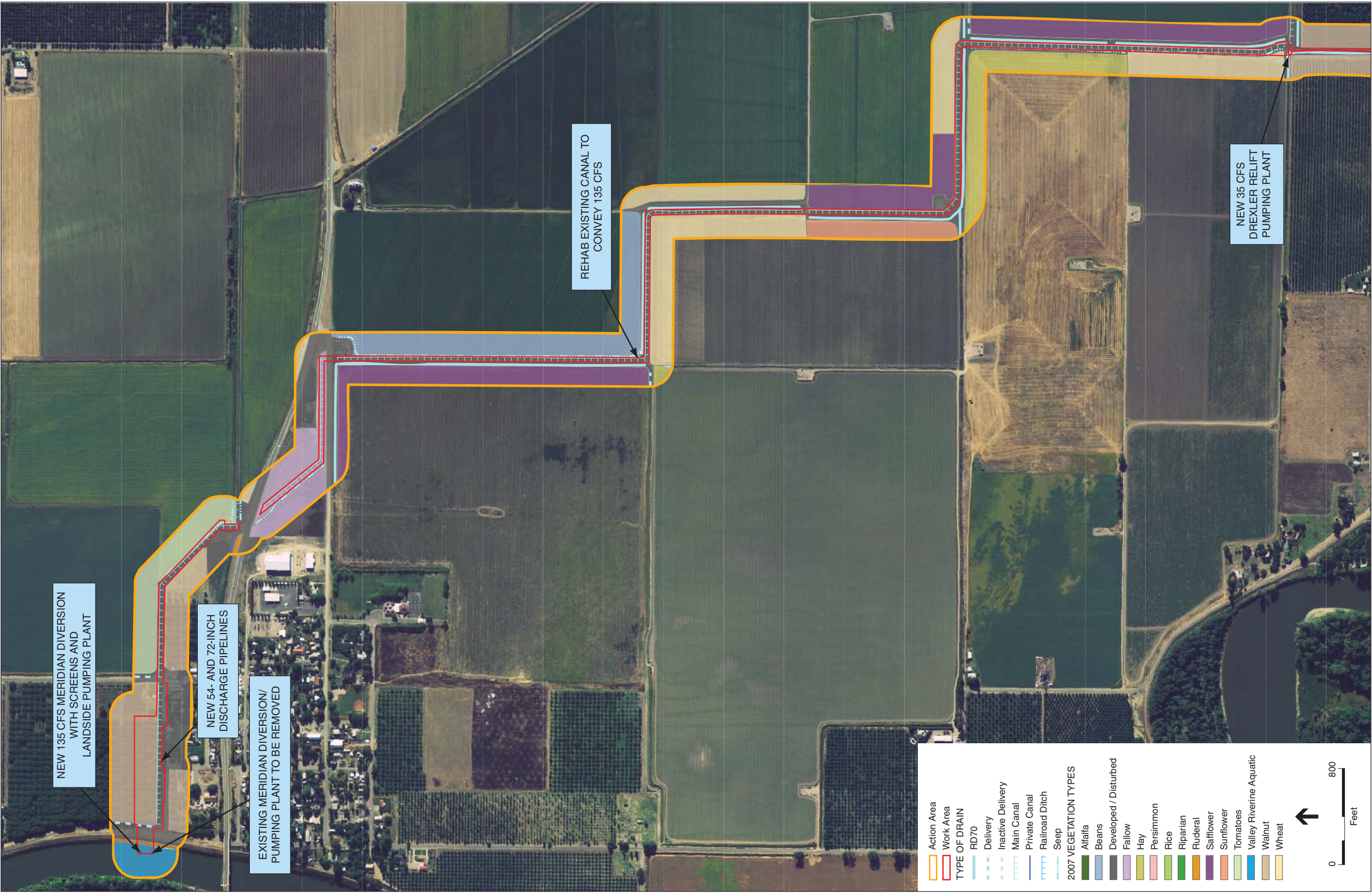
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Figure 2-2
Vegetation Communities within the Action Area – South



SOURCE: USDA, 2005; MWH, 2007; MFWC, 2007; and ESA, 2007

Figure 2-3
Vegetation Communities within the Action Area – Central



SOURCE: USDA, 2005; MWH, 2007; MFWC, 2007; and ESA, 2007

Figure 2-4
Vegetation Communities within the Action Area – North

The Sacramento River in the vicinity of the proposed intake locations serves as a migratory corridor for the upstream migration of adult salmon and steelhead, and the downstream migration of juvenile salmon and steelhead. North American green sturgeon and Sacramento splittail may also utilize the Action Area as migratory habitat. Other fish species common in the Sacramento River near the proposed intake locations include striped bass, threadfin shad, American shad, catfish, Sacramento pikeminnow, tule perch, sculpin, bullhead, and a variety of other resident fish species. The Sacramento River near Sacramento also provides habitat for a variety of invertebrates, including planktonic species such as copepods, and epibenthic species such as crawfish and amphipods.

Agriculture

Agriculture, irrigated with water drawn from the Sacramento River, dominates the surrounding landscape. Although the specific crop cultivated on a parcel of land may vary annually, the general types of crops grown in the region remain relatively consistent. The major crops include rice, safflower, sunflower, tomatoes, and beans. Hay crops, such as alfalfa, are widely grown, and orchards in the area grow walnuts and persimmons. These crops are irrigated by a series of canals that deliver water from the Sacramento River. The delivery canals within the Action Area are generally well maintained and concrete lined, support minimal vegetation. There are unlined overflow ditches characterized by emergent aquatic vegetation such as cattails (*Typha latifolia*) and tules (*Scripus californicus*) that occur within the study area, adjacent or perpendicular to the Main Canal. All ditches owned and managed by MFWC are maintained annually, and generally lack dense upland or aquatic vegetation. A few ditches that are owned by the local Reclamation District are not maintained as regularly, and support denser stands of tules and cattail. Agricultural crops and irrigation drainages provide foraging and cover habitat for a variety of wildlife such as birds, mammals, and some reptiles.

All Proposed Project/Action components are located in or adjacent to agriculture. The Main Canal and other delivery canals that are proposed for widening (increased conveyance) are surrounded by lands in active crop production. These canals are generally concrete-lined; although, in some locations, the concrete bed is damaged and there are places where the canals are unlined. The proposed Drexler Re-Lift Station is adjacent to existing canals and ditches. Irrigation ditches lateral to the Main Canal in the vicinity of the Proposed Project/Action support emergent aquatic vegetation. The proposed Drexler and Grimes pipelines will extend through agricultural orchards and, in some instances, through existing ditches. Canals and ditches may provide habitat for fish, aquatic invertebrates, and aquatic snakes.

Ruderal

In the study area, ruderal or disturbed habitats generally occur in narrow stretches adjacent to levees, roads, and along canals, ditches, river banks and agricultural land boundaries. Ruderal areas within the Action Area are located along the banks of the Sacramento River and are characterized by non-native annual grassland (**Photo 4, Appendix B**). Non-native annual grassland includes ripgut brome (*Bromus diandrus*), and wild oats (*Avena barbata*), and other common species including Johnson grass (*Sorghum halepense*), Leymus (*Leymus triticoides*),

thistle (*Sonchus asper*), and filaree (*Erodium moschatum*). This habitat is also present in the understory of the riparian woodland habitat, and within the Action Area, represents much of the vegetation growing within and along the banks of drainage ditches and irrigation canals. Ruderal grasslands provide important foraging, breeding, and resting habitat for many species of wildlife.

Developed / Disturbed

Developed and disturbed areas include major roads, highways, and buildings and structures within more urban areas, but also facilities and access roads which are located throughout agricultural areas within the Action Area. Also included within this category are the unpaved turnouts and shoulders of dirt access roads, and the regularly maintained banks of the levee, adjacent to the Sacramento River. As mentioned previously, the vegetation on these levees is removed through burning or by dragging a chain across its slopes.

2.2.2 Current Facilities

MFWC currently operates three surface water diversion/pumping plants on the Sacramento River at Meridian, Drexler, and Grimes in Sutter County. The diversions use pumps with unscreened intakes which likely entrain juvenile Chinook salmon, steelhead trout, and other native fishes that pass by the intake. Current facilities and improvements are described in more detail the following section which describes the Proposed Project/Action. The locations of the existing facilities are shown in **Figure 2-1**, and in **Photo 5** and **Photo 6** in **Appendix B**.

2.3 Proposed Project/Action Characteristics

2.3.1 Project Components

The MFWC Proposed Project/Action includes several components which are divided into two project phases (**Table 1-1**). The purpose for the phasing is to be able to implement the Proposed Project/Action in a way that is both economically feasible and practical for MFWC. Each phase is independent of the other and each will benefit fish species. Both Phase 1 and Phase 2 improvements will allow MFWC to more efficiently deliver water to its service areas. Consultation for each phase will occur independently of each other.

Phase 1 includes construction of the New Grimes Diversion/Pumping Plant, the New Grimes Pipeline and Canal Modifications, and constructing up to 6,500 lineal feet of Drexler Pipeline, as feasible, dependent upon funding. Phase 1 also includes the removal of the Existing Grimes Diversion/Pumping Plant. Phase 1 conveyance modifications will improve service in the Grimes Service Area, while the new diversion with fish screen will reduce fish entrainment in the pumps. Construction of the Drexler Pipeline will provide MFWC with the added ability to provide uninterrupted service to its customers in this service area. Currently, the existing Drexler Diversion is partially silted in, and may become inoperable within the next few years. Implementation of Phase 1 will provide redundancy in the MFWC system to be able to deliver water if the existing Drexler Diversion becomes inoperable.

Phase 2 includes the construction of the New Meridian Diversion/Pumping Plant, removal of the Existing Meridian Diversion/Pumping Plant, modifications to the Main Canal, construction of the New Drexler Re-lift Pumping Plant, additional improvements to the Drexler Pipeline (if needed), and removal of the Existing Drexler Diversion/Pumping Plant. The new diversion with fish screen will increase diversion capacity to compensate for the abandonment and removal of the existing Drexler Diversion while reducing fish entrainment in the pumps. The Main Canal modifications will increase conveyance capacity in order to handle increased flows resulting from the consolidation of the existing Drexler and Meridian diversions. A relift pump station will be constructed to deliver flows to the Drexler Service Area via the Drexler Pipeline. If the total 6,500 lineal feet of Drexler Pipeline is not constructed in Phase 1, then in Phase 2 the remaining length of pipeline would be completed in order to tie into the Main Canal at the new relift station.

The following is a summary of the Project facilities and proposed improvements (also shown in **Figure 2-1**):

PHASE 1

- **New Grimes Diversion/Pumping Plant.** A new 30-cubic feet per second (cfs) diversion with fish screen and pumping plant will be located north of the existing Grimes Diversion/Pumping Plant.
- **New Grimes Pipeline and Canal Modifications.** Approximately 650 lineal feet of 36-inch diameter pipeline and modifications to 3,800 lineal feet of the existing earthen canal to deliver flows from the New Grimes Diversion/Pumping Plant to the Grimes Service Area. Approximately 1,200 linear feet of ditch will be concrete lined. Approximately 3,250 feet of earthen ditch will remain.
- **Drexler Pipeline.** Approximately 3,000 up to 6,500 lineal feet of a 36-inch diameter pipeline will begin at the Drexler Re-lift Pumping Plant and will terminate at the intersection of Summy Road and the Main Canal. The length of pipeline constructed is dependent upon available funds, but any length of pipeline constructed will be an improvement to existing conditions.
- **Removal of the Existing Grimes Diversion/Pumping Plant.** The existing pumping facility will be removed after the new pumping plant is constructed.

PHASE 2

- **New Meridian Diversion/Pumping Plant.** A new 135 cfs diversion with fish screen and pumping plant will be located adjacent to and will replace the existing Meridian Diversion.
- **Main Canal Modifications.** Increase the capacity of approximately 15,200 lineal feet of the Main Canal to convey flows over to the Drexler Service Area in order to accommodate the consolidation of the Meridian and Drexler diversions.
- **New Drexler Re-lift Pumping Plant.** A new 35 cfs pumping plant will be located at the end of the Main Canal modifications to deliver flows to the Drexler Service Area via the new Drexler Pipeline.

- **Drexler Pipeline Extension (optional).** The Drexler Pipeline may be extended to a total length of 6,500 lineal feet, if not already constructed in Phase 1. The end of the pipeline would tie-in to the existing Main Canal at Summy Road.
- **Removal of Existing Meridian Diversion/Pumping Plant.** The existing diversion/pumping facility will be removed after the new pumping plant is constructed.
- **Removal of Existing Drexler Pumping Plant.** The existing pumping facility will be removed after the new pumping plant is constructed.

2.4 Proposed Project/Action Specifics – Phase 1

2.4.1 New Grimes Diversion/Pumping Plant

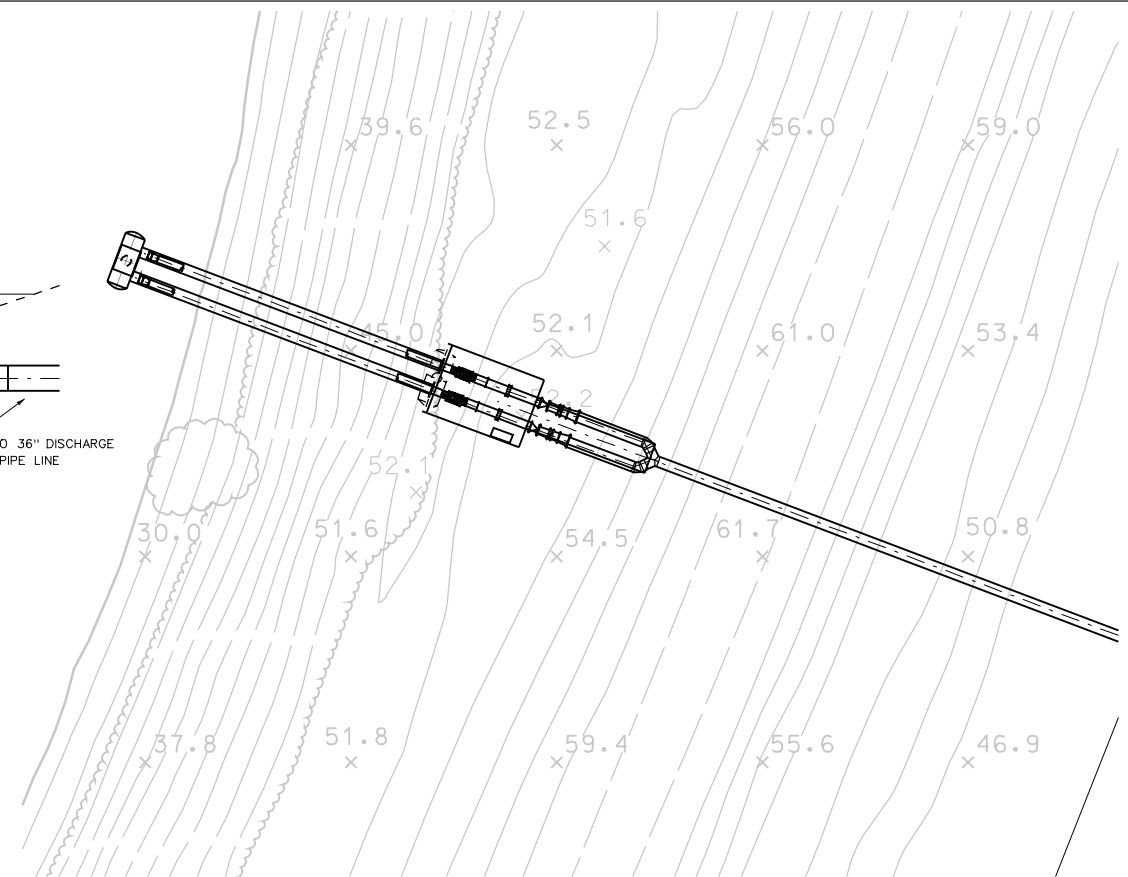
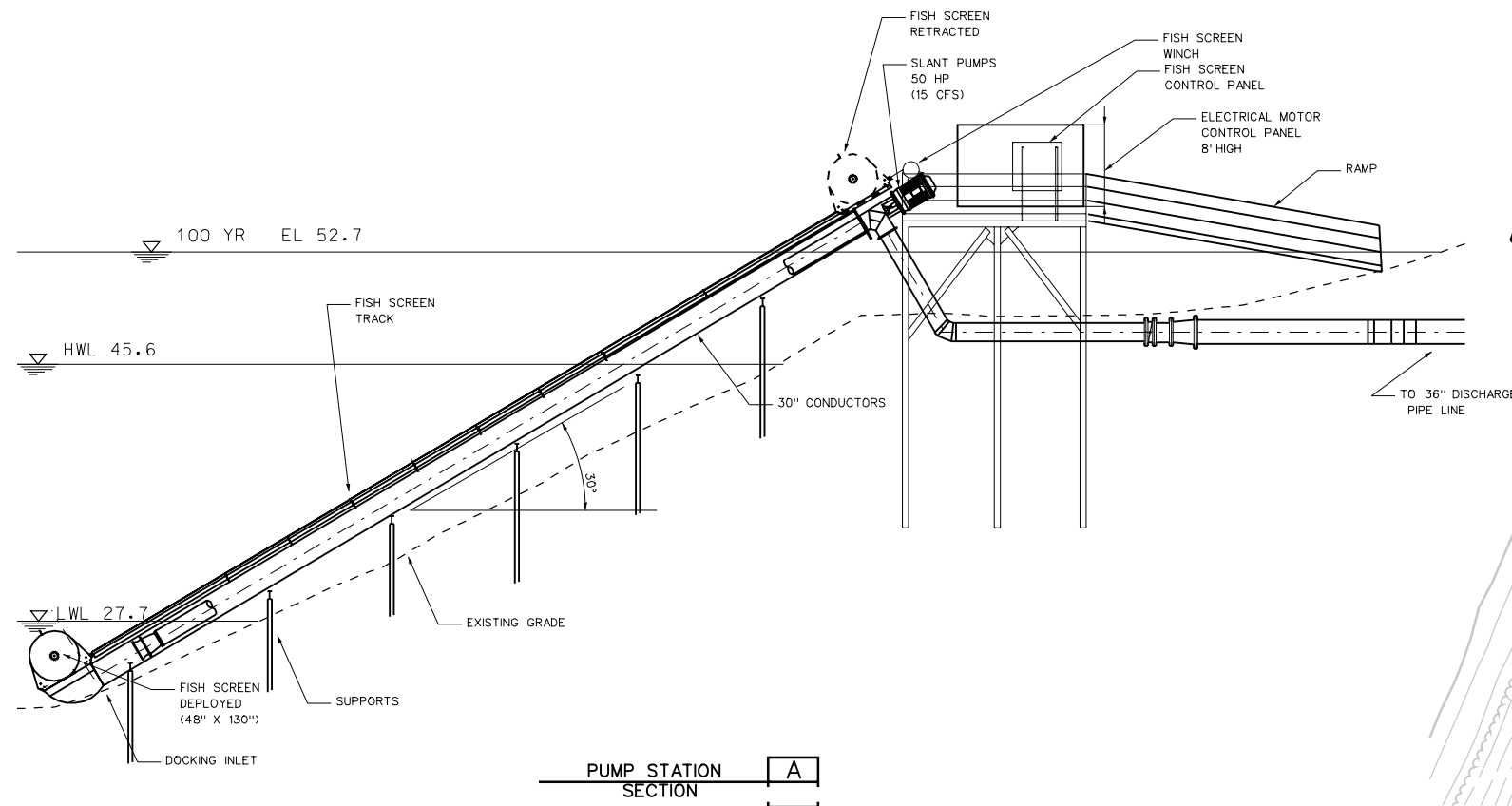
A new 30-cfs diversion with fish screen and pumping plant will be constructed north of the existing Grimes Diversion/Pumping Plant. A general schematic of the facility is provided in **Figure 2-5**. The New Grimes Diversion will consist of two 15 cfs mixed flow inclined pumps mounted along the slope of the levee that will operate from a common fish screen in the Sacramento River. Two 30-inch parallel conductor pipes, five feet on center, will house the inclined pump columns. The conductor piping will lie parallel to the incline of the riverbank, at an angle of roughly 30-degrees. The conductor piping will attach to a fabricated sheet metal docking inlet at the river intake, into which the fish screen will dock.

2.4.1.1 Fish Screen

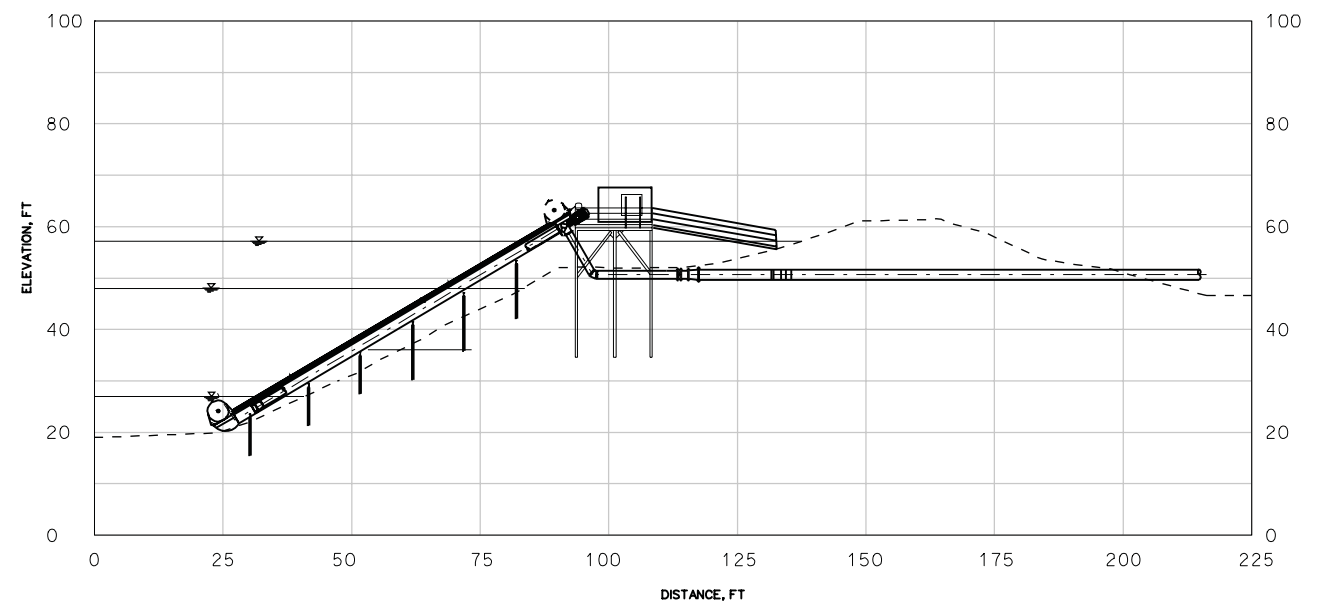
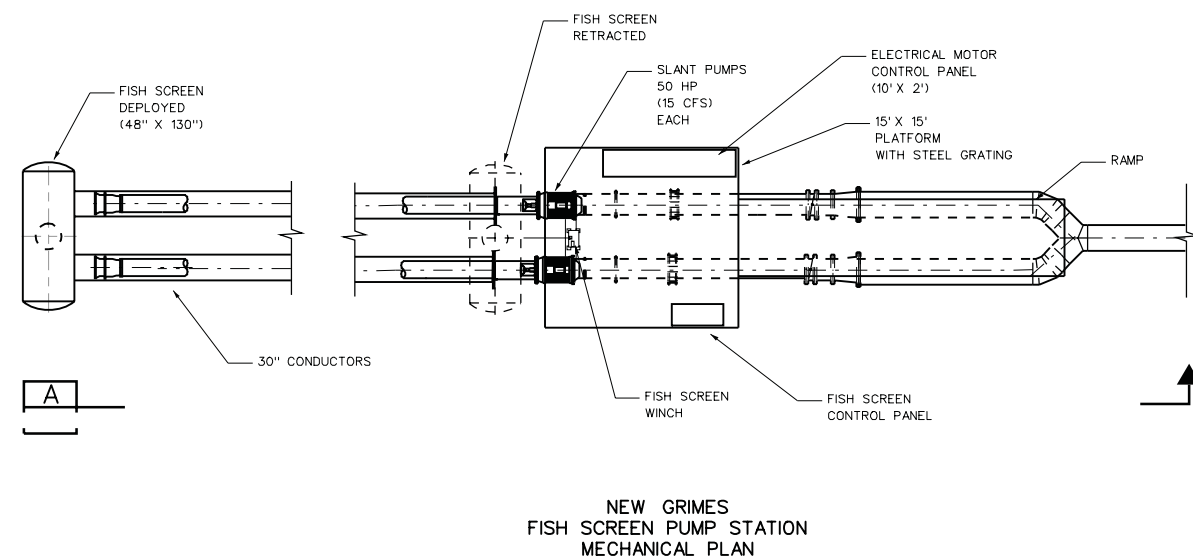
The fish screen will be a 48-inch diameter by 148-inch long cylinder at the river intake. The top of each fish screen will be submerged 3 feet under water at the 90 percentage exceedance elevation (elev. 27.7).

The actual intake screen is comprised of the last 44 inches of each end of the cylinder. It is fabricated from a mesh of wedge shaped stainless steel wire that is resistance welded to support bars. This produces a mesh screen of continuous 1.75 mm wide slots that will provide the 0.33 fps approach velocity limitations set by the CDFG. The center portion of the screen is fabricated sheet metal and will attach to the docking inlet. Steel wheels on the under carriage of the fish screen will allow it to track down rails that are welded to the tops of the conductor pipes and attach to the docking inlet. An electric or hydraulic powered winch will allow the operator to raise or lower the fish screen between deployment in the water and the pump platform.

The fish screen uses a stationary brush bar cleaning system in which a hydraulic power-pack (1.5 HP, 2 gpm, 900 in-lb torque) of pump and motor rotate the screen on a timed basis. The hydraulic motor rotates the screen at four rpm against internal and external stationary brushes. The cleaning cycle is five minutes and the cleaning interval is adjustable. The control panel will handle the cleaning cycle interval for the Fish Screen as well providing the power and control for the winch. The cleaning cycle will be initiated by either a high water level differential across the screens, elapsed time period, or manual actuation.



SITE PLAN



2.4.1.2 Docking Inlet and Conductor Pipe

Each pump column will reside in a 30-inch conductor pipe that extends down into a common intake manifold, or docking inlet. The docking inlet is a fabricated steel box that will sit on the river bottom and provides the fish screen with a simple locking mechanism to attach to. The conductor pipe will slant back to the river bank and up to the pump platform. The slant angle will not be less than 30 degrees from the horizontal. The distance from the river intake and the pump platform will require that the conductor piping to be at least 80-feet long. This allows the pump platform to be at a height that will clear the 100-year water elevation.

2.4.1.3 Incline Pumps

Two air-cooled, 50 HP, mixed flow slant pumps will provide 15 cfs each to the 36-inch discharge piping. The pumps chosen for this application are the Prime Pump Company Model 24M14. Additional names of pump manufacturers will be included in the specifications during detailed design. This selection will need to be verified once the pipeline length and routing have been determined. The electric motors will be premium efficiency, designed specifically for vertical pump applications with a totally enclosed, fan-cooled, enclosure rating.

The inclined pumps proposed for this project are vertical pumps, with mixed flow type impellers mounted in the inclined position. For a typical vertical pump, the rotating assembly is vertically suspended thereby all of the weight and thrust are axially absorbed by the motor thrust bearing. The bearings on the pump bell, pump shaft and column shafts are designed as guides and they are not meant to be subjected to radial load. In case of pumps mounted in an inclined position, all of the bearings will be subjected to radial load including the lower bearing of the motor.

If inclined pumps are the type of pumps to be used for this project, the pump manufacturer selected shall have proven experience in the design and manufacture of inclined pumps of this size length. The pump bearings, shafts and column shall be designed for the loading imposed on them. The conductor pipe and support where the pumps are to be installed shall be designed to have a minimum deflection suitable for the type of bearings used. The shaft enclosing tube and seal shall be designed to contain the lubrication oil and prevent the pumped liquid and grit to enter inside the shaft and bearing compartment.

The pumps shall require cast-iron bowls with stainless steel shafting. The pump impellers will be a bronze alloy and of the semi-enclosed design. The impeller will not include a wear ring.

2.4.1.4 Flow Measurement

The pumped river water will be measured with a 36-inch ultrasonic, multi-path flowmeter located in a vault somewhere just upstream of the discharge outlet. The meter will consist of two wetted transducers inserted into the pipe. The meter will be housed into a concrete vault with a galvanized access hatch.

The selected meter for this application is the GE Panametric, Aquatrans AT868. These meters are accurate to within plus or minus one (1) percent of reading, and are designed for insertion in raw or other water containing sand or grit. They will require five straight pipe diameters upstream, and two downstream to smooth the flow profile and maintain reading accuracy.

The flow meter will be equipped with an indicator-totalizer. The indicator shall have four digits and measure flow from 0 – 50 cfs. The totalizer shall have six digits and shall measure total flow in units of acre-feet. The MFWC and the U.S. Bureau of Reclamation will use the flow measurements to log and report diversions.

2.4.2 New Grimes Pipeline and Canal Modifications

The Proposed Project/Action includes the addition of approximately 650 lineal feet of 36-inch diameter pipeline and 3,800 lineal feet of modifications to the existing canal will be constructed to deliver flows from the New Grimes Diversion/Pumping Plant to the Grimes Service Area. The New Grimes Pipeline will be 36-inches in diameter, 650 feet in length, and extend from the New Grimes Pumping Plant to a transition structure that discharges to the Grimes Canal. Upon exiting the levee, on the landside, the pipeline heads east and south along the walnut orchard (**Figure 2-2**). The pipeline crosses an existing irrigation ditch and then turns due east and parallels the drainage-ditch. The pipeline will discharge to a transition structure that will feed the re-graded Grimes Canal.

The existing Grimes Canal is an earthen canal, and will be partially concrete-lined and re-graded to direct flow to the south. (Flow is presently from south to north.) Approximately 3,800 linear feet of earthen canal will be modified to tie-into the existing canals that deliver irrigation flows from the existing Grimes Diversion/Pumping Plant. Approximately 1,200 linear feet of ditch will be concrete lined. Approximately 3,250 feet of earthen ditch will remain.

2.4.3 Drexler Pipeline

The Drexler pipeline will consist of a 36-inch pipeline that will extend approximately 6,500 lineal feet south from the Drexler Re-lift Pumping Plant location, at Summy Road and just west of where the Main Canal intersects Summy Road. The pipeline will extend south parallel to a walnut orchard and then alfalfa field to the west, approximately 3,360 feet, then turn due west just north of the Chesney property walnut orchard (**Figure 2-3**). The pipeline will continue approximately 2,490 feet to the west where it will discharge into a turnout structure. The structure will consist of two turnouts. One turnout will service the Cusick field to the north and one turnout will feed into a 35 cfs capacity gravity pipeline that will extend south through the Chesney Orchard and roughly parallel the river levee. The 36-inch gravity pipeline will be approximately 600 feet in length and is required by the Reclamation Board regulations to be offset 10 feet from the toe of the levee. The gravity pipeline will be capable of supplying a maximum flow of 35 cfs to the Drexler Canal just south of the Chesney House and adjacent to the old Drexler Pumping Plant. Permanent and temporary easements will be needed for the construction and maintenance of the Drexler Pipeline.

2.4.4 Removal of Existing Grimes Diversion/Pumping Plant

Once the New Grimes Diversion/Pumping Plant is constructed, the existing Grimes Diversion/Pumping Plant will be removed. At a minimum, this will include the removal of the pumps, equipment platforms, electrical equipment, gauging stations, pile supports to required level, river side-piping, and placement of grout/concrete inside levee piping.

2.5 Proposed Project/Action Specifics – Phase 2

2.5.1 New Meridian Diversion/Pumping Plant

The New Meridian Diversion/Pumping Plant will consist of a new 135 cfs diversion and fish screen pumping plant that will be located upstream of the existing Meridian Diversion. The pumping plant will be located on the land-side of the levee. **Figures 2-6 and 2-7** show the site plan for the Meridian Diversion and Pumping Plant.

2.5.1.1 Fish Screens

The Meridian Diversion will consist of four 54-inch cylindrical tee fish screens. The fish screens will be made of stainless steel wedgewire with 1.75 millimeter (mm) slot size and a minimum of 50 percent open space. At the design flow of 135 cfs, the approach velocity is 0.33 feet per second (fps), which results in a minimum cylinder length of 14.5 feet. The outlet size for each fish screen is 36 inches. The top of the fish screen will be submerged three feet under water at the 90 percent exceedance elevation (elev. 32.6) as required in navigable waterways.

2.5.1.2 Fish Screen Cleaning System

The fish screens at this facility will be cleaned via an airburst system. The airburst cleaning system will consist of a 100 horsepower (hp) air compressor and 1,500 gallon steel pressure tank located at the pump station site. The fish screens are each connected to the tank via 6-inch stainless steel air feeder line. The air will be released and shut off by 6-inch motorized actuated butterfly valves. The air will move through the pipe and through the levee and exit through the air nozzles located inside the screens. Each screen will be cleaned once every 20 minutes. However, included in the CDFG design criteria is a cleaning cycle every five minutes. Based on recent experience at similar facilities along the Sacramento River, a five minute cleaning cycle is too conservative and results in an oversized and more costly cleaning system. Therefore, CDFG, as lead agency for this Proposed Project/Action, will be requested to grant a variance to extend the cleaning cycle to 20 minutes. The cleaning cycle will be initiated by either a high water level differential across the screens, elapsed time period, or manual actuation.

2.5.1.3 Deflection Piles

Approximately ten galvanized steel deflection piles will be installed just upstream and downstream of the fish screens in the river. The purpose of the deflection piles will be to protect the fish screens from large debris floating down the river. The top of the piles will be submerged a minimum of three-feet as required for navigable waterways. Steel beam will be used over the top of the fish screens to prevent debris from lying directly over them.

2.5.1.4 Conveyance from River Inlet to Sump

The inlet structure consists of two 72-inch tees, each with two screens mounted on top. The tees are then connected to a short segment of 84-inch pipeline. The 84-inch pipeline is then reduced to a 72-inch pipeline, which will then run through the levee and underneath North Meridian Road to the pump station wet-well. The tees and the segment of 84-inch pipe will be connected to a concrete pad approximately 40 feet by 25 feet. The concrete pad will be placed on piles.

2.5.1.5 Gate Structure

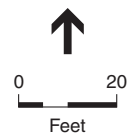
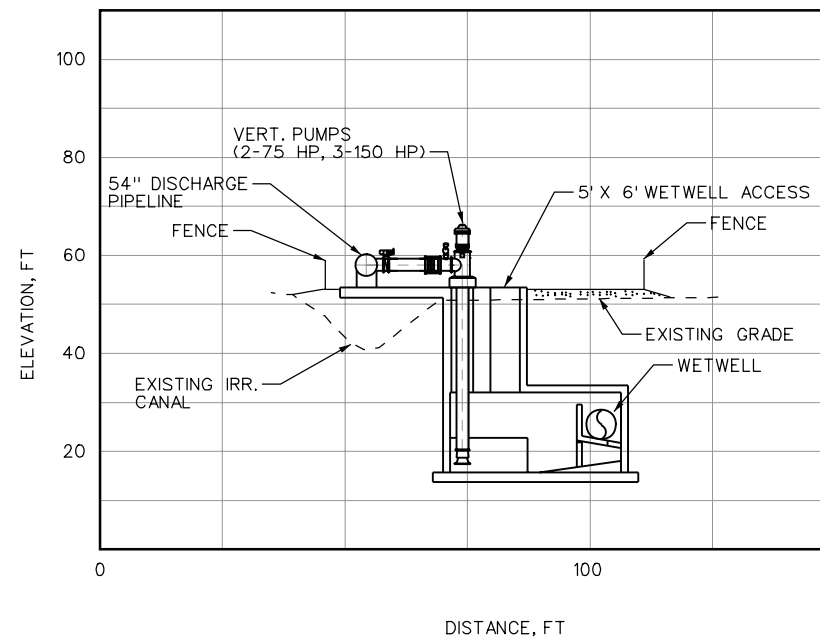
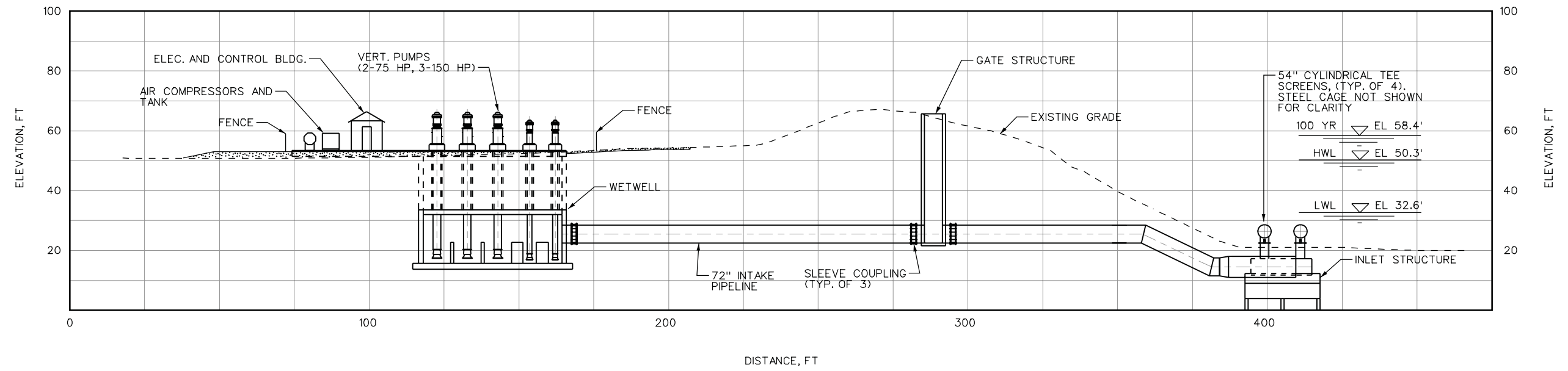
The gate structure provides a means for positive closure of the levee penetration by the 72-inch inlet pipeline. A sluice gate with 72-inch diameter thimbles will be mounted in a concrete structure on the water-side of the levee.

2.5.1.6 Sump

The sump structure will be located on the east side of the Sacramento River at the northeast corner of North Meridian Road and Alameda Street. The inside dimensions of the sump are 35-feet wide by 46-feet long. The inlet pipeline will enter the sump perpendicular to the 35-foot wide westerly wall at invert elevation 22.5 feet above mean sea level (fmsl). The sump is designed so that water enters the sumps inlet chamber and impinges on a baffle wall located parallel to the inlet pipe and eight-feet from the sump's north (front) wall.

The inlet chamber has bottom outlets that restrict the flow and thus provide time for air to escape. The bottom outlets for the low capacity pumps (16.5 cfs) and high capacity pumps (34 cfs) are sized respectively at 2-feet by 2-feet and at 2-feet, 8-inches by 2-feet, 8-inches to provide a maximum velocity of 5 cfs through the openings. The bottom outlets are located below the minimum water level in the pump chamber and are in line with the pumps – one outlet for each pump. Just beneath the bottom outlets, the floor of the sump will be sloped from the inlet wall to the baffle wall at eight degrees from horizontal. This will carry sediment towards the pumps and out of the sump structure.

The centerline of the pumps are located seven pump bell diameters away from the baffle wall to allow time for the flow to transition fully out of its turbulent state. The Hydraulic Institute Standards recommend that this distance be at least 4 pump bell diameters. However, propeller type pumps tend to be more sensitive to irregular flowlines at the pump inlet than other vertical turbine pumps. Partition walls between the pumps have also been added per the recommendations of the Hydraulic Institute Standards. The distance between the partition walls is two pump bell diameters. The top of the partition walls are set at elevation 22.7 fmsl which is one-foot, four-inches higher than the pump shut off elevation of 21.3 fmsl. A six by eight foot access will be provided between the baffle wall and the end of the partition walls just in front of the center pump for access into the sump. The invert of the sump is set at elevation 15.7 fmsl and is based on providing complete submergence for the inlet pipeline when the Sacramento River is at elevation 32.6 fmsl.



2.5.1.7 Pumping Plant

The pumping plant site will be located at the northeast corner of North Meridian Road and Alameda Street. The pumping plant will be equipped with two (2) 16.5 cfs and three (3) 34 cfs mixed flow pumping units will be provided to pump the total design flow of 135 cfs into MFWC's Main Canal. The pumps will be mixed flow pumps with Open-drip-proof WP1 enclosed electric motors and will sit outdoors on top of the concrete sump structure described above. The top of slab elevation for the pumping plant is 53.5 fmsl. Refer to **Figure 2-7**.

The pumping plant site will be surrounded by a galvanized steel mesh wire fence/masonry wall and encompass approximately 0.16 acres. The wet-well, pumping pad, pumps, air compressor, air tank, and an electrical control building will be located within the fenced site. The electrical control building will need to be air conditioned to keep the variable frequency drives (VFD) from overheating. A 15-foot access gate will be located on the west side just off North Meridian Road. A three-foot man-gate will be located at the southeast corner of the site just off Alameda Street. The entire site will be covered with eight-inches of aggregate base.

2.5.1.8 Pumps

Two (2) 16.5 cfs and three (3) 34 cfs mixed flow pumping units will be provided to pump the total design flow of 135 cfs into MFWC's Main Canal. The pumps selected for this application are Cascade Pump Company Model MF 16 and MF 24. The low capacity and high capacity pumps will operate at a maximum speed of 880 rpm and 700 rpm respectively. The low capacity pumps will be provided with variable frequency drives. At minimum speed, the low capacity pumps will be able to pump at a rate of 8.3 cfs. This provides MFWC the same pumping flexibility they have at their existing Meridian and Drexler pumping plants.

The pumping plant will need to operate up to capacity when the Sacramento River water surface elevations vary between 32.6 – 50.3 fmsl and with a pump discharge elevation of 57.6 fmsl (centerline of pump discharge piping).

The design point for each of the pumps will be a total dynamic head (TDH) of 29-feet at their respective design capacities (16.5 cfs and 34 cfs). The TDH was determined by assuming an average water surface elevation in the Sacramento River of 36.3 fmsl and a discharge elevation of 54.6 fmsl, and friction losses in the suction and discharge piping. The water surface elevation of 36.3 fmsl in the Sacramento River is the average water level for the month of July from 1947 to 2002. The month of July is typically when MFWC will have their heaviest pumping requirements for the year.

2.5.1.9 Discharge Piping

The 16.5 cfs pumps and 34 cfs pumps discharge into their respective 20-inch and 30-inch, above ground, pump discharge header pipes. Each discharge header is equipped with a combination air/vacuum valve and isolation valve. The water is then pushed from the discharge header into a common 54-inch, above ground, manifold pipeline. The 54-inch pipeline drops underground just before exiting the fenced area of the pumping plant site. Underground, the pipeline transitions to a 72-inch discharge pipeline that eventually discharges into the Main Canal near Mawson Road.

A separate 18-inch discharge will be connected to the most westerly 16.5 cfs pump. This 18-inch pipeline will branch off and head both north and south to existing irrigation ditches. The north branch will serve the existing walnut orchard located next to the pumping plant. The south branch will serve the property located immediately south of the pumping plant on the other side of Alameda Street.

2.5.1.10 Flow Measurement

The pumped Sacramento River water will be measured with a 54-inch multi-path, ultrasonic flowmeter just downstream from the pumping plant and an 18-inch ultrasonic flowmeter located just west of the most westerly 16.5 cfs pump. The 54-inch flowmeter will measure the amount of water being diverted and pumped into the Main Canal. The 18-inch meter will be used to measure the water being pumped into the 18-inch waterline serving the north and south properties. Each meter will consist of two wetted transducers inserted into the pipe. The meter will be housed into a concrete vault with a galvanized access hatch. The indicator-totalized will be housed outside the box for easy access.

The selected meter for this application is the GE Panametric, Aquatrans AT868. These meters are accurate to within plus or minus one (1) percent of reading, and are designed for insertion in raw or other water containing sand or grit. They will require five straight pipe diameters upstream, and two downstream to smooth the flow profile and maintain reading accuracy.

The flow meter will be equipped with an indicator-totalizer. The indicator shall have four digits and measure flow from 0 – 150 cfs. The totalizer shall have six digits and shall measure total flow in units of acre-feet. Flow measurements will be used by MFWC and Reclamation to log and report diversions.

2.5.2 Main Canal Modifications

The Proposed Project/Action will include an increase in the capacity of approximately 15,200 lineal feet of the Main Canal to convey flows to the Drexler Service Area needed as a result of the consolidation of the Meridian and Drexler diversions. **Table 2-1** provides a summary of the canal modifications proposed.

The current maximum capacity of the Main Canal is estimated at 120 cfs from the outlet of the existing pumping plant to Siphon 2 (State Highway 20). The existing canal is not large enough to convey the new maximum flow (135 cfs) from the new Meridian Pumping Plant. The canal will be widened and relined as detailed in **Figure 2-1** and **Table 2-1** to facilitate the new maximum flow rate.

The close proximity of the open canal to traffic on Alameda Street between the discharge inlet and Mawson Road presents a safety hazard. Two options were considered to address this safety hazard. The first option is to discharge the water into a 72-inch pipeline that will extend from the discharge inlet to Siphon 1 at Mawson Road. The second option is to extend the new Siphon 1 box structure back to the new discharge inlet. This Proposed Project/Action proposes the use of the 72-inch pipe option to address the safety hazard.

**TABLE 2-1
PROPOSED CANAL MODIFICATIONS**

Description	Existing Bottom Width (ft)	Proposed Bottom Width (ft)	Flow (cfs)	Velocity (ft/s)
End of 54-inch Manifold pipe to Siphon 1	6.0–6.5	6' Pipe	135	4.8
Check Structure (moved from original location before Siphon)	5.2–7.9	6.0	135	2.5
Siphon 2 to Siphon 3	1.7–3.6	5.5	120	2.9
Siphon 3 to Bend Transition	2.6–3.5	5.5	120	2.7
Bend Transition to Check Structure	2.6–3.1	5.5	70	2.0
Check Structure to Siphon 4	3.1–3.3	3.5	70	2.0
Siphon 4 to Siphon 5	2.6–3.4	3.5	70	2.2

Source: Montgomery Watson Harza, 2004

2.5.2.1 Typical Canal Section

The concrete lined canal will have a trapezoidal shape and side slopes of 1.5 horizontal to 1 vertical (1.5:1). The canal section will be lined with 2.5-inch-thick un-reinforced, cast-in-place concrete. The maximum bottom width will be six feet and the minimum bottom width will be 3.5 feet depending on the capacity requirements of the reach. The new canal invert elevation will be the same as the current elevation in order to continue utilizing existing siphons wherever hydraulic capacity is available. **Figure 2-8** illustrates the general cross-section.

2.5.2.2 Freeboard

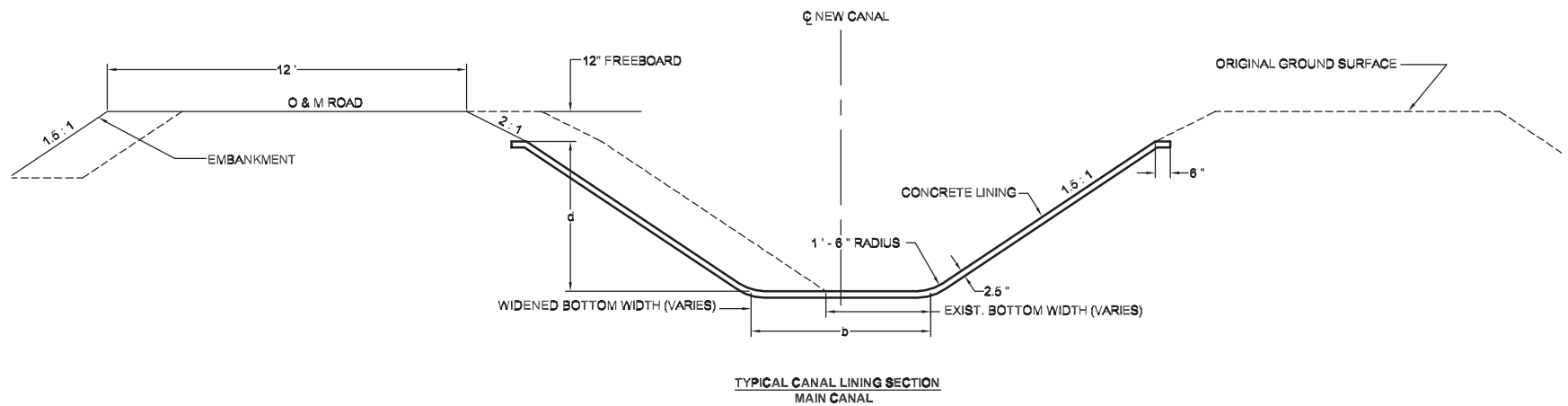
Portions of the existing canal run full (i.e., no concrete freeboard) during periods of maximum delivery. Reclamation design criteria recommend 6 inches of concrete freeboard at minimum. The Main Canal modifications will only be designed to accommodate the maximum flows without concrete freeboard. The earthen freeboard will be 12 inches from the top of the concrete to the elevation of the maintenance access road. The existing earthen freeboard varies slightly along the alignment, but is approximately 12 inches.

2.5.2.3 Embankment & Excavation

The existing canal will be demolished from one side or the other depending on the needed expanded width and the availability of right-of-way. Existing embankments will be excavated to the required canal width. The location of the widening will be determined on a reach by reach basis. Excavated material will be re-compacted to meet the requirements of the Operations and Maintenance (O&M) road. The widened canal will require an O&M access road on at least one side of the canal.

HYDRAULIC PROPERTIES

REACH	Q (cfs)	b (ft.)	d (ft.)
Start to Siphon 2	135	6.0	5.0
Siphon 2 to Sta. 73+35	120	5.5	4.0
Sta. 73+35 to End	70	3.5	4.0



The sides of the canal will rest on either a re-compacted embankment or neat excavation lines. Embankment materials will be specified as placed and spread evenly in uniformly compacted layers. Each horizontal layer will not exceed six inches in compacted thickness. Material will be homogeneous, free from lenses, pockets, streaks, laminations, or other deleterious materials. Prior to and during compaction operations, the materials will be specified to have a moisture content of no greater than two percent wet or less than five percent dry of optimum moisture for compaction.

All excavation or compacted embankment lines will have a tolerance limit of plus or minus 0.1-foot unless the governing concrete tolerance is more restrictive. Specified material thickness will have a tolerance limit of +10 percent or –5 percent. Transverse contraction joints will be placed at a maximum 10-foot spacing, on center, along the entire length of the new lining. Expansion joints will be provided at 50-foot spacing.

2.5.2.4 Check Structures

Reinforced concrete check structures exist at seven locations along the existing Main Canal between the Meridian Pumping Plant and Siphon 5. The check structure immediately upstream of Siphon 1 will be replaced downstream of Siphon 1. A check structure currently exists approximately 800-ft upstream of Siphon 5. This check structure is no longer used and will not be re-established upon widening. A new check structure will be installed immediately upstream of Siphon 5 to facilitate operation of the new Drexler Re-lift Pumping Plant in Phase 2.

A center post will be installed in the canal to allow for slots and stop logs (typically 2-inch by 12-inch pressure treated boards) to be inserted by operators between the reinforced concrete center post and the reinforced concrete stop log walls.

2.5.2.5 Turnouts

There are presently ten turnouts along the Main Canal from the Meridian Pumping Plant to Siphon 5. One of the turnouts is a safety overflow weir, and one is a 42-inch pass through culvert leading to two off-canal 24-inch turnouts. Six of the turnouts are pre-cast concrete structures notched into the side of the canal with slide gates. Upon completion of the canal widening, the turnouts will be reestablished. One 18-inch turnout between Siphon 2 and Siphon 3 is no longer useful and will not be reestablished upon canal widening. The turn-out gates will be reused and the gate frames will be refurbished if they are deemed useable by MFWC. If the gates have deteriorated beyond usefulness, they will be replaced with new gates and frames. It will be determined later if new pre-cast concrete structures will be procured. Approximately 2,625 feet due south of Siphon 3, at Sta. 74+50, the canal turns from due south to due east. At the turn, a 42-inch corrugated metal pipe (CMP) pass-through delivers flow to two turnouts. Upon widening of the canal, the 42-inch CMP will be reestablished and replaced in-kind.

2.5.2.6 Canal Buoyancy Control (Weep Holes)

It will be necessary to provide weep holes along some portions of the canal that have high groundwater in the winter months. Typically, the Main Canal has no flow in the winter months, but depending on Sacramento River levels, the ground water table can rise high enough to float the canal in some areas. A buoyancy condition would create non-uniform loads on the unreinforced

canal and lead to cracking, spalling, and failure of the canal system. Recommendations for weep holes will be finalized once the Geotechnical Report is completed.

2.5.2.7 Siphons

Two siphons will need to be replaced as part of the canal modifications. Siphon 1 will be removed and replaced by a 72-inch diameter RCP, designed for H-20 loading. The replacement of this siphon will require a shutdown and replacement of Mawson Road and will be subject to Sutter County Public Works' design standards.

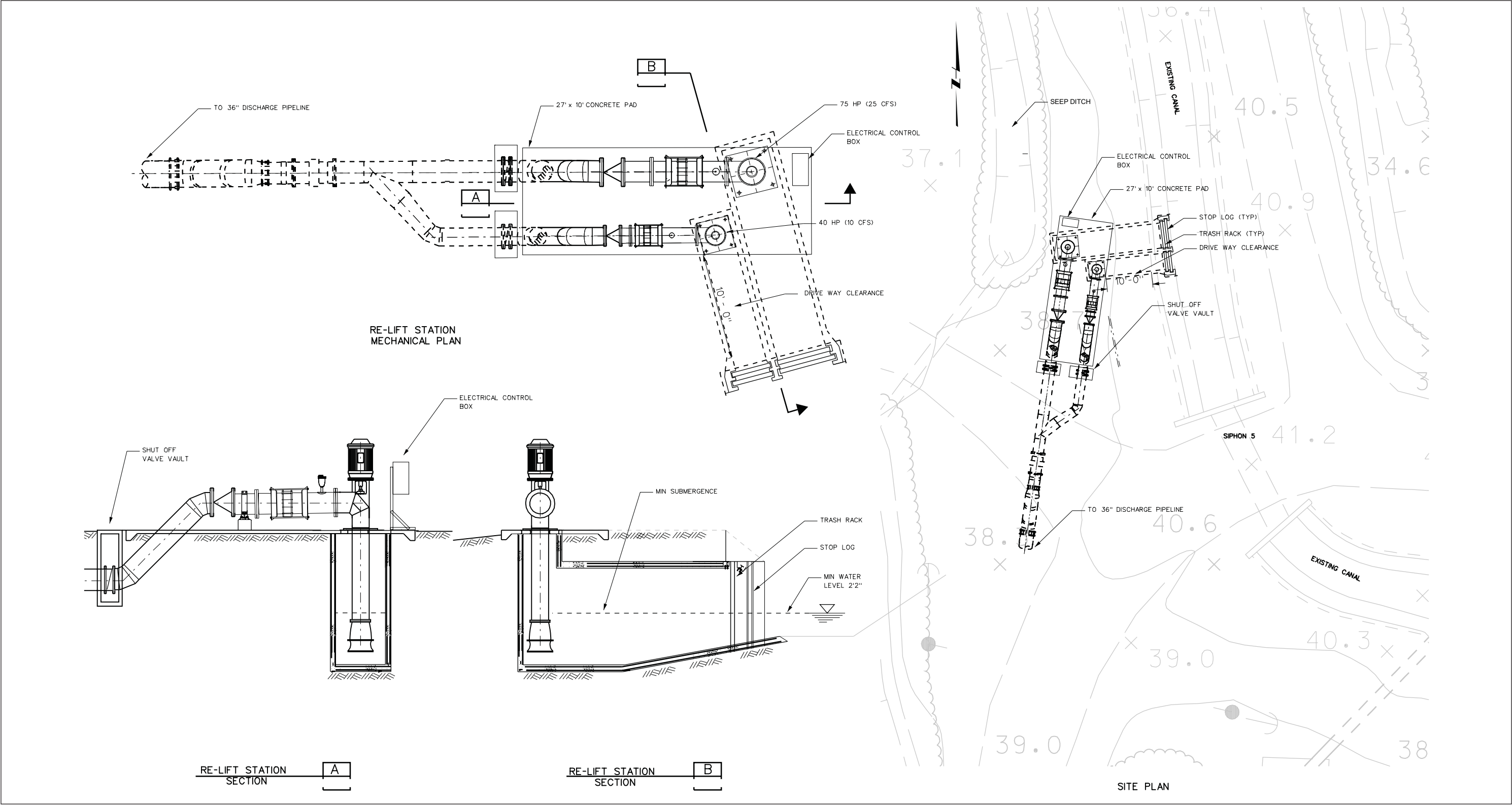
Siphon 3 will also be replaced by a 72-inch diameter RCP, designed for H-20 loading. Replacement of Siphon 3 will require a shutdown and replacement of Central Road and will be subject to Sutter County Public Works' design standards. Siphon 3 is currently 44 feet long. It is proposed that this siphon be lengthened to 200 feet to extend it past a home on Central Road that is situated next to the canal.

The remaining siphons (2, 4, and 5) provide adequate capacity and will be left in-place. Upstream and downstream transitions at each siphon will be constructed of 2.5-inch thick cast-in-place concrete or shotcrete.

2.5.3 Drexler Re-Lift Pumping Plant

The Drexler Re-Lift Pumping Plant will be located on the main canal, just upstream of the existing siphon 5 and pump #10. The purpose of the pumping plant will be to divert 35 cfs from the Main Canal to the Drexler Service Area due to the abandonment of the existing Drexler Diversion. The water will be pumped up to a new turnout structure via a new 36-inch diameter pipeline whose total length after all improvements will be approximately 6,500 lineal feet. From the turnout structure, the water will flow by gravity to the original Drexler canal outfall via approximately 600 feet of 36-inch pipe.

Figure 2-9 provides a general schematic of the proposed Drexler Re-Lift Pumping Plant. As shown, the Re-Lift station will be comprised of two vertical turbine pumps that will deliver 25 cfs and 10 cfs of canal water to a 36-inch discharge pipeline. The pumping plant will pump from a new two-channel sump on the irrigation canal.



SOURCE: MWH, 2004; and ESA, 2007

Figure 2-9
Drexler Re-Lift Station – Site Plan

2.5.3.1 Civil Site

The site will need to be re-graded to provide a suitable area for the 27 by 10 foot concrete pad that will house the pumps and the exposed piping. Since the pump pad will be at the same elevation as the existing canal berm (approximately elev. 40.5-feet), the berm will need widening to accommodate the pump pad and the need to provide vehicular access around the pumping plant. This requires that pump pad be located approximately 10–12 feet from the side-board of the canal to allow vehicle passage between the canal and the pumps. A small part of the seep drainage ditch on the western side of the canal will be impacted by the berm widening and the placement of the pump pad.

2.5.3.2 Pumps

Both pumps will discharge into separate, above ground, piping that will include a buried butterfly shutoff valve and a check valve. The 25-cfs pumps and 10-cfs pumps discharge into their respective 24-inch and 16-inch, above ground, piping. Each discharge header will be equipped with a combination air/vacuum valve and check valve. The two discharge headers then drop underground and transition into the main 36-inch pipeline, which extends to the Drexler canal. A buried butterfly shutoff valve allows isolation of each line. The concrete pad will extend out to include the pumps, the exposed piping, and the electrical power and control panel.

The pumps chosen for this application are the Prime Pump Company, Model 16P12 and Model M18. This selection will need to be verified once the pipeline layout is determined. The vertical turbine pumps will be standard clear water pumps. A 150 HP motor will drive the 25-cfs pump. The 10-cfs pump will require a 60 HP motor. The pumps will have 12-foot long columns and a required minimum submergence of 4.33 feet.

2.5.3.3 Sump

A new sump will be constructed just north of Siphon 5 to house the intake channels and the two new pumps. The conditions of the canal at the proposed intake site and the requirements of MFWC affect the general layout and orientation of the sump. The entrance to the sump will include a stop log and trash rack grate. Separate channels will serve each pump.

The channel dimensions will be governed by the Hydraulic Institute recommendations for sidewall and back wall clearance. For the 25-cfs pump, the channel will require 28 inches from the pump center line to the side wall (one pump column diameter). This will create a 54-inch wide channel. The back wall clearance from the center-line of the pump will be 21 inches (3/4 of pump column diameter). For the 10-cfs pump, side-wall clearance will be 18 inches (36-inch wide channel) and the back wall clearance will be 14-inches.

In order to get the proper submergence for the pumps at low water intervals, the floor at the entrance to the sumps will be sloped 10 degrees. The sloping floor will extend for 12 feet where the level bottom begins. The channel for the larger pump will be 24-feet long. The two pumps are off set in order to orient the discharge elbows to the pipeline and to save space. This makes for the channels to be of unequal lengths. Keeping the channels the same length would require that the discharge elbows to go up and out the back of the channel, requiring more piping and taking up more space.

2.5.3.4 Flow Measurement

The pumped water from the Main Canal will be measured with a 36-inch ultrasonic, multi-path flowmeter located in a vault somewhere just downstream of the pumping plant. The meter will consist of two wetted transducers inserted into the pipe. The meter will be housed into a concrete vault with a galvanized access hatch.

The selected meter for this application is the GE Panametric, Aquatrans AT868. These meters are accurate to within plus or minus one (1) percent of reading, and are designed for insertion in raw or other water containing sand or grit. They will require five straight pipe diameters upstream, and two downstream to smooth the flow profile and maintain reading accuracy.

The flow meter will be equipped with an indicator-totalizer. The indicator shall have four digits and measure flow from 0 – 50 cfs. The totalizer shall have six digits and shall measure total flow in units of acre-feet. The MFWC will use the flow measurements to track the amount of water being diverted to the Drexler Service Area.

2.5.4 Removal of Existing Meridian and Drexler

Diversion/Pumping plants

Once the New Meridian Diversion/Pumping Plant is constructed, the existing Meridian Diversion/Pumping Plant will be removed. Similarly, once the Drexler Relift pumping plant is operational, the existing Drexler Diversion/Pumping Plant will be removed. At a minimum, this will include the removal of the pumps, equipment platforms, electrical equipment, gauging stations, pile supports to required level, river side-piping, and placement of grout/concrete inside levee piping.

2.6 General Construction Considerations

The following construction methods and best management practices (BMPs) will be incorporated into the Proposed Project/Action where feasible. These measures will comply with the requirements set by the Central Valley Regional Water Quality Control Board to minimize construction-related impacts to water quality as well as minimize potential adverse impacts to sensitive biological resources.

- Silt screens and/or silt fences would be used where construction activities could possibly cause sediment to enter the river.
- All water-side construction activities for construction of the Meridian Diversion, including riprap installation, would be confined within a sheet-pile cofferdam, which would be put in place and removed during the “dry” season from June 1 to October 1. The season may be extended to November 1 with approval from NOAA Fisheries.
- Project construction and operations will result in no net loss of wetland resources.

- All construction contracts would specify a fish salvage program for all dewatered areas as part of construction. The Department of Fish and Game will be contacted to determine the proper disposition of salvaged aquatic organisms, including trapped fish and aquatic species.

Additional measures to avoid impacts to sensitive biological resources, including special-status fish and the giant garter snake, are included in Chapter 4.

2.7 Actions Contributing to MSCS Goals

The MSCS contains a list of conservation goals for each species and NCCPA community evaluated in the MSCS. The three alternative goals for species are recovery (“R”), contribute to recovery (“r”), and maintain (“m”). The goal of “recovery” was assigned to those species whose recovery is dependent on restoration of the Delta and Suisan Bay/Marsh ecosystems and for which CALFED could reasonably be expected to undertake all or most of the actions necessary to recover the species. Recovery is achieved when the decline of a species is arrested or reversed, threats to the species are neutralized, and the species long-term survival in nature is assured. The goal “contribute to recovery” was assigned to species for which CALFED Actions affect only a limited portion of the species range and/or have limited effects on the species. To achieve the goal of contributing to a species recovery, CALFED is expected to undertake some of the actions under its control and within its scope that are necessary to recover the species. When a species has a recovery plan, CALFED may implement both plan measures that are within the CALFED Solution Area and some measures that are outside the Solution Area. For species without a recovery plan, CALFED will need to implement specific measures that will benefit the species. The goal “maintain” was assigned to species expected to be affected minimally by CALFED Actions. For this category, CALFED will avoid, minimize, and compensate for any adverse effects to the species commensurate with the level of effect on the species. Actions may not actually contribute to the recovery of the species; however, at a minimum, they will be expected to not contribute toward the need to list the species or degrade the status of a listed species. CALFED also will, to the extent practicable, improve habitat conditions for these species.

The CALFED Ecosystem Restoration Program (ERP) has adopted the CALFED MSCS goals related addressing “recovery”, “contribute to recovery”, and “maintain” for MSCS covered species as described above. The ERP has also adopted the MSCS conservation measures and would build upon those measures during the process of completing ERP studies and actions. The ERP focuses on measures to enhance NCCPA communities and has a goal related to the need to “enhance and/or conserve biotic communities” (“E”). A final ERP goal is to “maintain and/or enhance harvested species” (“H”), which relates to commercial/recreational use of native and non-native biological resources. The MFWC Project will fulfill the following milestone of the CALFED ERP to the benefit of all MSCS “R” and “r” covered fish:

- Install positive barrier fish screens on all diversions greater than 250 cfs in all Ecological Management Zones (EMZs) and 25% of all smaller unscreened diversions in the Sacramento River Basin.

2.8 Conservation Measures

The CALFED MSCS presents the basis for conservation measures developed to address CALFED Actions overall, as outlined in the Programmatic CALFED EIS/EIR. The CALFED MSCS follows the two-tiered approach to FESA, CESA, and NCCPA compliance initiated by the CALFED Programmatic EIS/EIR and MSCS. The MSCS provides the CALFED programmatic compliance with FESA, CESA, and NCCPA while this MFWC ASIP provides the project-level compliance with these acts. As such, this ASIP represents the project-level biological assessment for initiating consultation with USFWS and NOAA-Fisheries under the Section 7 of the FESA and the project-level NCCPA compliance.

The following conservation measures are from a USFWS Programmatic Biological Opinion and will be incorporated into the Project Description. Conservation measures, as defined in this ASIP, include avoidance and minimization, compensation, and mitigation measures for giant garter snake. The following tables list the CALFED MSCS species specific conservation goals and measures, and habitat conservation measures for NCCPA habitats.

- For Phases 1 and 2, the contractor shall use vibrational pile driving to the greatest extent feasible. If percussive pile driving is necessary, its use shall be minimized to the maximum extent possible and comply with the following *Interim Criteria for Injury of Fish to Pile Driving Operations* (Popper et al., 2006):
 - The Sound Exposure Level (SEL) shall not exceed 187 dB (re: 1 $\mu\text{Pa}^2 \cdot \text{sec}$) in any single strike, measured at a distance of 32.8 ft from the source;
 - The peak sound pressure level should not exceed 208 dB (re: 1 $\mu\text{Pa}_{\text{peak}}$) in any single strike, measured at a distance of 32.8 ft from the source.
- For Phase 2 only, pump(s) used for dewatering the construction site will be screened according to NMFS fish screening criteria for anadromous salmonids (NMFS, 1997b). A qualified biologist will be on-site during such pumping activities to ensure that any fish that may be present within the construction area are relocated to suitable habitat near the project area.
- For Phases 1 and 2, during construction operations, the number of access routes, number and size of staging areas, and the total area of the proposed project activity will be limited to the minimum necessary. Routes and boundaries will be clearly demarcated. Movement of heavy equipment to and from the project site will be restricted to established roadways to minimize habitat disturbance. Project-related vehicles shall observe a 20-mile-per-hour speed limit within construction areas, except on County roads and on State and Federal highways. This is particularly important during periods when the snake may be sunning or moving on roadways. All heavy equipment, vehicles, and supplies will be stored at the designated staging area at the end of each work period.
- For Phases 1 and 2, during construction operations, stockpiling of construction materials, portable equipment, vehicles, and supplies will be restricted to the designated construction staging areas and exclusive of the Environmentally Sensitive Areas (ESAs). The applicant will ensure contamination of habitat does not occur during such

operations. All workers will be informed of the importance of preventing spills and appropriate measures to take should a spill occur.

- For Phases 1 and 2, at most 24-hours prior to the commencement of construction activities, the ESA shall be surveyed for giant garter snakes by a USFWS-approved biologist. The biologist will provide the USFWS with a written report that adequately documents the monitoring efforts within 24-hours of commencement of construction activities. The project area shall be re-inspected by the monitoring biologist whenever a lapse in construction activity of two weeks or greater has occurred.
- Construction activity within giant garter snake habitat (e.g. aquatic, upland, and rice habitat) shall be conducted between May 1 and October 1. This is the active period for the snake and direct mortality is lessened, because snakes are expected to actively move and avoid danger. If it appears that construction activity may go beyond October 1, the project proponents shall contact the USFWS as soon as possible, but not later than September 15 of the year in question, to determine if additional measures are necessary to minimize take. Construction activities within 200 feet from the banks of snake aquatic habitat will be avoided during the snake's inactive season. **If this is not feasible, the Project Proponent must consult with USFWS to determine measures to avoid impacts to giant garter snake.**
- For Phase 1, a USFWS-approved biologist shall inspect construction-related activities at the ESA to ensure that no unauthorized take of federally listed species or destruction of their habitat occurs. The biologist shall be available for monitoring throughout all phases of construction that may result in adverse effects to the giant garter snake. This includes clearing and grubbing activities and installation of exclusion fence in giant garter snake upland habitat. Furthermore, the biologist shall have the authority through communication with the resident engineer to stop construction activities in the immediate area if a giant garter snake is encountered during construction until appropriate corrective measures have been completed or until the snake is determined to be unharmed. Snakes encountered during construction activities shall be allowed to move away from the area on their own volition. The biologist shall notify the USFWS immediately if any listed species are found on-site, and will submit a report, including date(s), location(s), habitat description, and any corrective measures taken to protect the species found. The biologist shall be required to report any take of listed species to the USFWS immediately by telephone at 916/ 414-6600 and by electronic mail or written letter addressed to the Chief, Endangered Species Division, within three (3) working days of the incident. The Service does not authorize any handling or moving of a giant garter snake by other than a USFWS-permitted biologist.
- For Phases 1 and 2, a Worker Environmental Awareness Training Program for construction personnel shall be conducted by the USFWS-approved biologist for all construction workers, including contractors, prior to the commencement of construction activities. The program shall provide workers with information on their responsibilities with regard to the snake, an overview of the life-history of this species, information on

take prohibitions, protections afforded this animal under the Act, and an explanation of the relevant terms and conditions of this biological opinion. Written documentation of the training must be submitted to the Sacramento Fish and Wildlife Office within 30 days of the completion of training. As needed, training shall be conducted in Spanish for Spanish language speakers.

- For Phases 1 and 2, prior to the commencement of construction activities, high visibility fencing will be erected around the habitats of federally listed species to identify and protect these designated ESAs from encroachment of personnel and equipment. These areas will be avoided by all construction personnel. The fencing shall be inspected by the Contractor before the start of each work day and maintained by the Contractor until completion of the project. The fencing may be removed only when the construction of the project is completed. Fencing will be established in upland immediately adjacent to aquatic snake habitat and extending up to 200 feet from construction activities. Silt fencing, if properly installed, may serve as suitable snake exclusion fencing.
- For Phases 1 and 2, signs will be posted by the Contractor every 50 feet along the edge of the ESAs, with the following information: “This area is habitat of federally-threatened and/or endangered species, and must not be disturbed. These species are protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment.” The signs should be clearly readable from a distance of 20 feet, and must be maintained by the Contractor for the duration of construction.
- For Phases 1 and 2, Best Management Practices (BMPs), including a Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP), will be implemented to minimize effects to the snake during construction. Best management practices will be implemented to prevent sedimentation from entering ESAs and to reduce erosion, dust, noise, and other deleterious aspects of construction related activities. These BMPs may include, but are not limited to, silt fencing, temporary berms, restrictions on cleaning equipment in or near ESAs, installation of vegetative strips, and temporary sediment disposal. Runoff from dust control and hazardous materials will be retained on the construction site and prevented from flowing into the ESAs.
- For Phases 1 and 2, tightly woven fiber netting (mesh size less than 0.25 inch) or similar material shall be used for erosion control and other purposes at the ESA to ensure that the giant garter snake is not trapped or becomes entangled. This limitation shall be communicated to the contractor using special provisions included in the bid solicitation package.
- For Phases 1 and 2, to eliminate an attraction to predators of the snake, all food-related trash items, such as wrappers, cans, bottles, and food scraps, must be disposed of in closed containers and removed at the end of each workday from the entire project site.
- For Phases 1 and 2, the Contractor shall provide documentation that aggregate, fill, or borrow material provided for the proposed project was obtained in compliance with the State Mining and Reclamation Act (SMARA). Evidence of compliance with the Act

shall be demonstrated by providing the resident engineer with one of the following: 1) a letter from the USFWS stating that the use of the borrow pit will not result in the incidental take of species; 2) an incidental take permit for contractor-related activities issued by the USFWS pursuant to section 10(a)(1)(B) of the Act; 3) a biological opinion or letter concurring with a “not likely to adversely affect” determination issued by the USFWS to the Federal agency having jurisdiction over contractor-related services; 4) a letter from the USFWS concurring with the “no effect” determination for contractor-related activities; or 5) contractor submittal of information to the resident engineer indicating compliance with the SMARA and provision of County land use permits and California Environmental Quality Act (CEQA) clearance.

- For Phases 1 and 2, after construction activities are complete, any temporary fill or construction debris shall be removed and disturbed areas restored to their pre-project conditions. An area subject to “temporary” disturbance includes any area that is disturbed during the project, but that, after project completion, will not be subject to further disturbance and has the potential to be re-vegetated. All ESA snake habitats subject to temporary ground disturbances, including storage and staging areas and temporary roads, will be restored to pre-project conditions. If appropriate, these areas shall also be re-contoured to pre-project conditions. A written report shall be submitted to the USFWS within ten (10) working days of the completion of construction at the project site and restoration of the site to pre-project conditions.
- For Phases 1 and 2, an inspection of the site, with a photo documentation report showing pre- and post-project area photos, will be conducted and photos and a brief report will be submitted to USFWS one year from implementation of restoration to pre-project conditions.
- For Phases 1 and 2, the Contractor shall minimize the potential for harm, harassment, and direct mortality of the snake resulting from project-related activities by implementation of the project. The Contractor shall ensure that the temporary loss of giant garter snake habitat is confined to the proposed project site.
- For Phase 2, aquatic habitat for the snake will be dewatered 15 days prior to the initiation of construction activities. If complete dewatering is not possible, potential snake prey (*i.e.*, fish and tadpoles) will be removed so that giant garter snakes and other wildlife are not attracted to the construction area.
- For Phase 2, a USFWS-approved biologist shall inspect construction-related activities at the proposed project site to ensure that no unauthorized take of federally listed species or destruction of their habitat occurs. The biologist shall be available for monitoring throughout all phases of construction that may result in adverse affects to the giant garter snake. This includes clearing and grubbing and other construction activities in the areas of wetland vegetation/aquatic habitat, adjacent upland habitat, and during exclusion fence installation. Furthermore, the biologist shall have the authority through communication with the resident engineer to stop construction activities in the immediate area if a giant garter snake is encountered during construction until appropriate corrective measures

have been completed or until the snake is determined to be unharmed. Snakes encountered during construction activities shall be allowed to move away from the area on their own volition. The biologist shall notify the USFWS immediately if any listed species are found on-site, and will submit a report, including date(s), location(s), habitat description, and any corrective measures taken to protect the species found. The biologist shall be required to report any take of listed species to the USFWS immediately by telephone at 916/ 414-6600 and by electronic mail or written letter addressed to the Chief, Endangered Species Division, within three (3) working days of the incident. The Service does not authorize any handling or moving of a giant garter snake by other than a USFWS-permitted biologist.

- Prior to the commencement of construction activities, the project proponent shall compensate for the temporary and permanent loss habitat of the giant garter snake according to the Programmatic Guidelines.

**TABLE 2-2
CALFED MSCS SPECIES GOAL AND CONSERVATION MEASURES
FOR SPECIAL-STATUS SPECIES OCCURRING IN THE ACTION AREA**

Species (Scientific Name / Common Name)	Listing Status Federal/ State	MSCS Species Goal	Applicable MSCS Species Specific Conservation Measures
Fish			
<i>Acipenser medirostris</i> North American green sturgeon	FT/CSC	R	<ol style="list-style-type: none"> 1. Coordinate and maximize water supply system operations flexibility consistent with seasonal flow and water temperature needs of the green sturgeon; pursue opportunities to operate new and existing diversions to avoid and minimize adverse effects on green sturgeon, and, to the extent consistent with CALFED objectives, locate the diversion points to avoid the primary distribution of green sturgeon. 2. For all construction activities, limit construction to windows of minimal species vulnerability and implement best management practices (BMPs), including a stormwater pollution prevention plan (SWPPP), toxic materials control and spill response plan, and vegetation protection plan. 3. CALFED actions that have impacts on shallow water habitat will protect and restore in-kind habitat, including habitat features that minimize colonization by undesirable non-native species. 4. Avoid or minimize restrictions on the upward movement of green sturgeon to suitable spawning habitat. 5. Implement applicable conservation measures to avoid, minimize, and compensate for impacts on green sturgeon listed in MSCS Attachment D, "Summary of Potential Beneficial and Adverse Program Effects and Conservation Measures", Table D-19, "Anadromous Fish Group: Summary of Potential Beneficial and Adverse CALFED Effects and Conservation Measures".
<i>Oncorhynchus mykiss</i> Central Valley steelhead	FT/--	R	<ol style="list-style-type: none"> 1. Implement applicable conservation measures to avoid, minimize, and compensate for impacts on Central Valley steelhead listed in MSCS Attachment D, "Summary of Potential Beneficial and Adverse Program Effects and Conservation Measures", Table D-19, "Anadromous Fish Group: Summary of Potential Beneficial and Adverse CALFED Effects and Conservation Measures". 2. For all in-channel and near-channel construction activities, implement construction BMPs (such as erosion and sediment control measures) and conservation measures in the 404 NWP, GPs, and PL84-99 USACE flood relief BOs: <ol style="list-style-type: none"> a. Avoid or minimize channel modifications during time periods when steelhead are vulnerable to the direct and indirect adverse effects of construction activities. b. Avoid or minimize channel modifications in important natal, rearing, and migratory habitats that may result in habitat degradation and diminished habitat connectivity.

**TABLE 2-2
CALFED MSCS SPECIES GOAL AND CONSERVATION MEASURES
FOR SPECIAL-STATUS SPECIES OCCURRING IN THE ACTION AREA**

Species (Scientific Name / Common Name)	Listing Status Federal/ State	MSCS Species Goal	Applicable MSCS Species Specific Conservation Measures
			<ul style="list-style-type: none"> c. Avoid, minimize, and compensate for all adverse impacts on instream, shallow-water, riparian, and shaded riverine aquatic habitats resulting from CALFED Actions, including bank protection of in-channel islands, construction of attached berms, and levee program actions. d. Compensate for adverse impacts on habitats by in-kind, onsite replacement of habitats and their functional values. Compensation shall result in a net increase in the extent and connectivity of these habitats for migrating, rearing, and spawning steelhead.
			<ul style="list-style-type: none"> 3. Implementation of offsite, out-of-kind mitigation that reestablishes access to historical steelhead spawning and rearing habitat may be considered appropriate compensation: <ul style="list-style-type: none"> a. Remove or modify artificial barriers and diversion structures. 4. Fish screens shall be installed in accordance with NMFS/DFG fish screening criteria on any new diversions, consolidated diversions, or on the intake of any existing diversions as a compensation measure. 5. Fully adhere to the terms and conditions of all applicable CESA and FESA biological opinions and permits for CVP and SWP operations. 6. Implement construction BMPs including stormwater pollution prevention plans, toxic materials control and spill response plans, vegetation protection plans, and restrictions on materials used in channel and on levee embankments: <ul style="list-style-type: none"> a. All materials that are used for construction of in-channel structures must meet applicable State and federal water quality criteria. Avoid or minimize the use of such materials that are deleterious to aquatic organisms.
<i>Onchorhynchus tshawytscha</i> Central Valley spring-run Chinook salmon	FT/CT	R	<ul style="list-style-type: none"> 1. Implement applicable conservation measures to avoid, minimize, and compensate for impacts on Central Valley spring-run Chinook salmon listed in MSCS Attachment D, Table D-19. 2. For all in-channel and near-channel construction activities, implement construction BMPs (such as erosion and sediment control measures) and conservation measures in the 404 NWP, GPs, and PL84-99 USACE flood relief BOs: <ul style="list-style-type: none"> a. Avoid or minimize channel modifications during time periods when spring-run Chinook are vulnerable to the direct and indirect adverse effects of construction activities. b. Avoid or minimize channel modifications in important natal, rearing, and migratory habitats that may result in habitat degradation and diminished habitat connectivity. c. Avoid, minimize, and compensate for all adverse impacts on instream, shallow-water, riparian, and shaded

TABLE 2-2
CALFED MSCS SPECIES GOAL AND CONSERVATION MEASURES
FOR SPECIAL-STATUS SPECIES OCCURRING IN THE ACTION AREA

Species (Scientific Name / Common Name)	Listing Status Federal/ State	MSCS Species Goal	Applicable MSCS Species Specific Conservation Measures
			<p>riverine aquatic habitats resulting from CALFED Actions, including bank protection of in-channel islands, construction of attached berms, and levee program actions.</p> <p>d. Compensate for adverse impacts on habitats by in-kind, onsite replacement of habitats and their functional values. Compensation shall result in a net increase in the extent and connectivity of these habitats for migrating, rearing, and spawning spring-run Chinook salmon.</p> <p>3. Implementation of offsite, out-of-kind mitigation that reestablishes access to historical spring-run Chinook salmon spawning and rearing habitat may be considered appropriate compensation:</p> <p>a. Remove or modify artificial barriers and diversion structures.</p> <p>4. Fish screens shall be installed in accordance with NMFS/DFG fish screening criteria on any new diversions, consolidated diversions, or on the intake of any existing diversion that is either enlarged, modified, relocated, or for which the season of use is changed as a result of a CALFED action within the range of spring-run Chinook salmon. CALFED may also install fish screens on existing diversions as a compensation measure.</p> <p>5. Fully adhere to all terms and conditions in all applicable CESA and FESA biological opinions and permits for CVP and SWP operations.</p> <p>6. Implement construction BMPs including stormwater pollution prevention plans, toxic materials control and spill response plans, vegetation protection plans, and restrictions on materials used in channel and on levee embankments:</p> <p>a. All materials that are used for construction of in-channel structures must meet applicable State and federal water quality criteria. Avoid or minimize the use of such materials that are deleterious to aquatic organisms.</p>
<i>Onchorhynchus tshawytscha</i> Central Valley fall/late-fall-run Chinook salmon	FSC/CSC	R	<p>1. Implement applicable conservation measures to avoid, minimize, and compensate for impacts on Central Valley fall-/late-fall-run Chinook salmon listed in MSCS Attachment D, Table D-19.</p> <p>2. For all in-channel and near-channel construction activities, implement construction BMPs (such as erosion and sediment control measures) and conservation measures in the 404 NWP, GPs, and PL84-99 USACE flood relief BOs:</p> <p>a. Avoid or minimize channel modifications during time periods when steelhead are vulnerable to the direct and indirect adverse effects of construction activities.</p> <p>b. Avoid or minimize channel modifications in important natal, rearing, and migratory habitats that may result in</p>

**TABLE 2-2
CALFED MSCS SPECIES GOAL AND CONSERVATION MEASURES
FOR SPECIAL-STATUS SPECIES OCCURRING IN THE ACTION AREA**

Species (Scientific Name / Common Name)	Listing Status Federal/ State	MSCS Species Goal	Applicable MSCS Species Specific Conservation Measures
			<p>habitat degradation and diminished habitat connectivity.</p> <p>c. Avoid, minimize, and compensate for all adverse impacts on instream, shallow-water, riparian, and shaded riverine aquatic habitats resulting from CALFED Actions, including bank protection of in-channel islands, construction of attached berms, and levee program actions.</p> <p>d. Compensate for adverse impacts on habitats by in-kind, onsite replacement of habitats and their functional values. Compensation shall result in a net increase in the extent and connectivity of these habitats for migrating, rearing, and spawning steelhead.</p> <p>3. Implementation of offsite, out-of-kind mitigation that reestablishes access to historical fall-/late-fall-run Chinook salmon spawning and rearing habitat may be considered appropriate compensation:</p> <p>a. Remove or modify artificial barriers and diversion structures.</p> <p>4. Fish screens shall be installed in accordance with NMFS/DFG fish screening criteria on any new diversions, consolidated diversions, or on the intake of any existing diversion that is either enlarged, modified, relocated, or for which the season of use is changed as a result of a CALFED action within the range of fall-/late-fall-run Chinook salmon. CALFED may also install fish screens on existing diversions as a compensation measure.</p> <p>5. From April through June, avoid increasing the Delta export rate above the currently permitted instantaneous diversion capacity, as described in USACE Public Notice No. 5820A Amended.</p> <p>6. Implement construction BMPs including stormwater pollution prevention plans, toxic materials control and spill response plans, vegetation protection plans, and restrictions on materials used in channel and on levee embankments:</p> <p>a. All materials that are used for construction of in-channel structures must meet applicable State and federal water quality criteria. Avoid or minimize the use of such materials that are deleterious to aquatic organisms.</p>
<i>Onchorhynchus tshawytscha</i> Sacramento River winter-run Chinook salmon	FE/CE	R	<p>1. Implement applicable conservation measures to avoid, minimize, and compensate for impacts on Sacramento River winter-run Chinook salmon listed in MSCS Attachment D, Table D-19.</p> <p>2. For all in-channel and near-channel construction activities, implement construction BMPs (such as erosion and sediment control measures) and conservation measures in the 404 NWP, GPs, and PL84-99 USACE flood relief BOs:</p> <p>a. Avoid or minimize channel modifications during time periods when winter-run Chinook are vulnerable to the direct and indirect adverse effects of construction activities.</p>

**TABLE 2-2
CALFED MSCS SPECIES GOAL AND CONSERVATION MEASURES
FOR SPECIAL-STATUS SPECIES OCCURRING IN THE ACTION AREA**

Species (Scientific Name / Common Name)	Listing Status Federal/ State	MSCS Species Goal	Applicable MSCS Species Specific Conservation Measures
<i>Pogonichthys macrolepidotus</i> Sacramento splittail	FSC/CSC	<ul style="list-style-type: none"> b. Avoid or minimize channel modifications in important natal, rearing, and migratory habitats that may result in habitat degradation and diminished habitat connectivity. c. Avoid, minimize, and compensate for all adverse impacts on instream, shallow-water, riparian, and shaded riverine aquatic habitats resulting from CALFED Actions, including bank protection of in-channel islands, construction of attached berms, and levee program actions. d. Compensate for adverse impacts on habitats by in-kind, onsite replacement of habitats and their functional values. Compensation shall result in a net increase in the extent and connectivity of these habitats for migrating, rearing, and spawning spring-run Chinook salmon. <ul style="list-style-type: none"> 3. Implementation of offsite, out-of-kind mitigation that reestablishes access to historical winter-run Chinook salmon spawning and rearing habitat may be considered appropriate compensation: <ul style="list-style-type: none"> a. Remove or modify artificial barriers and diversion structures. 4. Fish screens shall be installed in accordance with NMFS/DFG fish screening criteria on any new diversions, consolidated diversions, or on the intake of any existing diversion that is either enlarged, modified, relocated, or for which the season of use is changed as a result of a CALFED action within the range of spring-run Chinook salmon. CALFED may also install fish screens on existing diversions as a compensation measure. 5. Fully adhere to all terms and conditions in all applicable CESA and FESA biological opinions and permits for CVP and SWP operations. 6. Implement construction BMPs including stormwater pollution prevention plans, toxic materials control and spill response plans, vegetation protection plans, and restrictions on materials used in channel and on levee embankments: <ul style="list-style-type: none"> a. All materials that are used for construction of in-channel structures must meet applicable State and federal water quality criteria. Avoid or minimize the use of such materials that are deleterious to aquatic organisms. 	<ul style="list-style-type: none"> 1. Consistent with CALFED objectives, limit dredging, diking, and filling of occupied shallow-water habitats. 2. Avoid or minimize the use of hard structures (i.e., riprap) to stabilize banks. 3. Implement applicable conservation measures to avoid, minimize, and compensate for impacts on Sacramento splittail listed in MSCS Attachment D, "Summary of Potential Beneficial and Adverse Program Effects and Conservation Measures," Table D-20, "Estuarine Fish Group: Summary of Potential Beneficial and Adverse CALFED Effects and

**TABLE 2-2
CALFED MSCS SPECIES GOAL AND CONSERVATION MEASURES
FOR SPECIAL-STATUS SPECIES OCCURRING IN THE ACTION AREA**

Species (Scientific Name / Common Name)	Listing Status Federal/ State	MSCS Species Goal	Applicable MSCS Species Specific Conservation Measures
Conservation Measures."			
Reptiles			
<i>Thamnophis gigas</i> Giant garter snake	FT/CT	r	<ol style="list-style-type: none"> 1. Conduct surveys to determine the occupancy and distribution of the species within suitable habitat that CALFED actions could affect.¹ 2. Restore potentially occupied habitat that would be temporarily degraded by CALFED actions onsite immediately following project completion.
Birds			
<i>Athene cunicularia</i> Western burrowing owl	--/CSC	m	<ol style="list-style-type: none"> 1. Restore or enhance 1-2 acres of suitable nesting habitat for each acre of occupied nesting habitat that is converted to unsuitable nesting habitat as a result of CALFED actions. 2. To the extent consistent with ERP objectives, design and manage grassland and agricultural land habitat restorations and enhancements to provide suitable foraging habitat conditions. 3. Avoid or minimize disturbances that could be associated with implementing CALFED actions near active nest sites during the nesting period (March-August). 4. To the extent consistent with ERP objectives, manage restored or enhanced habitats to maintain desirable rodent populations and minimize impacts associated with rodent control.
<i>Branta hutchinsii leucopareia</i> Cackling (=Aleutian Canada) goose	FD/--/--	m	<ol style="list-style-type: none"> 1. To the extent consistent with ERP objectives, direct proposed actions for improving agricultural habitats for wildlife to protecting and improving traditional wintering habitat.

¹ Note that the Service does not have a 'protocol-level survey' for the giant garter snake to determine presence/absence. Determination of species presence is based on habitat characteristics, the most current information about the extant range of the species, surrounding locality records, and the biology and ecology of the snake, and not on presence/absence surveys, which are not effective for this cryptic and evasive species.

TABLE 2-2
CALFED MSCS SPECIES GOAL AND CONSERVATION MEASURES
FOR SPECIAL-STATUS SPECIES OCCURRING IN THE ACTION AREA

Species (Scientific Name / Common Name)	Listing Status Federal/ State	MSCS Species Goal	Applicable MSCS Species Specific Conservation Measures
<i>Buteo swainsoni</i> Swainson's hawk	--/CT/--	r	<ol style="list-style-type: none"> 1. Before implementing actions that could result in take or the loss or degradation of occupied habitat, conduct surveys in suitable habitat within portions of the species' range that CALFED actions could affect to determine the presence and distribution of the species. 2. Avoid or minimize actions near locations that support high densities of nesting pairs that could adversely affect high value foraging and nesting habitat. 3. Avoid or minimize actions within 5 miles of active nest sites that could result in disturbance during the breeding period (April-September). 4. To the extent consistent with CALFED objectives, adhere to DFG Region II mitigation guidelines for avoiding or minimizing impacts of actions of the Swainson's hawk.
<i>Riparia riparia</i> Bank swallow	--/CT/--	r	<ol style="list-style-type: none"> 1. Before implementing actions that could result in take or the loss or degradation of occupied habitat, conduct surveys in suitable habitat within portions of the species' range that CALFED actions could affect to determine the presence and distribution of the species. 2. Avoid or minimize actions that could adversely affect known colonies or unoccupied river reaches with eroding banks composed of soils that would provide suitable nesting substrate. 3. Avoid actions near active colonies from April through August.

TABLE 2-3
CALFED MSCS CONSERVATION MEASURES FOR NCCPA NATURAL COMMUNITIES OCCURRING IN THE ACTION AREA

NCCPA Natural Community	Applicable MSCS Conservation Measures
Valley Riverine Aquatic Habitat	<ol style="list-style-type: none"> 1. Avoid or minimize disturbance to existing shaded riverine aquatic overhead cover. 2. Restore or enhance 1-3 times the linear footage of affected shaded riverine aquatic overhead cover near where impacts are incurred. 3. To the extent practicable, include project design features that allow for onsite reestablishment and long-term maintenance of shaded riverine aquatic overhead cover following project construction. 4. Avoid or minimize implementing actions during the periods evaluated species are present and could be affected by the actions.
Valley/Foothill Riparian Habitat	<ol style="list-style-type: none"> 1. Avoid or minimize disturbance to existing habitat. 2. Restore or enhance 2-5 acres of additional in-kind habitat for every acre of affected habitat near where impacts are incurred before implementing actions that could result in the loss or degradation of habitat. 3. To the extent practicable, include project design features that allow for onsite reestablishment and long-term maintenance of riparian vegetation following project construction. 4. Avoid or minimize construction activities during the breeding period of evaluated species that could be affected by the actions.
Anadromous Fish Group	<ol style="list-style-type: none"> 1. Implement measures on an emergency basis during extended droughts to protect water supplies dedicated to meet Delta inflow and outflow criteria deemed essential in maintaining anadromous fish populations. Such measures would be implemented infrequently and would be used only to readjust water supplies to levels expected without this set of CALFED actions. Measures may include additional supplies, or emergency provisions that would reduce other water supply demands. Another measure is initially to implement the actions to the extent feasible to determine potential effects on seasonal and critical-year water supplies and develop a long-term water management plan that includes this and other actions to minimize effects of reallocation in other seasons and critical years. 2. Avoid or minimize in-channel construction activities during periods when anadromous fish species are present in high abundance or when life stages are present that are most susceptible to adverse effects associated with implementing actions. 3. To the extent consistent with CALFED objectives, confine additional winter pumping for flooding agricultural lands to times and areas of channels with low densities of anadromous fish. 4. To the extent consistent with CALFED objectives, place consolidated intakes in areas with minimal numbers of juvenile anadromous fish. 5. To the extent consistent with CALFED objectives, include project design features that allow for onsite reestablishment and long-term maintenance of aquatic, wetland, and riparian habitat following project construction. 6. Reductions in unnatural inputs of organic carbon could be replaced with increased natural organic inputs such as from restored tidal wetlands and riparian habitats. 7. Water transfers should be conducted so as not to increase exports during times of the year when anadromous fish are more vulnerable to damage or loss at project facilities or when their habitat may be adversely affected. 8. Design and operate proposed new diversions from the Sacramento River to minimize adverse effects on migrating anadromous fish, to avoid blocking upstream migration of fish to the Sacramento River, and to improve habitat conditions for anadromous fish.
Estuarine Fish Group	<ol style="list-style-type: none"> 1. Implement measures on an emergency basis during extended droughts to protect water supplies dedicated to meet Delta

**TABLE 2-3
CALFED MSCS CONSERVATION MEASURES FOR NCCPA NATURAL COMMUNITIES OCCURRING IN THE ACTION AREA**

NCCPA Natural Community	Applicable MSCS Conservation Measures
	<p>inflow and outflow criteria deemed essential in maintaining anadromous fish populations. Such measures would be implemented infrequently and would be used only to readjust water supplies to levels expected without this set of CALFED actions. Measures may include additional supplies, or emergency provisions that would reduce other water supply demands. Another measure is initially to implement the actions to the extent feasible to determine potential effects on seasonal and critical-year water supplies and develop a long-term water management plan that includes this and other actions to minimize effects of reallocation in other seasons and critical years.</p> <ol style="list-style-type: none"> 2. To the extent consistent with CALFED objectives, construct and operate in-channel barriers and restrictions to provide sufficient leeway to adjust hydraulics in various channels to ensure fish are not being drawn in greater numbers or proportions toward the pumps or being affected by poor water quality. Implement monitoring and testing necessary to design, construct, and operate barriers and restrictions. Develop and implement procedures and operating criteria for barrier systems to protect fish. Implement monitoring and testing necessary to ensure against excessive movement of fish toward the south-Delta pumping plants. 3. Avoid or minimize in-channel construction activities during periods estuarine fish species would be most susceptible to adverse effects that could be associated with implementing proposed actions. 4. Avoid or minimize implementing proposed actions in occupied habitat areas that could have a substantial adverse effect on the distribution or abundance estuarine fish species. 5. To the extent practicable, confine additional pumping to times and area to channels with minimal concentrations of fish. 6. Install screens on new diversions to avoid entrainment of juvenile and adult estuarine fish. 7. Include project design features that allow for onsite reestablishment and long-term maintenance of aquatic, wetland, and riparian habitat following project construction. 8. Reductions in unnatural inputs of organic carbon could be replaced with increased natural organic inputs such as from restored tidal wetlands and riparian habitats. 9. Water transfers should be conducted in a manner that avoids increased exports during periods when estuarine fish are more vulnerable to damage or loss at project facilities. 10. Design and operate proposed new diversions from the Sacramento River to minimize adverse effects on migrating native estuarine fishes, to avoid blocking upstream migration of fish to the Sacramento River, and to improve habitat conditions for native estuarine fish.

CHAPTER 3

Environmental Baseline

The following chapter presents species accounts for species assessed in detail in this ASIP. The species addressed in this ASIP are those special-status species that may be affected or whose habitat may be affected by the Proposed Project/Action.

Species selected for detailed analysis include those federal- and/or state-listed species, candidate species, and/or species of special concern covered by the CALFED MSCS and potentially affected by the Proposed Project/Action. The following table shows these selected species which are addressed in detail in the ASIP.

Designated Critical Habitat and delineated Essential Fish Habitat in the Action Area are also discussed.

**TABLE 3-1
SPECIES, CRITICAL HABITAT, AND ESSENTIAL FISH HABITAT
ADDRESSED IN DETAIL IN THIS ASIP**

Species
<ul style="list-style-type: none">• North American green sturgeon (Southern DPS) (<i>Acipenser medirostris</i>)• Central Valley steelhead (<i>Oncorhynchus mykiss</i>)• Central Valley fall/late fall-run Chinook (<i>Oncorhynchus tshawytscha</i>)• Central Valley spring-run Chinook (<i>Oncorhynchus tshawytscha</i>)• Sacramento River winter-run Chinook (<i>Oncorhynchus tshawytscha</i>)• Sacramento splittail (<i>Pogonichthys macrolepidotus</i>)• Giant garter snake (<i>Thamnophis gigas</i>)• Western burrowing owl (<i>Athene cunicularia</i>)• Cackling (=Aleutian Canada) Goose (<i>Branta hutchinsii leucopareia</i>)• Swainson's hawk (<i>Buteo swainsoni</i>)• Bank swallow (<i>Riparia riparia</i>)
Critical Habitat
<ul style="list-style-type: none">• Central Valley steelhead Critical Habitat• Central Valley spring-run Chinook salmon Critical Habitat• Sacramento River winter-run Chinook salmon Critical Habitat
Essential Fish Habitat
<ul style="list-style-type: none">• Pacific salmon Essential Fish Habitat

3.1 Baseline Conditions for Species

The stretch of the Sacramento River that includes the Action Area is part of a migratory corridor for adult Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead, and provides migration and rearing habitat for juveniles of these species. A large proportion of all Federally listed Central Valley salmonids are expected to utilize aquatic habitat within the Sacramento River in the Action Area. The Sacramento River also functions as a migratory and holding corridor for adult and rearing and migratory habitat for juvenile Southern DPS of North American green sturgeon. The entire population of migrating adults and emigrating juvenile winter-, and Central Valley spring-run Chinook salmon, and a majority of Central Valley steelhead, must pass by/through the Action Area. The following section provides life history information for these special-status species with potentially affected by the Proposed Project/Action.

3.1.1 North American Green Sturgeon

On April 7, 2006, NMFS listed the Southern Distinct Population Segment (DPS) of the North American green sturgeon as threatened, although Critical Habitat for the green sturgeon has not yet been determined. Sturgeon are an anadromous fish species, spending the majority of their life in marine waters and then moving into freshwater throughout the fall and winter to spawn in the spring. Upon hatching the young green sturgeon develop in the fresh water and are known to return to the ocean within one to four years (COSEWIC, 2004). Historically, green sturgeon was found in the lower reaches of the San Joaquin River and Delta. Today, they occur in the upper Sacramento River and tributaries to the Sacramento River including the Feather, Yuba and American Rivers. Green sturgeon is frequently caught along the coast, but is present in limited numbers in the estuaries (COSEWIC, 2004).

The green sturgeon has diverse habitat needs ranging from freshwater streams, rivers, estuarine habitat as well as marine waters depending upon their life stage. The specific habitat requirements for green sturgeon are poorly understood but are thought to resemble those of white sturgeon. Green sturgeon spawning is thought to occur in deep pools in areas of large cobbles, but can range from clean sand to bedrock in turbulent river mainstems. The larger eggs and higher growth rates of developing green sturgeon in comparison to white sturgeon suggest that a higher oxygen demand may be required for proper embryonic development. Therefore, green sturgeon may subsequently require colder, cleaner water for spawning relative to white sturgeon (COSEWIC, 2004).

The spawning population of the Southern DPS of North American green sturgeon is currently restricted to the Sacramento River below Keswick Dam. This population is composed of a single breeding population which must pass by/through the Action Area. Adults migrate upstream by/through the Action Area primarily between March and June (Adams *et al.* 2002), and small groups of juveniles have been captured at various locations on the Sacramento River as well in the Delta (downstream of Sacramento) during all months of the year (IEP Database, Borthwick *et al.* 1999). Therefore, within the Action Area, green sturgeon are likely to occur within the riverine aquatic habitat of the Sacramento River year-round (**Figure 2-2, Figure 2-3, and Figure 2-4**).

3.1.2 Central Valley Steelhead

The Sacramento and San Joaquin Rivers offer the only migration route to the drainages of the Sierra Nevada and southern Cascade mountain ranges for steelhead. Information on migration and spawning tendencies of steelhead is difficult to determine due to the low abundance of spawners and the high flows and turbid waters occurring during winter spawning periods. NMFS reports limited data on the recent abundance of this ESU, but its present total run size based dam counts, hatchery returns, and past spawning surveys is probably less than 10,000 fish (NMFS, 1996). The most widespread run type of steelhead is in the winter (ocean-maturing) steelhead. Winter steelhead occur in essentially all coastal rivers in California, while summer steelhead are far less common. In California, both winter and summer steelhead generally begin spawning in December. Spawning occurs December through April in the Sacramento River mainstem and tributaries. Eggs are buried by the females in the loose gravel, usually at the lower end of a pool. Newly hatched larvae (alevins) initially stay in the gravel nesting area until their yolk sacs are absorbed (about two weeks) and then move into adjacent shallow and quiet pools. Juvenile steelhead remain in freshwater streams from one to three years before entering the ocean. Downstream migration predominantly occurs during fall and spring. Generally, steelhead will return to their natal streams in one to three years.

Adult steelhead typically migrate upstream within the Sacramento River during the winter (November - January) to spawning areas upstream of the proposed diversion locations and juvenile smolts migrate downstream during the spring (March – May). Steelhead inhabit the upper Sacramento River and occur seasonally in the vicinity of the proposed diversion locations. The proportion of steelhead in this DPS that migrate through the Action Area is unknown; however, because of the relatively large amount of suitable habitat in the Sacramento River relative to the San Joaquin River, the proportion of steelhead is probably high. At the Proposed diversion locations, there is limited quality juvenile rearing habitat (aquatic riverine habitat) in the Sacramento River – the vegetation along the shore and on the levee bank consists of ruderal vegetation, and on the levee, the vegetation is maintained annually by burning (**Figure 2-2**, **Figure 2-3**, and **Figure 2-4**). Riparian vegetation both upstream and downstream of the Proposed diversions, and at the existing Grimes and Drexler Diversions, provide suitable shaded riverine aquatic likely to be suitable rearing habitat. However, when the majority of juvenile steelhead emigrate as yearlings, they are assumed to be primarily utilizing the center of the channel rather than the shoreline.

Adult steelhead may be present in the Action Area from June through March, with the peak occurring between August and October (Bailey 1954, Hallock *et al.* 1957). Juvenile steelhead emigrate through the Sacramento River from late fall to spring. Given the timing of migrations and emigrations of adults and juveniles, Central Valley steelhead may be expected to occur in the Sacramento River near and within the Action Area from June through March.

3.1.3 Central Valley Spring-Run Chinook Salmon

Chinook salmon runs (fall-run, late fall-run, winter-run, and spring-run) are named for the time of season that upstream spawning migration occurs, and are defined by the combined timing of adult migration, the amount of time juveniles reside in a stream, and the time of year the smolts migrate out to sea. Timing of adult upstream migration varies within individual runs depending upon the region (Yoshiyama, 1998). Central Valley spring-run Chinook enter the Sacramento River system from March to July, and spawning occurs from late August through early October (Yoshiyama, 1998). Due to the longer period of time between upstream migration and spawning, spring-run Chinook must hold out in the cold temperatures of mountain headwaters to avoid excessive summertime temperatures of the valley and foothills. Spring-run ascent to mountain elevations can only be accomplished if there are no obstructions within the drainage system preventing passage.

Life histories (migration, holding, spawning, rearing, and juvenile emigration) of Chinook salmon vary within the separate runs, but essential habitat requirements including substrate, temperature, dissolved oxygen, stream flow, and water quality are consistent throughout the runs. Chinook salmon require a water temperature from 43° to 56° F to successfully spawn (Boles, 1988). Spawning can occur in habitats ranging from small tributaries to large river beds, and generally requires coarse gravel riffles. Chinook salmon eggs incubate in the gravel for approximately 35 to 50 days, depending on the temperature. The newly emerged fry remain in the gravel until most of the yolk sac is absorbed.

Successful rearing of juvenile Chinook requires cool streams/rivers with significant vegetative cover providing shade for protection from predation. Emigration strategies within the Sacramento-San Joaquin system can vary depending on the time of emergence. Spring-run emigration timing is dependant upon the tributaries of origin, and can occur through the period of November through June. Based upon Butte Creek research conducted by CDFG, over 95% of spring-run emigrate as fry/young-of-the-year. Only a small portion of the population will over-summer emigrating the subsequent fall as yearlings (McReynolds et al., 2006).

Adult Central Valley spring-run Chinook salmon are expected on the Sacramento River between March and July (Myers *et al.* 1998, Good *et al.* 2005). Peak presence is believed to be during February and March (CDFG 1998). In the Sacramento River, juveniles may begin migrating downstream almost immediately following emergence from the gravel with most emigration occurring from December through March (Moyle *et al.* 1989, Vogel and Marine 1991). Snider and Titus (2000) observed that up to 69 percent of spring-run Chinook salmon emigrate during the first migration phase between November and early January. The remainder of the Central Valley spring-run Chinook salmon emigrate during subsequent phases that extend into early June. The exact composition of the age structure is not known, although populations from Mill and Deer Creek primarily emigrate as yearlings (Colleen Harvey-Arrison, CDFG, pers. comm., 2004), and populations from Butte Creek primarily emigrate as fry (Ward *et al.* 2002). Younger juveniles are found closer to the shoreline than older individuals (Healey 1991).

Given the timing of migrations and emigrations of adults and juveniles, Central Valley spring-run Chinook may be expected to occur in the Sacramento River near and within the Action Area from November through June.

3.1.4 Central Valley Fall/Late Fall-Run Chinook Salmon

Although fall/late fall-run Chinook salmon inhabit a number of watersheds within the Central Valley for spawning and juvenile rearing, the largest populations occur within the mainstem Sacramento River, Feather River, Yuba River, American River, Mokelumne River, Merced River, Tuolumne River, and Stanislaus River. Fall/late fall-run Chinook salmon, in addition to spawning in these river systems, are also produced in fish hatcheries located on the Sacramento River, Feather River, American River, Mokelumne River, and Merced River. Hatchery operations are intended to mitigate for the loss of access to upstream spawning and juvenile rearing habitat resulting from construction of dams and reservoirs within the Central Valley in addition to producing fall/late fall-run Chinook salmon as part of the ocean salmon enhancement program to support commercial and recreational ocean salmon fisheries. Fall/late fall-run Chinook salmon also support an inland recreational fishery.

Adult fall/late fall-run Chinook salmon migrate from the coastal marine waters upstream through San Francisco Bay, Suisun Bay, and the Delta during late summer and early to late fall (approximately late July – early December). Spawning occurs between October and December with the greatest spawning activity occurring typically in November and early December. A portion of the fry population migrate downstream soon after emergence, where they rear within the lower river channels, Delta, and estuary, including Suisun Bay and the lower reaches of channels within the marsh, during the spring months. The remaining portion of juvenile salmon continue to rear in the upstream stream systems through the spring months, until they are physiologically adapted to migration into saltwater (smolting), which typically takes place between April and early June. A small proportion of the Chinook salmon juveniles may, in some systems, rear through the summer and fall months migrating downstream during the fall, winter, or early spring as yearlings. Adult Chinook salmon spawn at ages ranging from approximately two to five years, with the majority of adult fall-run Chinook salmon returning at age three.

Given the timing of migrations of adults and the potential for juveniles to linger within the Sacramento River system, Central Valley fall/late fall-run Chinook may be expected to occur in the Sacramento River near and within the Action Area all the months of the year.

3.1.5 Sacramento River Winter-Run Chinook Salmon

Winter-run Chinook salmon generally begin migrating upstream from December through February and hold-over in the Sacramento River system for a couple of months before peak spawning occurs between May and July (Groot, p. 319, 1998). Temperatures must be suitable for the winter-run to hold over. Winter-run Chinook emigration to the Delta has been known to occur from November through April, after only four to seven months of river life (Groot, p. 319, 1998). Juveniles may exhibit a sustained residence in the middle or lower Sacramento River or Upper Delta prior to seaward migration. Juvenile Sacramento River winter-run Chinook salmon

migration patterns in the Sacramento River can best be described by temporal migration characteristics found by the USFWS (2001) in beach seine captures along the lower Sacramento River between Sacramento and Princeton. Beach seining samples the shoreline rather than the center of the channel, as is often the case in rotary screw traps and trawls, and is considered the most accurate sampling effort in predicting the nearshore presence of juvenile salmonids. In the Sacramento River, between Princeton and Sacramento, juveniles are expected between September and mid April, with highest densities between December and March (USFWS 2001). Rotary screw trap work at Knights Landing on the Sacramento River by Snider and Titus (2000) captured juveniles between August and April, with heaviest densities observed first during November and December, and second during January through March. The largest captures occurred during periods of sustained high flow, generally greater than 20,000 cfs.

Adult winter-run typically migrate to spawning areas upstream of the proposed diversion locations, and occur seasonally in the vicinity of the proposed diversion locations. Adult Sacramento River winter-run Chinook salmon are expected to be present in the Sacramento River near and within the Action Area between November and June (Myers *et al.* 1998, Good *et al.* 2005) as they migrate to spawning grounds. Juveniles are expected to occur within the Sacramento River near and within the Action Area from September through April. Suitable winter-run Chinook rearing habitat occurs in the vicinity of the existing diversions, although at the locations of the Proposed new diversions, rearing habitat is absent.

3.1.6 Sacramento Splittail

The Sacramento splittail was recently (2003) delisted as a threatened species by the USFWS, but remains a State and Federal Species of Concern. The Sacramento splittail is endemic to the sloughs, lakes, and rivers of the Central Valley. In the Sacramento Valley, they were found in early surveys as far up the Sacramento River as Redding (below the Battle Creek Fish Hatchery in Shasta County), in the Feather River as high as Oroville, and in the American River to Folsom (Rutter 1908). Today they are found most frequently in the Sacramento River below the mouth of the Feather River and become increasingly rare in an upstream direction, particularly during summer and fall. A few individuals have been found annually in the Sacramento River at Red Bluff Diversion Dam, at Hamilton City, at the entrance to the Glenn Colusa irrigation diversion, and at the mouth of Big Chico Creek (Moyle *et al.*, 2004).

Splittail live 7-9 years, tolerate a wide range of environmental conditions, and have high fecundity. Typically, adults migrate upstream in January and February and spawn on seasonally inundated floodplains in March and April. In May the juveniles migrate back downstream to shallow, brackish water rearing grounds, where they feed on detritus and invertebrates for 1-2 years before migrating back upstream to spawn. Seven long-term sampling programs in the estuary indicate that the splittail population is maintained by strong year classes resulting from successful spawning in wet years, although some spawning occurs in all years. The Sacramento splittail may be expected to occur in the Sacramento River near and within the Action Area from January through May.

3.1.7 Giant Garter Snake

Giant garter snake preys primarily on aquatic species such as fish and amphibians; both native and introduced species are taken. Generally active from April through September, the giant garter snake breeds from March into May, and again briefly in September. Young are brooded internally by females, who give birth to 10 to 46 (average is 23) live young from late July into September. Young disperse into dense cover and reabsorb their yolk sacs, then begin feeding on their own. They reach sexual maturity in three to five years. From early October to April, the giant garter snake takes refuge in winter retreats and is generally not active (USFWS, 1999).

The giant garter snake is endemic to wetlands of California's Central Valley. This snake inhabits irrigation and drainage canals, rice lands, marshes, sloughs, ponds, small lakes, low-gradient streams, and adjacent uplands. The snake requires enough water during their active season to maintain high densities of prey; emergent wetland vegetation for cover and foraging; and adjacent uplands and openings in streamside vegetation for basking sites. Higher uplands are used for cover and refuge from floodwaters during their non-active season. The giant garter snake is typically absent from wetlands with sand, gravel, or rock substrates, and from riparian woodlands.

The giant garter snake population was probably always disjunct, with a southern population occurring from the vicinity Buena Vista Lake in Kern County to Merced County, and a northern population occurring from San Joaquin County to Butte County. To the east and west, the populations were probably confined by the foothills of the Sierra Nevada Mountains and the Coast Ranges. There are 13 separate populations presently recognized by the USFWS, coinciding with historic flood basins and tributary streams in the Central Valley (USFWS, 1999). These populations are discontinuously distributed from the Fresno area in the south to Butte Creek in the north. Dispersal corridors do not exist between the populations.

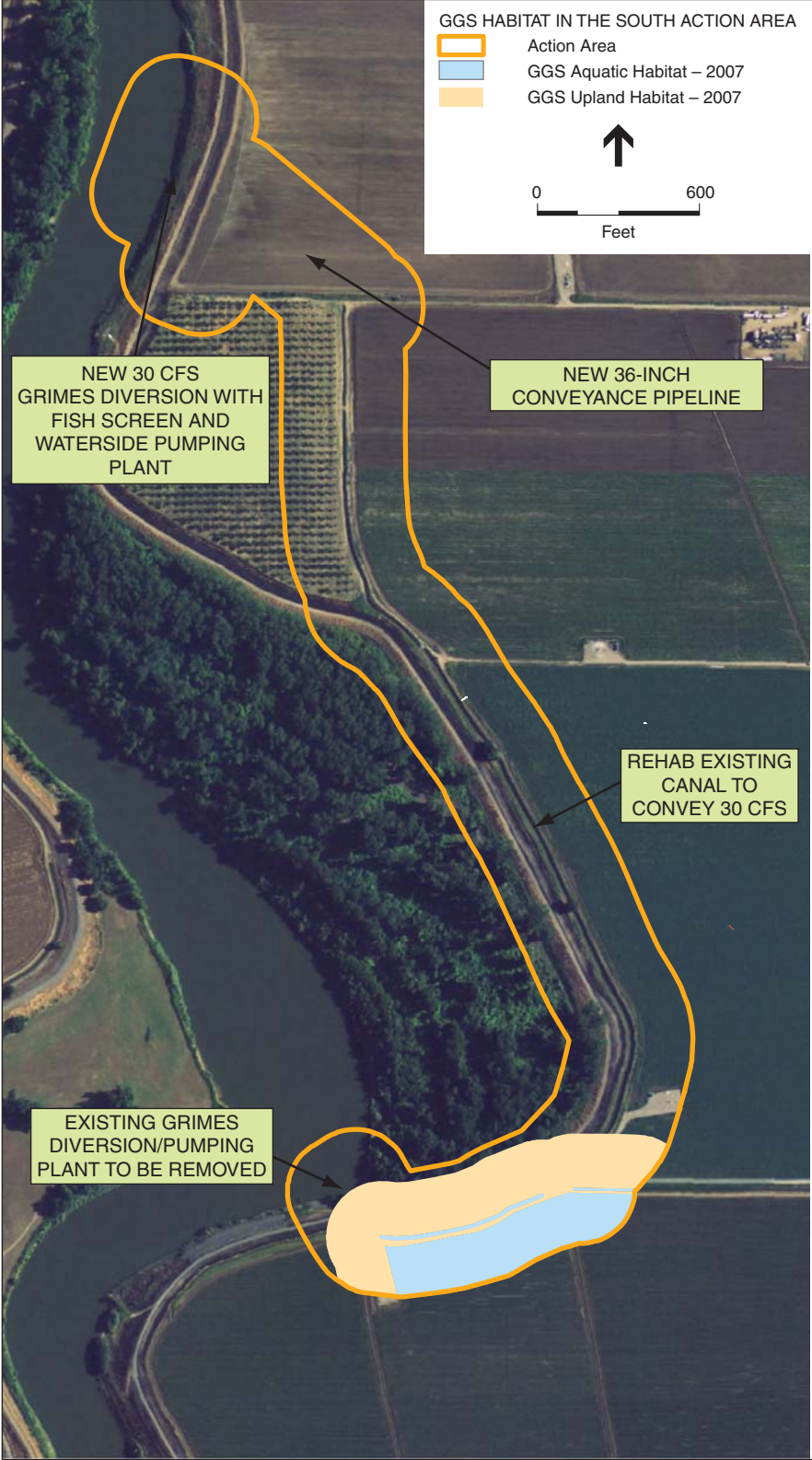
Giant garter snakes have been recorded in one location near the Action Area. The record dates back to 1983 and is approximately six miles southwest of the Action Area (CNDDDB, 2006). No giant garter snakes were observed during field reconnaissance for this project; however, given the cryptic and evasive nature of this species, determination of presence more often relies on the habitat characteristics, the most current information about the extant range of the species, surrounding locality records, and the biology and ecology of the giant garter snake.

Agricultural land use within the region generally provides suitable giant garter snake habitat, with abundant rice fields and associated irrigation ditches, rodent burrows for upland refugia, and open upland areas for basking. Within the Action Area, there are several types of drainage ditches that border various types of crops (including rice). The availability of emergent or aquatic vegetation for cover and basking sites varies with each ditch, season, and the operations of MFWC within a given year. A description of the potential giant garter snake habitat within the Action Area is provided below and is depicted in **Figure 3-1**. Within the Action Area, all habitats within 200' of suitable giant garter snake aquatic habitat are considered either aquatic or upland habitat for the snake. However, upland areas that are covered by a walled structure such as a building or more than 200' from suitable aquatic habitat are generally not considered suitable habitat for giant garter snake.

Aquatic Habitat

Rice Fields

Rice is a common crop grown within the Proposed Project/Action Area, and there are rice fields within the MFWC Service Area. In the 2007 growing season, there was one organic rice field within the Action Area, on the Park Farming Property in the vicinity of the Grimes canal improvements. For the 2008 growing season, rice fields are planned on the Gusti Properties, located along the Main Canal improvements within the Action Area (**Figure 3-1**). Because rice fields are inundated through the spring and summer, during the giant garter snake's active period, and because rice provides suitable vegetative cover, rice fields within the Action Area provide suitable habitat for the giant garter snake.



SOURCE: USDA, 2005; MWH, 2007; MFWC, 2007; and ESA, 2008

Figure 3-1
GGG Habitat within the Action Area

Irrigation Drains, Ditches, and Canals

There are several types of conveyances within the Action Area, ranging from wide, concrete-lined canals for irrigation delivery to relatively shallow, unstructured seep ditches used to collect minor drainage from fields. As previously mentioned, the giant garter snake's specific habitat requirements include the presence of aquatic habitat during its active period, the availability of aquatic vegetative cover, basking sites, and prey during the active period, and the availability of upland refugia (generally within 200 feet of suitable aquatic habitat) during the inactive period. Each type of ditch may provide some, all, or none of the required elements that define giant garter snake habitat, depending on MFWC maintenance and operations, as well as the individual farmer's agricultural practices, including which crops are grown in the fields. Following field visits to the site, analysis of collected data, and informal consultation with USFWS biologists, it was determined that the only ditches that are suitable aquatic habitat for giant garter snake are select drains belonging to Reclamation District 70, and portions of the Main Canal that are within 200 feet of suitable aquatic habitat. These drains are described in further detail in this chapter. In addition, the other types of conveyances are also described to document why they were excluded as suitable giant garter snake habitat under current conditions. **Figure 2-2, Figure 2-3, and Figure 2-4** show all types of ditches within the Action Area, and **Figure 3-1** shows the drains that are considered suitable giant garter snake aquatic habitat. A summary of suitable aquatic habitat for giant garter snake is included in **Table 3-2**.

Reclamation District 70 Drains

Some of the Reclamation District 70 drains (Reclamation Drains) are suitable aquatic habitat for giant garter snake, as they provide all the criteria necessary to support giant garter snake during its active and inactive periods. The Reclamation Drains are larger drainage ditches that follow along and adjacent to the Main Canal and are used by MFWC for water delivery or drainage. The locations of the Reclamation drains within the Action Area are shown in **Figure 2-2, Figure 2-3, and Figure 2-4**. These are unlined ditches up to 30 feet wide and five to six feet deep, and are typically vegetated with common tule (*Scirpus acutus*) and cattail (*Typha latifolia*). The Reclamation District maintains the drains for vegetation removal by burning and/or baling, on average approximately every two or three years, depending on how much the drain is used. Some drains may go without maintenance for longer periods if they do not receive significant drainage flows. Many of the Reclamation Drains hold water throughout the spring and summer, and presumably support aquatic invertebrates, amphibians, and small fish species. Reclamation Drains that were suitable in the 2007 growing season are considered suitable for 2008. Some Reclamation Drains, although they did not hold water in 2007, are located adjacent to fields that will be planted with rice for the 2008 growing season, and therefore are considered suitable aquatic habitat for giant garter snake in 2008. The select Reclamation Drains that are considered suitable aquatic habitat for giant garter snake within the Action Area are shown in **Figure 3-1**, and represented in **Photo 7, Appendix B**.

Main Canal

The aquatic habitat of the Main Canal is not suitable for giant garter snake, except for where it is 200 feet or less from otherwise suitable giant garter snake aquatic habitat, be it a Reclamation Drain, natural suitable wetlands, or rice field. The Main Canal is a concrete-lined ditch for the majority of its alignment. It is used to convey and deliver water from the Meridian

Diversion/Pumping Plant south to the central portion of the MFWC Service Area during the spring and summer. The Main Canal in the Action Area begins at the Meridian Diversion to its intersection with Summy Road as shown in **Figure 2-2**, **Figure 2-3**, and **Figure 2-4**.

Approximately 12 feet wide and 6 feet deep, the Main Canal typically does not support vegetation along its banks. Ruderal vegetation may grow along the unlined freeboard of the canal or along unlined portions of the canal, but this vegetation is regularly removed several times during the spring and summer. Control methods include application of herbicide three times per year and mowing three times per year. Although an aquatic grass grows within portions of the Main Canal during the summer, it is sparsely distributed and does not provide adequate structure or cover for giant garter snake. During the fall and winter, the Main Canal is no longer used for conveyance and remains dry until the next spring. A portion of the Main Canal is shown in **Photo 8, Appendix B**.

Another concrete-lined ditch in the northern portion of the Action Area, called the “Railroad Ditch,” has the same characteristics as the Main Canal and is not considered suitable aquatic habitat for giant garter snake because it does not provide the necessary cover and it is not within 200 feet of suitable aquatic habitat (**Figure 2-4**).

Water Delivery Ditches

Ditches used for water delivery are generally not considered suitable aquatic habitat for giant garter snake due to the lack of emergent aquatic vegetation for cover and basking, and/or lack of consistent water within the ditches during the snake’s active period. However, some delivery ditches within 200 feet or less from suitable giant garter snake aquatic habitat may be used by the snake. In addition to the Main Canal, these smaller (3-4 feet wide), unlined, earthen ditches are used to deliver irrigation water throughout the MFWC Service Area. Within the Action Area, these delivery ditches are located along the conveyance improvements in the Proposed Project/Action and are depicted in **Figure 2-2**, **Figure 2-3**, and **Figure 2-4**. A view of a typical delivery ditch is shown **Photo 9, Appendix B**. Similar to the Main Canal, the delivery ditches receive regular maintenance to remove all vegetation that grows within the ditches and along its banks. The vegetation removal occurs several times during the spring and summer – usually at least once and up to six times per year, depending on how often the maintenance is needed. Control methods include herbicide treatment, burning, and/or baling. These delivery ditches convey water at specified times during the spring and summer months and are controlled by MFWC operations. A few ditches hold water throughout the growing season, but the majority of the delivery ditches only hold water for one week during each month during the growing season while MFWC delivers water to its clients. Therefore, although there may be water in these ditches during the snake’s active period, it is not of sufficient duration to support giant garter snake aquatic habitat.

Seep Ditches

Seep ditches within the Action Area generally do not provide suitable aquatic habitat for giant garter snake, except where they are sufficiently wet, vegetated, unmaintained and/or in proximity to other aquatic habitat, including rice fields. Seep ditches, if not in a condition to be aquatic habitat for giant garter snake, are upland habitat for the snake if they are within 200’ of suitable giant garter snake aquatic habitat. These earthen, unlined ditches are on the edges of crop fields and serve to drain excess moisture from the fields. Seep ditches are dug by farmers within their

fields; therefore, the maintenance and even existence of these ditches is up to the farmers' discretion. These ditches are on average three to four feet wide and are located throughout the Action Area (**Figure 2-2, Figure 2-3, and Figure 2-4**). The seep ditches that appeared to be unmaintained during the 2007 growing season supported ruderal species such as Johnsongrass, prickly lettuce, and Italian thistle up to three feet tall (**Photo 10, Appendix B**). Because these ditches are not used for water delivery or large-flow drainage, they do not consistently hold water during the spring and summer unless they are adjacent to a rice field, for which the entire field is flooded. The ditches only receive rainwater in the winter, during the giant garter snake's inactive period. The only places where the ditches might be inundated during the snake's active period are where these ditches are located adjacent to rice fields, which are flooded during the spring and summer. During the 2007 growing season, the only rice fields identified within the Action Area, shown in **Figure 3-1**, are in the vicinity of the Grimes conveyance improvements. A map of crop types projected for 2008 for the general project region is also included in **Figure A-1** of the ASIP (**Appendix A**). The projected locations of rice fields in the Action Area for the 2008 growing season are shown in this figure as well. Currently no seep ditches are located within any rice fields in 2008.

Upland Habitat

Within the Action Area, upland refugia for the giant garter snake exist primarily as burrows made by small burrowing mammals such as ground squirrels and gophers. Upland burrows up to 200 feet from aquatic habitat are considered to be suitable refugia for giant garter snake. Open areas within 200 feet from aquatic habitat may also provide suitable basking habitat for giant garter snake during its active season. Small mammal burrows and basking habitat vary in location and quantity, but are generally available along the upper banks of ditches and unpaved areas, along and including roads or cultivated fields (the widths vary from five to 20 feet) (**Photo 11, Appendix B**). Earthen berms along agricultural fields may also support small mammal burrows.

Summary of Giant Garter Snake Habitat

Table 3-2 below summarizes the potential habitats available in the Action Area for the giant garter snake. The calculations were based on mapped locations of the crop types for 2007 and the projected crop types for 2008; and the locations of the drains, ditches, and canals within the Action Area. It should be noted that a few projections for crop types in 2008 – especially along Phase 2 of the Proposed Action – may change, as the type of crop planted is up to the individual farmer's discretion. Suitable aquatic habitats were determined to include all waterways with vegetative cover with adequate water during the snake's active season. Ditches that had an adequate water supply during the active season but did not have vegetative cover were included as aquatic habitat only if they were within 200 feet of suitable aquatic habitat. Upland habitats were determined to include all lands not covered by a walled structure, such as a building, within 200 feet of suitable aquatic habitat. All upland habitats with rodent burrows are suitable refugia for the giant garter snake during their inactive season, and all other upland habitats without refugia may be used by the giant garter snake for basking. Cropland is also included as upland habitat, although its utility to the giant garter snake may be limited and highly variable, depending on the type of crop.

**TABLE 3-2
SUMMARY OF SUITABLE GGS HABITAT IN THE ACTION AREA**

Habitat Type	2007		2008	
	Lineal feet	Acres	Lineal feet	Acres
AQUATIC:				
Rice Fields	--	3.9	--	15.7
Reclamation Drains	6,953.6	4.0	8,229.1	4.5
Main Canal	4,484.2	1.2	6,964.1	1.9
Delivery Ditches	992.6	0.3	140.3	0.03
UPLAND				
	--	61.0	--	62.3

3.1.8 Western Burrowing Owl

The western burrowing owl inhabits open grasslands and shrub lands with perches and burrows. These owls eat mainly insects, with small mammals, reptiles, and birds making up a portion of the diet as well. For cover and breeding, old rodent burrows, as well as debris piles are used. The western burrowing owl generally breeds from March through August, peaking in April and May.

In the Action Area, potential nest/burrow sites occur in unpaved and relatively undisturbed upland areas, such as along earthen berms and unpaved roads and turnouts. The relatively-exposed banks and levees of the Sacramento River and drainage canals may also provide suitable habitat.

3.1.9 Cackling (=Aleutian Canada) Goose

The cackling goose is a small, island-nesting subspecies of the Canada goose. This subspecies nests on the Aleutian Islands and winters in the Central Valley where it forages in meadows, agricultural fields, pastures, and moist grasslands near open water (lakes and ponds) and wetlands. The cackling goose was federal-listed endangered in 1967 due to a severe decline in populations. Hunting and loss of migration and wintering habitat contributed to this species' decline, although the introduction of Arctic and red foxes to the breeding islands was the main reason for population decline. However, due to reintroductions of wild geese onto fox-free islands and other conservation efforts, populations of cackling goose have recovered from approximately 6,300 individuals in 1989 to 37,000 individuals in 1999. The cackling goose was reduced to federal-listed threatened status in 1989, and finally delisted in 2001 (FR 66:54, 15642-15656, March 2001). Monitoring of goose populations will continue for 5 years after delisting, as required by the Endangered Species Act to ensure full recovery of the species. The cackling goose is still protected under the Migratory Bird Treaty Act, and is a federal species of concern.

Within the Action Area, suitable foraging habitat exists in the surrounding agricultural fields along the Sacramento River and the MFWC Service Area. The only occurrence in the CNDDDB (2006) is from 1978, documenting this species at Davis Ranch, 5 miles north of Grimes and within 2 miles of the MFWC service boundary.

3.1.10 Swainson's Hawk

The Swainson's hawk is a migratory raptor listed as threatened by the State of California, and federally as a species of special concern. It breeds in western North America and winters for the most part in South America. It nests in trees, usually in riparian areas, but forages over pasturelands and open agricultural fields. In the Central Valley it is associated with riparian corridors adjacent to field crops and grasslands and subsists largely on small mammals, especially California vole, California ground squirrel, and large insects. Suitable foraging habitat within an energetically efficient flight distance from active Swainson's hawk nests has been found to be of great importance. Because the prey base for Swainson's hawk is highly variable from year to year, depending on cycles of agriculture, rainfall, and other natural cycles, large acreages of potential foraging habitat must be allotted per breeding pair.

The decline of the species in the Central Valley has been associated with extensive reduction of Swainson's hawk habitat. Suitable foraging habitat is present within the Action Area in agricultural fields, where populations of prey species are supported. Suitable nesting habitat occurs within the riparian woodland habitats adjacent with the Proposed Project/Action site. Large valley oak and cottonwood trees occur adjacent to the river on the bank opposite from the proposed intake structures and fish screens. The most recent CNDDDB (2006) occurrence for Swainson's hawk within the MFWC Service Area boundary was observed in 1989 within riparian forest along the Sacramento River, approximately 0.5-mile north of Grimes. Within two miles of the MFWC Service Area, an active nest was observed in a strip of riparian forest on the north bank of the Sacramento River, east of Colusa.

3.1.11 Bank Swallow

The bank swallow is the smallest North American swallow, with a body length of about 4.75 inches. The bank swallow nests in colonies and creates nests by burrowing into vertical banks consisting of fine-texture soils. Bank swallows breed in California from April to August and spend the winter months in South America. Currently, bank swallows are locally common only in restricted portions of California where sandy, vertical bluffs or riverbanks are available for the birds to dig their burrows and nest in colonies. Most of California's remaining populations nest along the upper Sacramento River where it still meanders in a somewhat natural manner. In this alluvial plain, the river system provides suitable soil types and erosion needed for prime nesting habitat. Seventy-five percent of the State's population is concentrated on the banks of Central Valley streams, including several colonies on the Sacramento River.

Since 1900, the range of bank swallows in California has been reduced by approximately 50 percent largely attributed to habitat loss. The rip-rapping of natural stream banks is the single most serious, human-caused threat to the long-term survival of the bank swallow in California. Existing colonies

and areas of potential habitat may be lost over the next several years if current planning is implemented. Rip-rap installed by the COE under the Sacramento River Bank Protection Project has already affected almost 150 miles of Sacramento River bank since 1960. Additional rip-rap proposed under this project may result in extensive loss of essential, eroding bank habitat.

On the Sacramento River, bank swallow populations continue to decline. Based on an average occupancy rate of about 45 percent of all burrows dug into river banks, an estimated population of 13,170 pairs of bank swallows nested in Sacramento River habitats in 1986. In 1998 the population reached its lowest level of 4,990 pairs and then rebounded dramatically in 1999 to 8,210 pairs regaining some habitat from which it was extirpated (in 1998) on the lower end of its Sacramento River range. The significance of the apparent turnaround may not be known for a few years if it continues. The 1999 result may be a beginning of an expanding population boom for the species or just a momentary upswing. Further monitoring will be necessary to determine the true population trend, if any. Currently, the status of the bank swallow is still considered declining (CDFG, 2000a).

The State Recovery Plan for bank swallow includes identifying habitat preserves and a return to a natural, meandering riverine ecosystem as the two primary strategies for recovering the bank swallow. A recovery planning team has cited the return to naturally functioning riparian ecosystems as the best way to preserve, recover, and conserve the many species, including the bank swallow, that are dependent on this unique ecosystem.

In the general Action Area there is potential for nesting along the banks of the Sacramento River. The CNDDDB documents two occurrences of bank swallow within the MFWC Service Area. The most recent observation is from 1987; approximately 0.5-mile north of Grimes a colony of bank swallows was observed nesting in the river bank. There are three more observations, dated 1986-1987, of nesting colonies within two miles outside of the MFWC Service Area. The bank swallow prefers steep, open cliff-like banks for nesting. Where the proposed new intake will be located, however, the shore slopes gradually up to the levee and is largely vegetated with annual grasses.

3.2 Critical Habitat

The Action Area occurs within designated Critical Habitat for Central Valley steelhead, Central Valley spring-run Chinook salmon, and Sacramento River winter-run Chinook salmon. Critical Habitat for threatened Central Valley steelhead and Central Valley spring-run Chinook salmon was issued by NMFS on September 2, 2005. Critical Habitat for endangered Sacramento River winter-run Chinook salmon was designated on June 16, 1993.

The project vicinity is located within the Colusa Basin Hydrologic Unit (5520) of Critical Habitat for Central Valley steelhead and Central Valley spring-run Chinook. This unit includes the Sacramento River upstream to and including: Tisdale Bypass, Butte Creek, Butte Slough, Nelson Slough, Sacramento Slough, Sutter Bypass, Colusa Bypass, Little Chico Creek, and Little Dry Creek.

For the Sacramento winter-run Chinook, Critical Habitat is designated to include the Sacramento River from Keswick Dam, Shasta County (River Mile 302) to Chipps Island (River Mile 0) at the westward margin of the Sacramento-San Joaquin Delta, all waters from Chipps Island westward

to Carquinez Bridge, including Honker Bay, Suisun Bay, and Carquinez Strait, all waters of San Pablo Bay westward of the Carquinez Bridge, and all waters of San Francisco Bay (north of the San Francisco/Oakland Bay Bridge) from San Pablo Bay to the Golden Gate Bridge.

These species share similar habitat requirements. The Primary Constituent Elements (PCE's) of salmonid habitat within the Action Area include: freshwater spawning and rearing habitat; freshwater migration corridors; and estuarine areas containing adequate substrate, water quality, water quantity, water temperature, water velocity, cover/shelter, food, riparian vegetation, space, and safe passage conditions. The Sacramento River provides freshwater habitat in the Action Area and serves as an upstream and downstream salmonid migratory route, as well as juvenile salmonid rearing habitat.

The diversion and storage of natural flows by dams and diversion structures on Central Valley waterways have depleted streamflows and altered the natural cycles by which juvenile and adult salmonids have evolved. Changes in streamflows and diversions of water affect freshwater rearing habitat and freshwater migration corridor PCEs in the action area. Various land-use activities in the action area such as urbanization and agricultural encroachment have resulted in habitat simplification. Runoff from residential and industrial areas also contributes to water quality degradation (Regional Board 1998). Urban stormwater runoff contains pesticides, oil, grease, heavy metals, polynuclear aromatic hydrocarbons, other organics and nutrients (Regional Board 1998) that contaminate drainage waters and destroy aquatic life necessary for salmonid survival (NMFS 1996). In addition, juvenile salmonids are exposed to increased water temperatures as a result of thermal inputs from municipal, industrial, and agricultural discharges in the action area. Accelerated predation as a result of habitat changes in the action area, such as the alteration of natural flow regimes and the installation of bank revetment structures such as dams, bridges, water diversions, and piers are likely a factor in the decline of Sacramento River winter-run Chinook salmon, CV spring-run Chinook salmon, and CV steelhead.

Within the action area, the freshwater rearing and migration PCEs have been transformed from a meandering waterway lined with a dense riparian corridor, to a highly leveed system under varying degrees of control over riverine erosional processes and flooding. In the reach from Colusa downstream to Verona (RMs 143 to 80) – which includes the Action Area – levees are generally constructed near the edge of the river (USFWS 2000). Severe long-term riparian vegetation losses have occurred in this part of the Sacramento River, and there are large open gaps without the presence of important habitat features due to the high amount of riprap (USFWS 2000). Overall, more than half of the Sacramento Rivers banks in the lower 194 miles have been ripped (USFWS 2000).

1. Freshwater Rearing Habitat

Freshwater rearing sites are those with water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility; water quality and forage supporting juvenile development; and natural cover such as shade, submerged and overhanging large wood, log jams, beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks. Both spawning areas and migratory corridors comprise

rearing habitat for juveniles, which feed and grow before and during their outmigration. Non-natal, intermittent tributaries also may be used for juvenile rearing. Rearing habitat condition is strongly affected by habitat complexity, food supply, and presence of predators of juvenile salmonids. Some complex, productive habitats with floodplains remain in the system (*e.g.*, the lower Cosumnes River, Sacramento River reaches with set-back levees [*i.e.*, primarily located upstream of the City of Colusa]). However, the channeled, leveed, and riprapped river reaches and sloughs that are common in the Sacramento-San Joaquin system typically have low habitat complexity, low abundance of food organisms, and offer little protection from either fish or avian predators. Freshwater rearing habitat also has a high conservation value as the juvenile life stage of salmonids is dependant on the function of this habitat for successful survival and recruitment. Thus, although much of the rearing habitat is in poor condition, it is important to the species.

2. Freshwater Migration Corridors

Ideal freshwater migration corridors are free of obstruction with water quantity and quality conditions and contain natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility, survival and food supply. Migratory corridors are downstream of the spawning area and include the lower Sacramento River and the Delta. These corridors allow the upstream passage of adults, and the downstream emigration of outmigrant juveniles. Migratory habitat condition is strongly affected by the presence of barriers, which can include dams, unscreened or poorly- screened diversions, and degraded water quality. For successful survival and recruitment of salmonids, freshwater migration corridors must function sufficiently to provide adequate passage. For adults, upstream passage through the Delta and the much of the Sacramento River is not a problem, but problems exist on many tributary streams, and at the RBDD. For juveniles, unscreened or inadequately screen water diversions throughout their migration corridors, and a scarcity of complex in-river cover have degraded this PCE. However, since the primary migration corridors are used by numerous populations, and are essential for connecting early rearing habitat with the ocean even the degraded reaches are considered to have a high conservation value to the species. Thus, although much of the migration corridor is in poor condition, it is important to the species.

In the Action Area and vicinity, the adjacent riparian habitat has been modified by trails (both paved and unpaved), levees, and general recreation activities. These areas may be of poor quality but still provide cover for rearing juveniles. However, at the locations of the proposed new diversions (within the Action Area) suitable salmonid rearing habitat is low, lacking riparian-shaded riverine aquatic habitat. More suitable rearing habitat exists immediately upstream and downstream from the Proposed diversions, and at the existing diversion sites which will be removed. Based on unconsolidated sediments dominating the channel substrate, it is not likely that spawning habitat exists within Action Area.

3.3 Essential Fish Habitat

Essential Fish Habitat (EFH) is defined as those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity. For the purposes of interpreting the definition

of EFH, “waters” includes aquatic areas and their associated physical, chemical, and biological properties that are used by fish, and may include areas historically used by fish where appropriate; “substrate” includes sediment, hard bottom, structures underlying the waters, and associated biological communities; “necessary” means habitat required to support a sustainable fishery and a healthy ecosystem; and “spawning, breeding, feeding, or growth to maturity” covers all habitat types used by a species throughout its life cycle. The Proposed Project/Action is located within the region identified as EFH for Pacific salmon, including Chinook salmon, in Amendment 14 of the Pacific Salmon FMP.

The Sacramento River provides freshwater habitat in the Action Area and serves as an upstream and downstream migratory route for Pacific salmon and green sturgeon, as well as juvenile salmonid rearing habitat. Although the adjacent riparian habitat has been modified by trails (both paved and unpaved), levees, and general recreation activities, it does in some areas provide cover for rearing juveniles. However, in the vicinity of the proposed new diversion locations (within the Action Area), suitable salmonid and sturgeon rearing habitat does not occur due to low quality shaded riverine aquatic habitat. Based on unconsolidated sediments dominating channel substrate, it is not likely that spawning habitat exists within the immediate vicinity of the Action Area.

CHAPTER 4

Effects of Proposed Project/Action on Special Status Species

This section describes the methods used to determine the potential effects of the Proposed Project/Action on special-status species potentially occurring in the Action Area. Species included in this analysis are federal- and state-listed, candidates for federal or state listing, and other species of special concern that are covered under the CALFED MSCS. These special-status species include:

- North American green sturgeon (Southern DPS) (*Acipenser medirostris*)
- Central Valley steelhead (*Oncorhynchus mykiss*)
- Central Valley fall/late fall-run Chinook (*Oncorhynchus tshawytscha*)
- Central Valley spring-run Chinook (*Oncorhynchus tshawytscha*)
- Sacramento River winter-run Chinook (*Oncorhynchus tshawytscha*)
- Sacramento splittail (*Pogonichthys macrolepidotus*)
- Giant garter snake (*Thamnophis gigas*)
- Western burrowing owl (*Athene cunicularia*)
- Cackling (=Aleutian Canada) Goose (*Branta canadensis leucopareia*)
- Swainson's hawk (*Buteo swainsoni*)
- Bank swallow (*Riparia riparia*)

Evaluating potential effects on species within the Action Area requires an understanding of the species' life histories and life stage specific environmental requirements. Ecological and status information on these species is provided in Chapter 3, Environmental Baseline – Special-Status Species Accounts and Status in the Action Area, of this ASIP.

The analysis of effects of a particular action on a biological resource can be composed of one or more types of effects. Direct and indirect effects, interrelated and interdependent effects, and cumulative effects are defined below.

4.1 Direct and Indirect Effects

Under FESA (16 USC 1531-1544), direct effects are those that are caused by the Proposed Project/Action and occur at the time of the action. According to the USFWS and NOAA Fisheries, indirect effects:

“...are caused by or result from the proposed action, are later in time, and are reasonably certain to occur, e.g., predators may follow ORV tracks into piping plover nesting habitat and destroy nests; the people moving into the housing unit may bring cats that prey on the mice left in the adjacent habitat. Indirect effects may occur outside of the area directly affected by the action.”

4.2 Interrelated and Interdependent Effects

According to FESA, interrelated and interdependent actions are defined as follows:

Effects of the action under consultation are analyzed together with the effects of other activities that are interrelated to, or interdependent with, that action. An interrelated activity is an activity that is part of the proposed action and depends on the proposed action for its justification. An interdependent activity is an activity that has no independent utility apart from the action under consultation.

According to the USFWS and NOAA Fisheries, interrelated actions are those that are part of the Proposed Project/Action and depend on the Proposed Project/Action for their justification - actions that would not occur “but for” the larger action of the action under consultation (Proposed Project/Action). Interdependent actions are those that have no significant utility apart from the action that is under consideration. There are no interrelated or interdependent actions associated with MFWC’s Proposed Project/Action.

4.3 Effects on Species

4.3.1 North American Green Sturgeon, Central Valley Steelhead, Central Valley Fall/Late Fall-Run and Spring-Run Chinook Salmon, Sacramento River Winter-Run Chinook Salmon, and Sacramento Splittail

The Proposed Project/Action would involve work within the Sacramento River; therefore, the important special-status species to consider in this habitat are the threatened North American green sturgeon (Southern DPS), threatened Central Valley steelhead, endangered Sacramento River winter-run Chinook salmon, and special-concern Central Valley fall/late-fall Chinook salmon and Sacramento splittail. Although further USFWS and NOAA consultation on Phase 1 and Phase 2 will occur separately, this discussion applies to both phases.

Construction and operation of a surface water diversion in the Sacramento River has the potential to adversely impact various salmonids, sturgeon, and other fish species and their habitats through several mechanisms, including entrainment into the water diversion, impingement on the intake screen, increased vulnerability to predation mortality, and increased levels of turbidity and suspended solids, and underwater sound pressure waves. Direct mortality of fish species may also occur during cofferdam installation and dewatering. The following table summarizes potential effects to special-status fish species occurring in the Action Area (diversion footprints plus 200 feet).

TABLE 4-1 SUMMARY OF SPECIAL-STATUS FISH EXPOSURE TO STRESSORS AS A RESULT OF THE PROPOSED PROJECT/ACTION						
Potential Stressors:	Type of Exposure	Location of Exposure	Species (Life Stage) Exposed	Timing of Exposure	Duration of Exposure	Frequency of Exposure
Entrainment	Direct	Diversion Intake	GS (A, J); CVST (A); CVSR (A, J); CVFR (J); SWR (A, J); SS (A, J)	During normal operation	April to October	Constant
Impingement	Direct	Intake Screen	GS (A, J); CVST (A); CVSR (A); CVSR (A, J); CVFR (J); SWR (A, J); SS (A, J)	During normal operation	April to October	Constant
Increased Predation	Indirect	Local Vicinity of Diversion	All species (Both A and J stages)	Always	April to October	Constant
Increased turbidity and suspended solids	Indirect	Local Vicinity of Diversion	GS (A, J); CVST (A); CVSR (A); CVFR (J); SWR (A)	During construction	June to October	One-time construction event
Sound pressure waves	Indirect	Vicinity of Diversion	GS (A, J); CVST (A); CVSR (A); CVFR (J); SWR (A)	During installation of cofferdam	June to October	One-time construction event
*Stranding during dewatering	Indirect	Diversion (area within cofferdam)	GS (A, J); CVST (A); CVSR (A); CVFR (J); SWR (A)	During installation of cofferdam	June to October	One-time construction event
*Cofferdam	Direct	Local Vicinity of Diversion	GS (A, J); CVST (A); CVSR (A); CVFR (J); SWR (A)	During installation of cofferdam	June to October	One-time construction event

*Phase 2 only

A=Adults; J=Juveniles; GS=Green Sturgeon (Southern DPS); CVST= Central Valley Steelhead; CVSR=Central Valley Spring-run Chinook; CVFR=Central Valley Fall/Late Fall-run Chinook; SWR=Sacramento Winter-run Chinook, SS=Sacramento Splittail

As shown in Table 4-1, the effects of the Proposed Project/Action on special-status fish depend on whether the fish are exposed, which life stages are exposed, how long, how often, and when the fish are exposed. It can be inferred that with increasing distance from the stressor/source of stressor the effects to an individual are diminished. For many of the stressors, fish must be within the immediate vicinity of the Action Area to be affected. For example, a fish swimming a few hundred feet upstream of a diversion is not likely be pulled by suction into the diversion; however, if that fish approached within a few feet of the diversion intake, there is a much greater probability of entrainment. The following discussion analyzes the fish response to the potential stressors, and what kind of effects to the species would result.

Entrainment and Impingement

All of the special-status fish species considered are at risk of being entrained or impinged by a diversion in the Sacramento River. The risk of entrainment occurs when the pumps are drawing water; for the MFWC this is from April to October every year. Similarly, impingement or death

by collision or entrapment against the intake screen is a hazard to the fish when the pumps are active. However, the design criteria outlined by the Proposed Project/Action will comply with CDFG and NOAA Fisheries fish screen criteria, and will reduce potential effects from fish entrainment and impingement substantially. Installation of the new diversions with fish screens would be a significant improvement over the current diversions which are not screened.

Increased Predation

Placement of structures within the Sacramento River, including a positive barrier fish screen, would modify local velocity and current patterns, create localized turbulence and eddies, and provide cover habitat for a variety of predatory fish species, such as striped and smallmouth bass. Structural components of the positive barrier fish screen may result in the potential for increased localized predation mortality for all special-status species considered, as well as other fish species within the river. Juvenile fish are particularly vulnerable. However, placement of the Proposed Project/Action's new diversion structures is within areas with adequate flow velocities, thereby minimizing backwater eddy effects and potential impacts to salmonids and sturgeon from predatory species. Therefore, increased predation at these diversions is likely a stressor of low magnitude.

Sound Pressure Waves

Sound pressure waves or "noise" within the water would result from installation of support piles for the diversion facilities or installation of sheet piles and beams during construction of the cofferdam. Fish may be injured or killed by the impact sounds generated by percussive pile driving. Their hearing may also be affected or their behavior altered such that it constitutes harassment or harm. The specific effects of pile driving on fish depend on a wide range of factors including the type of pile, type of hammer, fish species, environmental setting, and many other factors (Popper et al., 2006). The Proposed Project/Action may require the use of vibratory or percussion hammer methods. Both methods produce underwater sound pressure waves that can be perceived by fish; however, while vibrating hammers do not produce sound pressure levels that would result in injury or mortality to fish, they may still impact the fish. The percussion hammer, if needed for cofferdam installation, would be used on an intermittent and short duration basis. Use of the percussion hammer would be minimized to the maximum extent possible. Fish species within the Action Area and vicinity are at risk of exposure to this stressor. The fish would likely respond to this stressor by swimming away from the noise. The pile-driving activity would only occur during the June 1 to October 1 period (to November 1 with NOAA Fisheries approval), when large numbers of special-status species are less likely to occur in the Action Area.

Cofferdam Construction

The construction of the proposed Meridian Diversion fish screen facility would require placement and removal of a sheet-pile cofferdam to isolate the work site from the rest of the river. Constructing a cofferdam would have a short-term, localized impact to water quality by causing an increase in turbidity and suspended solids. Increased sedimentation may cause reduced survival of eggs or alevins, reduce primary and secondary river productivity, interfere with feedings, cause behavioral avoidance, and cause a breakdown of social organization to native species downstream of the discharge area. In addition, the dewatering of the cofferdam would strand fish and other organisms trapped within the cofferdam. The physical placement of the cofferdam into the water may also cause direct mortality to fish.

Cofferdams generally lessen the impact of construction on the surrounding environment by isolating the construction area; however, the installation of the cofferdam does cause short-term localized impacts. In order to minimize impacts to fish species, the cofferdam installation would be limited to the in-water work period, from June 1 to October 1 (to November 1 with NOAA Fisheries approval). During this time, installation of the cofferdam would have the least impact on fish species. The abandonment of the existing Grimes Diversion (Phase 1) and Drexler Diversion (Phase 2), which would require minimal in-river work to cap and seal the existing intake pipe manifold, would also occur during the in-water work period. Any fish trapped in the cofferdam during dewatering will be salvaged, and the implementation of measures detailed in the Project Description will minimize impacts to water quality. Once it is installed, the cofferdam is not likely to be a significant stressor to fish species.

Given the overall benefit to fish as a result of the Proposed Project/Action, as well as the use of a cofferdam, the fish salvage requirement for dewatered work sites, the localized and minimal in-river disturbances, and constructing within the June 1 to October 1 in-water work period (may be extended to November 1 with NOAA approval), the Proposed Project/Action is expected to result in minimal impacts to the fisheries resources of the Sacramento River. The following measures will further reduce potential effects to listed and special-concern fish species in Phase 1 and Phase 2.

- **Measure BIO-1: Pile Driving Activities.** For Phases 1 and 2, the contractor shall use vibrational pile driving to the greatest extent feasible. If percussive pile driving is necessary, its use shall be minimized to the maximum extent possible and comply with the following *Interim Criteria for Injury of Fish to Pile Driving Operations* (Popper et al., 2006):
 - The Sound Exposure Level (SEL) shall not exceed 187 dB (re: 1 $\mu\text{Pa}^2 \cdot \text{sec}$) in any single strike, measured at a distance of 32.8 ft from the source;
 - The peak sound pressure level should not exceed 208 dB (re: 1 $\mu\text{Pa}_{\text{peak}}$) in any single strike, measured at a distance of 32.8 ft from the source.
- **Measure BIO-2: Dewatering.** For Phase 2 only, pump(s) used for dewatering the construction site will be screened according to NMFS fish screening criteria for anadromous salmonids (NMFS, 1997b). A qualified biologist will be on-site during such pumping activities to ensure that any fish that may be present within the construction area are relocated to suitable habitat near the project area.

However, implementation of these measures and of those in the Project Description is likely to result in “incidental take” (includes handling of fish for salvage) of one or more individuals of the special-status fish under consideration; therefore, the Proposed Project/Action may affect and is likely to adversely affect special-status fish species.

4.3.2 Giant Garter Snake

Consultation for Phase 1 and Phase 2 will be conducted separately for each phase. The following discussion applies to both phases; however, the effects and conservation measures are different for each phase. This document provides supporting information for Phase 1 consultation; therefore, the analysis for Phase 1 is more detailed than for Phase 2, which is planned for a future date. General effects are described for Phase 2, but consultation on this phase will occur at a later date and will require more in-depth analysis at that time.

The effects to giant garter snake habitat are those areas of habitat that would be permanently and/or temporarily affected by the activity within a Work Area. The Work Area is defined to include the construction footprint of all the diversion and pumping plant facilities, the conveyance facility improvements, and the Drexler Relift station. In addition to the footprints of all facilities, the Work Area includes construction easements and potential staging areas where construction activity may occur. Because construction is proposed for 2008, and habitat conditions for giant garter snake are largely dependent upon agricultural practices within the Action Area, the projected cropping pattern for 2008 was used to determine available habitat to giant garter snake in 2008. However, because cropping patterns may change season to season, the estimated future availability of habitat for and the estimated effects to the giant garter snake are also tentative for Phase 2.

Phase 1 Effects

Phase 1, which includes construction of the New Grimes Diversion/Pumping Plant, New Grimes Pipeline and Canal Modifications, and the Drexler Pipeline, as well as the removal of the existing Grimes Diversion, will temporarily affect a small amount of aquatic habitat for giant garter snake. **Figure 4-1** shows the giant garter snake habitats potentially affected by the Proposed Project/Action for Phase 1. In this phase, there is no suitable aquatic habitat in the vicinity of the Grimes Diversion or Grimes conveyance improvements. However, there is suitable aquatic habitat in the Reclamation Drains within 200' of the Work Area in the vicinity of the Drexler Pipeline. Most of the drains will be avoided; however, a section of a Reclamation Drain – approximately 435 square feet in area – at its intersection with Summy Road will be temporarily affected by the installation of an outfall into this drain (**Figure 4-1**). This work, associated with the construction of the Drexler Pipeline, will likely result in minor back-fill to this drain during the snake's active season. Therefore, Phase 1 may affect and is likely to adversely affect the giant garter snake. **Table 4-2** summarizes the habitat impacts resulting from Phase 1.

TABLE 4-2
SUMMARY OF GGS IMPACTS FOR PHASE 1

Habitat Type	Acres
Aquatic Temporary	0.01
Upland Temporary	1.67

Because Phase 1 is likely to adversely affect the giant garter snake, the conservation measures from the USFWS Programmatic BO (included in this chapter) have been incorporated to the Project Description (Chapter 2) and will be implemented to minimize and avoid permanent effects to the giant garter snake. Conservation measures include installation of snake-exclusion fencing to prevent snakes from entering the Work Area, and restoration of disturbed habitat. Any back-fill into the drain resulting from the outfall installation will be removed, and the bank of the drain will be restored to pre-construction condition and planted with a native seed mix or covered with erosion-control matting to prevent further soil erosion into the drain. In addition, 1.67 acres of upland habitat adjacent to these drains and within the Work Area for the Drexler Pipeline will be restored to pre-project conditions after completion of construction.

All effects resulting from Phase 1 are considered temporary because the disturbance to the giant garter snake and its habitat will last only one season. Under the Programmatic BO, Phase 1 effects are considered Level 1 Effects. These are effects that are (a) not permanent, (b) less than 20 acres of disturbance, and (c) restored to pre-project conditions within the same season or, at most, the same calendar year. The mitigation for Phase 1 implementation includes (a) restoration of temporary impacts to giant garter snake habitat, and (b) one year of monitoring with a photo documentation report due one year from the restoration implementation showing pre- and post-project area photos. The project will implement these measures in addition to several more “reasonable and prudent measures” included in the Programmatic BO.

Phase 2 Effects

Phase 2 includes the construction of the New Meridian Diversion/Pumping Plant, Main Canal Modifications, Drexler Relift, removal of the existing Meridian and Drexler Diversions, and the expansion of the Drexler Pipeline as well. The defined Work Area will avoid most of the Reclamation Drains and rice fields that are suitable aquatic habitat for the giant garter snake; there is no other fill of giant garter snake aquatic habitat associated with Phase 2 of the Proposed Project/Action. Widening the Main Canal would increase the amount of potential aquatic habitat, but it would also mean a subsequent permanent loss of potential upland habitat for the giant garter snake. In addition, a short section of a seep ditch would be filled in order to construct the Drexler Relift. Although this ditch was deemed unsuitable aquatic habitat for giant garter snake due to a lack of inundation, it is considered suitable upland habitat.

The main effect to giant garter snake as a result of Phase 2 is the construction during the snake’s inactive period. Because operation of the Main Canal is essential for MFWC water delivery in the spring and summer, the proposed Phase 2 improvements to the Main Canal must occur during the fall and winter. However, this time coincides with the giant garter snake’s inactive period, when there is greater danger of harming a snake that has taken refuge in the upland habitat within the Work Area. Because of these effects, implementation of Phase 2 of the Proposed Project/Action may affect and is likely to adversely affect giant garter snake. **Table 4-3** below summarizes generalized effects to giant garter snake anticipated with the implementation of Phase 2.

TABLE 4-3
SUMMARY OF GGS IMPACTS FOR PHASE 2

- | |
|--|
| <ul style="list-style-type: none"> • Temporary effects to GGS aquatic habitat resulting from the Main Canal improvements • Temporary and permanent effects to GGS upland habitat along the Main Canal improvements • Permanent effects to GGS upland habitat in association with the Drexler Relift • Possible incidental “take” of GGS during their inactive period |
|--|

Because Phase 2 may affect and is likely to adversely affect the giant garter snake, the conservation measures from the USFWS Programmatic BO (included in this chapter) have been incorporated to the Project Description (Chapter 2) and will be implemented to minimize and avoid permanent effects to the giant garter snake as much as possible. Conservation measures include installation

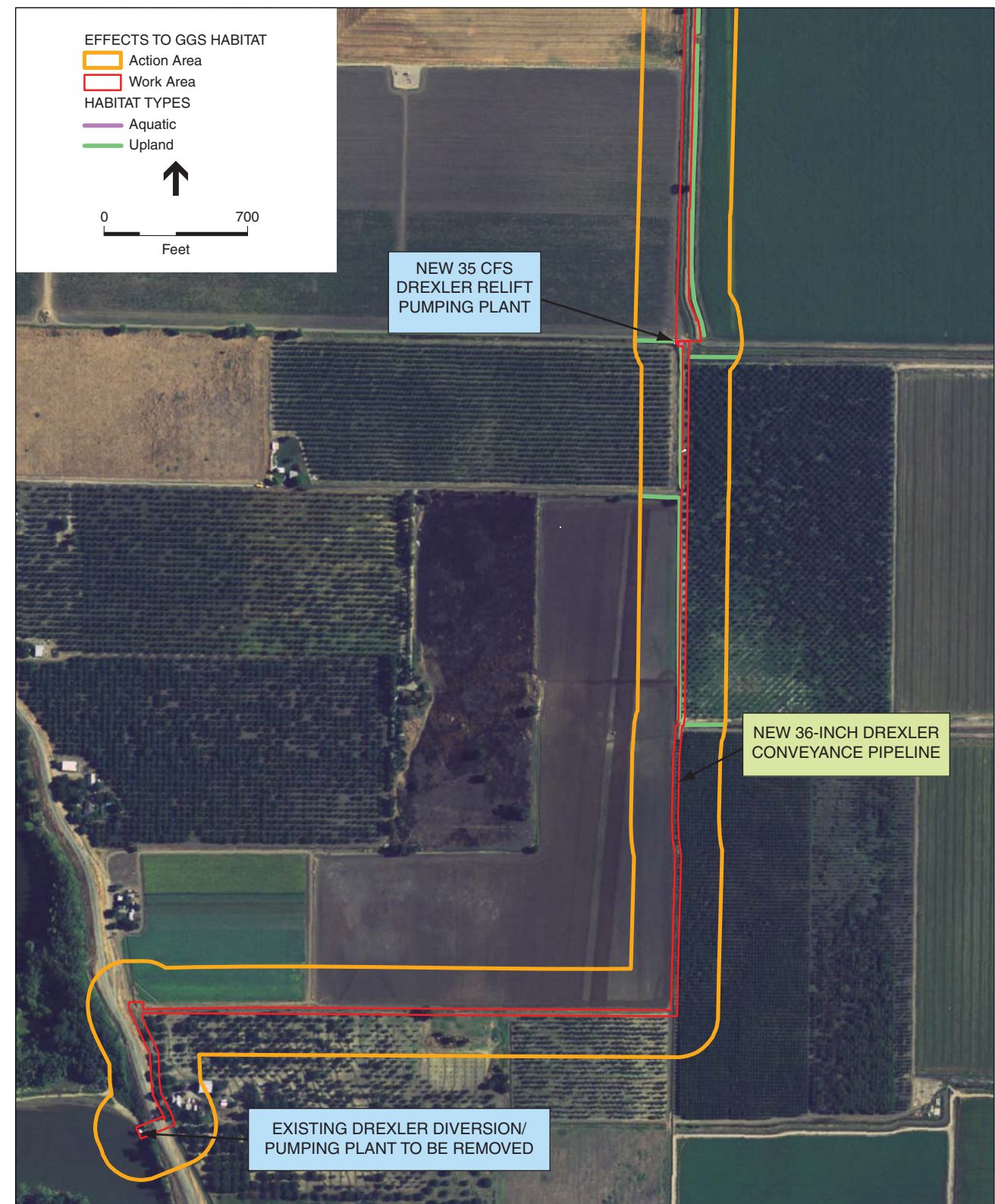
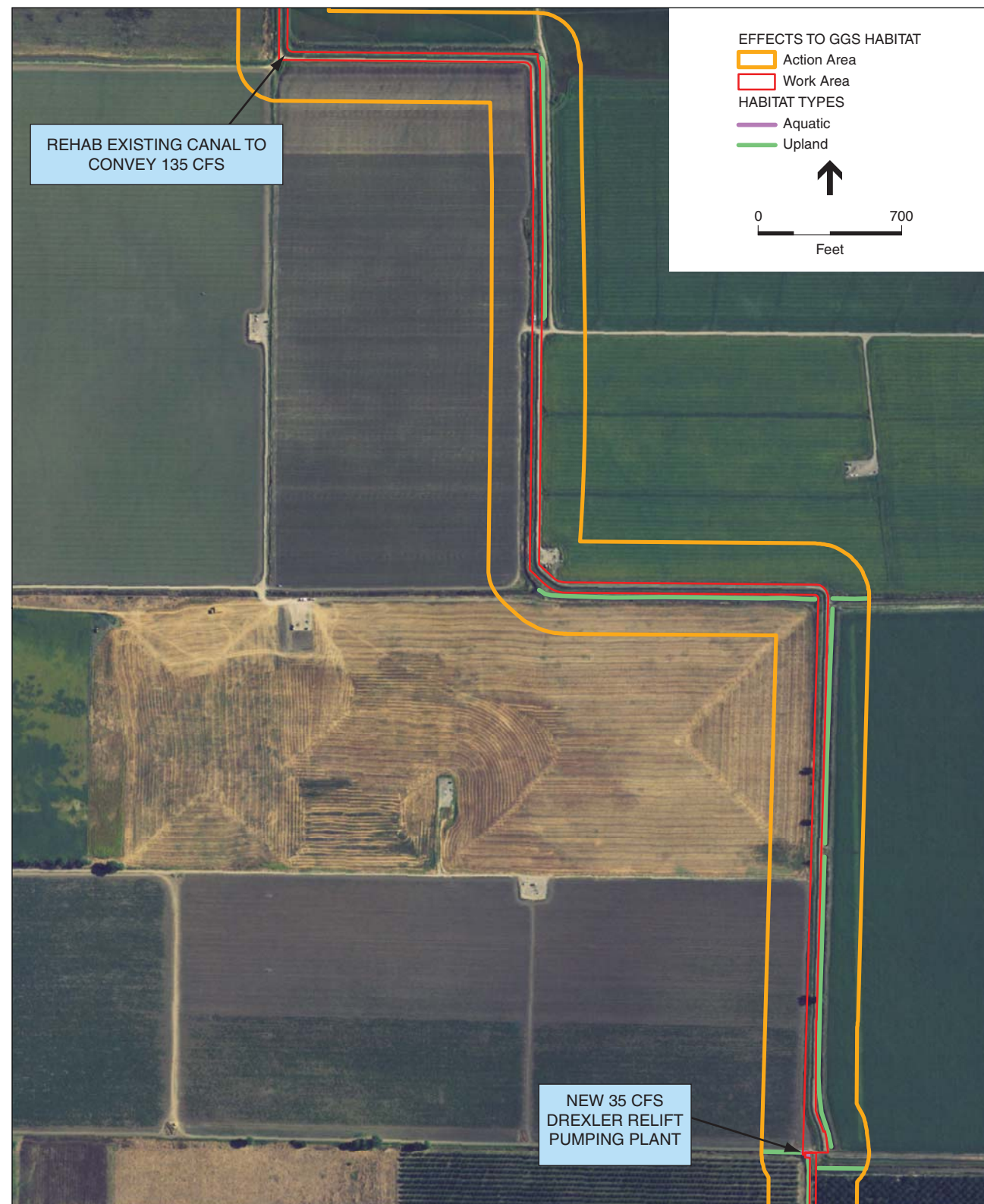
of snake-exclusion fencing to prevent snakes from entering the Work Area, and restoration of disturbed habitat to pre-project conditions. Because there will likely be permanent loss of giant garter snake upland habitat with the widening of the Main Canal, effects resulting from Phase 2 would be considered at Level 3 in the BO, and compensation for Phase 2 work would likely be required at a rate of 3 acres replaced for every 1 acre of effected habitat.

In summary, both phases may and are likely to adversely affect giant garter snake, and both phases will implement the conservation measures from the Programmatic BO to minimize and avoid effects to giant garter snake as much as possible. Phase 1 will temporarily affect 0.01-acre of aquatic habitat and 1.67 acres of upland habitat. There will be no permanent effects as a result of Phase 1, but there is potential for incidental take associated with working within aquatic habitat. Phase 2 may and is likely to result in temporary disturbance to aquatic habitat and both temporary and permanent disturbance to aquatic and upland habitats. In addition, there is a greater risk for “incidental take” in Phase 2, due to construction during the giant garter snake’s inactive period. Phase 2 analysis is generalized and is subject to change as conditions change in the Project/Action Area. **Table 4-4** below summarizes the Programmatic mitigation levels for effects to giant garter snake habitat.

TABLE 4-4
SUMMARY OF GGS IMPACTS FOR PHASE 2

	Duration of Effect	Acres of Effect	Level of Mitigation	Compensation
Phase 1	1 season	<20 and temporary	Level 1	Restoration
Phase 2*	permanent loss	<3 acres total GGS habitat AND <1 acre aquatic habitat	Level 3	3:1 Replacement

* Phase 2 effects will be re-evaluated prior to consultation on Phase 2.



The following conservation measures include avoidance and minimization, compensation, and mitigation measures for giant garter snake and will reduce potential effects to giant garter snake in both phases:

For Phase 1 Effects:

- **Measure BIO-3: Traffic Routing, and Movement.** During construction operations, the number of access routes, number and size of staging areas, and the total area of the proposed project activity will be limited to the minimum necessary. Routes and boundaries will be clearly demarcated. Movement of heavy equipment to and from the project site will be restricted to established roadways to minimize habitat disturbance. Project-related vehicles shall observe a 20-mile-per-hour speed limit within construction areas, except on County roads and on State and Federal highways. This is particularly important during periods when the snake may be sunning or moving on roadways. All heavy equipment, vehicles, and supplies will be stored at the designated staging area at the end of each work period.
- **Measure BIO-4: Staging Areas.** During construction operations, stockpiling of construction materials, portable equipment, vehicles, and supplies will be restricted to the designated construction staging areas and exclusive of the Environmentally Sensitive Areas (ESAs). The applicant will ensure contamination of habitat does not occur during such operations. All workers will be informed of the importance of preventing spills and appropriate measures to take should a spill occur.
- **Measure BIO-5: Pre-construction Surveys.** At most 24-hours prior to the commencement of construction activities, the ESA shall be surveyed for giant garter snakes by a USFWS-approved biologist. The biologist will provide the USFWS with a written report that adequately documents the monitoring efforts within 24-hours of commencement of construction activities. The project area shall be re-inspected by the monitoring biologist whenever a lapse in construction activity of two weeks or greater has occurred.
- **Measure BIO-6: Timing of Construction.** Construction activity within giant garter snake habitat (*e.g.* aquatic, upland, and rice habitat) shall be conducted between May 1 and October 1. This is the active period for the snake and direct mortality is lessened, because snakes are expected to actively move and avoid danger. If it appears that construction activity may go beyond October 1, the project proponents shall contact the USFWS as soon as possible, but not later than September 15 of the year in question, to determine if additional measures are necessary to minimize take. Construction activities within 200 feet from the banks of snake aquatic habitat will be avoided during the snake's inactive season. **If this is not feasible, the Project Proponent must consult with USFWS to determine measures to avoid impacts to giant garter snake.**
- **Measure BIO-7: Monitoring During Construction.** A USFWS-approved biologist shall inspect construction-related activities at the ESA to ensure that no unauthorized take of federally listed species or destruction of their habitat occurs. The biologist shall be

available for monitoring throughout all phases of construction that may result in adverse effects to the giant garter snake. This includes clearing and grubbing activities and installation of exclusion fence in giant garter snake upland habitat. Furthermore, the biologist shall have the authority through communication with the resident engineer to stop construction activities in the immediate area if a giant garter snake is encountered during construction until appropriate corrective measures have been completed or until the snake is determined to be unharmed. Snakes encountered during construction activities shall be allowed to move away from the area on their own volition. The biologist shall notify the USFWS immediately if any listed species are found on-site, and will submit a report, including date(s), location(s), habitat description, and any corrective measures taken to protect the species found. The biologist shall be required to report any take of listed species to the USFWS immediately by telephone at 916/ 414-6600 and by electronic mail or written letter addressed to the Chief, Endangered Species Division, within three (3) working days of the incident. The Service does not authorize any handling or moving of a giant garter snake by other than a USFWS-approved biologist.

- **Measure BIO-8: Worker Awareness Training.** A Worker Environmental Awareness Training Program for construction personnel shall be conducted by the USFWS-approved biologist for all construction workers, including contractors, prior to the commencement of construction activities. The program shall provide workers with information on their responsibilities with regard to the snake, an overview of the life-history of this species, information on take prohibitions, protections afforded this animal under the Act, and an explanation of the relevant terms and conditions of this biological opinion. Written documentation of the training must be submitted to the Sacramento Fish and Wildlife Office within 30 days of the completion of training. As needed, training shall be conducted in Spanish for Spanish language speakers.
- **Measure BIO-9: Install Snake Exclusion Fencing.** Prior to the commencement of construction activities, high visibility fencing will be erected around the habitats of federally listed species to identify and protect these designated ESAs from encroachment of personnel and equipment. These areas will be avoided by all construction personnel. The fencing shall be inspected by the Contractor before the start of each work day and maintained by the Contractor until completion of the project. The fencing may be removed only when the construction of the project is completed. Fencing will be established in upland immediately adjacent to aquatic snake habitat and extending up to 200 feet from construction activities. Silt fencing, if properly installed, may serve as suitable snake exclusion fencing.
- **Measure BIO-10: Provide Adequate Signage.** Signs will be posted by the Contractor every 50 feet along the edge of the ESAs, with the following information: "This area is habitat of federally-threatened and/or endangered species, and must not be disturbed. These species are protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment." The signs should be clearly readable from a distance of 20 feet, and must be maintained by the Contractor for the duration of construction.

- **Measure BIO-11: Implement BMPs.** Best Management Practices (BMPs), including a Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP), will be implemented to minimize effects to the snake during construction. Best management practices will be implemented to prevent sedimentation from entering ESAs and to reduce erosion, dust, noise, and other deleterious aspects of construction related activities. These BMPs may include, but are not limited to, silt fencing, temporary berms, restrictions on cleaning equipment in or near ESAs, installation of vegetative strips, and temporary sediment disposal. Runoff from dust control and hazardous materials will be retained on the construction site and prevented from flowing into the ESAs.
- **Measure BIO-12: Erosion Control Materials.** Tightly woven fiber netting (mesh size less than 0.25 inch) or similar material shall be used for erosion control and other purposes at the ESA to ensure that the giant garter snake is not trapped or becomes entangled. This limitation shall be communicated to the contractor using special provisions included in the bid solicitation package.
- **Measure BIO-13: Properly Dispose of Garbage.** To eliminate an attraction to predators of the snake, all food-related trash items, such as wrappers, cans, bottles, and food scraps, must be disposed of in closed containers and removed at the end of each workday from the entire project site.
- **Measure BIO-14: Use Approved Aggregate, Fill, or Borrow Materials.** The Contractor shall provide documentation that aggregate, fill, or borrow material provided for the proposed project was obtained in compliance with the State Mining and Reclamation Act (SMARA). Evidence of compliance with the Act shall be demonstrated by providing the resident engineer with one of the following: 1) a letter from the USFWS stating that the use of the borrow pit will not result in the incidental take of species; 2) an incidental take permit for contractor-related activities issued by the USFWS pursuant to section 10(a)(1)(B) of the Act; 3) a biological opinion or letter concurring with a “not likely to adversely affect” determination issued by the USFWS to the Federal agency having jurisdiction over contractor-related services; 4) a letter from the USFWS concurring with the “no effect” determination for contractor-related activities; or 5) contractor submittal of information to the resident engineer indicating compliance with the SMARA and provision of County land use permits and California Environmental Quality Act (CEQA) clearance.
- **Measure BIO-15: Restore Temporarily Affected Habitat.** After construction activities are complete, any temporary fill or construction debris shall be removed and disturbed areas restored to their pre-project conditions. An area subject to “temporary” disturbance includes any area that is disturbed during the project, but that, after project completion, will not be subject to further disturbance and has the potential to be re-vegetated. All ESA snake habitats subject to temporary ground disturbances, including storage and staging areas and temporary roads, will be restored to pre-project conditions. If appropriate, these areas shall also be re-contoured to pre-project conditions. A written report shall be submitted to the USFWS within ten (10) working days of the completion of construction at the project site and restoration of the site to pre-project conditions.

- **Measure BIO-16: Post-construction Monitoring.** An inspection of the site, with a photo documentation report showing pre- and post-project area photos, will be conducted and photos and a brief report will be submitted to USFWS one year from implementation of restoration to pre-project conditions.
- **Measure BIO-17: Minimize Impacts.** The Contractor shall minimize the potential for harm, harassment, and direct mortality of the snake resulting from project-related activities by implementation of the project. The Contractor shall ensure that the temporary loss of giant garter snake habitat is confined to the proposed project site.

For Phase 2 Effects:

Include all above measures for Phase 1, and the following additional or modified measures:

- **Measure BIO-18: De-watering Giant Garter Snake Habitat.** Aquatic habitat for the snake will be dewatered 15 days prior to the initiation of construction activities. If complete dewatering is not possible, potential snake prey (*i.e.*, fish and tadpoles) will be removed so that snakes and other wildlife are not attracted to the construction area.
- **Measure BIO-19: Monitoring During Construction.** A USFWS-approved biologist shall inspect construction-related activities at the proposed project site to ensure that no unauthorized take of federally listed species or destruction of their habitat occurs. The biologist shall be available for monitoring throughout all phases of construction that may result in adverse affects to the giant garter snake. This includes clearing and grubbing and other construction activities in the areas of wetland vegetation/aquatic habitat, adjacent upland habitat, and during exclusion fence installation. Furthermore, the biologist shall have the authority through communication with the resident engineer to stop construction activities in the immediate area if a giant garter snake is encountered during construction until appropriate corrective measures have been completed or until the snake is determined to be unharmed. Snakes encountered during construction activities shall be allowed to move away from the area on their own volition. The biologist shall notify the USFWS immediately if any listed species are found on-site, and will submit a report, including date(s), location(s), habitat description, and any corrective measures taken to protect the species found. The biologist shall be require to report any take of listed species to the USFWS immediately by telephone at 916/ 414-6600 and by electronic mail or written letter addressed to the Chief, Endangered Species Division, within three (3) working days of the incident. The Service does not authorize any handling or moving of a giant garter snake by other than USFWS-permitted biologist.

Measure BIO-20: Compensation. Prior to the commencement of construction activities, the project proponent shall compensate for the temporary and permanent loss habitat of the snake according to the Programmatic Guidelines.

4.3.3 Swainson's Hawk

In both phases, no known Swainson's hawk nesting habitat is proposed to be modified or eliminated by the Proposed Project/Action. Suitable nesting habitat is found adjacent to the Sacramento River within the valley riparian habitat. Habitat in this area includes riparian woodlands with large diameter (i.e., greater than 30 inches diameter at breast height) valley oak (*Quercus lobata*), cottonwood (*Populus fremontii*) and black willow (*Salix goodingii*). These overstory trees provide moderate to high (i.e., greater than 50%) canopy closure in this area. This riparian habitat will not be impacted by project activities. A few domestic trees and one isolated valley oak will be removed as a result of the Project Action. Minimal disturbances to potential foraging habitat (i.e., annual grassland and agricultural areas) will be temporary and are not expected to impact this species based on the overall regional abundance of these habitat types. This species is listed as threatened by the State of California. With numerous records of Swainson's hawk nests occurring within one mile of the project site along the Sacramento River (CNDDB, 2006) there is a moderate to high potential this area may be used by this species for nesting. To compensate potential disturbance and to avoid active nest sites, the following conservation measures are proposed:

- **Measure BIO-21: Tree Removal Period.** Some trees will be removed on the Chesney property for the Drexler pipeline, and some walnut trees removed on the Coffman property for the Meridian Pumping Plant. All of these trees are outside the Sacramento River riparian areas. If possible, trees required for removal shall be removed outside of the nesting period (nesting period = March 1st through August 31st).
- **Measure BIO-22: Swainson's Hawk Nest Survey.** If construction is proposed to take place during the nesting season, then a qualified biologist shall survey the project site and all habitats within 0.5 mile of the site for Swainson's hawk nests. Should an active nest site occur within 0.5 mile of the project site, the CDFG shall be consulted to develop measures that will protect the nest site from project-generated disturbance. Measures may include implementing a limited operating period surrounding the nest site until young have fledged.
- **Measure BIO-23: Riparian Habitat Exclusion.** There shall be no encroachment by construction equipment or personnel into existing riparian habitat areas located along the Sacramento River. Storage or parking of equipment shall be restricted within 100 feet of riparian habitat.

4.3.4 Cackling (=Aleutian Canada) Goose

The following discussion applies to both phases. The cackling goose winters in the Central Valley, and may use the cropland in the proposed project/action vicinity for foraging or cover. No potential foraging habitat is proposed to be modified or eliminated by the Proposed Project/Action, however noise and construction activities associated with the proposed

project/action may potentially disturb geese that may use the surrounding croplands. This disturbance may cause the geese to avoid foraging in the croplands in the vicinity and forage elsewhere. Due to the abundance of agriculture in the area it is unlikely that the geese would be subject to starvation or predation due to temporary disturbance from the proposed project/action. To compensate for potential disturbances to foraging habitat, the following conservation measures are proposed:

- **Measures BIO-24: Pre-Construction Avian Surveys.** Implement all conservation measures listed for the Swainson's hawk. Pre-construction avian surveys shall also target the above species.

4.3.5 Bank Swallow

The following discussion applies to both phases. Although the bank swallow is known to nest along the Sacramento River, the immediate Action Area does not provide suitable nesting habitat for bank swallow. The gradual grassy slope of the riverbank that would be affected by the proposed screened intake is not suitable for nesting. The bank swallow may occur both upstream and downstream from the Action Area, however, and may potentially be disturbed by construction activities related to the Proposed Project/Action. Disturbance to nesting bank swallows may cause abandonment or failure of the nest, reduced productivity, and possibly a decline of the local population.

To avoid potential disturbances to nearby breeding bank swallows, the following conservation measures are proposed:

- **Measures BIO-25: Pre-Construction Avian Surveys.** Implement all conservation measures listed for the Swainson's hawk. Pre-construction avian surveys shall also target the above species. Should active nests be found within 0.25 mile of the project site, CDFG shall be consulted to develop appropriate mitigation and avoidance measures.

4.3.6 Western Burrowing Owl

The following discussion applies to both phases. The western burrowing owl is a year-round resident in the Central Valley, and may nest along the levee bank where the proposed screened intake is located, and along the edges of cropland along the pipeline alignment. The burrowing owl may use the surrounding cropland for foraging as well. No cropland is proposed to be modified or eliminated by the Proposed Project/Action, however noise and construction activities associated with the proposed project/action may potentially disturb nesting burrowing owls in the vicinity. If burrowing owl nests occur within the construction footprint along the levee, or along the pipeline alignment near cropland, implementation of the proposed project/action may result in the destruction of nesting birds or an active nest, which may reduce the success of this species and potentially affect the stability of the local population. To avoid potential disturbances to nesting and foraging habitat, the following conservation measures are proposed:

- **Measures BIO-26: Pre-Construction Avian Surveys.** Implement all conservation measures listed for the Swainson's hawk. Pre-construction avian surveys shall also target the above species. Should active nests be found within 50 meters of the project site, CDFG shall be consulted to develop appropriate mitigation and avoidance measures.

4.4 Effects on Critical Habitat

Construction activities associated with both phases of the Proposed Project/Action would result in temporary disturbances – including increased turbidity and sedimentation, cofferdam installation, and dewatering – to designated Critical Habitat for Central Valley steelhead, Central Valley spring-run Chinook salmon, and Sacramento River winter-run Chinook salmon. These potential effects are mitigated through measures incorporated in the project (see Chapter 2). Furthermore, the proposed fish screens would permanently alter designated Critical Habitat within the Action Area. However, the overall benefit of the Proposed Project on fish species outweighs the minor modifications to designated Critical Habitat.

4.5 Effects on Essential Fish Habitat

Construction activities associated with both phases of the Proposed Project/Action would result in temporary disturbances, including increased turbidity and sedimentation, cofferdam installation, and dewatering, to delineated EFH for Chinook salmon. These potential effects are mitigated through measures incorporated in the project (see Chapter 2). Furthermore, the proposed fish screens would permanently alter delineated EFH within the Action Area. However, the overall benefit of the Proposed Project on fish species outweigh the minor modifications to delineated EFH.

CHAPTER 5

Environmental Baseline – NCCPA Communities

NCCPA Communities includes both habitats and ecologically-based fish groups which are defined in the MSCS. Two NCCPA habitats and two fish groups occur within the Action Area, have potential to be affected by the Action, and are therefore included within this ASIP. These communities are listed below, and their MSCS definitions are included in the following sections. The discussion is relevant to both Phase 1 and Phase 2.

- Valley Riverine Aquatic
- Valley/Foothill Riparian
- Anadromous Fish Group
- Estuarine Fish SpeciesGroup

5.1 NCCPA Habitats

There are 18 NCCPA habitats evaluated in the MSCS. These habitats were evaluated based on certain criteria: the level of acceptance of habitat nomenclature within the scientific community; consistency with existing CALFED habitat nomenclature from the ERP; consistency with existing electronically-mapped habitat data; and the potential for habitat types to be affected by CALFED actions.

5.1.1 Valley Riverine Aquatic

Valley riverine aquatic habitat includes the water column of flowing streams and rivers in low-gradient channel reaches below 300 feet in elevation. These waters are not tidally-influenced and include features such as pools, riffles, runs, and unvegetated channel beds and banks, as well as sloughs, backwaters, and flood bypasses.

In the Action Area, valley riverine aquatic habitat exists in the Sacramento River. The Sacramento River riverine habitat is characterized by fresh-water aquatic and shaded riparian. Flows are relatively slow within the Action Area, exhibiting deep channel characteristics with levied banks. Channel substrate generally consists of fine sandy-loam with sparse areas imported rip-rap along the banks used to reinforce the adjacent levees. At both proposed new diversion locations the channelized river bank habitat is exposed and dominated by annual grassland, exhibiting a deep, cold and slow moving flow.

5.1.2 Valley/Foothill Riparian

Valley/foothill riparian habitat includes all successional stages of woody vegetation, commonly dominated by willow, Fremont cottonwood, valley oak, or sycamore. This habitat occurs within the current and historical floodplains of low-gradient reaches of streams and rivers generally below 300 feet in elevation.

The valley riparian and riparian forest habitats are located adjacent to the Sacramento River system as it winds south along the western boundary of the Meridian Farms Service Area, and is usually located within the flood plain and levee system. Valley riparian habitats provide food, water, migration and dispersal corridors, and escape, nesting, and thermal cover for an abundance of wildlife. At least 50 amphibians and reptiles and 147 bird species occur in lowland riparian systems. Additionally, 55 species of mammals are known to use California's Central Valley riparian communities.

This habitat type is not within the immediate vicinity of proposed activities near or in the Sacramento River. Riparian forest habitat occurs along the opposite bank of both proposed diversion locations as shown in **Figure 2-2** and **Figure 2-4**, and a few non-contiguous patches of mixed willow riparian habitat occurs approximately 440 feet north of the proposed New Grimes Diversion.

5.2 NCCPA Fish Groups

There are two NCCPA Fish Groups which are evaluated in the MSCS: anadromous and estuarine fish species. These fishes are associated with several of the NCCPA habitats but are assessed separately because factors that support fish populations are not sufficiently addressed in the NCCPA habitats which are based on vegetation, land use, and geography. Instead, each fish group addresses the effects CALFED actions may have on factors important to fish ecology such as water flow, depth, temperature, quality, and seasonal fluctuations in stage and flow.

The fish species included in the NCCPA fish groups are those that will be most affected by CALFED actions, depend on the health of the Bay-Delta ecosystem, and are subject to existing USFWS, NOAA Fisheries, and DFG recovery goals. The following section describes the NCCPA Fish Groups potentially affected by the Project.

5.2.1 Anadromous Fish Species

Anadromous fish are those that are born in fresh water, migrate to the ocean where they mature into adults, and return to their native fresh waters to spawn. Anadromous fish species that are included in this fish group are Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, Central Valley fall/late fall-run Chinook salmon, Central Valley steelhead, Central California Coast steelhead ESUs, and green sturgeon. These species are associated with the following NCCPA habitat types: tidal perennial aquatic, valley riverine aquatic, montane riverine aquatic, lacustrine, saline emergent, and tidal freshwater emergent.

5.2.2 Estuarine Fish Species

Estuarine fish are those that spend most or all of their lives in euryhaline conditions, or at various salinities. Estuarine fish that are included in this fish group are the tidewater goby, delta smelt, longfin smelt, Sacramento splittail, and Sacramento perch. These species are associated with the following NCCPA habitat types: tidal perennial aquatic, valley riverine aquatic, lacustrine, saline emergent, and tidal freshwater emergent.

CHAPTER 6

Effects of the Proposed Project/Action on NCCPA Communities

This chapter analyzes the direct, indirect, and cumulative effects on NCCPA communities that exist within the Action Area and that may result from implementation of both phases of the Proposed Project/Action, as well as actions related to and dependent on those actions. The Proposed Project/Action is considered to have an effect on NCCPA communities if it could result in “take” of a species, or if it would decrease the quality or extent of habitat potentially occupied by a species.

This analysis also includes a discussion of the conservation measures to avoid, minimize, and compensate for such effects, as appropriate. For descriptions of the NCCPA communities addressed in this ASIP, refer to Chapter 5.

6.1 Proposed Project/Action Effects and Conservation Measures

The following text contains an analysis of potential direct, indirect, and cumulative effects on NCCPA communities and the appropriate compensation measures:

6.1.1 Valley Riverine Aquatic

The one sensitive natural community that may be impacted by the Proposed Project/Action is the valley riverine aquatic habitat in the Sacramento River. As shown in **Figure 2-2**, **Figure 2-3**, and **Figure 2-4**, the Work Area includes valley riverine aquatic habitat in the vicinity of the proposed and existing diversions. Work within the Sacramento River at the existing diversions and the proposed Grimes Diversion will be fairly minimal; however, construction of the new Meridian Diversion will require the use of a cofferdam.

Approximately 35 acres of valley riverine aquatic habitat in the Action Area will be affected by Proposed Project/Action. However, with avoidance, minimization, and erosion control measures outlined in Chapter 2 (Project Description), impacts to the Sacramento River are considered minimal.

6.1.2 Valley Riparian

Because of the proximity of the valley riparian and cottonwood riparian habitat in the vicinity of the existing Grimes Diversion and the existing Drexler Diversion, these habitats may also be

impacted by water quality effects resulting from in-water work. Both communities provide habitat for a range of terrestrial wildlife species, including several species of songbirds, small mammals, mesocarnivores, reptiles and amphibians. Incorporation of **Measure BIO-3** and **Measure BIO-23** will ensure no disturbance and encroachment into these sensitive riparian habitat areas, thereby reducing potential effects.

6.1.3 Anadromous and Estuarine Fish Groups

Within the Action Area, effects to valley riverine aquatic habitat in the Sacramento River may subsequently affect special-status fish species from both fish groups. The Sacramento River in the vicinity of the proposed intake locations serves as a migratory corridor for the upstream migration of adult salmon and steelhead, and the downstream migration of juvenile salmon and steelhead. Other fish species in the Sacramento River near the proposed intake locations include North American green sturgeon, Sacramento splittail, striped bass, threadfin shad, American shad, catfish, Sacramento pikeminnow, tule perch, sculpin, bullhead, and a variety of other resident fish species. The Sacramento River near Sacramento also provides habitat for a variety of invertebrates, including planktonic species such as copepods, and epibenthic species such as crawfish and amphipods. With avoidance, minimization, and erosion control measures outlined in Chapter 2 (Project Description), and implementation of **Measure BIO-1** and **Measure BIO-2**, impacts to the Fish Groups in the Sacramento River will be minimized.

CHAPTER 7

Interrelated, Interdependent, and Cumulative Effects

This chapter assesses the interrelated, interdependent and cumulative effects of the Proposed Project/Action.

7.1 Interrelated and Interdependent Effects

The Proposed Project/Action is considered to be an action that is independent and has a function apart from other projects. Installation of the proposed diversion facilities would not increase water diversions or lead to any future water use not already feasible under existing baseline conditions. Thus the Proposed Project/Action is not part of a single, larger project, and therefore no interdependent or interrelated effects will occur.

7.2 Cumulative Effects

Two new diversion facilities will be installed and three existing facilities will be removed as part of this MFWC Project. The capacity of water diverted from the Sacramento River would not increase or decrease. These continuing baseline diversions as well as the implementation of BMP's and conservation measures will ensure no cumulative effects to water quality (water resources). The placement and design of the new permanent water diversion facilities in the Sacramento River is not likely to result in any obstruction of fishery migration and will likely decrease the mortality of emigrating juvenile fish species (in particular steelhead and Chinook salmon), thus not contributing to a cumulative effect on fishery resources.

Placement of the cofferdam and associated dewatering activities may potentially contribute to the loss of native fish trapped within the structure. However, the timing of proposed dewatering activities is likely to avoid special-status native fish species known to inhabit the Sacramento River based on known migratory requirements and the unlikely occurrence of these species in the vicinity of the Proposed Project/Action outside of migratory periods.

Existing surrounding land-use (i.e., agricultural) will continue to provide foraging opportunities for Swainson's hawk and other raptor species. With the implementation of Conservation measures for Swainson's hawk, suitable habitat will be preserved for future nesting opportunities, and thus will not contribute to a cumulative effect to Swainson's hawk and other species associated with riparian habitat.

CHAPTER 8

Monitoring Needs

A list of monitoring needs is included below. Monitoring is necessary in order to monitor the effects and the implementation and effectiveness of the conservation measures. These are identified as measures that the implementing entity will undertake.

1. Conduct pre-construction surveys for GGS. Biological monitors present during pre-construction shall monitor for GGS and ensure that:
 - a. construction measures to minimize effects to GGS habitat outside the construction area are followed,
 - b. construction activities do not encroach into riparian areas outside of Proposed Project/Action footprint.
2. Conduct monitoring for GGS during construction activities within its habitat.
3. Conduct a post-construction monitoring visit to document restoration of affected GGS habitat within 1 year of restoration.
4. Conduct pre-construction avian surveys for Swainson's hawk, burrowing owl, cackling goose, bank swallow, and other avian species covered under the Migratory Bird Treaty Act. Should active nests be found within 0.25 mile of the project site, CDFG shall be consulted to develop appropriate mitigation and avoidance measures. Additional monitoring may be required.
5. If construction is proposed to take place during the nesting season, then a qualified biologist shall conduct a survey the Proposed Project/Action site and all habitats within 0.5 mile of the site for Swainson's hawk nests. Should an active nest site occur within 0.5 mile of the Proposed Project/Action site, the CDFG shall be consulted to develop measures that will protect the nest site from project-generated disturbance. Measures may include implementing a limited operating period surrounding the nest site until young have fledged and additional monitoring of the nest site.
6. NFMS engineers/inspectors shall be allowed to make a final inspection of the fish screens prior to the flooding of the intake bay. NFMS engineers/inspectors may also be present when operational criteria of the screens are being tested.

CHAPTER 9

Changed Circumstances

There are no anticipated changed circumstances that would affect implementation of the Proposed Project/Action.

CHAPTER 10

Effects Determination Conclusion

The purpose of this ASIP is to review the Meridian Farms Water Company's Proposed Fish Screen Project in sufficient detail to determine to what extent the Proposed Project/Action may affect any threatened, endangered, proposed, or sensitive species within the Action Area. This chapter summarizes the environmental setting, analysis, and effects determination presented in Chapters 3 and 4.

10.1 Summary of Effects

A determination of effects based on the Proposed Project/Action on the following five species is summarized below:

- North American green sturgeon (Southern DPS) (*Acipenser medirostris*)
- Central Valley steelhead (*Oncorhynchus mykiss*)
- Central Valley spring-run Chinook salmon (*Oncorhynchus tshawytscha*)
- Sacramento River winter-run Chinook salmon (*Oncorhynchus tshawytscha*)
- Giant garter snake (*Thamnophis gigas*)

In addition, a determination of effects based on the Proposed Project/Action on designated Critical Habitat for the following three species is summarized below:

- Central Valley steelhead (*Oncorhynchus mykiss*)
- Central Valley spring-run Chinook salmon (*Oncorhynchus tshawytscha*)
- Sacramento River winter-run Chinook salmon (*Oncorhynchus tshawytscha*)

Furthermore, a determination of effects based on the Proposed Project/Action on delineated EFH for species is summarized below:

- Pacific salmon, specifically Chinook salmon (*Oncorhynchus tshawytscha*)

Lastly, a determination of effects based on the Proposed Project/Action on the following four NCCPA Communities is summarized below:

- Valley Riverine Aquatic Habitat
- Valley/Foothill Riparian Habitat
- Anadromous Fish Species
- Estuarine Fish Species

These species and communities have been selected from a broad list of species compiled from USFWS lists and database searches from the CNDDDB and CNPS. The five species are federal-listed. The NCCPA communities were selected from 20 communities defined in the MSCS. These species and communities have the potential to be affected by the Proposed Project/Action and are therefore included in this ASIP.

10.1.1 North American Green Sturgeon (Southern DPS)

The Project Action occurs within and adjacent to the Sacramento River which provides habitat for several special-status anadromous fish species. Based on the Proposed/Project Actions described in Chapter 2, these fish species are most likely to be affected by a decrease in water quality due to construction-related activities, underwater sound pressure effects generated by pile driving activities associated with cofferdam installation, and direct mortality as a result of cofferdam installation and dewatering. Included within the Proposed Project/Action are measures to minimize such impacts; these include following the Central Valley RWQCB regulations to minimize construction-related effects, installing silt screens to filter out sediment before water re-enters the river, installing a cofferdam to contain most construction activities in the water, minimizing sound pressure effects, screening of dewatering pumps, and relocation of individuals trapped within the dewatered cofferdam. With the implementation of these measures and with the incorporation of seasonal in-channel construction restrictions, it is unlikely that construction of the Proposed Project/Action would significantly affect green sturgeon populations. Moreover, the proposed project will result in avoidance of future entrainment of green sturgeon at the diversion sites. This is a beneficial effect is expected to outweigh the temporary construction-related effects.

However, because there is a risk of “incidental take” with the implementation of some of the construction activity (pile driving) and even with some minimization measures (fish salvage), the Proposed Project/Action may affect, but are ‘likely to adversely affect North American green sturgeon identified in this ASIP.

10.1.2 Central Valley Steelhead

The Project Action occurs within and adjacent to the Sacramento River which provides habitat for several special-status anadromous fish species. Based on the Proposed/Project Actions described in Chapter 2, these fish species are most likely to be affected by a decrease in water quality due to construction-related activities, underwater sound pressure effects generated by pile driving activities associated with cofferdam installation, and direct mortality as a result of cofferdam installation and dewatering. Included within the Proposed Project/Action are measures to minimize such impacts; these include following the Central Valley RWQCB regulations to minimize construction-related effects, installing silt screens to filter out sediment before water re-enters the river, and installing a cofferdam to contain most construction activities in the water, minimizing sound pressure effects, screening of dewatering pumps, and relocation of individuals trapped within the dewatered cofferdam. With the implementation of these measures and with the incorporation of seasonal in-channel construction restrictions, it is unlikely that construction of the Proposed Project/Action

would significantly affect Central Valley steelhead populations. Moreover, the proposed project will result in avoidance of future entrainment of Central Valley steelhead at the diversion sites. This is a beneficial effect is expected to outweigh the temporary construction-related effects.

However, because there is a risk of “incidental take” with the implementation of some of the construction activity (pile driving) and even with some minimization measures (fish salvage), the Proposed Project/Action may affect, but are ‘likely to adversely affect’ Central Valley steelhead identified in this ASIP.

10.1.3 Central Valley Spring-Run Chinook Salmon

The Project Action occurs within and adjacent to the Sacramento River which provides habitat for several special-status anadromous fish species. Based on the Proposed/Project Actions described in Chapter 2, these fish species are most likely to be affected by a decrease in water quality due to construction-related activities, underwater sound pressure effects generated by pile driving activities associated with cofferdam installation, and direct mortality as a result of cofferdam installation and dewatering. Included within the Proposed Project/Action are measures to minimize such impacts; these include following the Central Valley RWQCB regulations to minimize construction-related effects, installing silt screens to filter out sediment before water re-enters the river, and installing a cofferdam to contain most construction activities in the water, minimizing sound pressure effects, screening of dewatering pumps, and relocation of individuals trapped within the dewatered cofferdam. With the implementation of these measures and with the incorporation of seasonal in-channel construction restrictions, it is unlikely that construction of the Proposed Project/Action would significantly affect Central Valley spring-run Chinook salmon populations. Moreover, the proposed project will result in avoidance of future entrainment of Central Valley spring-run Chinook salmon at the diversion sites. This is a beneficial effect is expected to outweigh the temporary construction-related effects.

However, because there is a risk of “incidental take” with the implementation of some of the construction activity (pile driving) and even with some minimization measures (fish salvage), the Proposed Project/Action may affect, but are ‘likely to adversely affect’ Central Valley Spring-run Chinook salmon identified in this ASIP.

10.1.4 Sacramento River Winter-Run Chinook Salmon

The Project Action occurs within and adjacent to the Sacramento River which provides habitat for several special-status anadromous fish species. Based on the Proposed/Project Actions described in Chapter 2, these fish species are most likely to be affected by a decrease in water quality due to construction-related activities, underwater sound pressure effects generated by pile driving activities associated with cofferdam installation, and direct mortality as a result of cofferdam installation and dewatering. Included within the Proposed Project/Action are measures to minimize such impacts; these include following the Central Valley RWQCB regulations to minimize construction-related effects, installing silt screens to filter out sediment before water re-enters the river, and installing a cofferdam to contain most construction activities in the water, minimizing sound pressure effects, screening of dewatering pumps, and relocation of individuals

trapped within the dewatered cofferdam. With the implementation of these measures and with the incorporation of seasonal in-channel construction restrictions, it is unlikely that construction of the Proposed Project/Action would significantly affect Sacramento River winter-run Chinook salmon populations. Moreover, the proposed project will result in avoidance of future entrainment of Sacramento River winter-run Chinook salmon at the diversion sites. This is a beneficial effect is expected to outweigh the temporary construction-related effects.

However, because there is a risk of “incidental take” with the implementation of some of the construction activity (pile driving) and even with some minimization measures (fish salvage), the Proposed Project/Action may affect, but are ‘likely to adversely’ affect Sacramento Winter-run Chinook salmon identified in this ASIP.

10.1.5 Giant Garter Snake

The giant garter snake has a low to moderate potential to occur in the Action Area and is an important species in the Central Valley region. The aquatic giant garter snake inhabits slow-moving waters, such as backwaters and sloughs, and requires some aquatic vegetation for basking and cover. Phase 1 habitats for giant garter snake include aquatic habitat in portions of some Reclamation Drains, the Main Canal, and delivery ditches, and upland habitat in adjacent undeveloped land within 200 feet of the aquatic habitat. Effects to Phase 1 habitats are temporary in duration, and will be restored to pre-project conditions. In addition, implementation conservation measures from the Programmatic BO will avoid or minimize potential effects to giant garter snake for Phase 1.

The details of Phase 2 effects are currently unknown; however, the anticipated effects to giant garter snake include: temporary effects to aquatic habitat resulting from the Main Canal improvements; temporary and permanent effects to upland habitat along the Main Canal improvements; permanent effects to upland habitat in association with the Drexler Relift; and possible incidental “take” during the snake’s inactive period. Consultation on Phase 2 will be initiated at a later date as funds become available. At that time, a more-detailed analysis of Phase 2 effects on giant garter snake will be conducted. To avoid and minimize the anticipated effects to giant garter snake in Phase 2, conservation measures from the Programmatic BO will be implemented. Compensation for permanent loss of habitat in Phase 2 is anticipated at a 3:1 replacement ratio.

It is anticipated that both phases of the Proposed Project/Action ‘may affect and is likely to adversely affect’ the giant garter snake.

10.2 Critical Habitat

Construction activities associated with the Proposed Project/Action would result in temporary disturbances, including increased turbidity and sedimentation, cofferdam installation, and dewatering, to designated Critical Habitat for Central Valley steelhead, Central Valley spring-run Chinook salmon, and Sacramento River winter-run Chinook salmon. These potential effects are mitigated through measures incorporated in the project (see Chapter 2). Furthermore, the

proposed fish screens would permanently alter designated Critical Habitat within the Action Area. However, the overall benefit of the proposed project on fish species outweighs the minor modifications to designated Critical Habitat.

Therefore, both Phase 1 and Phase 2 of the Proposed Project/Action may affect, but are not likely to adversely affect Critical Habitat identified in this ASIP.

10.3 Essential Fish Habitat

Construction activities associated with the proposed project/action would result in temporary disturbances, including increased turbidity and sedimentation, cofferdam installation, and dewatering, to delineated EFH for Chinook salmon. These potential effects are mitigated through measures incorporated in the project (see Chapter 2). Furthermore, the proposed fish screens would permanently alter delineated EFH within the Action Area. However, the overall benefit of the Proposed Project/Action on fish species outweigh the minor modifications to delineated EFH.

Therefore, both Phase 1 and Phase 2 of the Proposed Project/Action may affect, but are not likely to adversely affect Essential Fish Habitat identified in this ASIP.

10.4 NCCPA Communities

This section summarizes the environmental setting, analysis, and effects determination presented in Chapters 5. The NCCPA communities that may be affected by the Proposed Project/Action include Valley Riverine Aquatic and Valley/Foothill Riparian habitats, and the Anadromous and Estuarine Fish Groups, which are associated with these habitats in the Action Area. Effects to the fishes are largely related to water quality, which was addressed in the Proposed Project/Action description. Water quality control measures are included in the Proposed Project/Action, and reduce the effects to the fishes to less-than-significant levels.

Effects to the two habitats are addressed in conservation measures in Chapter 5, which include avoidance of riparian areas, and the implementation of Swainson's hawk conservation and water quality measures. With the implementation of these measures, effects to Valley Riverine Aquatic and Valley/Foothill Riparian habitats are not likely. Adverse effects to Anadromous and Estuarine Fish Groups are expected to be minor and are outweighed by the overall beneficial effects of the Proposed Project.

Therefore, both Phase 1 and Phase 2 of the Proposed Project/Action may affect, but are not likely to adversely affect NCCPA Communities identified in this ASIP.

CHAPTER 11

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Appendix A (ASIP)

Species List





United States Department of the Interior
FISH AND WILDLIFE SERVICE

Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825



July 12, 2007

Document Number: 070712043233

Sara Lee
Environmental Science Associates
8950 Cal Center Drive
Building 3, Suite 300
Sacramento, CA 95820

Subject: Species List for Meridian Farms Fish Screen Project

Dear: Ms. Lee,

We are sending this official species list in response to your July 12, 2007 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 October 10, 2007.

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 at www.fws.gov/sacramento/es/branches.htm.

Endangered Species Division



**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: 070712043233

Database Last Updated: June 9, 2007

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 packardii*
 - Critical habitat, vernal pool tadpole shrimp (X)*
 - 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)*
 - Critical habitat, winter-run chinook salmon (X) (NMFS)*
 - winter-run chinook salmon, Sacramento River (E) (NMFS)*

Amphibians

- Ambystoma californiense*
 - California tiger salamander, central population (T)*
- Rana aurora draytonii*
 - California red-legged frog (T)*

Reptiles

- Thamnophis gigas*
 - giant garter snake (T)*

Candidate Species

Fish

- Oncorhynchus tshawytscha*
 - Central Valley fall/late fall-run chinook salmon (C) (NMFS)*
 - Critical habitat, Central Valley fall/late fall-run chinook (C) (NMFS)*

Birds

- Coccyzus americanus occidentalis*
 - Western yellow-billed cuckoo (C)*

Quads Containing Listed, Proposed or Candidate Species:

SUTTER BUTTES (545A)

MERIDIAN (545B)

GRIMES (545C)

TISDALE WEIR (545D)

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 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.

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 [critical habitat](#) page for maps.

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) 414-6580.

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 October 10, 2007.

California Department of Fish and Game

Natural Diversity Database

Selected Elements by Scientific Name - Portrait

USGS 7.5-minute Quads: Grimes, Kirkville, Dunnigan, Arbuckle, Colusa, Wildwood School, Tisdale Weir, Sutter Buttes, Meridian

Scientific Name/Common Name	Element Code	Federal Status	State Status	GRank	SRank	CDFG or CNPS
1 <i>Agelaius tricolor</i> tricolored blackbird	ABPBXB0020			G2G3	S2	SC
2 <i>Ambystoma californiense</i> California tiger salamander	AAAAA01180	Threatened		G2G3	S2S3	SC
3 <i>Antrozous pallidus</i> pallid bat	AMACC10010			G5	S3	SC
4 <i>Ardea alba</i> great egret	ABNGA04040			G5	S4	
5 <i>Ardea herodias</i> great blue heron	ABNGA04010			G5	S4	
6 <i>Astragalus tener var. ferrisiae</i> Ferris' milk-vetch	PDFAB0F8R3			G1T1	S1.1	1B.1
7 <i>Athene cunicularia</i> burrowing owl	ABNSB10010			G4	S2	SC
8 <i>Atriplex depressa</i> brittlescale	PDCHE042L0			G2Q	S2.2	1B.2
9 <i>Atriplex joaquiniana</i> San Joaquin spearscale	PDCHE041F3			G2	S2.1	1B.2
10 <i>Branchinecta lynchi</i> vernal pool fairy shrimp	ICBRA03030	Threatened		G3	S2S3	
11 <i>Branta hutchinsii leucopareia</i> cackling (=Aleutian Canada) goose	ABNJB05035	Delisted		G5T4	S2	
12 <i>Buteo swainsoni</i> Swainson's hawk	ABNKC19070		Threatened	G5	S2	
13 <i>California macrophyllum</i> round-leaved filaree	PDGER01070			G3	S3.1	1B.1
14 <i>Carduelis lawrencei</i> Lawrence's goldfinch	ABPBY06100			G3G4	S3	
15 <i>Charadrius montanus</i> mountain plover	ABNNB03100			G2	S2?	SC
16 <i>Cicindela hirticollis abrupta</i> Sacramento Valley tiger beetle	IICOL02106			G5TH	SH	
17 <i>Coastal and Valley Freshwater Marsh</i>	CTT52410CA			G3	S2.1	
18 <i>Coccyzus americanus occidentalis</i> western yellow-billed cuckoo	ABNRB02022	Candidate	Endangered	G5T2	S1	
19 <i>Cordylanthus palmatus</i> palmate-bracted bird's-beak	PDSCR0J0J0	Endangered	Endangered	G1	S1.1	1B.1
20 <i>Desmocerus californicus dimorphus</i> valley elderberry longhorn beetle	IICOL48011	Threatened		G3T2	S2	
21 <i>Dipodomys californicus eximius</i> Marysville California kangaroo rat	AMAFD03071			G4T1	S1	SC
22 <i>Great Valley Cottonwood Riparian Forest</i>	CTT61410CA			G2	S2.1	
23 <i>Great Valley Mixed Riparian Forest</i>	CTT61420CA			G2	S2.2	
24 <i>Great Valley Willow Scrub</i>	CTT63410CA			G3	S3.2	

California Department of Fish and Game

Natural Diversity Database

Selected Elements by Scientific Name - Portrait

USGS 7.5-minute Quads: Grimes, Kirkville, Dunnigan, Arbuckle, Colusa, Wildwood School, Tisdale Weir, Sutter Buttes, Meridian

Scientific Name/Common Name	Element Code	Federal Status	State Status	GRank	SRank	CDFG or CNPS
25 <i>Grus canadensis tabida</i> greater sandhill crane	ABNMK01014		Threatened	G5T4	S2	
26 <i>Hibiscus lasiocarpus</i> rose-mallow	PDMAL0H0Q0			G4	S2.2	2.2
27 <i>Lasiurus blossevillii</i> western red bat	AMACC05060			G5	S?	
28 <i>Lasiurus cinereus</i> hoary bat	AMACC05030			G5	S4?	SC
29 <i>Lasthenia glabrata ssp. coulteri</i> Coulter's goldfields	PDAST5L0A1			G4T3	S2.1	1B.1
30 <i>Layia septentrionalis</i> Colusa layia	PDAST5N0F0			G2	S2.2	1B.2
31 <i>Lepidurus packardii</i> vernal pool tadpole shrimp	ICBRA10010	Endangered		G3	S2S3	
32 <i>Myotis ciliolabrum</i> western small-footed myotis	AMACC01140			G5	S2S3	
33 <i>Navarretia leucocephala ssp. bakeri</i> Baker's navarretia	PDPLM0C0E1			G4T2	S2.1	1B.1
34 <i>Northern Hardpan Vernal Pool</i>	CTT44110CA			G3	S3.1	
35 <i>Perognathus inornatus inornatus</i> San Joaquin pocket mouse	AMAFD01061			G4T2T3	S2S3	
36 <i>Plegadis chihi</i> white-faced ibis	ABNGE02020			G5	S1	SC
37 <i>Riparia riparia</i> bank swallow	ABPAU08010		Threatened	G5	S2S3	
38 <i>Silene verecunda ssp. verecunda</i> San Francisco campion	PDCAR0U213			G5T2	S2.2	1B.2
39 <i>Spea hammondi</i> western spadefoot	AAABF02020			G3	S3	SC
40 <i>Thamnophis gigas</i> giant garter snake	ARADB36150	Threatened	Threatened	G2G3	S2S3	
41 <i>Trichocoronis wrightii var. wrightii</i> Wright's trichocoronis	PDAST9F031			G4T3	S1.1	2.1



Inventory of Rare and Endangered Plants

v7-07c 7-09-07

Status: search results - Thu, Jul. 12, 2007 15:42 c

{QUADS_123} =~ m/545C|530A|530B|546D|546A|531A|545D|545/

Tip: Want to search by county? Try the [county index](#). [\[all tips and help.\]](#) [\[search history\]](#)

Your Quad Selection: Grimes (545C) 3912118, Kirkville (530A) 3812187, Dunnigan (530B) 3812188, Arbuckle (546D) 3912211, Colusa (546A) 3912221, Wildwood School (531A) 3812281, Tisdale Weir (545D) 3912117, Sutter Buttes (545A) 3912127, Meridian (545B) 3912128

Hits 1 to 11 of 11

Requests that specify topo quads will return only Lists 1-3.

To save selected records for later study, click the ADD button.

Selections will appear in a new window.

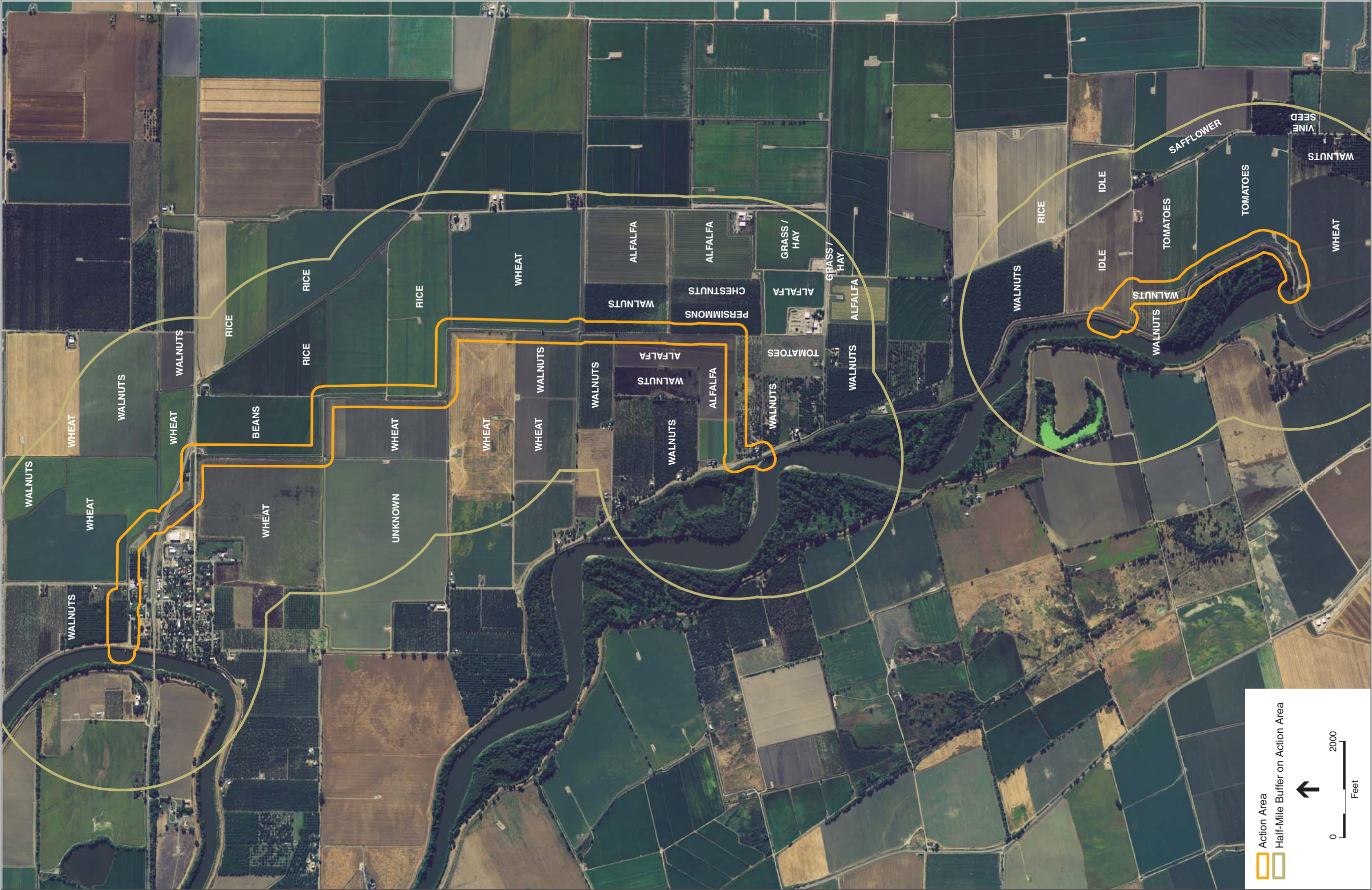
open	save	hits	scientific	common	family	CNPS
	<input type="checkbox"/>	1	<u>Astragalus tener</u> var. ferrisiae	Ferris' milk-vetch	Fabaceae	List 1B.1
	<input type="checkbox"/>	1	<u>Atriplex depressa</u>	brittlescale	Chenopodiaceae	List 1B.2
	<input type="checkbox"/>	1	<u>Atriplex joaquiniana</u>	San Joaquin spearscale	Chenopodiaceae	List 1B.2
	<input type="checkbox"/>	1	<u>California macrophylla</u>	round-leaved filaree	Geraniaceae	List 1B.1
	<input type="checkbox"/>	1	<u>Cordylanthus palmatus</u>	palmate-bracted bird's-beak	Scrophulariaceae	List 1B.1
	<input type="checkbox"/>	1	<u>Hibiscus lasiocarpus</u>	rose-mallow	Malvaceae	List 2.2
	<input type="checkbox"/>	1	<u>Lasthenia glabrata</u> ssp. coulteri	Coulter's goldfields	Asteraceae	List 1B.1
	<input type="checkbox"/>	1	<u>Layia septentrionalis</u>	Colusa layia	Asteraceae	List 1B.2
	<input type="checkbox"/>	1	<u>Navarretia leucocephala</u> ssp. bakeri	Baker's navarretia	Polemoniaceae	List 1B.1
	<input type="checkbox"/>	1	<u>Silene verecunda</u> ssp. verecunda	San Francisco campion	Caryophyllaceae	List 1B.2
	<input type="checkbox"/>	1	<u>Trichocoronis wrightii</u> var. wrightii	Wright's trichocoronis	Asteraceae	List 2.1

To save selected records for later study, click the ADD button.

Selections will appear in a new window.

No more hits.





SOURCE: USDA, 2005; MWH, 2007; MFWC, 2007; and ESA, 2008

Meridian Farms Water Company – Fish Screen Project - 203104

Figure A-1
Proposed Crop Types for 2008 in the
Vicinity of the Action Area

Appendix B (ASIP)

Site Photos





PHOTO 1 – Riparian habitat near the existing Drexler Diversion.



PHOTO 2 – Location of the Proposed New Grimes Diversion.



PHOTO 3 – Location of the Proposed Meridian Diversion.



PHOTO 4 – View of ruderal grassland along the Sacramento River near the Meridian Diversion.



PHOTO 5 – Existing Grimes Diversion.

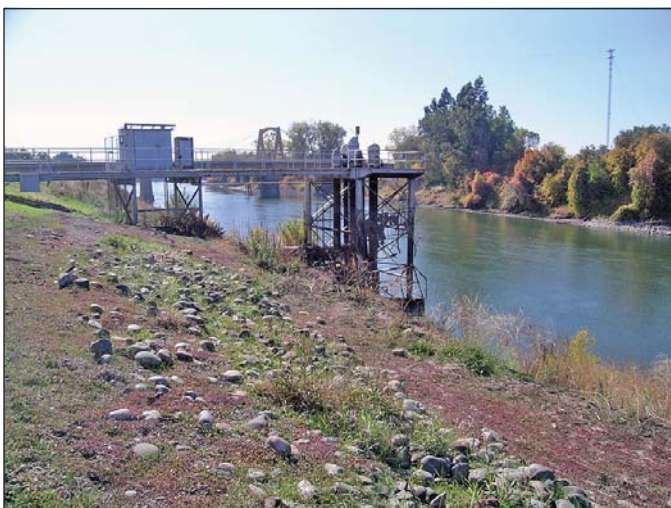


PHOTO 6 – Existing Meridian Diversion.



PHOTO 7 – Reclamation District 70 Drain.



PHOTO 8 – Main Canal.



PHOTO 9 – Water Delivery Ditch.



PHOTO 10 – Seep Ditch at the location of the Proposed Drexler Relift.



PHOTO 11 – Small mammal burrow.