

**Meeting of the Central Valley Flood Protection Board
September 28, 2012**

**Staff Report – Encroachment Permit
California Department of Fish and Game
Riparian Restoration, Colusa County**

1.0 – ITEM

Consider approval of Permit No. 18682 (Attachment B)

2.0 – APPLICANT

California Department of Fish and Game (DFG)

3.0 – LOCATION

The project is located approximately 2-miles north of Colusa.
(Sacramento River, Colusa County, see Attachment A)

4.0 – DESCRIPTION

Applicant proposes to restore five (5) acres to riparian habitat inside the Colusa Unit of the Sacramento River Wildlife Area (Colusa-North Tract) on the right (west) bank overflow area of the Sacramento River (RM 147).

5.0 – PROJECT ANALYSIS

The applicant proposes to remove an abandoned walnut orchard and actively restore the site with native riparian vegetation to prevent infestation of non-native invasive species. This 5-acre restoration site is included in the 119-acre Colusa-North Tract (CNT) site which is a component of the Colusa Unit of the Sacramento River Wildlife Area. Existing riparian habitat covers approximately 113 acres of the CNT and surrounds the 5-acre parcel that is planned for restoration. The right (west) bank Project Levee is located approximately 700-feet from the restoration site. The restoration planting scheme consists of mixed riparian forest (288 plants), mule fat scrub (297 plants), savannah/valley wildrye grassland (165 plants), valley oak riparian

forest (317 plants), and willow scrub (1,006 plants). New riparian vegetation will be irrigated and maintained for a three-year period to ensure the establishment of the proposed plant communities. All irrigation components will be removed from the floodway following the three-year establishment period. New vegetation was considered at full maturity in the two-dimensional hydraulic model that was done for the proposed project so no new maintenance is anticipated as a result of the project.

The California Department of Fish and Game (DFG) and the California Department of Water Resources (DWR) are actively negotiating on a Memorandum of Understanding (MOU) for maintenance of flood control projects in the Sacramento River and Feather River wildlife areas. The goal is for both agencies to mutually agree to maintain channel capacity while managing, monitoring, restoring, and enhancing lands set aside for fish and wildlife. The agencies will further agree to coordinate land management efforts and facilitate the respective parties' efforts to meet public safety and environmental stewardship goals. DWR will complete routine maintenance in accordance with this MOU and the Streambed Alteration Agreement issued by DFG for Routine Maintenance of Flood Control Projects (Notification No. 1600-2010-01 08-R2). Permit No. 18682 is conditioned on the MOU being executed by both agencies.

5.1 – Authority of the Board

- California Code of Regulations, Title 23-Waters, Division 1, Article 3, §6 - Need for a Permit; Article 8, §112 – Streams Regulated, §131 - Vegetation.

5.2 – Hydraulic Analysis

A detailed two-dimensional (2-D) hydraulic analysis was conducted for eight parcels (including the proposed 5-acre restoration site) that are planned for restoration on the Sacramento River between Princeton (RM 164.0) and Colusa (RM 144.4). One hydraulic model was used for all eight sites to determine if there were any cumulative effects.

The initial model was calibrated using 1995 high flow runoff information and 1995 surveyed high water marks. Available 1997 river topography information was used for creating model geometry. The calibrated model was then updated with 2006 LIDAR topography and 2006 land use conditions, and then re-run using discharges corresponding to the U.S. Army Corps of Engineers (USACE) 1957 design profile for this reach of the Sacramento River. Multiple alternative restoration scenarios were evaluated until acceptable water surface conditions were achieved.

The proposed 5-acre restoration site is an area of relatively ineffective velocity located approximately 800-feet from the river channel. Restoration of this small area results in a minimal impact on flood flows. The proposed vegetation was modeled with roughness coefficients that match remnant riparian areas in the study area so that maximum future growth and corresponding hydraulic impact of the proposed restoration is incorporated

into the hydraulic analysis results. The specific findings of the hydraulic analysis for the proposed 5-acre restoration site are summarized below:

Existing Conditions:

Flow Velocity: less than 1 foot per second (fps).

With-Project Conditions:

Flow Velocity: an increase of up to 0.22 fps in isolated areas.

Water Surface Elevation: an increase of 0.04 feet in isolated areas.

5.3 – Geotechnical Analysis

Due to the nature and scope of the proposed restoration this evaluation does not require a geotechnical analysis.

5.4 – Additional Staff Analysis

This proposed 5-acre restoration project is one of eight restoration sites that was identified in the August 2008 Colusa Subreach Planning Report (CSP). CSP was initiated to develop a strategy for restoration of the ecosystem along the Sacramento River between the community of Princeton and the City of Colusa, referred to as the Colusa Subreach, in Northern California. The subject area is located entirely inside of the flood protection levees from River Mile 164.5 on the north, downstream to RM 143.5 on the south. The north boundary is the site of the former Princeton Ferry and the south boundary is the Colusa Bridge. It includes approximately 5,466 acres of land with 5,094 acres in Colusa County and 372 acres in Glenn County. The objective of this ecosystem restoration is to restore the ability of the environment to support viable populations of native wildlife including those listed under State and federal Endangered Species Acts. This strategy was to be integrated with the flood management system, agriculture and other existing land uses. The project plan includes measures to plant multiple species of native vegetation intended to improve ecosystem functions. The Nature Conservancy (TNC) and the Sacramento River Conservation Area Forum (SRCAF) formed a partnership to conduct the planning program and funding was provided by the CALFED Ecosystem Restoration Program.

6.0 – AGENCY COMMENTS AND ENDORSEMENTS

The comments and endorsements associated with this project, from all pertinent agencies are shown below:

- State Maintenance Area No. 1 (maintained by Sutter Maintenance Yard) endorsed the project on May 25, 2010, with conditions. The conditions will be incorporated into the permit as Exhibit A.
- The U.S. Army Corps of Engineers 208.10 comment letter has not been received for this application. Staff anticipates receipt of a letter indicating that the USACE District Engineer has no objection to the project, subject to conditions. Upon receipt of the letter, staff will review to ensure conformity with the permit language and incorporate it into the permit as Exhibit B.

7.0 – CEQA ANALYSIS

Board staff has prepared the following California Environmental Quality Act (CEQA) determination:

The Board, as a responsible agency under CEQA, has reviewed Initial Study/Mitigated Negative Declaration (IS/MND) (SCH Number: 2008052098, May 2008) and Mitigation Measures for the Colusa Subreach Wildlife Habitat Restoration Project prepared by the lead agency, the California Department of Fish and Game (CDFG). These documents, including project design, may be viewed or downloaded from the Central Valley Flood Protection Board website at <http://www.cvpfb.ca.gov/meetings/2012/9-28-2012.cfm> under a link for this agenda item. These documents are also available for review in hard copy at the Board and the CDFG offices.

CDFG determined that the project would not have a significant effect on the environment at on August 26, 2008 and filed a Notice of Determination on August 27, 2008 with the State Clearinghouse. Board staff finds that although the proposed project could have a potentially significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. The project proponent has incorporated mandatory mitigation measures into the project plans to avoid identified impacts or to mitigate such impacts to a point where no significant impacts will occur. These mitigation measures are included in the project proponent's IS/MND and address impacts to biological resources and cultural resources. The description of the mitigation measures are further described in the adopted IS/MND.

8.0 – SECTION 8610.5 CONSIDERATIONS

1. Evidence that the Board admits into its record from any party, State or local public agency, or nongovernmental organization with expertise in flood or flood plain management:

The Board will make its decision based on the evidence in the permit application and attachments, this staff report, and any other evidence presented by any individual or group.

2. The best available science that related to the scientific issues presented by the executive officer, legal counsel, the Department or other parties that raise credible scientific issues.

The accepted industry standards for the work proposed under this permit as regulated by Title 23 have been applied to the review of this permit.

3. Effects of the decision on the facilities of the State Plan of Flood Control, and consistency of the proposed project with the Central Valley Flood Protection Plan as adopted by Board Resolution 2012-25 on June 29, 2012.

The proposed riparian vegetation at full maturity results in minor hydraulic changes that are localized to the restoration site. Therefore the proposed project will have an insignificant effect on facilities of the State Plan of Flood Control and the project is consistent with the Central Valley Flood Protection Plan. In addition the proposed native vegetation plantings would also improve the diversity of the ecosystem within the project site consistent with the Central Valley Flood Protection Plan – Conservation Framework.

4. Effects of reasonable projected future events, including, but not limited to, changes in hydrology, climate, and development within the applicable watershed:

There will be no effects to the proposed restoration site from reasonable projected future events.

9.0 – STAFF RECOMMENDATION

Staff recommends that the Board adopt the CEQA findings and approve the permit, conditioned upon receipt of a U.S. Army Corps of Engineers comment letter indicating that the District Engineer has no objection to the project, subject to conditions, and conditioned upon execution of a Memorandum of Understanding for wildlife area

maintenance between DFG and DWR, and direct staff to file a Notice of Determination with the State Clearinghouse.

10.0 – LIST OF ATTACHMENTS

- A. Location Maps
- B. Draft Permit No. 18682
- C. Hydraulic Results
- D. Planting Plan
- E. Maintenance Plan

Design Review:	Gary W. Lemon P.E.
Environmental Review:	James Herota / Andrea Mauro
Document Review:	Mitra Emami P.E., Eric Butler P.E., Len Marino P.E.

Two-Dimensional Hydraulic Modeling of Riparian
Habitat Restoration from Colusa to Princeton
33-0551.00

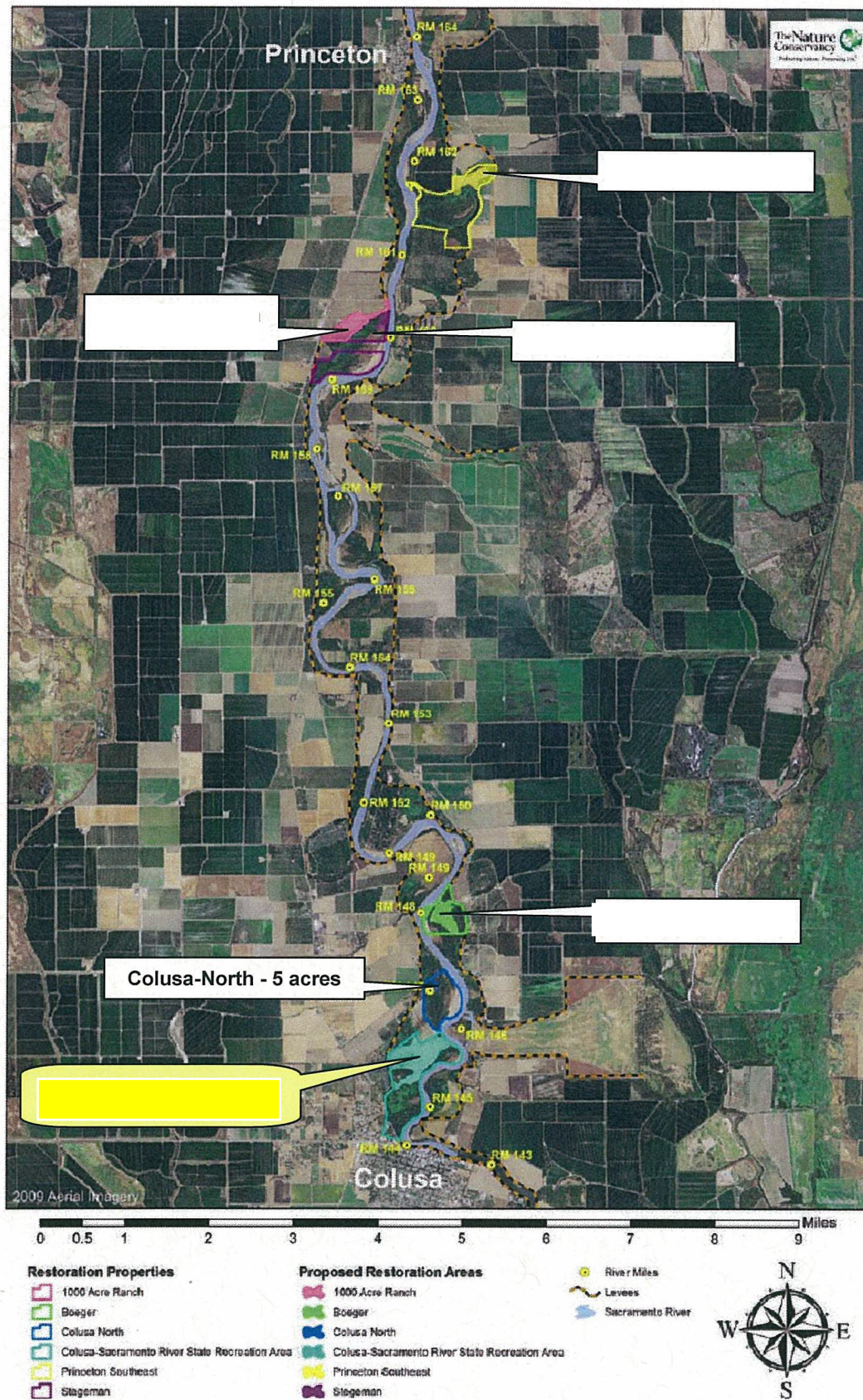


Figure 1. Colusa Subreach Restoration Tracts

STATE OF CALIFORNIA
THE RESOURCES AGENCY
THE CENTRAL VALLEY FLOOD PROTECTION BOARD

PERMIT NO. 18682 BD

This Permit is issued to:

CA Department of Fish and Game
1701 Nimbus Road, Suite A
Rancho Cordova, California 95670

To restore 5-acres to riparian habitat inside the Colusa Unit of the Sacramento River Wildlife Area (Colusa-North Tract) on the right (west) bank overflow area of the Sacramento River (RM 147). The project is located approximately 2 miles north of Colusa (Section 18, T16N, R1W, MDB&M, Sutter Maintenance Yard, Sacramento River, Colusa County).

NOTE: Special Conditions have been incorporated herein which may place limitations on and/or require modification of your proposed project as described above.

(SEAL)

Dated: _____

Executive Officer

GENERAL CONDITIONS:

ONE: This permit is issued under the provisions of Sections 8700 – 8723 of the Water Code.

TWO: Only work described in the subject application is authorized hereby.

THREE: This permit does not grant a right to use or construct works on land owned by the Sacramento and San Joaquin Drainage District or on any other land.

FOUR: The approved work shall be accomplished under the direction and supervision of the State Department of Water Resources, and the permittee shall conform to all requirements of the Department and The Central Valley Flood Protection Board.

FIVE: Unless the work herein contemplated shall have been commenced within one year after issuance of this permit, the Board reserves the right to change any conditions in this permit as may be consistent with current flood control standards and policies of The Central Valley Flood Protection Board.

SIX: This permit shall remain in effect until revoked. In the event any conditions in this permit are not complied with, it may be revoked on 15

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days' notice.

SEVEN: It is understood and agreed to by the permittee that the start of any work under this permit shall constitute an acceptance of the conditions in this permit and an agreement to perform work in accordance therewith.

EIGHT: This permit does not establish any precedent with respect to any other application received by The Central Valley Flood Protection Board.

NINE: The permittee shall, when required by law, secure the written order or consent from all other public agencies having jurisdiction.

TEN: The permittee is responsible for all personal liability and property damage which may arise out of failure on the permittee's part to perform the obligations under this permit. If any claim of liability is made against the State of California, or any departments thereof, the United States of America, a local district or other maintaining agencies and the officers, agents or employees thereof, the permittee shall defend and shall hold each of them harmless from each claim.

ELEVEN: The permittee shall exercise reasonable care to operate and maintain any work authorized herein to preclude injury to or damage to any works necessary to any plan of flood control adopted by the Board or the Legislature, or interfere with the successful execution, functioning or operation of any plan of flood control adopted by the Board or the Legislature.

TWELVE: Should any of the work not conform to the conditions of this permit, the permittee, upon order of The Central Valley Flood Protection Board, shall in the manner prescribed by the Board be responsible for the cost and expense to remove, alter, relocate, or reconstruct all or any part of the work herein approved.

SPECIAL CONDITIONS FOR PERMIT NO. 18682 BD

THIRTEEN: This permit is not valid until the Memorandum of Understanding for maintenance of flood control projects in the Sacramento River and Feather River wildlife areas between the California Department of Fish and Game and the California Department of Water Resources, Division of Flood Management, is executed.

FOURTEEN: The permittee should contact the U.S. Army Corps of Engineers, Sacramento District, Regulatory Branch, 1325 J Street, Sacramento, California 95814, telephone (916) 557-5250, as compliance with Section 10 of the Rivers and Harbors Act and/or Section 404 of the Clean Water Act may be required.

FIFTEEN: All work approved by this permit shall be in accordance with the submitted drawings and specifications except as modified by special permit conditions herein. No further work, other than that approved by this permit, shall be done in the area without prior approval of the Central Valley Flood Protection Board.

SIXTEEN: The permittee is responsible for all liability associated with construction, operation, and maintenance of the permitted facilities and shall defend, indemnify, and hold the Central Valley Flood Protection Board and the State of California; including its agencies, departments, boards, commissions, and their respective officers, agents, employees, successors and assigns (collectively, the "State"), safe and harmless, of and from all claims and damages arising from the project undertaken pursuant to this permit, all to the extent allowed by law. The State expressly reserves the right to supplement or take over its defense, in its sole discretion.

SEVENTEEN: The permittee shall defend, indemnify, and hold the Central Valley Flood Protection Board and the State of California, including its agencies, departments, boards, commissions, and their respective officers, agents, employees, successors and assigns (collectively, the "State"), safe and harmless, of and from all claims and damages related to the Central Valley Flood Protection Board's approval of this permit, including but not limited to claims filed pursuant to the California

Environmental Quality Act. The State expressly reserves the right to supplement or take over its defense, in its sole discretion.

EIGHTEEN: The Central Valley Flood Protection Board and the Department of Water Resources shall not be held liable for any damages to the permitted encroachment(s) resulting from flood fight, operation, maintenance, inspection, or emergency repair.

NINETEEN: No construction work of any kind shall be done during the flood season from November 1st to April 15th without prior approval of the Central Valley Flood Protection Board.

TWENTY: Upon receipt of a signed copy of the issued (not approved only) permit the permittee shall contact the Department of Water Resources by telephone, (916) 574-0609, and submit the enclosed postcard to schedule a preconstruction conference. Failure to do so at least 10 working days prior to start of work may result in delay of the project.

TWENTY-ONE: No material stockpiles, temporary buildings, or equipment shall remain in the floodway during the flood season from November 1st to April 15th.

TWENTY-TWO: Land preparation (landleveling, dredging, etc.) is not allowed.

TWENTY-THREE: In the event trees and brush are cleared, they shall be properly disposed of either by burning or removing from the floodway prior to the flood season.

TWENTY-FOUR: Tree rows shall be parallel to the direction of the overbank flow and planted vegetation shall not cause the flows to be directed toward any levee.

TWENTY-FIVE: Trees shall not be planted within 15 feet of the levee toe.

TWENTY-SIX: Areas where plantings are lost to erosion shall not be replanted.

TWENTY-SEVEN: If the planted trees result in an adverse hydraulic impact, the permittee will provide appropriate mitigation.

TWENTY-EIGHT: All temporary fencing, gates and signs shall be removed upon completion of the project.

TWENTY-NINE: The temporary irrigation system shall be removed from the floodway at the end of the three year vegetation establishment period.

THIRTY: All debris generated by this project shall be disposed of outside the floodway.

THIRTY-ONE: Any vegetation which interferes with the successful execution, functioning, maintenance, or operation of the adopted plan of flood control must be removed by the owner at owner's expense upon request by the Central Valley Flood Protection Board, Department of Water Resources, or local maintaining agency. If the owner does not remove such vegetation upon request, the Central Valley Flood Protection Board reserves the right to remove the vegetation at the owner's expense.

THIRTY-TWO: The permittee shall comply with all conditions set forth by the California Department of Water Resources Sutter Maintenance Yard which is attached to this permit as Exhibit A and is incorporated by reference.

THIRTY-THREE: The permittee shall comply with all conditions set forth in the letter from the Department of the Army (U.S. Army Corps of Engineers, Sacramento District) dated September xx, 2012, which is attached to this permit as Exhibit B and is incorporated by reference.

CONDITIONS

1. Maintaining Agency, "DWR", Sutter Maintenance Yard, shall maintain this section of the Sacramento River, located in Colusa County, Section 8; Township 16N; Range 1W, in accordance with USACE Operations and Maintenance Manual, "For The Sacramento River Flood Control Project", Section:

6-02. Maintenance

6-04. Operations

and the Supplement to Standard Operations and Maintenance Manual, "Unit No. 165 Cleared Floodways" Section:

2-01. Channel

3-01. Repair of Damage

as is necessary to insure passage of project flood flows, and maintain channel capacity.

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Hydraulic Analysis Summary *(data from Ayres Associates 2008)*

The restoration site is in an area of relatively ineffective velocity located 800 feet from the river channel. Restoration of this small area results in a minimal effect on flood flows in the area. The proposed restoration will result in:

- A Design Flow elevation well below the project design
- No increase in Design Flow elevation off the site
- No erosive increase in velocity
- No damage to the neighboring property

The proposed vegetation communities are modeled with roughness coefficients that match remnant riparian areas in the Colusa Subreach so that the maximum future growth and hydraulic effect of the restoration is incorporated into the analysis results. The specific findings of the hydraulic analysis are summarized below:

Existing Conditions Velocity: Design Flow with existing conditions results in a very low velocity less than 1 fps.

Existing Conditions vs. Design Flow Elevation: Design Flow with existing conditions results in flood flow elevation from 1.06 feet below the project design.

With-Project Change in Velocity: Restoration results in an increase of up to .22 fps in small spots on the restoration site. The increase does not extend beyond the site or to either the river channel or the levee (see Figure E-3).

With-Project Flood Flow Elevation vs. Design Flow Elevation: Restoration results in a very small bulge of .04 feet only on the restoration site that does not extend to other property or to either river channel or the levee. (See Figure E-4).

Effect on Adjoining Property: Ayres Assoc. found no impacts on adjoining properties or the levees.

Because the above findings are based upon the restored habitat at full growth no regular maintenance will be required to ensure that the restored habitat will be compatible with the flood management system and adjoining property interests.

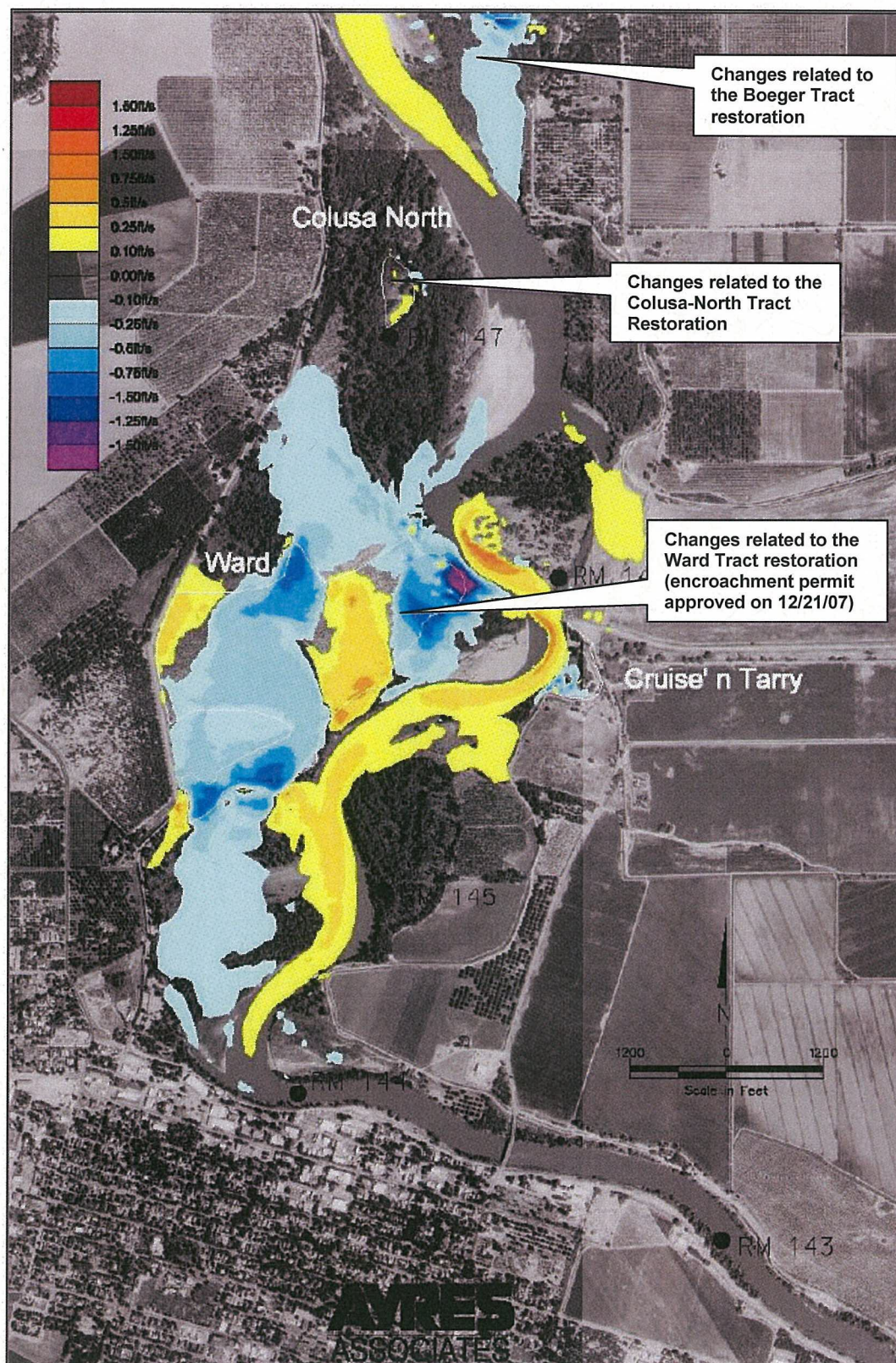


Figure E-3. Velocity Differential – Existing to With-Project

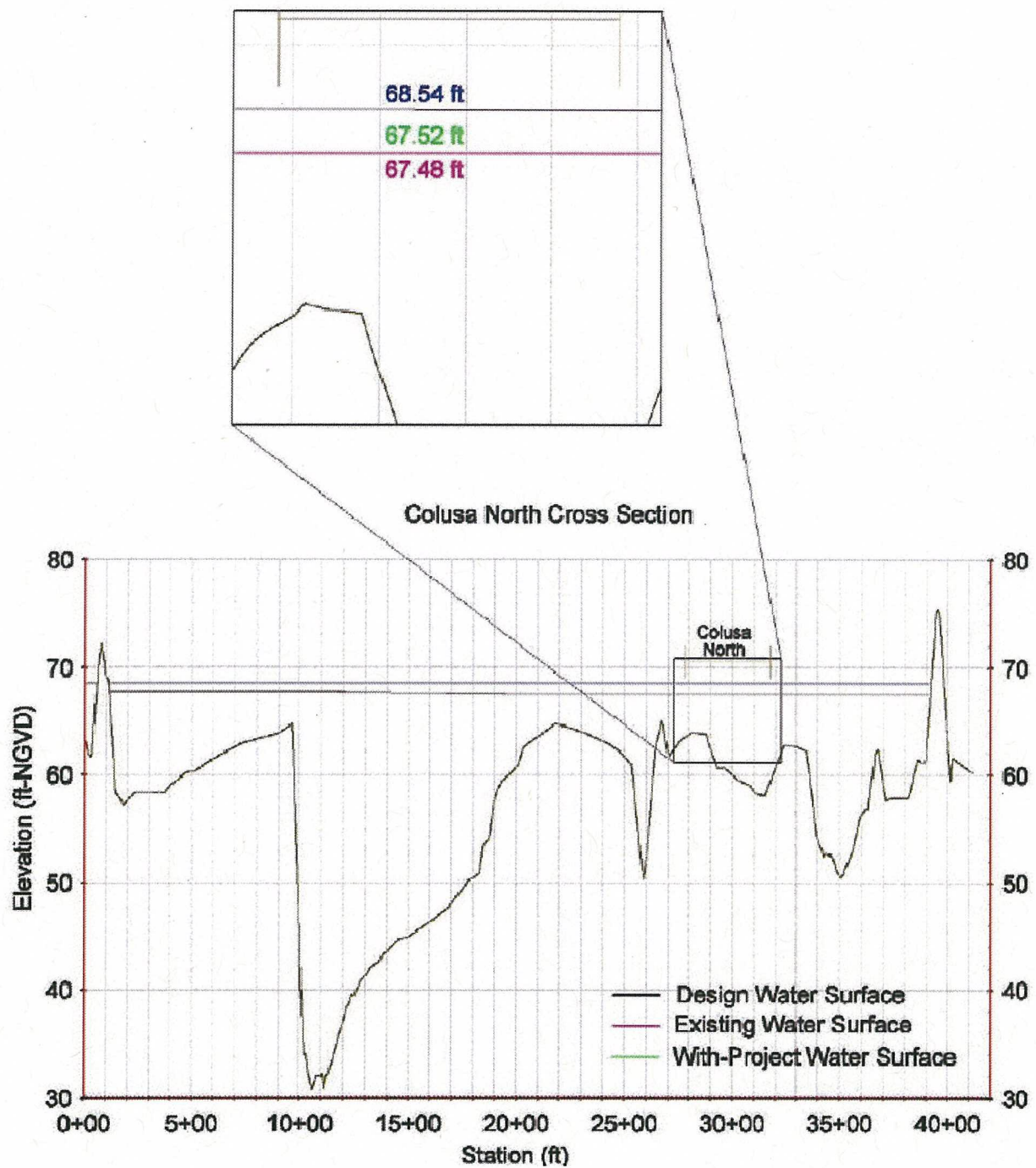


Figure E-4. Water Surface Elevation Cross Section – Colusa-North

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Restoration Plant Composition.

The restoration plan for the Colusa-North Tract specifies the native plants that will compose each plant community incorporating the appropriate plant and row spacings. Species and seeding rates are also specified for the native grass understory that will be established to provide initial cover and assist weed control. Figure E-6 illustrates the restoration plan for the Colusa-North Tract depicting the proposed plant community and the configuration of the planting rows that will be parallel with the flow of flood waters.

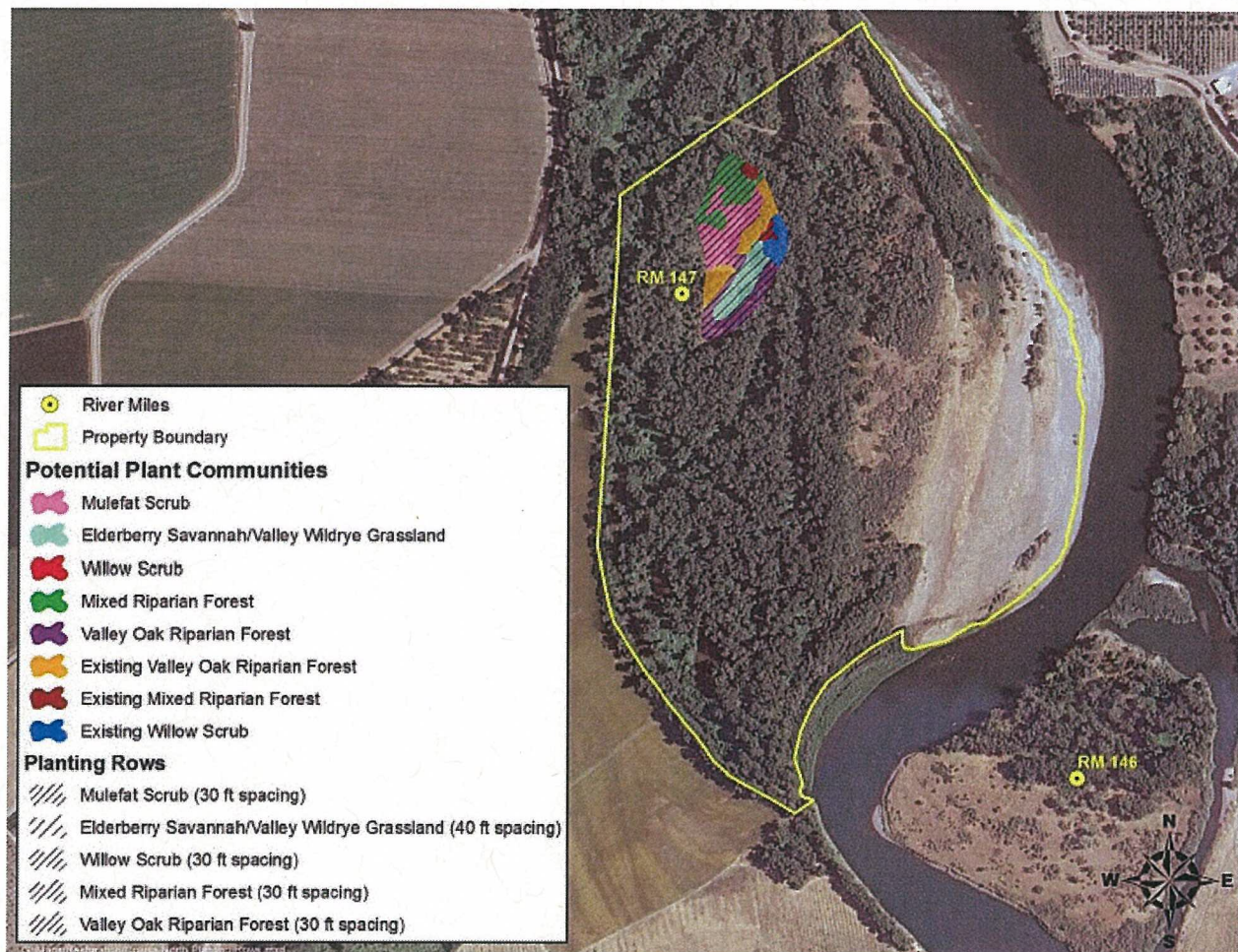


Figure C-6. Restoration Plan for the Colusa-North Tract with Planting Rows

Valley Oak Riparian Forest (VORF)

Phase 1 - Manual Planting

Planting Spacings (plants x row)	11' x 30'
Emitter Density per acre	132
Acres	1.2
Target Planting Date	Spring, Project Year 2
Total Locations	158
Total Plants	317

Canopy Structure	Species		Frequency	Total
Overstory	<i>Platanus racemosa</i>	Western sycamore	10%	16
	<i>Quercus lobata</i>	Valley oak	43%	68
Midstory	<i>Acer negundo</i>	Box elder	8%	13
	<i>Fraxinus latifolia</i>	Oregon ash	4%	6
Understory shrubs	<i>Rosa californica</i>	California rose	13%	21
	<i>Rubus ursinus</i>	California blackberry	17%	27
	<i>Toxicodendron diversilobum</i>	Poison oak	5%	8
			100%	158
Sedges	<i>Carex barbarae</i>	Santa Barbara sedge	20%	32
	<i>Caerex praegracillis</i>	Slender sedge	20%	32
Forbs	<i>Artemisia douglasiana</i>	Mugwort	10%	16
	<i>Euthamia occidentalis</i>	California goldenrod	10%	16
	<i>Lotus purshianus</i>	Lotus	5%	8
	<i>Urtica dioecia</i>	Hoary nettle	10%	16
Vines	<i>Oenothera hookeri</i>	Primrose	10%	16
	<i>Aristolochia californica</i>	California pipevine	10%	16
	<i>Clematis ligusticifolia</i>	Clematis	3%	5
	<i>Vitis californica</i>	California grape	2%	3
			100%	158

Phase 2 - Direct Understory Seeding

Acres 1.2
Seeding rate (lb/acre) 13
December, Project Year
Target Planting Date 2

Grass Species		Ecotype	Seeding Rate
<i>Elymus glaucus</i>	Blue wildrye	Parrott	20%
<i>Hordeum brachyantherum</i>	California meadow barley	Yolo Co.	10%
<i>Leymus triticoides</i>	Creeping wildrye	Yolo Co.	10%
<i>Melica californica</i>	California melic	Tehama Co., Inks Creek	15%
<i>Nassella cernua</i>	Nodding needlegrass	Tehama Co., Inks Creek	15%
<i>Nassella pulchra</i>	Purple needlegrass	Llano Seco	20%
<i>Poa secunda</i>	One sided bluegrass	Yolo Co. Fiske Creek	10%
			100%

**Mixed Riparian Forest
(MRF)**

Phase 1 - Manual Planting

Planting Spacings (plants x row)	11' x 30'
Emitter Density per acre	132
Acres	1.2
Target Planting Date	Spring, Project Year 2
Total Locations	158
Total Plants	288

Canopy Structure	Species		Frequency	Total
Overstory	<i>Platanus racemosa</i>	Western sycamore	20%	32
		Fremont		
	<i>Populus fremontii</i>	cottonwood	15%	24
	<i>Quercus lobata</i>	Valley oak	5%	8
Midstory	<i>Acer negundo</i>	Box elder	10%	16
	<i>Cephalanthus occidentalis</i>	Button willow	2%	3
	<i>Fraxinus latifolia</i>	Oregon ash	5%	8
	<i>Salix gooddingii</i>	Goodding's willow	6%	10
	<i>Salix laevigata</i>	Red willow	2%	3
	<i>Salix lasiolepis</i>	Arroyo willow	8%	13
	<i>Salix lucida</i>	Shining willow	2%	3
	<i>Rosa californica</i>	California rose	5%	8
	<i>Rubus ursinus</i>	California blackberry	12%	19
	<i>Toxicodendron diversilobum</i>	Poison oak	8%	13
			100%	158
Sedges	<i>Carex barbarae</i>	Santa Barbara sedge	15%	24
	<i>Caerex praeegracillis</i>	Slender sedge	15%	24
Forbs	<i>Artemisia douglasiana</i>	Mugwort	22%	35
	<i>Euthamia occidentalis</i>	California goldenrod	5%	8
	<i>Lotus purshianus</i>	Lotus	2%	3
	<i>Urtica dioecia</i>	Hoary nettle	5%	8
Vines	<i>Aristolochia californica</i>	California pipevine	4%	6
	<i>Clematis ligusticifolia</i>	Clematis	3%	5
	<i>Vitis californica</i>	California grape	11%	17
			82%	130

* companion planting frequency is 82%, this accounts for not planting a companion plant next to the willow species.

Phase 2 - Direct Understory Seeding

Acres 1.2
 Seeding rate (lb/acre) 13
 Target Planting Date December, Project Year 2

Grass Species	Ecotype	Seeding Rate
<i>Elymus glaucus</i>	Blue wildrye	Parrott 40%
<i>Hordeum brachyantherum</i>	California meadow barley	Yolo Co. 30%
<i>Leymus triticoides</i>	Creeping wildrye	Yolo Co. 30%

100%

Willow Scrub (WS)**Phase 1 - Manual Planting**

Planting Spacings (plants x row) 11' x 30'
 Emitter Density per acre 132
 Acres 0.1
 Target Planting Date Spring, Project Year 2
 Total Locations 13
 Total Plants 1,006

Canopy Structure	Species	Frequency	Total
Overstory	<i>Populus fremontii</i>	Fremont cottonwood 10%	1
Midstory	<i>Salix exigua</i>	Narrow leaved willow 43%	6
	<i>Salix lasiolepis</i>	Arroyo willow 5%	1
	<i>Salix lucida</i>	Shining willow 7%	1
Understory shrubs	<i>Rosa californica</i>	California rose 10%	1
	<i>Rubus ursinus</i>	California blackberry 15%	2
	<i>Toxicodendron diversilobum</i>	Poison oak 10%	1
		100%	13
Forbs	<i>Artemisia douglasiana</i>	Mugwort 21%	3
	<i>Urtica dioeca</i>	Hoary nettle 10%	1
	<i>Aristolochia californica</i>	California pipevine 9%	1
Vines	<i>Vitis californica</i>	California grape 5%	1
		45%	6

* companion planting frequency is 45%, this accounts for not planting a companion plant next to the willow species.

Phase 2 - Direct Understory Seeding

Acres 0.1
 Seeding rate (lb/acre) 13
 Target Planting Date December, Project Year 2

Grass Species	Ecotype	Seeding Rate
<i>Elymus glaucus</i>	Blue wildrye	Parrott 35%
<i>Hordeum brachyantherum</i>	California meadow barley	Yolo Co. 30%
<i>Leymus triticoides</i>	Creeping wildrye	Yolo Co. 35%

100%

**Mulefat Willow Scrub
(MFS)**

Phase 1 - Manual Planting

Planting Spacings (plants x row)	11' x 30'
Emitter Density per acre	132
Acres	1.5
Target Planting Date	Spring, Project Year 2
Total Locations	198
Total Plants	297

Canopy Structure	Species		Frequency	Total
Midstory	<i>Baccharis salicifolia</i>	Mulefat	50%	99
	<i>Salix exigua</i>	Narrow leaved willow	25%	50
	<i>Salix lasiolepis</i>	Arroyo willow	25%	50
			100%	198
Grass	<i>Muhlenbergia rigens</i>	Deergrass	5%	10
Forbs	<i>Artemisia douglasiana</i>	Mugwort	15%	30
	<i>Euthamia occidentalis</i>	California goldenrod	15%	30
	<i>Urtica dioecia</i>	Hoary nettle	15%	30
			50%	99

* companion planting frequency is 50%, this accounts for not planting a companion plant next to the willow species.

Phase 2 - Direct Understory Seeding

Acres	1.5
Seeding rate (lb/acre)	13
Target Planting Date	December, Project Year 2

Grass Species		Ecotype	Seeding Rate
<i>Elymus glaucus</i>	Blue wildrye	Parrott	35%
<i>Hordeum brachyantherum</i>	California meadow barley	Yolo Co.	30%
<i>Leymus triticoides</i>	Creeping wildrye	Yolo Co.	35%
			100%

Savanna/Valley Wildrye Grassland (ES/VWG)

Phase 1 - Manual Planting

Planting Spacings (plants x row)	11' x 40'
Emitter Density per acre	99
Acres	0.9
Target Planting Date	Spring, Project Year 2
Total Locations	89
Total Plants	165

Canopy Structure	Species		Frequency	Total
Overstory	<i>Quercus lobata</i>	Valley oak	10%	9
Midstory	<i>Baccharis pilularis</i>	Coyote brush	30%	27
Understory shrubs	<i>Rosa californica</i>	California rose	29%	26
	<i>Toxicodendron diversilobum</i>	Poison oak	29%	26
			100%	89
Sedges	<i>Carex barbarae</i>	Santa Barbara sedge	20%	18
	<i>Caerex praeegracillis</i>	Slender sedge	15%	13
Forbs	<i>Artemisia douglasiana</i>	Mugwort	15%	13
	<i>Urtica dioecia</i>	Hoary nettle	5%	4
	<i>Oenothera hookeri</i>	Primrose	15%	13
Vines	<i>Aristolochia californica</i>	California pipevine	10%	9
	<i>Vitis californica</i>	California grape	5%	4
			85%	76

* companion planting frequency is 85%, this accounts for not planting a companion plant next to the *Baccharis* species.

Phase 2 - Direct Understory Seeding

Acres	0.9
Seeding rate (lb/acre)	13
Target Planting Date	December, Project Year 2

Grass Species		Ecotype	Seeding Rate
<i>Elymus glaucus</i>	Blue wildrye	Parrott	20%
<i>Leymus triticoides</i>	Creeping wildrye	Yolo Co.	10%
<i>Melica californica</i>	California melic	Tehama Co., Inks Creek	15%
<i>Nassella cernua</i>	Nodding needlegrass	Tehama Co., Inks Creek	15%
<i>Nassella pulchra</i>	Purple needlegrass	Llano Seco	30%
<i>Poa secunda</i>	One sided bluegrass	Yolo Co. Fiske Creek	10%
			100%

Maintenance Plan – Colusa-North Tract

The proposed riparian habitat restoration will infill larger, existing areas of remnant riparian vegetation to maximize the connectivity and overall ecological value of that habitat for native species and game species. The proposed restoration involves a small portion of the five Tracts as most of the Tracts are already in riparian habitat. Only 167 acres of the 717 total acres, 23% of the total area, will be modified in any way. The remaining 77% of the land will be unchanged from the current condition. Five acres of the 143-acre Colusa-North Tract will be restored. The remaining 94% of the Tract will be unchanged.

The proposed plant communities are designed to achieve the full, natural vegetation potential that can be supported on the respective portions of each site. These communities were determined on the basis of the site characteristics, which include but are not limited to, soils, drainage and inundation frequency. These restored areas will gradually blend into the remnant riparian habitats that surround them and eventually they will be indistinguishable from the surrounding remnant habitat.

The hydraulic analysis prepared as a part of Colusa Subreach Planning modeled the proposed vegetation communities with roughness coefficients that matched the remnant riparian areas in the Colusa Subreach so that the maximum future effect of the restoration is incorporated into the analysis results. The modeling considered the restoration to be at full growth and, therefore, demonstrates a “full growth” or “worst case” flood impact that will not occur for many years. The analysis, which is detailed for each restoration site, demonstrates that the completed restoration will not result in unacceptable increases in either flood flow elevation or flood flow velocity and that the restorations will not unreasonably affect the flood management system or surrounding properties; either individually or cumulatively. As a result, following initial establishment of the vegetation no physical management actions are required to ensure compliance with Flood Protection Board standards.

Maintenance During Restoration

The intensive activity and maintenance that will occur over a four-year period is specified in a detailed Restoration Plan that was developed for of each of the five restoration sites as part of Colusa Subreach Planning. This initial activity and maintenance will ensure that the proposed plant communities will be established consistent with the Restoration Plan and the Hydraulic Analysis. This work will include the following:

Year One

- Collect native seeds and cuttings for overstory and understory plantings
- Propagate plantings in a nursery
- Perform weed control

Year Two

- Prepare fields for planting and lay out the plan onsite
- Install, maintain, and operate irrigation system
- Plant overstory and understory materials in the spring
- Seed understory native grass in the fall
- Perform weed control
- Monitor regularly
- Prepare annual report

Year Three

- Perform weed control
- Maintain and operate irrigation system
- Monitor regularly and replace plants as required
- Prepare annual report

Year Four

- Perform weed control
- Maintain and operate irrigation system
- Monitor regularly
- Prepare the final report

Maintenance Following Restoration

- Periodic visits by agency enforcement and lands management staff
- Annual review of each restoration site

The restoration planting will be irrigated and maintained for a three-year period to ensure the cost effective establishment of the proposed plant communities. By the end of the three year maintenance period the plants will be established to the point that irrigation and weed control are no longer required. The riparian habitat will function just like the surrounding remnant riparian habitat and no unusual maintenance will be required. DFG will manage the property for wildlife habitat and for public recreation use consistent with other comparable lands along the Sacramento River.

The DFG and Department of Water Resources (DWR) have entered into a Memorandum of Understanding for maintenance of flood control projects in the Sacramento River and Feather River wildlife areas. The agencies mutually agree to maintain channel capacity while managing, monitoring, restoring and enhancing lands set aside for fish and wildlife. The agencies further agree to coordinate land management efforts and facilitate the respective parties' efforts to meet public safety and environmental stewardship goals. DWR will complete routine maintenance in accordance with this MOU and the Streambed Alteration Agreement issued by DFG for Routine Maintenance of Flood Control Projects (Notification No. 1600-2010-0108-R2).