

**Meeting of the Central Valley Flood Protection Board  
February 24, 2012**

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

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**1.0 – ITEM**

To consider approval of Permit No. 18683 (Attachment B)

**2.0 – APPLICANT**

California Department of Fish and Game

**3.0 – LOCATION**

The project is located approximately one-mile southeast of Princeton.  
(Sacramento River, Colusa County, see Attachment A)

**4.0 – DESCRIPTION**

The applicant proposes to restore 54-acres to riparian habitat inside the Princeton Southeast Unit of the Sacramento River Wildlife Area (Womble Tract) on the left (east) bank overflow area of the Sacramento River (RM 162).

**5.0 – PROJECT ANALYSIS**

The proposed 54-acre restoration site is located in the northeast corner of the 320-acre Princeton Southeast Unit of the Sacramento River Wildlife Area. The 320-acre tract, also known as the Womble Tract (WT), is owned by the State of California and is managed by the California Department of Fish and Game (DFG). The majority of the WT is currently in riparian habitat and includes a large oxbow lake. The proposed 54-acre restoration site has been used to plant field crops in the past but the area is inundated almost every winter making farming difficult.

The proposed restoration site adjoins existing mixed riparian forests to the north and south. Agricultural land bounds the site to the west and the Project Levee bounds the restoration site to the east. The Project Levee is maintained by Levee District No. 3-Glenn County (650-feet), and the California Department of Water Resources (1,600-feet). All proposed plantings will be planted a minimum, of 15-feet from the waterside levee toe.

Mixed riparian forest is proposed for most of the restoration site (7,741 plants) to connect the existing mixed riparian forest north and south of the restoration area. The mixed riparian forest area is predominantly at a higher elevation than the rest of the site and is mainly within the estimated 2- to 4-year floodplain. Rose/baccharis scrub vegetation would be planted in an area adjacent to the eastern edge of the proposed mixed riparian forest (3,128 plants). Narrow stringers of willow scrub vegetation (1,006 plants) are proposed to be planted along the eastern edge of the rose/baccharis scrub, widening to the south, and in a small area in the southeast corner of the proposed restoration area. Blackberry scrub would occupy the east end of the proposed restoration site (1,824 plants). All planting rows will be parallel to flood flows at a spacing of 30-feet for trees and 20-feet or more for scrub vegetation.

As per the provided Maintenance Plan the 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 2-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. 18683 is conditioned on the MOU being ratified by both agencies.

## **5.1 – Hydraulic Analysis**

A detailed 2-dimensional (2-D) hydraulic analysis was conducted for eight parcels (includes the proposed 54-acre restoration site) that are planned for restoration on the Sacramento River between Princeton (RM 164.0) and Colusa (River Mile 144.4). One hydraulic model was used for all eight sites to determine if the proposed restoration projects would cause a cumulative hydraulic impact.

The 2-D hydraulic model was calibrated using the 1995 high flow runoff, available 1997 river topography and the 1995 surveyed high water marks. The calibrated model was then updated to 2006 LIDAR topography and 2006 land use conditions and then re-run for the 1957 Corps of Engineers design flow. Multiple alternative restoration scenarios were evaluated until acceptable water surface conditions were achieved.

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

The hydraulic analysis shows that Womble Tract is a backwater area that has a very low flow velocity at the project design flow of 160,000-cfs. The low flow velocity is due in part to the existing riparian vegetation that bounds the proposed restoration site to the north and south. In addition the proposed restoration site is located approximately 2,500-feet from the river channel. The results from the hydraulic analysis are summarized below:

**Existing Conditions:**

**Flow Velocity:** 0.25 to 2.0-feet per second (fps).

**With-Project Conditions:**

**Flow Velocity:** a 0.53-fps decrease on the proposed restoration site and a small increase (0.01 to 0.25-fps) on the adjacent land to the west.  
(see Attachment C)

**Water Surface Elevation:** a decrease from between 0.05 to 0.11-feet.  
(see Attachment C).

## **5.2 – Geotechnical Analysis**

The proposed restoration does not require a geotechnical analysis.

## **5.3 – Additional Staff Analysis**

This proposed 54-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 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 (Sutter Maintenance Yard) endorsed the project on May 25, 2010, with conditions. The conditions will be incorporated into the permit as Exhibit A.
- Levee District No.3-Glenn County endorsed the project on August 26, 2010, with no conditions.
- The U.S. Army Corps of Engineers 208.10 comment letter has not yet been received for this application. Upon receipt of a favorable letter and review by Board staff the letter will be incorporated into the permit as Exhibit B.

## **7.0 – CEQA ANALYSIS**

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.cvfpb.ca.gov/meetings/2012/02-24-2012.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 entire State Plan of Flood Control:

The proposed riparian vegetation at full maturity results in a minor hydraulic impact that is localized to the restoration site; therefore there should be no effects to the overall State Plan of Flood Control.

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 favorable U.S. Army Corps of Engineers comment letter, and direct staff to file a Notice of Determination with the State Clearinghouse.

## **10.0 – LIST OF ATTACHMENTS**

- A. Location Maps and Photos
- B. Draft Permit No. 18683
- C. Hydraulic Results
- D. Planting Plan
- E. Maintenance Plan

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



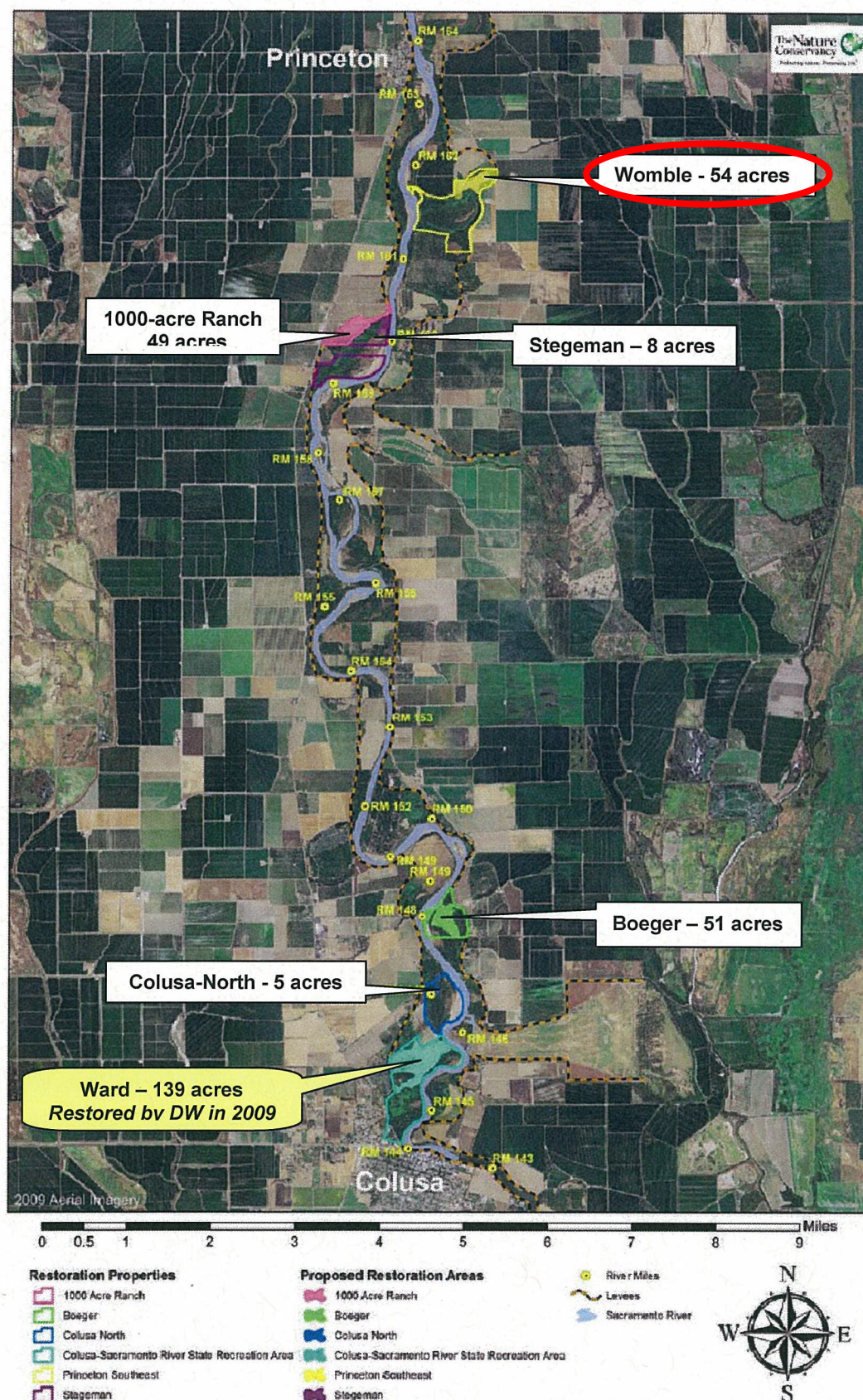
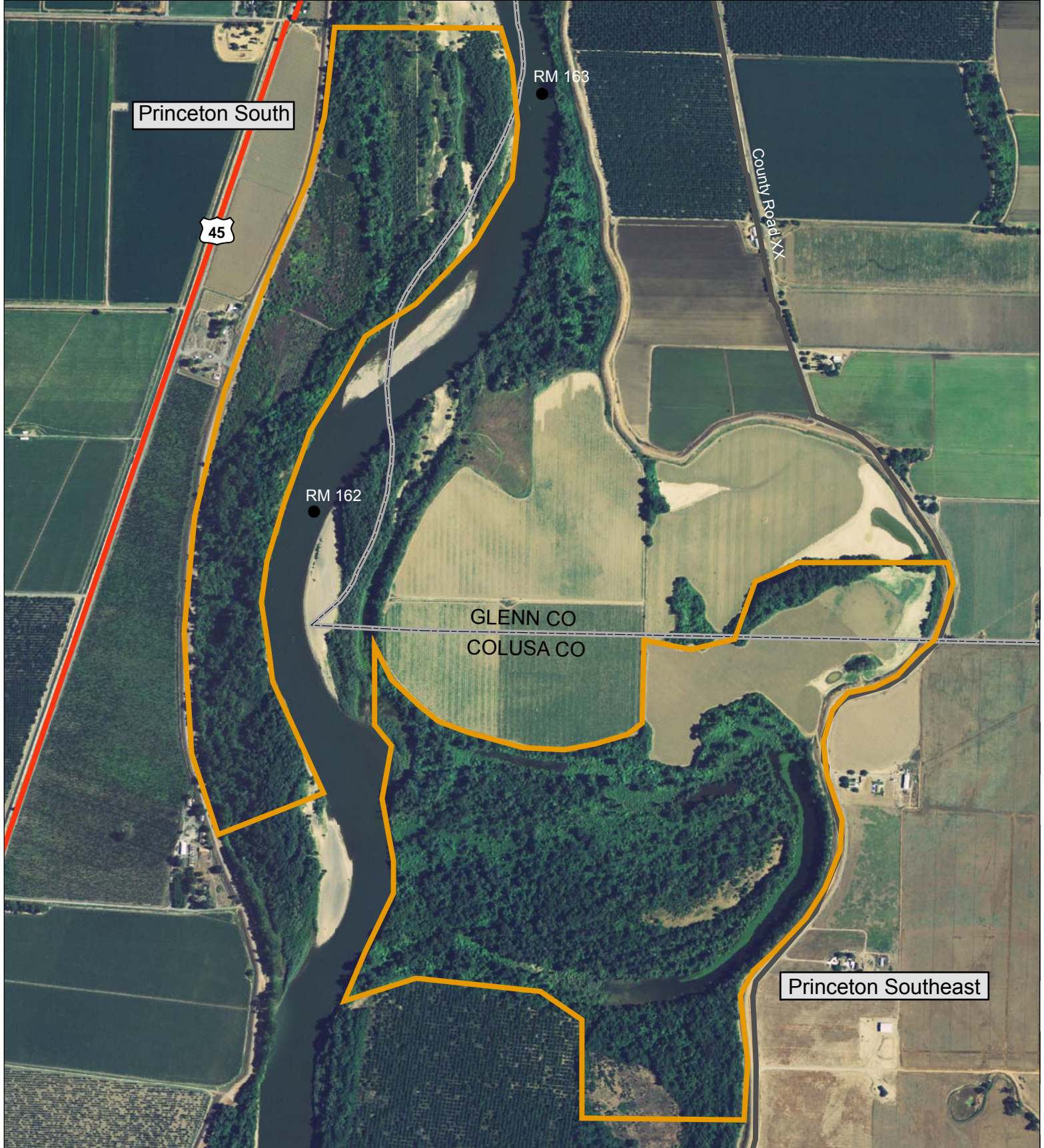


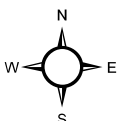
Figure 1. Colusa Subreach Restoration Tracts



California Department of Fish and Game  
 North Central Region  
**SACRAMENTO RIVER WILDLIFE AREA**  
**PRINCETON UNITS**  
 Colusa and Glenn Counties



- River Mile
- Boundary
- Local Roads
- Highway



0 0.1 0.2 0.3 0.4  
 Miles

Topographic map 1:24 000

May 2008 - JG  
 DFG Region2 - WLM



## A. Womble Tract Overview and Restoration Plan Description

Section 29, Township 18North, Range 1 West

**Womble Tract** is a 320-acre site located about one mile south of Princeton, on the east side of the Sacramento River. Figure A-1 depicts the site on a 2006 aerial photo. The majority of the tract is in riparian habitat, which includes a large oxbow lake. The oxbow lake was formed after the river channel was cut across Boggs Bend about 1930. Approximately 54 acres of the northeast corner of the tract has been cleared of native riparian vegetation and is used for annual field crops. This area is proposed for restoration. The field crop area is inundated in most winters, and the portion of the area adjacent to the levee, ponds water annually because it is lower than the property to the west. Ponded water in this area has commonly been pumped out in the late spring or early summer to permit planting. The tract is owned by the State of California and is managed by the Department of Fish and Game (DFG) as the Princeton-Southeast Unit of the Sacramento River Wildlife Area. The site has access from River Road on the east and it is open to public access and recreation use.

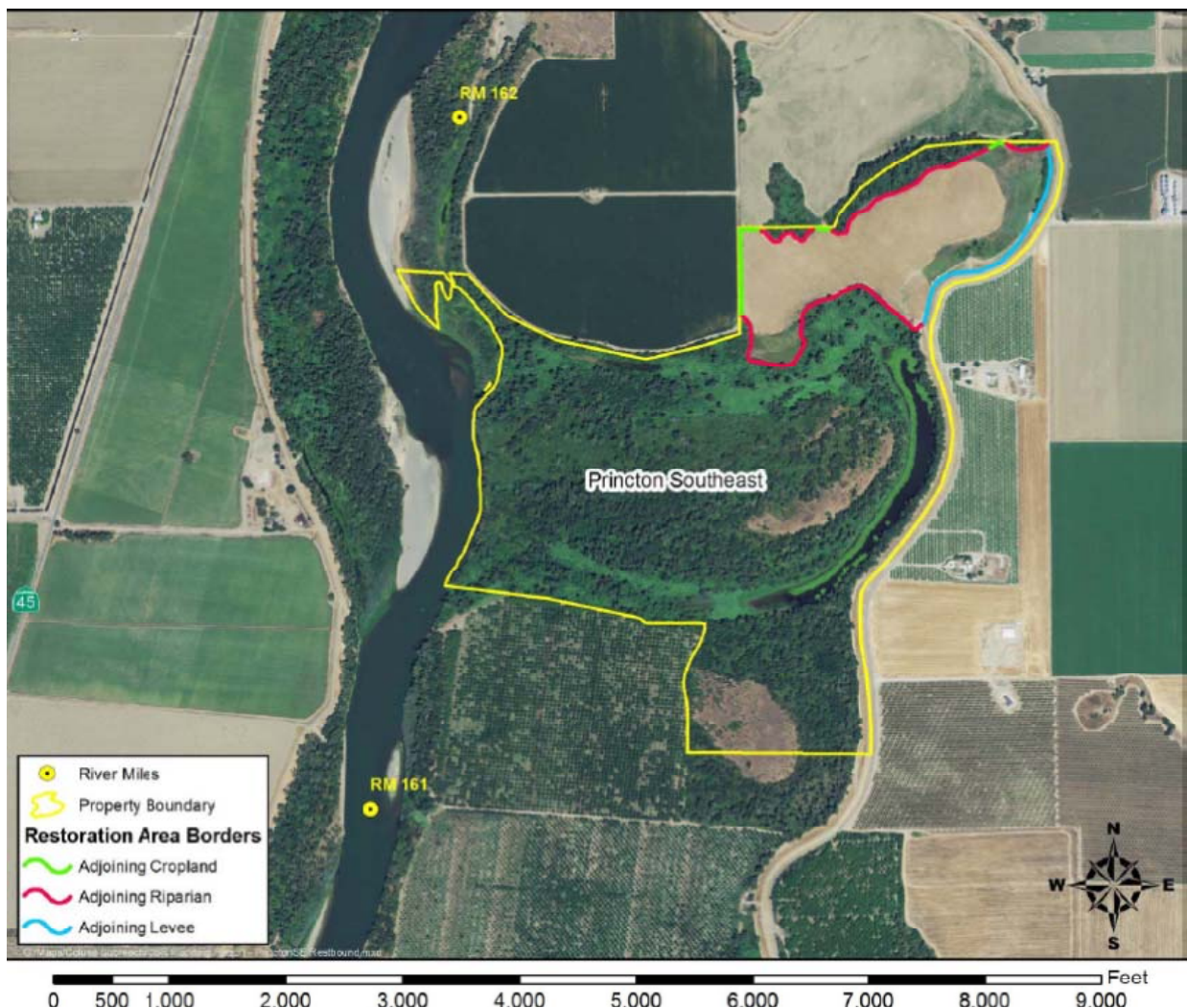


Figure A-1. Womble Tract

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**DRAFT**

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

**PERMIT NO. 18683 BD**

**This Permit is issued to:**

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

To restore 54-acres to riparian habitat inside the Princeton Southeast Unit of the Sacramento River Wildlife Area (Womble Tract) on the left (east) bank overflow area of the Sacramento River (RM 162). The project is located 1-mile southeast of Princeton (Section 29, T18N, R1W, MDB&M, Levee District 3 and DWR, 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

Page 1 of 4

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. 18683 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 ratified.

**FOURTEEN:** 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.

**FIFTEEN:** 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.

**SIXTEEN:** 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.

**SEVENTEEN:** The Central Valley Flood Protection Board, Department of Water Resources, and Levee District No. 3, Glenn County, shall not be held liable for any damages to the permitted



encroachment(s) resulting from flood fight, operation, maintenance, inspection, or emergency repair.

EIGHTEEN: 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.

NINETEEN: Upon receipt of a signed copy of the issued 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: No material stockpiles, temporary buildings, or equipment shall remain in the floodway during the flood season from November 1st to April 15th.

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

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

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

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

TWENTY-SEVEN: The temporary irrigation system shall be secured to prevent flotation or detachment into the floodway during high water.

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

TWENTY-NINE: All debris generated by this project shall be disposed of outside the floodway.

THIRTY: 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-ONE: 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-TWO: The permittee shall comply with all conditions set forth in the letter from the Department of the Army dated February xx, 2012, which is attached to this permit as Exhibit B and is

incorporated by reference.

State of California

DEPARTMENT OF WATER RESOURCES  
CENTRAL VALLEY FLOOD PROTECTION BOARD

California Natural Resources Agency

APPLICATION FOR A CENTRAL VALLEY FLOOD PROTECTION BOARD  
ENCROACHMENT PERMITApplication No. \_\_\_\_\_  
(For Office Use Only)

## 1. Description of proposed work:

Restoration of native wildlife habitat on five sites, totaling 167 acres in the Colusa Subreach of the Sacramento River, between Princeton and Colusa.

A. Womble Tract - restoration of 64 of 320 acres located approximately one mile south of Princeton, on the east side of the Sacramento River

2. Location: Colusa County, in Section 29,Township: 18N (N)  
(S), Range 1W (W), M. D. B. & M.3. California Department of Fish and Game of 1701 Nimbus Road, Suite A  
Name of Applicant AddressRanch Cordova  
CityCA  
State95670  
Zip Code916-358-2876  
Telephone Number916-358-2912  
Fax Number

## 4. Endorsement: (of Reclamation District)

We, the Trustees of Glenn County Levee District No. 3 & California Department of Water Resources  
Name and District Number

approve this plan, subject to the following conditions:

☐ Conditions listed on back of this form☒ Conditions Attached☐ No Conditions

Trustee

Date

Trustee

Date

SUPERINTENDENTDWR - SUTTER MAINTENANCE YARD

## 5. Names and addresses of adjacent property owners sharing a common boundary with the land upon which the contents of this application apply. If additional space is required, list names and addresses on back of the application form or an attached sheet.

Beatrice Ferraro Trust et al  
NamePO Box 141, Forest Ranch CA  
Address95942  
Zip CodeIvy G Zumwalt & Associates520 Market Street, Suite 4, Colusa, CA95932

## CONDITIONS

1. Maintaining Agency, "DWR", Sutter Maintenance Yard, shall maintain this section of the Sacramento River, located in Colusa County, Section 29; Township 18N; Range 1W, in accordance with USACE Operations and Maintenance Manual, "For The Sacramento River Flood Control Project", Section:

6-02. Maintenance

6-04. Operations

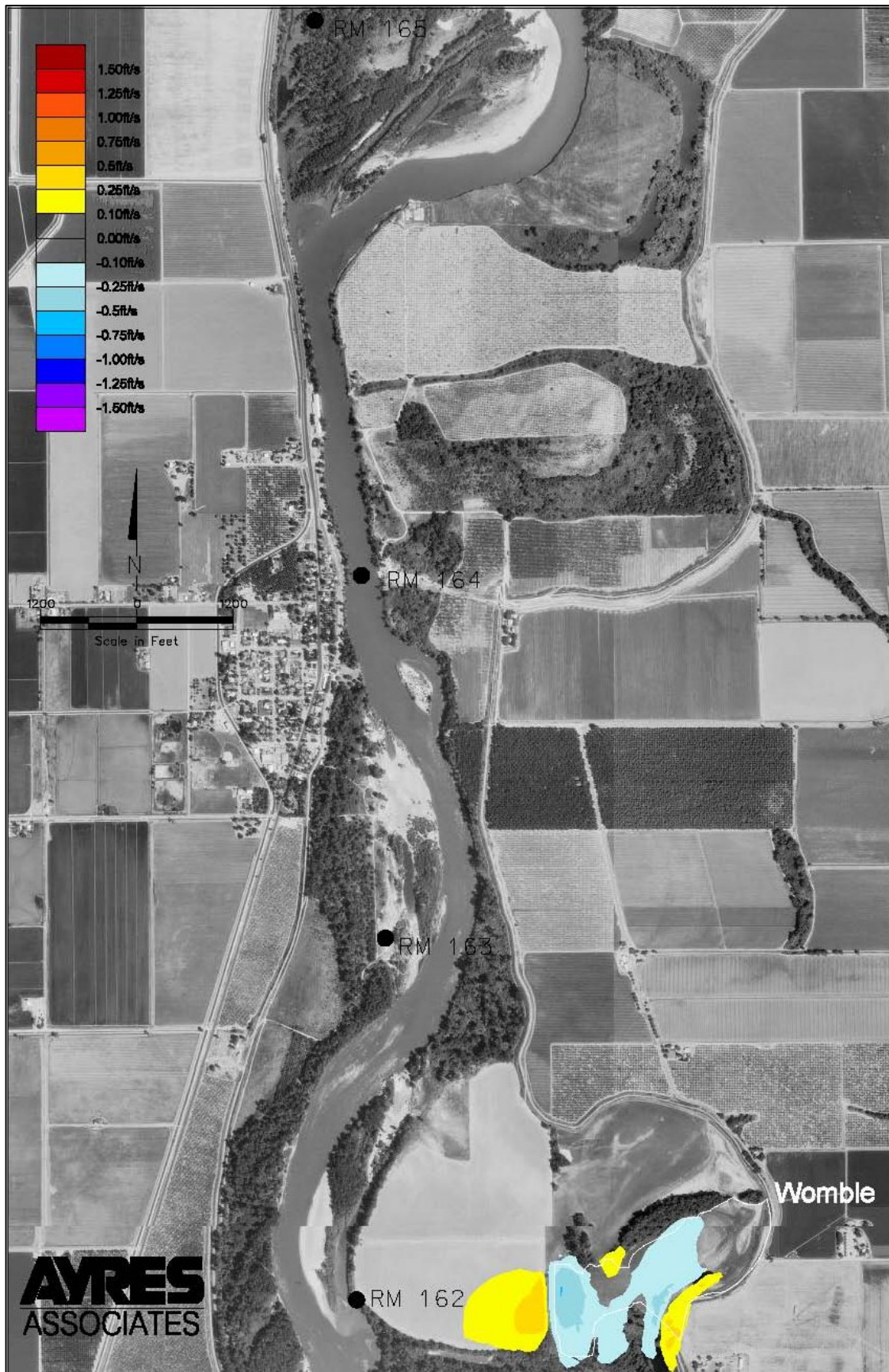
and the Supplement to Standard Operations and Maintenance Manual, "Unit No. 165 Cleared Floodways" Section:

2-01. Channel

3-01. Repair of Damage

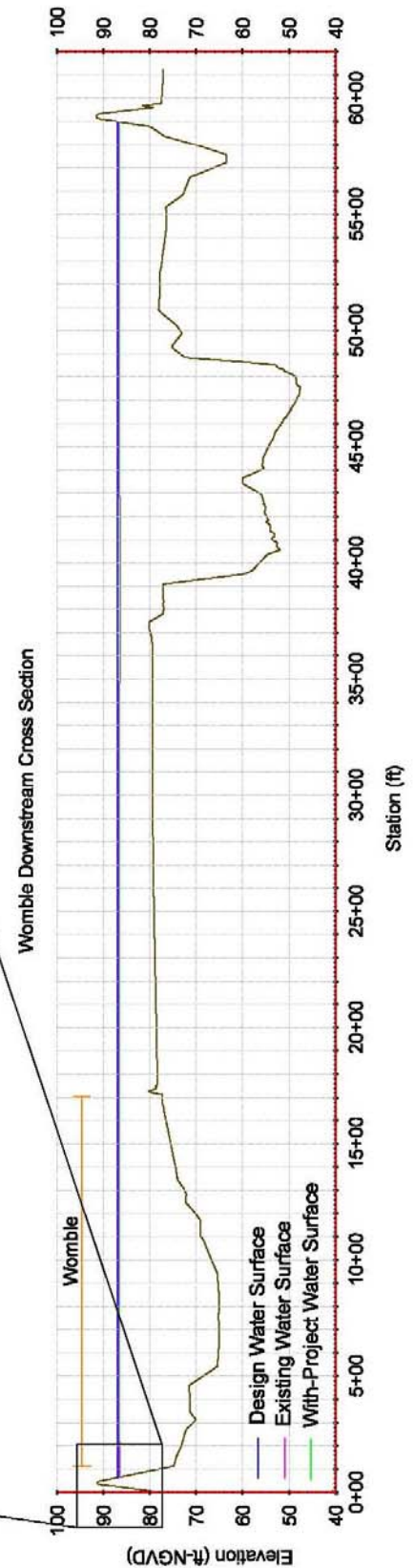
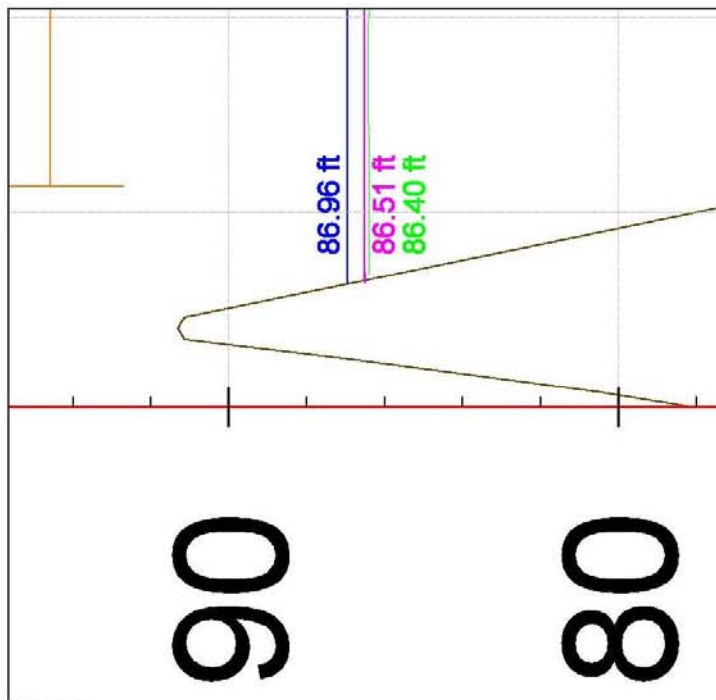
as is necessary to insure passage of project flood flows, and maintain channel capacity.

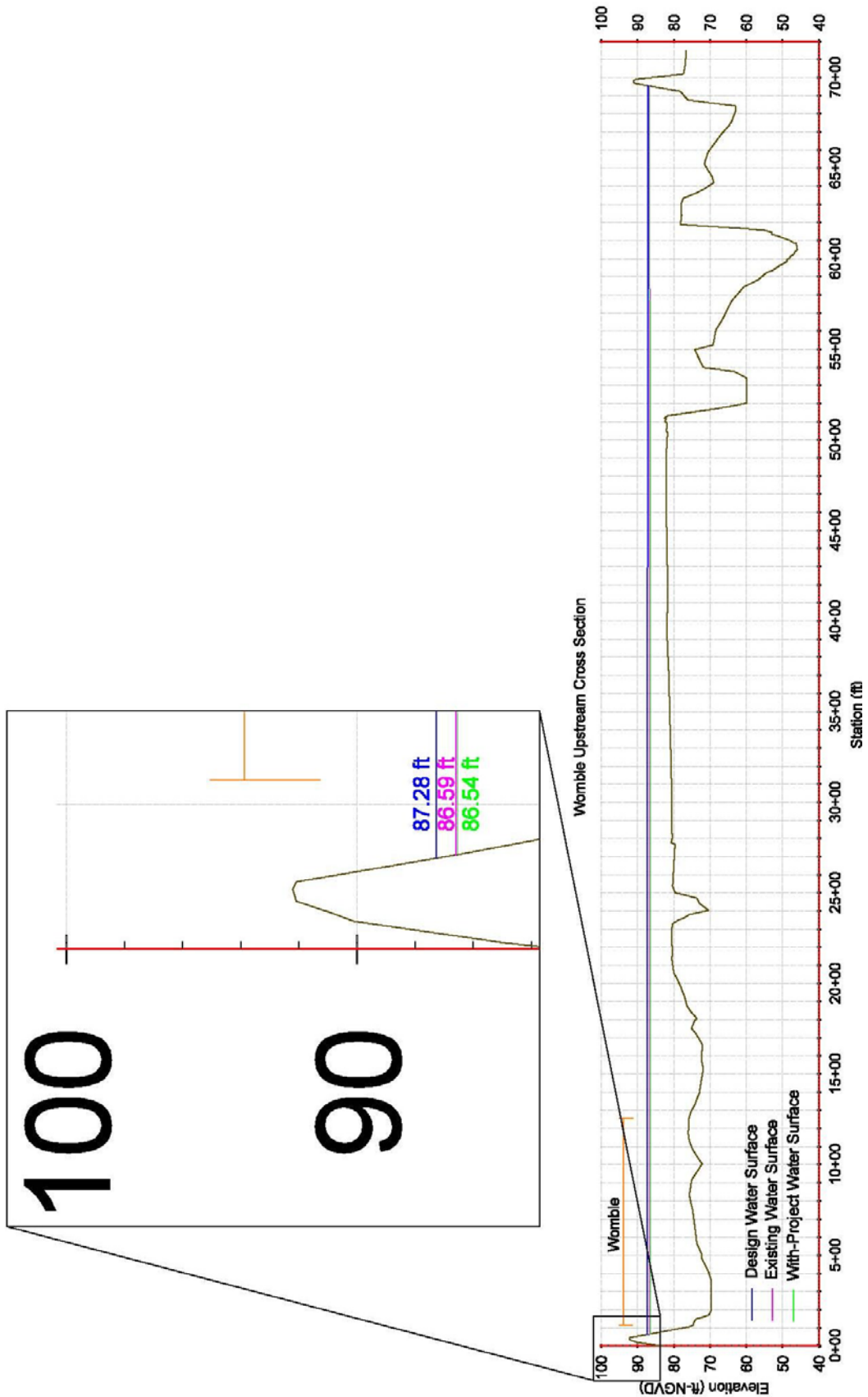










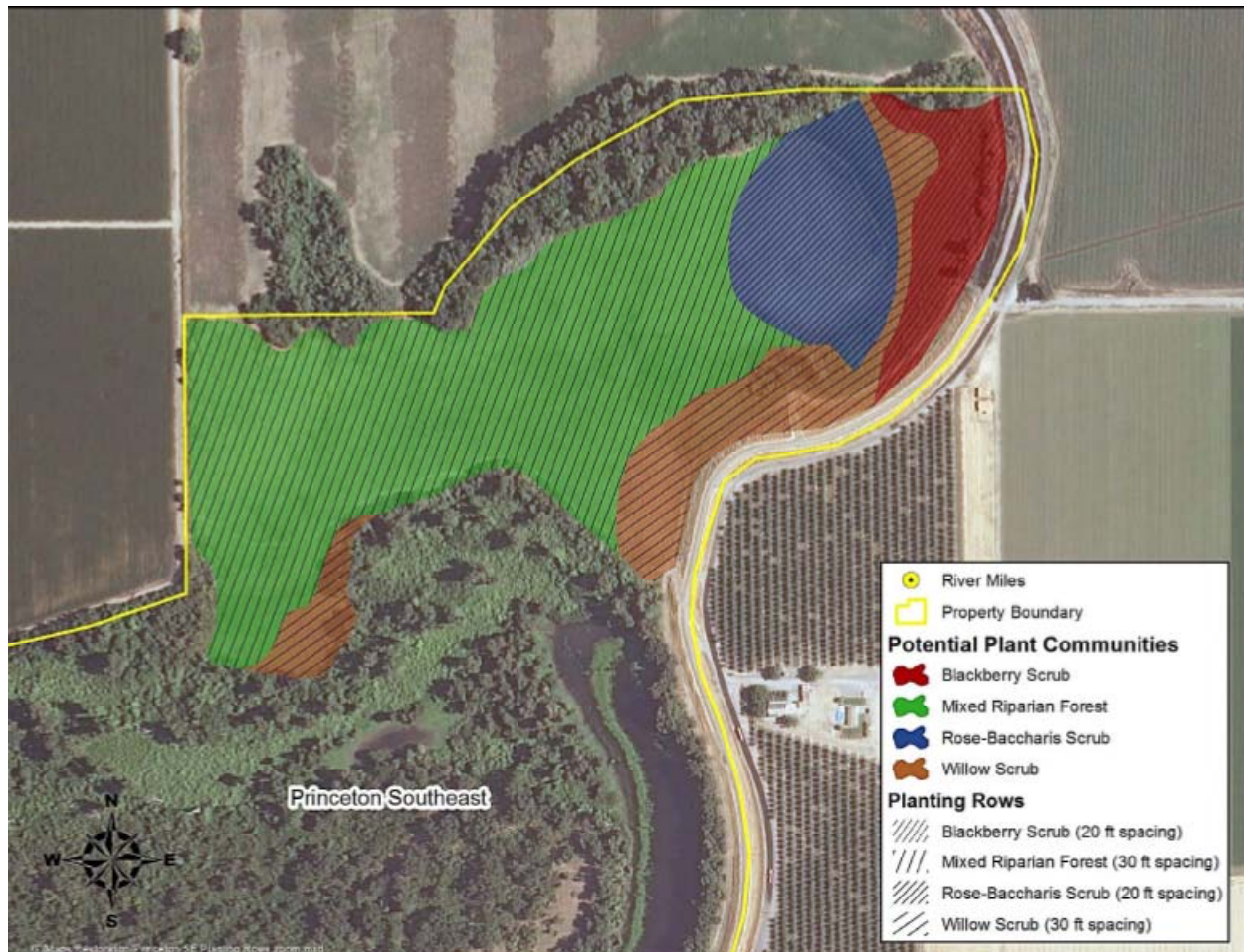






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The restoration plan for the Womble Tract specifies the native plants that will compose each plant community incorporating the appropriate plant and row spacings. Species and seeding rates are also specified for the native grass understory that will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



**Figure A-6. Restoration Plan for the Womble Tract with the Planting Rows**

**Mixed Riparian Forest (MRF)****Phase 1 - Manual Planting****Planting Spacings (plants x row)**

11' x 30'

**Emitter Density per acre**

132

**Acres**

32.4

**Target Planting Date**

Spring, Project Year 2

**Total Locations**

4,277

**Total Plants**

7,741

<b>Canopy Structure</b>	<b>Species</b>		<b>Frequency</b>	<b>Total</b>
<b>Overstory</b>	Platanus racemosa	Western sycamore	8%	342
	Populus fremontii	Fremont cottonwood	10%	428
	Quercus lobata	Valley oak	6%	257
<b>Midstory</b>	Acer negundo	Box elder	23%	984
	Cephalanthus occidentalis	Button willow	4%	171
	Fraxinus latifolia	Oregon ash	5%	214
	Salix gooddingii	Goodding's willow	6%	257
	Salix laevigata	Red willow	3%	128
	Salix lasiolepis	Arroyo willow	7%	299
	Salix lucida	Shining willow	3%	128
	Rosa californica	California rose	8%	342
	Rubus ursinus	California blackberry	17%	727
			100%	4,277
<b>Sedges</b>	Carex barbarae	Santa Barbara sedge	10%	428
	Caerex praegracillis	Slender sedge	5%	214
<b>Forbs</b>	Artemisia douglasiana	Mugwort	20%	855
	Euthamia occidentalis	California goldenrod	20%	855
	Lotus purshianus	Lotus	6%	257
	Urtica dioecia	Hoary nettle	5%	214
	Oenothera hookeri	Primrose	5%	214
<b>Vines</b>	Aristolochia californica	California pipevine	5%	214
	Clematis ligusticifolia	Clematis	5%	214
			81%	3,464

\* companion planting frequency is 81%, this accounts for not planting a companion plant next to the willow species.

**Phase 2 - Direct Understory Seeding****Acres**

32.4

**Seeding rate (lb/acre)**

13

**Target Planting Date**

December, Project Year 2

<b>Grass Species</b>		<b>Ecotype</b>	<b>Seeding Rate</b>
<i>Elymus glaucus</i>	Blue wildrye	Parrott	30%
<i>Hordeum brachyantherum</i>	California meadow barley	Yolo Co.	25%
<i>Leymus triticoides</i>	Creeping wildrye	Yolo Co.	45%
			100%



## Blackberry Scrub (BBS)

### Phase 1 - Manual Planting

Planting Spacings (plants x row)	11' x 20'
Emitter Density per acre	198
Acres	4.7
Target Planting Date	Spring, Project Year 2
Total Locations	931
Total Plants	1,824

Canopy Structure	Species		Frequency	Total
Overstory	<i>Populus fremontii</i>	Fremont cottonwood	5%	47
Midstory	<i>Acer negundo</i>	Box elder	21%	195
	<i>Cephalanthus occidentalis</i>	Button willow	6%	56
	<i>Salix lasiolepis</i>	Arroyo willow	4%	37
Understory shrubs	<i>Rubus ursinus</i>	California blackberry	64%	596
			100%	931
Sedges	<i>Carex barbarae</i>	Santa Barbara sedge	49%	456
	<i>Caerex praeegracillis</i>	Slender sedge	47%	437
			96%	893

\* companion planting frequency is 96%, this accounts for not planting a companion plant next to the willow species.

### Phase 2 - Direct Understory Seeding

Acres	4.7
Seeding rate (lb/acre)	13
Target Planting Date	December, Project Year 2

Grass Species		Ecotype	Seeding Rate
<i>Elymus glaucus</i>	Blue wildrye	Parrott	30%
<i>Hordeum brachyantherum</i>	California meadow barley	Yolo Co.	25%
<i>Leymus triticoides</i>	Creeping wildrye	Yolo Co.	45%
			100%

## Rose-Baccharis Scrub (RBS)

### Phase 1 - Manual Planting

Planting Spacings (plants x row)	11' x 20'
Emitter Density per acre	198
Acres	7.9
Target Planting Date	Spring, Project Year 2
Total Locations	1,564
Total Plants	3,128

Canopy Structure	Species		Frequency	Total
Midstory	<i>Baccharis pilularis</i>	Coyote brush	35%	547
Shrubs	<i>Rosa californica</i>	California rose	37%	579
	<i>Rubus ursinus</i>	California blackberry	28%	438
			100%	1,564
Forbs	<i>Euthamia occidentalis</i>	California goldenrod	85%	1,330
Vines	<i>Clematis ligusticifolia</i>	Clematis	15%	235
			100%	1,564

### Phase 2 - Direct Understory Seeding

Acres	7.9
Seeding rate (lb/acre)	13
Target Planting Date	December, Project Year 2

Grass Species	Ecotype	Seeding Rate
<i>Elymus glaucus</i>	Blue wildrye	Parrott
<i>Leymus triticoides</i>	Creeping wildrye	Yolo Co.
<i>Nassella pulchra</i>	Purple needlegrass	Llano Seco
		100%
		100%

## Willow Scrub (WS)

### Phase 1 - Manual Planting

Planting Spacings (plants x row)	11' x 30'
Emitter Density per acre	132
Acres	7.9
Target Planting Date	Spring, Project Year 2
Total Locations	1,043
Total Plants	1,006

Canopy Structure	Species		Frequency	Total
Overstory	<i>Populus fremontii</i>	Fremont cottonwood	7%	73
Midstory	<i>Acer negundo</i>	Box elder	11%	115
		Narrow leaved		
	<i>Salix exigua</i>	willow	35%	365
	<i>Salix gooddingii</i>	Goodding's willow	10%	104
	<i>Salix laevigata</i>	Red willow	10%	104
	<i>Salix lasiolepis</i>	Arroyo willow	10%	104
	<i>Salix lucida</i>	Shining willow	10%	104
Understory shrubs	<i>Rosa californica</i>	California rose	7%	73
			100%	1,043
Forbs	<i>Artemisia douglasiana</i>	Mugwort	10%	104
	<i>Euthamia occidentalis</i>	California goldenrod	5%	52
	<i>Urtica dioecia</i>	Hoary nettle	4%	42
	<i>Oenothera hookeri</i>	Primrose	6%	63
			25%	261

\* companion planting frequency is 25%, this accounts for not planting a companion plant next to the willow species.

### Phase 2 - Direct Understory Seeding

Acres	7.9
Seeding rate (lb/acre)	13
Target Planting Date	December, Project Year 2

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

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## **Maintenance Plan – Womble 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. Fifty-four acres of the 320-acre Womble Tract will be restored. The remaining 83% 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 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) are developing 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).