

# ***COLUSA SUBREACH PLANNING REPORT***



*Prepared by*  
**The Nature Conservancy**  
**Northern Central Valley Office**  
*in Partnership with the*  
**Sacramento River Conservation Area Forum**  
**August, 2008**



## ACKNOWLEDGEMENTS

*This Colusa Subreach Planning Report documents the combined work product of a dedicated **Project Team** from The Nature Conservancy and the Sacramento River Conservation Area Forum.*

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# I. INTRODUCTION

Colusa Subreach Planning (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 in Northern California. Figure 1 depicts the regional location of the area which is referred to as the Colusa Subreach. 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.



**Figure 1. Colusa Subreach Location**

Colusa Subreach Planning was directed to address the questions and concerns of local landowners and residents in regard to the conservation of riparian wildlife habitat and it focused on the restoration of native vegetation. CSP was initiated to respond to the expressed desire of Colusa and Glenn County residents to have the opportunity to participate in the planning of habitat conservation efforts. It addressed the entire Colusa Subreach and it identified the potential cumulative effects and benefits of the ecosystem restoration strategy.

The Primary Goal of Colusa Subreach Planning was to:

***Increase citizen stakeholder involvement in determining realistic conservation strategies and projects for protecting and restoring riparian vegetation along the Sacramento River, between River Miles 143.5 and 164.5, compatible with the flood control system and other economic and environmental uses of the floodplain***

This Goal was specified in Recipient Agreement ERP-02-P27, which was the contract for the CALFED grant that supported CSP. Colusa Subreach Planning was predicated upon the belief that, through good communication, information sharing and collaborative design, many of the existing concerns regarding the restoration of the riparian ecosystem along the Sacramento River could be resolved.

The Objectives of the planning effort were to:

- a) Ensure an open and inclusive planning process consistent with the SRCAF principles and guidelines with multiple opportunities for input by local stakeholders, agencies and private interest groups.
- b) Collect baseline data and analyze existing data to inform floodplain management and compliment long-term monitoring programs.
- c) Build and calibrate tools (including models) to evaluate the effects of restoration on land management alternatives and flood control infrastructure specific to the Princeton – Colusa Subreach.
- d) Develop design alternatives and identified implementation projects, incorporating ecosystem restoration and related compatible flood protection, recreation and other land use benefits.
- e) Address stakeholder concerns and research priority questions.

## **A. Purpose of this Report**

This *Colusa Subreach Planning Report* was prepared to synthesize the results of the Colusa Subreach Planning and to identify recommended actions for future management of the Subreach. It also chronicles the activities that took place as part of CSP and summarizes the products of the planning process. The Colusa Subreach Planning Advisory Workgroup reviewed the *Draft Colusa Subreach Planning Report* to ensure consistency with the goals and policies of the *Sacramento River Conservation Area Forum Handbook*. The *Draft Report* was also provided to other interested stakeholders, GCAP Services (Contract Manager for CSP) and the California Department of Fish and Game (CDFG) for review and comment. TNC then incorporated relevant comments into this final *Colusa Subreach Planning Report*.

## **B. Colusa Subreach Planning Overview**

Colusa Subreach Planning addressed a twenty-one mile section of the Sacramento River lying between the unincorporated community of Princeton and the City of Colusa. 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. The terms “Planning Area” and “Colusa Subreach” are used interchangeably in this Report to describe the area. It includes approximately 5,466 acres of land with 5,094 acres in Colusa County and 372 acres in Glenn County. Figure 2 depicts the Colusa Subreach Planning Area on a 2006 aerial photo.

The Colusa Subreach is an important subreach of the Sacramento River corridor. The corridor is a rich mosaic of aquatic habitat, oxbow lakes, sloughs, seasonal wetlands and riparian forests within the most diverse and extensive river ecosystem in the State of California. It supports a wide range of wildlife including numerous rare and declining species, critical breeding areas for neo-tropical migrant birds as well as the largest remaining populations of anadromous fish in California. It also supports a vibrant agricultural economy and provides important recreational opportunities to local residents and visitors from other parts of the State and the nation. The Sacramento River is the largest source of water in the State of California and a healthy waterway is essential to the economic and social wellbeing of the entire State.

The Sacramento River has been greatly altered through water supply and flood control activities. Less than ten percent of the natural riparian habitat adjoining the river remains. These changes have contributed to the elimination of some wildlife species and the listing of other species as Threatened, Endangered and of Special Concern under state and federal Endangered Species Acts. At present, these special status species include 43 different anadromous fish, raptors, songbirds and other animals. In response, a wide range of private interests and public agencies have joined together in the effort to restore the riparian ecosystem to a healthy state and provide for stable populations of fish and wildlife.

Over 90 percent of the original riparian habitat area, which averaged about five miles in width, has been converted to agricultural use over the past 150 years. The area nearest the river is primarily planted to orchards and row crops, while rice is the dominant crop in the outer portions of the area. The agricultural lands along the river are an important part of the local agricultural economy, which is the mainstay of both Colusa and Glenn Counties. The communities of Colusa and Princeton and the Sacramento River Flood Protection System, composed of levees and two major weirs for flood flow diversion to the Butte Basin, have also been developed within this area. The flood control system is essential to the existing social and economic fabric of Colusa and Glenn Counties. Therefore, it is recognized that reclamation and flood control have had substantial social and economic benefits.

A frequent comment along the river has been that landowners and other stakeholders should be involved in the planning of ecosystem restoration projects at the beginning of the process and that their concerns should be incorporated into land use decisions. Speakers at CSP public outreach activities and other forums asked that conservation projects address the range of landowner concerns that are summarized in Chapter VI. Accordingly, Colusa Subreach Planning focused on early involvement of the wide range of stakeholders in order to address these



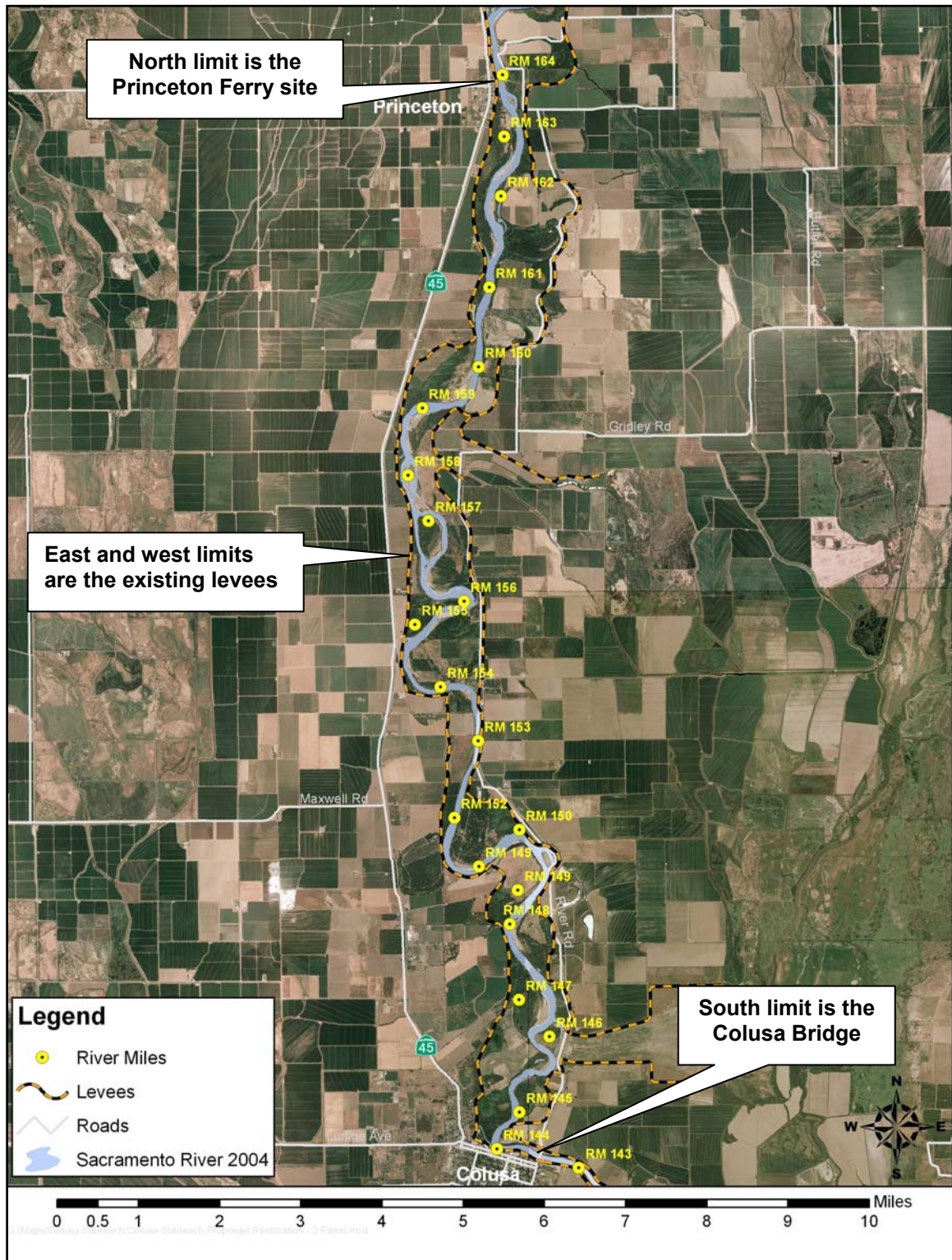


Figure 2. Colusa Subreach Planning Area

concerns. For the purposes of CSP, “Stakeholders” are defined as groups or individuals that can affect or will be affected by conservation activities within the floodway of the Sacramento River. This includes landowners in the Subreach as well as other persons outside of the Subreach that are affected by the flood control system, infrastructure within the Subreach and the local economy.

CSP was directed to develop a strategy for the restoration of riparian habitat and related flood management and land use considerations. There were seven established Tasks within CSP as summarized below:

#### **Task 1 – Coordination and Outreach**

SRCAF and TNC managed an extensive and open public engagement effort that will focus on the following groups:

- A **Steering Committee** composed of SRCAF and TNC representatives that directed the initial public engagement process on behalf of SRCAF and TNC.
- An **Advisory Workgroup** composed of the Steering Committee, local stakeholders and representatives of public agencies that manage property along the river. The Workgroup identified principal landowner questions and selected planning and research projects to address those questions. The Workgroup reviewed technical reports and products, proposed plans for restoration and related land uses for consistency with the Goal and Principles of the *Sacramento River Conservation Area Forum Handbook*.
- **Technical Subgroups** of the Advisory Workgroup were established as needed for various projects to help advise the scientific and technical aspects of CSP. Subgroups for recreation planning, hydraulic analysis and pest and regulatory effects were established.

An experienced, professional facilitator was chosen, from the Common Ground Center for Cooperative Solutions at U. C. Davis, to help plan the public engagement and to directly facilitate meetings of the Advisory Workgroup and other public meetings.

CSP reached out to a wide range of stakeholders that might be affected by ecosystem restoration in the Colusa Subreach. The Institute for Social Research at California State University, Sacramento was retained to develop and conduct an initial and final survey of landowners in the Subreach to determine their perceptions and concerns in regard to the restoration of riparian habitat. Outreach to landowners and other stakeholders will also include public meetings, workshops, information presentations to local organizations and newsletters. Additionally, a CSP website was established within the SRCAF website at [www.sacramentoriver.org](http://www.sacramentoriver.org). It featured CSP information, documents and announcements regarding all public engagement events.

#### **Task 2 – Baseline Assessments**

Baseline Assessments were conducted to compile and analyze the information base required to support planning of the restoration of riparian habitat, integrated land use and resource planning. The information also supported the discussion of landowner questions as part of Task 5 through four components:

- The Subreach Background Report that characterized the entire Planning Area and establish Geographic Information System (GIS) base for CSP.

- Tract Specific Baseline Assessment Reports to characterize soils, vegetation, inundation factors, etc. and develop preliminary restoration recommendations.
- Small Mammals Research to develop information that was used to help predict changes in small mammal distribution and abundance that could occur as a result of restoration.
- Insect Pest Research that summarized recent research that analyzed the effects of crops and riparian habitat on insect pests.
- A Cultural Resources Assessment Report to identify cultural resources on these restoration tracts that should be protected.
- Detailed topographic mapping of the entire Subreach using Light Detection and Ranging (LIDAR) technology to support the design and future evaluation of future projects in the Colusa Subreach.

### **Task 3 – Modeling**

Modeling of the hydraulic impacts of proposed restoration actions was performed by Ayres Associates in order to determine the potential effect of restoration activities on the flood protection system and neighboring lands. A state of the art two-dimensional hydraulic model was developed for the entire Colusa Subreach. Peer review at the scoping and results and review by the California Department of Water Resources of the modeling results was also included.

### **Task 4 – Focal Area Planning**

Two recreation plans were prepared to address the questions of local stakeholders.

- *Master Plan for the Colusa-Sacramento River State Recreation Area*
- *Colusa Subreach Recreation Access Plan*

Eight plans for the restoration of riparian habitat were developed for review by the Advisory Workgroup and adjoining land owners.

### **Task 5 – Landowner Questions**

The Advisory Workgroup identified principal landowner questions and concerns related to ecosystem restoration. They also chose planning and research projects to address those concerns. Key components of this Task included:

- Fiscal and economic analysis of the effects of habitat restoration.
- Pest and regulatory effects of habitat restoration.
- Flood management questions related to the capacity of the existing floodway and the effect of large woody debris on flood flows.
- An environmental evaluation of the potential effects of habitat restoration.

### **Task 6 and 7 – Project Management, Administration and Closure**

CSP involved requisite accounting and record keeping, subcontract management, preparation of quarterly, annual and final reports. A key component of this Task is this *Subreach Planning Report*.

Colusa Subreach Planning was funded through the Ecosystem Restoration Program of the CALFED Bay-Delta Program pursuant to Recipient Agreement No. ERP-02-P27. Total funding authorization was \$1,488,009 and the source of the funds was Proposition 204 which was approved by the voters of California on November 5, 1996. The California Department of Fish and Game (CDFG) assumed the



management of the Ecosystem Restoration Program and overview of CSP in 2007. As a contractor and subcontractor, TNC and SRCAF were responsible to the CDFG Authority for management of CSP. CSP was conducted over a four-year term, ending in the summer of 2008.

### **C. Colusa Subreach Planning Timeline**

Colusa Subreach Planning was conceived in discussions between TNC and SRCAF in 2001 and it was completed in 2008. The following timeline highlights important project events and milestones that occurred during that time period.

#### **2001**

- |                 |  |
|-----------------|--|
| May - September | - TNC and SRCAF developed the Colusa Subreach proposal with input from SRCAF Board Members |
| September       | - Colusa Subreach grant proposal presented to SRCAF Board                                  |
| October         | - Colusa Subreach application submitted for CALFED ERP grant funding                       |

#### **2002-2003**

- CALFED review and approval of Colusa Subreach grant proposal

#### **2004**

- |                |   |
|----------------|---|
| April          | - Recipient Agreement executed for Colusa Subreach Planning / Colusa Subreach Planning officially begins                                      |
| June           | - SRCAF and TNC adopted a Memorandum of Agreement for Colusa Subreach Planning<br>- Contract with SRCAF for public outreach services executed |
| July – October | - CSP Steering Committee met 3 times to approve the CSP program plans and propose Advisory Workgroup membership                               |
| August         | - Contracts for meeting facilitation and landowner surveys executed   |
| November       | - Advisory Workgroup held its initial meeting and adopts a mission statement  |
| December       | - Colusa Subreach Planning website established<br><i>*The Advisory Workgroup held 2 meetings in 2004</i>                                      |

#### **2005**

- |                 |   |
|-----------------|---|
| January – March | - Initial Landowner Survey conducted by the Institute for Social Research                               |
| February        | - Initial public Input meeting held<br>- First annual newsletter mailed to Colusa Subreach stakeholders |
| April           | - Advisory Workgroup identified Priority Landowner Questions and Concerns                               |

- |                    |   |
|--------------------|---|
| May - June,        | - Advisory Workgroup reviewed/approved CSP planning and research projects to respond to Priority Landowner Questions and Concerns |
| August             | - <i>Colusa Subreach Background Report</i> completed  |
| August – October   | - Advisory Workgroup reviewed/approved scopes of work for planning and research projects  |
| October – December | - Advisory Workgroup members participated in interviews and selection of contractors for planning and research projects           |
| November           | Advisory Workgroup selected Fran Borcalli to provide peer review of the hydraulic analysis  |
- \*The Advisory Workgroup held 9 meetings, 1 workshop, 5 Subgroup meetings and sponsored 1 public information meeting in 2005*

## 2006

- |                  |  |
|------------------|--|
| January          | - <i>Cultural Resources Investigation</i> completed  |
| February         | - Eight of the twenty-one members of the Advisory Workgroup resigned following the initial 16 Workgroup meetings |
|                  | - Second annual newsletter mailed to Colusa Subreach stakeholders  |
| February - March | - Contracts were let for initial planning and research projects /  |
| December         | - <i>Fiscal and Economics Impact Analysis</i> completed  |
- \*The Advisory Workgroup held 5 meetings, 2 subgroup meetings and sponsored 1 public information meeting and 2 workshops in 2006*

## 2007

- |          |  |
|----------|--|
| January  | - <i>Colusa-Sacramento River State Recreation Area Master Plan</i> completed       |
|          | - <i>Colusa Subreach Recreation Access Plan</i> completed                          |
| February | - <i>Initial Hydraulic Analysis Report</i> released for public review              |
| March    | - Third annual newsletter mailed to Colusa Subreach stakeholders                   |
| November | - <i>Draft Pest and Regulatory Effects Study</i> released for Public Review        |
| November | - Public information meeting on hydraulic analysis and ward tract restoration held |
- \*The Advisory Workgroup held 4 meetings, 2 subgroup meetings and sponsored 1 public information meeting in 2007*

## 2008

- |                  |  |
|------------------|--|
| January          | - <i>Pest and Regulatory Effects Study</i> completed |
| February – April | - Final landowner survey conducted                   |

March	- Fourth annual newsletter mailed to Colusa Subreach stakeholders
March	- <i>Hydraulic Analysis Report</i> completed
May	- <i>Draft Colusa Subreach Planning Report</i> released for public review
June	- <i>Colusa Subreach Environmental Analysis</i> completed
August	- <i>Colusa Subreach Planning Report</i> completed
September	- Colusa Subreach Planning Program Closeout
*The Advisory Workgroup held 2 meetings and 1 subgroup meeting in 2008	

#### D. Sacramento River Conservation Area Forum

The Sacramento River Conservation Area Forum is a nonprofit corporation that adopted the following mission statement in 2004:

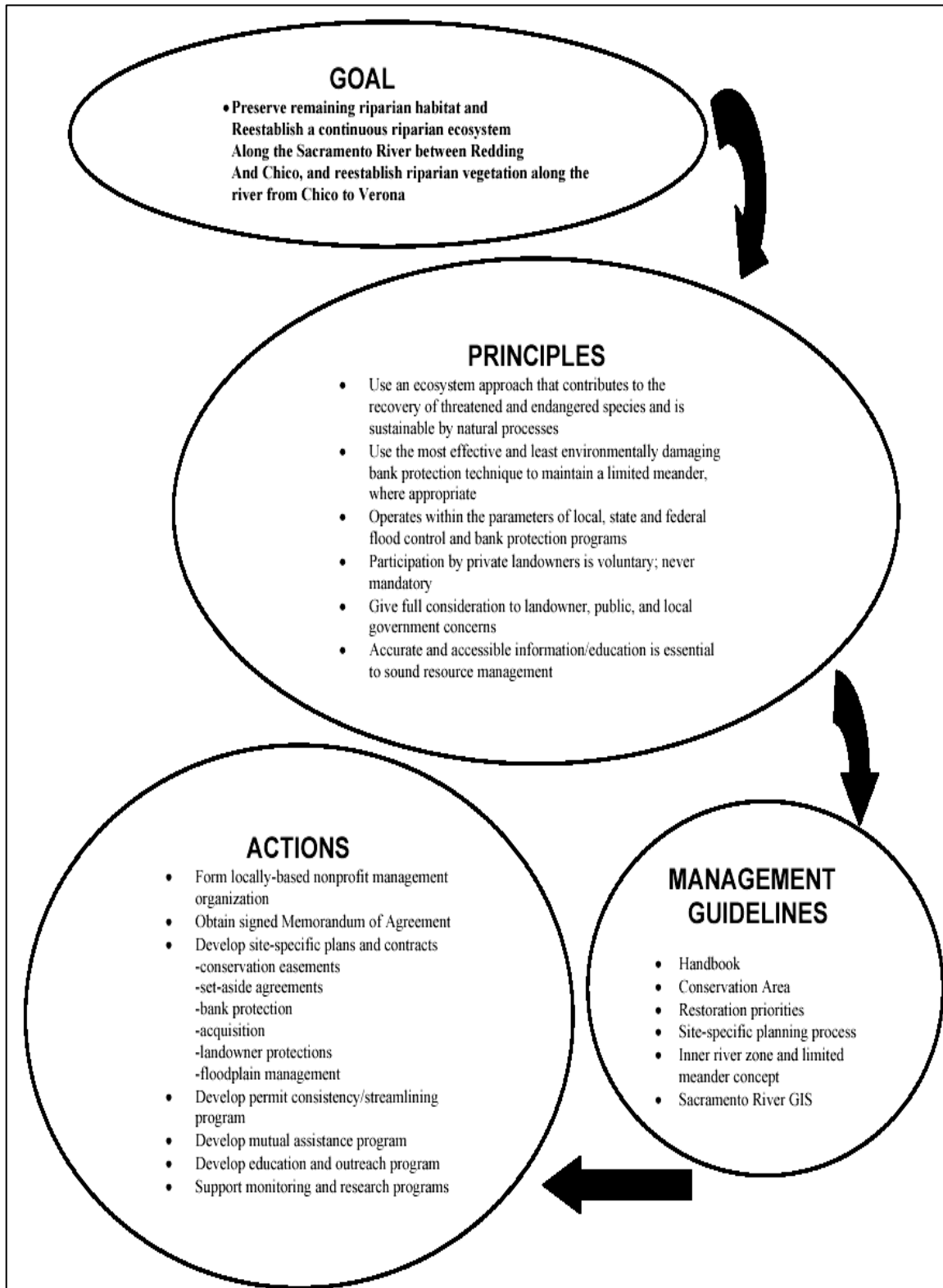
***The Sacramento River Conservation Area Forum brings communities, individuals, organizations and agencies together along the Sacramento River from Keswick to Verona to make resource management and restoration efforts more effective and sensitive to the needs of local communities. The Forum supports restoration done well, and serves as a forum for sharing, a facilitator of solutions, and a partner for projects that protect both the natural values of the Sacramento River and the communities it runs through.***

The Sacramento River Conservation Area (SRCA) extends along 222 miles of the Sacramento River, from its confluence with the Feather River near Verona to Keswick Dam just north of Redding. The SRCA includes land in Shasta, Tehama, Butte, Glenn, Colusa, Sutter and Yolo Counties. The Colusa Subreach lies in the lower half of the SRCA and it includes land in both Colusa and Glenn Counties.

The SRCA is a product of the effort initiated through State Senate Bill 1086 in 1986. That legislation created an Advisory Council that completed the *Upper Sacramento River Fisheries and Riparian Habitat Management Plan* in 1989. The Riparian Habitat Committee of the Advisory Council also conducted an extensive public process that resulted in the completion of the *Sacramento River Conservation Area Handbook* in 1999. The *Handbook* established a Goal and the Basic Principles and Management Guidelines for the SCRAF. The *Handbook* was developed as the basis for interagency cooperation and agreement on programs within the SCRA. The *Sacramento River Conservation Area Handbook Forum, as updated in 2003*, specifies the following overall Goal for the SCRAF:

***Preserve remaining riparian habitat and reestablish a continuous riparian ecosystem along the Sacramento River between Redding and Chico and reestablish riparian vegetation along the river from Chico to Verona.***

This Goal is supported by a set of Principles, Actions and Management Guidelines that detail a process to reach the Goal. Figure 3 depicts the structure of the SCRAF in a diagram from the *Handbook*. The *Handbook* also provides a detailed discussion of the dynamic river processes and the resulting habitat communities.



**Figure 3. The Structure of the Sacramento River Conservation Area Program**

*Source: Sactamento River Conservation Area Forum Handbook.*

The Handbook is available online at the SRCAF website ([www.sacramentoriver.ca.gov](http://www.sacramentoriver.ca.gov)) and it should be consulted for additional information regarding the SRCAF. Consistency with the Goal and Principles of the *Handbook* was also chosen as the review standard for products of the Colusa Subreach Planning when the project was first conceived in 2001.

## E. The Nature Conservancy

The Nature Conservancy is a nonprofit corporation that has been active in conservation activities in California and along the Sacramento River for many years. The mission of The Nature Conservancy is:

***To preserve the plants, animals and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive.***

The Sacramento River corridor has been identified by TNC as well as many other private, academic and public entities as an unusually diverse ecosystem; a priority for plants and animals, including humans. TNC's approach to conservation along the Sacramento River is designed to accommodate both the human uses of the river (such as agriculture, flood control and recreation) and the natural resource benefits provided by the river.

The Nature Conservancy is one of many organizations and agencies working to restore the Sacramento River ecosystem. TNC works in partnership with landowners, the SRCAF, other local organizations and local, state and federal government agencies to implement practical conservation strategies in several key ways:

- Developing the best available scientific information to help guide conservation
- Planning for habitat management and restoration in concert with stakeholders
- Acquiring land for conservation; only from willing sellers
- Restoring native riparian habitat utilizing local agricultural contractors
- Preserving and restoring natural river processes.

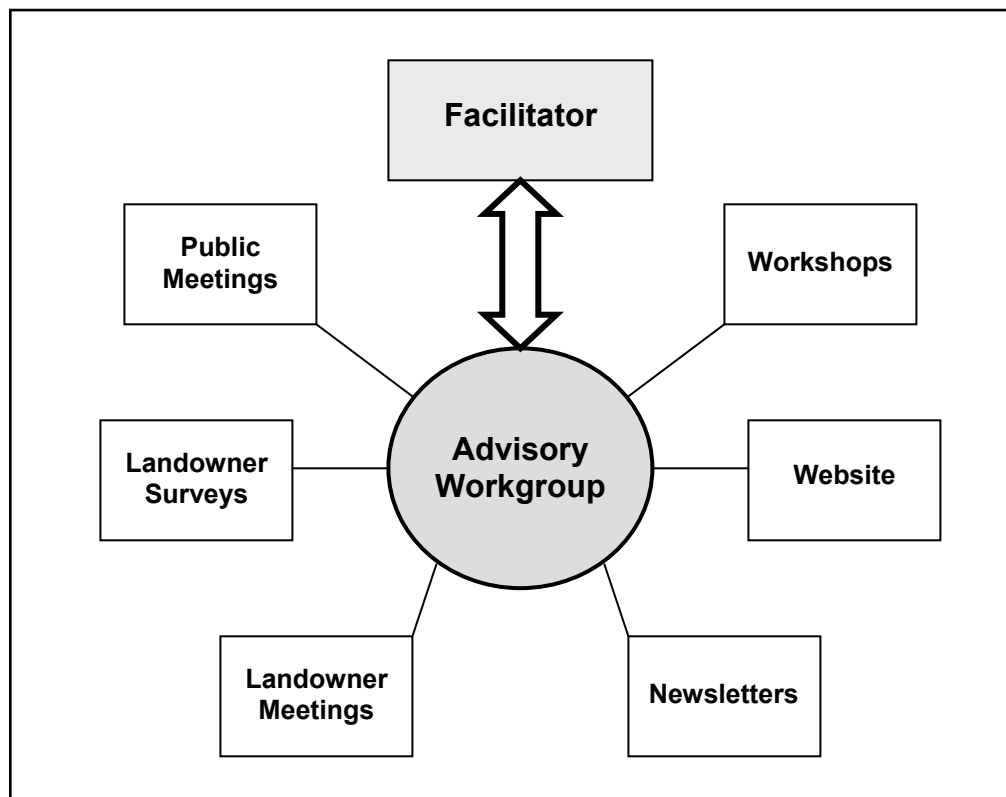
Working with the SRCAF, TNC has developed subreach planning as a tool to involve local interests and other stakeholders in the planning of conservation actions along the Sacramento River. The overall Colusa Subreach Planning effort is managed from the TNC office at 500 Main Street in Chico, California. Further information regarding TNC is available online at [www.nature.org](http://www.nature.org).

## E. The Public Engagement Process

TNC and SRCAF initially agreed to form a partnership to conduct Colusa Subreach Planning in the summer of 2001 when the application for project funding was first prepared. Both entities recognized that there were concerns with habitat restoration that required open and cooperative interaction with all stakeholders. This joint agreement was further detailed the *Memorandum of Agreement Between the Sacramento River Conservation Area Forum and The Nature Conservancy Regarding the Colusa Subreach Planning Project (Memorandum of Agreement)*, in June of 2004. The *Memorandum of Agreement*, contained in Appendix A, specifies the shared commitments of both entities related to:

- The Goal and Objectives of CSP
- The responsibilities of both SRCAF and TNC
- Provision for a Steering Committee to direct the public outreach
- Provision for an Advisory Workgroup to provide representative stakeholder input

The *Public Engagement Plan for Colusa Subreach Planning*, contained in Appendix B, details plans for the various components of public outreach that were a part of CSP as depicted in Figure 4. It was developed with the project facilitator and approved by the Steering Committee. It served as a blueprint to “Increase stakeholder involvement in realistic conservation strategies...” as stated in the CSP Goal. It described multiple strategies and tools to engage a wide range of stakeholders in the planning process.



**Figure 4. CSP Public Engagement Plan**

The central focus of the *Public Engagement Plan* was the Advisory Workgroup. The Workgroup initially included twenty-one representatives of local government, organizations and interest groups as well as representatives of the SRCAF and public agencies that were involved with conservation and flood control along the river. The membership of the Advisory Workgroup is included in Appendix C. The following mission statement was adopted by the Workgroup at their initial meeting, on November 3, 2004.

***To cooperatively determine practical strategies for conservation and restoration of wildlife habitat within the Colusa Subreach that minimize adverse economic impacts, are compatible with agriculture and local community needs, integrate with recreation needs and protect the integrity of the flood control system.***

The membership of the Workgroup was reduced when eight members resigned in 2006 as explained in Chapter X. Many other stakeholders were engaged in CSP through landowner surveys, the website, public presentations, public meetings, workshops, newsletters and individual landowner meeting.

In conjunction with the initial commitment of TNC and SRCAF to the establishment of the partnership in 2001, TNC additionally committed to delay habitat restoration activity within the Subreach until it could be planned as part of CSP. The intent was that all the restoration projects that were proposed at that time would be planned and considered comprehensively as part of the Colusa Subreach Planning process. It was anticipated that the ecosystem restoration strategy to be developed as part of CSP would also provide direction for other public access or habitat conservation projects that, while not planned at this time, might occur in the future.

## II. LAND USE PATTERNS

The Colusa Subreach was originally part of a riparian forest that was approximately five miles in width that occupied the floodplain of the Sacramento River. Within this landscape, the river continually meandered and constantly changed its channel location. It annually flooded during the rainy season and overflowed into the adjoining Colusa and Butte Basins. The area supported a large and diverse population of wildlife including resident and migratory land animals and birds as well as resident and anadromous fish. The area was populated by Native Americans in a relatively dense pattern although their cultural practices resulted in minimal disturbance of the area.

With Euro-American settlement, land use in the Subreach began to change. Over 90 percent of the original riparian forest was cleared, initially for steamboat fuel and lumber and later for agriculture (Golet et al, 2003). The current levee system was constructed in the early 1900's and the existing overflow weirs were added in the early 1940's. The resulting improvement in flood protection stimulated an expansion of agriculture outside of the levees and the riparian forest was soon reduced to the area inside of the levees. With the regulation of the flows afforded by Shasta Dam, additional area inside the levees was cleared for agriculture, resulting in the present pattern of land use in the Subreach.

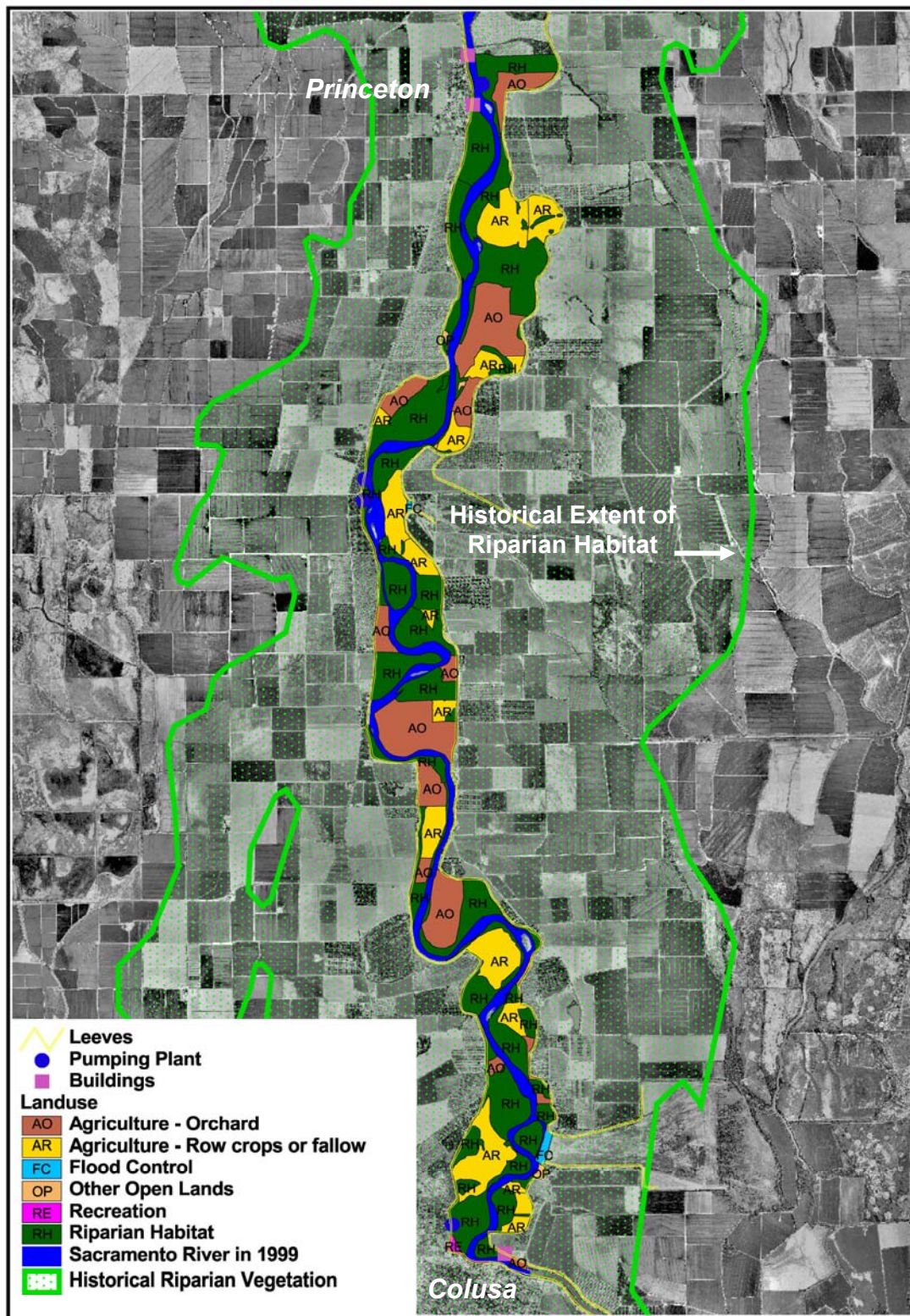
The conversion of native vegetation to agriculture in Colusa and Glenn Counties resulted in substantial economic and social benefits to the area. The expansion of agricultural activity fueled the growth of towns such as Colusa and Princeton. The development of reliable irrigation systems also increased the range and yield of crops, adding to the prosperity of the area. The local economies in Colusa and Glenn Counties are now based upon their agriculture production. The economic impact of these agricultural economies is further described in Chapter VI.

The Colusa Subreach extends from levee to levee, from the Princeton Ferry site in the north to the Colusa Bridge in the south. The Planning Area includes approximately 5466 acres of land as well as the Sacramento River, which flows through the Subreach as its most dominant feature. More than half of this land is in natural riparian habitat, although this is less than ten percent of the larger habitat corridor that originally existed along the river. The majority of the remaining portion of the Subreach is in agricultural use. There are no urban uses and there is no expectation that the area will be converted to urban use in the foreseeable future. This Chapter summarizes the mapping and analysis of existing land use patterns that was conducted to help provide a technical basis for subreach planning.

### A. Existing Land Use

Land use in the Planning Area was determined through interpretation of 1999 aerial photography from the *1999 Sacramento River Aerial Atlas* with supplemental analysis from other available sources and field observation. Data was analyzed as part of a geographic information system (GIS) database. Figure 5 depicts the existing land uses in the Subreach and the estimated historical extent of riparian





**Figure 5. Land Use in the Coulsa Subreach**

Source: The Nature Conservancy & Greco, 1999

vegetation. The extent of the original area of riparian habitat was determined on the basis of soils characteristics by Steven Greco of UC Davis in 1999. Table 1 describes the existing land uses in the Subreach.

**Table 1. Land Use in the Colusa Subreach**

<b>Land Use Category</b>	<b>Acres</b>	<b>Percent of Total Area</b>
Agriculture – Orchard	1246	23%
Agriculture – Field Crops & Fallow	1197	22%
Other Open Area	23	0.4%
Riparian Habitat	2955	54%
Flood Control	25	0.5%
Water Supply	5	0.1%
Recreation	14	0.3%
Residential	1	0.1%
<b>Total</b>	<b>5466</b>	

*Source: The Nature Conservancy*

The following land use categories were used to describe the Colusa Subreach:

Agriculture-Orchard .....	Land planted to orchard crops
Agriculture-Field Crops & Fallow .....	Land planted to field crops or fallow, open crop land
Other Open Lands.....	Land that is open and not visibly in other use
Riparian Habitat.....	Land devoted to riparian vegetation or gravel bars
Flood Control.....	Land devoted to weir structures and open, approaches to weirs
Water Supply.....	Land devoted to irrigation pumping and diversion facilities serving multiple properties
Recreation.....	Land improved for active recreation activities
Residential.....	Land devoted to residential dwellings

All land area figures in this Chapter, and this Report in general, should be considered as approximate because they are not based on a field survey of the Planning Area. They do, however, reflect relatively accurate figures that were derived through GIS analysis of aerial photography. The land areas were measured from the inside edge of the levees and do not include portions of properties that lie under the levees or outside of the levees. The figures also exclude the river surface at the flow rate of approximately 8,000 cubic feet per second, which occurred on the May 24, 1999, the date when the aerial photos for the 1999 *Sacramento River Aerial Atlas* were taken. Minor adjustments for data anomalies were also made. For these reasons, property areas may not precisely match figures derived from County Assessor's maps or other record sources.

The two principal land uses in the Subreach are riparian habitat and agriculture. Together these two uses represent approximately 98% of the land area in the Subreach. Small portions of the Planning Area, totaling less than two percent of the area, are devoted to flood control water supply, recreation and miscellaneous open areas. Riparian habitat areas occupy about 3031 acres, or 55% of the Colusa Subreach. This compares to 44% habitat in the portion of the Sacramento River Conservation Area (SRCA) between Red Bluff and Colusa (SRCAF 2003). Habitat areas tend to be on lower elevation property that may have been less attractive, or more expensive to utilize, for agriculture. Habitat areas are commonly in locations that have been within the meandering river channel during the past century.

Agricultural areas are divided into orchard (1204 acres or 22% of the total Subreach area) and field crops (1163 acres and 21% of the area). The percentage of the land devoted to agriculture, 43%, equals the figure for the portion of the SRCA that lies between Red Bluff and Colusa (SRCAF 2003). The orchards are almost entirely composed of English walnuts and prunes. The field crop areas are annually planted to a mix of crops including beans, safflower, wheat and other vegetables and grains.

Approximately 25 acres are devoted to flood control purposes at the Mouton and Colusa Weirs and 14 acres are devoted to water supply purposes at four pumping plants that each provide irrigation water from the river to multiple properties outside of the Planning Area. Approximately 14 acres are improved for recreation use at the Colusa-Sacramento River State Recreation Area (CSRSRA) and at the Colusa Levee Park, downstream of the CSRSRA. Two residential dwellings also lie along the crest of the levee with small yard areas extending inside the levee. The only building in the Planning Area, other than the small structures at the Colusa State Recreation Area, is a metal storage building that is across the river from Colusa.

## B. Land Ownership

Land ownership in the Planning Area was determined through the review of the 2004 Colusa and Glenn County Assessor's rolls and Assessor's Parcel Maps. The information was then transferred to aerial photography coverage from the 1999 *Sacramento River Aerial Atlas*. Data was incorporated into and analyzed using the Sacramento River Geographic Information System. Table 2 describes the land ownership in the Subreach and Figure 6 depicts the location of those uses. As noted previously, all acreage figures are unsurveyed and therefore approximate.

**Table 2. Land Ownership in the Colusa Subreach**

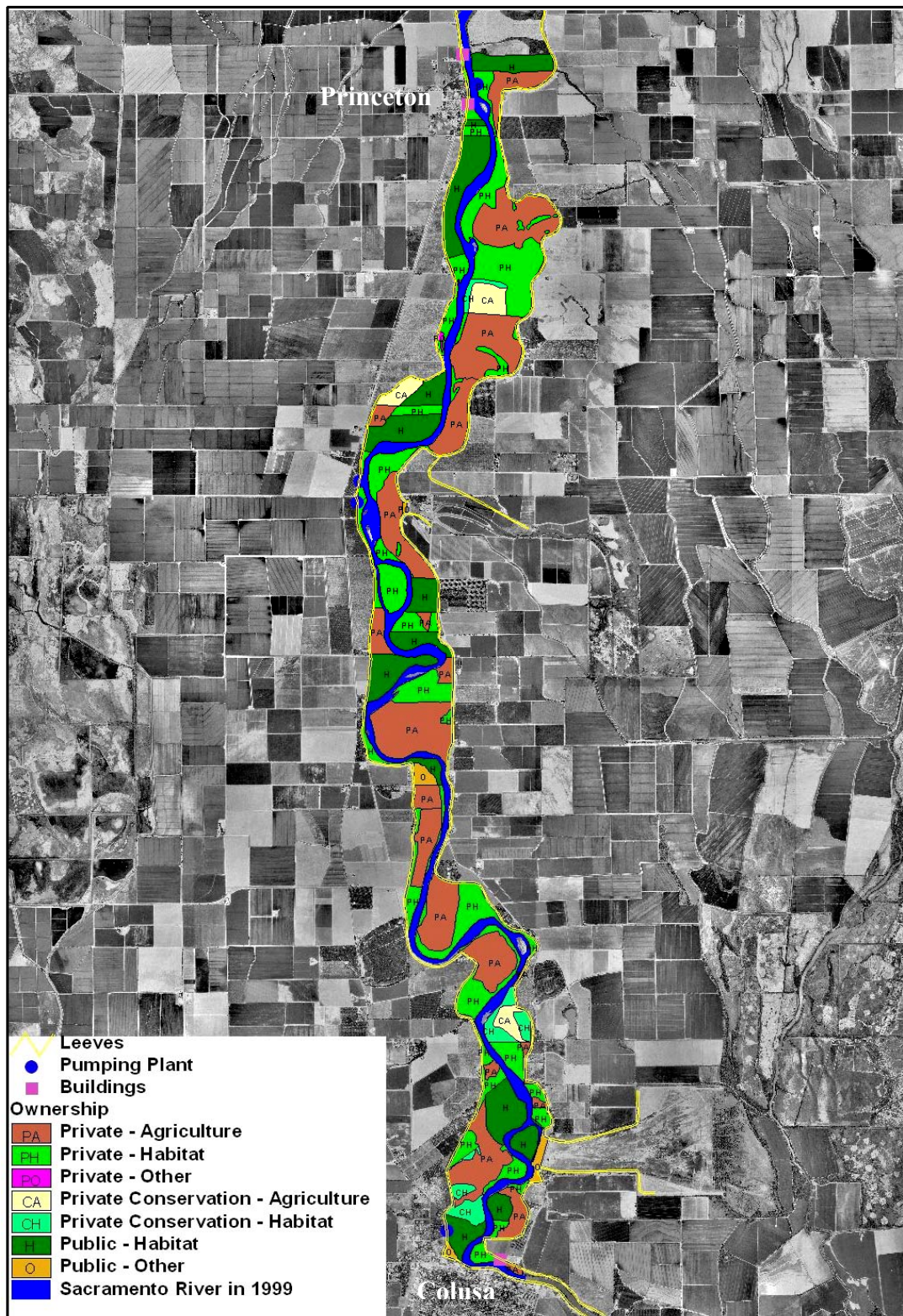
<b>Ownership Category</b>	<b>Acres</b>	<b>Percent of Total Area</b>
Private - Agriculture	2069	38%
Private -Habitat	1388	25%
Private - Other	5	0.1%
Private Conservation-Agriculture	181	3%
Private Conservation-Habitat	91	2%
Public - Habitat	1476	27%
Public - Other	256	5%
<b>Total</b>	<b>5466</b>	

*Source: Colusa and Glen County Assessor's Office records*

The land use categories were utilized to describe the Colusa Subreach:

Private-Agriculture.....	Land owned by private entities in agricultural use
Private-Habitat.....	Land owned by private entities in riparian habitat
Private-Other.....	Privately-owner land not in either agriculture or riparian habitat
Private Conservation-Ag.....	Land owner by a private conservation organization and devoted to agriculture
Private Conservation-Habitat..	Land owner by a private conservation organization and in riparian habitat
Public-Habitat.....	Land owned by a public agency in riparian habitat
Public-Other.....	Land owned by a public agency in crops or fallow





**Figure 6. Land Ownership in the Colusa**

*Source: Colusa and Glen County Assessor's Office Records*

Approximately 68% of the land in the Colusa Subreach is in private ownership and about 32% of the land is in public ownership. The percentage of private ownership is slightly less than that in the Red Bluff to Colusa portion of the SRCA where approximately 72% is privately owned and 28% is publicly owned (SRCAF 2003). The Private ownership category includes 3,884 acres owned by about 80 different owners, of which, 60% is devoted to agriculture and 40% is in riparian habitat with less than one percent is in other miscellaneous uses. A subcategory of private ownership is Private Conservation, which represents the 272 acres owned by The Nature Conservancy. Approximately two-thirds of this land is in agriculture with the remainder in habitat.

Public ownership totals approximately 1,732 acres and it is composed of 85% habitat and 15% other uses including recreation, water supply, flood control and agriculture. Public agencies managing land within the Subreach include four local agencies, three State agencies and one federal agency. Table 3 lists public lands by managing agency and Figure 7 depicts the location of the public lands in the Colusa Subreach. Acreage figures in Table 3 are rounded to the nearest whole number.

**Table 3. Public Lands in the Colusa Subreach**

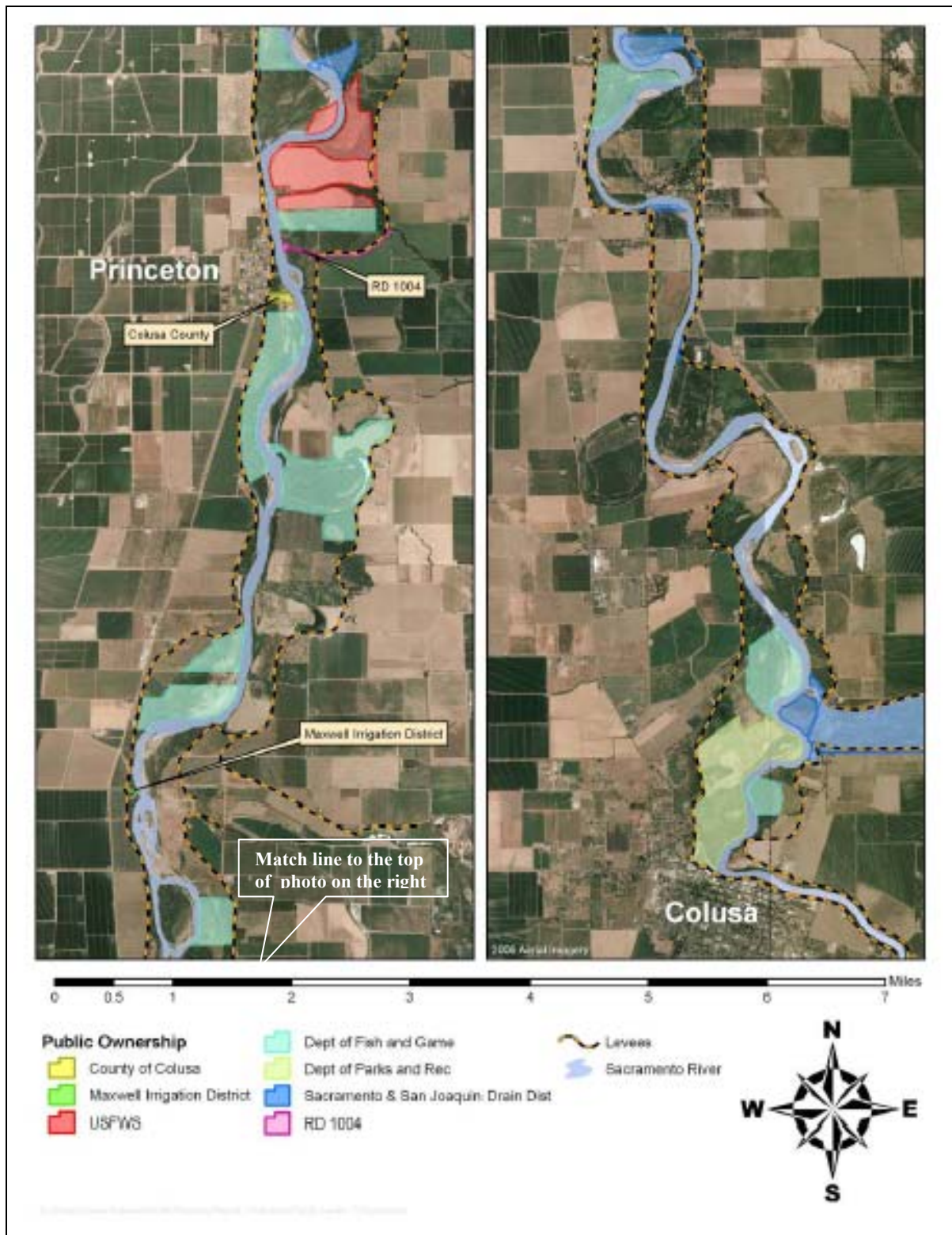
<b>Public Agency</b>	<b>Number of Sites</b>	<b>Acres</b>
City of Colusa	1	<1
County of Colusa	2	11
Rec. District 1004	1	4
Maxwell Irrigation. District	1	<1
CA Dept. of Fish and Game	7	1186
CA Dept. of Parks and /Recreation	1	333
Sac. & San Joaquin Drainage Dist.	1	161
US Bureau of Indian Affairs	1	37
<b>Totals</b>	<b>15</b>	<b>1732</b>

*Source: Colusa and Glenn County Assessor's Offices and The Nature Conservancy*

The State of California also holds three conservation easements in the Subreach, which total 188 acres, that are administered by the Department of Fish and Game. These easements apply to privately-owned property and do not include the right of public access. One of the three sites is entirely in riparian habitat and the easement provides for permanent maintenance of the habitat. The other two easements apply to property that is partially in riparian habitat and these easements include the potential of converting the remaining land to wildlife habitat. Consistent with the Department's policy, these conservation easements are not mapped or located in this Report in order to help protect the property rights of the landowners.

The three conservation easements were purchased in the 1990's from willing sellers for the fair market value of the property rights that were transferred on the basis of competent appraisals. Conservation easements involve the transfer of certain, specified property rights. The landowner retains fee title ownership of the property and all the property rights that are not sold as part of the transaction. The provisions of conservation easements can vary depending on the objectives of the transaction parties. Generally, conservation easements commit the landowner to maintain the habitat value of the subject property. For example, a property that is in riparian habitat would typically be kept in that habitat under a conservation easement. Such easements may also permit continuation of agricultural use, commonly subject to





**Figure 7. Public Lands in the Colusa Subreach**

Source: Colusa and Glen County Assessor's Office Records

the provision that the land not be developed for more intensive use with a lower habitat value. All transferred rights, which become permanent binding limitations on the fee title ownership, are specified in the easement deed. The holder of the easement is normally given the right to access the property and verify that the easement provisions are being met.

### **C. Recreation Use and Facilities**

Recreation is a common secondary use of the riparian habitat and, to a lesser degree, agricultural areas. The most common recreation uses are hunting and fishing, although birding, hiking, camping, boating, photography, beach activities and environmental education occur frequently. Recreation use of private land is subject to the owner's permission and the use of public land is dependant on the use and regulations established by the managing agency. One private property owner near Princeton does reportedly permit public use such as boat launching on a fee basis.

The majority of the public land is specifically open to public use by State law or agency regulations. This includes the approximate 1500 acres managed by the California Department of Fish and Game (CDFG) and Department of Parks and Recreation (CDPR). The small, City-owned Colusa Levee Park is also open to the public. The CDPR land, the Colusa-Sacramento River State Recreation Area (CSRSRA), is accessible from public roads and from the river. One of the CDFG sites, the Princeton-East Unit of the Sacramento River Wildlife Area, has public road access. The other six Wildlife Area sites do not have public access rights-of-way and they are accessible only from the river. The remaining six public properties are not specifically managed for public access.

The only substantive recreation improvements in the Colusa Subreach are adjoining the City of Colusa at the CSRSRA. Improvements include a boat ramp, parking, restrooms and a campground. The boat ramp is located on a side channel about fifteen hundred feet away from the main river channel. The channel between the boat ramp and the river is subject to siltation and requires frequent and expensive dredging to be kept open. During low flow periods the channel is often closed and the boat ramp is not usable. A local committee, supported by the City of Colusa, investigated this problem. Desired characteristics of a boat ramp site were that it not require complete new support facilities, be in close proximity to local businesses and not be seriously impacted by future channel meander. The State Department of Water Resources assisted this effort with an analysis of the hydraulic and geomorphologic characteristics of the area.

The City of Colusa City Council recently was awarded funding for a new boat ramp from the California Department of Boating and Waterways. The new ramp will be located on City property that adjoins the river, at the mouth of the channel that connects to the current boar ramp. The City plans to manage the construction of the new boat ramp and the California Department of Parks and Recreation will maintain the relocated boat ramp facility as part of the CSRSRA.

CSP included two substantial planning efforts directed at recreation use in the Subreach. The *Master Plan for the Colusa-Sacramento River State Recreation Area* details a program to increase the area of the site and greatly improve the recreation opportunities that are offered. The *Colusa Subreach Recreation Access Plan* includes recommendations for future use and improvement of other public lands

within the Subreach. Both of these recreation plans were the product of intensive public involvement as part of CSP. Chapter VII includes an overview of both of these plans.

#### **D. Local Land Use Standards**

The Colusa Subreach includes land within both Colusa and Glenn Counties. The portion of the Planning Area from RM 162 to 164.5 on the east side of the river is in Glenn County and the remaining majority of the Subreach is in Colusa County. All of the Glenn County area is unincorporated. Only a very small portion of the Colusa County area, a small strip, along the base of the levee, is within the City of Colusa. The remaining area in Colusa County, including the community of Princeton, is unincorporated area. For all practical purposes, the two counties administer the local land use controls within the Colusa Subreach.

Glenn and Colusa Counties have both adopted general plans and zoning ordinances to maintain basic land use controls. The Glenn County General Plan designates its respective portion of the Planning Area as “Intensive Agriculture” and the zoning district applied to the area is “AE-40” which establishes a minimum parcel size of forty acres. The Colusa County General Plan designates the majority of the Planning Area as “Designated Floodway” with the “Floodway” zoning district applied to the area. A small portion of the Planning Area, which includes the existing State Recreation Area and the Colusa Levee Park, are designated “Parks and Recreation” on the County General Plan. The existing general plan designations and the zoning preclude urban development within the Planning Area. The existing uses within the Planning Area (agriculture, habitat, flood control, water supply and recreation) appear to be consistent with the existing, local land use controls.

The Planning Area is also located entirely within the mapped area of the 100-year flood as established by the Federal Emergency Management Agency (FEMA). This FEMA designation is implemented through local floodplain management ordinances. These ordinances essentially preclude urban or otherwise intensive development inside of the flood control levees. This development limitation is reinforced by the jurisdiction of the Central Valley Flood Protection Board, a State agency which has authority to review all substantive development within the flood control levees.



## III. THE SACRAMENTO RIVER

The Sacramento River is the largest river in California. It drains a watershed of over 24,000 square miles, most of which lies above the Colusa Subreach. The river receives annual runoff of over twenty-two million acre feet of water and contributes 80% of the fresh water that flows to the Sacramento-San Joaquin Delta. It provides water to farmers in Northern and Central California and cities in Northern, Central and Southern California. Its water sustains the agricultural economy of the Sacramento Valley and it is vitally important to the communities in the Colusa Subreach.

The river also sustains the riparian ecosystem that includes the riparian plant communities, the animals that have adapted to those communities and the animals that utilize the aquatic habitats the river provides. The river is the single greatest source of salmon caught off the California coast. It also sustains public recreation activities, such as hunting, fishing, birding and boating that are enjoyed by thousands of people each year. In short, the Sacramento River is many things to many people and important to all of California.

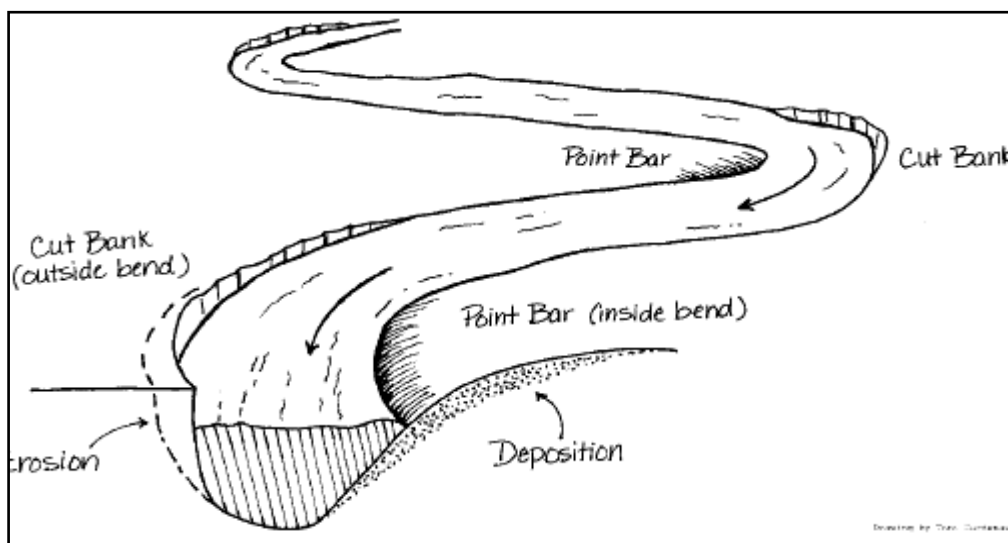
### A. Hydrology and Geomorphology

Stream flow is the primary variable affecting the riverine (related to or formed by the river) environment in the Colusa Subreach. The natural disturbance regime of the river, the intra and inter-annual variability in the flow patterns and all of its associated physical processes are the factors largely responsible for the mosaic of riparian vegetation communities along the river. In the Colusa Subreach, and along the river in general, the preservation and restoration of these physical processes has been identified as the key to successful long-term restoration and maintenance of the riparian ecosystem.

**Channel Movement** - Channel meander and avulsion are the dominant processes that shape the floodplain and associated natural communities along an alluvial river such as the Sacramento River. Meandering involves the river channel migrating laterally through the floodplain, eroding materials on the outside (concave side) of a bend in the channel creating nearly vertical cut banks, while at the same time depositing materials on the inside (convex side) of a bend creating point bars. This combination of erosion on the outside of bends and deposition on the inside results in the familiar meander form when seen on a map or aerial photo. Figure 8 depicts a typical bend on the river. Over time, this continual process of erosion and deposition creates new floodplain area and provides a variety of ecosystem niches for the associated riparian species.

Channel avulsion also creates a dynamic variety of landforms that sustain natural communities along the river. Although channel avulsion is a complex process, it can be described simply as the channel cutting off a bend that has become too tight to maintain. When a meander bend becomes too tight of a turn for the river to maintain, the river will create a straighter path for itself.

Recent analysis has identified at least a third of the riparian communities on the Sacramento River result from this process (Greco, 2000).



**Figure 8. Typical Bend on the Sacramento River**

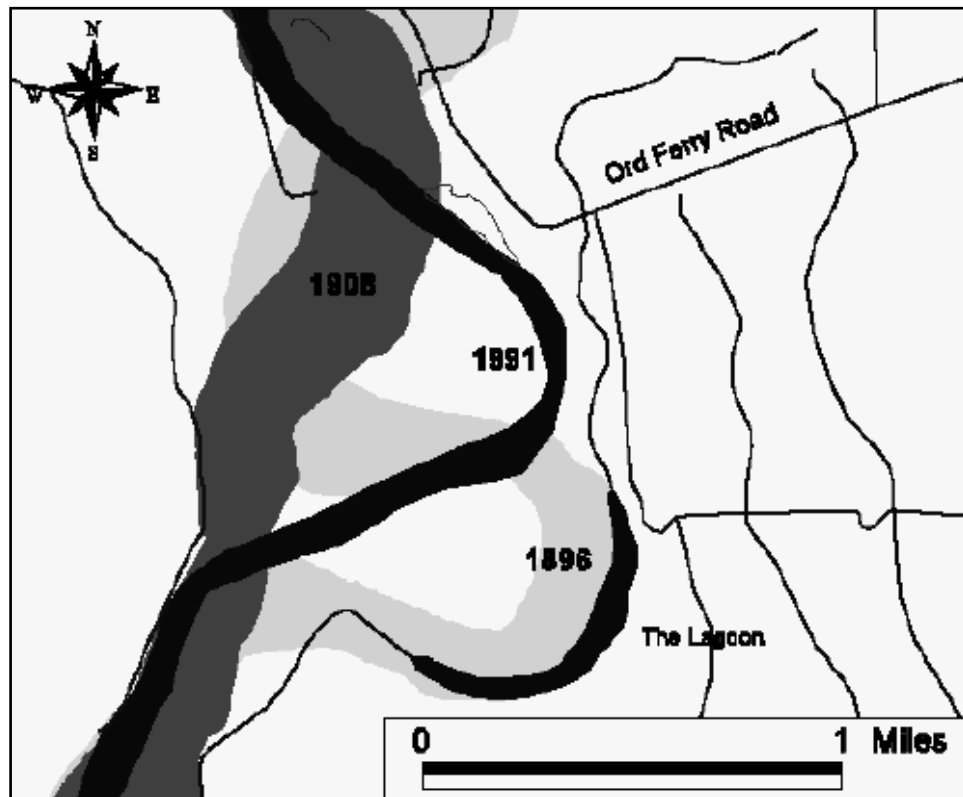
*Illustration from the Sacramento River Conservation Area Handbook.*

This process leaves evidence on the floodplain in the form of oxbow lakes and sloughs. A slough results from a relatively recent avulsion, where the channel has filled one end in with sediment, generally the upstream end, leaving the bottom or downstream end connected to the river. As more time passes, this bottom end eventually fills in as the river channel moves away from it creating an oxbow lake.

Within the meander belt of the river, the constant movement of the channel can greatly change the configuration of property. Figure 9 depicts the change that has occurred at RM 183 just south of the Ord Bend Bridge. The main river channel moved approximately one mile to the west between 1896 and 1908 as the result of avulsion. An oxbow lake, known as "The Lagoon," resulted from this sudden shift in the channel location. Since that time, the river has moved progressively east, eroding and redepositing the land in that area. Similar, substantial changes in the river channel location and the resulting reconfiguration of the adjoining land areas have occurred throughout the Colusa Subreach.

This constant changing of the channel can, however, result in impacts to flood management and infrastructure improvements within the Subreach and to the agricultural use of the adjoining land. Movement of the channel can render costly improvements, such as pumping plants, ineffective if the river moves away from the intake location. A related problem is that channel movement can result in changes to the velocity of the flow, which can impact the effective operation of some fish screen systems. Major changes in channel location can also impact the utility of bridges and boat ramps. Likewise, channel meander can result in the loss of agricultural cropland as the river erodes into orchards or row crop land located on the outside of bends.

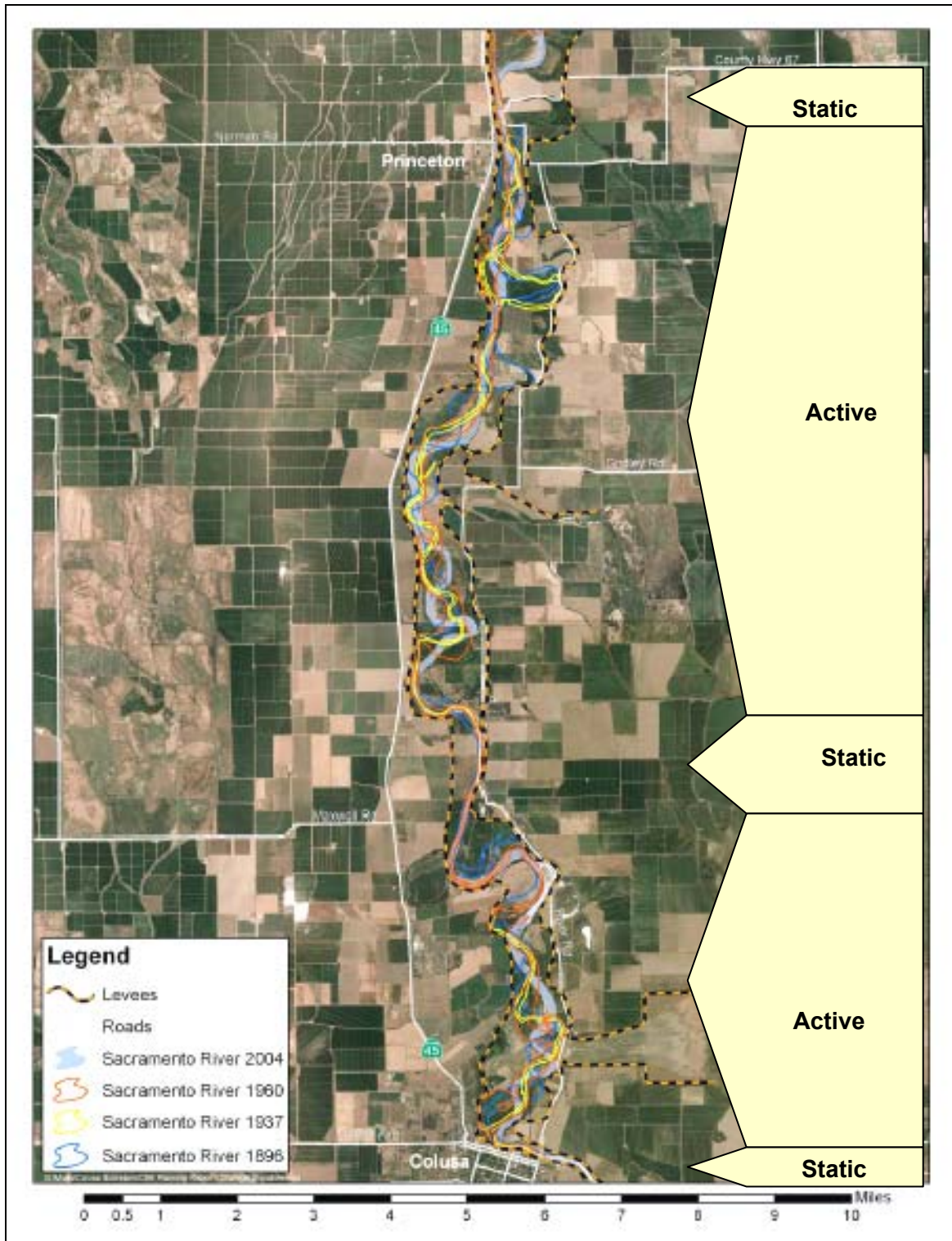
A 150 year meander belt has been described and mapped by the Department of Water Resources for the Sacramento River. This meander belt includes the location that the river channel has occupied in the last 100 years (moving both through meander and avulsion), and where it is projected to occupy in the next 50 years. Channel movement can be either incremental or more sudden, and this is controlled by the interaction of many complex physical factors. Therefore, the 50-year projections while approximate are still of great value for large-scale planning. Within the Colusa Subreach, the 150 year meander belt is entirely located within the flood protection levees and, therefore, within the Planning Area.



**Figure 9. River Channel Movement at RM 183**

*Illustration from the Sacramento River Conservation Area Handbook.*

This combination of gradual meander and sudden avulsion occurs differentially within the Subreach and the river corridor in general. Different soils along the river offer differing resistance to channel movement and, as a result, the river channel is actively moving in some areas and relatively static in other areas. Soils that are highly resistive to channel movement are referred to as geologic Protection. The presence of these geologic Protections results a differential pattern of channel movement. Figure 10 depicts the historical movement of the river channel in the Colusa Subreach. Channel locations from 1896, 1937, 1960, 1976 and 1999 are shown to demonstrate the range of channel movement



**Figure 10. Historic Channel Movement**

Source: Sacramento River Geographic Information System

that has occurred. Figure 10 also generalizes this channel movement to differentiate where the channel has been historically active and static during the 20<sup>th</sup> Century.

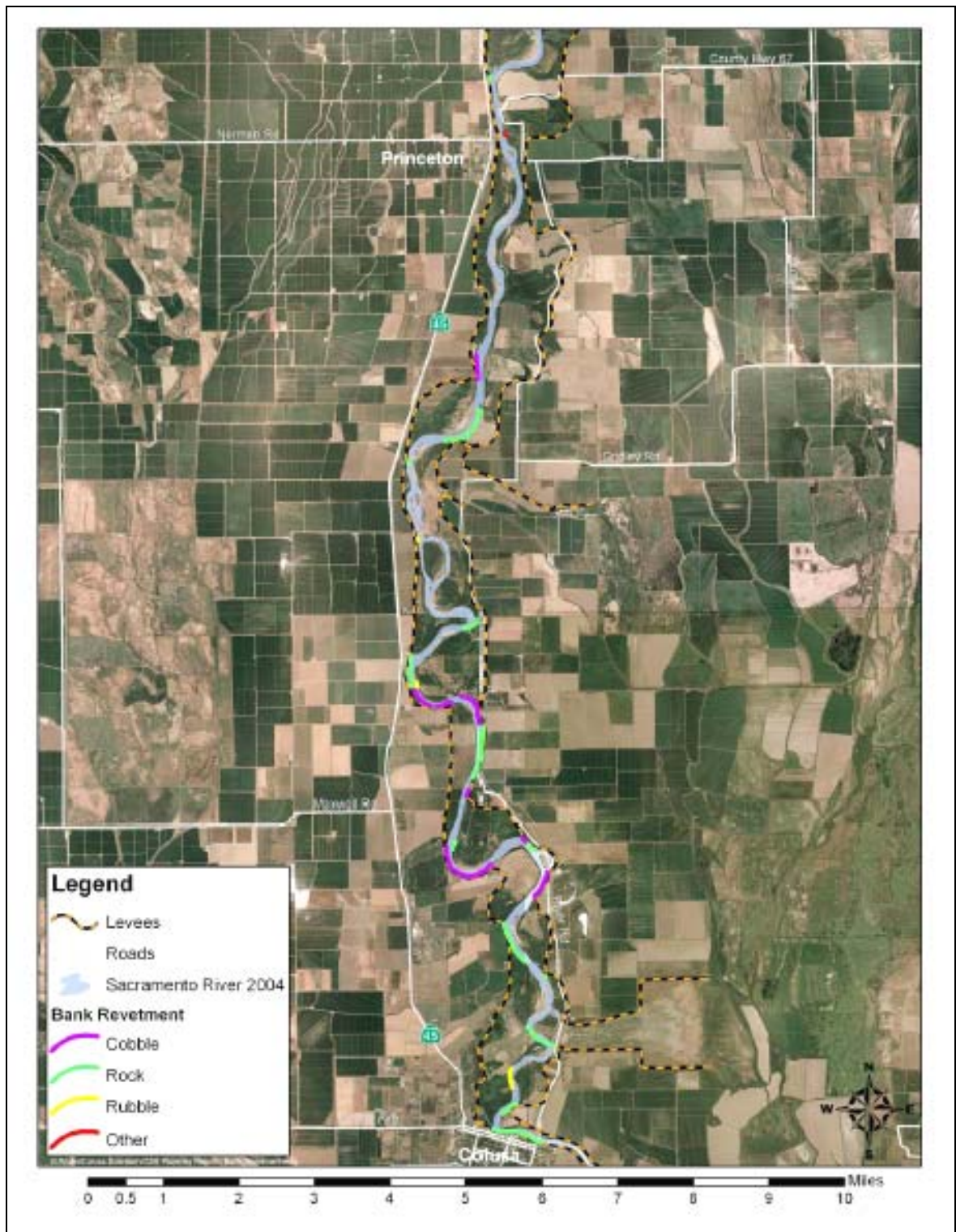
**Bank Protection** – As noted previously, the natural movement of the channel can be disruptive to adjacent improvements and land uses. Land areas on one side of the river can be reduced and land areas on the opposite side of the channel can be increased. In response to this natural process, revetment, which is often referred to as bank protection or armoring, has been installed along portions of the middle Sacramento River in an effort to protect substantial investments such as levees, pumping plants, fish screens, buildings, orchards, bridges, other public improvements and adjacent land uses. Within the Colusa Subreach, revetment has been installed along approximately 20% of the river bank in an attempt to limit erosion and the resultant movement of the river channel. Most of this revetment has been installed to limit erosion where the river is adjacent to the levee system. Figure 11 depicts the location of revetment within the Subreach as mapped by the California Department of Water Resources. This revetment was primarily installed through state and federal projects.

Bank protection typically involves stripping away existing vegetation and replacing it with riprap, a covering of large rocks or concrete rubble, set at a relatively steep angle to the channel. This alters the rate of channel movement both upstream and downstream. It often, however, relocates and modifies patterns of erosion, but does not completely halt erosion. When the channel migration process is frozen in place at one bend by bank protection, the bend downstream or across the river may erode more rapidly than it would have otherwise (Sacramento River Conservation Area Forum, 2002). Agencies such as the Army Corps of Engineers are attempting to develop analysis that will take offsite impacts into consideration when formulating new bank protection projects and the related mitigation actions that are required. In the past, however, the full offsite and ecological impacts of revetment were generally not considered.

Bank protection has also been shown to have substantial, negative impacts on wildlife, especially fish species. Site-level impacts occur that are directly related to the loss of vegetation and habitat where the bank protection is installed. An example is the loss of the cut banks that are required for bank swallow nesting. Substantial, reach-level impacts also occur. Bank protection halts the formation of new riparian forest and alters the sediment transport regime, a primary driving force in the overall ecological balance of the riverine ecosystem. Another major impact is the loss of large woody debris, a key component of fishery habitat, in the river downstream of the riprap (U.S. Fish and Wildlife Service, 2000). Because of these negative impacts, the placement of new revetment often involves a requirement to appropriately mitigate the negative impact on special-status species such as bank swallows and anadromous fish.

Revetment, which is intended to fix the river in a relatively permanent location, involves a conflict of societal values. The need to protect levees from erosion is a priority given the great importance of the flood





**Figure 11. Location of Bank Protection in the Colusa Subreach**

*Source: California Department of Water Resources*

management system. Also, given the high cost of infrastructure along the river, there is a need to maximize the utility and service life of public and private investments. On the other hand, there is a large body of scientific research that documents that the covering of river banks with rock and the stalling of channel meander is very disruptive to the natural systems and directly contributes to the loss of animal species including several Threatened and Endangered Species. In recent years, the general response to this dilemma has been to limit new revetment to locations that are required to protect the flood management system or protect major public infrastructure investment.

**Sediment Transport** – Sediment transport is the process that supplies the source of materials for land and habitat building. The river works as a conveyor of sediment, transporting materials eroded from upper reaches and depositing them in lower ones. Material transported by the river includes various sizes of rock material, soil, fine vegetative matter and large woody debris. This material is generally deposited on the inside of meander bends, but it is deposited over a larger area of the floodplain in conjunction with flood flows.

The construction of Shasta Dam in the mid 1940's reduced the contribution of sediment from the upper portion of the watershed and modified the natural sediment transport regime. The exact status of the river in terms of sediment transport and balance is a matter of some scientific uncertainty, and additional research and information is needed before management conclusions can be drawn.

**Flow Variation and Flooding** – The flow regime of the Sacramento River has been substantially changed from the natural situation. Naturally, the river had a pattern of high flows during the winter, rainy season and during the spring when a combination of rain and snowmelt from the higher portions of the watershed generated heavy runoff. Extreme flood flows occurred during these portions of the year. During the summer and early fall, flows diminished to annual, low levels. Upstream regulation, principally by Shasta Dam, has modified the flow regime by greatly reducing the wet season flows and greatly increasing the summer flow levels. High flows during the wet season are stored at Shasta Dam and released during the summer to meet water supply demands for agriculture and municipal uses.

Most of the Planning Area is a low-lying portion of the floodplain that is inundated every year or two on average. For example, most if not all of the Subreach was inundated by the flows that occurred on February 18, 2004. All of the Subreach experiences flooding at least every five years.

Flooding and flow variation are important factors in the creation and maintenance of riparian habitat. While Shasta Dam has substantially regulated the flow regime of the river from its natural conditions, the river still retains some degree of natural flow variability. There are substantial unregulated tributaries below the Dam, which significantly contribute to the present-day flooding and flow regime patterns. Although many aspects of the flow regime have been altered (such as the frequency, magnitude, duration, timing and rate of change) flooding as an important natural change agent has not been eliminated within the levee system. In part, it is this level of natural process and the resulting

ecological function that makes the Colusa Subreach important for ecosystem restoration.



***Flooding of the Boggs Bend Area on February 18, 2004***

Flood flows within the Subreach deposit sediment over the portion of the floodplain that is inundated, building up the level of the land. The sediment also provides mineral and vegetative matter to create and enrich the soil that sustains riparian vegetation. The plants that form the mosaic of riparian habitat have selectively adapted to and depend on this flood regime. Flooding also carries essential nutrients and organic matter to the river and in so doing benefits fish and other aquatic species. Higher flood flows can also impact the floodplain through erosion. This occurs along the outer edge of channel meanders and through the scouring of the area between meanders. The rate and intensity of this erosion is variable and it is affected by several factors including soil characteristics, vegetative cover and the velocity of the flow.

Concurrent with the evaluation of future water storage and supply options in the Sacramento River watershed, there are studies ongoing that are intended to identify flow regime options that can better support plant and animal life along the river. The intent is to foster flow regimes that support both the river's ecosystem and the demands for irrigation and municipal water supply. A point raised during the CSP public outreach was that some local interests are concerned that flow regime changes could effect flood protection water supply considerations.

## **B. Sacramento River Flood Protection Project**

All uses in the Colusa Subreach must be considered in the context of the Sacramento River Flood Protection Project. The Army Corps of Engineers completed the Project in 1968 and system maintenance is under the jurisdiction of



the Reclamation Board with the funding and maintenance provided by a combination of the State Department of Water Resources and local districts. The *Sacramento River Conservation Area Forum Handbook*, Chapter 2, contains an overview of the Sacramento River Flood Protection Project. Material within this section is adapted from the *Handbook*, from *Battling the Inland Sea*, by Robert Kelly, a historical account of flood Protection in the Sacramento Valley, and other available sources.

**History** - The Colusa Subreach flooded annually as flows generated by upstream rain and snowmelt exceed the capacity of the river channel. This pattern resulted in the channel and the adjoining land being built up higher than the lands to the east and west. Flood flows spilled from the river to these lower lands, the Butte Basin on the east and the Colusa Basin on the west, through distributary channels such as Cheney and Drumheller Sloughs. These basins held water into the summer until a combination of drainage release to the south and evaporation dried the areas. The majority of the flood flows left the river channel north of Colusa and as a result, the river channel downriver from Colusa had a substantially reduced flow capacity.

Initial levees in the Subreach were constructed in the 1870's by local Reclamation Districts. For the next forty years, individual districts in the Subreach and throughout the Sacramento Valley attempted to control annual flooding by constructing ever-higher levees in the hope of limiting flood flows to the river channel and precluding outflow into the basins. These levee systems were not coordinated and often levees on one side of the river resulted in increased flooding across the river or upstream. Ultimately, a series of disastrous floods made it clear that a comprehensive flood protection system that included restoration of outflow into the adjoining basins was required. In 1917 the US Congress authorized the Sacramento River Flood Protection Project. The project was constructed in increments that included the rebuilding and heightening of some locally-built levees and managed overflow from the main river channel. In the early 1930's, the Moulton and Colusa Weirs were opened to permit major diversion of flood flows from the Subreach into the Butte Basin. By the mid 1940's the Project was able to provide regular flood protection to the lands outside of the levees and the planned overflow areas.

**The Existing System** - The Sacramento River Flood Protection Project was designed to provide flood damage reduction for 800,000 acres of agricultural land as well as the urban areas located in the floodplain. The system was also designed to increase the sediment transport capacity of the river in order to flush out large quantities of debris resulting from gold mining activities in the surrounding mountains. Overall, the Flood Protection Project mimics the spatial patterns of natural historic flood flows with a complex system of levees, weirs for diversion of floodwaters, off-stream floodways and channel modifications. The Flood Protection Project levees begin in the vicinity of the Ord Ferry Bridge (RM 184) and extend downstream to the mouth of the river.

The Flood Protection Project is assisted by the regulation of flood flows that is afforded by Shasta Dam on the Sacramento River and, to a lesser degree, by Black Butte Dam on Stony Creek. Shasta Dam has storage capacity of 4.5 million acre feet, of which 1.3 million acre feet are dedicated to flood protection. Shasta controls the runoff from the upper 6,420 square miles of the watershed and it substantially limits flood flow contribution from the upper watershed. The river, however, receives unregulated flows from major tributaries below Shasta

Dam that drain the east and west sides of the Sacramento Valley. These flows, as well as occasional high releases from Shasta Dam, result in flows in the Colusa Subreach that still exceed the capacity of the channel on an annual basis.

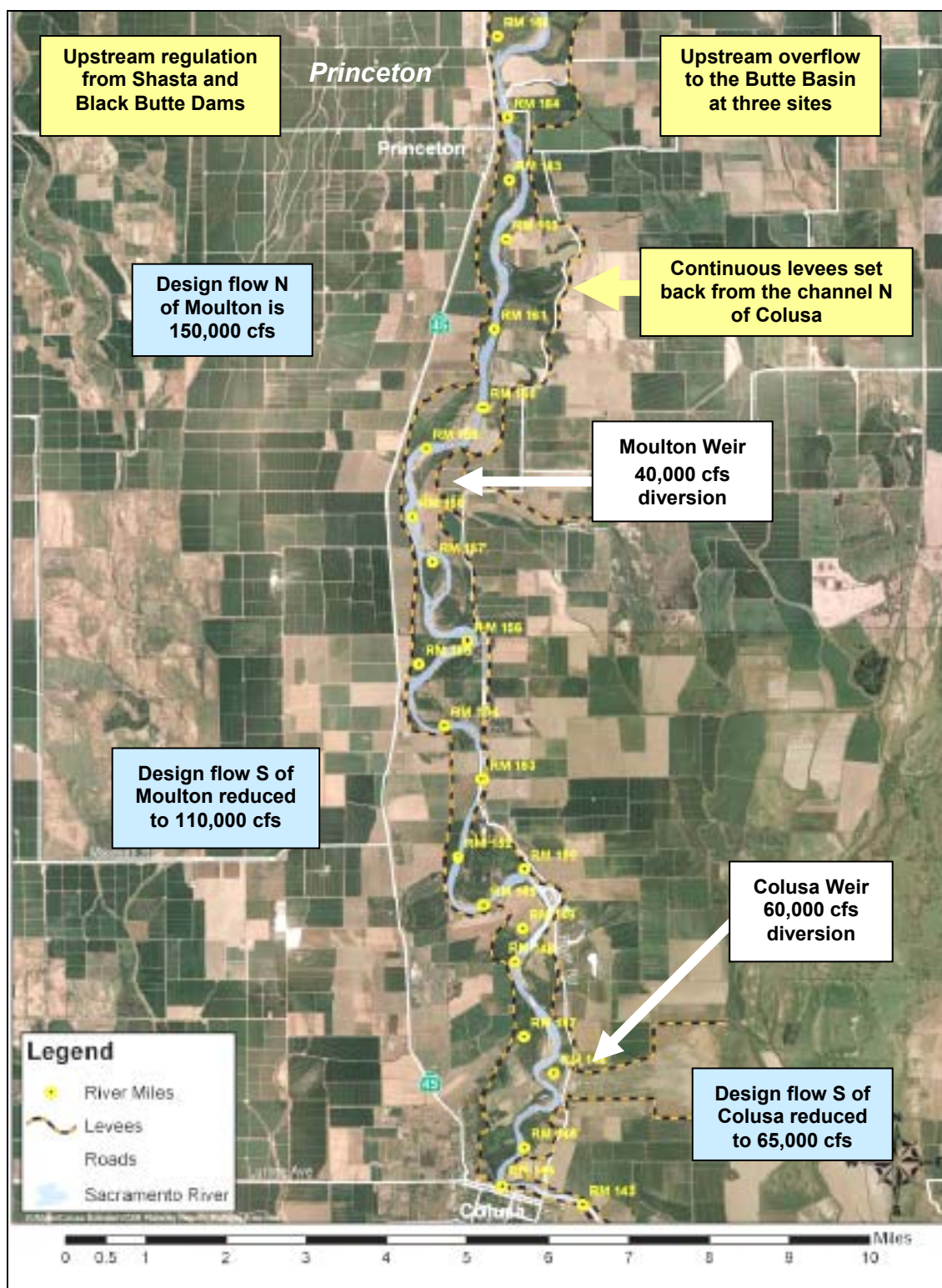
Within the Colusa Subreach, the Flood Protection Project is designed to limit river-related flood damage by restricting design flows to the area inside the levees. Figure 12 depicts the key features of the Flood Protection Project in the Colusa Subreach. The channel in the northern portion of the Subreach has design flow of 150,000 cubic feet per second (cfs). The levees north of Colusa are often set back several thousand feet, on one or both sides of the river, such that the total levee-to-levee width of the floodway is over a mile in several sections of the Subreach. This total floodway width, however, varies greatly and in three locations the width is reduced to less than 2000 feet. At its narrowest point, about RM 153, the floodway is only about 1,250 feet wide.

The Project utilizes three natural overflows north of the Subreach (M&T, Three B's and Goose Lake) as well as two major overflow structures in the Subreach (Moulton Weir and Colusa Weir). Together these five diversions are designed to transfer about 70% of the river's flood flow east to the Butte Basin. The Moulton Weir has a design flow of 40,000 cfs and the Colusa Weir has a design flow of 60,000 cfs, equaling a total diversion of 100,000 cfs from the river. This diversion is designed to accommodate the reduction in the floodway width and capacity that occurs from the City of Colusa southward. The levees from Colusa southward are generally adjacent to the river bank and the design flow for the channel is reduced to 65,000 cfs. All flow figures in this section are taken from the *Handbook*, Figure 2-14.

**System Maintenance** – The flood protection system is maintained by multiple entities. These include the U.S. Bureau of Reclamation which operates Shasta Dam and the U.S. Army Corps of Engineers (USACE) which operates Black Butte Dam. The levee system is maintained by a combination of local and state agencies with annual funding coming from both local and state sources. The California Department of Water Resources (CDWR) is responsible for maintenance of the weirs and bypass channels.

Within the Colusa County portion of the Subreach, levee maintenance is performed by CDWR. Funding for maintenance on the west side of the river comes from local assessments that are collected by Colusa County pursuant to a Maintenance Area. Funding for the east side of the river comes from the State General Fund. The portion of the Subreach within Glenn County has levee maintenance performed by Levee District No. 3, an independent local district funded by property tax.

Levee maintenance generally includes vegetation and rodent management on the levees, minor levee repair and limited vegetation and debris removal inside of the levees. Activities do not generally include the channel area. Basic maintenance budgets are not adequate to fund larger levee repair projects and those more expensive projects require other state or federal funding sources that are not always available. Maintenance activities do not include reconstruction or retrofit of levees for increased integrity. In locations where system integrity is at risk, work is usually done by the ACOE and State Reclamation Board under the emergency authority of the PL-84-99 Program.



**Figure 12. Sacramento River Flood Protection Project Features**

Source: Design Flow Data from the SRCAF Handbook

CDWR activities that relate to weirs and bypass areas include limited annual debris removal, scour hole repair and vegetation management. In bypass areas below the Colusa Subreach, such as the Tisdale Bypass, sedimentation is a problem that was addressed on a regular basis. Overall maintenance resources have been reduced in recent years due to the State's budget deficit. Between 2000 and 2004 the budget for the Flood management division of DWR was reduced by 74% (Leavenworth, 2004). Maintenance funding does not come from a dedicated source and it must compete with other legislative priorities as part of the annual State budget process. Local interests have often been critical of the overall maintenance effort related to the Sacramento River Flood Protection Project. A recent report issued by CDWR, *Flood Warnings: Responding to California's Flood Crisis*, concludes that additional local and State funding sources are required to support adequate levels of maintenance.

The US Army Corps of Engineers and the California Department of Water Resources conduct an annual field inspection of the levee system to identify and monitor erosion of the levees. A report is subsequently prepared which serves as a guide to future repair activities. The most recent publicly available report, *2007 Field Reconnaissance Report of Bank Erosion Sites-Sacramento River Flood Protection Levees and Tributaries* was prepared by Ayres Associates, the hydraulic analysis subcontractor for Colusa Subreach Planning. Ayres has prepared reports on a consistent basis since 2003. The 2007 report noted 152 erosion sites on Sacramento River levees that were being monitored, with 5 of those sites categorized as, "Critical." Three of the monitored erosion sites were within the Colusa Subreach but they were ranked as relatively low priorities in the 2007 analysis.

Public input received as part of CSP indicated that many local residents are concerned about the current adequacy of the flood protection system. This leads to their further concerns that restoration of wildlife habitat within the Colusa Subreach may reduce flood protection for the area outside of the levees. Comments included a shared perception that the flood Protection system is not adequately maintained and that the ability of the system to carry the design flows was compromised. Perceptions that were cited in conjunction with this perspective include:

- Past maintenance activities included dredging and debris removal within the channel that kept the channel more open.
- Buildup of large woody debris has resulted in sediment build-up within the channel.
- There is increased pressure on the levees and inadequate maintenance is provided.
- There is a critical need to clean out weirs and bypasses.
- Environmental review and mitigation requirements have increased maintenance costs and delayed implementation of projects.

Hydraulic analysis was conducted as part of CSP to evaluate the capacity of the floodway to carry the system "Design Flow" with and without restoration projects. The analysis indicated that generally the capacity of the floodway has not been diminished. Chapter VII provides an overview of the findings of this analysis.

**Emergency Levee Repairs** - On February 24, 2006, following sustained heavy rainfall and runoff, the Governor of California declared a State of Emergency for California's levee system, commissioning up to \$500 million of state funds to repair and evaluate State/federal project levees. Following the emergency declaration, CDWR secured the necessary means to fast-track repairs of critical erosion sites. In addition, California's environmental permitting process was streamlined to allow levee repairs to proceed at a greatly accelerated pace.

To date, nearly 250 levee repair sites have been identified, with more than 100 of the most critical sites having already been completed. Repairs to others are either in progress or scheduled to be completed in the near future, and still more repair sites are in the process of being identified, planned, and prioritized. Within the Colusa Subreach three emergency levee repair projects were completed in 2006.

- RM145.9L - a setback levee approximately 1200 feet long was constructed downstream of the Colusa Weir.
- RM154.5L – rock revetment approximately 1200 feet in length was installed on the north side of Reservation Road.
- RM164.0 - rock revetment approximately 800 feet in length was installed east of Princeton.

Another project downstream from the Subreach but of particular interest to Colusa County residents was the Tisdale Bypass Sediment Removal Project. Approximately 1.85 million cubic yards of sediment were removed from the Bypass to increase its flood flow capacity.

**System Benefits and Effects** – The construction of the flood Protection system made significant expansion of the local agricultural economy possible by virtually eliminating the annual occurrence of flooding from the Sacramento River for the area outside of the levees. As such, the ongoing maintenance of this system facilities and system capacities are of paramount importance to residents of the entire Sacramento Valley. Local public input received as part of CSP has stressed that protecting the integrity of the Sacramento River Flood Protection Project is a critical part of any ecosystem restoration strategy.

The Flood Protection Project affects the natural river process in various ways depending on the location. The Project levees through much of the Subreach are setback from the channel, accommodating continued channel meander where bank protection has not been installed. Though upstream regulation has reduced the annual occurrence and intensity of flooding, within the levee system annual flooding still occurs. This flooding helps sustain some limited natural river process, which, in turn, helps to sustain the ecosystem. South of the Colusa Subreach, the flood Protection levees, and often bank protection, are directly adjacent to the river channel, effectively limiting channel meander and the natural process of habitat formation and maintenance. The Sacramento River Flood Protection Project serves a large area and flood damage reduction is an important State and local priority. Therefore, the interrelationship between the flood damage reduction system, the riparian habitat and other uses of the floodway must be considered as part of planning for ecosystem restoration in the Colusa Subreach.

**Regulation** - The Central Valley Flood Protection Board (CVFPB), which was formally called the Reclamation Board, is charged with the responsibility of maintaining the integrity of the Sacramento River Flood Protection Project. The Board reviews proposals for physical change within the “Designated Floodway” to ensure that such projects will not cause new flooding problems. For the Colusa Subreach, the Designated Floodway is the area inside of the levees. This jurisdiction is applicable to most substantive improvements within the Subreach such as levees, bridges, planting to restore riparian habitat, etc. Accordingly, habitat restoration plans that are developed as a part of CSP will be subject to hydraulic modeling and analysis to ensure that they do not diminish the integrity of the Flood Protection Project per the standards of the Reclamation Board. Prior to the planting of native vegetation restoration plans will also be subject to review and permit approval by the Reclamation Board per its established jurisdiction.

### C. Sacramento River Bank Protection Project

To support the objectives of the Sacramento River Flood Protection Project, the Sacramento River Bank Protection Project was authorized by the U.S. congress in 1960 and a second phase was authorized in 1973. The purpose of the Project was to reduce the need for emergency levee repair, periodic dredging, and loss of land area due to channel meander. This was to be accomplished by revetment that typically involved stripping away existing vegetation and replacing it with rock riprap.

In addition to the revetment that was installed as part of the Sacramento River Bank Protection Project portions of river bank have also been modified through state projects and private landowner projects. Concrete rubble has sometimes been dumped over eroding banks and other materials such as cobbles and car bodies were occasionally utilized in the past. Generally, the private projects have occurred without required review or permits from the Reclamation Board and the U.S. Army Corps of Engineers.

Eventually, the ecosystem impacts of bank protection became an issue and all of the authorized bank protection sites were not completed. Recreation and conservation interests objected strongly to the losses of fish, wildlife and aesthetic resources that occurred from revetment. State and federal agencies also determined that bank protection constituted a further threat to Threatened and Endangered Species, such as bank swallows and fish. Additionally, there were concerns that bank protection could act to transfer erosive impacts to different properties.

Direct ecosystem impacts occur to relatively small-scale areas when native vegetation is removed from the project levee or riverbank and replaced with rock. More importantly, long-term and much larger scale impacts to the overall ecosystem result from halting the process of river channel meander. As described previously in this Chapter, this meander is one of the fundamental processes that creates and maintains the diverse mosaic of riparian communities.

Nonetheless, it is recognized that bank protection has an important purpose in protecting levees from erosion in order to maintain the flood Protection system and the benefits that it provides. It is also recognized that major public investments, like bridges and pumping plants, may require protection from erosion. The *Handbook*



incorporates the concept of “limited meander.” This concept acknowledges that some revetment is required to maintain the flood Protection levees and key infrastructure features. Review of each individual revetment project is dictated by current regulations in order to evaluate the effect on the environment and on neighboring properties. There remains, however, strong interest in developing a more comprehensive program, which will not only protect the levee system, but that will also preserve riparian environmental attributes (Sacramento River Conservation Area Forum, 2003). The conflicting objectives, of channel stabilization through bank protection and the protection of wildlife habitat and special-status species are recognized, but not yet resolved.

## IV. RIPARIAN HABITATS AND WILDLIFE

The Sacramento River has meandered across the valley for thousands of years, transforming the landscape and supporting a unique riparian ecosystem within its floodplain. The dynamic riverine processes reviewed in Chapter III have created and maintained this ecosystem. The plants in these riparian communities have adapted to and become dependent upon these natural processes. In turn, many species of fish and wildlife that inhabit the riparian corridor have adapted exclusively to these habitat communities. As a result, threats to the viability and connectivity of this habitat are threats to the viability of those species.

The wildlife and fishery resources of the Sacramento River riparian ecosystem are of great natural and economic importance. The river corridor supports a great variety of resident and migratory species. Waterfowl and songbirds are attracted by the diversity and richness of the riparian habitat. Many neotropical songbirds breed in the riparian communities along the river and winter in Central and South America, while other species prosper in the moist and lush environment all year long. The river supports four distinct runs of Chinook salmon, which are the greatest source of supply for the commercial salmon fishery off the California coast. It also supports runs of other anadromous game fish including steelhead trout, striped bass, shad and sturgeon, which combine to generate substantial local economic activity.

This Chapter reviews the adaptation of plants to the dynamic riverine environment and the related adaptations of animals to the resulting habitats. It also identifies key impacts to these habitats that threaten wildlife in the Colusa Subreach. In addition, this Chapter identifies special status species, which are species that are listed as Threatened, Endangered or of Special Concern under state and federal Endangered Species Acts.

This review of the natural environment must, however, be considered in the context of the existing pattern of land uses and the changes that have occurred over the past 150 years. The modification of the river's flow regime and the removal of most of the native vegetation on the floodplain have contributed to the development of an agricultural economy that is the mainstay of the Sacramento Valley and a social fabric that has developed over many generations. Colusa Subreach Planning is intended to develop a strategy for ecosystem improvements that is reasonably integrated with these existing patterns of economic and social activity.

### A. Existing Habitat Communities and Plants

The Colusa Subreach is part of a rich riparian ecosystem that supports a wide variety of wildlife and fish on a seasonal and year-round basis. Within this ecosystem, riparian habitat provides the food, water, and shelter necessary for the reproduction and survival of many native and nonnative species of wildlife. The habitat includes various forms of vegetation, wetlands, banks, sand and gravel bars along the river. The *Sacramento River Conservation Area Forum Handbook*, Chapter 2, contains a description of the habitats in the river corridor. Much of the material in this Chapter is adapted from the *Handbook*. Relevant material is also

adapted from *Comprehensive Management Plan for the Sacramento River Wildlife Area*, which was prepared by the California Department of Fish and Game in 2003.

**Ecological Adaptation** – The riparian vegetation along the Sacramento River has evolved in an environment maintained by the natural disturbance regime of the river. This regime is primarily composed of flooding and substrate erosion and deposition. The majority of the species are phreatophytes, which must have their roots in contact with a stable water supply during long periods of the year. Most of the trees within the riparian corridor are broadleaved and deciduous during the winter months. Broad leaves enable trees to maximize sun exposure, thus maximizing growth. Early colonizing species such as willows and cottonwood exhibit rapid growth of foliage and roots, characteristics necessary for surviving during the hot, dry summers on a substrate composed of alluvial sands or gravels with available subsurface water. Other adaptations that plants have made to thrive in the riparian corridor include:

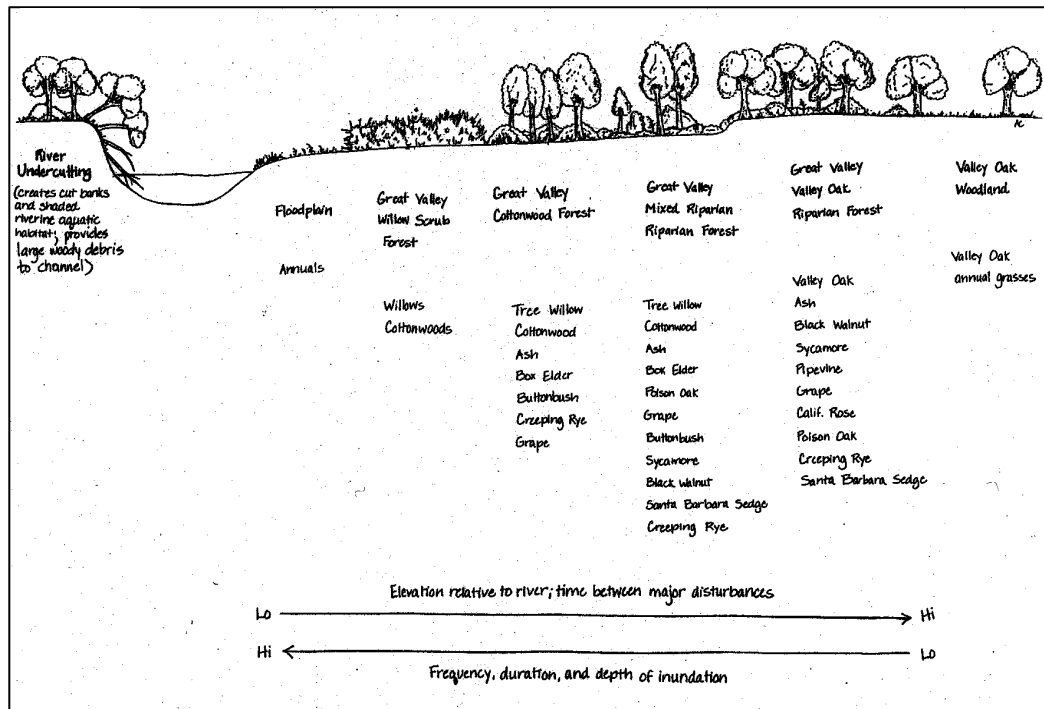
- seed dispersal mechanisms to ensure successful recruitment such as seeds which float and are resistant to rotting
- adventitious roots (roots that bud from buried stems) which form after sediments are deposited over plants during flood events
- ability to tolerate low levels of oxygen in soil in flooding events
- ability to form suckers and roots after mechanical damage

These adaptations help to ensure species survival in the portions of the Subreach that are subject to frequent riverine disturbances. Individual plants may not always survive following disturbances at particular sites, however, the species readily colonize other newly disturbed or deposited areas and the cycle will be repeated.

As silt accumulates under the initial willow-cottonwood scrub, other trees such as box elder and ash are able to germinate in the spring after flooding has ended. Because the existing trees have slowed the flood flows, the materials deposited in these areas tend to have a higher percentage of fine material such as silt. This finer material builds soils that are able to retain moisture longer than sand and gravel substrates and thus additional species can thrive. Species such as box elder and ash can tolerate some deposition, but not to the same extent as the early- colonizing cottonwood and willow species. On higher areas of the floodplain where the disturbance regime is more muted and deposited soils are deeper, species such as valley oak and sycamore are typically dominant.

Flood events can also result in channel cutoffs, which can bring about major physical change in a short period of time. The Boggs Bend area on the east side of the river, approximately two miles south of Princeton, was the site of such a sudden change in the river channel that resulted in a profound impact on the habitat characteristics of the immediate area. A new river channel was formed through an avulsion or channel cutoff that occurred in the early 1930's. This new channel quickly became the active channel, resulting in the creation of an oxbow lake within the former channel area. Such oxbow areas benefit from the adaptations of the native plant species and the river's steady deposition of sediment. Working in tandem, these forces can develop "optimal" riparian habitat for special status species such as the yellow-billed cuckoo, within as few as 12 years (Greco, 1999).

**Successional Stages** – From a distance, the riparian communities of the Colusa Subreach appear to be a uniform blanket of lush, green growth. A closer view, however, reveals that there are distinct bands of vegetation that are differentiated by plant species composition, forest structure and wildlife usage. These areas of vegetation are, in turn, differentiated by the magnitude in which they are affected by the disturbance regimes and by their position on the floodplain. The Subreach is located on the river where the natural disturbance regime results in an environment of continual physical change. The riparian communities and their associated vegetation species have adapted to colonize and establish themselves in successional stages as these areas are physically changed over time. Figure 13 illustrates the typical succession pattern for these communities in relation to river hydrology and channel movement.



**Figure 13. Typical Plant Communities and Successional Stages**

*Illustration from the Sacramento River Conservation Area Handbook*

The successional stages of the riparian communities that occur in the Subreach can be classified into several distinct plant communities for overview purposes. In the field, however, the pattern of riparian communities is far more complex. Any one species of tree, shrub or vine can occur in more than one natural community. There is an intergrading between communities and there is rarely an abrupt edge between them. Figure 15 incorporates a fifth riparian community, the Valley Oak Woodland, which exists in some upland areas outside of the levees. It should be noted that the clearing of riparian forest for other uses, the presence of large project levees and the loss of natural riverine process often interrupts the typical, natural successional pattern reflected on the diagram. The riverine process also creates other aquatic and marsh habitats that are not reflected in this simplified description of typical succession stages.

The California Natural Diversity Database (NDDDB/Holland) classification system was chosen for the primary description of habitat in this Report for consistency with the *Handbook*. This system is also best known by the public in reference to the Subreach. The descriptions of the habitat communities relate to the typical situation and do not reflect variations related to the loss of some natural riverine process in the Subreach. It is important to note that this loss can result in interference with the typical successional patterns and lead to the grouping of plant species that differ substantially from those listed below.

**Great Valley Riparian Forest** – The Great Valley Riparian Forest communities, classified by NDDDB/Holland, are the dominant communities in the remaining riparian areas along the river. They are uniquely adapted to the natural processes of the river and the resulting natural environment. Also prominently represented in the Subreach are the Coastal and Valley Freshwater Marsh and the Great Valley Willow Scrub communities. While these communities do not specifically fall within the Great Valley Riparian Forest series in NDDDB/Holland, they are serial stage communities that often succeed to the Great Valley Cottonwood Forest. For the purposes of this Plan, these communities are treated as components of the Great Valley Riparian Forest series.

The Great Valley Riparian Forest communities are a biologically rich habitat. The cottonwood-willow areas support more breeding avian species than any other comparable, broad California habitat type (Gaines, 1977). Riparian forests along the Sacramento River have several characteristics which enable them to support an abundance and diversity of wildlife. Abundant resources, high structure and habitat diversity (maintained over time by flooding and channel movement) and linear continuity all contribute to the diversity of species in the Subreach.

Proximity to water, a variety of soils and periodic influx of nutrient-rich sediment from flooding all contribute to the abundance of resources in the riparian forest system. This abundance continues through the summer months, in contrast with much of California which is hot and dry, such that many plant species outside of the riparian corridor die or go dormant. The riparian forests attract a vast array of terrestrial and aquatic insects, which in turn attract many species of birds, fish and mammals.

- ◆ **Coastal and Valley Freshwater Marsh** occurs commonly in the Subreach on the lowland periphery of the side channels, sloughs and oxbow lakes that are formed by the natural riverine processes. These areas are seasonally inundated to a substantial depth by floodwaters. The plant community is typically dominated by monocots up to two meters in height. These include cattails, bulrush, sedges, spike rushes and watercress. Rooted aquatic species with floating stems and leaves may also be present, including water primrose, water smartweed and pondweed. Black willow and button brush are also common at the edges of the water. The Coastal and Valley Freshwater Marsh areas may succeed to the Great Valley Willow Scrub community, if deposition raises the level of the land above the permanent water level, and these areas can rapidly move to the Great Valley Cottonwood Riparian Forest community when deposition rates are substantial. This community is especially important for many species of migratory birds and fish.



***Coastal and Valley Freshwater Marsh***

- ♦ **Great Valley Willow Scrub** is the most common pioneering community found on depositional areas (typically point bars) on the river's edge. The community will tend to survive along a band that meets the substrate, texture and moisture requirements of germinating seeds. The young plants are adapted to a coarse substrate such as sand or gravel. The rapidly growing root systems must stay in contact with water as it recedes to summer levels. If the right conditions exist, the narrow band of cottonwoods in this community will become the riparian forests of the future. Common species in this community are the sandbar willow, other willow species



***Great Valley Willow Scrub***



(black, red, yellow and arroyo willows) and Fremont cottonwood. Openings within the willow scrub may be covered by annual and perennial grasses and forbs. As vegetation slows the velocity of flood flows, deposition increases, reducing the frequency and duration of inundation. As this occurs, California sycamore, box elder and Oregon ash may become established. This community intergrades with and generally succeeds to the Great Valley Cottonwood Riparian Forest.

The initial colonization and long-term survival of these species is directly related to the river's flow regime. If the flow level drops too fast, the roots of young plants cannot reach groundwater levels and the plants die. Research indicates that manipulation of the flow regime on the river can interfere with the colonization of cottonwoods on recently deposited areas (Roberts et al., 2002).

**Great Valley Cottonwood Riparian Forest** is typically the successor community to the Great Valley Willow Scrub. As the river meanders away, frequency of flooding is diminished. This community is dominated by Fremont cottonwood, which sometimes constitutes the entire upper canopy. A second tall tree, the black willow, is often a significant member of the community. This community has a total canopy coverage of greater than 80%. Many species are able to germinate under the dense canopy cover, including berries, California rose, wild grape and poison oak, and many smaller tree species. These species combine to develop into a dense understory. Trees such as box elder and ash may become established in the understory, but do not typically become significant canopy species until the land surface is built up and flooding becomes less frequent. The understory, but do not typically become significant canopy species until the land surface is built up and flooding becomes less frequent.



***Great Valley Cottonwood Riparian Forest***

The tall form of the cottonwood trees is visible from a great distance. It is a common indicator of the river when crossing the featureless areas of the Sacramento Valley. This community intergrades with and generally succeeds to the Great Valley Mixed Riparian Forest away from the river.

- ♦ **Great Valley Mixed Riparian Forest** is typically the successor to the Great Valley Cottonwood Forest, as the land area is further raised through deposition of sediment, and flooding frequently continues to diminish. This community has a diverse, often dense, mixture of tall cottonwoods and willows in combination with sycamores, box elders, black walnuts and alders at greater than 80% canopy coverage. Shrubs, such as buttonbrush, blackberries and poison oak, are often covered by an assortment of vines (clematis, wild grape and pipevine) which extend up into the overstory trees. Perennial grasses, such as creeping wild rye and Santa Barbara sedge, may form dense pockets in the understory. Openings in this community may also contain elderberry savanna. This community intergrades with the Great Valley Cottonwood Riparian Forest in lower lying areas and the Great Valley Valley Oak Riparian Forest in higher areas.

This community may be a substantial distance from the active channel, but still experiences relatively frequent flooding. This brings additional deposition, but not necessarily the damaging flows and subsequent erosion. As the community becomes drier (i.e. further above the water table), species such as the valley oaks are able to germinate and become established. Over an extensive period of time, valley oaks become dominant and the community develops into the most mature of the riparian vegetation types, the Great Valley Valley Oak Riparian Forest.

- ♦ **Great Valley Valley Oak Riparian Forest** is dominated by tall, mature valley oaks with significant numbers of sycamores, black walnuts and ash. The canopy is typically less dense than the Great Valley Cottonwood or Mixed Riparian Forest at less than 60% canopy coverage. The understory may be dense, with vines and shrub species typical in the Mixed Riparian Forest, shrub species from drier sites and often stands of perennial grasses and sedges. Often present with this community type are very old specimens of elderberry plants, which are the host of the valley elderberry longhorn beetle.

This community is subject to periodic flooding, but of a lesser frequency and duration than the preceding communities. This brings additional deposition and, as a site rises further above the water table, it can develop into a Valley Oak Woodland. Within the Subreach, inside of the levees, the Valley Oak Woodland does not currently exist.

**Habitat Types at the Water's Edge** – In addition to creating a mosaic of riparian forest communities, the natural disturbance regime creates other critical habitats and habitat elements. Channel meander, flooding and aggradation create sloughs and side channels, sand and gravel bars, bare cut banks and shaded banks with vegetation and woody debris extending into the water. All of these features and the vegetation that they support play an integral role in the functioning of the riparian ecosystem.

- ♦ **The Open River Channel** is a key part of the riparian ecosystem. The river channel is the migratory route for the annual runs of multiple species of anadromous fish and it sustains the activities of many avian, reptilian, amphibian and mammalian species. The river channel provides great variation for the species that utilize this habitat. These variations include depth, velocity, cover and riverbed material. Important natural breaks in the consistency of the channel are often formed by vegetative materials that originate in the adjoining river corridor. Large woody debris, often composed of cottonwood or English walnut trees from eroding banks, has been identified as essential components of the habitat that supports fish species including the anadromous species. Concurrently, however, large woody debris has been noted as a concern by local interests who question its impact on boating, infrastructure and the flow capacity of the floodway.
- ♦ **Shaded Riverine Aquatic Habitat** is an important component of the Sacramento River ecosystem that is created as the river erodes into a bank supporting riparian forests. This is where “the adjacent bank is composed of natural, eroding substrate supporting riparian vegetation that overhangs or protrudes into the water” (U.S. Fish and Wildlife Service, 1992). It is characterized by “variable amounts of woody debris, such as leaves, logs, branches and roots, as well as variable depths, velocities and currents.” Shaded riverine habitats with large woody debris provide feeding and cover for aquatic species, such as salmon, and vital nutrients to help maintain the overall health of the ecosystem. They also play an important role in regulating water temperature (Triska and Cromack, 1980).



***Shaded Riverine Aquatic Habitat***

- ♦ **Cut Banks** are important component of the riparian ecosystem. These nearly vertical banks, substantially free of plant cover, are found on the outside of meander bends where the river is actively eroding high terraces. Cut banks support the majority of California’s bank swallow colonies.

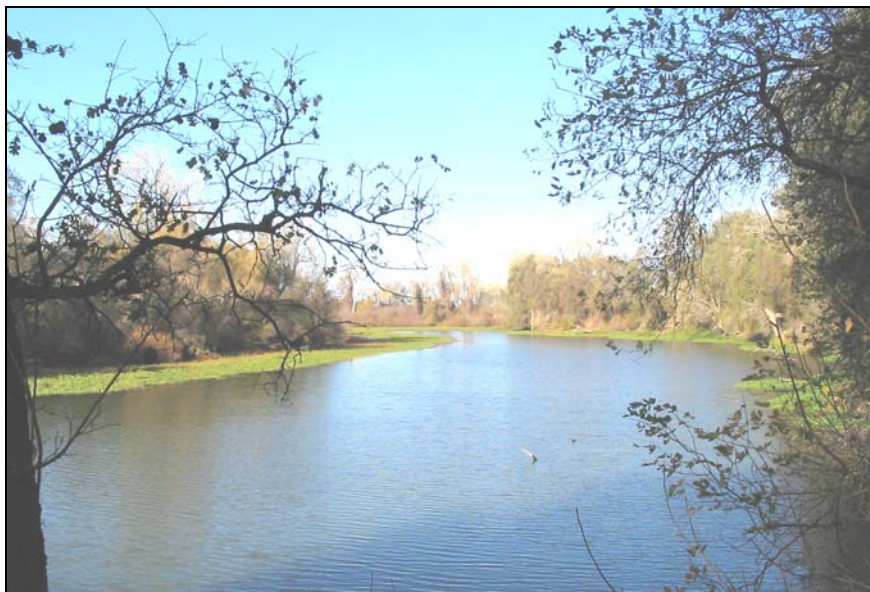


The bank swallow is a migratory species that winters in Central and South America. It nests in the spring, mostly in freshly eroded earthen banks.



***Cut Bank***

**Sloughs, Side Channels and Oxbow Lakes** are created by channel movements and contribute substantially to the richness of the riparian ecosystem. They provide shelter from the fast currents of the main channel, creating habitat for many species such as beavers, river otters and northwestern pond turtles. They provide important spawning and rearing



***Oxbow Lake***

areas for fish species, notably chinook salmon, steelhead rainbow trout, and sturgeon and Sacramento splittail (Limm and Marchetti, 2003). Sloughs and side channels often have shaded riverine aquatic habitat along their banks. Most heron rookeries are located in tall vegetation surrounding sloughs, oxbow lakes and on mid channel islands.

## **B. Existing Wildlife Species**

Riparian habitats exhibit great diversity of animal species as compared to many other California terrestrial habitats. Most species are permanent residents, but several species of fish and many avian species are migratory. Overviews of the wildlife and fish populations contained in this section were adapted from the *Comprehensive Conservation Plan for the Sacramento River National Wildlife Refuge* and the *Comprehensive Management Plan for the Sacramento River Wildlife Area*.

Though substantially fragmented, the existing riparian habitat provides an important migration corridor plus an equally important wintering and breeding habitat for migratory birds. The high value of riparian habitats for neotropical migrants has been identified by both the Partners in Flight and the Riparian Habitat Joint Venture programs. Riparian vegetation is also home to a variety of mammals, such as the ringtail, which might not occur in the Sacramento Valley if these habitats were absent.

Riverine and lacustrine (related to the edge of a lake) habitats support a diversity of fish, amphibian, reptilian, avian and mammalian species. The aquatic habitats are especially important to anadromous fish species that utilize these habitats for migratory passage and rearing of young. Riparian vegetation that overhangs the river channel, sloughs and side channels in the Shaded Riverine Aquatic habitat is critically important for salmon.

**Mammals** – Most mammals (with the exception of bats) are year-round residents of the Subreach. Beaver, muskrat, mink and river otter are found in close proximity to the river channel, sloughs, side channels, oxbow lakes and other wetland areas. Several species of bats are common, including the red bat and Yuma myotis. Upland species in the riparian forests include rodents such as gray squirrel, deer mouse, ground squirrel, rat, shrew, pocket gopher, California vole and porcupine. Other mammals include the mule deer, black-tailed jackrabbit, desert cottontail, spotted and striped skunk, opossum, raccoon, river otter and ringtail. Carnivores include bobcat, the red fox, gray fox and coyote.

**Birds** - Avian species are a major component of the wildlife resource in the riparian habitat. The Subreach supports a wide variety of permanent resident and migratory species.

- ♦ **Waterfowl** use the wetland habitats of the Subreach primarily for wintering during the months of August through March. Peak wintering populations occur in December to January and a small portion remains through the spring and summer months to nest. Common wintering duck species include northern pintail, wigeon, green-winged teal, gadwall, northern shoveler, wood duck, ring-necked duck, canvasback, redhead and ruddy duck. The most common wintering goose species is the Canada goose.

Mallard, cinnamon teal, gadwall, wood duck and lesser numbers of pintail and redhead ducks stay through the spring and summer to nest.

- ♦ **Shore birds** use the Subreach in great numbers during their fall and spring migrations with peak populations in April. Common fall and spring migrants include western and least sandpipers, dunlin, dowitcher, black-necked stilt, American avocet, black-bellied and semi-palmated plovers, greater and lesser yellowlegs, long-billed curlew and whimbrel.
- ♦ **Wading and diving birds** use the Subreach year-round, utilizing wetland and riparian habitats for foraging, roosting and nesting. Species include great blue heron, green heron, black-crowned night heron, great, snowy and cattle egrets, American bittern, white-faced ibis, Virginia rail, sora, moorhen, American coot, pied-billed and western grebes, and the double-crested cormorant. Other waterbirds that use the Subreach during various times of the year include western and eared grebe and American white pelican.
- ♦ **Gulls and terns** occupy the Subreach seasonally. Ring-billed and herring gulls are common from the fall into the spring. The Caspian tern is a rare visitor to the river. Forster's terns occur infrequently, but are often seen in small numbers along the river during spring and fall migrations.
- ♦ **Raptors** are a very visible component of the avian population and they are often seen perching along the riparian corridor. Populations are greatest during the winter when the prey base is the greatest. The most abundant wintering species are red-tailed hawk and northern harrier, but bald and golden eagle, white-tailed kite, sharp-shinned hawk, rough-legged hawk, Cooper's hawk, peregrine falcon and short-eared owl occur regularly. The red-shouldered hawk is a resident species and turkey vulture, red-tailed hawk, osprey, bald eagle, white-tailed kite, northern harrier, American kestrel, barn owl and great-horned owl are breeding species. Swainson's hawk is common during the spring and summer when they are nesting in riparian areas.
- ♦ **Game birds** inhabit the Subreach year round. Common species include mourning doves, California quail and ring-necked pheasant. Wild turkey populations are also increasing.
- ♦ **Landbirds** inhabit the Subreach in great diversity and abundance. Both resident and migratory species are found. Common year-round wetland residents include marsh wren, Brewer's blackbird and black phoebe. Resident species that can be found in riparian forests include belted kingfisher, Anna's hummingbird, downy woodpecker, hairy woodpeckers, Nuttall's woodpecker, acorn woodpecker, northern flicker, California towhee, scrub jay, American crow, bushtit, Bewick's wren, mockingbird, loggerhead shrike, starling, western meadowlark and house finch. Additional breeding species supported by these habitats include yellow-billed cuckoo, western wood pewee, ash-throated flycatcher, western kingbird, house wren, American robin, black-headed grosbeaks, titmouse and tree, violet-green, bank, barn and Northern rough-winged swallows, which are found in riparian and adjoining upland areas during the nesting season. Wintering species include ruby-crowned kinglet, yellow-rumped warbler, lark sparrow, golden-crowned sparrow, white-crowned sparrow and lesser and American goldfinches, which may be found in wetland, riparian or upland areas during the winter. Other common migrants include olive-sided flycatcher, horned lark, Wilson's warbler, song sparrow and Lincoln's sparrow.



**Reptiles** - Common reptile species in riparian areas include the common garter snake, gopher snake, common kingsnake, western fence lizard and alligator lizard. The western rattlesnake also occurs. The northwestern pond turtle and the red-eared slider are found in aquatic and wetland habitats and venture into upland habitats for nesting.

**Amphibians** - Amphibian species are limited in the Subreach. Common species are the bullfrog, western toad and pacific tree frog.

**Fish** - Fish are found in the sloughs, side channels and oxbow lakes of the riparian habitat as well as in the channel of the Sacramento River. During periods of high water, species that are normally confined to the river channel occur within the flooded portions of the Subreach. Resident species in these aquatic habitats include hardhead, roach, pike minnow, Sacramento sucker, river lamprey, bluegill, carp, channel catfish, green sunfish, mosquitofish, smallmouth bass and largemouth bass. Anadromous fish include American shad, chinook salmon, striped bass, Sacramento splittail, green and white sturgeon, and steelhead rainbow trout. Four distinct runs of salmon use the river for access to upstream spawning areas, spawning and the rearing of young.

**Invertebrates** – Invertebrates are found in the greatest abundance and diversity in the aquatic habitats. They provide an important food base for many avian and fish species. Common aquatic invertebrates include waterfleas, snails, clams, dragonflies and damselflies, waterboatmen, backswimmers, beetles, midges, mosquito larva, crayfish and worms. Terrestrial invertebrates such as grasshoppers, beetles, butterflies (including the pipevine swallowtail), moths, midges and ants are an important food base for bats, neotropical migrant birds and waterfowl. The Valley Longhorn Elderberry Beetle nests exclusively within cavities of elderberry plants.

### C. Impacts on Habitats and Wildlife

Many changes have occurred along the Sacramento River since the mid 1800's. These changes have resulted in a strong agricultural economy and a reliable water supply for the State of California. At the same time, they have greatly impacted the riparian habitat and the fish and wildlife of the area. Colusa Subreach Planning will not eliminate all these impacts but it is important that they be identified as part of a review of existing conditions. An understanding of these impacts is necessary to help make practical determinations regarding wildlife habitat conservation and restoration in the Colusa Subreach. It is recognized that the clock will not be turned back to the 1800's. Many changes that have taken place along the river have had important positive effects and the ultimate resolution of these impacts on habitats and wildlife will involve consideration of tradeoffs and diverse opinions.

**Loss of Natural Riverine Processes** - Natural processes of the Sacramento River have been greatly modified as discussed in Chapter II. The natural processes of erosion, deposition and seasonal flooding historically enriched the riparian areas, creating and sustaining habitat. These changes have substantially interfered with this self-perpetuating system. The regulation of river for water supply, flood control and other purposes has changed the annual flow regime and bank protection has stalled channel meander. As a result, the

Sacramento River in the Colusa Subreach has lost some capability to maintain existing habitats and create new areas of habitat.

The regulation of flows for water supply and flood control, which is provided by Shasta Dam, has resulted in many public benefits but it has had a substantial impact on the riparian habitat. The flood flows are reduced in the winter and spring, such that the frequency and duration of inundation are reduced. As a result, the natural distribution of sediment, seeds and other materials that helped to create and maintain habitat is altered. The rate of flow is greatly increased in the summer season and varied in response to water demand, especially those from south of the Delta. This flow regime contradicts the natural regime to which plants are adapted. This operational control has been found to have negative impacts on the establishment of certain types of riparian vegetation (Roberts et al., 2003). Rapid reduction in flow levels can leave seedlings without adequate moisture so that they cannot continue to survive and become established.

Bank protection can stall the meander function, and with it the creation of habitat. Meander features such as sloughs, side channels and oxbow lakes are not developed, and a comparatively sterile environment can result. The natural variations in channel depth, velocity and vegetative matter are diminished. Areas of shaded riverine aquatic habitat are lost, and the contribution of large woody debris to help sustain the downstream fishery is greatly reduced. These substantial impacts on the wildlife and fishery resources affect both the area where bank protection is applied, and a substantial downstream reach (U.S. Fish and Wildlife Service, 2000).

**Habitat Loss and Fragmentation** - The substantial reduction and disruption of the riparian habitat has had major negative impacts on the wildlife and fish populations of the Sacramento River riparian corridor. Research indicates that only about 10% of the combined Valley Oak Woodland and Great Valley Riparian Forest in the river corridor, between Colusa and Red Bluff, remains (Golet et al., 2003). In addition, the majority of the associated wetland basins, that are located east and west of the river, have been converted to agricultural and urban uses. The net effect is a huge reduction in the overall area of the habitats that once supported healthy and diverse populations of fish and wildlife.

A serious ramification of this habitat loss along the riparian corridor is habitat fragmentation. Habitat fragmentation occurs when large and contiguous tracts of natural vegetation are converted to other uses, such that only fragments of the original habitat types remain. This fragmentation affects wildlife in various ways that include direct loss of habitat, increased edge effect and isolation effects. The species most affected are those with large home range requirements, species with narrow or very specific habitat needs and species that lack the ability to disperse and adapt. Habitat fragmentation also disrupts migration corridors along the river and connecting tributaries.

Each species requires a specific arrangement of food, water and cover to meet its biological needs. In addition, each species requires a minimum amount of suitable habitat area. For example, the western yellow-billed cuckoo requires dense deciduous forest with dense understory cover near slow-moving water. The species generally selects these habitats for nesting, only if they are in contiguous stands of at least 25 acres in area and at least 300 feet in width (Gaines, 1974). Smaller and narrower sites are seldom used. When species minimum home range sizes are greater than the available fragment sizes, they

are frequently eliminated. Therefore, a consequence of habitat fragmentation is a reduction in richness and diversity of species, with the greatest impact being observed in small or linear-shaped fragments.

For area-sensitive species like cuckoos, edge effects further reduce the viability of otherwise suitable habitat areas. Where one habitat type borders another, edge effect can be negative for species that require large blocks of contiguous habitat. The fragmentation of habitat tends to increase the amount of the edge relative to the amount of the interior space. The adverse impacts of edge effects documented for birds in the riparian forest include increased nest predation, interspecific competition and reduced pairing and nesting success. Edge effects have been documented to extend 150 to 1800 feet into the interior of fragmented forest habitats (Paton, 1994).

Isolation effects lessen a species' ability to move between fragments of habitat. Isolated fragments may support lower densities of species than similar sized areas of contiguous habitat and that the long-term persistence of species may be lower in these areas. Birds and bats generally have excellent dispersal capabilities, while small mammals and some species of reptiles and amphibians typically have significantly poorer capability to disperse. The habitat in the Colusa Subreach has been substantially reduced in area and greatly fragmented.

**Nonnative, Invasive Plant Species** - Nonnative, invasive plant species that were not present prior to Euro American settlement have become established in the Colusa Subreach. Some were imported for a variety of purposes that included erosion control, food crops, animal fodder and garden stock, as well as accidental introduction. In some cases, these plants displace or preclude the establishment of native plant communities. They also provide relatively low habitat value for the wildlife species that have adapted to the native species. Some "successful" invasive species feature adaptations, such as the production of large amounts of seeds, fast growth, and the ability to reproduce from small pieces of the plant. Adding to this advantage is the frequent lack of natural herbivores, parasites, diseases and a release from the competitive pressure of plants from their native environment.

An example of such a species is giant reed (*Arundo donax*), a large bamboo-like plant. It is able to reroot from small pieces that are distributed by flood events. It is well adapted to alluvial deposits and often proliferates in the same locations that historically support willow scrub communities. It grows extremely fast (3½ inches per day under optimal conditions) and manual attempts to remove the plant often result in pieces floating downstream to form new stands. It burns easily, but will resprout vigorously after a fire.

Other invasive species such as tree of heaven (*Ailanthus altissima*) appear to "fit" into the riparian environment, but provide poor habitat because they provide less cover value or structure than the native species they replace, or the seeds that they produce are of low nutritional value. Some plants, such as edible fig and black walnut, have the ability to produce chemicals (phytotoxins) that inhibit the germination of competing plant species. Nonnative invasive species, that have particularly serious disruptive impacts to the riparian habitat, include:

<i>Ailanthus altissima</i>	tree of heaven
<i>Apocynaceae</i>	vinca minor and major
<i>Arundo donax</i>	giant reed

<i>Centaurea solstitialis</i>	yellow starthistle
<i>Cynodon dactylon</i>	Bermuda grass
<i>Ficus carica</i>	edible fig
<i>Juglans spp.</i>	black walnut
<i>Rubis discolor</i>	Himalayan blackberry
<i>Sorghum halepense</i>	Johnson grass
<i>Tamarix chinensis</i>	salt cedar
<i>Lepidium latifolium</i>	perennial pepperweed

Some areas along the river, especially on higher elevation locations where flooding is now less frequent, have become dominated by nonnative invasive species such as Johnson grass and yellow starthistle. These exotic communities are acting to preclude the establishment of natural riparian vegetation, such that, in some cases, the natural succession process of habitat communities has been effectively stalled. The Comprehensive Management Plan for the Sacramento River Wildlife Area documented this situation at the Merrill's Landing, Dicus Slough and Wilson Landing Units (California Department of Fish and Game, 2004). These three sites are located outside of the Colusa Subreach but they are examples of the situation that exists in the Subreach and throughout the Sacramento River Conservation Area.

**Fire** – The potential for wildfires to substantially impact the riparian habitat is a possible, serious threat to the both the habitat and the related fish and wildlife species. Research has suggested that the lack of a natural flooding regime, which formerly washed out vegetative materials from the riparian areas, can result in increased fire fuel. This greater fuel load might then support more intense fires, which could impact the composition and structure of habitat communities (Ellis 2001). Given the existing impairment of the natural riverine processes that historically created and renewed riparian habitat, the concern has been raised that future fires could severely damage natural riparian vegetation that lack the natural means of regeneration. This situation could be worsened, if nonnative species invade and proliferate in riparian areas following a fire.

The magnitude of this additional threat is not known. It is known that fire has impacted riparian habitat in the past, although some impacts have been considered positive, and some plants are adapted to respond positively to fire events. The riparian forest is a relatively moist environment compared to upland habitats. Further monitoring and research is required to determine if the threat from wildfire is substantial. Recent habitat management plans, prepared by the Department of Fish and Game and the US Fish and Wildlife Service, recommend a fire protection strategy should be kept current for the protection of both the habitat resource and the adjoining property.

#### D. Special-Status Species

The Impacts noted in Section C of this Chapter, in conjunction with other wide-scale environmental changes, have resulted in a substantial decrease in the abundance and diversity of wildlife species in the Colusa Subreach and along the entire Sacramento River. Table 4 lists 43 special status species known or thought to occur in the Subreach, their state and federal listing status and a description of the habitat that they utilize. Also included are five plants that are listed as "rare, threatened and endangered" by the California Native Plant Society.

**Table 4. Special-Status Species Known or with Potential to occur in the Colusa Subreach**

Species	Status			Habitat
	CNPS	State	Federal	
Fish				
Chinook salmon, Cen Val Sp.-run <i>Oncorhynchus tshawytscha</i>	-	ST	FT	Sacramento River and its tributaries for spawning and rearing
Chinook salmon, Sac River W-run <i>Oncorhynchus tshawytscha</i>	-	SE	FE	Sacramento River and its tributaries for spawning and rearing
Chinook salmon, Cen Val F/late F-run <i>Oncorhynchus tshawytscha</i>	-	SC (2)	FC	Sacramento River and its tributaries for spawning and rearing
Central Valley steelhead <i>Oncorhynchus mykiss</i>	-	-	FT	Sacramento River and its tributaries for spawning and rearing
Green sturgeon <i>Acipenser</i>	-	SC (1)	FC	Sacramento River for spawning and rearing
Hardhead <i>Mylopharadon conocephalus</i>	-	SC (3)	-	Sacramento River and its tributaries for spawning and rearing
River lamprey <i>Lampreta ayresi</i>	-	SC (3)	-	Sacramento River and its tributaries for spawning and rearing
Sacramento perch <i>Archoplites interruptus</i>	-	SC (2)	-	Sacramento River and its tributaries for spawning and rearing
Sacramento splittail <i>Pogonichthys macrolepidotus</i>	-	SC (1)	-	Shallow backwater areas for foraging and rearing
Wildlife				
Valley elderberry longhorn beetle <i>Desmocerus californicus dimorphus</i>	-	-	FT	Elderberries are the sole host plant for nesting
Giant garter snake <i>Thamnophis gigas</i>	-	ST	FT	Backwater areas and marshes with suitable prey, high ground for protection from floods
Northwestern pond turtle <i>Clemmys marmoratta marmoratta</i>	-	SC (2)	FC	Backwater areas and oxbow lakes with aquatic vegetation
Least bittern <i>Ixobrychus exilis</i>	-	SC (3)	FC	Marshes along ponds with tules, cattails and rushes
Bald eagle <i>Haliaeetus leucecephalus</i>	-	SFP	FT	Tall trees for nesting, protected sites with abundant populations of fish
Golden eagle <i>Aquila chrysaetos</i>	-	SC (3) SFP	PR	Tall trees and protected sites with plentiful small/medium -sized mammals for prey
Osprey Pabdion haliaetus	-	SC (2)	-	Tall trees for nesting, protected sites with abundant populations of fish
Northern harrier Circus cyaneus	-	SC (2)	-	Grasslands, meadows and marshes providing tall cover
Cooper's Hawk <i>Accipiter cooperii</i>	-	SC (2)	-	Nests in riparian forests and forages in open woodlands
American Peregrine Falcon <i>Falco peregrinus anatum</i>	-	SFP	-	Forages along rivers and wetlands
Merlin <i>Falco columbarius</i>	-	SC (1)	-	Forages along open grasslands, savannas and woodlands
Sharp-shinned hawk <i>Accipiter striatus</i>	-	SC (3)	-	Dense forest and riparian habitats
Swainson's hawk <i>Buteo swainsoni</i>	-	ST	-	Tall trees for nesting and near by open areas for foraging

Species	Status			Habitat
	CNPS	State	Federal	
<b>Short-eared owl</b> <i>Asio flammeus</i>	-	SC (2)	-	Freshwater marsh, lowland meadows with dense tules or grass for nesting and roosts
<b>Long-eared owl</b> <i>Asio otus</i>	-	SC (2)	-	Dense stands of cottonwoods and willows with adjacent open areas for foraging
<b>American white pelican</b> <i>Pelecanus erythrychchos</i>	-	SC (1)	-	Sloughs and side channels with a prey base of small fish and amphibians
<b>Double-crested cormorant</b> <i>Phalacrocorax auritus</i>	-	SC (2)	-	Open water for foraging, nests in riparian forest or protected islands
<b>Western yellow-billed cuckoo</b> <i>Coccyzus americanus occidentalis</i>	-	SE	FC	Dense riparian forests with a thick understory of willows for nesting and cottonwood overstory
<b>Willow flycatcher</b> <i>Empidonax traillii</i>	-	SE	FC	Riparian areas with abundant willows for breeding
<b>Bank swallow</b> <i>Riparia riparia</i>	-	ST	-	Cut banks with sandy or sandy loam soil for nesting
<b>Loggerhead shrike</b> <i>Lanius ludovicianus</i>	-	SC	FC	Open habitats with scattered shrubs, trees and other perches
<b>Yellow warbler</b> <i>Dendroica petechia bewersterii</i>	-	SC (2)	-	Riparian areas with willows, cottonwoods, sycamores or alders for nesting
<b>Yellow-breasted chat</b> <i>Icteria virens</i>	-	SC (2)	-	Riparian areas dominated by willows, alders, Oregon ash, tall weeds and blackberry and grape for nesting
<b>Tricolored blackbird</b> <i>Agelaius tricolor</i>	-	SC	-	Nests in dense colonies in emergent marsh vegetation, nesting habitat must support 50 pairs
<b>Fringed Myotis</b> <i>Myotis thysanodes</i>	-	SC	FC	Habitat includes riparian forests
<b>Long-eared Myotis</b> <i>Myotis evotis</i>	-	-	FC	Forages in heavily vegetated habitats
<b>Long-legged Myotis</b> <i>Myotis volans</i>	-	SC	FC	Habitat includes riparian forests
<b>Pallid bat</b> <i>Antrozous pallidus</i>	-	SC	-	Habitat includes riparian forests and oak savanna
<b>Western red bat</b> <i>Lasiurus blossevilli</i>	-	SC	-	Roosts under overhanging leaves of large trees in forest interiors, forages in open air
<b>Small-fotted Myotis</b> <i>Myotis ciliolabrum</i>	-	-	FC	Habitat includes riparian forests
<b>Towson's big-eared bat</b> <i>Corynorhinus towsonii pallescens</i>	-	SC (2)	FC	Forages along edges of riparian habitats, ,
<b>Western mastiff bat</b> <i>Eumops perotis</i>	-	SC	FC	Forages over open meadows, grasslands, forests and open water.
<b>Yuma Myotis</b> <i>Myotis yumanensis</i>	-	-	FC	Riparian habitats, feeds over water and roosts in cavities in trees
<b>Ringtail</b> <i>Bassariscus astutus</i>	-	SFP	-	Riparian forest habitats
<b>Plants</b>				
<b>Columbian watermeal</b> <i>Wolffia brasiliensis</i>	CNPS 2	-	-	Marsh habitats
<b>Four-angled spikerush</b> <i>Eleocharis quadrangulata</i>	CNPS 2	-	-	Marsh habitats



Species	Status			Habitat
	CNPS	State	Federal	
<b>Fox sedge</b> <i>Carex vulpinoidea</i>	CNPS 2	-	-	Marsh and riparian habitats
<b>Rose mallow</b> <i>Hibiscus lasiocarpus</i>	CNPS 2	-	-	Wet banks, marshes and riparian habitats
<b>Wright's trichocoronis</b> <i>Trichocoronis wrightii</i>	CNPS 2	-	-	Marsh and riparian habitats

**Status Key**

**California**

SE	State-listed, Endangered
ST	State-listed, Threatened
SC	State Species of Special Concern
SFP	State Fully Protected

**Federal**

FE	Federally-listed, Endangered
FT	Federally-listed, Threatened
FC	Federal Species of Concern
PR	Protected under Golden Eagle Protection Act

**California Native Plant Society**

CSP 1	Plants rare, threatened, or endangered in California and elsewhere
CSP 2	Plants rare, threatened, or endangered in California but more common elsewhere

Sources: US Fish and Wildlife Service, California Department of Fish and Game, California Native Plant Society, PRBO Conservation Science

Adaptation to the riparian habitat has occurred over an extended period of time and each of the species in the Subreach depends on different habitat types and components of the riparian ecosystem. As the habitat area has been reduced, fragmented and degraded, some species have been extirpated and others are in danger of being extirpated (no longer existing in the area) or becoming extinct (no longer existing in the state or country). The least Bell's vireo was considered the most numerous songbird along the river in the 1940's, but it was completely absent by the early 1960's. The vireo depended upon the willow scrub riparian community created by river meander. It is thought that the willow scrub habitat declined, following flood control projects, increasing the vireo's vulnerability to cowbird Parasitism, which eventually caused its elimination (Frauzreb, 1990).

The bank swallow is another example of a species that depends entirely upon a specific habitat situation created by the dynamics of the river processes. The bank swallows make their nests in the eroding cut banks, which result from the meandering of the river channel and the river corridor has the greatest concentration of bank swallows in California. Unfortunately, this habitat is the location where landowners and governmental agencies have installed bank protection to prevent river meander. The placing of riprap on cut banks eliminates these vital nesting sites, and this once common species has disappeared throughout much of its historic range (Schlorff, 1977). The Colusa Subreach contains multiple sites where remaining cut banks support nesting populations of bank swallows.

Federally-listed species include species that are listed as "Endangered" and "Threatened" pursuant to the federal Endangered Species Act, as well as species that are fully protected under federal law. Federal "Species of Concern", as identified by the USFWS, are also noted. State-listed species likewise include species that are listed as "Endangered" and "Threatened" pursuant to the California

Endangered Species Act, as well as species that are fully protected under state law. Also included are “Species of Special Concern” as determined by the Department of Fish and Game. These are species that are not state listed as Endangered or Threatened but, nonetheless, are either declining at a rate that could result in listing, or historically occurred in low numbers and known threats to their persistence currently exist.

Table 4 incorporates the special-status species listings, as of this point in time. It is expected that these listings will change over time as new species are listed and others are delisted as the result of successful conservation efforts. Consistent with the policies of CALFED and the SRCAF, Colusa Subreach Planning will address the recovery of special-status species, and the support of other native and game species through an ecosystem approach to habitat management.

## V. ECOSYSTEM RESTORATION POLICY

Since the Euro-American settlement of the Sacramento Valley, the natural ecosystem along the Sacramento River has been greatly changed. The flow regime of the river has been greatly altered and over ninety percent of the riparian forest has been removed. Non-native, invasive plant and animal species now compete for limited space and resources. Agriculture has become the dominant land use in the use in the entire Sacramento Valley and development in the watershed has modified the quality and quantity of runoff.

These changes have substantially impacted the habitats and animal species of the Colusa Subreach. Numerous animal species have been extirpated from the area and numerous species are now listed as “Endangered”, “Threatened” or of “Special Concern” through state and federal Endangered Species Acts. This situation has led to strong statements of public concern and responses through legislation and funding initiatives. Political responses to these concerns have included SB 1086, which was the precursor of the SRCAF, the Central Valley Public Improvement Act and the CALFED Bay-Delta Program.

This Chapter reviews the ecosystem restoration policy that has been adopted for the larger Sacramento River corridor from Red Bluff to Colusa. This information is intended to provide a policy context for an ecosystem restoration strategy that is tailored to the Colusa Subreach. CSP was based on the concept that a broad ecosystem restoration strategy that is integrated with flood control, water supply, agriculture and recreation will best serve all interests: the local community, the entire state and the wildlife resource. It was recognized that a balance between ecosystem health and economic health was a necessary element of an effective ecosystem restoration strategy.

### A. CALFED Ecosystem Restoration Goals

The CALFED Bay-Delta Program addressed the entire Sacramento – San Joaquin Delta watershed which includes the Colusa Subreach. It focused on the four objectives of Water Supply Reliability, Water Quality, Levee System Integrity and Ecosystem Restoration. Ecosystem Restoration was also one of the eleven Program Elements of the CALFED Program. The Ecosystem Restoration Program Element was oriented to achieve six Goals for the entire Bay-Delta system:

1. Recover 19 at-risk native species and contribute to the recovery of 25 additional species.
2. Rehabilitate natural processes related to hydrology, stream channels, sediment, floodplains and ecosystem water quality.
3. Maintain and enhance fish populations critical to commercial, sport and recreational fisheries.
4. Protect and restore functional habitats, including aquatic, upland and riparian, to allow species to thrive.

5. Reduce the negative impacts of invasive species and prevent additional introductions that compete with and destroy native species.
6. Improve and maintain water and sediment quality to better support ecosystem health and allow species to flourish.

Colusa Subreach Planning was funded as part of the Ecosystem Restoration Program to help meet these Goals. Involving stakeholders and addressing landowner questions and concerns through targeted planning and research projects was established as an important element of the planning process, consistent with CALFED policy.

## **B. SRCAF Restoration Priorities**

The *Sacramento River Conservation Area Handbook* specifies four priorities for habitat restoration that are consistent with the Goal and Guiding Principles of the SRCAF. These priorities are drawn from the body of scientific knowledge that is summarized in the *Handbook*. The *Handbook* also provides specific directives for the Chico Landing–Colusa Reach which includes the Colusa Subreach in Chapter 5. Ecosystem restoration in the Sacramento River Conservation Area, including the Colusa Subreach, is expected to address four priorities. In the following discussion, each priority is evaluated in regard to the Colusa Subreach, in light of the most current information.

- **Protect physical processes where still intact** – A key consideration is whether a project protects existing processes of erosion, deposition and flooding. There is recognition within the *Handbook* that these natural riverine processes are what creates and replenishes riparian habitat and sustains the succession of plant communities. Therefore, a restoration project consistent with the *Handbook* would normally not include provisions such as new levees that would divert floodwater or revetment that would eliminate or stall channel meander. The *Handbook* provides the following specific guidance regarding this priority for the Colusa Subreach:

***Purchase of these areas (inside of the levees) or landowner participation in voluntary programs should receive the highest priority for protection of a functional riparian ecosystem. Note that clarification is added in brackets***

- **Allow riparian forests to reach maturity** – Projects which protect areas of existing riparian habitat from conversion to other uses are supported by the *Handbook*. This priority relates to both public and private land. The *Handbook* provides the following specific guidance regarding this priority:

***All areas of early succesional stages should be allowed to mature to climax conditions, thus ensuring a wide variety of vegetation types.***

- **Restore physical and successional processes** – Projects which restore natural riverine processes can help to reestablish habitat by restoring connectivity to the floodplain and facilitating the reworking of land through channel meander. The *Handbook* does not provide definitive guidance regarding this priority for the Colusa Subreach and no projects addressing this priority have been identified to date.

- **Conduct reforestation activities** – The *Handbook* indicates that horticultural replanting of riparian plants should be a last resort. Where possible, the natural recruitment and reestablishment of native vegetation is preferred. This means replanting of riparian habitat is appropriate only where the natural processes are not sufficient to naturally restore riparian habitat in a reasonable period of time. The *Handbook* provides the following specific guidance regarding this priority:

***The establishment of a wide continuous riparian and valley oak woodland corridor should be the first option under the reforestation priority.***

In some low-lying areas there is adequate flooding, erosion and deposition so that native vegetation can be recruited naturally. On many higher sites, however, the combination of three key factors effectively frustrates effective natural recruitment of riparian vegetation. These key factors are:

1. Changes to the flow and flooding regime have reduced the natural capability to recruit riparian vegetation.
2. Levees and revetment have limited the meander of the river and the resultant creation of new habitat areas.
3. Competition from nonnative, invasive vegetation has severely limited the establishment of riparian plants.

Over the past fifteen years much scientific research has been directed to the restoration of riparian habitat along the Sacramento River. As a result, the scientific basis of habitat restoration has been greatly advanced. The use of detailed soils evaluation, inundation patterns and other baseline data has made the determination of the most appropriate vegetation community and structure much more precise and accurate. The rate of planting success is now relatively high. Additionally, advances in planting and maintenance techniques have greatly reduced the average cost of restoration. Restoration costs today are generally in a range of from \$2,500 to \$5,000 per acre, including a three-year maintenance period. The range in cost is due to variations in site-specific costs including weed control, discontinuation of existing uses, planting design, irrigation, etc. These cost figures are based upon TNC's recent experience as part of several restoration projects along the Sacramento River. However, costs may increase if Prevailing Wage requirements are applied to state or federally-funded projects.

It should also be noted that the SRCAF adopted its *Good Neighbor Policy* on March 15, 2007. The *Policy* was adopted after a multiyear process involving many different interests. It focused on an effective communication process, monitored by the SRCAF, where neighboring landowners are expected to work cooperatively to identify concerns and resolve problems. The *Policy* includes a specific process for "Communication and Review", a policy for a "SRA Mitigation Area and Regulatory Assurances" and it established an initial process for "Conflict Resolution". Since the adoption of the *Policy* the SRCAF has proceeded to implement it as part of its review of activities within the Sacramento River Conservation Area.

As further examined in Chapter 10 the Good Neighbor Policy did not, however, meet the expectations of all stakeholders. Some local interests were desirous of stronger Landowner Assurances provisions that were determined to conflict with provisions of existing state and federal laws.

## C. CDFG Management Goals

The California Department of Fish and Game (CDFG) is the major public land manager within the Colusa Subreach. CDFG manages approximately 1,180 acres of land that are owned by the State of California as part of the Sacramento River Wildlife Area. It is also anticipated that CDFG may, in the future, receive approximately 283 additional acres of land that is currently owned by TNC. As such the management policies of CDFG are an important component of the policy framework that directs ecosystem restoration activities in the Colusa Subreach.

CDFG adopted the *Comprehensive Management Plan for the Sacramento River Wildlife Area* in 2004 following a two and one-half year planning process that included substantial public participation. The Plan directs the Department's ongoing management of approximately 4,300 acres of wildlife habitat in 19 different sites, extending 70 River Miles from Colusa north to the Woodson Bridge area. It provides a detailed inventory and analysis of the lands the Wildlife Area and it also expresses Management Goals for the Wildlife Area. Management policy is organized into four Elements: Biological, Public Use, Facility Maintenance and Management Coordination. For each Goal, specific tasks are identified.

- **Biological Element Goals**

1. Contribute to the Overall Goal of the Sacramento River Conservation Area.
2. Maintain and Enhance Habitat for Special Status Species.
3. Support the Natural Processes that Result in the Creation and Enhancement of Habitat.
4. Maximize the Habitat Value of Wildlife Area Property.
5. Support Scientific Research and Monitoring.
6. Support the Conservation of Wildlife Habitat on Privately-owned Land along the Sacramento River.

- **Public Use Element Goals**

1. Support Compatible Public Use through Consistent Regulations.
2. Inform the Public of Compatible Recreation Use Opportunities.
3. Identify the Wildlife Area through a Signing Program.
4. Expand Opportunities for Public Access.
5. Support Environmental Education.
6. Provide Law Enforcement to Protect Habitat and Wildlife and to Help Mitigate Impacts on Adjacent Landowners.

- **Facility Maintenance Element Goals**

1. Secure the Habitat from Vehicular Trespass.
2. Control Invasive, Nonnative Plant Species.
3. Maintain Management Area Signing.
4. Maintain Access Improvements.
5. Control Dumping of Refuse and Vehicles.

- **Management Coordination Goals Element Goals**

1. Cooperate with Adjacent, Private Landowners to Address Mutual Concerns.
2. Participate in an Ongoing Management Coordination Structure for Habitat and Recreation Lands along the River.



3. Support the Hamilton City Flood Damage Reduction and Ecosystem Restoration Project.
4. Coordinate with Other Law Enforcement Agencies
5. Coordinate with Local Public Service Agencies.
6. Share Resources and Equipment with Other Public Habitat Management Agencies.
7. Pursue Alternative Management Mechanisms and Property Transfers and with other Public Property Management Agencies

#### **D. Ecosystem Approach to Habitat Management**

The SRCAF, TNC, CDFG and the CALFED Program all support an ecosystem approach to the restoration and management of riparian habitat along the Sacramento River. This is the concept of achieving species management objectives by sustaining and enhancing the fundamental ecological structures and processes that contribute to the well being of the communities and species that comprise the ecosystem. The basic objective is to restore and rehabilitate, where feasible, the natural processes that create and sustain the important elements of the ecosystem structure. The ecosystem approach differs fundamentally from the more traditional approach of single-species management, which seeks to manipulate specific environmental factors thought to limit target species populations at levels below management objectives.

An example of single-species management would be the direct removal of predators from an environment to reduce predation levels on a target species. In the context of the Colusa Subreach and the entire Sacramento River Conservation Area, the ecosystem approach seeks to restore and support natural riverine processes and resolve impediments to restoration through the application of the best available scientific information and adaptive management of the habitat. The expectation is that restoration of the natural ecosystem will benefit the broadest range of wildlife including special-status species, other native species and game species.

#### **E. Common Ecosystem Restoration Strategy Components**

Under the ecosystem approach various strategies have been implemented by the entities involved in ecosystem restoration along the Sacramento River. Some common elements of these strategies are reviewed below to highlight the evaluation and consideration as part of Colusa Subreach Planning. The strategy components that are summarized in this Chapter are not strictly limited to habitat improvement but rather include related public involvement, accessory use and process streamlining concepts. It should be recognized, however, that the components reviewed in this Chapter do not represent the whole of the strategy elements that are currently apply to the Colusa Subreach.

**Restoration of Natural Riverine Processes** – Restoration of natural riverine processes is the most important component of the ecosystem approach. This includes actions that permit the river to meander and create habitat through the natural processes of erosion and deposition. This involves permitting the river to erode within most areas of the Subreach and not placing artificial constraints in the way of that process. The *Handbook* recognizes, however, that there are some situations where revetment is required to protect the levee system, existing uses

and investments such as buildings, pumping plants, bridges, etc. It is also understood that offsite ramifications of bank protection must be considered.

**Reestablishment of the Habitat Corridor** – In order to recover wildlife along the Sacramento River, a habitat corridor of adequate size, condition and connectivity must be reestablished. This involves a combination of preserving existing riparian habitat and infilling with habitat restoration, through either natural recruitment or horticultural planting. Acquisition of land in fee title and conservation easement by public agencies and private conservation organizations from willing sellers is included in the SRCAF program. This permits direct management of the habitat resource and can facilitate the restoration of riverine process.

Within the Colusa Subreach approximately 50% of the existing habitat is privately-owned. This is a major resource and how to best maintain this resource is an important consideration. The restoration of key areas of wildlife habitat on private land could be part of a meaningful habitat restoration effort. It is recognized, however, that additional economic incentives for private landowners to preserve or restore wildlife habitat are needed. Concerns regarding regulatory requirements that might follow restoration activities may also be a limiting factor. Preservation and management of habitat by private landowners is, however, vital to the success of the overall ecosystem restoration effort and the development of new incentives for the private conservation of habitat would be of great value.

The Colusa Subreach and the river corridor, in general, have experienced substantial habitat loss and fragmentation. To help deal with the effects of habitat loss and fragmentation, the preservation and restoration of habitat should be directed to sites which are of the greatest value. The *Comprehensive Management Plan for the Sacramento River Wildlife Area* in 2003 incorporated the following three locational priorities for habitat corridor restoration that appear to be relevant to the Colusa Subreach.

1. The assembly of large, contiguous areas, with high interior to edge ratios.
2. The preservation and restoration of sites which fill gaps and expand corridors of protected habitat.
3. The preservation of sites with significant existing habitat value.

An additional priority that should be considered is, “The acquisition of sites that provide or increase the opportunity for the restoration of natural riverine process.” It is reasonable to expect that these priorities could result in the greatest ecosystem benefit for the resources expended.

**Control of Non-native, Invasive Plant Species** – The control of non-native, invasive plant species is an important element of the maintenance and restoration of riparian habitat. Where allowed to proliferate, invasive species can come to dominate a site and preclude the recruitment of native riparian vegetation. In so doing they may greatly diminish the habitat value for wildlife. Due to the prevalence of invasive species in the other areas of the river corridor and the interconnections that exist through flood flows, the control of invasive species management is a difficult challenge that requires a coordinated approach.

Eradication activities such as those taking place on US Fish and Wildlife Service lands higher in the watershed are desirable, as part of the maintenance of the habitat in the Colusa Subreach. Controls may involve mechanical removal, chemical control, burning or other methods. Control or eradication of invasive

species should also continue to be a standard part of any future restoration planting projects.

**Restoration Planting** – The replanting of riparian vegetation will be required to restore some portions of the Colusa Subreach to native riparian habitat. The preferred method of restoration is to permit natural processes to restore the riparian habitat. In portions of the Subreach, such as low lying locations that are frequently inundated, successful natural recruitment of riparian vegetation continues to occur. The river is still actively reworking these areas and creating new habitat. Unfortunately, natural recruitment will not restore all sites in the foreseeable future to help recover wildlife species.

Recent analysis has identified certain high terrace sites along the Sacramento River that have not recruited substantial native riparian vegetation even though they have been open and unfarmed for over 25 years (California Department of Fish and Game, 2003). In these cases, nonnative plants such as yellow starthistle and Johnson grass with low habitat value have dominated the sites and precluded meaningful recruitment of native plants. For these types of higher sites there is no reasonable expectation that the remaining natural processes will generate prime riparian habitat communities in the foreseeable future.

Horticultural planting of native vegetation is required in these situations so that the quantity and quality of habitat can be increased in the near future. The objective of both the state and federal Endangered Species Acts is to foster positive steps that will result in viable populations of special-status species in the foreseeable future so that species can be recovered and delisted. Restored habitat has been shown to support substantial populations of indicator species such as songbirds and Valley Elderberry Longhorn Beetles in relatively short periods of time. For these higher sites where the reduced natural processes (erosion, deposition and flooding) cannot support natural regeneration of riparian habitat horticultural planting of riparian vegetation is necessary to help recover special-status species.

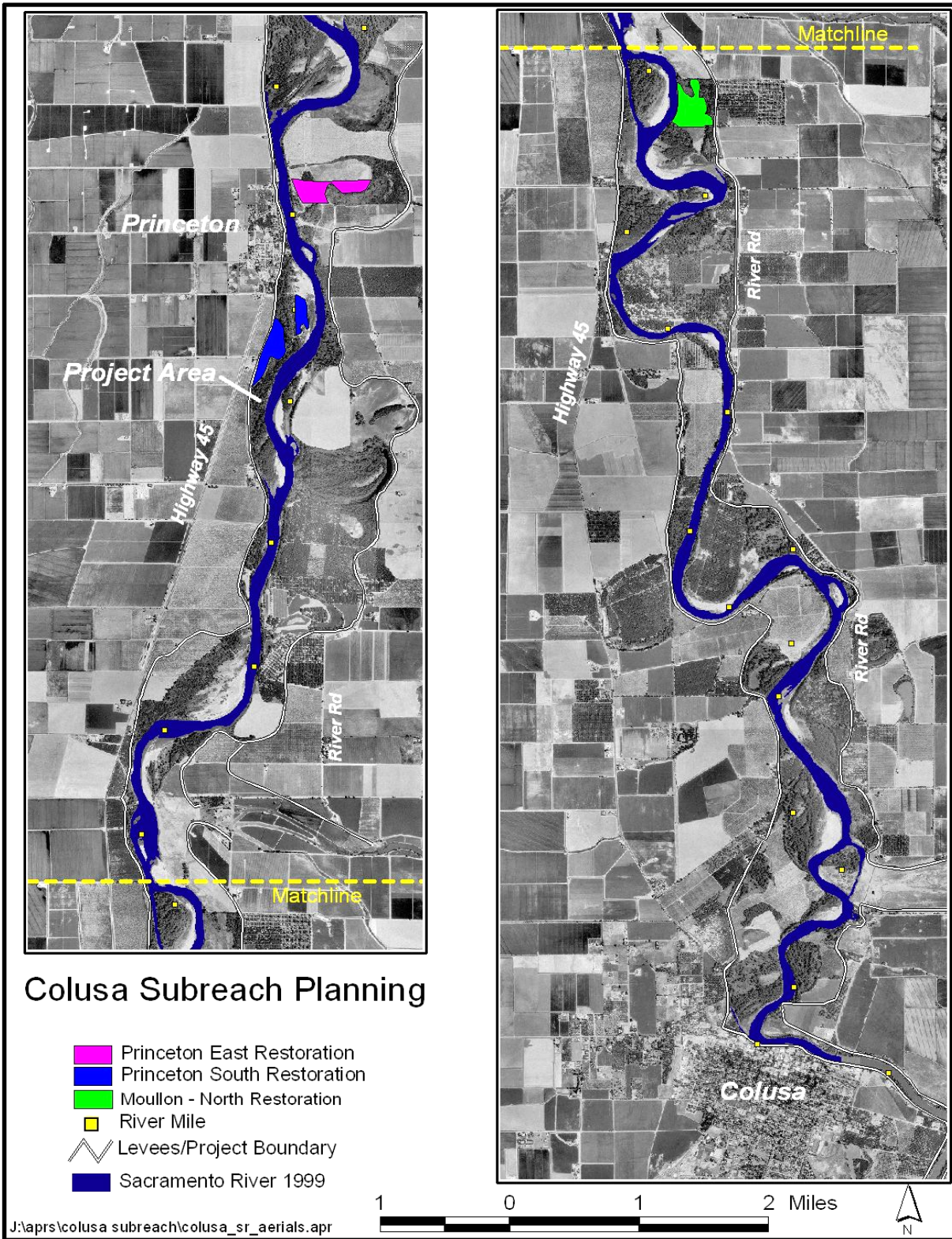
Over 4000 acres of riparian habitat have been restored along the Sacramento River between Red Bluff and Colusa. Only a small portion of this total restoration, 124 acres, has occurred within the Colusa Subreach. Restoration has taken place at three tracts within the Sacramento River Wildlife Area, which is managed by the California Department of Fish and Game. These three tracts are described on Table 5 and depicted on Figure 14.

**Table 5. Existing Habitat Restoration Tracts**

Property	River Mile	Year	Acres
Princeton- East Subunit	164 L	1992	44
Princeton - South Subunit	162.5 R	2001	34
Moulton – North Subunit	156.5 L	2001	46
Total	-		124 acres

*Source: Comprehensive Management Plan for the Sacramento River Wildlife Area*

On each site it was determined that natural processes alone would not restore the area to riparian habitat of sufficient value in the near term. Restoration planting followed a detailed baseline analysis of the site characteristics and the development



**Figure 14. Existing Habitat Restoration Tracts**

Source: California Department of Fish and Game

of a plan for the planting and initial maintenance of the area. The planting was limited to native species in a design that responded to existing site characteristics that included soils, drainage, inundation frequency and surrounding land uses. Irrigation was provided for a three-year establishment period. After three years the irrigation was discontinued because the root systems were adequately established to draw necessary moisture from groundwater (Alpert et. al., 1999).

**Public Involvement in Habitat Management Planning** – In recent years public agencies have expanded their efforts to involve the public in general and local interests specifically in planning for the management of the properties. This outreach is strongly encouraged by the SRCAF. Both the California Department of Fish and Game and the US Fish and Wildlife Service consulted local interests and held multiple public input meetings in the vicinity of the Colusa Subreach as part of their planning processes. While the California Department of Parks and Recreation has not conducted recent planning in this Subreach, it did include a substantial public input process as part of its development of a new general plan for the Bidwell-Sacramento River State Park near Hamilton City. Colusa Subreach Planning took public involvement in restoration planning to a new level bringing public agencies, the SRCAF and TNC together with many local interests.

The recent experiences of each of these agencies suggest that a range of stakeholder perspectives can be expected in regard to habitat management. This range of input will reflect the variety of interests in the local area and California in general. Some inputs will likely conflict with others but some common themes can be expected to be heard that can help direct the future planning of habitat management.

**Coordination with Other Area Landowners** – Landowner coordination is stressed by the SRCAF and is an important provision in the habitat management plans prepared by the Department of Fish and Game, the Department of Parks and Recreation and the Fish and Wildlife Service. This coordination normally involves consultation as part of the planning of habitat restoration projects and communication as part of ongoing management of properties. There is a realization that activities on land managed for habitat may affect adjoining land and that the reverse is true.

The SRCAF facilitates the coordination of activities with neighbors as well as the public review of plans and projects related to ecosystem restoration. It has developed specific provisions for communication with neighboring owners and local governments as well as review through its Technical Advisory Committee (TAC) and Board of Directors. A *Good Neighbor Policy* was adopted by the SRCAF Board in 2007 that establishes a process for communication between restoration proponents and neighboring landowners.

**Planning for Compatible Public Recreation** – Riparian habitat has been and will continue to be attractive for recreation uses that appeal to a substantial segment of both the local and regional population. The public ownership of land for ecosystem restoration offers the potential for increased public access and utilization of this recreation resource. Public input also indicates that such recreation is considered to be a visible and tangible return on the taxpayer investment directed toward habitat conservation along the Sacramento River.



Planning for public recreation by been an important focus of activity within the Sacramento River Conservation Area over the past three years. Chico Landing Subreach Planning included the *Sacramento River Public Recreation Access Study* that developed an information base for subsequent planning efforts. Both the Department of Fish and Game and the Fish and Wildlife Service identified recreation uses that are compatible with their wildlife habitat conservation missions and identified policies and improvements that they would pursue, in order to better support public recreation use of the properties that they manage. The recent general plan for the Bidwell-Sacramento River State Park had public recreation as a central focus. All these processes identified the fact that the increased populations of fish and wildlife, that will result from habitat conservation, will support more and better public recreation opportunities on the more than 13,400 acres of land that is open to public use along the middle Sacramento River.

Colusa Subreach Planning offers the potential to draw from these previous planning programs, obtain specific public input and target recreation needs that can be coordinated with habitat conservation. In this way compatible public recreation use could be integrated into the overall ecosystem restoration strategy that will be developed for the Subreach. The planning of specific restoration tracts additionally offers the potential to plan for public access and use (trails, parking areas, etc.) that will permit the public to directly experience the benefits of habitat conservation. For example, areas could be reserved for future public parking. Also, primitive roads for the initial maintenance of restoration plantings could be located so that they could serve as trails to desirable public use areas such as gravel bars in the future.

**Regulatory Streamlining** – The concept of streamlining regulations is a key element of the *Handbook*. The Sacramento River corridor is a rich but fragile ecosystem that is affected by numerous regulations designed to protect air quality, water quality, public health and wildlife. These standards are administered by many different agencies; and meeting these various regulations can be complex, time consuming and expensive. Compliance with these standards impacts agriculture, flood control, water supply, and recreation and ecosystem restoration.

The *Handbook* proposes a regulatory consistency/streamlining program that should include the following elements:

- Mitigation requirements
- Interagency consistency
- Consolidation of application forms
- Mitigation banking

Components of a streamlining program are moving forward and it has been suggested that the Colusa Subreach might provide a real world opportunity to take a streamlining concept from the theoretical to reality.

A major streamlining effort that is nearing completion is the development of a Programmatic Safe Harbor Agreement / Voluntary Local Program (PSHA/VLP) by the SRCAF. The proposed program will utilize provisions of the California and federal Endangered Species Acts to provide landowners with the opportunity to establish a baseline of listed species on their property and gain the ability to “take” any species in the future that are in excess of that baseline. It is anticipated that future restoration projects in the Colusa Subreach will be enrolled in the PSHA/VLP, which will permit neighboring landowners to join the, establish a baseline and enjoy



endangered species protections. Thus if a restoration project or any other occurrence results in an increase of listed species on a property, the landowner will not be subject to regulatory limitations.

Additionally, the California Department of Water Resources is pursuing advanced mitigation of flood management improvements a means of making flood maintenance less expensive and more timely. CDWR is pursuing the restoration of the Ward Tract near Colusa which includes the concept of “banking” the restoration of riparian habitat that exceeds its initial needs. The restoration of the Ward Tract was planned, publically vetted and hydraulically modeled as part of CSP. CDWR is also working with Caltrans to establish a pilot project to demonstrate the potential and benefit of advanced mitigation. The planning work accomplished through CSP may facilitate this effort.

## VI. LANDOWNER QUESTIONS AND CONCERNS

An essential element of Colusa Subreach Planning was the identification of landowner questions and concerns related to wildlife habitat conservation in general and habitat restoration in particular. This Chapter provides a summary of the principal questions and concerns that were identified by the Advisory Workgroup as part of the CSP process. These concerns often related to potential effects of habitat restoration activities on the flood control system, the local economy and neighboring landowners. Other general concerns included environmental regulations, public recreation and public land management. In this and subsequent Chapters the terms "landowner questions" and "landowner concerns" are used interchangeably to describe important considerations that landowners in the Colusa Subreach wished to have analyzed and evaluated.

Colusa Subreach Planning was directed to engage local landowners, organizations and agencies in the planning of an ecosystem restoration strategy for the Colusa Subreach. Following the identification of landowner concerns, these concerns became the focus of the planning process. This was accomplished through planning and research projects that were specifically directed toward the identified concerns. The results of these projects were integrated with the planning of wildlife habitat restoration on eight properties in the Subreach. The Advisory Workgroup monitored these planning and research projects and results were made available to all interested stakeholders.

### A. Local Setting

The Advisory Workgroup requested that a description of the local agricultural economy and local voting patterns related to water and land conservation measures be included in the Subreach Background Report in 2005. The information was requested to help establish a context for consideration of local questions and concerns. This information has been incorporated into this Report to serve that same purpose.

The Colusa Subreach is a 5,466-acre (8.54 square miles) portion of Colusa and Glenn Counties. Colusa County lies on the south side of Glenn County and both counties extend from Sacramento River and Butte Creek on the east to roughly the crest of the Coast Range on the west. Colusa County has a total area of 736,450 acres (1,151 square miles) and an estimated population of 21,916 persons as of January 1, 2008. Glenn County has an area of 841,470 acres (1,315 square miles) and a population estimated to be 29,195 persons. Between 2007 and 2008 Colusa County increased at a rate of 2.0% and Glenn County increased at a rate of 1.3%. The population estimates cited in this paragraph are from the California Department of Finance, Demographics Research Unit.

**Agricultural Economy** – The combination of agriculture and agriculture-related business is the principal economic activity in both Colusa and Glenn Counties. In Colusa County, approximately 45% of the land is in agricultural crops and in Glenn County approximately 32% of the land is in crops. The majority of the

land that is not in crops is in the mountainous, western portion of the two counties, where soils and slopes are not suitable for cropland. A substantial portion of that area, however, is utilized for livestock ranching. Table 6 describes the land within each County that is devoted to agricultural crops.

**Table 6. Cropland in Colusa and Glenn Counties**

<b>Data Category</b>	<b>Colusa County</b>	<b>Glenn County</b>
Total Acres	736,450	841,420
Acres in Farms	485,392	506,372
Cropland Acres	331,843	271,470
Irrigated Acres	290,861	233,127
Number of Farms	821	1,283

*Source: USDA 2002 Census of Agriculture*

The vast majority of the crop value is produced on irrigated land. In Colusa County, approximately 88% of the cropland was irrigated and in Glenn County approximately 86% was irrigated in 2002. A comparison between the 1997 and 2002 USDA Census of Agriculture indicates that acreage of irrigated cropland increased in both Counties over that period. The increase was approximately 3% in each County; 9,700 acres in Colusa County and 6,900 acres in Glenn County. This increase was a continuation of a fifteen-year trend. The largest source of water for irrigation of this area is the Sacramento River.

In 2003, both Counties produced a record total value of crops. Compared to the total value ten years earlier, this represented a 27% increase for Colusa County and a 23% increase for Glenn County. For each County, the highest value crop was rice followed by almonds. Table 6 lists the highest value crops for each County in 2003. All figures cited in this paragraph are taken from the 2003 annual reports prepared by the County Agriculture Departments for each of the two Counties. It is important to note that these available figures represent gross receipts and that they do not represent net income. Additionally, these figures have not been adjusted to reflect inflation.

**Table 7. 2003 Crop Value in Colusa and Glenn Counties**

<b>Product</b>	<b>Colusa County</b>		<b>Glenn County</b>	
	<b>Value</b>	<b>Rank</b>	<b>Value</b>	<b>Rank</b>
Rice	\$106,669,000	1	\$160,971,000	1
Almonds	\$73,206,000	2	\$53,060,000	2
Processing Tomatoes	\$32,318,000	3	na	na
Cattle and Calves	\$11,628,000	4	\$17,639,000	4
Rice Seed	\$9,485,000	5	\$2,487,000	na
Dairy Products	na	na	\$48,539,000	3
Walnuts	\$6,466,000	6	\$15,182,000	5
Total of all Crops	\$361,573,000		\$317,387,000	

*Source: 2003 Crop Report, Colusa County Department of Agriculture  
2003 Crop and Livestock Report, Glenn County Department of Agriculture*

All of the cropland in Glenn and Colusa counties was in native vegetation prior to the mid 1800's. This area included grasslands, seasonal marshes and riparian forests. The conversion of this land to agriculture over the last 150 years permitted the growth of the local agricultural economy and the related services and activities that it supports. Local concerns about potential impact of restoration activities on the flood control system and on agriculture within and adjoining the Colusa Subreach often relate to flood protection and to the ongoing viability of the local economy and the social interactions that it supports.

**Electorate Direction** - In California, voters have authorized substantial amounts of funding for water supply, water quality, recreation, wildlife habitat conservation and related programs through ballot initiatives in recent years. However some local stakeholders have pointed out that, while these initiatives have passed statewide, the majority of the voters in Colusa and Glenn Counties voted against these initiatives by substantial margins. To clarify that point, Table 8 is provided below. It details the results of four initiative propositions that have provided funding for a wide range of activities that included wildlife habitat conservation in recent years.

**Table 8. California Conservation Initiative Results**

Initiative	Year	Colusa County		Glenn County		Statewide	
		Yes	No	Yes	No	Yes	No
Proposition 12	2000	38%	62%	36%	64%	63%	37%
Proposition 13	2000	47%	53%	44%	56%	65%	35%
Proposition 40	2002	31%	69%	24%	76%	57%	43%
Proposition 50	2002	26%	74%	23%	77%	55%	44%
Proposition 84	2006	36%	64%	30%	70%	54%	46%

*Source: California Secretary of State, Elections Division*

It is assumed that this pattern of negative response to water, recreation and conservation-related initiatives is related to multiple factors. Such factors may include fiscal conservatism, concern about governmental involvement and lack of support for public water, recreation and wildlife habitat projects. As background for this Chapter's discussion of landowner questions and concerns it is of value to recognize that many voters in Colusa and Glenn Counties area do not appear to share the same opinions as voters statewide

## **B. Principal Landowner Questions and Concerns**

Landowner questions and concerns were identified as part of the initial phase of CSP. Records from past public input programs were reviewed and a public input meeting was held on February 17, 2005, which was specifically focused on the identification of landowner concerns. A telephone survey of landowners within the Colusa Subreach and on the adjoining properties was also conducted by the Institute for Social Research at California State University, Sacramento. Finally, the Advisory Workgroup held several discussions that addressed overall concerns and specific concerns that related to the eight proposed habitat restoration sites. The listing of the principal landowner questions was accepted by the Advisory Workgroup in April of 2005 is reviewed in this Chapter. It should be noted that the

identification of these principal landowner questions and concerns occurred while the Advisory retained all of its original members.

The following listing of the priority landowner questions and concerns includes an explanation of the response to each listed question that was approved by the Advisory Workgroup. These responses were integrated into the planning process.

**Flood Management** – Because the Sacramento River Flood Protection Project is vital to the safety and ongoing economic welfare of Colusa and Glenn Counties, stakeholders questioned the current status of the system. They were also concerned that habitat restoration could reduce the protection afforded by the system.

- **Has there been a reduction in floodway capacity due to increased deposition of sediment caused by increased vegetation cover or other factors?**

Response – Form a Hydraulic Analysis Subgroup and develop a scope of work for hydraulic analysis to evaluate changes in channel depth using available data and utilize two-dimensional hydraulic modeling to compare the current floodway capacity to that which was established as the Design Flow by the US Army Corps of Engineers in 1957.

- **Has there been a reduction in flood flow capacity due to the presence of large woody debris in the channel and related aggradation?**

Response - Form a Hydraulic Analysis Subgroup and develop a scope of work to inventory large wood debris in the Subreach and use the two-dimensional hydraulic model to determine the contribution of large woody debris to flood flow elevations.

- **Mitigation requirements related to the Valley Elderberry Longhorn Beetle and other Special Status Species can delay or increase the cost of flood protection. Can restoration projects provide mitigation for flood control maintenance and improvements?**

Response – Pursue the use of restoration projects as mitigation for flood protection activities as direct project mitigation (ex. the Ward Tract restoration), advance mitigation projects and a Programmatic Safe Harbor Agreement / Voluntary Local Program.

- **Will restoration projects should be subject to review and approval by the Central Valley Flood Protection Board (CVFPB), which was formerly the Reclamation Board?**

Response – Habitat restoration projects require approval of the CVFPB. CSP should anticipate the requirement of an encroachment permit and design restoration projects to conform to CVFPB standards for safe encroachments in the floodplain to be documented through hydraulic analysis.

- **How can stakeholders be assured that the hydraulic analysis is technically correct and unbiased?**

Response – Retain an expert water resources engineer, chosen by the Advisory Workgroup, through a third-party contract to conduct independent peer review of the scope of work and the hydraulic modeling.

- **Will habitat restoration projects result in increased flooding or jeopardy to the flood management system?**

Response – Conduct two-dimensional hydraulic model analysis of all proposed restoration projects at the draft plan stage to ensure that any changes to flood flow elevations and flood flow velocities meet the standards of the CVFPB and do not result in substantive negative impacts to neighboring properties.

- **Will habitat restoration projects increase seepage of flood waters through the levees?**

Response – Analyze the potential for increased levee seepage in conjunction with the hydraulic analysis of proposed restoration projects.

- **Will restoration projects result in riparian vegetation on the levees or result in animals from restoration projects burrowing into levees and undermining their stability?**

Response - Implement CDWR standards and setback restoration planting of trees and shrubs from levees to help keep levees free of riparian vegetation and provide open access areas at the base of the levees for ongoing maintenance and inspections.

**Fiscal and Economic Effects** – The transfer of land from private to public ownership for habitat conservation, flood control and recreation purposes can affect tax revenues to local government agencies. The conversion of active cropland to riparian habitat may also result in some reduction in local economic activity. Some local interests expressed the concern that these impacts could be substantial.

- **Will the acquisition of private property by state and federal governments for habitat conservation, recreation or other purposes result in reduced revenue to local government agencies in Colusa and Glenn Counties?**

Response – Develop a scope of work with the Advisory Workgroup and select a qualified contractor to prepare an analysis of the fiscal impacts of anticipated government acquisitions of private property.

- **Will the conversion of farmland to riparian habitat result in a loss of economic activity, jobs and business in the local economy?**

Response – Develop a scope of work with the Advisory Workgroup and select a qualified contractor to prepare an analysis of the economic impacts of proposed habitat restoration on the economy of Colusa and Glenn Counties.

**Public Recreation and Access to Public Land** – Local stakeholders wished to have access to public land for recreation purposes. At the same time there is a strong concern that public access should be directed in a way that minimizes potential problems for neighboring landowners.

- **How can the Colusa-Sacramento River State Recreation Area be improved to meet recreation needs, address the boatramp deficiency and integrate the Ward Tract for recreation use?**

Response – Form a Recreation Subgroup to develop a scope of work and select a qualified contractor to prepare a master plan for the State Recreation Area that integrates wildlife habitat with recreation use.

- **How can public recreation and access to public lands in the Subreach be managed so that the public property can be reasonably used compatibly with neighboring private property?**



Response – Form a Recreation Subgroup and develop a scope of work and select a qualified contractor to prepare a plan for recreation use, related improvements and appropriate access to public lands in the Subreach.

**Trespass and Vandalism on Private Property** - Landowners in the Subreach have expressed a concern that the public access to wildlife habitat can result in problems such as trespass, vandalism and degradation of natural resources.

- **Will access to public lands in the Subreach be limited and managed to protect the rights of neighboring landowners?**

Response – Combine this with the preparation of a plan for recreation use, related improvements and appropriate access to public lands in the Subreach and include management considerations

**Mosquitoes and West Nile Virus** - The concern was expressed that habitat restoration could result in more opportunities for mosquito breeding and the proliferation of West Nile Virus.

- **Will habitat restoration result in increased numbers of mosquitoes?**

Response – Maintain existing agricultural land surfaces and drainage patterns in proposed restoration projects and coordinate with the Colusa County Mosquito Abatement District to implement best management practices for ongoing controls following restoration.

**Increased Environmental Regulations** – There was a concern that increased public ownership of land and increased areas of publicly-owned wildlife habitat may result in increased regulation of other properties in the Subreach by state and federal agencies. These concerns primarily relate to regulations that pertain to Special Status Species, water and air pollution standards, pesticides and herbicides.

- **Will increased areas of wildlife habitat through acquisition and restoration result in increased environmental regulation of neighboring agricultural interests?**

Response – Develop a scope of work with the Advisory Workgroup and select a qualified contractor to prepare an analysis of the potential for increased regulations with identification of appropriate ways to preclude or limit such effects.

Response – Develop, through SRCAF, a Programmatic Safe Harbor / Voluntary Local Program to permit neighboring landowners to avoid any increased requirements related to the state or federal Endangered Species Acts.

**Pest Species Effects on Neighboring Landowners** – When land is restored to riparian habitat there will be changes to the distribution and abundance of wildlife species. Increases in pest species including gophers, ground squirrels, deer, and various insects can impact neighboring farming operations.

- **Will increased numbers of pest species and related crop damage result from restoration of riparian habitat in the vicinity of existing cropland?**

Response – Develop a scope of work with the Advisory Workgroup and select a qualified contractor to prepare an analysis of the potential pest species effects associated with habitat restoration with identification of appropriate ways to preclude or limit such effects.

**Dispute Resolution Process** – Increased public ownership of land and increased areas of publicly-owned wildlife habitat may result in damages and disputes related to impacts on neighboring private property. A quick and simple process to resolve such potential disputes was desired.

- **How can disputes between neighboring landowners and habitat management agencies be efficiently resolved?**

Response – There was agreement that this was a complex and larger issue affecting the entire river corridor that was beyond the scope of resolution as part of CSP.

**Self Mitigating Area** – There was a desire to establish the larger river corridor as a “self mitigating area” where habitat enhancements such as restoration projects could provide mitigation for other activities including flood control, water supply and agricultural maintenance and improvement projects.

- **How can the Colusa Subreach become a self mitigating area where environmental mitigation for individual projects is not required?**

Response – There was agreement that this was a larger issue that involved state and federal laws and affects the entire river corridor that was beyond the scope of resolution as part of CSP.

**Coordination with Neighboring Landowners** – Existing agricultural landowners can be affected by restoration projects that are in close proximity to their cropland. There should be a process for communication, coordination and shared agreement related to restoration projects.

- **How can effective communication and coordination between restoration managers and neighboring landowners ensured?**

Response – The SRCAF Good Neighbor Policy establishes standards for communication and coordination prior to, during and following restoration projects. CSP development of habitat restoration plans will follow this Policy.

Response – When a landowner or manager decides to implement habitat restoration a written agreement should be proposed between the involved landowners or managers that describes the restoration project and clarifies points of agreement such as buffers.

## **VII. PLANNING AND RESEARCH PROJECTS**

The Advisory Workgroup used its first five months to take input, engage in spirited discussion and then determine the principal landowner questions. Following the identification of landowner questions and agreement on the responses that are contained in the previous Chapter VI, the Advisory Workgroup considered scopes of work for planning and research projects to address these landowner questions. The Workgroup also participated in the interview and selection of contractors to perform six planning and research projects and peer review of a seventh. This activity was concluded while the Workgroup included all of its original members.

It was recognized that the chosen projects would not resolve all questions and concerns but that they could, at a minimum, help stakeholders to evaluate the importance of the various concerns. It was anticipated that the planning and research projects would yield information and ideas that could be integrated into the habitat restoration plans that would be developed as part of CSP. It was also expected that this new information could help to conduct habitat restoration in a way that increased compatibility with agriculture, flood control, water supply and recreation in the Colusa Subreach.

Seven projects were initially chosen; two planning projects and five research projects. These projects were initiated in 2006. These seven projects were consolidated into four contracts because the expertise required to conduct some of the projects overlapped. An eighth project was added in 2007 by the Advisory Workgroup. All of the planning and research projects were reviewed by the Advisory Workgroup in draft form and they were also provided to potentially interested stakeholders for their review and comment. Copies of the draft reports and later the final reports were placed in local libraries and in the CSP website for public review. This Chapter provides an overview of each planning and research project and the findings of the final report for that project.

### **A. Master Plan for the Colusa-Sacramento River State Recreation Area**

Colusa Subreach Planning included “Focal Area Planning” as one of its seven specified Tasks. Focal Area Planning was defined as a planning activity identified through the public engagement process that focused on a particular portion of the Colusa Subreach or on a particular topic within the whole Subreach. A planning project that was identified as a principal landowner question was master planning of the Colusa-Sacramento State Recreation Area (CSRSRA). The improvements and layout of the CSRSRA were thought to be inadequate and the boatramp was located such that it was often unusable due to siltation. Also, the CDPR and TNC were working to transfer the Ward Tract, a proposed habitat restoration site, to the State to become part of the CSRSRA. Local interests desired a planning effort that would determine how the CSRSRA could be improved to support local demands and attract visitors from out of the area. CDPR was also anxious to develop a plan that would integrate wildlife habitat with compatible recreation and environmental education.

Because this master planning project required the same type of ecological and recreation planning expertise as the recreation access plan, a decision was made to combine the two planning projects in a single contract. It was also determined that the public outreach needs of the two projects were similar and that some economies of scale could be realized in a combined effort. EDAW Inc. was chosen to prepare the two plans in a joint public process that would result in two separate planning documents as final products.

A Recreation Subgroup of the Advisory Workgroup was formed to help direct the planning effort. The public engagement process included two public workshops and a public information meeting as well as many smaller meetings. The process involved close coordination with the CDPR staff from the Northern Buttes District and the City of Colusa. It resulted in the completion of the *Colusa-Sacramento River State Restoration Area Master Plan* in January of 2007.

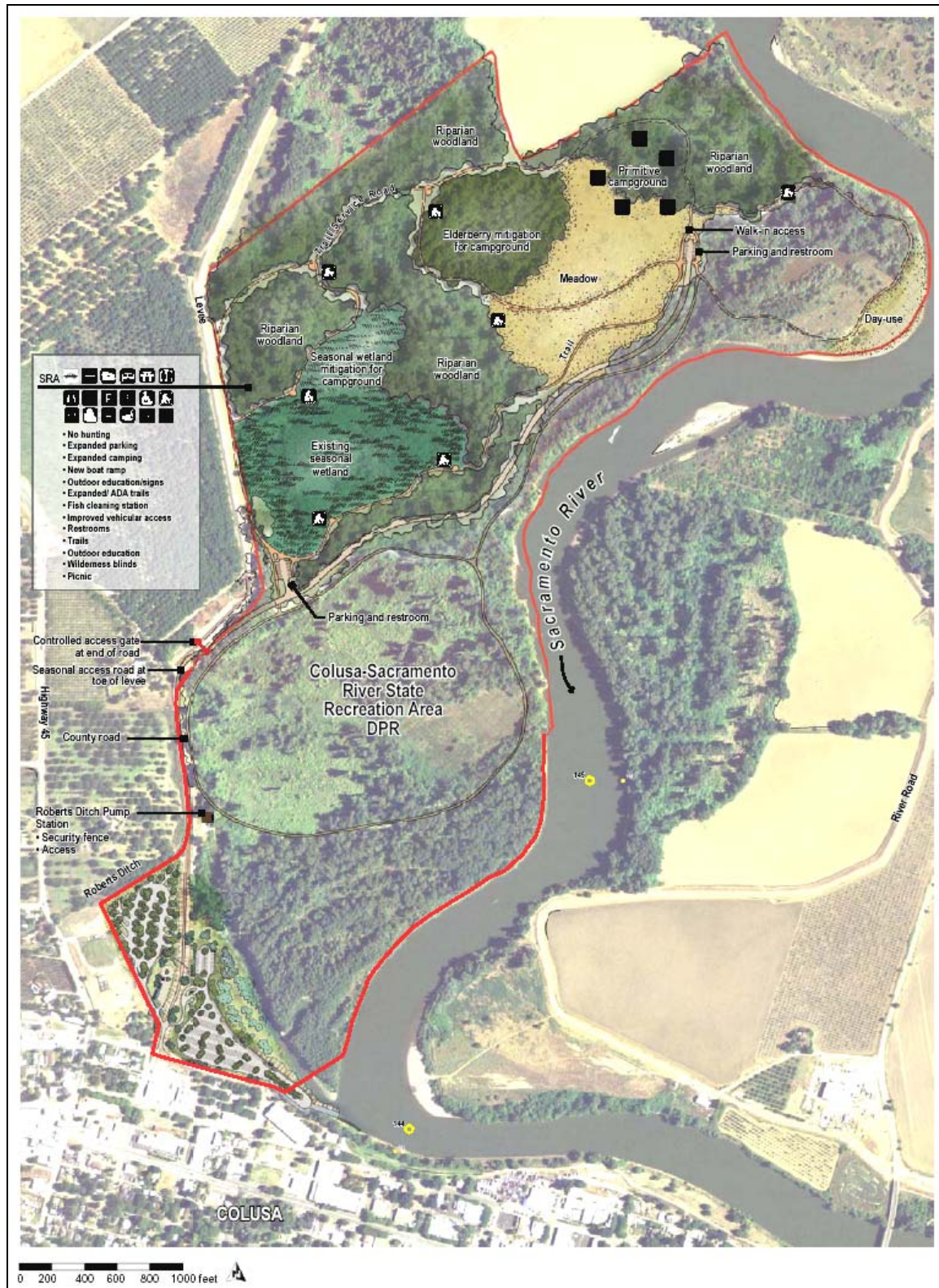
The Master Plan is a blueprint for the future improvement and expansion of the CSRSRA. The Master Plan proposes the rebuilding of the forty-year old camping and day use areas and it focuses on a proposed new boatramp. The new boatramp was a project of the City of Colusa, which has since been allocated State funding to rebuild and relocate the boatramp on City-owned land adjacent to the CSRSRA. Proposed improvements to the CSRSRA are designed to complement the new boatramp location as illustrated on Figure 15. Planned improvements include:

- Relocation of the boatramp parking
- Increased boat trailer parking
- A dock at the end of the new boatramp
- Relocation of the existing entry to 12<sup>th</sup> Street to improve access to the new boatramp
- Relocation of the campground to State-owned property outside of the levee and winter flooding
- Expansion of the campground from 14 to 30+ spaces with full hookups to accommodate modern recreational vehicles
- New support facilities (ADA compliant restrooms, entry stations, dump stations, fish cleaning stations and other accessory facilities)
- Maintaining the current amount of landscaped, day use area
- A levee trail connecting to the Levee Scenic Park and downtown Colusa

The Master Plan also proposes integration of the Ward Tract as part of the Recreation Area, including:

- Road access with parking areas
- Beach access to the existing point bar beach on the river
- A loop trail approximately two miles long
- An open meadow for special events
- A walk-in camping area
- Interpretive signing and displays
- Restoration of riparian vegetation for wildlife habitat

The Master Plan received the consensus approval of local stakeholders at the final public information meeting in December of 2006. The success of the planning effort and the local support for the project were factors in the decision of CDWR to



**Figure 15. Colusa-Sacramento River State Recreation Area Master Plan**

Source: Colusa-Sacramento River State Recreation Area Master Plan



Implement the restoration of the Ward Tract as mitigation for habitat loss in the Tisdale Bypass Sediment Removal Project. CDPR has since entered into a management agreement with the City of Colusa for the new boatramp. CDPR has also initiated steps to expand the Master Plan and develop an official General Plan for the CSRSRA.

## **B. Colusa Subreach Recreation Access Plan**

A second focal area planning project addressed the need to determine how other public lands in the Colusa Subreach should be used, accessed and improved. The initial CSP public engagement process identified two strongly-held, but partially conflicting, perceptions in regard to public land in the Colusa Subreach. One was that public lands should be made more available for public recreation uses that were compatible with the riparian habitat. The second was that access to public lands for recreation use should be limited to preclude trespass and vandalism on neighboring lands. It was clear that an involved public process would be required to resolve these two perspectives.

Because this planning project required the same type of ecological and recreation planning expertise as the master plan for the CSRSRA, a decision was made to combine the two planning projects in a single contract. It was also determined that the public outreach needs of the two projects were similar and that some economies of scale could be realized in a combined effort. EDAW Inc. was chosen to prepare the two plans in a combined public process that would result in two separate planning documents as final products.

The Recreation Subgroup of the Advisory Workgroup helped to direct the planning effort and the process included close coordination with CDFG and CDPR staff. The public engagement process included two public workshops and one public information meeting. This public outreach process was shared with the development of the master plan for the Recreation Area.

The Colusa Subreach Recreation Access Plan recommends appropriate public access and recreation use for seventeen public properties in the Colusa Subreach. It also identifies existing and desirable access rights and proposes appropriate improvements for the area. Figure 16 is an example of the level of detail that the Plan incorporated. The Plan also includes cost estimates for future improvements that are consistent with the recommended land uses.

A major point that was raised at public meetings was that public agencies must have adequate resources to appropriately manage increased public access and use of lands in the Colusa Subreach. Specific concerns included the need for maintenance and law enforcement services. It was generally felt that public agency resources were not currently adequate to support increased land access to public properties along the river. In response to these public comments, no new land access routes were recommended for the public lands in the Colusa Subreach until adequate management resources were available. The Recreation Access Plan was submitted to the various public agencies that manage the public recreation sites in the Colusa Subreach for their consideration and future action.

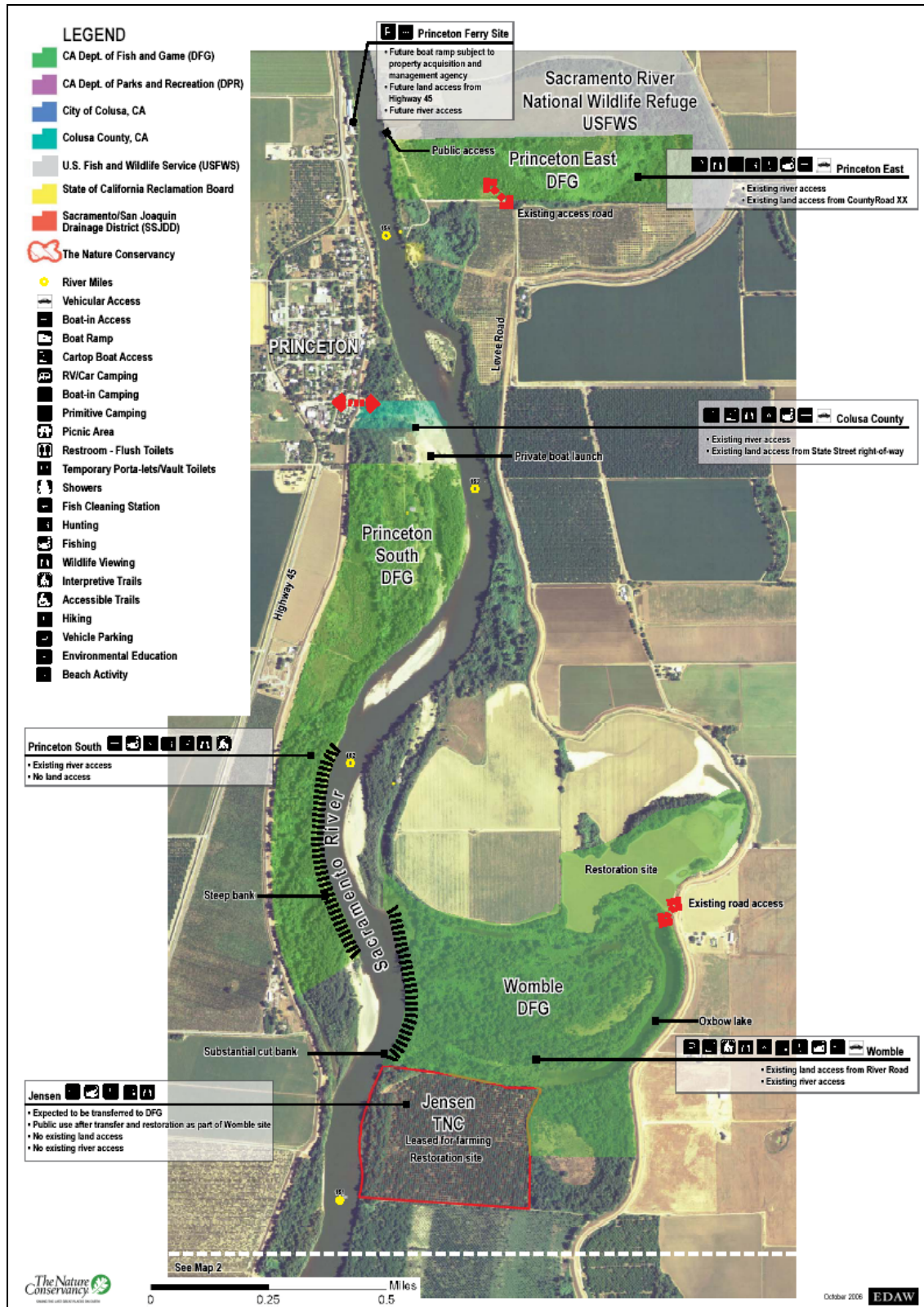


Figure 16. Typical Colusa Subreach Recreation Access Plan Exhibit

Source: Colusa Subreach Public Recreation Access Plan



### **C. Fiscal and Economic Impact Analysis**

Local interests questioned how wildlife habitat conservation efforts would affect local government agency revenue. They also questioned how it would affect the local economy. Transfer of TNC land to state ownership would reduce property tax revenues and the proposed habitat restoration would reduce agricultural production and related economic benefits. Because answering these two questions required related expertise commonly found in consultant firms that specialize in economic analysis, a decision was made to combine these two questions into one contract. A single report was commissioned that would address each of the questions.

Economic and Planning Systems, Inc. was retained to prepare a fiscal and economic impact analysis of the habitat conservation proposals included in CSP. The transfer of four TNC properties to the State of California (the Jensen, 1000-acre Ranch, Boeger and Ward Tracts) was analyzed for fiscal effects on local government agencies. The conversion of five tracts, from agriculture to riparian habitat (the Womble, Jensen, 1000-acre Ranch, Boeger and Ward Tracts) was analyzed for effect on the economy of Colusa and Glenn Counties. The other three restoration sites (the Stegeman, Colusa-North and Cruse n'Tarry Tracts) were not included in the economic analysis because they had not been in agriculture for many years and they involved no reduction in cropland.

The fiscal impacts were estimated for the government agencies in Colusa County because the tracts were all located in that County. The estimated impact on the County General fund was a reduction of about \$5,100 or about .02 percent of the \$26.4 million fund in the approved 2005/6 County budget. The total property tax revenue reduction for the properties was about \$21,500 although it was noted that the amount was only about \$10,800 prior to TNC's purchase of the tracts and their subsequent reassessment. The estimates were derived from base data provided by the Colusa County Assessor's and Auditor-Controller's offices.

Economic impacts are related to the conversion of 389 acres of agricultural crops located in both Colusa and Glenn Counties. This represented approximately .0004% of the 900,000 acres of cropland in the two county area. The annual reduction in economic activity was estimated to be about \$379,400 including multiplier effects as determined through the use of the IMPLAN input-output model. Offsetting new economic activity related to recreation use of the restored habitat was estimated to be about \$134,200 per year. Limited term positive impacts related to the improvement investments into the restoration projects were also estimated.

The *Fiscal and Economic Impact Analysis-Colusa Subreach* concluded that overall impacts of the transfer and conversion of the five tracts were found to be relatively small in scale compared to the overall scale of the agricultural industry in both counties and to the size of the Colusa County budget. The potential for state Payment in Lieu of Taxes was analyzed as a source to reduce the loss of property tax. It was noted, however, that the state legislature has not consistently allocated that funding in the recent past.

### **D. Pest and Regulatory Effects Study**

Agricultural interests questioned whether the restored habitat would lead to increased populations of deer, rodents, and insects that could forage in and cause

damage to their crops. They also questioned whether restored habitat would lead to additional regulatory requirements being applied to cropland in the immediate vicinity. Because answering these two questions required overlapping expertise commonly found in consultant firms that specialize in environmental and regulatory analysis, a decision was made to combine these two questions into one contract. A single report was commissioned that would address each of the topics. To address these questions, a contract was executed with an environmental consulting firm, EDAW Inc., to prepare the *Pest and Regulatory Effects Study*.

Related to additional pest effects the study concludes that “riparian habitat restoration proposed in the Colusa Subreach is likely to provide both benefits and some minimal risk in pest effect changes compared to existing conditions.” The study points out that 55 percent of the subreach already consists of riparian habitat and that the proposed restoration of an additional 7 percent is unlikely to result in a substantial change in pest populations and effects. It further concludes that there could be an overall decrease in pest effects from existing conditions because riparian habitat does not support most agricultural pests. The study acknowledges, however, that there is limited information available concerning the ecology of pest species in relation to riparian habitat uses and influences.

The Study examines 25 species identified by an External Experts group that included farmers and professional agricultural advisors. It finds that short-term increases in pest effects on adjacent or nearby lands are likely for four of the species: California ground squirrel, western gray squirrel, California vole, and lygus bug (western tarnish). The Study concludes, however, that none of these species are likely to lead to increased predation over the long term because mature riparian vegetation will not provide habitat for substantial populations of these species. The Study finds that the pest effects of 11 of the high- and medium-priority species—mule deer, black-tailed jackrabbit, Audubon’s cottontail, coyote, American beaver, northern river otter, common muskrat, Brewer’s blackbird, European starling, American crow, and brown rot—are likely to remain the same as they currently are. It also concludes that the pest effects of 10 high- and medium-priority species—Botta’s pocket gopher, codling moth, navel orangeworm, walnut husk fly, peach twig borer, fruit-tree leafroller, oblique-banded leafroller, omnivorous leafroller, walnut blight, and root and crown rot—are likely to decrease.

The study describes several possible solutions, based on expert information and best available science, to limit damage to crops caused by pest species. These solutions consist of strategies to prevent increases in pest populations and crop damage and abatement of established pest populations. The prevention strategies include restoration design strategies, biological controls, and adaptive management; the abatement strategies include pesticides, trapping, and shooting.

The regulatory requirements question was related to the concern that restoration of wildlife habitat would cause increased involvement by state and federal agencies, which could in turn lead to reduced local control of agricultural activities. A specific concern was that agricultural activities could be limited by laws and regulations protecting special-status species. The Study examines seven federal and eight California laws and regulations that could relate to agricultural operations and 14 special-status species and six protected habitats that have the potential to occur along the Colusa Subreach. The Study concludes that the only potential regulatory constraint on agriculture resulting from riparian habitat restoration along the Colusa Subreach involves the valley elderberry longhorn beetle (VELB), which is listed as

threatened under the federal Endangered Species Act. Current protections for the VELB involve restrictions against activities within 100 feet of elderberry shrubs, the host plant for the VELB, though this restriction is commonly not enforced.

The Study finds that “because the open canopy types of riparian habitat (e.g., savannah) that are most suitable to the growth of elderberry shrubs constitute only a small percentage of the proposed restoration area and because only a small percentage of the proposed restoration perimeter borders agricultural land, the potential increase in valley elderberry longhorn beetle-related constraints on adjacent agricultural parcels is expected to be small.” It was noted that the U.S. Fish and Wildlife Service has proposed removing (delisting) the VELB from the endangered species list, although a final decision on delisting could take several years. If the species were delisted, there would be no regulatory constraints on adjacent agricultural lands involving the VELB.

The study examines eight potential solutions for the VELB issue and identifies three as being the most promising:

- Maintained buffer zones,
- Programmatic Safe Harbor Agreement as part of the SRCAF Good Neighbor Policy, and
- Memoranda of agreement/memoranda of understanding.

The study concluded that “riparian habitat restoration is not expected to increase agricultural regulatory constraints associated with the other 14 regulations, 14 protected species, and 6 protected habitats analyzed in [the] study.”

## E. Hydraulic Modeling and Flood Control Analysis

Flooding in the Colusa Subreach was often cited as the most important concern of local landowners. In anticipation of this question CSP included, as a required Task, the development of a two-dimensional hydraulic model to evaluate the potential effect that proposed habitat restoration could have on flood flows. Stakeholders, however, expressed additional flood-related questions that included:

- Has the floodway capacity diminished over time due to sedimentation and aggradation?
- Has the floodway capacity diminished over time due to the impact of large woody debris (LWD) on flood flow levels?

To address both the effects of habitat restoration within the floodway as well as these additional issues related to flooding, Ayres Associates Inc. was retained to perform a detailed hydraulic analysis of the Sacramento River floodplain in the Colusa Subreach. The two-dimensional hydraulic modeling was developed for the entire Colusa Subreach from RM 142.5 to 164.5 (Colusa to Princeton), to allow consideration of cumulative effects within the entire Subreach. The modeling tool used was a modified version of US Army Corps of Engineers' RMA-2V model, which has been used for similar projects on the Sacramento River. The procedures and results were peer-reviewed by Francis Borcalli, the individual chosen by the Advisory Workgroup as well as by CDWR staff engineers. These reviewers endorsed the findings of the *Two-Dimensional Hydraulic Modeling of Riparian Habitat Restoration from Colusa to Princeton* as prepared by Ayres Associates.

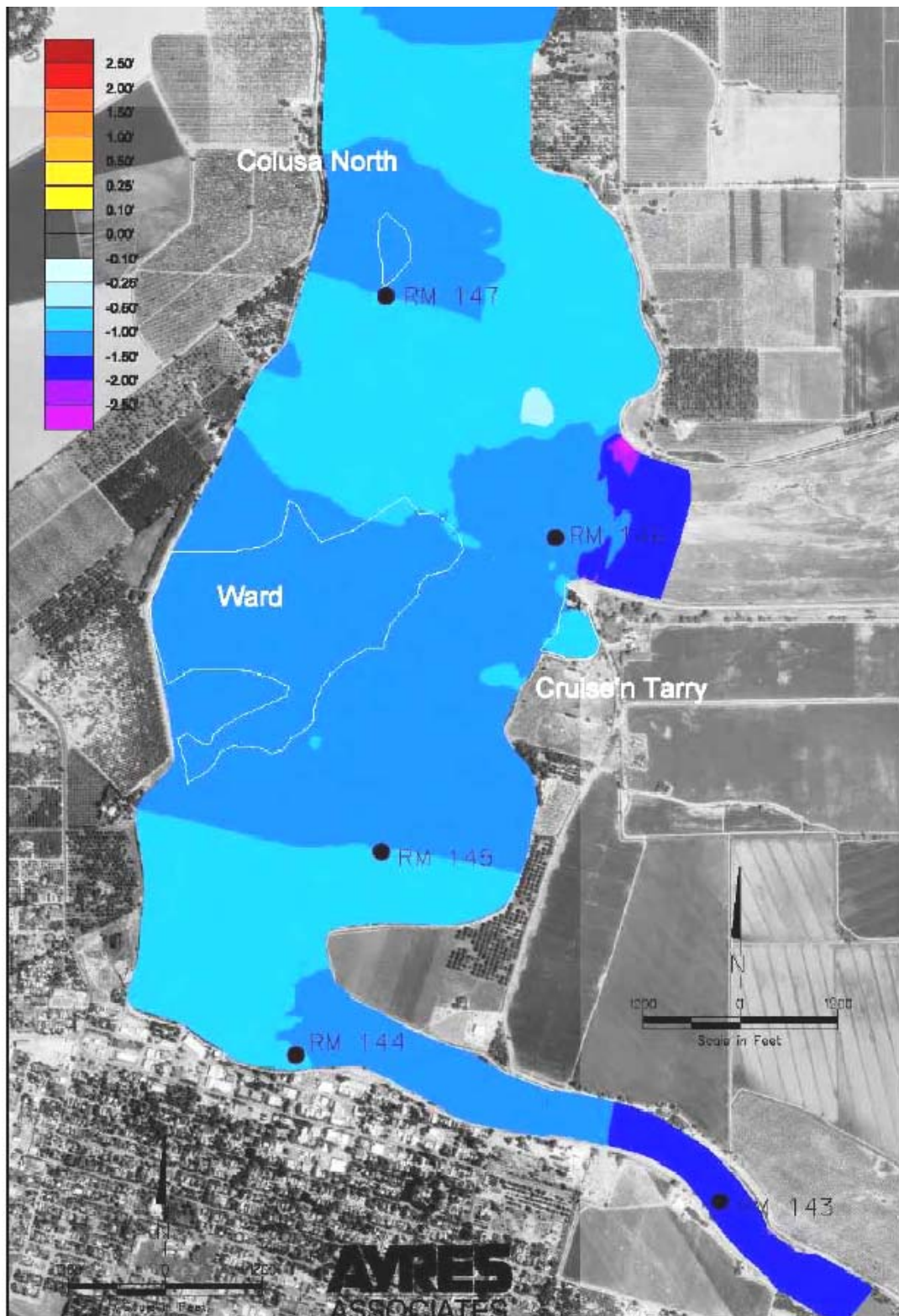
The historic change in the elevation of the channel thalweg was compared as a means of describing the variation in to the channel depth over time. The thalweg is the deepest point in the channel. Data from surveys in 1937, 1957 and 1997 was plotted to visually portray the change over time, however, the results were deemed inconclusive. This determination was largely related to the great variability in the number of data points in the three surveys. Ayres also determined that the thalweg data failed to take into account other factors that influence channel capacity such as variations in the channel bed, changes in land use and placement of revetment.

As part of the hydraulic analysis Ayres developed an Existing Conditions model. This model predicts the flood flow elevation and velocity for the entire Subreach. The model incorporates the Design Flow volume of 160,000 cubic feet per second at the Butte City gage. It incorporates existing channel bathometrics, land use and off channel topography. It is also calibrated against the 1995 flood flows to ensure accuracy.

A more informative means of describing the channel capacity and the change that has occurred over time was the comparison of the Existing Conditions model with the 1957 Design Flow model. The 1957 Design Flow refers to the analysis conducted by the US army Corps of Engineers in 1957 that was used to define the capacity and parameters of the floodway through water surface elevation lines across the floodway. These Design Flow elevations were compared to those contained in the Existing Conditions model. This comparison found that in about 70 percent of the Subreach the Existing Conditions flood flow levels are below those projected in 1957 by as much as three feet. In the remaining 30 percent of the Subreach the flow levels are higher by as much as one and one-half feet. An important finding, however, was that adjoining the City of Colusa the Existing Conditions flood level is one-half to one and one-half feet below the 1957 Design Flow. Figure 17 shows the graphic representation of the Existing Conditions to Design Flow comparison for the lower portion of the Subreach adjoining the City of Colusa. The analysis noted that no absolute explanation could be provided but it stated that, "obvious reasons include changes in land use within the levees and a greater capacity than design for both weirs."

To address the concern that channel capacity has been restricted over time by the accumulation of large woody debris, an inventory of large woody debris was developed for the entire Colusa Subreach through an on-the-water survey. Then the Existing Conditions model was run with specific adjustments made for the large woody debris to determine the effect that the debris had on flood flow elevations. The analysis concludes that large woody debris makes a very small contribution to flood flow levels, which range from 0 feet to 0.1 feet in the Colusa Subreach. The results were primarily attributed to the small portion of the overall flood flow cross-section occupied by the large woody debris.

Regarding the concern that habitat restoration could decrease the existing level of food protection, the analysis concludes that the proposed habitat restoration will have no substantive effect on the flood levels affecting the levees or adjoining properties. In general, the computed water surface elevations for the proposed restoration sites are at or below either the existing conditions or the 1957 design profile. A more detailed review of the findings related to the effects of habitat restoration is contained in the following Chapter VIII.



**Figure 17. Existing Conditions to Design Flow Comparison for RM 143 to RM147**

*Source: Ayres Associates Inc.*

## F. Colusa Subreach Environmental Evaluation

Because many of the landowner questions related to the effects of the habitat restoration projects that were proposed through CSP, it became apparent that there was a need to identify and evaluate all of the potential effects of the proposed projects under one cover for simplified review by interested stakeholders. Additionally, it was recognized that an analysis of the proposed restoration projects would be required under the California Environmental Quality Act (CEQA). It was determined that these two objectives, stakeholder information and CEQA compliance, could be met in a single comprehensive document. Therefore, the preparation of an environmental report was initiated in the final year of the planning process.

The environmental report serves as a CEQA analysis for CSP but it goes well beyond the basic requirements of CEQA. In order to explain CSP more thoroughly to decision makers, stakeholders, other agencies, and interested members of the public, the report is expanded from the traditional Initial Study format to provide additional information on the background of CSP, the proposed restoration activities, and the substantive issues known to be of concern to agencies and stakeholders.

As required by CEQA, the potential discretionary project approvals that will be required in carrying out the recommendations of CSP are identified as the following:

- Approval of habitat restoration plans by CDFG
- Transfer of three of the tracts now owned by TNC to the Wildlife Conservation Board or another state agency prior to the commencement of restoration
- Authorization of state funding to implement restoration of riparian habitat
- Approval of encroachment permits by the Central Valley Flood Protection Board for restoration of habitat within the Sacramento River floodway
- Other discretionary approvals as may be required

The California Department of Fish and Game was identified as the CEQA “Lead Agency” at the inception of the project. The State Reclamation Board, Wildlife Conservation Board, and Central Valley Water Quality Control Board (CVWQCB) were also identified as Responsible Agencies.

The environmental planning firm, North State Resources Inc. was chosen to prepare the CEQA document in the fall of 2007. In May of 2008 the draft *Evaluation of Environmental Effects Associated with Wildlife Habitat Restoration on Seven Tracts along the Sacramento River between Colusa and Princeton* was released for public and agency review. The document included an overview of CSP activities, a description of the proposed activities, an analysis of existing conditions in the Subreach and an expanded Initial Study as required by CEQA.

The document also contained a draft finding on the part of CDFG that the various activities would not, individually or cumulatively, have a significant impact on the environment subject to the Mitigation Measures that were incorporated into the expanded Initial Study. The identified Mitigation Measures related to protection of biological resources and cultural resources. The findings of the Initial Study were generally consistent with the findings of other previously completed CEQA documents relating to habitat restoration projects along the Sacramento River.

The draft *Evaluation of Environmental Effects Associated with Wildlife Habitat Restoration on Seven Tracts along the Sacramento River between Colusa and Princeton* was initially circulated for public review for 30 days as required by the *State CEQA Guidelines* and that period was subsequently extended to ensure adequate opportunity for public review. The *Evaluation* was reviewed by the Advisory Workgroup on June 16, 2008. It was also made available to the local public agencies, adjoining landowners and other known interested parties. It was circulated to state agencies through the State Clearinghouse.

Only one comment to the document or the proposed CEQA determination was received by CDFG. The one comment received was a standard form comment from the Native American Heritage Commission that outlined appropriate records search, site evaluation, Native American contacts and onsite procedures that are required. A review of the Cultural Resources Assessment Report that was prepared as part of the Baseline Assessment indicated that the planning and research recommendations of the comment had been met.

The proposed Initial Study and Mitigated Negative Declaration were certified by North Central Region of CDFG On August 26, 2008 and a Notice of Determination was filed with the State Clearinghouse.



## VIII. HABITAT RESTORATION PLANS

Colusa Subreach Planning included the development of habitat restoration plans for eight tracts that are owned by a public agency or owned by TNC. They include a total of 390 acres that were converted from riparian habitat to agriculture in the past. The restoration plans identify the restoration opportunities at each tract and the site-specific techniques to be employed to restore riparian habitats. The plans identify the species to be planted and the arrangement of planting at each site. They are based on extensive baseline assessment, information generated through other CSP studies and meetings with neighboring landowners. They are of a sufficient detail that funding applications for restoration can be pursued for each tract in the future.

Through the CSP public engagement process the restoration plans were reviewed with a focus on the adjoining landowners. Initial restoration recommendations were developed as part of the Tract-Specific Baseline Assessment. Meetings were held with adjoining landowners and restoration recommendations were reviewed by the Advisory Workgroup. Draft plans were subject to hydraulic analysis to determine the impact on the flood control system and appropriate adjustments were made to ensure that no substantive impacts to the integrity of the flood management system or to adjoining properties would result from the proposed restoration.

Colusa Subreach Planning did not include the implementation of these restoration plans. The process was directed to develop plans and information that would permit landowners and agency managers to make decisions regarding restoration in the future. One exception to this situation occurred, however, when CDWR and CDPR decided to restore the Ward Tract in the near future as part of the Tisdale Bypass Sediment Removal Project. For the remaining seven potential restoration sites the owners and managers have not yet made a decision regarding restoration. It is expected that such determinations will be related to the availability of funding for these restorations, alternative recreation options and other factors. It is also, recognized that the owners and managers may choose to make adjustments to the restoration sites and the restoration planting plans based upon information available at the time.

### A. Baseline Assessments

Baseline Assessments were prepared for the eight restoration tracts in order to characterize each site and provide the necessary technical basis for the design of restoration plans. The eight tracts are described in Table 9 below and depicted in Figure 18. Each tract contains an area that is a candidate for restoration of native habitat. Assessments involved three subcontracts: Tract-Specific Baseline Assessment, the Cultural Resources Assessment and Insect Pest Research.

**Tract-Specific Baseline Assessment** – Researchers from the Department of Biology at CSU Chico prepared the tract-specific baseline assessment under subcontract to TNC. Work on this subcontract was initiated in the summer of 2004 because of the need to begin this work early and have it completed in time to support the subsequent phases of CSP. This effort will result in two components, the Tract-Specific Baseline Data component and the small mammals research.

**Table 9. Proposed Restoration Tracts**

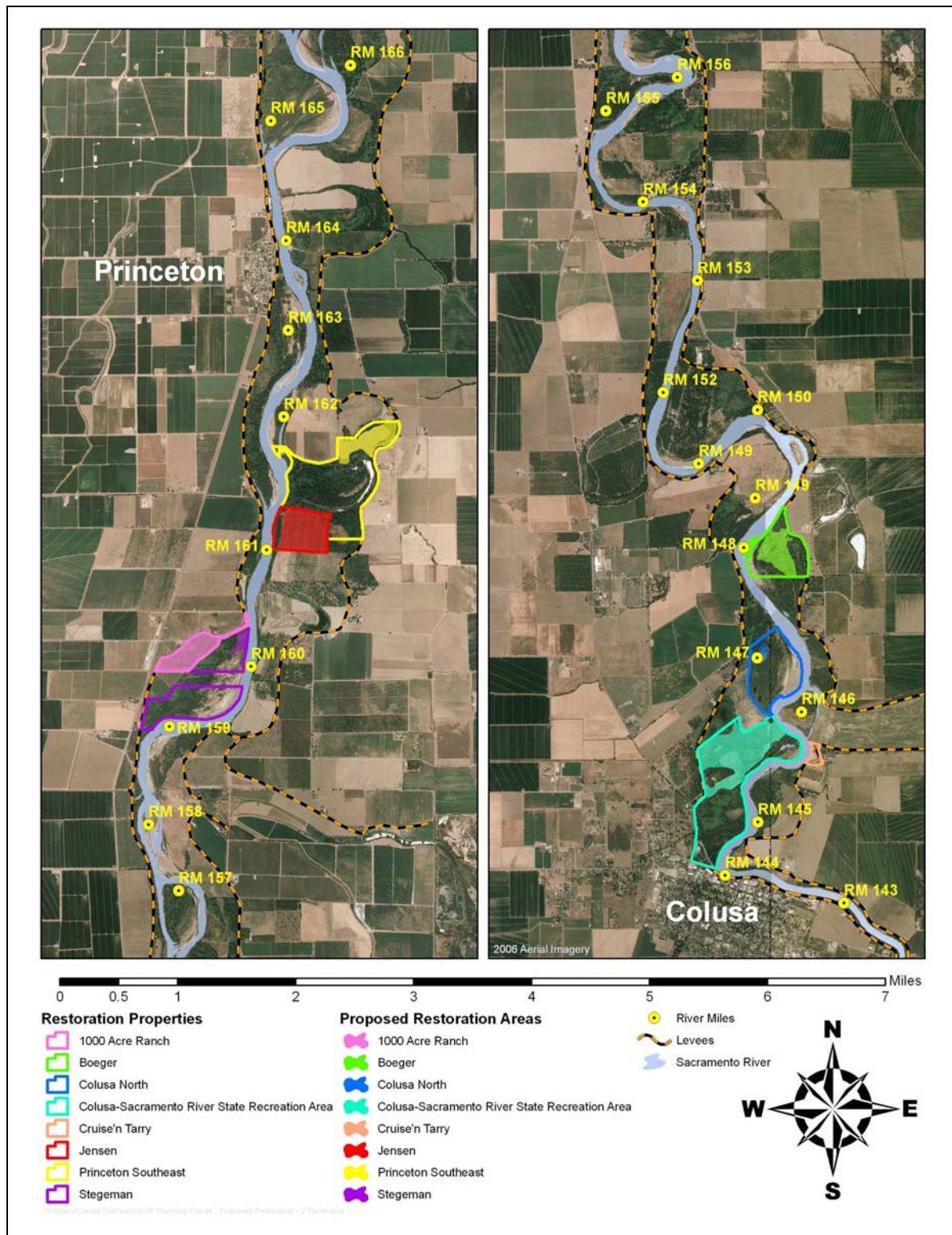
Tract	Total Area	Restoration Area	River Mile	Existing Land Use	Owner/Manager
Womble	320	54	RM 162L	Agriculture-annual field crops	State / CDFG
Jensen	98	81	RM 161L	Agriculture-walnut orchard	TNC
Stegeman	69	8	RM 160R	Fallow-former orchard	State / CDFG
1000-acre Ranch	60	49	RM 160R	Agriculture-prune orchard	TNC
Boeger	125	51	RM 148L	Agriculture-annual row crops	TNC
Colusa-North	143	5	RM 147R	Fallow-former orchard	State / DFG
Ward	238	139	RM 145.5R	Agriculture-annual row crops	State / CDPR
Cruise n'Tarry	10	3	RM 145.5L	Fallow-former marina	State/ DWR
Total Areas	1,063 ac.	390 ac.			

*Source: The Nature Conservancy*

The tract-specific baseline data included research and analysis of existing vegetation, soils, inundation frequency and wildlife in order to develop the basic scientific information that is required for the planning of habitat restoration. It also included description of adjacent land use patterns. This informed a determination as to whether a tract is likely to recruit adequate natural vegetation to restore the habitat, without a horticultural planting program. If planting was judged to be necessary, preliminary restoration planting recommendations were developed. These restoration recommendations included specifications as to the appropriate mix and distribution of plant species. The planting design was developed to replicate the vegetation that would cover the tract under natural conditions. A separate report was provided for each of the eight restoration sites. These last of these reports was completed in February of 2007.

**Small Mammals Research** – This research considered how restoration projects can affect agricultural pest problems, CSUC researchers assessed small mammal distribution and abundance at agricultural lands, young (3-4 years) and older (12-15 years) restoration sites, and remnant riparian forest habitats. Sampling these four habitat types enabled predictions of changes likely to occur at a given restoration site as it transitions from agricultural use to mature riparian habitat. During spring and fall 2005 and 2006, three replicates of each habitat type were sampled using live traps and visual survey techniques. Individual sites were sampled for five consecutive days using 100 traps arranged in 10 x 10 trap grid, with traps spaced 10 meters apart. Once the live trapping was completed, visual surveys were conducted within all cells of the trap grid at each site.

Results suggested that rodent distribution and abundance are strongly influenced by changing habitat conditions and demonstrate clear habitat preferences among both pest and non-pest species. Of the pest species, the California ground squirrel was common only at agricultural sites. Botta's pocket gopher was most common at agricultural sites, although it was also present in considerable abundance at young restoration sites. Gophers were uncommon at older restoration sites and remnant habitats. The California vole was highly abundant at young restoration sites. Because the abundances of voles were dramatically lower at the older sites and remnants, we expect that they will become less common in restored areas as these sites mature and, consequently, less of a problem for farmers. To help control voles at young restoration sites, it was recommended that Barn Owl (*Tyto alba*) nest boxes be erected, as voles are their most common prey at both restoration sites and agricultural properties along the Sacramento River.



**Figure 18. Proposed Habitat Restoration Tracts**

Source: The Nature Conservancy

**Insect Pest Research** – this research considered the effects of riparian habitat on insect pests and insect pest control in the interface between agricultural and riparian habitat on the Sacramento River. Within this landscape, movement of species across boundaries could have both positive (increased pest predators) and negative (increased agricultural pests) effects on crop production.

More specifically, the research focused on insect pests and insect pest-predators associated with remnant riparian forest, restored riparian forest, and walnut farms. She surveyed orange worm (*Amyelois transitella*), codling moth (*Cydia pomonella*) and pest bird species. She also conducted foraging observations of insectivorous bird species, and assessed the effects of excluding these beneficial birds from branches of walnut trees.

The research demonstrated that:

1. Proximity to remnant and restored riparian forest does not appear to have a clear effect on insect pest species. Navel orange worm is most abundant on farms adjacent to non-forest habitat. These results could reflect the number of mummy nuts left on the walnut trees or proximity to almond or other walnut orchards, or could reflect the ability of remnant and restored riparian forest to act as a movement barrier for navel orange worm. There was also no relationship between codling moth abundance and proximity to habitat.
2. Proximity of restored riparian habitat has an effect on density of two riparian insectivorous bird species and an effect on density of insectivorous bird species that feed on codling moth. However, there were no significant patterns for other insectivorous bird species or for all riparian insectivorous bird species combined. Some of the bird species, such as woodpeckers, have large feeding ranges during the winter that allow them to forage far from riparian habitat. It is possible that there is a certain distance from riparian forest that is too far for such species, but that such distance was not contained within this study. It is also possible that during winter the habitat needs for these riparian species are not as specific as during the breeding season when they have specific nesting requirements. This could lead to more riparian species using agricultural areas during winter.
3. The exclosure work suggested that avian natural enemies do not have an effect on herbivory on walnut trees, either near or far from riparian habitat. However, as described above, codling moth predators have higher densities on farms adjacent to restored habitat. Therefore, it is expected that birds associated with restored habitat may have an effect on some specific pest species (e.g., codling moth).

**Cultural Resources Assessment** – The Archaeological Research Program at CSU Chico performed the Cultural Resources Assessment under subcontract to TNC. The intent of the Assessment was to document any significant cultural resources on the restoration tracts and to ensure that any subsequent restoration plans were designed so that they do not impact such cultural resources. The Assessment built upon the *Cultural Resources Overview and Management Plan, Sacramento River Conservation Area, Tehama, Butte, Glenn and Colusa Counties, California* that was prepared in 2003 as part of Chico Landing Subreach Planning.

The Assessment included review of existing archaeological records for the entire area of the restoration tracts, field survey of the restoration areas of these tracts and preparation of a report summarizing the findings of the study. The report also specified appropriate protections for any identified cultural resources. The Ward Tract was included in the *Cultural Resources Overview and Management Plan*, as referenced above, in 2003. Cultural resources information regarding the Ward Tract was, however, updated and incorporated in the Cultural Resources Assessment Report.

The report was completed in January of 2005 and presented to the Advisory Workgroup for review. One potent archaeological site was identified and mitigation measures to protect the site were recommended. These measures were incorporated into the restoration plan for the subject tract. The specific location of these potentially important cultural resources was kept confidential to protect the resources.

## **B. Coordination with Neighboring Landowners**

The owners of land that adjoined the proposed restoration tracts were contacted at many points in the planning process. A listing of all neighboring landowners was initially prepared from the Colusa County Assessor's ownership roles in 2004 and it was updated in 2007. Contact persons throughout the planning process were the record landowner except where a land manager was recommended as a more appropriate point of contact. Landowners or their representatives were contacted and asked to be a part of the initial and final landowner survey conducted by the Institute for Social Research. They also received all annual CSP newsletters, SRCAF quarterly newsletters and notices of public meetings and workshops. Many of the adjoining landowners attended one or more of the CSP public meetings and workshops. Numerous telephone conversations with project staff also occurred.

During the preparation of the Baseline Assessments in March through May of 2005, the owners of properties that directly adjoined the restoration areas were contacted and meetings were held with TNC staff where possible. In these meetings the planning process was reviewed, the development of restoration plans was explained and questions were answered. Contact information for TNC staff was provided and an offer to meet at the landowner's request was conveyed.

A second series of meetings occurred when hydraulic modeling results were complete in March and April of 2008. For landowners that directly adjoined the proposed restoration areas, direct meetings were requested and information related to restoration planning and hydraulic modeling results was shared. Of the seven directly adjoining ownerships, four direct meetings were held and two phone call meetings were held with mailed follow-information. One of the owners indicated that he did not wish to meet and he was mailed a written explanation of the proposed restoration and a summary of the hydraulic modeling findings. For the twelve owners that had property separated from the restoration areas by existing habitat or levees, a written explanation of the proposed restoration and the hydraulic modeling findings was sent by mail, which included an offer to meet directly if such a meeting was desired by the landowner. In this final round of meetings and mailings important points that were emphasized in text and graphics included:

- Where the proposed restoration was located relative to the landowner's property
- What vegetation communities were proposed and where they would be located
- The specific findings of the hydraulic modeling related to flood flow elevation and flood flow velocity
- A description of what restoration would include and how it would be conducted
- That, with the exception of the Ward Tract, a determination to restore the subject tract had not been made and that it would be a future determination
- Contact information for the TNC project manager was provided

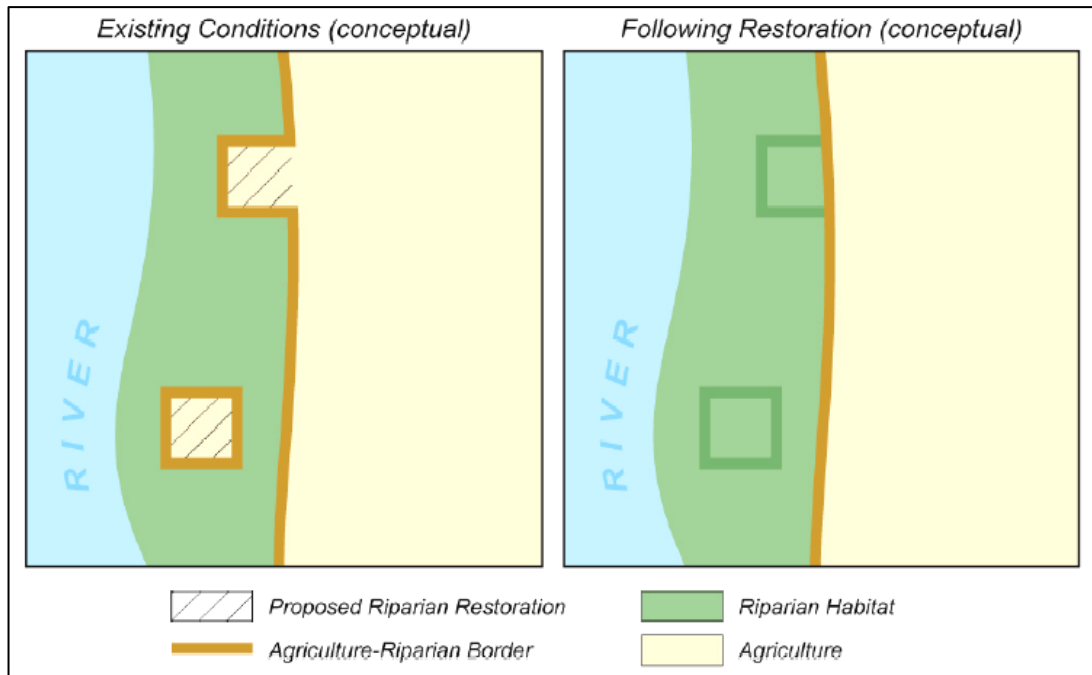
Of the owners who responded to the second round of meetings and written communications, only one expressed substantive concerns with the proposed restoration plans. Some indicated that they felt that restoration was an acceptable exercise of property rights as long as neighboring properties were not unreasonably affected. Several of the neighbors also indicated that they were supportive of restoration. The one owner that was opposed to restoration indicated that he did not wish to meet with project staff to review the draft restoration plan. It was assumed, from prior conversations, that potential public ownership and access combined with potential trespass problems were the principal sources of his concern. Lacking further direct communication, however, this assumption could not be verified.

### **C. Proposed Restoration Tracts and Plans**

Eight tracts were chosen for restoration evaluation and planning within the Subreach. Each site appeared to have the potential to support native vegetation that would provide high value habitat for wildlife. As previously noted, the eight tracts are owned by public agencies or by TNC. They are all located adjoining or in close proximity to the river and are inside of the levees. All of the tracts are subject to frequent flooding, most with an inundation frequency of one to two years. On two of the tracts, the agricultural use has been abandoned. The remaining six tracts retain some agricultural use.

Each of the eight tracts adjoins an existing area of remnant riparian habitat. Restoration will fill gaps in wildlife habitat so that the resulting habitat areas will be larger and more connected. As a result these larger areas will better support viable populations of special status species as well as other native species and game species.

One of the common concerns expressed by some landowners in the Colusa Subreach and along the Sacramento River in general was that restoring wildlife habitat in close proximity to crops will result in negative impacts to the crops caused by animals that live in the riparian habitat. This concern was analyzed in the *Pest and Regulatory Effects Study* as explained in Chapter VII. An evaluation of the proposed restoration areas contained in that *Study* indicates, however, that the specific locations of the eight tracts minimize such effects. The restoration areas have a limited interface with cropland on adjoining ownerships. Figure 19 provides a conceptual depiction illustrating that gaps in habitat can be filled and the interface between wildlife habitat and cropland can be diminished in the process.



**Figure 19. Infill in Riparian Habitat**

Source: Pest and Regulatory Effects Study

Only about 11 percent of the perimeters of the proposed restoration areas adjoin cropland and 89 percent of the perimeters adjoin remnant riparian habitat or flood protection levees. Table 10 provides details related to the uses that surround the restoration areas. All of the adjoining cropland areas already have a substantial portion of their perimeters that are adjacent to riparian habitat and any effects that are related to animal species. As a result, while the portion of the cropland will increase, the proposed restorations will not add a new factor that has not already been present in the area so that any effects should be proportionately limited.

**Table 10 Proposed Restoration Tracts and Adjoining Land Use**

Restoration Tract	Total Area	Restoration Area	Adjoining Riparian	Adjoining Levee	Adjoining Cropland	Percent Adjoining Cropland
Womble	320	54	5,226	2,095	1,161	13.7%
Jensen	98	81	5,819	0	2,117	26.7%
Stegeman	69	8	3,044	0	0	0%
1000-acre Ranch	69	49	2,234	3,561	1,255	17.8%
Boeger	125	51	6,789	221	0	0%
Colusa-North	143	5	2,256	0	0	0%
Ward	238	139	12,774	974	1,338	8.9%
Cruise n"Tarrry	10	3	2,173	538	0	0%
	<b>1,063 ac.</b>	<b>390 ac.</b>	<b>40,084 ft.</b>	<b>7,399 ft.</b>	<b>6,092 ft.</b>	<b>11.4%</b>

Source: The Nature Conservancy



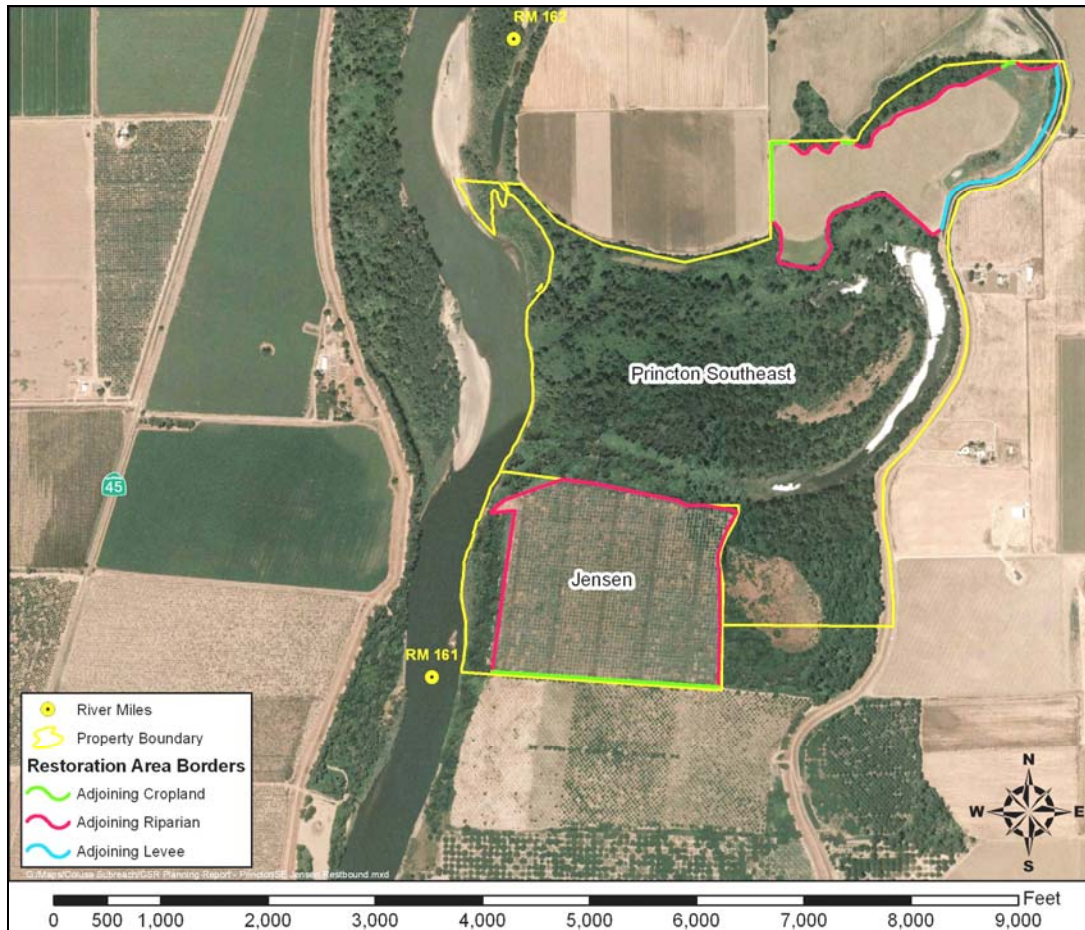
**Womble Tract** is an approximate 320-acre site located about one mile south of Princeton, on the east side of the river. Figure 20 depicts the site on a 2006 aerial photo. The majority of the tract is in riparian habitat, which includes a large oxbow lake. The oxbow lake was formed after the river channel was cut across Boggs Bend about 1930. Approximately 54 acres of the northeast corner of the tract has been cleared 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 and is managed as the Princeton-Southeast Unit of the Sacramento River Wildlife Area. The Womble Tract adjoins the Jensen Tract to the southwest. The site has access from River Road on the east.

Only about 14 percent of the proposed restoration area on the Womble Tract abuts existing cropland to the north and west. The cropland to the east is separated by the flood protection levee and River Road. The majority of the property to the west is annually planted to field crops. The restoration area abuts about 1100 feet of the ownership to the west. Along that joint property line, approximately 350 feet of the boundary is remnant habitat and 750 feet of the boundary is field crops. The adjoining property abuts remnant habitat to the south and west and along most of its northern perimeter. The proposed restoration will result in a relatively small increase in the portion of the cropland perimeter that abuts riparian habitat.

The agricultural property to the north is substantially separated from the Womble Tract by remnant riparian habitat. The common boundary is about 4000 feet in length and only three small gaps exist in the vegetation, totaling about 300 feet, where the proposed restoration would abut the field crops to the north. The additional exposure between filed crops and riparian habitat would be very small.

Active restoration is proposed to restore native riparian vegetation on the 54-acre field crop area based upon analyses presented in the *Baseline Assessment for Riparian Restoration at the Womble Restoration Area* and referenced in this description of the Womble Tract (Hubbell et al. 2006). The proposed vegetation communities within the restoration area along with remnant riparian habitat in the general vicinity of the Womble Tract are shown on Figure 21. The existing patches of mixed riparian forest adjacent to the northern portion of the Womble Tract have required more than 50 years to attain their current size. This suggests that the development of high-quality habitat would occur very slowly. In addition, the higher elevation of the western two-thirds of the proposed restoration area would probably preclude the amount of flooding required for successful restoration through natural processes. The higher floodplain could also contribute to an increased risk of infestation by non-native invasive species, such as yellow-starthistle, Johnson grass, and Bermuda grass.

Mixed riparian forest is proposed to be restored on most of the site 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. It has loamier soils and a greater depth to the water table and is mainly within the estimated 2- to 4-year floodplain. These characteristics are typical of areas that support mixed riparian forest.



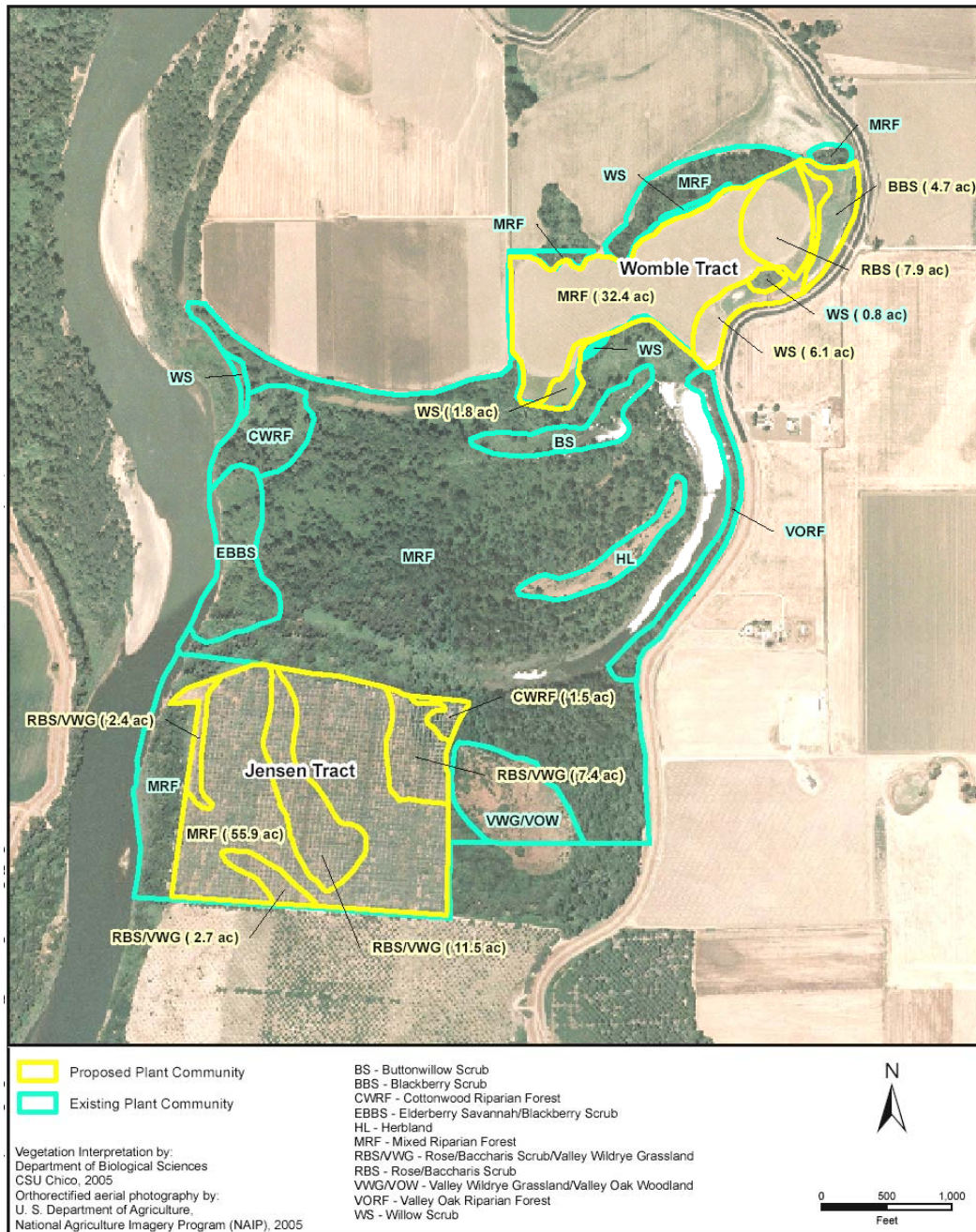
**Figure 20. Womble and Jensen Tracts**

*Source: The Nature Conservancy*

Rose/baccharis scrub vegetation would be planted in an area adjacent to the eastern edge of the proposed mixed riparian forest. The Womble Baseline Assessment Report found evidence of a gravel pit in this part of the site in the 1968 Glenn County Soil Survey as well as on a 1952 aerial photo. Soils in this area tend to be coarser-textured and thus drier than surrounding areas and are very slightly mounded.

Narrow stringers of willow scrub vegetation 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. Both the willow scrub and blackberry scrub restoration areas are subject to ponding annually, as a result of their slightly lower elevation. The area proposed for restoration as blackberry scrub encompasses an area that historically was occupied by an oxbow lake (Hubbell et al. 2006). The area coincides with the elevation of surrounding elderberry blackberry scrub and the California blackberry-dominated shrub layer in the northern patch of mixed riparian forest adjacent to the site.

An adjustment to the restoration plan for the Ward Tract was made that incorporated a buffer on the west border of the restoration area. The westerly three rows of trees



**Figure 21. Proposed Plant Communities for the Womble and Jensen Tracts**

*Source: The Nature Conservancy*

and shrubs were eliminated from the mixed riparian forest community to create a relatively open area adjoining the field crop land to the west. The width of this buffer area will be approximately eighty feet and within this area only native grass will be planted. The buffer area was added following discussions with the manager of the adjoining cropland. The intent of the buffet is to provide separation between the riparian forest and the crop area and the manager felt that this separation would



provide flexibility to deal with potential pest effects, especially if the crop planted in the adjoining area changed in the future.

**Jensen Tract** is an approximate 98-acre site located about 1.75 miles south of Princeton on the east side of the river. Figure 20 depicts the site on a 2006 aerial photo. About 81 acres of the tract is a walnut orchard and 17 acres are in riparian vegetation. The tract floods approximately every one to two years. The tract was purchased by TNC in 2000. The Jensen Tract adjoins the river on the west, and riparian portions of the Womble Tract on the north and along the north half of the east boundary. Access to the site is across a private easement from River Road.

The existing orchard area is proposed to be restored to riparian habitat. The orchard area abuts onsite riparian area to the west. It abuts a walnut orchard, with a single owner on the south; and a riparian area, with a single owner along the south half of the east boundary. The orchard area is leveled and irrigation is supplied from an onsite well.

The Jensen Tract abuts agricultural land to the south and riparian habitat the other three sides. Approximately 27 percent of the proposed restoration area is adjacent to existing cropland. The land to the south is a mature walnut orchard with about 2100 feet adjacent to the proposed restoration area. The walnut orchard currently abuts riparian vegetation along its western perimeter and along about 40 percent of its northern perimeter.

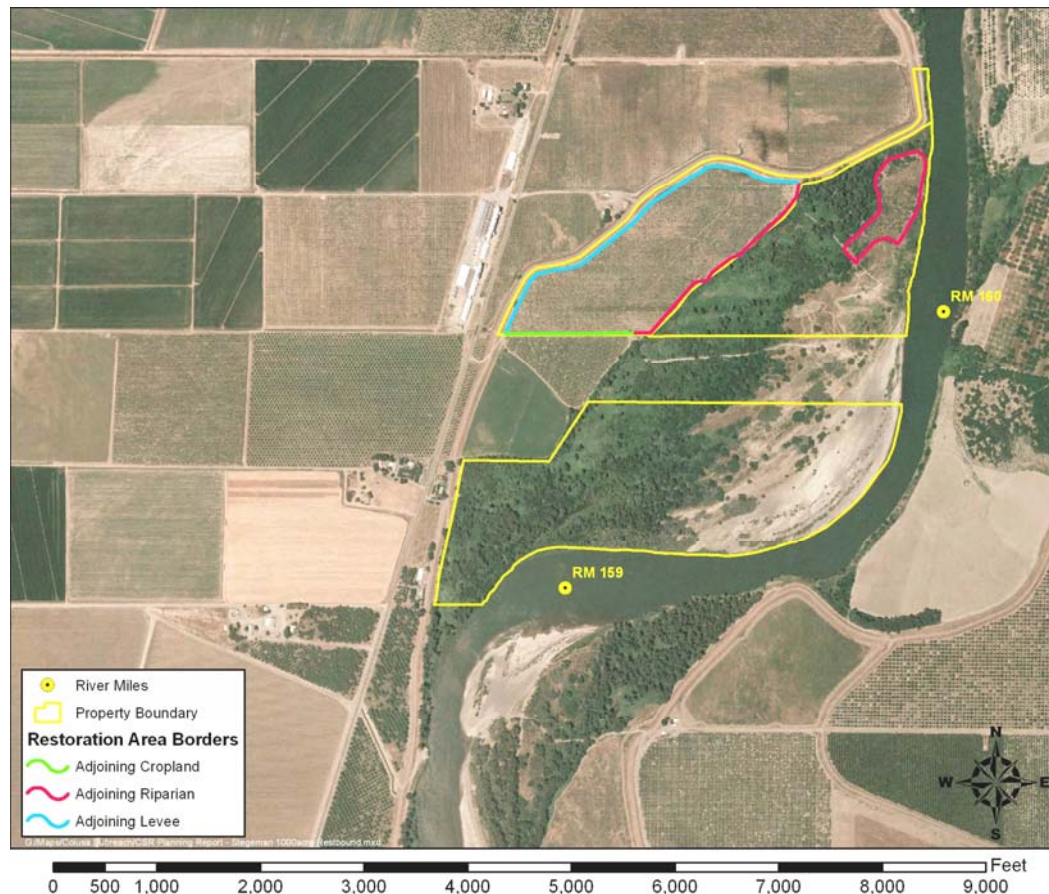
Active restoration is proposed to restore native riparian vegetation on 8 acres of the 69-acre area Stegeman Tract based upon analyses presented in the *Baseline Assessment for Riparian Restoration at the Jensen Restoration Area* and referenced in this description of the Jensen Tract (Hubbell et al. 2006). The proposed vegetation communities within the restoration area along with remnant riparian habitat in the general vicinity of the Jensen Tract are shown on Figure 21. The existing mixed riparian habitat adjacent to the northern portion of the restoration area has required more than 50 years to attain their current size. This suggests that the development of high-quality habitat would occur very slowly. In addition, the higher elevation of the proposed restoration site would likely preclude it from flooding to the degree required for natural process restoration to be successful. The higher floodplain also contributes to an increased risk of infestation by non-native invasive species such as yellow-starthistle, Johnson grass, and Bermuda grass.

After removal of the existing walnut orchard, most of the site would be converted to mixed riparian forest, which would expand the existing mixed riparian forest north and west of the site. The restoration area is appropriate for riparian forest habitat because of its clay loam soils, the fact that its elevation is similar to that of the remnant vegetation, and its location within the 1- to 2-year floodplain.

The mid-section and portions of the site along the western, southern, and northeast boundaries would be restored to rose/baccharis scrub and valley wildrye grassland. The combination of these two vegetative habitat types would reflect both the composition of the valley wildrye grassland/valley oak woodland found in nearby remnant vegetation as well as the physical factors of the proposed restoration area. Planting of rose/baccharis scrub vegetation would provide structural and habitat diversity to the site.

A small area of cottonwood riparian forest would be planted in the northeast corner of the proposed restoration site. Restoration of this portion of the site to cottonwood riparian forest would expand the cottonwood forest near the oxbow lake located to the northeast and increase habitat diversity. The higher water table in this portion of the restoration area, the fact that its elevation is similar to that of the adjacent remnant vegetation, and its location in the 2-year floodplain make it conducive to supporting cottonwood riparian forest.

**Stegeman Tract** is an approximate 69-acre site located, on the west side of the river, about 2.85 miles south of Princeton. Figure 22 depicts the site on a 2006 aerial photo. About 61 acres of the tract is in riparian habitat. Approximately ten acres is occupied by a walnut orchard that has been abandoned for over 17 years. The tract is flooded about every one to four years depending on elevation. It was purchased by the State of California in 1990 and it is the northerly parcel of the Stegeman Unit of CDFG's Sacramento River Wildlife Area. The tract adjoins the 1000-Acre Ranch Tract on the west. Access to the site is across a private easement from Highway 45.



**Figure 22. The Stegeman and 1000-acre Ranch Tracts**

*Source: The Nature Conservancy*

The abandoned orchard area is proposed to be restored to riparian habitat. The abandoned orchard area is entirely surrounded by onsite riparian habitat but the

walnut trees have effectively precluded natural conversion to riparian over the last 17+ years. The orchard area is generally level and no irrigation infrastructure exists. The proposed restoration on the Stegeman Tract is completely surrounded by existing riparian habitat on state-owned property. The flood protection levee further separates the restoration site from the nearest cropland, a young pecan orchard, which is about 400 feet to the northwest.

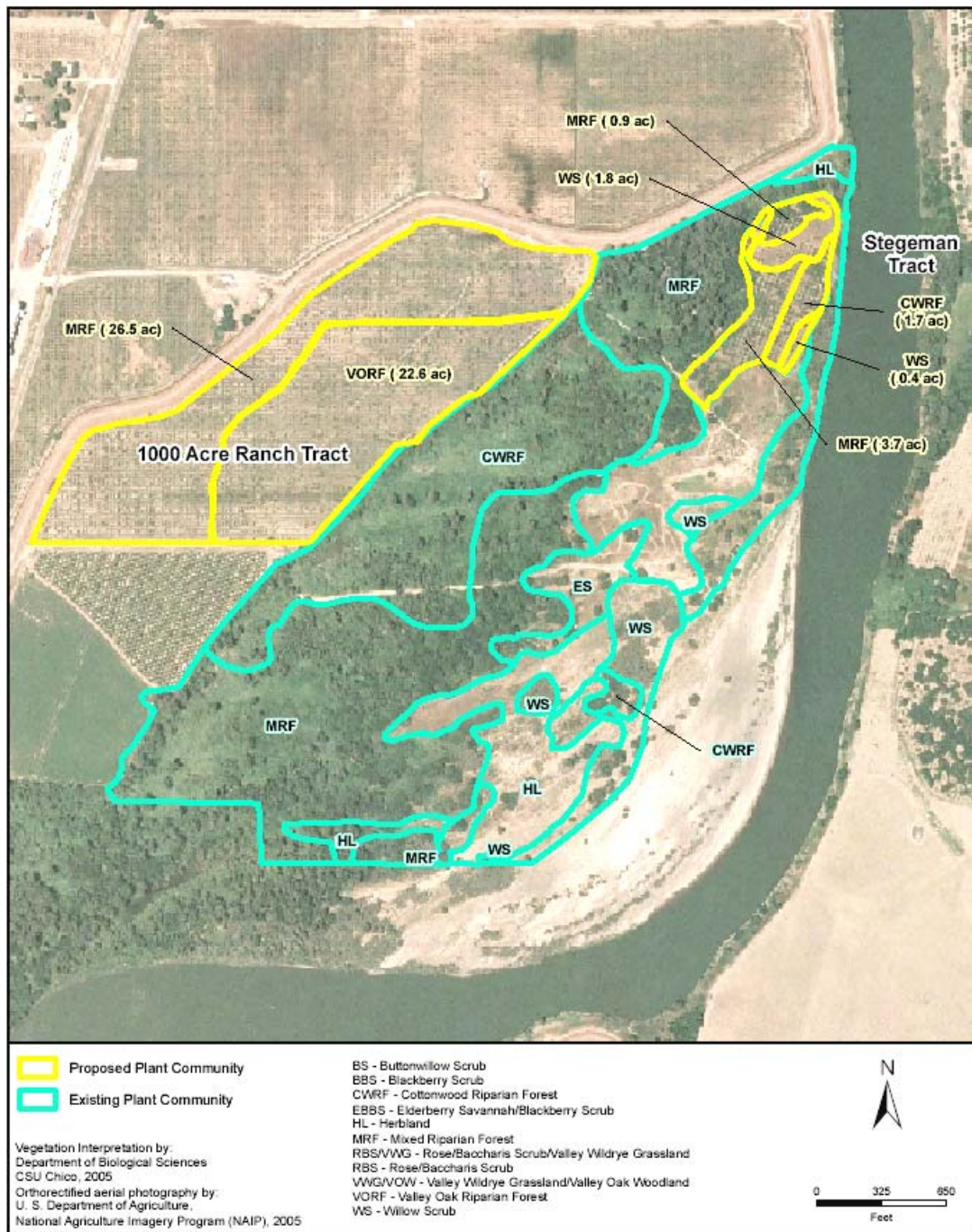
Active restoration is proposed to restore native riparian vegetation on 49 acres of the 1000-Acre Ranch Tract based upon analyses presented in the *Baseline Assessment for Riparian Restoration at the Stegeman Restoration Area* and referenced in this description of the 1000-acre Ranch Tract (Hubbell et al. 2006). The proposed vegetation communities within the restoration area along with remnant riparian habitat in the general vicinity of the Stegeman Tract are shown on Figure 23.

Although the proposed Stegeman Tract restoration site is near the main channel of the Sacramento River and lies primarily in the estimated 1- to 2-year floodplain, elevation data show that the entire proposed restoration site is higher by several feet than the large area of remnant vegetation to the west and south (Hubbell et al. 2006c). This suggests that the proposed restoration site would probably not flood to the degree required for natural process restoration to be successful. In addition, the Stegeman Tract Baseline Assessment Report found through a comparison of air photos (1999 and 2004) that the proposed restoration site had remained essentially unchanged during the 5-year period assessed and that significant colonization by native species had not occurred (Hubbell et al. 2006a). This means that active intervention (orchard removal and weed control) is warranted in order to prevent the continued infestation of non-native invasive species, such as yellow starthistle, Johnson grass, and Bermuda grass.

Mixed riparian forest would be restored to the north and over much of the western and southern portions of the site where soils were determined by the baseline report to be most conducive to tree growth. Willow scrub would be planted in the sandiest areas of the site where poor orchard growth and regular flooding (1- to 2-year intervals) was found to occur. Willow scrub would also be planted in a small area along the site's eastern boundary. Also in the eastern portion of the site, cottonwood riparian forest would be planted to allow for extension of the existing cottonwood riparian forest habitat throughout the approximate 1-year floodplain. Soils here are coarser textured and thus better drained than those where mixed riparian forest is proposed.

An alternative to restoration planting of the Stegeman Tract is passive restoration, which would involve only the removal of the abandoned walnut orchard and initial weed control. This would be a lesser cost option that may be pursued because the restoration area is relatively small, and economies of scale would make the active restoration of the tract more expensive on a cost-per-acre basis. Also, the tract lacks an onsite well to provide a water supply for initial irrigation. This alternative would result in a much slower conversion to native plant communities with increased competition from nonnative invasive species. The inherent limitations of this small restoration site may be overcome, however, if the restoration is combined with that of the nearby 1000-acre Ranch Tract. It is expected that CDFG will determine in the future whether active or passive restoration of the tract will be pursued.





**Figure 23. Proposed Plant Communities for the Stegeman and 1000-acre Ranch Tracts**

Source: The Nature Conservancy

**1000-Acre Ranch Tract** is an approximate 60-acre site located on the west side of the river about 2.75 miles south of Princeton. Figure 22 depicts the site in on a 2006 aerial photo. Forty nine acres of the tract is an older prune orchard and the remaining eleven acres are covered by the levee and the adjacent access area.



The tract is estimated to be inundated about every two to four years. The tract was purchased by TNC in 2003. The 1000-Acre Ranch Tract adjoins the Stegeman Tract on the east. Access to the site is across a private easement from Highway 45.

The existing orchard area is proposed to be restored to riparian habitat. The tract area abuts a young walnut orchard to the south, which is under the same ownership as the adjoining riparian habitat to the east. The restoration area has been leveled and irrigation is supplied from an offsite well.

The proposed restoration area on the 1000-Acre Ranch Tract abuts remnant riparian habitat on the east, the flood protection levee on the north and west and about 18 percent of its perimeter is adjacent to cropland. The southern border abuts a walnut orchard along a boundary of about 1250 feet. The majority of the parcel containing the walnut orchard parcel is existing riparian habitat and the orchard abuts that onsite riparian habitat to the east. The orchard's direct exposure to adjacent habitat would be increased substantially although the general area contains a large amount of riparian habitat.

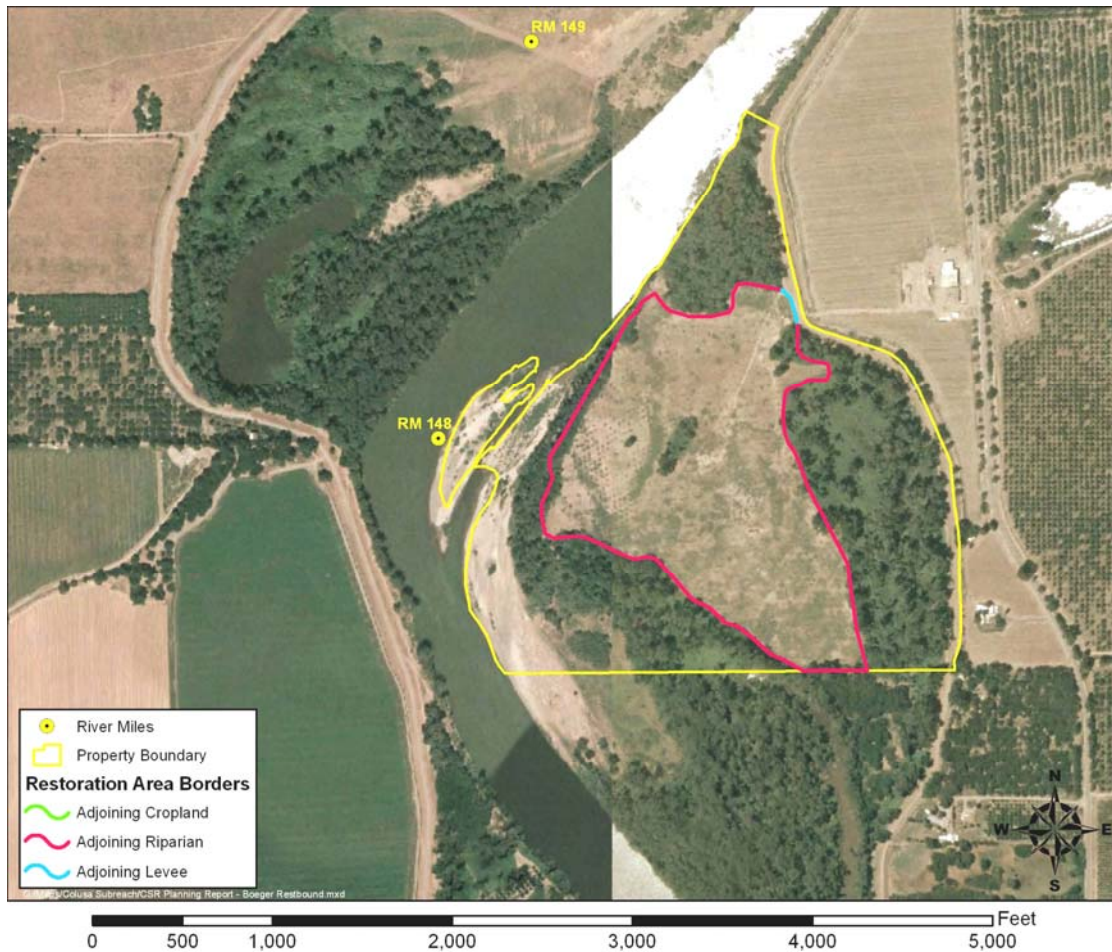
Active restoration is proposed to restore native riparian vegetation on 49 acres of the 1000-Acre Ranch Tract based upon analyses presented in the *Baseline Assessment for Riparian Restoration at the 1000-acre Ranch Restoration Area* and referenced in this description of the 1000-acre Ranch Tract (Hubbell et al. 2006). The proposed vegetation communities within the restoration area along with remnant riparian habitat in the general vicinity of the Tract are shown on Figure 23.

Upon removal of the existing prune orchard, a curved band of mixed riparian forest would be planted from the north along the western boundary and over much of the southern portion of the tract, connecting to the existing mixed riparian forest habitat to the east. Although the entire tract was modeled within the 5-year floodplain where valley oak riparian forest would be anticipated, the shallow depth to the water table and the clayey soils of the western portion of the tract make it more appropriate for mixed riparian forest restoration.

Valley oak riparian forest would be planted in the sandier, coarser-textured soils of the eastern portion of the tract. In this portion, the depth to the water table is greater and the reduced flood interval (approximately every 2 to 4 years) is typical for valley oak riparian forest habitat. Although the area is adjacent to remnant cottonwood riparian forest, there are several large valley oaks along its western edge.

**Boeger Tract** is an approximate 125-acre site located about 2.5 miles north of Colusa on the east side of the river. Figure 24 depicts the site on a 2006 aerial photo. About 74 acres are in riparian habitat and 51 acres are now in field crops. The tract is flooded about every one to four years, depending on elevation, and it was purchased by TNC in 2002. The Boeger Tract adjoins the river, on the west and north. It abuts the levee on the east and private riparian habitat on the south. Access to the site is across a private easement from River Road.

The existing field crop area is proposed to be restored to riparian habitat. The field crop area is surrounded by onsite riparian, the adjoining private riparian property to the south and the levee on the east. The row crop area is generally leveled, and irrigation is supplied from an onsite well. Restoration of the tract would increase the local area of contiguous riparian vegetation, from approximately 140 to 195 acres.

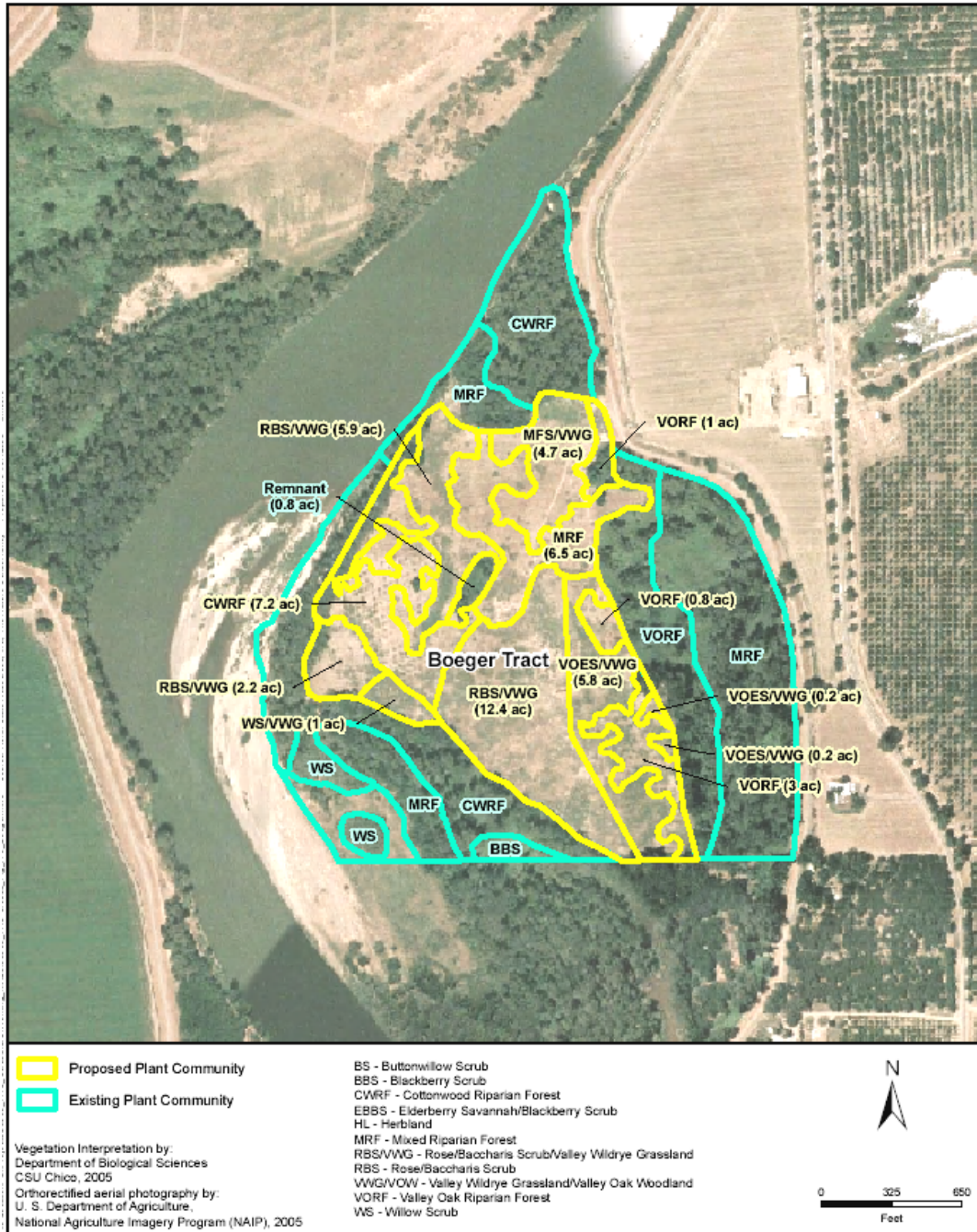


**Figure 24. The Boeger Tract**

Source: The Nature Conservancy

The restoration area on the Boeger Tract does not directly abut any existing cropland. Approximately 97 percent of the perimeter abuts remnant riparian habitat and 3 percent abuts the levee. A young walnut orchard to the north east is separated by the flood protection levee along a 200 foot gap in the riparian vegetation. Riparian vegetation lies across the levee from most all of the young orchard. A mature walnut orchard to the south is separated by a relatively dense area of riparian vegetation that averages about 30 feet in width. The orchard is completely surrounded by riparian vegetation, most of it on the same property.

Active restoration is proposed to restore native riparian vegetation on 51 acres of the 125-acre Boeger Tract based upon analyses presented in the *Baseline Assessment for Riparian Restoration at the Boeger Restoration Area* and referenced in this description of the 1000-acre Ranch Tract (Hubbell et al. 2006e). The proposed vegetation communities within the restoration area along with remnant riparian habitat in the general vicinity of the Boeger Tract are shown on Figure 25.



**Figure 25. Proposed Plant Communities for the Boeger Tract**

Source: The Nature Conservancy

Although the Boeger Tract is located near the main channel of the Sacramento River, is predominantly in the 1- to 2-year floodplain, and has generally similar elevation (USACE 1997) to the adjacent remnant riparian vegetation, the baseline report prepared for the tract (Hubbell et al. 2007) determined that natural regeneration in the surrounding vicinity was better suited to lower elevations than those that occur within the proposed restoration area. The proposed restoration area would probably not flood to the degree required for natural process restoration

to be successful. The higher floodplain also contributes to an increased risk of infestation by non-native invasive species, such as yellow-starthistle, Johnson grass, and Bermuda grass.

Differences in elevation, soils, and flood potential result in a mosaic pattern of proposed habitat restoration species plantings. Rose baccharis scrub/valley wildrye grassland would be planted in the coarser, drier sandy loam soils that occupy much of the southern and western portions of the site. Although rose/baccharis scrub does not currently occur in the Boeger Tract, species such as California rose and baccharis occur as a major understory component of many of the remnant vegetation communities in the Colusa Subreach project area. Similarly, valley wildrye grassland, while not found to occur in the Boeger Tract, does occur throughout the Colusa Subreach project area under suitable environmental conditions (e.g., soils, elevation), such as those found within the proposed restoration area. Planting of rose/baccharis scrub/valley wildrye grassland in the proposed restoration area would provide structural and habitat diversity in the proposed restoration area.

Mixed riparian forest plantings in the northern half of the proposed restoration area would expand the existing mixed riparian forest habitat north and east of the site. The wetter, finer-textured clay loams and elevations similar to similar adjacent habitat would be conducive to the establishment of mixed riparian forest. Mule fat scrub/valley wildrye grassland would be planted in the northeast portion of the proposed restoration site. These habitat types would reflect both the physical factors of this part of the site and the herbaceous composition of the mule fat scrub. Combining mule fat scrub with valley wildrye grassland would provide structural and habitat diversity in the proposed restoration area.

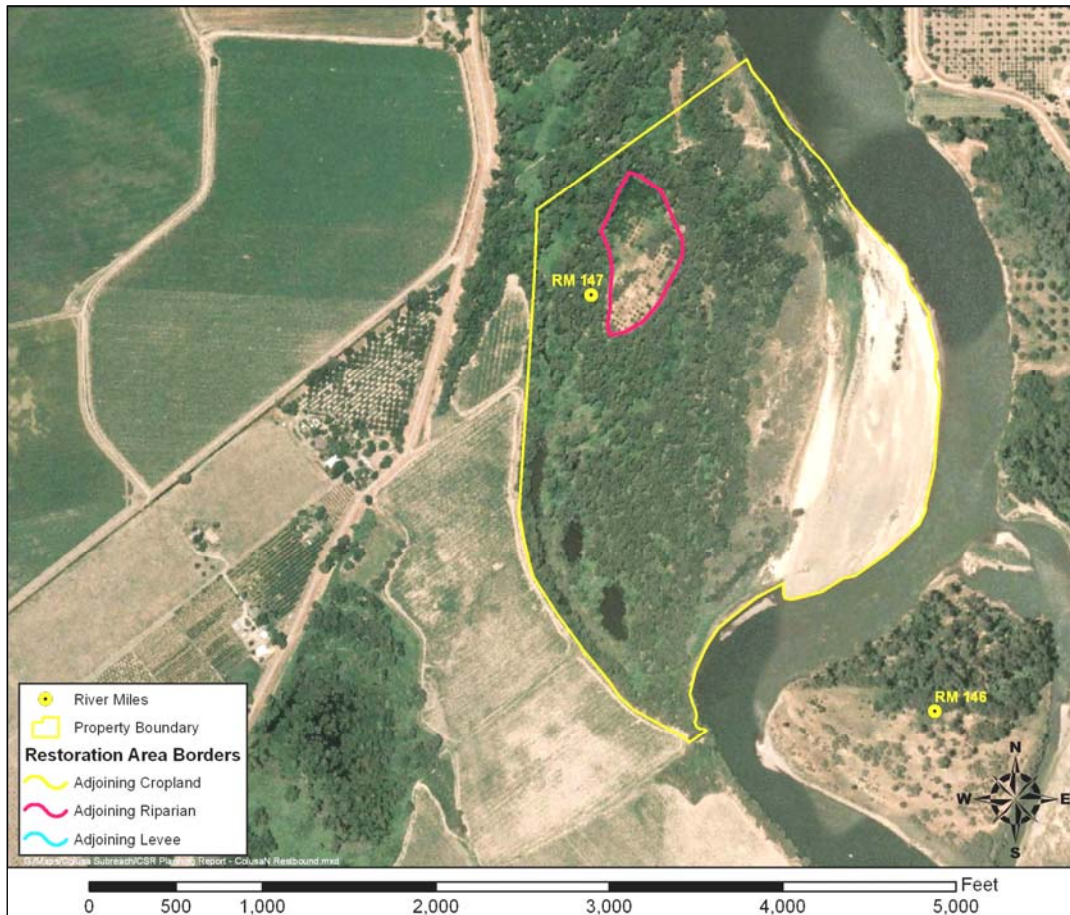
Cottonwood riparian forest would be planted in the western half of the proposed restoration site, which would expand the existing forest to the west of the proposed restoration site. This area has clay loam and silty clay loam soils and an elevation that is similar to that of the remnant vegetation; it is in the 1-year floodplain and has a slightly higher water table than the rest of the site.

Valley oak riparian forest plantings along the eastern proposed restoration site boundary would expand the existing valley oak riparian forest to the east. The elevation of this area is similar to that of the remnant vegetation, and the area is within the estimated 4-year floodplain. Valley oak savannah/valley wildrye grassland would be planted adjacent to valley oak riparian forest areas. Valley oak savannah often intergrades with valley oak riparian forest and/or woodlands (Hubbell et al. 2006e). With the particular configuration of sandy soils, estimated floodplains, and the adjacent valley oak riparian forest, there is an opportunity to create a forest/savannah/shrubland mosaic that would provide important structural diversity and patchiness for wildlife.

A very small pocket of willow scrub/valley wildrye grassland would be planted in the southwest corner of the proposed restoration site to increase the number of existing willow scrubs. Willow scrub and valley wildrye grassland would be combined to reflect both the physical factors of the proposed restoration area and the herbaceous composition of the willow scrub.



**Colusa-North Tract** is an approximate 143-acre site located on the west side of the river, about 2 miles north of Colusa. Figure 26 depicts the site on a 2006 aerial photo. About 113 acres of the tract is in riparian habitat. Approximately five acres is occupied by a walnut orchard that has been abandoned for over 14 years. The tract floods about every one to two years, depending on elevation. It was purchased by the State of California in 1994 and comprises the northerly subunit of the Colusa Unit of DFG's Sacramento River Wildlife Area. The tract is north of the Ward Tract, with an intervening private property, where the owner has indicated a desire to restore natural habitat in the future. Access to the site is across a private easement.



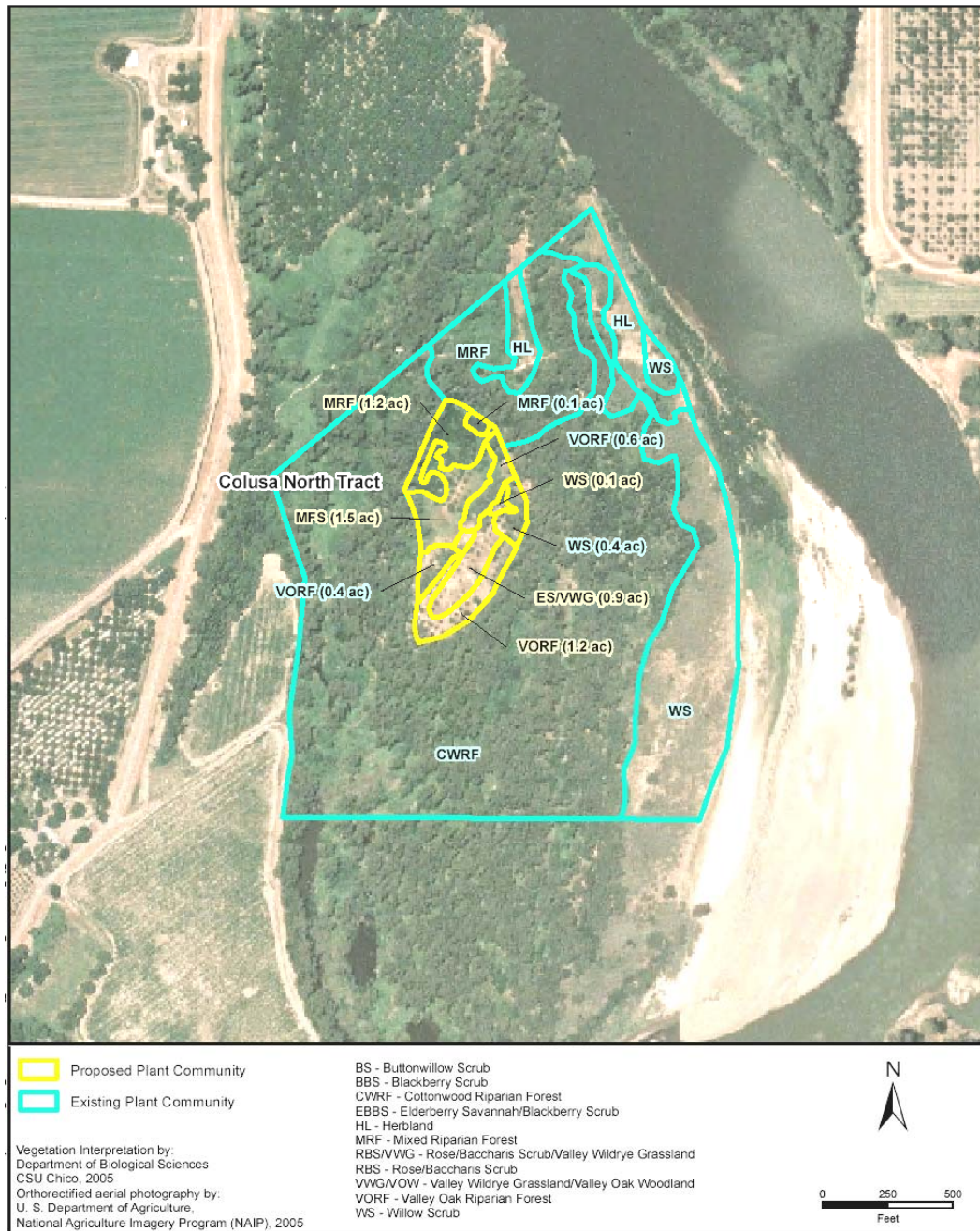
**Figure 26. The Colusa-North Tract**

*Source: The Nature Conservancy*

The abandoned orchard area is proposed to be restored to riparian habitat. The area is entirely surrounded by onsite riparian habitat, but the walnuts have effectively precluded natural conversion to riparian habitat over the last 10+ years. The orchard area is generally level and no irrigation infrastructure exists.

The Colusa North restoration site is completely surrounded by riparian habitat on state-owned property. It does not abut any agricultural land and it is more than 700 feet away from the nearest crops. The restoration of the area would not be expected to result in any noticeable difference in the cropland and riparian habitat interface in the area.

Active restoration is proposed to restore native vegetation on 5 acres of the 143-acre Colusa-North Tract supported by information contained in *Baseline Assessment for Riparian Restoration at the Colusa-North Restoration Area* and referenced in this description of the Colusa-North Tract (Hubbell et al. 2006). The proposed vegetation communities within the restoration area along with remnant riparian habitat in the general vicinity of the Colusa-North Tract are shown on Figure 27.



**Figure 27. Proposed Plant Communities for the Colusa-North Tract**

Source: The Nature Conservancy



Mixed riparian forest would be planted adjacent to the existing mixed riparian forest in the northern portion of the site. The elevation and soils, consisting of fine-textured clay and silty clay loam over sandy loam, indicate that this portion of the site will be wetter than the rest of the site and thus more likely to support a mixed riparian forest.

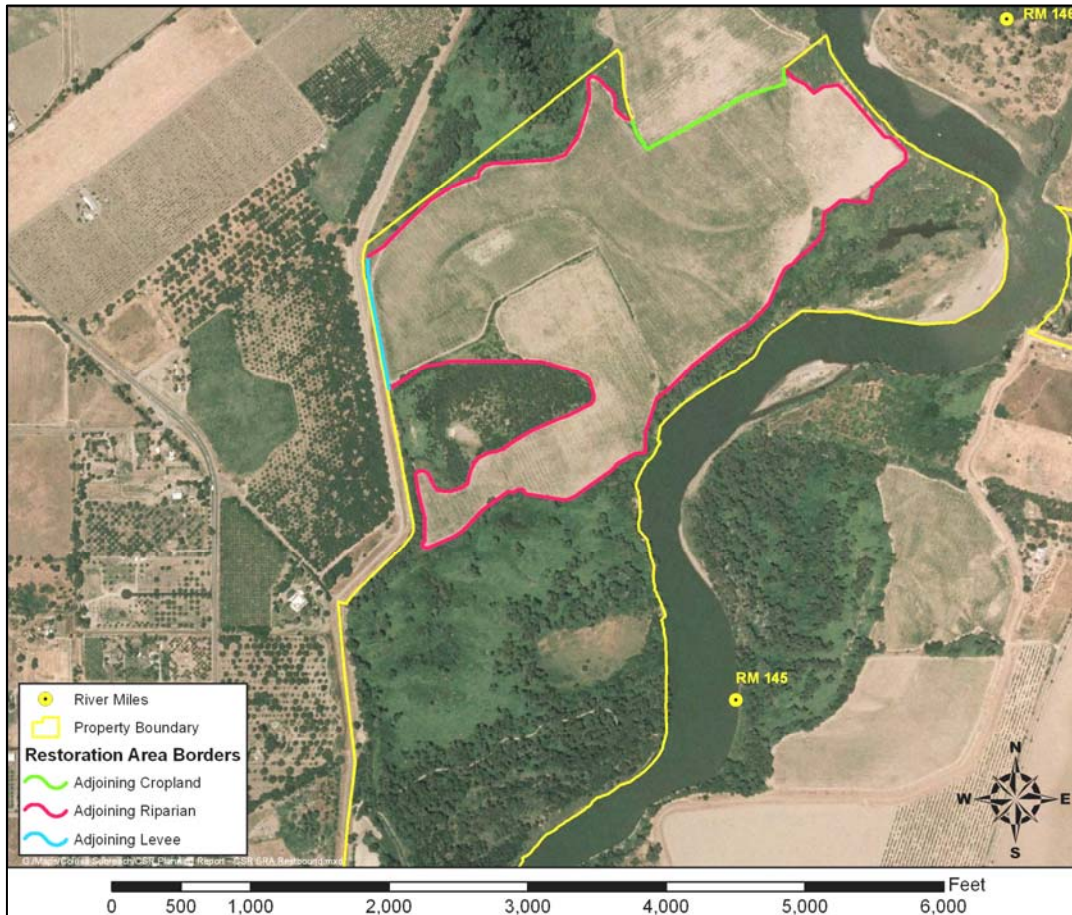
Much of the central portion of the site and the area to the west would be planted with mule fat scrub. Mule fat scrub was found by the Colusa-North Baseline Assessment Report to be recruiting extensively within this portion of the site. When combined with valley wildrye grassland, the restored habitat would reflect the herbaceous composition of naturally occurring mule fat scrub habitat.

A majority of the southern portion of the proposed restoration area would be planted to savannah/valley wildrye grassland surrounded on all but its northern end by valley oak riparian forest. Although valley wildrye grassland, dominated by blue wildrye (*Elymus glaucus* ssp. *glaucus*), was not found to occur at the Colusa-North Tract, it does occur adjacent to the Colusa Subreach project area, adjacent to the Jensen Tract. The baseline assessment prepared for the Colusa-North Tract found the species mix and percentages of existing vegetation in this area to be weighted toward mixed riparian forest species more tolerant of dry soils such as valley oak and blue elderberry, both of which occur nearby. The savannah (which, in its natural occurrences typically includes elderberry shrub) and valley wildrye grassland communities would provide structural diversity for the restoration area and thus create different types of habitat within the tract.

Willow scrub would be planted immediately to the north of the proposed savannah/valley wildrye grassland, thus expanding the existing willow scrub found within the tract. Willow scrub combined with valley wildrye grassland reflects both the physical characteristics of the proposed restoration site as well as the herbaceous composition of the willow scrub.

An alternative to restoration planting of the Colusa-North Tract is passive restoration including the removal of the abandoned walnut orchard and initial weed control. This would be a lesser cost option that could be pursued because the restoration area is relatively small and the Tract would be relatively more expensive to restore on a cost per acre basis. Additional considerations include the lack an onsite well to provide a water supply for initial irrigation and the need to establish a temporary roadway through existing habitat to the site for active restoration. Development of a substantial access road would involve disruption of remnant habitat and possible wetland areas. It is expected that CDFG will determine in the future whether active or passive restoration of the Tract will be pursued.

**Ward Tract** –The Ward Tract is an approximate 238-acre site located about one mile north of Colusa, on the west side of the river. Figure 28 depicts the site on a 2006 aerial photo. About 99 acres of the tract are in riparian habitat and approximately 139 acres are in field crops. The tract is flooded about every one to four years, depending on location. It was purchased by TNC in 2001. The Ward Tract adjoins the river on the east, and the remnant riparian portion of the Colusa-Sacramento River State Recreation Area on the south. It abuts the levee on the west and privately-owned riparian and field crop land on the north. Access to the site is across a private easement.



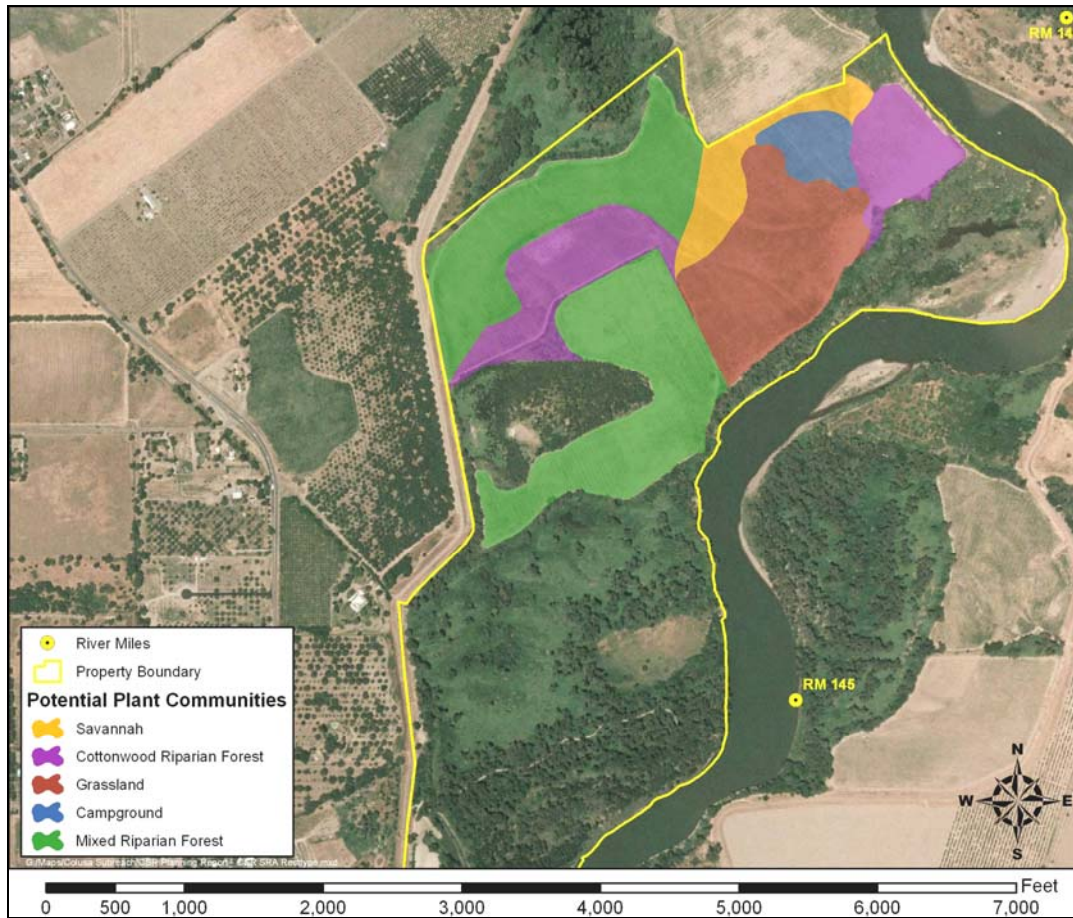
**Figure 28. The Ward Tract**

Source: The Nature Conservancy

The field crop area is proposed to be restored to riparian habitat based upon the analysis presented in the *Baseline Assessment for Riparian Restoration at the Ward Restoration Area* (Hubbell et al. 2006). The field crop area is surrounded, by onsite riparian, the levee and the river, on three sides. The owner of the adjoining row crop land, to the north, has indicated a desire to restore the adjoining area to habitat. The area has been leveled and irrigation is supplied from the river. The proposed vegetation communities within the restoration area Tract are shown on Figure 29.

Mixed riparian forest would be planted on the majority of the restoration area to extend the existing adjacent mixed riparian forest into the approximate 2- and 4-year floodplains and higher grounds. Mixed riparian forest sampled in nearby remnant habitat generally occurs from 60-64 feet. Part of the area identified as appropriate for mixed riparian forest in the baseline assessment (Hubbell et al. 2006) would be planted with savannah and grassland. This is to provide open space adjoining a campground area that will be installed and maintained by the CDPR.

Remnant cottonwood riparian forests are found at two elevations adjacent to the restoration area and likely resulted from different colonization processes. Near the main channel of the Sacramento River they are found from 60-64 feet, where



**Figure 29. Proposed Plant Communities for the Ward Tract**

*Source: The Nature Conservancy*

colonization is likely from a time when the gravel bar was exposed. Away from the channel (and nearer to the levee) cottonwood riparian forest is found in the lowlands from 50-60 feet, where floodwaters remain longest, providing a colonization opportunity for seedlings of cottonwood riparian forest species. Both sections would be restored to cottonwood riparian forest despite having differing elevations. Cottonwood riparian forest in one section would extend the adjacent lowland cottonwood riparian forest into the restoration area lowland with its high water table. Cottonwood riparian forest in the eastern portion of the restoration area would connect two existing patches of cottonwood riparian forest across the approximate 1-year floodplain. Here, cottonwood riparian forest is limited to the area where historic channels have occurred in the last 109 years, the soils here being slightly coarser textured and thus better drained than those where mixed riparian forest would be established.

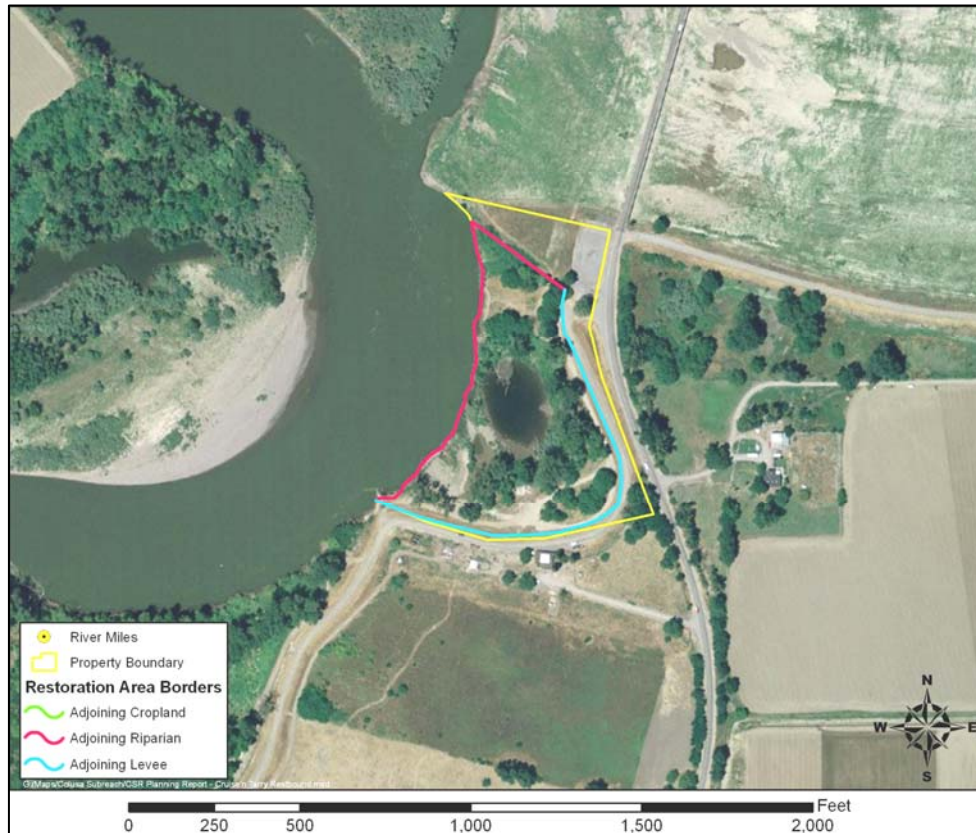
The restoration of the Ward Tract was chosen as a mitigation project by CDWR in 2007. The Department had recently completed the Tisdale Bypass Vegetation Removal Project which included the removal of a substantial area of riparian forest. CDWR agreed to mitigate that loss of habitat for Special Status Species by restoring seventy acres of riparian forest along the Sacramento River. The Ward Tract was chosen for this mitigation for several reasons:



- The land was owned by the State and purchase of a mitigation site was not required.
- Baseline assessment, hydraulic analysis and a restoration plan had already been prepared through CSP.
- The public engagement process had already been conducted for the *Master Plan for the Colusa –Sacramento River State Recreation Area* through CSP.
- Compatible use of the restoration area would be managed by CDPR in the future.

CDWR prepared a CEQA assessment of the project in the fall of 2007 and approved a Mitigated Negative Declaration for the project. An encroachment permit was approved for the project by the Central Valley Flood Protection Board in December Of 2007. The project is scheduled to go out to bid in the summer of 2008 and initial restoration planting was scheduled for the spring of 2009.

**Cruise n'Tarry Tract** - The Cruise n'Tarry Tract is an approximate 10 acre site located about one mile north of Colusa, on the east side of the river. Figure 30 depicts the site on a 2006 aerial photo. It is the site of a former marina and it was recently leased to Colusa County. The tract is a mixture of open area and riparian habitat. It is flooded about every one to four years, depending on elevation and it was purchased by the State in 1989. The tract adjoins the river on the west, the Colusa Weir on the north and the levee on the east and south. The Ward Tract is located across the River to the west. Access to the site is from River Road.



**Figure 30. The Cruise n'Tarry Tract**

Source: The Nature Conservancy

Three acres are proposed to be restored habitat and one acre will continue to be reserved for short-term storage materials cleared from the adjoining Colusa Weir. The tract has a permanent pool in the center that is approximately the level of the river surface. A residence is located on the adjacent property, to the south, across the levee. The Cruise n'Tarry Tract does not abut any cropland. It is separated from other properties by the flood protection levee on the south and the levee and River Road on the east. The Active restoration proposal is supported by information contained in Baseline Assessment for Riparian Restoration at the Cruise n'Tarry Restoration Area and referenced in this description of the Tract (Hubbell et al. 2006). The proposed vegetation communities within the restoration area along with remnant riparian habitat in the general vicinity of the Cruise n' Tarry Tract are shown on Figure 31.

The proposed restoration site's location within the 4-year floodplain suggests that much of the site would probably not flood to the degree required for natural process restoration to be successful. Riverbanks at this site are generally steep and actively eroding. Higher floodplain lands such as those found in much of the Cruise n' Tarry Tract are more likely to become infested with non-native invasive species, such as yellow starthistle, Johnson's grass, and Bermuda grass (Hubbell et al. 2006b).

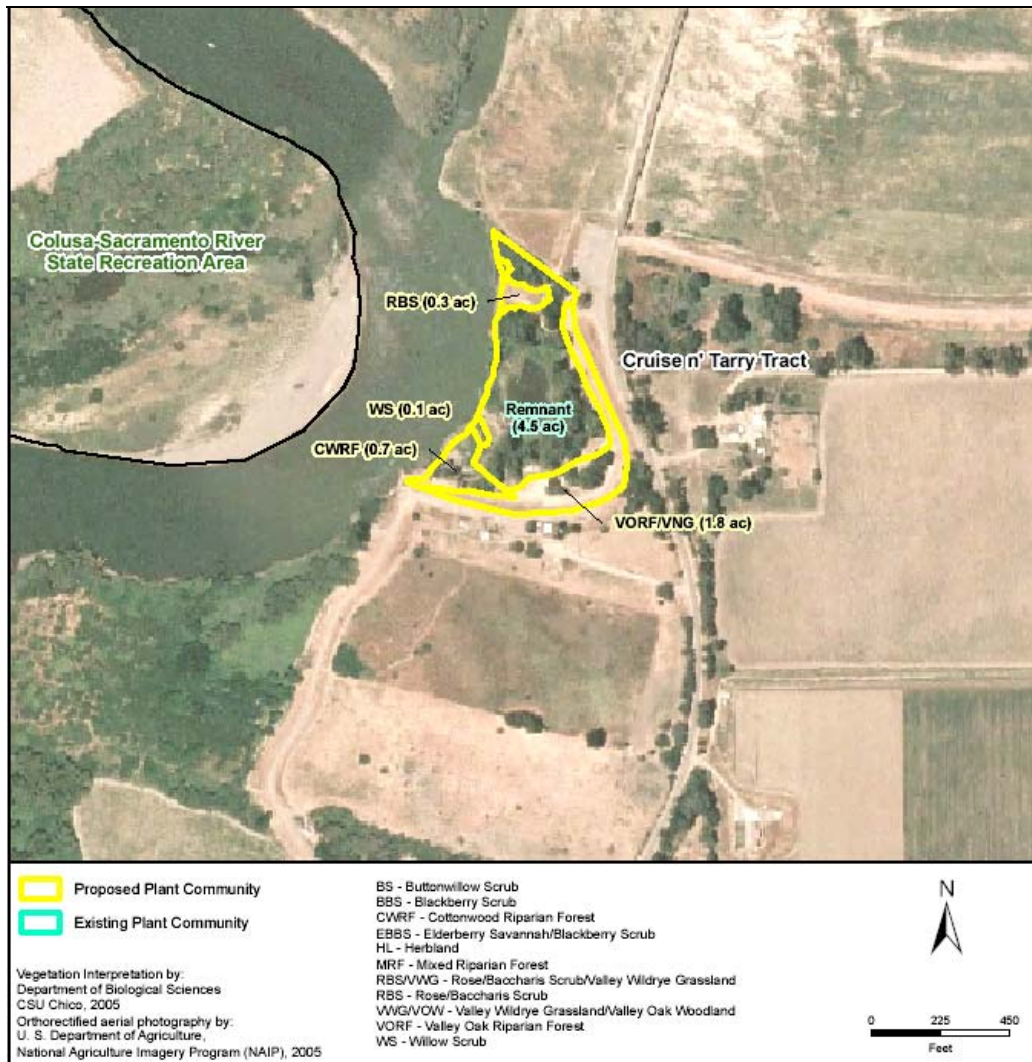
A majority of the Cruise n' Tarry Tract would not be subject to active restoration, as remnant valley oak riparian forest has established itself on the lower elevation portion of the site. However, restoration could be applied to several smaller areas adjacent to the existing valley oak riparian forest. In the northern part of the proposed restoration site, rose/baccharis scrub would be planted over an area thought to be underlain by a gravel bar. Lack of tree invasion indicates the likelihood of a gravel bar approximately 10 feet below the surface, despite the presence of a clay loam soil surface layer and an approximate 4-year flood return interval.

Willow scrub would be planted along the steep banks of the inlet on the tract since it is adjacent to the water and its low elevation coincides with the elevation of willow scrub onsite and in the remnant riparian vegetation across the river (USACE 1997). This lowland is likely to flood more frequently than the rest of the proposed restoration site, despite being within the 4-year floodplain. Planting this area with willow scrub would expand the current willow scrub habitat.

Cottonwood riparian forest would be planted in the southwest corner of the proposed restoration site in order to connect an existing patch of adjacent cottonwoods to the existing cottonwood riparian forest found onsite along the inlet. This area's adjacency to the Sacramento River and its elevation coincides with the elevation of cottonwood riparian forest found in the remnant riparian vegetation across the river and in other previously restored habitats along the Sacramento River. It is further likely that parts of this portion of the proposed restoration area flood more frequently than the estimation of once every 4 years. Gleyed soils and a high water table support this conclusion, and further indicate the suitability of this portion of the site for restoration as cottonwood riparian forest.

The Cruise n'Tarry Tract is a small restoration site that would be relatively more expensive to restore on a cost-per-acre basis. It also lacks an existing water supply source for irrigation. The tract is owned by the Sacramento and San Joaquin Drainage District, a state agency governed by the Central Valley Flood Protection Board. The CVFPB approved a lease of the site to the County of Colusa in

December of 2007. The County has expressed a general intent to manage the property for public access to the river although plans for such use have not yet been developed. At this time it is unknown if the proposed active restoration would be compatible with changes to the site that Colusa County may propose in the future.



**Figure 31. Proposed Plant Communities for the Cruise n'Tarry Tract**

*Source: The Nature Conservancy*

The Cruse n'Tarry Tract was included in Colusa Subreach restoration planning with the agreement of the CVFPB's former General Manager. At the time he indicated that the state might wish to have the site restored for mitigation purposes. Given the recent lease of the site to Colusa County, the potential for restoration of the site is uncertain. TNC has indicated that restoration of the small site is not a priority and that the restoration plan developed through Colusa Subreach planning will be provided to the State to simply identify the restoration potential of the site. Whether the tract is restored to riparian habitat will be determined by the Central Valley Flood Protection Board and Colusa County in the future.



## **D. Hydraulic Analysis of the Effects of Restoration**

Two-dimensional hydraulic modeling as described in Chapter VII was utilized to determine the effect that the proposed restoration of riparian habitat would have on flooding in the Colusa Subreach. The model was used to compare the Existing Conditions flow levels and the 1957 Design Flow levels with the water surface profiles of the proposed tracts after restoration. The modeling determined how the proposed restorations would affect both flood flow elevations and flood flow velocities. The objectives of this analysis were twofold:

1. To provide stakeholders with a thorough analysis of the cumulative effect of all eight proposed restoration projects on the flood control system and on neighboring properties.
2. To provide the technical information that the Central Valley Flood Protection Board would require in considering encroachment permits for the eight proposed restoration projects.

This cumulative analysis was provided by including the entire Colusa Subreach in a single model and considering all eight restoration projects in each model run. The modeling incorporated the restoration projects at mature vegetation growth so that it evaluated the maximum impact on flood flows. The model also extended beyond the limits of the Subreach to ensure that it captured impacts to the point that the effects on flood flows were nil.

In general the analysis concluded that the computed water surface elevation for the post-project restoration sites would be at or below the Existing Conditions levels or the 1957 Design Flow profile. A single location where the projected flow levels were projected to exceed both Design Flow and Existing Conditions levels was at the Jensen Tract where a very small increase was modeled. The analysis noted, however, that the increase did not affect the flow level at the levee. The minor velocity increases and decreases associated with the proposed restorations were found to not significantly affect erosion or deposition patterns in the river channel or floodplain. Additionally, the analysis determined the proposed restoration would have no effect on levee seepage. Table 11 provides a summary of information derived from the hydraulic analysis.

The general conclusion of the hydraulic modeling was that changes to flood flow elevations and flood flow velocities were within the tolerances and standards that were expected to be applied by the Central Valley Flood Protection Board when encroachment permits are requested for the proposed restoration sites in the Colusa Subreach. This expectation was strengthened by the Board's approval of an encroachment permit for the Ward Tract restoration in December of 2007 supported by the CSP hydraulic modeling results.

The modeling and hydraulic analysis report prepared by Ayres Associates was peer reviewed by Fran Borcalli of Wood Rodgers. Borcalli concluded, "I concur with the conclusions based upon the results of the hydraulic modeling performed in that there is essentially no significant adverse impact from the proposed restoration of wildlife habitat in the floodplain." The modeling and hydraulic analysis report was also reviewed by CDWR engineers prior to their use of the modeling results to substantiate their application to the Central Valley Flood Protection Board for an encroachment permit for the restoration of the Ward Tract. Table 9 provides a summary of information derived from the hydraulic analysis.

**Table 11. Summary of Hydraulic Analysis Results**

<b>Restoration Tract</b>	<b>Change in Flow Velocity</b>	<b>Change in Water Surface Elevations</b>	<b>Effects on Adjoining Properties</b>
Womble	varies, no erosion impacts	<DF (.56' to .74') <EC (.05' to .11')	No substantive effect
Jensen	varies, no erosion impacts	>DF (.08' to .1') <EC (.01') to > (.05')	No substantive effect
Stegeman	onsite increase (to 1.5 fps)	<small>No increase at levee</small> <DF (.08') <EC (.12')	No substantive effect
1000-ac. Ranch	varies, no erosion impacts	<DF (.2') to > (.16') EC even to > (.02')	No substantive effect
Boeger	varies, no erosion impacts	<DF (.3' to 1.3') EC even to > (.24')	No substantive effect
Colusa-North	increase, no erosion	<DF (1.02') >EC (.04')	No substantive effect
Ward	varies, no erosion impacts	<DF (.86' to 1.08') <EC (.03') to > (.11')	No negative impact
Cruise n'Tarry	minimal change Ward effects control	<DF (.94') <EC (.02')	No negative impact

Key: DF is Design Flow, EC is Existing Conditions

Source: Ayres Associates

## **IX. COLUSA SUBREACH STRATEGY**

A major goal of Colusa Subreach Planning was the development of a Strategy for the Colusa Subreach that addresses ecosystem restoration integrated with other land uses in the subreach. As specified in the original Scope of Work for CSP, this Strategy was intended to identify recommended actions for future management of the Subreach. During the four-year planning process a great deal of new information was developed and shared with stakeholders. Existing legal requirements and economic realities were considered and many new ideas were been generated. From all this information a set of recommendations for future management of the Colusa Subreach was developed.

The future direction of the Colusa Subreach will involve decisions made by a wide range of landowners, both private and public. It will also involve determinations made by a number of regulatory agencies representing local, state, and federal governments. As a result, a meaningful strategy must focus on actions that are broadly acceptable to a wide range of stakeholders.

Not every stakeholder will agree with every point included in this Strategy. The perspectives of the stakeholders that have contributed to Colusa Subreach Planning range widely. Nonetheless, this Strategy represents the important concepts that were vetted through Colusa Subreach Planning with the wide range of stakeholders, including: local landowners, other local residents, local governmental agencies, state and federal agencies with jurisdiction in the Colusa Subreach, as well as SRCAF and TNC.

This Strategy will provide the most specific direction to the public and private entities that are involved in ecosystem restoration in the Colusa Subreach. This includes private nonprofits (SRCAF and TNC), state agencies (CDFG, CDPR, and CDWR), and federal agencies (US Fish and Wildlife Service, Army Corps of Engineers, and National Marine Fisheries Service). Colusa Subreach Planning provided the opportunity to direct substantial resources and talent to the questions of ecosystem restoration in a defined area with unprecedented opportunities for local stakeholder involvement. As such, this Strategy expresses direction that considers local perspectives and new science as well as state and federal policy.

The most important functions that occur in the Colusa Subreach are flood management, water supply conveyance, agriculture, recreation, and wildlife habitat. The Colusa Subreach Planning process has concluded that all can coexist compatibly and thrive if management decisions are based on the best available information and if cooperation between stakeholders occurs. The needs of the five key functions should be balanced to achieve a mix of land uses, facilities, and activities that reasonably support the economic, public safety, and environmental needs of all stakeholders. Specific findings related to these five key functions are:

- The use of the river corridor as a floodway is vital to public safety and capacity should not be compromised.
- The use of the river channel as a water supply conduit is vital to the state economy and it should be supported.

- Agriculture is an important land use that is vital to the local economy and it should be supported.
- Recreation uses, which are important to local residents and important to the local economy, should be supported.
- Wildlife habitat in the Subreach is an important resource of local and state significance that should be supported.

Consistent with these findings, land uses in the Subreach should retain a rural character and urban development or residential uses inside of the levees should continue to be precluded due to the frequency of flooding and incompatibility with the five key functions. Individual property rights should be respected for all landowners in the Subreach consistent with the provisions of state and federal law.

The Strategy presented in this Chapter addresses a range of topics that relate to the future physical, economic, and environmental health of the Colusa Subreach. It is composed of individual recommendations that are organized into seven broad subject areas. The term “should” is consistently used as part of the proposed Strategy to reflect the reality that this Strategy does not have legal authority over the various managers.

#### **A. Flood Management**

**Maintaining the integrity of the floodway is necessary to protect public safety. It is an essential prerequisite to other uses and activities in the Subreach. The following specific standards should apply:**

1. Encroachments into the floodway should not impair the function of the flood management system or unreasonably affect neighboring private property.
2. Projects in the floodway that are subject to the jurisdiction of the Central Valley Flood Protection Board should continue to require approval of an encroachment permit to ensure that the integrity of the flood control system is maintained.
3. Projects subject to the jurisdiction of the Central Valley Flood Protection Board should demonstrate through hydraulic modeling of an appropriate level of sophistication that the proposed action will not result in:
  - a. A substantive increase above the Design Flow elevation or the existing conditions elevation, if higher.
  - b. A substantively increase erosion effects on levees, other public infrastructure or neighboring private property.
4. Limited meander consistent with the SRCAF Handbook should be maintained with revetment installation and maintenance occurring only where required to protect the levee system and major public infrastructure features.
5. Levee setback should be considered where appropriate to improve flood flow, protect the levee system and reduce ongoing levee maintenance costs.

## B. Recreation

**Recreation uses in the Colusa Subreach have great benefit to local and state residents and their contribution to the local economy is substantial. The following specific standards should apply:**

1. Compatible recreation such as fishing, boating, hunting, camping, wildlife viewing, photography, hiking, beach activities, and environmental education should be encouraged and supported.
2. Recreation uses should be managed to ensure that private property rights are respected and the wildlife habitat values of the Subreach are not compromised.
3. Implementation of the *Master Plan for the Colusa-Sacramento River State Recreation Area* should be made a priority for the California Department of Parks and Recreation with appropriate funding provided by the State Legislature.
4. Construction of the new boatramp at the CSRSRA should be a priority for the City of Colusa, the California Department of Parks and Recreation and the California Department of Boating and Waterways with appropriate funding provided by the State Legislature.
5. Implementation of the *Colusa Subreach Recreation Access Plan* should be made a priority for the California Department of Fish and Game and other managers of public lands with appropriate funding provided by the State Legislature.
6. The potential for a new boatramp in the Princeton Ferry area, as recommended on the Colusa Subreach Recreation Access Plan, should be investigated by the California Department of Parks and Recreation and/or the California Department of Boating and Waterways with appropriate funding provided by the State Legislature.

## C. Management of Public Lands

**Effective management of public lands is essential to protect habitat resources, support public recreation, and limit effects on adjoining private property. Provision of adequate resources to support the effective management of public lands in the Subreach is required. The following specific standards should apply:**

1. The California Department of Fish and Game should support the Sacramento River Wildlife Area with a management, enforcement, and maintenance effort consistent with the Comprehensive Management Plan for the Sacramento River Wildlife Area with appropriate funding provided by the State Legislature.
2. Provision of new land access to the Units of the Sacramento River Wildlife Area should be dependent upon the provision of adequate management resources.

3. Proposed improvement of the Colusa-Sacramento River State Recreation Area should include provision for additional management, enforcement, and maintenance with appropriate funding provided by the State Legislature.
4. The three properties in the Colusa Subreach that are owned by TNC should be transferred to a public agency to provide for future public use, appropriate management and resource protection. Given the proximity to existing Wildlife Area Units, the California Department of Fish and Game is the most likely long term manager of these properties.
5. Public agencies that manage wildlife habitat in the Subreach should have regular communication with neighboring landowners and other agencies to coordinate on cross boundary issues.
6. State and federal governments should provide Payment in Lieu of Taxes to local government agencies on a consistent and reliable basis with appropriate funding provided by the respective legislatures.

#### **D. Wildlife Habitat on Private Lands**

**Approximately one-half of the riparian habitat that is located in the Colusa Subreach is on private property. Good stewardship of this area is vital to the ongoing health of the ecosystem. The following specific standards should apply:**

1. Maintenance of existing remnant riparian habitat on private lands should be encouraged and additional incentives should be provided to help private landowners support good stewardship of riparian habitat.
2. Landowner participation in programs such as the Ecosystem Restoration on Agricultural Lands Program (ERAL) and the Landowner Incentive Program (LIP), which provide funding for restoration of habitat and ongoing payments for maintenance of this habitat should be encouraged and supported.
3. Development of a riparian buffer area at least 50 feet wide along the river channel should be encouraged to provide a corridor of contiguous riparian habitat and help filter runoff into the river, while maintaining substantial area for ongoing agriculture.
4. Provision of conservation easements to compensate landowners for preservation of substantial areas of riparian habitat, on a willing seller basis, should be encouraged and supported.

#### **E. Regulatory Streamlining**

**New programs and tools to streamline regulatory compliance and support efficient environmental standards are needed to assist both public and private activities. The following specific standards should apply:**



1. The proposed Programmatic Safe Harbor Agreement and Voluntary Local Program, under development by the SRCAF, should be encouraged and supported and other practical methods to simplify Endangered Species Act compliance should be pursued.
2. Restoration projects in the Colusa Subreach should be enrolled in the Programmatic Safe Harbor Agreement and Voluntary Local Program so neighboring landowners and levee maintenance agencies may take advantage of the benefits of these programs.
3. Delisting of threatened and endangered species should occur where supported by the best available science.
4. Development of additional mechanisms to permit the Colusa Subreach and the Sacramento River Conservation Area to function as self-mitigating area, within the provisions of state and federal regulations, should be pursued.
5. Mitigation banking and mitigation projects, like the proposed DWR restoration of the Ward Tract, should be pursued, especially where such mitigation results in cost savings and related public benefits.

#### **F. Acquisition for Habitat Conservation**

**Future acquisition of land should build upon existing conservation lands and should focus on locations within the Subreach that help to preserve and enhance contiguous areas of riparian habitat. The following specific standards should apply:**

1. Acquisition should be only from willing sellers who wish to exercise their right to sell their property to the buyer of their choice.
2. Consistent with the SRCAF *Good Neighbor Policy*, future acquisitions utilizing public funding should include communication with neighboring landowners and review by the SRCAF Technical Advisory Committee and Board of Directors.
3. A priority for future acquisition should be portions of the Subreach where acquisition will create contiguous areas of protected habitat that maximize value to wildlife and minimize the interface between agriculture and habitat.

#### **G. Restoration of Riparian Habitat**

**Future restoration of riparian habitat should focus on locations within the Subreach that help to fill gaps in existing areas of riparian habitat. The following specific standards should apply:**

1. Consistent with the SRCAF *Good Neighbor Policy*, future restoration projects should include communication with neighboring landowners and review by the SRCAF Technical Advisory Committee and Board of Directors.

2. Restoration projects should have a single individual identified as the contact person and written documentation should be made of agreements related to project design, buffers, and ongoing management.
3. Restoration projects should be designed to appropriately buffer adjoining cropland areas considering the findings of the *Pest and Regulatory Effects Study*.
4. Restoration projects should demonstrate through appropriate hydraulic modeling that the proposed activity will not impair the function of the flood control system or unreasonably effect neighboring private property and public infrastructure.
5. Restoration projects should be directed to benefit listed and declining species in order to help support delisting of species and preclude additional listings.
6. The Ward Tract should be restored to riparian habitat as proposed by DWR to mitigate the habitat loss resulting from the Tisdale Bypass Sediment Removal Project. DWR should also consider restoration of the remaining Colusa Subreach restoration tracts as a means of providing cost effective mitigation for future flood control projects.
7. The restoration areas on the Womble, Jensen, Stegeman, 1000-Acre Ranch, Boeger, and Colusa North Tracts should be restored to riparian habitat as proposed in the restoration plan for each Tract.
8. Restoration of the Cruise n'Tarry Tract should be at the discretion of the Central Valley Flood Protection Board and DWR subject to compatibility with recreation use of the Tract as proposed by Colusa County pursuant to its lease of the site.

## **X. EVALUATION OF COLUSA SUBREACH PLANNING**

Colusa Subreach Planning was the longest and most intensive of the three subreach planning efforts that were conducted along the Sacramento River. It involved over four years of time and it focused on an extensive public engagement program that included 36 public meetings. These meetings included public input and information meetings, workshops, Advisory Workgroup meetings and Subgroup meetings. CSP was unique in that it was directed to address the questions and concerns of local stakeholders as part of ecosystem restoration planning.

CSP was also conducted during a time of heightened controversy regarding ecosystem restoration in the Sacramento River Conservation Area. During this period representatives from Colusa County expressed strong opinions and concerns regarding the need for landowner assurances to offset the perceived effects of various conservation and regulatory actions. Within this context, some local stakeholders withdrew from participation in Colusa Subreach Planning and requested that the planning process be terminated. CSP moved forward to completion but there was a decrease in formal participation from some local stakeholders.

CSP constituted a substantial investment of time and resources on the part of CALFED, SRCAF and TNC as well as the individuals, groups and agencies that participated. Given that investment, it is appropriate that there be some introspective evaluation of the planning process. This Chapter reviews the context in which CSP transpired and the stakeholder response to the process that was identified through the initial and final landowner surveys. It also includes an evaluation of the effectiveness of the various steps and activities within the planning process. Finally, it assesses whether the original Goal and Objectives of Colusa Subreach Planning were met.

### **A. Controversy Regarding Ecosystem Restoration**

Colusa Subreach Planning was first conceived in 2001 by The Nature Conservancy and SRCAF in response to local stakeholder concerns that there needed to be a comprehensive process to plan ecosystem restoration activities in the Colusa Subreach. There was a desire expressed to assess the cumulative effects of restoration activities, something that could not occur when restoration projects were planned individually. The initial application for CALFED funding was developed by TNC with review and input from the SRCAF Manager and the two members of the SRCAF Board from Colusa County. The concepts in the initial application were refined in the Scope of Work that was approved in 2004 as part of the Recipient Agreement. The Scope of Work was further refined in early 2005 following the initial meetings of the Advisory Workgroup. An amendment to the Recipient Agreement in 2005 permitted an increased focus on the specific landowner questions that were identified by the Workgroup.

Colusa Subreach Planning was impacted by controversy that affected the entire Sacramento River Conservation Area. CSP was in its second year when concerns related to the ecosystem restoration and appropriate landowner assurances gained prominence. These issues had been under discussion for several years but they came to the forefront of SRCAF discussions and activities in late 2005 and in the first half of 2006. The Advisory Workgroup discussed landowner assurances in the spring of 2005 and determined that, while they were important local landowner questions, they were beyond the scope of resolution as part of CSP.

A Colusa County representative on the SRCAF Board who was also member of the Advisory Workgroup delivered a statement to the SRCAF Board at their December 1, 2005 meeting in which he asked that the Board, "Withdraw all support from ecosystem restoration within the Sacramento River Conservation Area until such time as the agencies come forth with tangible landowner assurances." This request was followed by a resolution of the Colusa County Board of Supervisors on December 13, 2005 requesting, "That the CAL-FED/Bay Delta Authority immediately suspend all funding directed to the SRCAF, the Colusa Sub-reach Planning, and any restoration project work within the scope of the SRCAF in Colusa County until the good neighbor policy has been adopted and implemented in its entirety."

The SRCAF Board considered a motion to oppose ecosystem restoration until a good neighbor policy with certain landowner assurances was adopted at its meeting of January 19, 2006. That motion failed by a vote of 2 to 7. The general sense was that the majority agreed that stronger landowner assurances were desirable but they did not believe that declaring opposition to ecosystem restoration was an appropriate way to try to achieve that end.

Soon after the action at the SRCAF Board meeting on January 19, 2006, eight members from Colusa County resigned from the CSP Advisory Workgroup. A letter dated February 1, 2005 explained their action. That letter, which is contained in Appendix E, stated, "We write to express our disappointment with how the project has been implemented and to state our disapproval of the process that has taken place to date." The letter also recommended a "Complete cessation of funding to this effort."

Perspectives on the reasons for the resignations vary. One perspective, expressed in the letter of resignation, was that the resigning members felt that they were not being truly heard in the Workgroup process and that they would not have the opportunity to meaningfully affect the outcome of CSP. The fact that the Workgroup was established to be "advisory", and it was not vested with complete authority to make all key determinations regarding CSP was clearly an issue. The letter of resignation expressed the opinion that CSP was an "Unbalanced and unresponsive process." An alternative perspective held by TNC and SRCAF representatives to the process was that the resignations were substantially related to the landowner assurances issues and the inability of resource management agencies to agree to all desired assurances. It was noted that the Workgroup had reached agreement regarding its mission, landowner questions and planning and research projects through its first fifteen months. It was anticipated that the Workgroup could reach general agreement or compromise on many other questions in the future.

Some Colusa County interests requested that TNC and SRCAF suspend Colusa Subreach Planning in 2006 until all the desired landowner assurances were in place.

This suspension of the planning process was not agreed to by TNC and SRCAF for several reasons:

- CSP was about one-third finished and many subcontracts for public engagement, planning and research activities were under way.
- Some of the desired landowner assurances were in conflict with existing laws and agency procedures and therefore they were very unlikely to be forthcoming in the near future.
- It was felt that if the planning process were suspended as requested, the contractors and funding would be lost, CSP would not be completed and the potential benefits of subreach planning would not be realized.

A CALFED review of CSP was conducted in the summer of 2006 in response to the request that CALFED terminate funding for SRCAF and CSP. A letter outlining the findings and recommendations of that review is contained in Appendix F. The review concluded that the CSP planning process was meeting the requirements of the Recipient Agreement and recommended that funding should be continue for both CSP and SRCAF.

The SRCAF adopted a *Good Neighbor Policy* on May 25, 2006 as a “White Paper” and formally adopted the *Good Neighbor Policy* on March 15, 2007. The adopted *Good Neighbor Policy* did not, however, meet the expectations of all members of the SRCAF Board. The *Policy* was adopted by a vote of 8 to 3 with one member each from Colusa, Glenn and Butte Counties casting a negative vote. The major concern with the adopted *Policy* was that it did not contain desired landowner assurances including mandatory dispute resolution, provision for the SRCAF as a “Self Mitigating Area” and incidental take of Threatened and Endangered Species. At the time it was noted that the desired landowner assurance provisions were not included because they conflicted with state and federal statutes and regulatory procedures. Supervisor Gary Evans, a Colusa County representative on the SRCAF Board, entered a statement into the record of the meeting on March 15, 2007 that is contained in Appendix G.

## **B. Landowner Survey Results**

The Institute for Social Research at CSU Sacramento (ISR) was retained to conduct two surveys of landowners within the Colusa Subreach. The initial survey was conducted in early 2005 when the public engagement effort was being initiated and the final survey was conducted in early 2008 when the public engagement process was being completed. The purpose of the surveys was to determine landowner opinions regarding habitat conservation, their concerns regarding restoration of riparian habitat and their expectations of the planning process. The two surveys were intended to provide feedback as to changes in landowner opinions that occurred over the term of CSP.

The surveys were conducted by telephone and they followed a set format that was reviewed with the Advisory Workgroup in 2004. A listing of landowners was obtained from the Colusa and Glenn County Assessor's rolls in 2004 with an update in 2007. Surveyed landowners included those owning property inside of the flood protection levees and those owning property that adjoined the levees on the outside. Telephone numbers were obtained from the local telephone directory, various on-line search engines, SRCAF records and available local agency sources. A request

for phone numbers was also included in letters that were sent to Subreach landowners by the SRCAF prior to the initial and final surveys. These letters informed landowners that a telephone survey was going to be conducted and requested their participation.

The initial survey in 2005 consisted of six sections that addressed:

- Property characteristics
- Landowner awareness of SRCAF, the Colusa Subreach Planning effort and the agencies involved
- Confidence and trust in agencies providing technical information on the environmental impact of wildlife habitat restoration
- Expectations regarding the likely outcomes of habitat restoration in the Colusa Subreach
- Preferences for methods of communication between landowners and the planning process
- Additional contact information for the respondent

The final survey in 2008 was modified to reflect its occurrence near the conclusion of CSP. For example, the questions related to actual methods of communication utilized rather than those preferred. Also, contact information was not longer required.

The ISR interviewer made five attempts to reach each landowner. If a request for a call back was received on the fifth attempt, the call was returned as requested. If the landowner was not available at the time of the call, messages were left on answering machines or with others in the household or office. Upon reaching the respondent, the interviewer identified herself by name and her affiliation with the Institute for Social Research at CSUS. She briefly described the purpose of the call and asked to speak with the landowner who is most familiar with the management and uses of the property. If the initial respondent referred the interviewer to a tenant, manager or co-owner, the phone number was obtained and a call was made to the person recommended. Interview responses were recorded by hand, with extensive comments entered into the computer. Coded responses were entered into a data file for analysis.

A detailed analysis was prepared in report format by ISR to document the procedure and the results of both the initial and final surveys. These reports contain the raw survey results, cross tabulations of key responses and an analysis of responses. These reports were each presented to the Advisory Workgroup by the ISR interviewer. The initial and final survey reports are contained in Appendix H and I. These survey reports should be consulted for a complete review of the results of the surveys and the differences in responses that were noted between the initial and final surveys.

**Initial Landowner Survey** telephone calls began in January of 2005. Contact was attempted for 92 landowners in the Subreach. Telephone numbers for the remaining owners were unlisted and could not be obtained through the various means noted above. Of the 92 owners, there was a participation rate of 64% and a total of 60 landowners completed the interview. Of the interviewees, 90% were private owners and 10% were local, state or federal agencies. Seventy-two percent of the interviewees reported that their land was used for agricultural purposes and 61% of these owners farmed the land themselves. Of the interviewees, 43% lived on the subject property and the breakdown of other



residence locations was: 30% elsewhere in Colusa County, 4% elsewhere in Glenn County, 22% in another California county.

Responses from landowners to selected questions were as follows:

- Fifty-seven percent had heard of the SRCAF.
- Fifty-seven percent had heard of CSP.
- Twenty-nine percent knew the general geographic boundaries of CSP.
- The greatest confidence was placed in technical information provided by local agencies (6.43 to 7.04 out of 10) followed by state and federal agencies (5.04 to 5.88 out of 10).
- The most useful methods of communicating were expected to be mailing brief issue-specific flyers (87%), attending general formation meetings (81%) and attending issue-specific meetings (72%).

Awareness of CSP and the SRCAF was highest with owners that lived in Colusa and Glenn Counties and local owners tended to stress the importance of involvement by local agencies and organizations. A majority of the owners expressed concerns that possible outcomes of restoration could include increases in wildlife populations and negative impacts that included decrease in agricultural income, decrease in local tax income, decrease in property values increase in flooding and increased damage due to insects, rodents and deer and increased trespassing.

**Final Landowner Survey** telephone calls were initiated in January of 2008. Contact was attempted for 93 landowners in the Subreach. Of the 93 owners, there was a participation rate of 51% and a total of 47 landowners completed the interview. Of the interviewees, 83% were private owners and 17% were local, state or federal agencies. Sixty-nine percent of the interviewees reported that their land was used for agricultural purposes and 74% of these owners farmed the land themselves. Of the interviewees, 38% lived on the subject property and the breakdown of other residence locations was: 18% elsewhere in Colusa County, 5% elsewhere in Glenn County, 36% in another California county. Survey participation was on a voluntary basis and the methodology did not include determination of the degree to which the respondents in 2008 were the same individuals that responded in 2005.

Responses from landowners to selected questions were as follows:

- Eighty-two percent had heard of the SRCAF, up from 57% in 2005.
- Ninety-two percent heard of CSP, up from 57% in 2005.
- Forty-seven percent knew the general geographic boundaries of CSP, up from 29% in 2005.
- The greatest confidence was placed in technical information provided by local agencies (5.44 to 7.03 out of 10) followed by state and federal agencies (4.89 to 5.67 out of 10), generally consistent with the 2005 results.
- The most useful methods of communicating with landowners were found to be newspaper articles (39%), attending general formation meetings (34%), attending a meeting for landowners adjoining a restoration site (34%) and annual CSP newsletters (34%).

Awareness of CSP and the involvement of TNC and SRCAF increased substantially over the three year period. This awareness did not result in increased confidence in SRCAF or the perceived objectivity of the process. The confidence level in the SRCAF was slightly lower and a new question regarding confidence in TNC indicated that the confidence level for TNC was lower than that felt for SRCAF. A comparison to TNC confidence levels from 2005 was not possible, however, because that question was deleted from the initial survey at the request of members of the Advisory Workgroup who subsequently resigned. The greatest confidence was expressed in technical information provided by local agencies and organizations although some of those entities withdrew from CSP participation and did not provide substantive input into the process.

A few respondents indicated that they were frustrated because the planning process moved forward without what they considered to be local approval or participation. There were also indications that concerns about landowner assurances, the SRCAF *Good Neighbor Policy* and the withdrawal of local representatives from formal participation in CSP affected respondent's perception of CSP. Related to these issues the ranking of the "Influence of local landowners and other local interests in Colusa Subreach Planning process" decreased from 2005 from 4.73 to 3.42 on a 1 to 10 scale. This response is considered to be a reflection of the peripheral events that transpired between 2005 and 2008 including the well-publicized resignation of eight local representatives from the Advisory Workgroup.

### C. Effectiveness of the Activities within the Planning Process

Colusa Subreach Planning was conducted in accordance with the Recipient Agreement which included a Scope of Work that was divided into specific Tasks. This section provides an introspective evaluation of the relative effectiveness of activities that occurred as part of the seven Tasks contained in the Scope of Work.

**Task 1. Coordination and Outreach** – The most critical CSP Task involved effective communication with the various stakeholders. As initially established in the *Public Engagement Plan*, multiple approaches were taken to establish two-way communication and involve the wide range of stakeholders in the planning process.

- ❖ **The SRCAF and TNC Partnership** was established through a Memorandum of Agreement and a subcontract for services. SRCAF provided assistance in managing the public engagement through direct meeting participation, preparation of Advisory Workgroup meeting records, mailed and emailed notifications and other stakeholder outreach services. The working relationship between SRCAF and TNC staff was excellent and SRCAF provided all the services that were anticipated in a positive and professional manner. The involvement of the SRCAF was also seen by some to bring a more practical perspective to CSP, less representative of the environmentalist point of view. Accordingly, the final landowner survey indicated that Subreach landowners placed greater confidence in SRCAF than TNC.
- ❖ **The Advisory Workgroup** served as the principal vehicle for stakeholder direction to the planning process. The original twenty-one member

Workgroup functioned effectively for fifteen months after its initial meeting and completed all of the initial work that was anticipated including determination of principal landowner concerns, selection of planning and research projects, approval of scopes of work and consultant selection. After that point, however, the Workgroup membership was reduced to thirteen members as explained previously. Replacement of the resigned members was not proposed because it was felt that this would jeopardize the informal participation by former members that was still occurring.

The Advisory Workgroup continued to perform its role of advising the planning process after the resignations of February 2006 with reduced membership. Ten additional Workgroup meetings and five additional Subgroup meetings were held during the remaining term of the planning process. Some former Workgroup members attended various meetings on an unofficial basis but their overall level participation was greatly diminished. The lack of the majority of the Colusa County representatives on the Advisory Workgroup resulted in less local input into Workgroup discussions as only one Colusa County resident remained as an active participant. Despite this reduced participation, the Workgroup continued to serve its important role as the key stakeholder group advising the process.

- ❖ **Landowner Surveys** were conducted at the beginning of CSP and near the end of the planning process. The first survey provided initial insight into landowner concerns and it helped to direct the public engagement process. The final survey was interpreted to confirm that the controversy surrounding landowner assurances and efforts to terminate CSP had helped to shape the opinions of some landowners. The surveys provided valuable information but the fact that the respondents to the final survey were not necessarily the same persons that responded to the initial survey made it difficult to conclusively compare the findings of the two surveys.
- ❖ **Newsletters** were distributed to all subreach landowners, members of the Advisory Workgroup and other interested stakeholders in March or April of each year of the planning process. The newsletters provided an overview of the CSP activities and update on planning and research projects. In general, the newsletters elicited a small response from stakeholders but the final landowner survey results indicated that newsletters were one of the most useful communication tools. Articles about CSP were also placed in quarterly SRCAF newsletters to help inform stakeholders. The final landowner survey indicated that the limited articles that were appropriate in the SRCAF newsletters were of slightly less utility to Subreach landowners.
- ❖ **Public Meetings and Workshops** were held during the process. Three Public meetings and three workshops were held. The initial meeting was well attended as was the second meeting related to recreation planning. The third public information meeting on flood control had a lesser attendance. Two of the three workshops related to the development of recreation plans were well attended and much public input was received. The final landowner survey indicated that public meetings were relatively useful for Subreach landowners.
- ❖ **CSP Website** was established as a subset of the SRCAF website. It provided basic information about CSP and it provided access to all of the

substantive products of CSP. The limits of the system did not permit monitoring of the usage of the website but the provision of online information is considered a basic requirement for any substantial public engagement program. The final landowner survey indicated that the CSP website was little used by the individuals that responded to the survey.

- ❖ **Individual Landowner Meetings** were an essential part of the planning process. Multiple contacts were made with the landowners that had property in the immediate vicinity of the eight restoration tracts. These contacts were critical to effective restoration planning as well as compliance with SRCAF's Good Neighbor Policy. The time spent and relationships built with these neighbors were especially important because most of the neighboring owners indicated either support for restoration or no opposition to restoration adjoining their property. Only one neighboring landowner indicated that he was opposed to nearby habitat restoration. This was in marked contrast with some other local interests who indicated that they were opposed to any restoration of riparian habitat. The final landowner survey also indicated that meetings with neighboring landowners were a relatively valuable means of communication.

**Task 2. Baseline Assessments** – Baseline assessments were conducted to provide the information base required to support the planning of habitat restoration. Three contractors were engaged to provide the necessary information.

- ❖ **Subreach Background Report** was designed to be a basic information source for the planning process. It was reviewed in detail by the Advisory Workgroup. The original draft was expanded to include additional information regarding the local area and the agricultural economy at the request of the Workgroup. The *Report* served as a resource for stakeholders and contractors throughout the planning process.
- ❖ **Tract-specific Baseline Assessments** were prepared for each of the eight potential habitat restoration tracts. These assessments were absolutely essential in the habitat planning process. The development of the reports required longer than originally anticipated due to a number of factors but the information that they contained supported an efficient process in the preparation of restoration plans.
- ❖ **Small Mammals Research** was conducted under the same contract as the tract-specific baseline assessments. The analysis focused on small mammals that are considered to be agricultural pest species. It sampled their relative abundance in different types of habitat including agriculture, young restoration, older restoration and remnant habitat. The results provided important data to support *the Pest and Regulatory Effects Study* and meetings with neighboring landowners and the preparation restoration plans.
- ❖ **Insect Pest Research** was conducted to determine effects of riparian habitat on insect pests and insect pest control in the interface between agricultural and riparian habitat on the Sacramento River. Like the small mammals research, the results provided important data to support *the Pest*

and *Regulatory Effects Study* and meetings with neighboring landowners and the preparation restoration plans.

- ❖ **Cultural Resources** baseline assessment was contracted to provide the necessary information to ensure that restoration activities did not impact important cultural resources. The assessment was completed on schedule and met all established expectations. One potential cultural site was identified in one of the proposed restoration tracts and the recommendations for dealing with that site were incorporated into the restoration plan for the site. Cultural resources assessment is considered an essential part of habitat restoration planning.
- ❖ **Topographic Mapping** was developed for the entire Subreach using Light Detection and Ranging (LIDAR) technology. The new mapping provided much greater detail and reliability than previous mapping that was generated from aerial photos. The output of this detailed mapping is in the form of data files that can be manipulated in a Geographic Information System (GIS) to provide a wide range of products. The topographic mapping provided important information to support the hydraulic modeling and the development of restoration plans.

**Task 3. Modeling** – Early in the CSP process it was determined that the only necessary modeling under this Task would be two-dimensional hydraulic modeling to assess the effects of habitat restoration on the flood control system and neighboring properties. This modeling was conducted through a contract that also included addressing landowner questions related to the flood management system.

- ❖ **Hydraulic Modeling and Analysis** is an essential component of habitat restoration planning that is also required in order to apply for encroachment permits from the Central Valley Flood Protection Board. The hydraulic modeling and analysis also established technical creditability with the CDWR, local engineers and other stakeholders who were willing to invest the time required to understand the findings of the analysis. As part of the draft and final reports the contractor developed new and more effective graphics that demonstrated that the proposed restoration projects would not result in flood issues. Overall, the Task was a very worthwhile and essential effort.

**Task 4. Focal Area Planning** – Focal Area Planning was designed to respond to concerns and questions raised by local stakeholders. The Task also included development of habitat restoration plans that were based on information generated from the entire CSP process.

- ❖ **Recreation Plans** were identified as being particularly important to local stakeholders as part of the identification of Principal Landowner questions under Task 5. They also provided the opportunity to coordinate riparian habitat with compatible recreation and, in turn, relate habitat conservation to strong local interests. Two plans were prepared, the *Master Plan for the Colusa-Sacramento River State Recreation Area* and the *Colusa Subreach Recreation Access Plan*. These plans responded directly to local concerns and helped to establish creditability and working relationships with local stakeholders. This was especially true for the City of Colusa. Development

of the *Master Plan* for the CSRSRA demonstrated that TNC and SRCAF shared objectives with the City and that an effective partnership could exist.

- ❖ **Restoration Plans** were prepared for each of the eight potential restoration Tracts. These plans were a key product of CSP that were specifically required in the Scope of Work. The restoration plans incorporated information and ideas drawn from all the other Tasks and from meetings with neighboring landowners.

**Task 5. Landowner Questions** – Landowner questions and related planning and research projects were identified by the Advisory Workgroup while it still had its original membership. These planning and research projects directly addressed ten of the highest priority landowner questions.

- ❖ **Priority Landowner Questions** were identified after much discussion on the part of the Advisory Workgroup. These identified landowner questions, or concerns as they were also called, became the focus of the planning process. Input received from various stakeholders indicated that the identified questions were the correct priorities for CSP.
- ❖ **Research Projects** and planning projects as noted in Task 4 were chosen by the Advisory Workgroup to address landowner concerns. The Workgroup also approved scopes of work for these projects and participated in the selection of contractors. The research projects supported the development of the restoration plans for tracts in the Subreach. The new information and techniques generated will support future ecosystem restoration plans and projects throughout the Sacramento River Conservation Area. The development of projects that address specific landowner questions also was important because it helped to establish credibility with some stakeholders.

**Task 6. Project Management and Administration** includes standards for basic management of the planning process in accordance with Ecosystem Restoration Program grant procedures. This Subreach Planning Report was also prepared as specified in this Task.

- ❖ **Quarterly Reports** were prepared to keep GAP Services and CDFG apprised of the status of the planning process and compliance with Recipient Agreement requirements. The reporting was valuable because it provided a regular opportunity to assess the project compliance and assess any needed adjustments.
- ❖ **Subcontractor Selection and Data Management** requirements were specified to ensure that Ecosystem Restoration Program grant procedures were met. The standards were practical and compliance was achieved.
- ❖ **Subreach Planning Report** synthesizes the results of CSP and recommends a strategy for future management of ecosystem restoration in the Subreach. The *draft Report* was reviewed by the Advisory Workgroup, circulated to stakeholders for input and provided to GCAP Services and DFG for review and comment. One written response was received from Ashley Indrieri, the Executive Director of the Family Water Alliance. Ms. Indrieri's comments and the response provided to them are contained in Appendix J.



**Task 7 Project Closure** directs the closeout of the Recipient Agreement including administrative and financial details. A Project Closeout Summary Report will complete the Colusa Subreach Planning process

#### **D. Achievement of the Project Goal and Objectives**

The Primary Goal of Colusa Subreach Planning as established in the Recipient Agreement was to

***Increase citizen stakeholder involvement in determining realistic conservation strategies and projects for protecting and restoring riparian vegetation along the Sacramento River, between River Miles 143.5 and 164.5, compatible with the flood control system and other economic and environmental uses of the floodplain***

The Goal was defined through five Objectives. An evaluation of the achievement of each of these Objectives through the CSP process is provided:

- a) Ensure an open and inclusive planning process consistent with the SRCAF principles and guidelines with multiple opportunities for input by local stakeholders, agencies and private interest groups.**

The planning process was open to all stakeholders that chose to participate and multiple forms of notice were used to inform stakeholders of input opportunities and project results. In general, stakeholders chose to become involved when meetings were focused on topics of specific interest or concern to them. All outreach efforts included in the Public Engagement Plan were carried out and the planning process was consistent with SRCAF principles and guidelines. The withdrawal of some stakeholders from the process and the related publicity that followed reduced overall participation of local stakeholders but the level of involvement by local stakeholders, agencies and private interest groups was substantially greater than that which occurred before CSP. Thus, this objective was met.

- b) Collect baseline data and analyze existing data to inform floodplain management and compliment long-term monitoring programs.**

Baseline Assessments were conducted that included tract-specific assessments, the small mammal research, the insect pest research, the cultural resources assessment and LIDAR topographic mapping. The sum of the products clearly exceeded the expectations established in the Scope of Work such that this objective was met.

- c) Build and calibrate tools (including models) to evaluate the effects of restoration on land management alternatives and flood control infrastructure specific to the Princeton – Colusa Subreach.**

A two-dimensional hydraulic model was developed for the entire Subreach in addition to new analysis tools and new methods of displaying model results. The hydraulic model was successfully used to evaluate the effects of restoration projects on both the flood management system and neighboring properties. It was also used to answer other landowner questions related to flood management. This objective was met.

**d) Develop design alternatives and identified implementation projects, incorporating ecosystem restoration and related compatible flood protection, recreation and other land use benefits.**

The master plan for the CSRSRA, the recreation access plan and the eight restoration plans integrated ecosystem restoration with flood management, compatible recreation opportunities and adjoining land uses. This objective was met.

**e) Address stakeholder concerns and research priority questions.**

Planning and research projects were completed that directly addressed the landowner questions that were identified by the Advisory Workgroup. The research projects supported the development of the Strategy for the Colusa Subreach. The new information and techniques generated through CSP will also support future ecosystem restoration plans and projects throughout the Sacramento River Conservation Area. This objective was met.

## REFERENCES

### **Colusa Subreach Planning Documents**

- Ayres Associates. 2007. *Two dimensional hydraulic modeling of riparian habitat restoration form Colusa to Princeton. Sacramento River, RM 142.5 to 164.5 Glenn and Colusa counties, CA*. Report to The Nature Conservancy, Chico, California. 22 pp (plus appendices).
- Economic & Planning Systems, Inc. 2006. *Fiscal and economic impact analyses Colusa Subreach*. Report to The Nature Conservancy, Chico, California. 76 pp (plus appendices).
- EDAW. 2007b. *Colusa Sacramento River State Recreation Area master plan*. Report to The Nature Conservancy, Chico, California.
- \_\_\_\_\_, 2007b. *Colusa Subreach recreation access plan*. Report to The Nature Conservancy, Chico, California.
- \_\_\_\_\_, 2008. *Colusa Subreach planning pest and regulatory effects study final project report*. Report to The Nature Conservancy, Chico, California.
- Hubbell, M.S., C. Little, K.C. Price, J.W. Wood, and D.M. Wood. 2005. *Baseline assessment for riparian restoration at the Ward restoration area*. Report to The Nature Conservancy. 51 pp.
- \_\_\_\_\_, M.S., C. Little, K.C. Price, J.W. Wood, and D.M. Wood. 2006. *Baseline assessment for riparian restoration at the 1000-Acre Ranch restoration area*. Report to The Nature Conservancy. 45 pp.
- \_\_\_\_\_, M.S., C. Little, K.C. Price, J.W. Wood, and D.M. Wood. 2006. *Baseline assessment for riparian restoration at the Cruise'n Tarry restoration area*. Report to The Nature Conservancy. 47 pp.
- \_\_\_\_\_, M.S., C. Little, K.C. Price, J.W. Wood, and D.M. Wood. 2006. *Baseline assessment for riparian restoration at the Jensen restoration area*. Report to The Nature Conservancy. 50 pp.
- \_\_\_\_\_, M.S., C. Little, K.C. Price, J.W. Wood, and D.M. Wood. 2006. *Baseline assessment for riparian restoration at the Stegeman restoration area*. Report to The Nature Conservancy. 48 pp.
- \_\_\_\_\_, M.S., C. Little, K.C. Price, J.W. Wood, and D.M. Wood. 2006. *Baseline assessment for riparian restoration at the Womble restoration area*. Report to The Nature Conservancy. 52 pp.
- \_\_\_\_\_, M.S., C. Little, K.C. Price, J.W. Wood, and D.M. Wood. 2007. *Baseline assessment for riparian restoration at the Boeger restoration area*. Report to The Nature Conservancy. 54 pp.
- \_\_\_\_\_, M.S., C. Little, K.C. Price, J.W. Wood, and D.M. Wood. 2007. *Baseline assessment for riparian restoration at the Colusa North restoration area*. Report to The Nature Conservancy. 49 pp.
- Koenig, D.A., J.W. Hunt, D.M. Wood, R. J. Bogiotto, and L. Altier. 2007. *Examination of potential agricultural pest mammal species associated with riparian habitat restoration projects along northern California's Sacramento River*. Report to The Nature Conservancy. 54 pp.

- Langridge, S. 2007. *Pests and Pest Control in a landscape mosaic: Agricultural and large-scale riparian forest restoration*. Report to The Nature Conservancy, Chico, California. 20 pp.
- North State Resources. 2008. *Evaluation of environmental effects associated with wildlife habitat restoration on seven tracts along the Sacramento River between Colusa and Princeton*. Report to The Nature Conservancy, Chico, California. 74 pp (plus appendices).
- Terrapoint. 2006. *Colusa Subreach baseline assessment & Dead Man's Reach topographic mapping*. Report to The Nature Conservancy, Chico, California. 11 pp.
- The Nature Conservancy. 2005. *Initial Colusa Subreach background report*. Report to the Colusa Subreach Planning Advisory Workgroup and CALFED. 95 pp.
- \_\_\_\_\_, 2008. *Riparian Habitat Restoration Plan for the Northern Expansion Area of the Colusa - Sacramento River State Recreation Area (Formerly the Ward Tract)*. Report to CALFED.
- \_\_\_\_\_, 2008. *Riparian Habitat Restoration Plan for the 1000-Acre Ranch tract*. Report to the Colusa Subreach Planning Advisory Workgroup and CALFED.
- \_\_\_\_\_, 2008. *Riparian Habitat Restoration Plan for the Boeger tract*. Report to the Colusa Subreach Planning Advisory Workgroup and CALFED.
- \_\_\_\_\_, 2008. *Riparian Habitat Restoration Plan for the Colusa North tract*. Report to the Colusa Subreach Planning Advisory Workgroup and CALFED.
- \_\_\_\_\_, 2008. *Riparian Habitat Restoration Plan for the Cruise'n Tarry tract*. Report to the Colusa Subreach Planning Advisory Workgroup and CALFED.
- \_\_\_\_\_, 2008. *Riparian Habitat Restoration Plan for the Jensen tract*. Report to the Colusa Subreach Planning Advisory Workgroup and CALFED.
- \_\_\_\_\_, 2008. *Riparian Habitat Restoration Plan for the Stegeman tract*. Report to the Colusa Subreach Planning Advisory Workgroup and CALFED.
- \_\_\_\_\_, 2008. *Riparian Habitat Restoration Plan for the Womble tract*. Report to the Colusa Subreach Planning Advisory Workgroup and CALFED.
- Westwood, L.D. and G.G. White. 2005. *Cultural resource investigation for the Colusa Subreach planning*. California State University, Chico, Archaeological Research Program Report to The Nature Conservancy, Chico, California. 59 pp (plus appendices).

### **Other Publication References**

- Alpert, Peter et. al., 1999. *Riparian Forest Restoration along Large Rivers: Initial Results from the Sacramento River Project*. Restoration Ecology. Volume 7 No. 4: 360-368.
- Ayres Associates, 2001. *Hydraulic Modeling and Geomorphic analysis of the Sacramento river, RM 184 to RM 194, Glenn and Butte Counties, California*. Sacramento, California.
- \_\_\_\_\_, 2002. *Two-dimensional Hydraulic Modeling of the Upper Sacramento River, RM 194.0 to RM 202.0 Including Riparian Restoration, Revised Setback Levee, and East Levee Removal, Glenn and Butte Counties, California*. Sacramento, California.
- \_\_\_\_\_, 2002. *Hydraulic Modeling of the Sacramento River, RM 163 to RM 176 Glenn and Colusa Counties, California*. Sacramento, California.

- California Bay Delta Program, 1999. *Flow Regime Requirements for Habitat Restoration along the Sacramento River between Colusa and Red Bluff*. Sacramento, California.
- \_\_\_\_\_, 2000. *Ecosystem Restoration Program Plan Volume I: Ecological Attributes of the San Francisco Bay-Delta Watershed*. Sacramento, California.
- \_\_\_\_\_, 2000. *Ecosystem Restoration Program Plan Volume II: Ecological Management Zone Visions*, Sacramento. California.
- \_\_\_\_\_, 2000. *Flow Regime Requirements for Habitat Restoration along the Sacramento River between Colusa and Red Bluff*. Sacramento, California.
- \_\_\_\_\_, 2001. *Ecosystem Restoration Program Plan Volume II, Draft Stage 1 Implementation Program*. Sacramento, California.
- California Department of Finance, 2005. E-1: *City/County Population Estimates with Percent Change, January 1, 2004 and 2005*. Sacramento California.
- California Department of Fish and Game, 1980. *Interim Management Plan for Merrill's Landing Wildlife Area*. Kenneth E. Zanzi, Redding, California.
- \_\_\_\_\_, 1986. *Preliminary Descriptions of Terrestrial Natural Communities of California*. Robert F. Holland. Sacramento, California.
- \_\_\_\_\_, 1995. *Management Plan, Sacramento River Wildlife Area*. Prepared by J. H. Snoden, Rancho Cordova, California.
- \_\_\_\_\_, 1996. *Guidelines for Assessing the Effects of Proposed Projects on Rare, Threatened, and Endangered Plants and Natural Communities*. Sacramento, California.
- \_\_\_\_\_, 2001. *Draft Management Plan, Sacramento River Wildlife Area*. Rancho Cordova, California.
- \_\_\_\_\_. 2002. *California Natural Diversity Database, List of California Terrestrial Natural Communities Recognized by the California Natural Diversity Database*. Wildlife and Habitat Data Analysis Branch, Sacramento, California.
- \_\_\_\_\_, 2002. *Guide and Annotated Outline for Writing Land Management Plans*. Lands and Facilities Branch, Sacramento, California.
- \_\_\_\_\_, 2004. *Comprehensive Management Plan for the Sacramento River Wildlife Area*. Rancho Cordova, California.
- \_\_\_\_\_, 2003. *State and Federally Listed Endangered and Threatened Animals of California*. Habitat Conservation Division. Sacramento, California.
- California Department of Water Resources, 2002. *Sacramento River Aerial Atlas*. Northern District, Red Bluff, California.
- \_\_\_\_\_, 2002. *Sacramento River Geographic Information System*. Northern District, Red Bluff, California.
- \_\_\_\_\_, 2002. *Final Recommendations Report – California Floodplain Management Taskforce*. Sacramento, California.
- \_\_\_\_\_, 2005. *Responding to California's Flood Crisis*. Sacramento California.

- California Native Plant Society, 1995. *A Manual of California Vegetation*. John O. Sawyer and Todd Keeler-Wolf. Sacramento, California.
- Colusa County, 1989. *Colusa County General Plan*. Prepared by Sedway-Cooke Associates.
- Colusa County Department of Agriculture, 2003. *2003 Crop Report*. Colusa, California.
- Ellis, L. M. 2001. *Short-term Response of Woody Plants to Fire in a Rio Grange Riparian Forest, Central New Mexico, USA*. Biological Conservation 97:159-170.
- EDAW Inc, 2003. *Sacramento River Public Recreation Access Study*. Sacramento, California.
- Franzreb, Kathleen E. 1990. *An Analysis of Options for Reintroducing a Migratory native passerine, the Endangered Least Bell's Vireo *Vireo bellii pusillus* in the Central Valley, California*. Biological Conservation 53: 105-123.
- Gaines, David, 1977. The Valley Riparian Forests of California: Their Importance to Bird Populations. In: *Riparian Forests in California*. Institute of Ecology Publication No. 15.
- Glenn County, 1993. *Glenn County General Plan, Volume I*, prepared by QUAD Consultants.
- Glenn County Department of Agriculture, 2003. *2003 Annual Crop and Livestock Report*. Willows, California.
- Golet et al., 2—3. *Using Science to Evaluate Restoration Efforts and Ecosystem Health on the Sacramento River Project, California*. In Faber P.M. (ed) 2003. California Riparian Systems: Processes and Floodplain Management, Ecology and Restoration. 2001. Riparian Habitat and Floodplains Conference Proceedings, Riparian Habitat Joint Venture, Sacramento, California.
- Greco, Steven E., 1999. *Monitoring Riparian Landscape Change and Modeling Habitat Dynamics of the Yellow-billed Cuckoo on the Sacramento River, California - A Dissertation in Ecology for the Office of Graduate Studies, University of California, Davis, Davis, California*.
- Hunt, John W. et al. 2003. *Comparison of Surface-active Beetle (Order: Coleoptera) Assemblages in Remnant and Restored Riparian Forest of Varying Ages on the Middle Sacramento River, California*. 2003.
- Jones and Stokes, et al, 2003. *Socioeconomic Assessment of Proposed Habitat Restoration within the Riparian Corridor of the Sacramento River Conservation Area - Final Report*. Sacramento, California.
- Josselyn, M et. al., 1988. *Sacramento River Wildlife Area Operations and Maintenance Plan, Final Report*. San Francisco State University, San Francisco, California.
- Kelly, Robert, 1989. *Battling the Inland Sea*. University of California Press. Berkley and Los Angeles, California.



- Larsen, Eric, et al., 2003. *The Controls on and Evolution of Channel Morphology of the Sacramento River: A case study of River Miles 201-185, Final Report*. Davis, California.
- Leavenworth, Stuart, 2004. *Defenses Decayed, Neglected levees pushed past limits*. Sacramento Bee, March 24, 2004.
- Leopold, Luna B., 1994. *A View of the River*. Harvard University press, Cambridge, Massachusetts.
- Limm, Michael P. and Marchetti, Michael. P., 2003. *Contrasting Patterns of Juvenile Chinook Salmon (Oncorhynchus tshawytschaw) Growth, Diet, and Prey Densities in Off-channel and Main Stem Habitats on the Sacramento River*. Chico, California.
- Molinar, Jennifer et. al., 2004. *The Sum is Greater than the Parts*. Conservation Biology, Volume 18 No. 6.
- Morken, Ingrid and Kondolf, G. Mathias. 2003. *Evolution Assessment and Conservation Strategies for Sacramento River Oxbow Habitats*. Berkeley, California.
- Mount, Jeffrey, 1995. *California Rivers and Streams*. University of California Press, Berkeley, California.
- Murray, Burns and Kienlen, 1987. *Retention of Riparian Vegetation, Sacramento River Tisdale Weir to Hamilton City*. Sacramento, California.
- Paton, Peter C., 1994. *The Effects of Edge on Avian Nest Success: How Strong is the Evidence*. In Conservation Biology, Volume 8: 17-26.
- PRBO Conservation Science, 2004. *Monitoring Landbirds in the Sacramento Valley*. Stinson Beach, California.
- Resources Agency of the State of California, 1978. *Sacramento River Environmental Atlas*. State of California, Sacramento, California.
- \_\_\_\_\_, 1984. *River Atlas – Appendix to Middle Sacramento River Spawning Gravel Study*. Department of Water Resources, Red Bluff, California.
- \_\_\_\_\_, 1989. *Upper Sacramento River Fisheries and Riparian Habitat Management Plan*. SB 1086 Advisory Council, Sacramento, California.
- Roberts, M. D. et al., 2003. *A Pilot Investigation of Cottonwood Recruitment on the Sacramento River*. Chico, California.
- Sacramento River Conservation Area Forum, June, 2002. *Sacramento River Conservation Area Handbook*. Red Bluff, California.
- Sacramento River Partners, 1999. *Restoration Plan, River Mile 166.5R, Thomas Unit*, Department of Fish and Game. Gregory A. Treber. Chico, California.
- \_\_\_\_\_, 1999. *Riparian Restoration Plan for River Mile 169.5-R, Beehive Bend Unit*, the California State Department of Fish and Game, Glenn County, California. Gregory A. Treber. Chico, California.
- \_\_\_\_\_, 2002. *Riparian Restoration Plan for the Moulton Weir Unit, Sacramento River Wildlife Area, Colusa County, California, Draft Report*. Dan Efseaff and Helen Swagerty. Chico, California

- \_\_\_\_\_, 2002. *Riparian Restoration Plan for the Princeton Unit, Sacramento River Wildlife Area, Colusa County, California, Draft Report*. Dan Efseaff and Helen Swagerty. Chico, California.
- \_\_\_\_\_, 2003. *Riparian Restoration Plan for the Jacinto Unit, Upper Sacramento River Wildlife Area, Glenn County, California*. Erin McKinney, Dan Efseaff and Helen Swagerty, Chico, California.
- \_\_\_\_\_, 2003. *Riparian Restoration Unit Plan for the Pine Creek Unit, Upper Sacramento River Wildlife Area, Glenn County, California, Draft Report*. Dan Efseaff, Erin McKinney and Helen Swagerty. Chico, California.
- Schlorff, Ronald W., 1997. *Monitoring Bank Swallow Populations on the Sacramento River: a Decade of Decline*. 1997 Transactions of the Western Section of the Wildlife Society 33: 40-48.
- Stillwater Sciences, 2003. *Sacramento River Ecological Indicators Pilot Study*. Berkeley, California.
- The Nature Conservancy, 1996. *Princeton Ferry Restoration Unit Completion Report 1992-1995*. Sacramento River Project, Chico, California.
- \_\_\_\_\_, 1994. *Lohman Restoration Unit Plan*. Sacramento River Project. Chico, California
- \_\_\_\_\_, 1998. *Sacramento River Project Riparian Forest Restoration Manual*. Sacramento River Project, Chico, California.
- \_\_\_\_\_, 2003. *Management and Monitoring Recommendations for Floodplain Habitats of the Chico Landing Subreach (RM 178-206), Sacramento River, CA*. Sacramento River Project, Chico, California.
- \_\_\_\_\_, 2003. *Methods for Evaluating Ecosystem Integrity and Monitoring Ecosystem Response*. Sacramento River Project, Chico, California.
- \_\_\_\_\_, 2003. *Management and Monitoring Recommendations for Floodplain Habitats of the Beehive Bend Subreach (RM 164 –178), Sacramento River, CA*. Northern Central Valley Office, Chico, California.
- \_\_\_\_\_, 2003. *Baseline Information for Monitoring of Floodplain Deposition*. Chico, California. Northern Central Valley Office, Chico, California.
- University of California Cooperative Extension Colusa County, 2004. *The Changing Face of Agriculture in the Lower Sacramento Valley*. Row Crops.
- U.S. Army Corps of Engineers, 2002. *Sacramento and San Joaquin River Basins Comprehensive Study – Draft Interim Report*. Sacramento, California.
- \_\_\_\_\_, 2004. *2003 - Field Reconnaissance Report of Bank Erosion Sites – Sacramento River Flood Control Levees and Tributaries*. Sacramento, California.
- U.S. Fish and Wildlife Service, 2000. *Impacts of Riprapping to Ecosystem Functioning, Lower Sacramento River*, Richard DeHaven, Sacramento, California.
- \_\_\_\_\_, 2003. *Ord Bend Unit Restoration Project, California*, Dan Efseaff and Kelly Moroney. Willows, California.

- \_\_\_\_\_, 2005. *Comprehensive Conservation Plan and Environmental Assessment – Sacramento River National Wildlife Refuge*. California/Nevada Refuge Planning Office, Sacramento, California.
- U.S, Department of Agriculture, National Agriculture Statistics Service, 1999, *1997 Census of Agriculture*. Washington, DC.
- U.S, Department of Agriculture, National Agriculture Statistics Service, 2004, *2002 Census of Agriculture*. Washington, DC.
- Vaghti, Mehrey Grace, 2003. *Riparian Vegetation Classification in Relation to Environmental Gradients, Sacramento River, California*. Thesis. University of California, Davis, Davis, California.
- White, Gregory. G., et al., 2003. *Cultural Resource Overview and Management Plan, Sacramento River Conservation Area, Tehama, Butte, Glenn and Colusa Counties California*. Chico, California.
- Wood, David M., 2003. *Distribution and Composition of Woody Species in Riparian Forests along the Middle Sacramento River, California*. Chico, California.
- \_\_\_\_\_, 2003. *Pattern of Woody Species Establishment on Point Bars on the Middle Sacramento River, California*. Chico, California.

### **Website References**

- California Bay-Delta Authority, [www.calwater.ca.gov](http://www.calwater.ca.gov)
- California Department of Fish and Game, [www.dfg.ca.gov](http://www.dfg.ca.gov).
- California Department of Parks and Recreation, [www.parks.ca.gov](http://www.parks.ca.gov).
- California Department of Water Resources, [www.water.ca.gov](http://www.water.ca.gov).
- California Reclamation Board, [www.recbd.ca.gov](http://www.recbd.ca.gov).
- California Department of Finance, [www.dof.ca.gov](http://www.dof.ca.gov).
- California Secretary of State – Elections Division, [www.ss.ca.gov/elections/election](http://www.ss.ca.gov/elections/election).
- City of Colusa, [www.colusa-ca.gov](http://www.colusa-ca.gov)
- Colusa County, [www.colusacountyclerk.com](http://www.colusacountyclerk.com).
- Colusa Subreach Planning, [www.sacramentoriverportal.org](http://www.sacramentoriverportal.org). \*click on Colusa Subreach Planning
- Family Water Alliance. [www.familywateralliance.com](http://www.familywateralliance.com).
- Glenn County, [www.countyofglenn.net](http://www.countyofglenn.net).
- Sacramento River Conservation Area Forum, [www.sacramentoriver.org](http://www.sacramentoriver.org)
- Sacramento River Portal, [www.sacramentoriverportal.org](http://www.sacramentoriverportal.org).
- Sacramento River Preservation Trust, [www.sacriverttrust.org](http://www.sacriverttrust.org).

Sacramento and San Joaquin River Basins Comprehensive Study, [www.compstudy.org](http://www.compstudy.org).

The Nature Conservancy, [www.nature.org](http://www.nature.org).

The Sacramento Bee, [www.sacbee.com](http://www.sacbee.com).

US Army Corps of Engineers – Sacramento District, [www.spk.usace.army.mil/index](http://www.spk.usace.army.mil/index).

US Fish and Wildlife Service – Pacific Region, [www.pacific.fws.gov](http://www.pacific.fws.gov)

US Fish and Wildlife Service – Sacramento National Refuge Complex,  
[sacramentovalleyrefuges.fws.gov](http://sacramentovalleyrefuges.fws.gov).

## **APPENDIX A**

### **Memorandum of Agreement between the Sacramento River Conservation Area Forum and The Nature Conservancy regarding the Colusa Subreach Planning Project**

The Memorandum of Agreement was adopted by the Steering Committee on June 17, 2004 to define the project partnership between STCAF and TNC. The full text of the Memorandum is contained in this Appendix.

**MEMORANDUM OF AGREEMENT  
BETWEEN THE SACRAMENTO RIVER CONSERVATION AREA FORUM  
AND THE NATURE CONSERVANCY REGARDING THE COLUSA  
SUBREACH PLANNING PROJECT**

**I. Preamble**

The Nature Conservancy ("TNC") has been awarded a grant from the California Bay Delta Authority ("CBDA") referred to as ERP-01-P27 to conduct a three-year subreach planning project along the Sacramento River (the "Project"). The Project will focus on the land inside of the Sacramento River Flood Control Project levees between the Princeton Ferry site and the Colusa Bridge (the "Project Area"). The Project will involve a comprehensive approach to restoration planning that includes a high level of stakeholder involvement to develop conceptual restoration plans and analyze potential benefits to, and impacts of, restoration implementation on surrounding landowners and land uses. This planning process will develop the tools and information needed to make informed land use decisions regarding the effects of restoration actions that are uniquely designed to correspond to local conditions. TNC entered into a Recipient Agreement on April 21, 2004 with GCAP, the contract manager for CBDA, to implement the Project.

In October of 2001, TNC submitted a proposal to CBDA for funding of the Project (the "Proposal"). The Sacramento River Conservation Area Forum ("SRCAF") assisted in the development of the Proposal, supported the Proposal and was named in the Proposal as a partner in the Project. The principal role of SRCAF in the Project application was to collaboratively manage, with TNC, a public outreach process that would involve a wide range of stakeholders in planning the use of the floodplain and the restoration of riparian habitat within the Project Area. As set forth in the Proposal, TNC plans to enter into a subcontract with the CSU Chico Foundation, the contracting agent for SRCAF, to provide funding for certain staff services to be provided by SRCAF related to the public outreach aspects of the Project.

**II. Purpose of the Memorandum of Agreement**

The purpose of this Memorandum of Agreement ("MOA") is to set forth the agreement between SRCAF and TNC in regard to the implementation of the Project and to document and detail the collaborative partnership between the parties.

**III. Commitment to the Goal and Objectives the Project**

**Shared Commitment to the Project Goal**

SRCAF and TNC jointly commit to the following Goal of the Project:

**Increase citizen stakeholder involvement in determining realistic conservation strategies and projects for protecting and restoring a riparian corridor along the Sacramento River in the Project Area that address flood control and economic and environmental uses of the floodplain.**

**Shared Commitment to the Project Objectives**

SRCAF and TNC jointly commit to the following Objectives of the Project:



1. Ensure an open and inclusive planning process consistent with the SRCAF principles and guidelines with multiple opportunities for input by local stakeholders, agencies and private interest groups.
2. Collect baseline data and analyze existing data to inform floodplain management and compliment long-term monitoring programs.
3. Build and calibrate tools to evaluate the effects of restoration, land management alternatives and flood control infrastructure specific to the Princeton – Colusa Subreach.
4. Develop design alternatives and build support among stakeholders for identified implementation projects, incorporating ecosystem restoration and related compatible flood protection, recreation and other land use benefits.
5. Address stakeholder concerns and research priority questions.

#### **IV. Responsibilities of SRCAF**

SRCAF commits to discharge the following responsibilities pursuant to this MOA:

1. Act as a partner with TNC to jointly manage the public outreach portion of the Project to be consistent with the goal and principles of the SRCAF Handbook.
2. Assist TNC in selecting a project facilitator, as specified in the Recipient Agreement (“Facilitator”).
3. Select the Advisory Workgroup in coordination with TNC, consistent with Section VII of this MOA.
4. Coordinate and distribute, in conjunction with the Facilitator and TNC, agendas and information for the Advisory Workgroup.
5. Communicate with local governments and conservation agencies regarding the Project in coordination with TNC.
6. Utilize the SRCAF Board, Technical Advisory Committee and other appropriate SRCAF committees to review and comment on Project reports, studies and plans.

#### **V. Responsibilities of TNC**

TNC commits to discharge the following responsibilities pursuant to this MOA:

1. Manage the Project activities under the Recipient Agreement to be consistent with the goal and principles of the SRCAF Handbook, with reporting responsibility to CBDA.
2. Act as a partner with SRCAF to jointly manage the public outreach portion of the project to be consistent with the goal and principles of the SRCAF Handbook.
3. Coordinate with SRCAF in recruiting the Facilitator.
4. Assist SRCAF in selecting the Advisory Workgroup, consistent with Section VII of this MOA.
5. Assist SRCAF and the Facilitator to coordinate and distribute agendas and information for the Advisory Workgroup.
6. Communicate with local governments and conservation agencies regarding the Project.
7. Manage the preparation of reports and studies that are part of the Project.
8. Develop land use and restoration alternatives for land owned by those who choose to participate, including public agencies, TNC and other private landowners, with input from the Advisory Workgroup.

9. Consider input from the Advisory Workgroup and make Project determinations consistent with the goal and principles of the SRCAF Handbook per CBDA requirements.

## **VI. The Steering Committee**

The Steering Committee will serve as a coordinating body to guide the public outreach process and oversee the implementation of the Project. The Steering Committee will be members of the Advisory Workgroup and a member of the Steering Committee, selected by the Steering Committee, will serve as the chair of the Advisory Workgroup. The Steering Committee shall be composed of seven members as follows:

- SRCAF
  - Board members from
    - Colusa County – public interest representative
    - landowner representative
    - Glenn County – public interest representative
    - landowner representative
  - SRCAF Manager
- Public Conservation Agency representative selected by the SRCAF Board
- TNC representative – Project Director

## **VII. The Advisory Workgroup**

### **Function**

The Advisory Workgroup will serve to provide input representative of stakeholders to the planning of restoration and related land uses along the river and to studies developed through the Project. Members of the Advisory Workgroup will be expected to commit to become informed in regard to restoration and flood management issues, regularly attend meetings throughout the term of the Project and review Project reports and studies. An Advisory Workgroup Role Description will be developed by SRCAF staff and TNC in conjunction with the Facilitator that will detail the duties and expectations of the Advisory Workgroup. The Advisory Workgroup Role Description will be approved by SRCAF and TNC prior to the selection of the Advisory Workgroup.

### **Selection**

The Advisory Workgroup will be selected by the SRCAF with the input of TNC. The composition of the Advisory Workgroup will be as specified on Attachment “A”.

### **Consistency with the Sacramento River Conservation Area Forum Handbook**

The Advisory Workgroup will review reports, studies and plans to ensure consistency with the goal and principles of the SRCAF Handbook.

### **Science Subgroup**

A Science Subgroup will be selected by the Steering Committee from the membership of the Advisory Workgroup to review technical aspects of the Project and related technical reports in order to permit the Advisory Workgroup to focus on substantive policy issues.

## **VIII. Amendment**

This MOA may be supplemented, amended or modified by the written agreement of SRCAF and TNC.

## **IX. Approval**

This MOA shall be effective as of June 17, 2004 and shall extend through April 15, 2007.

\_\_\_\_\_ (original signed by) \_\_\_\_\_  
Lynnel Pollock, Board of Directors Chair  
Sacramento River Conservation Area Forum

\_\_\_\_\_ (original signed by) \_\_\_\_\_  
Mike Sweeney, Chief Operating Officer  
The Nature Conservancy

### **Attachment “A”\***

*\*This is subject to further refinement by the Steering Committee*

## **Composition of the Advisory Workgroup**

### **Steering Committee members (7)**

- ◆ SRCAF Board Member– Colusa County, landowner
- ◆ SRCAF Board Member – Colusa County, public interest
- ◆ SRCAF Board Member - Glenn County, landowner
- ◆ SRCAF Board Member - Glenn County, public interest
- ◆ SRCAF - Public Conservation Agency representative
- ◆ SRCAF Manager
- ◆ TNC Project Director

### **Interest Representatives (8):**

- ◆ Inner Levee Private Property Owner
- ◆ Local Irrigation or Reclamation District
- ◆ City of Colusa
- ◆ Colusa County government
- ◆ Glenn County government
- ◆ Recreation Interest
- ◆ Business Interest
- ◆ Environmental Interest

### **Agency Property Owner Representatives (5):**

- ◆ State Department of Fish and Game
- ◆ State Department of Parks and Recreation
- ◆ State Department of Water Resources
- ◆ US Fish and Wildlife Service
- ◆ California Bay Delta Authority

## **APPENDIX B**

### **Colusa Subreach Planning Public Engagement Plan**

The Public Engagement Plan was adopted by the Steering Committee on October 1, 2004 to help guide Colusa Subreach Planning. The full text of the Plan is contained in this Appendix.



# COLUSA SUBREACH PLANNING

## Public Engagement Plan



### 1. Purpose of the Public Engagement Plan

The Public Engagement Plan is intended to outline a process that will provide stakeholders with the opportunity to become informed about the Colusa Subreach Planning Project and to participate in the planning process. It is also intended to provide for a planning process is efficient and contributes to achieving the Project Goal and Objectives.

### 2. Overview of the Project

The Colusa Sub-reach Planning Project is a collaborative effort among landowners, other local interests and resources agencies to develop a conservation strategy along the twenty-one mile stretch of the Sacramento River from Princeton to Colusa. Planning will focus on identifying the concerns of area landowners and addressing them through research projects. It will include an emphasis on the restoration of riparian habitat on public lands and lands purchased for habitat conservation that are inside the Sacramento River Flood Control Project levees. Private properties will not be accessed without permission and private property rights will be respected. The Project will occur over a three-year period and it is funded by the California Bay-Delta Program, which is commonly known as CALFED.

The Colusa Subreach Planning Project will be substantially driven by the issues and opportunities that are identified as part of the public engagement process. The Project will include the preparation of detailed, baseline assessments for potential restoration sites and hydraulic analysis of draft restoration proposals to ensure the continuing integrity of the flood control system. Research projects will also be initiated to address key landowner questions and concerns identified by the Advisory Workgroup. The overall intent of the Project is to plan for identified habitat restoration activities and related uses that are compatible with agriculture and the flood control system.

### 3. TNC and SRCAF Partnership

The Sacramento River Conservation Area Forum (SRCAF) and The Nature Conservancy (TNC) initially agreed to form a partnership to conduct the Colusa Subreach Planning Project in the summer of 2001, when the application for project funding was first prepared. Both entities recognized that there were concerns with habitat restoration that required open and cooperative interaction with all stakeholders. This joint agreement was further detailed in the *Memorandum of Agreement between the Sacramento River Conservation Area Forum and the Nature Conservancy Regarding the Colusa Subreach Planning Project* in June of 2004. The *Memorandum of Agreement* specifies the shared commitments of both entities related to:

- The Goal and Objectives of the Project
- The responsibilities of both SRCAF and TNC

- Provision for a Steering Committee to direct the public outreach
- Provision for an Advisory Workgroup to provide representative stakeholder input

TNC is responsible to the California Bay-Delta Authority for the completion of all Project tasks. SRCAF partners with TNC to manage the public outreach effort and provides staff services to help support the effort pursuant a subcontract to TNC.

#### 4. Key Targets for Public Engagement

- Landowners in and adjoining the Project Area (between the levees)
- Local government (Colusa and Glenn Counties, City of Colusa, local special districts)
- Local organizations (Farm Bureaus, Chambers of Commerce, etc.)
- Agricultural interests
- Water supply interests
- Recreation interests
- Conservation interests
- Other community opinion leaders
- Federal and State agencies with key jurisdiction in the Project Area
  - US Fish and Wildlife Service
  - US Army Corps of Engineers
  - California Department of Fish and Game
  - California Department of Parks and Recreation
  - California Department of Water Resource
  - California Reclamation Board
  - California Bay-Delta Authority

#### 5. Key Information Needs for Key Contacts

Key Information To Contacts	Key Information From Contacts
Description of Project - Overview	Ways in Which Project is Attractive
Description of Project - Key Players	Ways in Which Project Raises Concerns
Description of Project - Timeline	Who Else Should Be Contacted
Description of Ways to Stay Informed	Familiarity with Restoration Issues
Purpose of Survey	Particular Issues or Areas of Concern
How Survey Results Will Be Used	Potential Solutions
How to Get Copy of Products	Information Needs
	Process Concerns

#### 6. Public Engagement Tools

A wide range of techniques will be utilized to engage the stakeholders in the planning process:

- **Project Facilitator** - To provide professional guidance of the public meeting process (Advisory Workgroup, public meetings and workshops) over the term of the Project the services of a professional facilitator will be utilized. This will help ensure openness, transparency, representative participation and efficiency in the process.
- **Advisory Workgroup** - To provide primary stakeholder input throughout the process an Advisory Workgroup will be formed. The Advisory Workgroup is

intended to be representative of the range of stakeholders concerned with habitat restoration in the Subreach. The Advisory Workgroup tasks include:

- Identification of landowner concerns for research
  - Identification of locations for focal area planning
  - Review of studies and reports for consistency with the Goal and Principals of the SRCAF
  - Review of restoration plans for consistency with the Goal and Principals of the SRCAF
- **Landowner Survey** – To gain direct input from landowners within and adjoining the Project Area landowner surveys will be conducted. Two surveys will be taken; one during the initial stage of the Project and one at the end of the Project. The surveys will address the following questions:
    - General attitudes regarding habitat conservation and restoration
    - Concerns regarding habitat conservation and restoration
    - Input regarding the desired planning process (initial survey)
    - Feedback regarding success of the process (final survey)
  - **Public Meetings** - To provide an opportunity for all interested parties to provide direct input to the process and receive information regarding the status of the Project. Three such meetings are planned.
  - **Newsletters** - To provide landowners and other stakeholders with written information regarding the status of the Project and to publicize Project activities and events a newsletter will be distributed to stakeholders. Three newsletters are planned.
  - **Workshops** - To provide an opportunity to gain greater information and understanding of the technical factors involved in ecosystem restoration in an informal format and provide for field visits workshops will be held. Workshop participants will be the Advisory Workgroup and other interested persons. Three workshops are planned.
  - **Information Presentations** - To provide direct communication to SRCAF Board of Directors, local government, local organizations and state and federal agencies regarding the project and to receive direct input from these organizations information presentations will be made. Information presentations are planned during the initial stage and as otherwise appropriate,
  - **Project Website** – To provide an information posting location on the internet to provide interested persons with information about the Project, provide meeting information, post reports and plans a Project website will be established. A posting site connected to the SRCAF website is planned.
  - **Local Media Contacts** - To help inform interested parties about the status of the Project and publicize Project activities and events contacts with local media will be made and news releases will be provided. Local media contacts will be made throughout the project to help publicize key activities.
  - **Individual Stakeholder Meetings** – To help inform key stakeholders Project staff will meet informally with selected key stakeholders to introduce the Project, initiate working relationships, solicit input and address issues that arise in the process.
  - **Outreach Materials** – Various outreach materials to introduce the Project to stakeholders in detail appropriate to the anticipated interests of stakeholder groups, will be developed. These materials will include a project handout, PowerPoint presentations and materials in the Project webpage.



## **APPENDIX C**

### **Advisory Workgroup Membership**

The Advisory Workgroup met from November of 2004 through June of 2008. There were originally twenty-one members and eight members resigned in February of 2006. A listing of the membership is contained in this Appendix.

## COLUSA SUBREACH PLANNING

### Advisory Workgroup Membership

Representation	Individual	Background
<b>Steering Committee</b>		
SRCAF - Glenn Co. - Landowner	Don Anderson	Glenn County Farmer
SRCAF - Glenn Co. - Public Interest	Denny Bungarz	Glenn County Supervisor
SRCAF - Colusa Co. - Landowner	Ben Carter	Colusa County Farmer <sup>1</sup>
SRCAF Manager	Beverly Abbs-Anderson	SRCAF Manager <sup>2</sup>
SRCAF - Public Agency	Armand Gonzales	DFG Env. Program Manager
SRCAF - Colusa Co. - Public Interest	Gary Evans	Colusa County Supervisor <sup>1</sup>
The Nature Conservancy	Greg Golet	TNC Senior Ecologist <sup>3</sup>
<b>Interest Representatives</b>		
Irrigation and Reclamation Districts	John Garner	PCGID Bd Member, Farmer
Environmental Interests	Jay Dee Garr	Local Wildlife Consultant
Inner Levee Private Property Owners	Francis Hickel	Colusa County Farmer <sup>1</sup>
Recreation Interests	Pat Kittle	Kittle's Outdoor <sup>1</sup>
Business Interests	Ray Krause	Ray's Bike Shop <sup>1</sup>
Glenn County Government Director	Dan Obermeyer	Co. Planning & Pub. Works
City of Colusa	John Rogers	Mayor, Farmer <sup>1</sup>
Agriculture Interests	Jeff Sutton	FWA Executive Director <sup>1</sup>
Colusa County Government	Jon Wrysinski	County Pub. Works Director <sup>1</sup>
<b>Agency Representatives</b>		
CA Department of Water Resources	Annalena Bronson	Flood Management
CA Department of Parks and Rec.	Denise Reichenberg	Supervising Ranger <sup>4</sup>
California Bay Delta Authority	Rebecca Fris	CBDA staff
US Fish and Wildlife Service	Kelly Moroney	Asst. Refuge Manager
CA Department of Fish and Game	Paul Raquel	Supervising Biologist

Notes:

<sup>1</sup> Carter, Evans, Hickel, Kittle, Krause, Rodgers and Sutton and Wrysinski resigned in February of 2006

<sup>2</sup> Anderson succeeded Burt Bundy on the Advisory Workgroup in June of 2007

<sup>3</sup> Golet succeeded Dawit Zeleke on the Workgroup in September of 2006

<sup>4</sup> Reichenberg succeeded Fehling on the Workgroup in December of 2007

## **APPENDIX D**

### **The SRCAF Good Neighbor Policy**

The Sacramento River Conservation Area Forum adopted its Good Neighbor Policy on March 15, 2007. The full text of the Policy is contained in this Appendix.

## **SRCAF BOARD POLICY – ADOPTED MARCH 15, 2007**

### **GENERAL POLICY**

It is the fundamental policy of the Sacramento River Conservation Area Forum (SRCAF) to promote communication and understanding among neighbors<sup>1</sup> within the adopted Sacramento River Conservation Area (Conservation Area). As an essential part of this policy, the SRCAF will make every reasonable effort to prevent harm or loss to any person and public or private entity from activities prescribed in the SRCAF Handbook. It is also a policy that the SRCAF will use its resources to promptly address, and resolve to the best of its ability, any conflict between neighbors resulting from activities associated with the implementation of the Handbook within the Conservation Area.

The Sacramento River Conservation Area Forum Board fully recognizes the issues that concern all landowners along the Sacramento River, and is committed to assist in the resolution of those concerns. The SRCAF is a non-governmental entity that does not have legislative nor regulatory authority over local, state and federal programs or funding mechanisms. The SRCAF policies apply and are binding only to its allowed actions as an advisory body.

### **NEED FOR A GOOD NEIGHBOR POLICY**

The SRCAF supports management of water and land resources that is consistent with the overall goals of the SRCAF and principles described in its Handbook. To accomplish these goals, the SRCAF recognizes that historic uses and local concerns must be respected.

The SRCAF appreciates the value of the Sacramento River as a vital habitat area for fish and wildlife and supports the overall goal to; “preserve remaining habitat and reestablish a riparian ecosystem along the Sacramento River between Redding and Chico, and to reestablish riparian vegetation along the river from Chico to Verona”.\* The SRCAF also appreciates the agricultural heritage of the Sacramento Valley as an important part of the Sacramento River’s history, and recognizes that much of the land within the Conservation Area has been in agricultural use for more than a century and provides open space and environmental benefits. The Conservation Area extends through seven rural counties with numerous communities that rely on agriculture as their economic base. Agriculture is an essential life sustaining industry on which many local landowners and communities depend; therefore protection and preservation of agricultural land is a high priority. The SRCAF also recognizes the importance of the Sacramento River as a water supply for the local agricultural economic base and as a public recreation resource. Moreover, flood control for the local citizens, communities, and agricultural lands is also a concern. Therefore, all activities within the Conservation Area must demonstrate planning and management that is sensitive to agricultural needs, public safety, recreation, and flood protection, along with fish and wildlife and their habitat.

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<sup>1</sup> “Neighbor” pertains to adjacent, nearby, or “in the vicinity”.

\* Overall goal of the Sacramento River Conservation Area Handbook, Page 1-1.

Landowners<sup>2</sup> often experience stress and anxiety when other land uses<sup>3</sup> occur near their land because such activities may directly or indirectly affect the normal management of their operation. Conflicts between different land uses are common, and those that can occur between agriculture and riparian habitat pose some unique and serious problems. Restoration of habitat seeks to enhance the living conditions of native flora and fauna. However, managers and operators of neighboring farmlands may consider plant and wildlife species that move from restored habitat areas on to farmlands as pests, predators, or competitors with the production of their crops. Possible impacts to farming operations, crop production, water supply, and flood protection, coupled with the increase in permitting requirements tied to the protection of threatened and endangered species, create an atmosphere where farmers may be opposed to any restoration near their property.

For agricultural operations, some of the possible impacts from neighboring landowners can be those that increase costs of normal farming practices, inhibit routine maintenance of agricultural facilities, add time and effort in performing tasks, and reduce production and profits. Increased crop depredation, rodent damage, and trespass problems can also negatively affect farming programs. In addition, public services and local economies may be affected by activities that impact flood protection, public facilities, recreational uses, and the rural tax base. Small local economies may be seriously affected by significant land use change. Local infrastructure and services depend on established funding streams, and when those are changed, they may never recoup.

It is noted that lands used for habitat can also be affected by activities of their neighbors. Adjacent weed and pest abatement, trespass problems, game disturbance, water management, noise, and dust pollution can create unfavorable conditions for wildlife habitat and key species. Natural ecological processes can also be impacted by nearby farming activities.

While the differences between riparian habitat and farming exist, commonalities are apparent and may offer opportunities upon which to build. Most agricultural landowners are conservation minded and can appreciate habitat on neighboring lands if the habitat and its inhabitants do not have serious negative offsite impacts. Likewise, farming is likely to be a more compatible land use than urban and industrial development on lands adjacent to habitat, especially if offsite impacts to both can be minimized. The challenge is to understand the various land uses to the extent that each can be managed to remove or minimize negative or maximize positive impacts on others. In situations where conflicts or harm do arise, there should be mechanisms established to determine the extent of the impacts and identify the resources available to promptly alleviate adverse effects, compensate the affected parties or assist in finding mutually acceptable solutions to the impacts.

This SRCAF Good Neighbor Policy (GNP) is set forth to outline an approach that all landowners (new, existing, and absentee) should follow in order to comply with the intent and spirit of the SRCAF Handbook. The goal of the GNP is to avoid negative impacts, address and resolve unavoidable impacts, and foster good communication and relationships among

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<sup>2</sup> For the purposes of this document, the term “landowner” is to apply to private and public entities and their day-to-day operating agents (e.g. managers, lessees, tenants, etc.)

<sup>3</sup> Land uses are those general uses as designated by the respective county planning body (e.g. agricultural, residential, commercial, industrial, etc.)

neighbors and communities. The GNP is intended to apply to land management activities within or affecting the Conservation Area, including changes in land use where habitat is actively developed, develops naturally, or is converted to agricultural or other uses. The GNP is not intended to apply to those cultural practices normally used in farming or habitat conservation operations or to the normal maintenance practices required of public entities for public safety, as long as those practices are undertaken within the law, and with reasonable consideration to prevent impacts to others.

The Good Neighbor Policy envisions all landowners being good stewards of the land, understanding the issues facing their neighbors and the implications of land use practices on the neighbors and community. Only with this understanding can one avoid negative impacts. Open and honest communication is a very important tool in being a good neighbor.

## **POLICY ACTIONS**

The Sacramento River Conservation Area Forum resolves to take the following actions to address the potential impacts discussed above:

1. **Communication and Review** - The SRCAF recommends that prior to initiating any land use or management actions, all landowners within the Conservation Area be considerate of, and communicate with, those neighbors potentially affected. In particular, those landowners conducting activities that affect flood control, agriculture, habitat, and recreation must be sensitive to conflicts that could arise. Consistent with that belief, the following items should be incorporated into all proposals and project<sup>4</sup> plans prior to beginning any physical changes to the property to help avoid any adverse impacts.
  - a. Proponents of proposals for changes in land use shall emphasize proactive communication with neighbors and the community. While developing proposals and plans, project proponents should introduce themselves to all potentially affected landowners and describe the anticipated project and the desired outcome of the project. Through SRCAF Project Review<sup>5</sup> and discussion with nearby landowners, project proponents need to anticipate potential impacts and incorporate appropriate actions to avoid or minimize impacts to their neighbors. Their proposals should describe the activities they've undertaken to initiate proactive communication and should further describe their plans to continue communication through the completion of their project.
  - b. Proponents shall designate a local contact person for their project who would make every reasonable effort to meet with adjacent landowners and discuss any issues that may be of concern. This individual should be readily known by neighboring landowners and county officials and must be empowered to the maximum extent possible to address questions and problems relating to the management of the project.

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<sup>4</sup> For the purposes of this document, a "project" is defined as an activity that uses or affects public resources.

<sup>5</sup> "Project Review" is SRCAF Policy # 3 that outlines a process and criteria for SRCAF review of publicly funded proposals and projects.

c. To the extent required by law, project proponents shall follow the local processes for land use, including county permitting and zoning, and if applicable, provide environmental analyses that conform to the California Environmental Quality Act and the National Environmental Policy Act. The SRCAF will not endorse any project that has not met its legal requirements. Projects not required by law to comply with local processes for land use (such as State and Federal projects) are highly encouraged to develop proposals consistent with the spirit and intent of local plans and ordinances.

d. To the extent feasible, or as required by law, project proponents shall provide a series of baseline studies of the land targeted for conversion of land use. Where appropriate, social/economic, cultural, biologic, topographic, hydrologic and geomorphic studies should be done to help guide proposed changes in use and ascertain the potential impacts of such changes to adjacent lands. These data can also serve as a reference to demonstrate changes to the baseline condition on the project site.

e. The proposal or plan shall describe any infrastructure that may be necessary to manage access in and out of the project area and prevent trespass on adjacent landowner property.

f. As part of the development of plans to minimize negative impacts to adjacent landowners, project proponents shall consider incorporating buffer zones or barriers on the project property. The goal of a buffer zone or barrier is to provide an area between different land uses that would reduce or eliminate damage to neighboring lands and assist with a successful transition between types of land use. When a buffer or barrier is deemed appropriate, a plan to incorporate, fund and maintain this area in the final project must be included.

g. A project must include an analysis of possible flood impacts and a plan to prevent or address those impacts, as required by the State Reclamation Board or local responsible agency.

h. A source of contingency funds should be identified for each project to provide a means to remedy unforeseen adverse impacts where they may occur. This could include performance bonds, escrow accounts or a similar set-aside of funds. In some instances, a legal or procedural mechanism for providing such funds has yet to be identified, but could be specified in a Bond Act or by legislative action. Those funds would be controlled by the funding agency to address needs that require prompt resolution and be available for only a specified length of time after the project completion date. The SRCAF will continue to investigate and support such funding mechanisms.

2. **SRCA Mitigation Area and Regulatory Assurances** - The SRCAF will work to promote the concept of the Sacramento River Conservation Area as a “self-mitigating area”; where implementation of the activities prescribed in the 1989 Plan and Handbook are anticipated to provide significant net conservation benefit to fish, wildlife, and their habitats within the Conservation Area. Additionally, the SRCAF will work with signatory agencies and stakeholders to identify and pursue mechanisms that will minimize, avoid or eliminate the



potential for conflict that might arise due to provisions of federal and state Endangered Species Acts. The goal of this effort would be to provide landowners in proximity to restoration sites assurance that increases in populations of listed threatened or endangered species due to restoration actions will not adversely affect their otherwise lawful current or future operations.

A Programmatic Safe Harbor Agreement (PSHA), would allow non-profits, agencies, or private landowners to do habitat restoration pursuant to an agreement that would allow “take” of listed species which might occur “incidental to, and not the purpose of, the carrying out of an otherwise lawful activity” provided that such incidental take does not reduce the local populations of the covered species below some pre-determined baseline. Neighbors connected in some way to these restored properties would also be able to sign up under the PSHA and receive incidental take protections allowing them to avoid Endangered Species Act liability for any “otherwise lawful activities”, such as existing and routine farming activities. They could also be protected from future restrictions associated with additional species or habitat on their land, and be able to return their lands to baseline levels in the future (notwithstanding requirements associated with funding received for the work). Similarly, under state law, a Voluntary Local Program could allow for “taking of any covered species whose conservation and management is provided for”, and will be investigated for coverage of state listed species and their habitat.

A *Programmatic* Safe Harbor Agreement, as opposed to an individual Safe Harbor Agreement, would have the SRCAF as the permit holder for covered activities within the Conservation Area, thereby allowing landowners to access the regulatory assurances without direct contact with agencies.

- a. The SRCAF will work with habitat project implementers, and with the agencies responsible for ensuring that a project’s adverse impacts on fish and wildlife resources are mitigated, to minimize or avoid having additional mitigation requirements imposed on such projects. It is recognized that net conservation benefits for non-listed species are not appropriate mitigation for adverse impacts to listed species.
- b. The SRCAF will work with entities responsible for public works projects (i.e. flood management projects, water supply projects, other infrastructure projects, etc.) and maintenance thereof to meet any mitigation requirements they may face by brokering agreements with conservation project implementers. Such agreements could include contributing resources (funds, equipment, manpower, etc.) in exchange for net conservation benefit credits to meet mitigation needs. Using this approach, it is highly likely that net conservation benefits can be shown while simultaneously minimizing mitigation requirements and permitting time for routine activities. In addition, it could help those entities significantly in meeting any Federal Section 7 consultation requirements.
- c. The SRCAF will work on behalf of private landowners in order that they might avail themselves of some of the "net conservation benefits" created by the habitat restoration/enhancement efforts of others to meet mitigation requirements they might face. In such instances, the SRCAF might facilitate agreements between the habitat project implementers, the regulatory agencies, and the private landowner, in which

some credits that accrue to a habitat restoration/enhancement project may be used to offset the private landowner's mitigation requirement in exchange for some consideration or action by the landowner (e.g. help in implementing a conservation project or measure, use of equipment or supplies, or similar consideration to be decided among the affected parties).

d. As a means of helping to achieve the habitat restoration goals of the 1989 Plan and Handbook, the SRCAF will also promote establishment of mitigation and/or conservation banking within the Conservation Area. Consideration will be given to developing conservation banking on a project-by-project basis or through a formal bank in accordance with state and federal guidelines. Priority will be given to establishing banks within the Conservation Area but they may also be outside and still contribute to the overall goal of establishing a viable habitat focused ecosystem.

3. **Conflict Resolution** - It is the intent of the SRCAF to facilitate a voluntary process to help resolve unforeseen conflicts between project activities and neighboring landowners in a quick, responsive, and cost-effective manner. It is sound policy to anticipate and resolve potential conflicts between the management, conservation and protection of fish and wildlife resources and their habitats and private and public activities. Therefore, the SRCAF will work with landowners and agencies involved in projects within the Conservation Area to utilize an informal means of settling disputes before they embark on other, more legalistic processes. This would not replace existing legal remedies: instead, it would provide a locally based alternative process for resolution of conflicts before legal remedies are instituted.

The SRCAF, as soon as possible, but no later than fifteen (15) days after receiving written notification of a conflict, shall offer to convene the parties involved, both county SRCAF Board members, and technical experts as needed to resolve the issue. The group may bring the issue to the SRCAF's Technical Advisory Committee for technical advice or to the Board for a recommendation to the parties involved. The recommendation may include: no action, remedial action, preventative action, or identification of potential resources available (financial, technical, etc.) to resolve the issue.

**Addendum “A”:**

Some of the possible impacts on neighboring landowners and communities are:

1. Impaired drainage of both flood water and surface (irrigation) water due to discontinued maintenance of drainage or flood control structures.
2. Farming delays and crop loss resulting from seepage and flooding.
3. Increased maintenance of hard points (ex: pumping plants, fish screens, bridges, boat landing/ramps) and facilities/infrastructure (ex: ditches, pipelines, fences, roads, parks and recreation resources) due to siltation, erosion, woody debris, and river meander.
4. Crop depredation from wildlife.
5. Migration of invasive and noxious weeds.
6. Curtailment of normally accepted agricultural practices (ex: aerial spraying and baiting) resulting in higher production costs and possible crop loss.
7. Abnormal changes in local ground water aquifers.
8. Migration of present or future endangered/threatened species stopping any or all agricultural activities.
9. Increased trespass.
10. Increased fire risk due to build up of vegetation and forests and possible increased public access and use.
11. Closure of public lands and loss of public use.
12. Loss of revenue to counties and special districts (ex: fire, irrigation and mosquito abatement) due to removal of property from local tax rolls.
13. Increased local government operation and maintenance costs such as fire protection, law enforcement.
14. De-stabilization of rural, agricultural-based economies resulting from removal of land from production and from the implementation of the federal and state Endangered Species Acts.
15. The increased cost or inability to perform operation and maintenance or repairs of flood control projects.
16. The increased cost or inability to provide flood fight response or implement federal or state public safety programs (PL84-99 or USACE Projects).
17. The increased cost or inability to maintain, modify, or expand the existing design function (i.e. flow splits at weirs) and actual carrying capacities of flood control projects.
18. Harm to habitat and species from toxic substances.
19. Harm to habitat and species from nutrients (ex: fertilizers and amendments) entering habitat from adjacent properties.
20. Harm to habitat and species from sediment runoff, noise and dust from adjacent property.
21. Loss of wildlife that wanders onto adjacent lands.
22. Loss or disturbance of nesting or rearing habitat.
23. Loss due to trespass from adjacent land.
24. Loss of wildlife and habitat caused by feral or domestic animals or livestock.

## **APPENDIX E**

### **Advisory Workgroup Resignation Letter**

On February 1, 2008 eight members of the Advisory Workgroup resigned. The letter was submitted to explain the resignations is contained in this Appendix.

February 1, 2006

Joe Grindstaff  
Director, CALFED Bay-Delta Program  
650 Capitol Mall, 5th Floor  
Sacramento, CA 95814

Dawit Zeleke  
The Nature Conservancy  
Colusa Subreach Planning Project Director  
500 Main Street  
Chico, CA 95928

Burt Bundy  
Director, Sacramento River Conservation Area Forum  
2440 N. Main Street  
Red Bluff, CA 96080

RE: Colusa Subreach Planning, a CALFED Funded Project  
Project Proponents: TNC and SRCAF

Dear Mr. Grindstaff, Mr. Zeleke, Mr. Bundy:

On behalf of the undersigned local interest representatives of the Colusa Subreach Planning (CSP) Advisory Workgroup, we write to express our disappointment with how this project has been implemented and to state our disapproval of the process that has taken place to date. As such, we hereby announce our resignation from the Advisory Workgroup and recommend a complete cessation of funding to this effort, as it has failed to integrate local concerns, lacks local support, and ignores the redirected negative impacts associated with the CALFED Program of land acquisition and ecosystem restoration projects.

The Colusa Subreach Planning Project, a CALFED funded project whose proponents include The Nature Conservancy (TNC) and the Sacramento River Conservation Area Forum (SRCAF), was advertised as a collaborative effort among landowners, local interests, and the resources agencies. The Mission Statement of the workgroup is: "To cooperatively determine practical strategies for conservation and restoration of wildlife habitat within the Colusa Subreach that minimize adverse economic impacts, are

compatible with agriculture and local community needs, integrate with recreation needs and protect the integrity of the flood control system." Our purpose for participation was to seek out solutions to minimize and mitigate the impacts associated with ecosystem restoration within this reach and to address the concerns voiced by the local community and landowners.

Members of the Advisory Work group have been asked to attend monthly meetings of four hours in length, review substantial amounts of documentation and come prepared to provide meaningful input, volunteer for various committees that meet outside of the parameters of the monthly meetings, and conduct outreach to the public. The undersigned members of the Advisory Workgroup readily volunteered to commit the time and effort necessary, without compensation, in an effort to further policies to address the concerns expressed by the residents and landowners along the Sacramento River. Our goal in accepting this charge was the promotion of solutions that would serve to protect the economic viability, public safety, and the general well-being of this region.

However, to date, the proponents of the project (TNC and the SRCAF) have clearly illustrated that the Advisory Workgroup has been assembled merely to serve as a box to be checked off next to the heading of 'public input', without allowing the members of the Advisory Workgroup to have any real influence in regard to the project. When pressed on the issue, Mr. Zaleke, the TNC project director, made it abundantly clear that the Workgroup was to have no decision making authority. The members of the advisory workgroup have no ownership of the process; and are clearly being taken along for the ride without the ability to steer the direction of the agenda promoted by the proponents. Such a one-sided arrangement is unpalatable, and the members of the workgroup cannot continue to be expected to dedicate their time and resources to such an unbalanced and unresponsive process.

On December 13, 2005, the Colusa County Board of Supervisors unanimously passed a resolution recommending cessation of funding to the SRCAF, the CSP, and all associated ecosystem restoration projects until such time as the Good Neighbor Policy drafted by the Landowner Assurances Committee (of the SRCAF) is adopted and implemented in its entirety. On January 3, 2006, the members of the City of Colusa Council voted to honor and support the actions taken by Colusa County as well. We, the undersigned, echo the sentiments expressed in that resolution, a copy of which is enclosed herewith.

The CALFED Record of Decision at page 9 specifically mandates that any CALFED solution must satisfy certain solution principles, including:

**Be Equitable:** Solutions will focus on solving problems in all problem areas. Improvements for some problems will *not* be made without *corresponding improvements for other problems*.

**Be Implementable:** Solutions will have *broad public acceptance* and legal feasibility, and will be timely and relatively simple to implement compared with other alternatives.



**Have No Significant Redirected Negative Impacts:** Solutions *will not* solve problems in the Bay-Delta system by *redirecting significant negative impacts*, when viewed in their entirety, within the Bay-Delta or to other regions of California. (*Emphasis added*).

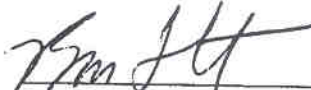
Further, the SRCAF purports to be guided by the self mandated principle of addressing and being responsive to 'Local Concerns'. The SRCAF, the CSP, and the CALFED Program of land acquisitions and ecosystem restoration in the Sacramento River area, which is commonly referred to as the CALFED Solution Area, have breached these commitments by continuing to fail to address the concerns and impacts on local communities and landowners. As such, we can no longer continue to support and/or participate in the CSP as members of the Advisory Workgroup, and request a cessation of all funding to this project immediately due to concerns outlined above.

Respectfully Submitted,

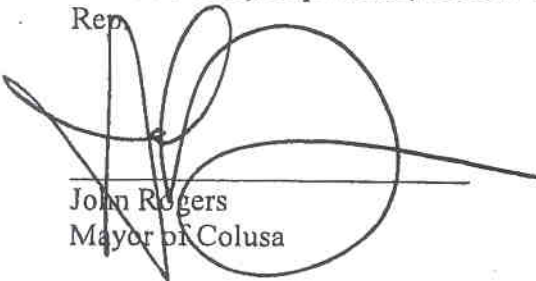
The Undersigned Members of the Colusa Subreach Planning Advisory Workgroup



Gary Evans  
Colusa County Supervisor, SRCAF Rep.  
Rep.



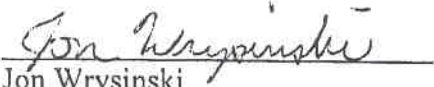
Ben Carter  
Landowner, Colusa County SRCAF



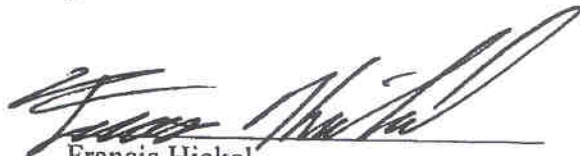
John Rogers  
Mayor of Colusa



Jeff Sutton  
Agricultural Interest



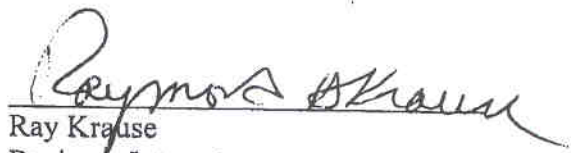
Jon Wrynski  
Colusa County Public Works Director



Francis Hickel  
Inner Levee Private Property Owner



Pat Kittle  
Recreation Interest



Ray Krause  
Business Interest



Cc.

Governor Arnold Schwarzenegger  
Congressman Wally Herger  
CA Senator Sam Aanestad  
CA Assemblyman Doug LaMalfa  
CA Assemblyman Rick Keene  
CA Secretary of Resources Mike Chrisman  
CA Department of Water Resources, Director Lester Snow  
CA Department of Fish and Game, Director Ryan Brodderick  
USFWS, Wayne White  
Colusa County Board of Supervisors  
Glenn County Board of Supervisors  
City of Colusa

## **APPENDIX F**

### **CALFED Review Letter**

CALFED reviewed the performance of Colusa Subreach Planning response to a request that the funding for the process be terminated. A letter dated July 28, 2008 that summarized the findings of the review of program performance is contained in this Appendix.



## DEPARTMENT OF FISH AND GAME

<http://www.dfg.ca.gov>  
Director's Office  
1416 Ninth Street  
P.O. Box 944209  
Sacramento, CA 94244-2090



July 28, 2006

Mr. Joe Grindstaff, Director  
California Bay Delta Authority  
650 Capitol Mall  
Sacramento, CA 95814

Dear Joe:

This is to follow up on several meetings we've had regarding the Sacramento River Conservation Area Forum (SRCAF) and the current Colusa Subreach Planning Project. You appropriately asked for this Department's direct involvement in addressing the current controversy surrounding the Colusa Subreach Planning. As requested by Director Broddrick, I evaluated this CALFED/ERP funded effort.

As you will recollect, significant discussion occurred and documentation was provided outlining the organization of the SRCAF, the participation or lack thereof of local elected officials, and the public input process associated with the completion of the Colusa Subreach Planning Project. As part of my review, I read the numerous materials supplied by the SRCAF ranging from SB 1086 forward through existing Subreach planning documents. In addition, I met with several proponents and opponents of the projects and visited on-site.

The Bay Delta Authority funded the Colusa Subreach project under Proposition 204. By funding this project, the Authority and the state and federal agencies implementing the CALFED Ecosystem Restoration Program (ERP) intended to create an opportunity for local interests and concerns to be voiced, and to enable future conservation projects in the sub-reach to appropriately balance the protection and restoration of habitat with potential impacts on neighboring land owners.

Throughout the founding documents of the effort, the intention was to insure open and inclusive planning, to provide multiple opportunities for input by local stakeholders and private and public interests. A steering committee was established, along with an advisory workgroup and technical subgroup. The stated goal of the Colusa Subreach Planning effort is to:

*Increase citizen stakeholder involvement in determining realistic conservation strategies and projects for protecting and restoring riparian vegetation along the Sacramento River...compatible with the flood control system and other economic and environmental uses of the floodplain.*



And the Colusa Subreach Planning Workgroup mission (adopted November 3, 2004) is:

*To cooperatively determine practical strategies for conservation and restoration of wildlife habitat within the Colusa Subreach that minimize adverse economic impacts, are compatible with agriculture and local community needs, integrate with recreation needs and protect the integrity of the flood control system.*

The project is scheduled to end in April of 2007. Attached you will find the most recent Public Engagement Highlights from June, 2006, as a demonstration of the level of public involvement that has been solicited.

It is evident from my review of the materials that a breakdown and significant decline in local participation in this project occurred when a number of Colusa residents directly participating in the Project Advisory Workgroup resigned on February 1, 2006, to protest the fact that the SRCAF had not adopted certain specified language in its "Good Neighbor Policy." In related actions, the County of Colusa passed a resolution (Resolution 05-84) recommending cessation of the funding to the SRCAF and directing the county representatives to exercise a "veto" over Colusa County restoration projects; the Glenn County Board of Supervisors (Resolution 2006-21) opposed all future state and federal funded land acquisitions for ecosystem restoration projects within the conservation area; and, finally, the City Council of the City of Colusa (Resolution 06-07) voiced their support of the actions of the Colusa County Board of Supervisors.

Below are additional steps some stakeholders asked the Department to take along with my response.

**The Nature Conservancy Contract:** The first action requested was to terminate the \$1.5 million dollar three year *planning* agreement with The Nature Conservancy (TNC) to conduct the Colusa Subreach planning effort (Recipient Agreement ERP-02-P27). I am advised that the agreement allows for termination in instances of mal- or misfeasance or non-performance, but not for lack of cooperation on the part of some affected landowners. Therefore, I have not recommended and do not believe that we can terminate that agreement.

**SRCAF Governance:** Secondly, various observers suggested that there is a failure of governance at the SRCAF that warrants the elimination of that organization from ERP funding. The SRCAF itself was established as a forum to ensure and encourage public participation in conservation efforts in the seven-county region along the Sacramento River. While the Colusa and Glenn County Boards of Supervisors have opposed funding the SRCAF, both remain signatory members. Other counties that are on the SRCAF governing board continue to participate and have not expressed similar concerns. The coordination and communications functions of SRCAF remain an important element of conservation planning in the region, and therefore current funding and active participation on SRCAF by Fish and Game will continue. It should be noted that future funding decisions will be based on a number of factors, including the capacity for governance.



**Good Neighbor Policy:** A great deal of local discussion, research and consideration has gone into the development of a proposed Good Neighbor Policy to guide decision making in the SRCAF area. I have been most impressed with the conscientiousness of the participants in that effort, particularly Mr. Ben Carter, former Chair of the Landowners Assurances Committee. This policy effort emanates from the stated concern that conservation policies – particularly the acquisition of conservation easements or tracts – will have direct impacts on local land owners and on agricultural economies. Suggested policies cover communication and review; regulatory assurances for incidental take of endangered species; the definition of the SRCAF as a self-mitigating area; the establishment of a conflict resolution process; and the establishment of a good neighbor fund. The Department has some concerns regarding the following two specific policies, but encourages further efforts to develop Good Neighbor policies which address local concerns.

**Conflict Resolution:** The proposed policy provides that the SRCAF will work with landowners and agencies to resolve conflicts informally, but will then enter into a more formal process to resolve conflicts. In the case of Fish and Game, and of other agencies, existing statutory provisions govern how conflicts are resolved. Further, we cannot voluntarily forego our public trust responsibilities by entering into any conflict resolution process, other than as provided by statute. We can and will, however, work to resolve any conflicts with local landowners through informal processes.

**Good Neighbor Fund:** The proposed Good Neighbor Policy contemplates the establishment of a Good Neighbor Fund to compensate landowners for a range of impacts they believe could occur from establishing nearby habitat, including the cost of potential wildlife depredations. Although case law (*Moerman v. State of California*) has established that the government does not owe compensation for damage to property caused by protected wildlife, there have been instances where private funding has been provided as compensation. If, however, there is an expectation of state funding for the depredations of wildlife, we must make sure that the proponents understand that no public funds for such an effort are anticipated at any time.

In summary, I believe that the existing planning effort should continue to completion and encourage the parties of interest to attempt to reconcile differences in approach to the common goals of the planning project. It is noted, however, that this is a planning and not an implementation effort. Prior to implementation of any of the recommendations of the planning study, formal concerns such as those of the Boards of Supervisors and City Council will have to at a minimum be considered in depth.

During the course of the reviews conducted of the SRCAF and the Subreach planning effort, I was most impressed with the sincerity and level of effort of a number of the participants to truly try and accomplish similar goals and to reconcile differences in approach. I am confident that with renewed commitment, a successful planning effort can be completed.

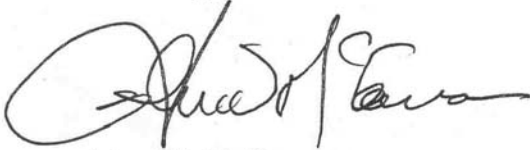
Mr. Joe Grindstaff

Page 4

July 28, 2006

Please let me know if you have any other questions or concerns in this or any regard.

Sincerely,

A handwritten signature in black ink, appearing to read "John W. McCamman". The signature is fluid and cursive, with a large initial "J" and "M".

John W. McCamman  
Chief Deputy Director

JM:jo

cc: L. Ryan Broddrick, Director, DFG  
Burt Bundy, SRCAF  
Sandy Morey, Region 2, DFG  
Ben Carter



## **COLUSA SUBREACH PLANNING**

### **Public Engagements Highlights – June 2006**

#### Advisory Workgroup (all meetings are open to the public)

- Has met 15 times (12 times before Colusa resignations)
- Has held six meetings of two Subgroups plus
- Has held one fieldtrip
- The Workgroup achieved consensus on:
  - A Mission Statement and Ground Rules
  - Priority Landowner Questions and Concerns
  - Eight planning and research projects to address the Landowner Questions and Concerns
  - Scopes of work for the planning and research projects
  - The choice of contractors for six planning and research projects
  - A peer review contractor for the Hydraulic Analysis (the remaining 2 projects)

#### Neighboring Landowner Meetings

- Project staff have held 13 meetings with neighboring landowners (adjacent to restoration tracts).
- Project staff have had phone conversations with three other neighboring landowners with future meetings planned.
- A number of the neighboring landowners also attended the public input meetings.

#### Landowner Survey

- A professional survey of landowners within the Colusa Subreach was conducted in early 2005 (A follow-up survey will be conducted near the end of the project).

#### Public Input Meetings

- Two public input meetings were held in February of 2005 and May of 2006.
- News releases preceded each meeting and substantial local newspaper coverage was received before and after each meeting. Neighboring landowners were sent meeting notices.
- Response articles from the Family Water Alliance in the Colusa newspaper provided an alternative perspective on each meeting.

#### Local Government

- Meetings have been held with the three Colusa County Supervisors, the Colusa County Assessor, Auditor-Controller, Public Works Director, and Planning Director, the Mayor, City Manager and Public Works Administrator of the City of Colusa, one Glenn County Supervisor and the Glenn County Planning and Public Works Director.
- Outside experts group including Asst. Co. Ag Commissioner formed to review the Pest and Regulatory Effects Analysis

#### Newsletters

- CSP newsletters were sent to landowners within the Colusa Subreach and other interested parties in 2005 and 2006.
- Updates regarding CSP were included in four issues of the quarterly SRCAF newsletter which was sent to the landowners in the Colusa Subreach.

#### Website

- A CSP website was established in 2004 and it provides updated information, meeting agendas and summaries, and all CSP reports.

#### Local Libraries

- CSP reports and materials are provided for public review at public libraries in Colusa, Princeton and Willows.



## **APPENDIX G**

### **Gary Evans Statement to the SRCAF Board**

When the SRCAF Board of Directors approved the Good Neighbor Policy on March 16, 2007, Gary Evans, a Colusa County Supervisor and member of the SRCAF Board, delivered a statement in opposition to the proposed Policy. The full text of the statement is contained in this Appendix.

**Statement of Gary Evans to the SRCAF Board  
Regarding the Landowner Assurances Policy**

March 15, 2007

The "Landowner Assurances Policy," originated from the outcry of landowners and the need for landowner protections from the negative impacts as a result of environmental work done within the SRCA.

It is important to note here that the intent of the original legislation SB 1086 was to create a mechanism for landowners and the environmental communities to work out problems that kept arising. The legislation's intent was for these entities in conflict to get together and work out real solutions. A laudable goal, that has yet to be realized.

It is now 21 years later and environmental restoration projects continue to move forward without protections in place to mitigate the negative impacts that continue to burden neighboring landowners. We can all attest to the many hours over many years that have been spent attempting to establish a good neighbor policy, yet the language brought before this board today fails to provide any real tangible assurances or mitigation possibilities for the landowners within the SRCA.

This causes great frustration for myself and many of my fellow board members. This lack of progress and the failure of a good faith effort to address landowner concerns has caused us to lose valuable board members, as well as the willingness of counties and stakeholders to continue to support the SRCAF's mission. When our Forum receives Resolutions from Counties, Cities, Farm Bureau, and local land organizations stating they do not want restoration projects in their counties, **we have failed.**

It is time we stop playing games, it is time we stop giving the landowners lip service, it is time we stop acquiescing only to the environmental agenda, and it is time we stop reflecting in our newsletters and minutes that all is well, it is not. We are perpetrating fraud on the public by not reflecting openly and honestly the concerns and grievances within our Forum.

The Board and staff of the SRCAF have not done their part in advocating for real and tangible landowner assurances. It pains me once again to state that the current language as written is still nothing more than a policy paper outlining a process that will be set into practice on how the Forum will conduct itself. This language does nothing to provide true assurances for private landowners, while at the same time exempting State and Federal landowners from participating in local processes.

## **APPENDIX H**

### **Initial Landowner Survey Report**

The Institute for Social Research conducted the initial survey of landowner opinions for Colusa Subreach Planning. A report documenting the findings of that survey that was released in May of 2005 is contained in the Appendix.

# **COLUSA SUBREACH PLANNING PROJECT LANDOWNER SURVEY**

Prepared for the Sacramento River Conservation  
Area Forum and The Nature Conservancy  
by Laura Beth Jones, Graduate Research Assistant

May 2005



Institute for Social Research  
California State University, Sacramento  
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(916) 278-5737 FAX (916) 278-5150

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## **Instrument Design**

ISR was provided with a list of topics that the Sacramento River Conservation Area Forum and The Nature Conservancy wanted to cover in the telephone interview with landowners in the Colusa Subreach. ISR also received the Handbook and other materials that described issues surrounding habitat restoration. With this background, ISR staff drafted an interview schedule that went through multiple revisions as a result of input from SRCAF and TNC staff and the Advisory Workgroup. The final version has six sections, covering:

- Property characteristics
- Landowner awareness of SRCAF, the Colusa Subreach Planning effort and the agencies involved
- Confidence and trust in agencies providing technical information on the environmental impact of wildlife habitat restoration
- Beliefs about the likely outcomes of habitat restoration in the Colusa Subreach
- Preferences for methods of communication between landowners and SRCAF
- Contact information for the respondent

A copy of the interview schedule is included in an appendix to this report.

## **Data Collection Procedures**

SRCAF/TNC provided ISR with information for 138 properties inside and adjoining the levee within the Colusa Subreach. Phone numbers were provided for 114 of these properties. Interviewing began on January 20, 2005.

Contact procedure. The interviewer made five attempts to reach each landowner. If a request for a call back was received on the fifth attempt, the call was returned as requested. If the landowner was not available at the time of call, messages were left on answering machines or with others in the household or office.

Interviewing protocol. Upon reaching the respondent, the interviewer identified herself by name and her affiliation with the Institute for Social Research at CSUS. She briefly described the purpose of the call and asked to speak with the landowner who is most familiar with the management and uses of the property. (Please see the script at the beginning of the interview schedule.) If the initial respondent referred the interviewer to a tenant, manager or co-owner, the phone number was obtained and a call was made to the person recommended. If the time of initial contact with a respondent was not convenient, a callback was scheduled at a more convenient time.

Disconnected or wrong numbers were reported to TNC. TNC then tried to provide new contact information whenever possible. There were eleven properties with incorrect or disconnected phone numbers for which no new contact information was available (Table 1). If land had been sold, the interviewer attempted to obtain the new



landowner's name and phone number from the previous owner. When the attempt was unsuccessful, the sale was reported to TNC for their action. Three properties were not included in the survey because they had been sold and the new owner could not be located.

Interview responses were recorded by hand, with extensive comments entered into the computer. Coded responses were entered into a data file for analysis.

## **Response Rate**

Contact information was ultimately available for 97 landowners. Interviews were completed with landowners from 60 properties, for a response rate of 62% (Table 2). Twenty-five landowners could not be reached and 12 declined to be interviewed.

## **Property Characteristics**

Over two-thirds (68%) of the properties are used for agricultural purposes and 73% have some part of the property in natural vegetation (Table 3). Property size ranges from one acre (or less) to over 900 acres. The majority of respondents (89%) are private property owners; the remaining 11% represent properties owned by public agencies. Almost a third of these properties were located inside the levee (30%); another 43% were located outside the levee; and a little more than a fourth (27%) included land that was both inside and outside the levee area. The private landowners were asked if they farmed the land themselves and were given the option of having a tenant interviewed in their place. Almost two-thirds (62%) of respondents farmed the land themselves. Out of the landowners who leased their property the majority (87%) completed the interview instead of their tenant(s). Many respondents lived either on the property (43%) or in a county (Glenn & Colusa) near the project area with 23% living in a different California county.

## **Landowner Awareness of the Colusa Subreach Planning Effort**

Almost two-thirds of respondents are familiar with the Sacramento River Conservation Area Forum (62.3%)<sup>1</sup>. Of the 38 respondents who have heard of the Forum, a little over half (55%) receive the Forum's newsletter. (Table 4)

Awareness of the Forum is associated with location of the owner's residence, size of property and its location inside or outside the levee. Respondents who live in the region are more likely to have heard of the Forum than those who live outside of Glenn or Colusa counties or on the property (69% vs. 17%, Table 7). Similarly, those with larger

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<sup>1</sup> During the interviewing process, the Sacramento River Conservation Area Forum was also referred to as the Forum.

plots of land and those with property inside the levees are more apt to have heard of the Forum (Tables 6 & 8).

Respondents were asked to indicate their overall perception of the Forum on a scale from 1 (very negative) to 10 (very positive). The average response was 5.11 (Table 4). This neutral position was consistent with comments made frequently by respondents that, although they supported the general idea of the Forum, they felt that interference from government organizations was keeping it from meeting its goals.

Almost two-thirds of respondents (62%) are aware of the Colusa Subreach planning project (Table 5). A similar percentage thought the planning effort involved land inside the levees; respondents expressed concern that the project would eventually extend beyond the inner levee area. One-third (34%) of the respondents correctly identified Princeton to Colusa as the north/south boundaries of the planning effort.

Knowledge of the planning project is associated with location of the owner's residence and its location inside outside the levee. Local landowners (those who live in Glenn, Colusa, and on the property) are more likely to have heard of the project than those who reside in other California counties (67% vs. 25%). Landowners who owned property inside the levee are more likely to have heard of the planning effort. Most landowners (89%) who have property within the levees said that they were aware of the planning project (vs. 35% who have land outside the levees). (Table 10)

Awareness of the Forum significantly affected whether the landowner was aware of the Colusa planning project or not. Most respondents (87%) who were aware of the Forum were also aware of the project (Table 11).

Almost half of the landowners (45%) are not familiar with the agencies that are involved in the project (Table 12). Of those who did name agencies, roughly a third responded that the California Department of Fish and Game and the U.S. Department of Fish and Wildlife are involved in the planning project (34% and 29%, respectively). During the survey many respondents frequently remarked that government and agency involvement in habitat restoration should be restricted along the river. More than half (53%) of the respondents listed various entities such as local organizations, landowners, or concerned citizens as other groups that should be actively involved in the planning for habitat restoration. There are four agencies – California Department of Water Resources, California Department of Parks and Recreation, U. S. Bureau of Reclamation, and CALFED – that very few respondents identified as agencies that were involved or should be involved in the planning project.

## Confidence and Trust in Agencies Involved

Landowners were asked to indicate their level of confidence in the technical information provided by agencies Using a one to ten scale where one is very little confidence and ten is a great deal of confidence, respondents registered more confidence in information supplied by local irrigation and reclamation districts (6.78) than any other agency (Table 13). They also had substantial confidence in information supplied by hydrologists, biologists and other scientists, Glenn and Colusa County governments, and the State Reclamation Board (6.23, 6.22, and 6.13 respectively). Respondents often commented that their level of confidence in scientists depended upon the type of agency that was funding them. Respondents had less, but still above average confidence in the California Department of Fish and Game (5.95). While they were essentially neutral with respect to the California Department of Parks and Recreation (5.6), the U.S. Bureau of Reclamation (5.53) and U.S. Army Corps of Engineers (5.53), they had the least confidence in CALFED (4.0).

Levels of confidence in agencies are associated with length of property ownership, location of the owner's residence, and property location relative to the levee. Respondents who have owned their property for less time have more confidence in the information supplied by agencies than those who have owned their property for many years. Property tenure significantly affects confidence in four agencies: the California Department of Fish and Game; the California Department of Parks and Recreation; the U.S. Fish and Wildlife Service; and the U.S. Bureau of Reclamation. Respondents who have owned their property longer have less confidence in all four agencies than those with a shorter period of ownership (Table 14). Similarly, respondents who live outside the region have more confidence than local residents in three agencies: the U.S. Fish and Wildlife Service; the California Department of Parks and Recreation; and CALFED (Table 15).

Property location, however, has a different effect on confidence in different agencies. Owners of property both inside and outside the levee have significantly more confidence in local irrigation/reclamation districts and in hydrologists, biologists and other scientists than those who only own property inside the levee (Table 16). On the other hand, this latter group has much more confidence in CALFED than owners of property on both sides of the levee.

Respondents were asked how objective they think the planning effort will be in evaluating impacts of restoration on agriculture land. They used a 10 point scale with 1 being not at all objective and 10 being very objective. Respondents were also asked how much influence they believe local landowners will have in the planning process. For this item they used a 10 point scale with 1 being no influence at all and 10 being a great deal of influence. The average response to these two questions was 4.69 and 4.91, respectively (Table 13). This position was consistent with comments made frequently by respondents that, they were hopeful the project would be objective and allow landowners a great deal of influence although they doubted that it would happen.

## Opinions about Wildlife Habitat Restoration

Respondents were asked to describe the physical changes involved in wildlife habitat restoration. More than half (55%) are aware that planting native vegetation is part of habitat restoration (Table 17). About one in five respondents (21.7%) are aware that wildlife habitat restoration involves removing agricultural crops or orchards. Very few respondents are aware that wildlife habitat restoration involves removing bank protection or changing adjacent levees. Many respondents (66.7%) described a number of other activities too diverse to categorize. These respondents may have misunderstood the question or were in general unaware of the activities involved. When respondents were asked this question, many expressed the opinion that wildlife habitat restoration should not take place *at all*.

Respondents were asked whether they thought a variety of outcomes would occur as a result of wildlife habitat restoration. Increased government agency involvement was seen as the most likely outcome. Eighty-eight percent of respondents said that wildlife habitat restoration will increase the involvement of state and federal agencies in the Colusa Subreach. Moreover, three out of four respondents said that this increased governmental involvement will reduce local control of agricultural activities (Table 18).

A substantial number of respondents said that agricultural activities will be limited by new regulations protecting endangered species and that tax income for local government will decrease as private lands are purchased for public use (76% and 75% respectively). Many respondents (73%) think that increased public access will affect the safety and privacy of area residents and that habitat restoration will increase deer and rodent damage to agricultural crops.

During the course of the interview, many respondents indicated that the potential outcomes of habitat restoration on agricultural land depend on the details of the restoration project. According to many respondents, restoration outcomes will depend on the types of vegetation that are planted, how close to crops they are planted, and how public lands are maintained. Many landowners commented that changes to public access would depend on whether conservancy groups allowed access to the land that is restored. There were also respondents who said that whether trespassing increases depends on how public lands are regulated.

Perceptions about the potential results of wildlife habitat restoration vary according to a number of characteristics, including length of property ownership, property size, property location relative to the levee, and whether the property owner lives in the local area. The longer respondents have owned their property, the more likely they are to feel that agricultural income on adjoining land will decrease as a result of habitat restoration. Those who have owned their property longer are also more likely to feel that wildlife habitat restoration will make agricultural land more difficult to lease. (Table 19)

Respondents who own smaller and larger pieces of property have different opinions about a variety of potential wildlife habitat restoration outcomes. There were two potential outcomes that larger property owners perceived as more likely to happen. Compared to those who own smaller pieces of property (under 10 acres), those who own 10 or more acres are more likely to feel that wildlife populations will increase as a result of habitat restoration. Respondents who own 10 or more acres are also much more likely than those with smaller pieces of property to feel that the increased public access brought about by habitat restoration will affect the safety and privacy of area residents (Table 20).

In contrast, there were two potential outcomes that larger property owners perceived as *less* likely to happen. The more land a respondent owns, the less likely they are to feel that agricultural activities will be limited by new regulations protecting endangered species. Larger property owners are also less likely to feel that increased involvement by state and federal agencies will reduce local control of agricultural-related activities.

Perceptions about the likelihood of several possible outcomes vary depending on whether the owner's property is located inside or outside the levee. Those who own property inside the levee are more likely to feel that habitat restoration will increase wildlife populations and that hunting and fishing activities will become a more important source of revenue for the local economy. (Table 21)

Compared to those who own land inside the levee, property owners with land outside the levee are more likely feel that some of the outcomes related to agricultural land use are likely to occur as a result of habitat restoration. The perception that agricultural activities will be limited by new regulations protecting endangered species is much more prevalent among those who own property outside the levee. More than nine out of ten (92%) respondents who own land outside the levee think that this will be one of the outcomes of habitat restoration, compared to just under half (47%) of property owners with no land outside the levee.

Property owners with land outside the levees are more apt to think that the increasing involvement of government agencies will reduce local control of agriculture-related activities. They are also more likely to feel that habitat restoration will increase insect damage to agricultural crops, decrease the ability of farmers to take irrigation water from the river, and decrease agricultural income on adjoining land.

Property owners who live in the local area have somewhat different perceptions than those who live outside the area. Compared to those who live outside the area, local landowners are much more likely to believe habitat restoration will result in increased flooding on private lands, increased deer and rodent damage to agriculture crops, and increased insect damage to agricultural crops. Non-local landowners are more likely than local landowners to feel that wildlife habitat restoration will increase public access to land along the river (83% vs. 53%, respectively). (Table 22)

## Methods for Exchanging Planning Information

Respondents were asked about the usefulness of a variety of ways that landowners could receive information about the planning process (Table 23). Three methods were rated as very or somewhat useful by more than 80% of respondents:

- Mailing brief, issue-specific flyers. According to more than half of the respondents (52.5%), mailing frequent, brief, issue-specific flyers would be a very useful way to communicate needed information. Almost a third (32.2%) of respondents thought that that this method would be somewhat useful.
- Providing opportunities to question experts on wildlife habitat restoration. Respondents indicated that the opportunity to speak with experts would be useful; 43.9% said that it would be very useful and 38.6% thought it would be somewhat useful.
- Establishing a community liaison or ombudsman to field questions from landowners and provide information about the planning process. Almost half (47.5%) of respondents think it would be somewhat useful to establish a community liaison and 37.3% think it would be very useful.

There was clear consensus that placing board meeting and other documents in the local library would be the least useful strategy. Nearly six out of ten respondents said it would be either less useful or not at all useful. Establishing a toll-free telephone information line was also seen as a relatively less useful method of communicating information to property owners.

Respondents were also asked how likely they would be to use six different methods to relay information to the Forum and Nature Conservancy. The least popular choices were calling a toll-free number with comments and suggestions and submitting e-mailed comments (Table 24). While no single method emerges as the single most popular choice, there are three methods that respondents appear to prefer:

- Participating in informal workshops sponsored by the Forum and The Nature Conservancy. While this was a popular method for some, opinions were mixed. This method received the most “very likely to use” responses (33.9%), but it also received the most “not at all likely to use” responses (21.3%). This suggests that for one in five respondents, other methods of communicating information should be available.
- Making oral comments at public meetings. Nearly one out of three property owners (29.5%) said they would be very likely to make oral comments at public meetings. Only 11.5% of respondents said that they would be unlikely to use this method.
- Participating in a community group to present landowner input. More than one out of six property owners would be either very likely (26.2%) or somewhat likely (26.1%) to use this method.



Table 1: Dispositions for Properties in Study Area

	Number
No phone number available	24
Disconnected or wrong number	11
Sold land, unable to locate new owner	3
Property owners listed twice <sup>2</sup>	3
Refused interview	12
No answer, answering machine, or left message	25
Completed interview	60
Total	138

Table 2: Outcomes for Property Owners with Correct Phone Numbers

	Number	Percent
Refused interview	12	12%
No answer, answering machine, or left message	25	26%
Completed interview <sup>3</sup>	60	62%
Total	97	100%

<sup>2</sup> The initial list of properties included three property owners who each owned two separate properties in the study area. Since the unit of analysis for this study is the property owner, only one interview was conducted with each of these property owners.

<sup>3</sup> In general, when a property was owned by more than one person, the landowner most familiar with the management and uses of the property was interviewed. However, for one property with multiple owners, a decision was made to conduct two separate interviews because each owner—they were business partners—was familiar with different aspects of the management and uses of the property. This means that 61 interviews were conducted with landowners. Fifty-four interviews were completed with private landowners. The remaining 7 interviews were conducted with respondents representing public or non-profit agencies.

Table 3: Property Characteristics

		Percent
Respondent type	Private landowner	89%
	Public or non-profit agency	11%
	Total	100%
	<i>Number of cases</i>	60
Is property used for agricultural purposes?	Yes	68%
	No	32%
	Total	100%
	<i>Number of cases</i>	60
Is property farmed by landowner or leased? <sup>4*</sup>	Farm it myself	62%
	Lease it to others	33%
	Both	5%
	Total	100%
	<i>Number of cases</i>	39
Would you like to have the tenant or lessee contacted and interviewed in your place? <sup>3</sup>	Yes	13%
	No	87%
	Total	100%
	<i>Number of cases</i>	15
Is any part of this property located in natural vegetation?	Yes	73%
	No	27%
	Total	100%
	<i>Number of cases</i>	59
Where do you live? <sup>3</sup>	On the property	43%
	Glenn county	5%
	Colusa county	30%
	Another California County	22%
	Total	100%
	<i>Number of cases</i>	60
How many years have you owned this property?	1-9 years	30%
	10-25 years	30%
	More than 25 years	40%
	Total	100%
	<i>Number of cases</i>	58
Property location relative to levee	Inside levee	30%
	Outside levee	43%
	Both	27%
	Total	100%
	<i>Number of cases</i>	60
Property size	Less than 10 acres	30%
	10-99 acres	30%
	100 or more acres	40%
	Total	100%
	<i>Number of cases</i>	60

<sup>4</sup> These questions were only asked during interviews with private landowners.

Table 4: Awareness and Perception of the Sacramento River Conservation Area Forum

		Percent
Have you heard of the Sacramento River Conservation Area Forum?	Yes	62.3%
	No	34.4%
	Not sure	3.3%
	Total	100.0%
	<i>Number of cases</i>	38
Do you receive the Forum's newsletter?	Yes	55.3%
	No	39.5%
	Not sure	5.3%
	Total	100.0%
	<i>Number of cases</i>	38
Overall, what is your perception of the Forum? (on a scale from 1 to 10, with 1 being very negative and 10 being very positive)	Mean	5.11
	Standard deviation	2.58
	<i>Number of cases</i>	37

Table 5: Awareness of the Colusa Subreach Planning Project

		Percent
Have you heard of the Colusa Subreach planning effort to develop strategies for wildlife habitat restoration along the Sacramento River?	Yes	62.0%
	No	33.0%
	Not sure	5.0%
	Total	100.0%
	<i>Number of cases</i>	61
Do you know whether the planning effort involves land inside the levee, outside the levee, or both?	Inside the levee	63.2%
	Outside the levee	2.6%
	Both inside/outside	31.6%
	Other	2.6%
	Total	100.0%
	<i>Number of cases</i>	38
Could you describe what the geographic boundaries are for the planning effort?	Princeton to Colusa	34.2%
	Whole Sacramento River	2.6%
	Red Bluff to Colusa	10.5%
	Other	15.8%
	I don't know	36.8%
	Total	100.0
	<i>Number of cases</i>	38

Table 6: Awareness of the Sacramento River Conservation Area Forum by Property Size

		Property Size			Total
		Less than 10 acres	10-99 acres	100 or more acres	
Have you heard of the Sacramento River Conservation Area Forum? p = .05	Yes	44%	61%	76%	62%
	No	56%	39%	16%	34%
	Not sure	0%	0%	8%	3%
	Total	100%	100%	100%	100%
	<i>Number of cases</i>	18	18	25	61

Table 7: Awareness of the Sacramento River Conservation Area Forum by Residence of Respondent

		Residence of Respondent <sup>5</sup>		Total
		Local	Non-Local	
Have you heard of the Sacramento River Conservation Area Forum? p = .005	Yes	69%	17%	57%
	No	29%	75%	39%
	Not sure	2%	8%	4%
	Total	100%	100%	100%
	<i>Number of cases</i>	42	12	54

Table 8: Awareness of the Sacramento River Conservation Area Forum by Property Location Relative to Levee

		Location of Property			Total
		Inside Levee	Outside Levee	Both	
Have you heard of the Sacramento River Conservation Area Forum? p = .003	Yes	67%	38%	94%	62%
	No	28%	58%	6%	34%
	Not sure	6%	4%	0%	3%
	Total	100%	100%	100%	100%
	<i>Number of cases</i>	18	26	17	61

<sup>5</sup> Local includes on the property or somewhere else in Glenn or Colusa county. Non local includes respondents who live in a different California county.

Table 9: Awareness of the Colusa Subreach Planning Effort by Residence of Respondent

		Residence of Respondent		Total
		Local	Non-Local	
Have you heard of the Colusa Subreach planning effort to develop strategies for wildlife habitat restoration along the Sacramento River? p = .017	Yes	67%	25%	57%
	No	31%	58%	37%
	Not sure	2%	17%	6%
	Total	100%	100%	100%
	<i>Number of cases</i>	42	12	54

Table 10: Awareness of the Colusa Subreach Planning Effort by Property Location Relative to Levee

		Location of Property			Total
		Inside Levee	Outside Levee	Both	
Have you heard of the Colusa Subreach planning effort to develop strategies for wildlife habitat restoration along the Sacramento River? p = .003	Yes	89%	35%	76%	62%
	No	11%	54%	24%	33%
	Not sure	0%	12%	0%	5%
	Total	100%	100%	100%	100%
	<i>Number of cases</i>	18	26	17	61

Table 11: Awareness of the Colusa Subreach Planning Effort by Awareness of the Sacramento River Conservation Area Forum

		Have you heard of the Sacramento River Conservation Area Forum?			Total
		Yes	No	Not sure	
Have you heard of the Colusa Subreach planning effort to develop strategies for wildlife habitat restoration along the Sacramento River? p = .000	Yes	87%	19%	50%	62%
	No	11%	76%	0%	33%
	Not sure	3%	5%	50%	5%
	Total	100%	100%	100%	100%
	<i>Number of cases</i>	38	21	2	61

Table12: Perceptions Regarding Agencies that *Are* and *Should Be* Involved in the Planning Effort

	Agencies that <i>are</i> involved %	Agencies that <i>should be</i> involved %
I don't know	45	2
CA Department of Fish and Game	34	5
The Nature Conservancy	24	0
CA Department of Parks and Recreation	10	0
CA Department of Water Resources	13	0
State Reclamation Board	11	5
U.S. Army Corps of Engineers	0	7
U.S. Bureau of Reclamation	8	0
U.S. Fish and Wildlife Service	29	0
CALFED	5	0
Board of Supervisors in Colusa or Glenn county governments	5	11
Cities and communities in the area	5	7
Local districts responsible for levees and reclamation, flood control and drainage, resource conservation, and irrigation or water	13	0
Other	53	82
<i>Number of cases</i>	38	38

Percentages do not sum to 100 because categories are not mutually exclusive.

Table 13: Confidence and Trust in Agencies Involved in the Planning Effort

	Mean	N
Many local, state and federal agencies supply technical information about the environmental impact of wildlife habitat restoration. I'm going to read you a list of agencies and I'd like you to tell me, in general, how much confidence you place in the information they provide. Use a scale from 1 to 10 where 1 is very little confidence and 10 is a lot of confidence.	CA Department of Fish and Game	5.95
	CA Department of Parks and Recreation	5.60
	State Reclamation Board	6.13
	CA Department of Water Resources	6.02
	U.S. Army Corps of Engineers	5.53
	U.S. Bureau of Reclamation	5.53
	U.S. Fish and Wildlife Service	5.29
	Colusa and Glenn county governments	6.22
	CALFED	4.00
	Local irrigation or reclamation districts	6.78
How much confidence do you place in the information supplied by hydrologists, biologists and other scientists? (1 indicates very little confidence and 10 indicates a lot of confidence)	6.23	52
In the planning for wildlife habitat restoration and flood protection strategies in the Colusa Subreach, how objective do you think the Colusa Subreach Planning effort will be in evaluating the impacts of restoration on agricultural land? Use a scale from 1 to 10, with 1 being not at all objective and 10 being very objective.	5.95	51
How much influence do you believe local landowners and other local interests will have in the planning process for wildlife habitat restoration and flood protection strategies in the Colusa Subreach? Use a scale from 1 to 10, with 1 being no influence at all and 10 being a great deal of influence.	5.60	58



Table 14: Level of Confidence in Agencies Involved in the Planning Effort by Years of Ownership

		Years of Ownership			Total
		1-9	10-25	26+	
CA Department of Fish and Game p = .033	Mean	7.33	5.68	4.95	5.95
	Standard deviation	2.28	2.83	3.09	2.89
	Number of Cases	18	19	20	57
CA Department of Parks and Recreation p = .052	Mean	6.78	5.22	4.76	5.60
	Standard deviation	1.90	2.21	3.25	2.60
	Number of Cases	18	18	17	53
U.S. Bureau of Reclamation p = .033	Mean	6.81	5.20	4.56	5.53
	Standard deviation	2.40	2.24	2.56	2.54
	Number of Cases	16	15	16	47
U.S. Fish and Wildlife Service p = .023	Mean	6.24	6.06	3.72	5.29
	Standard deviation	2.88	2.91	2.93	3.08
	Number of Cases	17	16	18	51

Table 15: Level of Confidence in Agencies Involved in the Planning Effort by Residence

		Residence of Respondent		Total
		Local	Non-local	
CA Department of Parks and Recreation p = .026	Mean	5.00	7.00	5.43
	Standard deviation	2.27	3.02	2.55
	Number of Cases	37	10	57
U.S. Fish and Wildlife Service p = .043	Mean	4.58	6.89	5.04
	Standard deviation	2.96	2.98	3.07
	Number of Cases	36	9	45
CALFED p = .006	Mean	2.73	5.67	3.36
	Standard deviation	1.88	2.94	2.42
	Number of Cases	22	6	28

Table 16: Level of Confidence in Agencies and Scientists Involved in the Planning Effort by Location of Property Relative to Levee

		Location of Property			Total
		Inside Levee	Outside Levee	Both	
CALFED p=.009	Mean	5.45	4.00	2.10	4.00
	Standard deviation	2.57	2.68	1.85	2.73
	Number of cases	13	11	10	34
Local irrigation or reclamation districts p=.025	Mean	5.50	7.14	7.71	6.78
	Standard deviation	2.63	2.10	2.05	2.40
	Number of cases	16	21	14	51
Hydrologists, biologists and other scientists p=.003	Mean	6.00	6.50	6.65	6.23
	Standard deviation	2.78	2.55	2.42	2.66
	Number of cases	16	22	17	55

Table 17: Knowledge of Physical Changes Involved in Wildlife Habitat Restoration

	Percent
What physical changes do you think are involved in the planning for wildlife habitat restoration?	
Planting native vegetation	55.0
Removing agricultural crops or orchards	21.7
Don't know	15.0
Removing bank protection	1.7
Changing adjacent levees	1.7
Other	66.7
<i>Number of cases</i>	<i>60</i>

Percentages do not sum to 100 because categories are not mutually exclusive

Table 18: Opinions Regarding Possible Outcomes of Habitat Restoration

Do you think the following outcomes will happen if wildlife restoration takes place?	Yes %	No %	It de- pends %	I don't know %	Total %	<i>Number of cases</i>
Wildlife restoration will increase involvement by state and federal agencies	88	7	0	5	100	59
Agriculture activities will be limited by new regulations protecting endangered species	76	19	3	2	100	59
Increasing involvement by state/federal agencies will reduce local control of agriculture-related activities	75	20	2	3	100	59
Tax income for local government will decrease as private lands are purchased for public use	75	22	0	3	100	59
Increased public access will affect safety and privacy of area residents	73	20	3	3	100	59
Deer and rodent damage to agricultural crops will increase	73	19	5	3	100	59
More trespassing will occur on private property	70	17	10	3	100	59
Wildlife populations will increase	71	17	5	7	100	59
Public access to land along the river will increase	64	26	9	2	100	59
The ability of farmers to take irrigation water from the river will decrease	60	29	0	10	100	59
Agricultural income on adjoining land will decrease	59	25	12	3	100	59
Insect damage to agriculture crops will increase	59	33	4	6	100	59
Agricultural land will be more difficult to lease	58	29	10	3	100	59
Increased flooding will occur on private lands in the subreach	53	32	9	7	100	59
Property values will decrease	44	37	12	7	100	59
Hunting and fishing activities will become a more important source of revenue for the local economy	37	49	5	9	100	59
Fish populations will increase	31	30	3	7	100	59
Some species may be removed from the threatened and endangered list	32	54	5	9	100	59
Recreation related uses may become a greater source of supplemental income for farmers	29	64	3	3	100	59
Public access to land along the river will decrease	21	76	3	0	100	59

Table 19: Opinions Regarding Possible Outcomes of Habitat Restoration by Years of Ownership

		Years of Ownership		
		1-10	11-25	26+
Agricultural income on adjoining land will decrease p = .026	Yes	32%	63%	81%
	No	37%	32%	10%
	It depends	26%	0%	10%
	I don't know	5%	5%	0%
	Total	100%	100%	100%
	<i>Number of cases</i>	<i>19</i>	<i>19</i>	<i>21</i>
Agricultural land will be more difficult to lease p = .002	Yes	26%	68%	76%
	No	58%	26%	5%
	It depends	5%	5%	19%
	I don't know	11%	0%	0%
	Total	100%	100%	100%
	<i>Number of cases</i>	<i>19</i>	<i>19</i>	<i>21</i>

Table 20: Opinions Regarding Possible Outcomes of Habitat Restoration by Property Size

		Property Size		
		Less than 10 acres	10-99 acres	100 or more acres
Wildlife populations will increase p = .035	Yes	59%	72%	79%
	No	35%	11%	8%
	It depends	0%	17%	0%
	I don't know	6%	0%	13%
	Total	100%	100%	100%
	<i>Number of cases</i>	<i>17</i>	<i>18</i>	<i>24</i>
Increased public access will affect the safety of residents p = .002	Yes	35%	94%	83%
	No	47%	0%	17%
	It depends	6%	6%	0%
	I don't know	12%	0%	0%
	Total	100%	100%	100%
	<i>Number of cases</i>	<i>17</i>	<i>18</i>	<i>24</i>
Agricultural activities will be limited by new regulations protecting endangered species p = .012	Yes	88%	78%	67%
	No	6%	11%	33%
	It depends		11%	0%
	I don't know	6%	0%	0%
	Total	100%	100%	100%
	<i>Number of cases</i>	<i>17</i>	<i>18</i>	<i>24</i>
Increasing involvement by state and federal agencies will reduce local control of agriculture-related activities p = .013	Yes	88%	78%	63%
	No	0%	22%	33%
	It depends	0%	0%	4%
	I don't know	12%	0%	0%
	Total	100%	100%	100%
	<i>Number of cases</i>	<i>17</i>	<i>18</i>	<i>24</i>

Table 21: Opinions Regarding Possible Outcomes of Habitat Restoration by Property Location Relative to Levee

		Location of Property		
		Inside Levee	Outside Levee	Both
Wildlife population will increase p = .035	Yes	82%	68%	65%
	No	18%	24%	6%
	It depends	0%	8%	6%
	I don't know	0%	0%	24%
	Total	100%	100%	100%
	<i>Number of cases</i>	17	25	17
Hunting and fishing activities will become a more important source of revenue for the local economy p = .019	Yes	71%	20%	29%
	No	24%	64%	53%
	It depends	6%	8%	0%
	I don't know	0%	8%	18%
	Total	100%	100%	100%
	<i>Number of cases</i>	17	25	17
Agricultural activities will be limited by new regulations protecting endangered species p = .012	Yes	47%	92%	82%
	No	47%	4%	12%
	It depends	6%	0%	6%
	I don't know	0%	4%	0%
	Total	100%	100%	100%
	<i>Number of cases</i>	17	25	17
Increasing involvement by state and federal agencies will reduce local control of agriculture-related activities p = .013	Yes	53%	88%	76%
	No	47%	4%	18%
	It depends	0%	0%	6%
	I don't know	0%	8%	0%
	Total	100%	100%	100%
	<i>Number of cases</i>	17	25	17
Insect damage to agricultural crops will increase p = .023	Yes	41%	72%	58%
	No	59%	20%	18%
	It depends	0%	0%	12%
	I don't know	0%	0%	12%
	Total	0%	0%	8%
	<i>Number of cases</i>	17	25	17
The ability of farmers to take irrigation water from the river will decrease p = .036	Yes	50%	76%	60%
	No	50%	16%	29%
	It depends	0%	0%	6%
	I don't know	0%	0%	10%
	Total	100%	100%	100%
	<i>Number of cases</i>	17	25	17
Agricultural income on adjoining land will decrease p = .020	Yes	47%	60%	71%
	No	53%	24%	0%
	It depends	0%	12%	24%
	I don't know	0%	4%	6%
	Total	100%	100%	100%
	<i>Number of cases</i>	17	25	17

Table 22: Opinions Regarding Possible Outcomes of Habitat Restoration by Residence of Respondent

		Residence of Respondent	
		Local	Non-Local
Increased flooding will occur on private lands in the subreach p = .007	Yes	63%	25%
	No	17%	67%
	It depends	12%	0%
	I don't know	7%	8%
	Total	100%	100%
	<i>Number of cases</i>	<i>41</i>	<i>12</i>
Deer and rodent damage to agricultural crops will increase p = .054	Yes	80%	58%
	No	15%	17%
	It depends	5%	8%
	I don't know	0%	17%
	Total	100%	100%
	<i>Number of cases</i>	<i>41</i>	<i>12</i>
Insect damage to agricultural crops will increase p = .042	Yes	68%	42%
	No	24%	33%
	It depends	5%	0%
	I don't know	2%	25%
	Total	100%	100%
	<i>Number of cases</i>	<i>41</i>	<i>12</i>
Public access to land along the river will increase p = .035	Yes	53%	83%
	No	35%	8%
	It depends	13%	0%
	I don't know	0%	8%
	Total	100%	100%
	<i>Number of cases</i>	<i>41</i>	<i>12</i>

Table 23: Usefulness of Methods of Receiving Communication from the Forum and The Nature Conservancy

What are the most useful ways for you to receive communication from the Forum and The Nature Conservancy?	Very Useful %	Some-what useful %	Less useful %	Not at all useful %	Total %	<i>Number of cases</i>
Mailing frequent, brief, issue-specific flyers	52.5	32.2	6.8	8.5	100.0	59
Providing opportunities to question experts on wildlife habitat restoration	43.9	38.6	5.3	12.3	100.0	57
Establishing a community liaison	37.3	47.5	11.9	3.4	100.0	59
Holding occasional general informational public meetings	33.9	45.8	5.1	15.3	100.0	59
Establishing a website that summarizes Forum activities and decisions	28.8	35.6	11.9	23.7	100.0	59
Providing opportunities for site visits	28.1	56.1	1.8	14.0	100.0	57
Newspaper articles	23.7	42.4	16.9	16.9	100.0	59
Mailing infrequent, more comprehensive newsletters	20.3	50.8	18.6	10.2	100.0	59
Holding frequent, issue-specific public meetings	24.6	47.4	14.0	14.0	100.0	57
Establishing a toll-free telephone information line	15.5	43.1	19.0	22.4	100.0	58
Placing Board minutes and other documents in the local library for easy public access	5.1	35.6	27.1	32.2	100.0	59

Table 24: Likelihood of Using Methods to Communicate Information to the Forum and The Nature Conservancy

How likely would you be to use the following methods to communicate with the Forum and The Nature Conservancy about the planning process?	Very likely %	Some-what likely %	Less likely %	Not at all likely %	Total %	<i>Number of cases</i>
Participating in informal workshops sponsored by the Forum and The Nature Conservancy	33.9	31.1	23.0	21.3	100.0	58
Making oral comments at public meetings	29.5	24.6	29.5	11.5	100.0	58
Participating in a community group to present landowner input	26.2	36.1	13.1	14.8	100.0	55
Submitting e-mailed comments	34.5	15.5	27.6	22.4	100.0	58
Submitting written comments	25.9	31.0	25.9	17.2	100.0	58
Calling a toll-free number with comments and suggestions	18.0	21.3	36.1	19.7	100.0	58

## **APPENDIX I**

### **Final Landowner Survey Report**

The Institute for Social Research conducted the final survey of landowner opinions for Colusa Subreach Planning. A report documenting the findings of that survey that was released in May of 2008 is contained in this Appendix.



## **COLUSA SUBREACH PLANNING PROJECT LANDOWNER SURVEY**

Prepared for the Sacramento River Conservation Area Forum  
by the Institute for Social Research at California State University, Sacramento

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## Introduction

The Institute for Social Research at California State University, Sacramento was contracted to develop and execute a pair of surveys of landowners in the Colusa Subreach. The objective was to determine landowner perspectives regarding the restoration of riparian habitat in the subreach, their concerns regarding restoration, their expectations regarding the planning process prior to initiation of the Colusa Subreach Planning (CSP) Project and their views of the process following the project's completion. This report summarizes results of the follow-up survey and compares landowner perceptions at the beginning and end of this CALFED-sponsored project.

The project's overall goal was to:

*Increase citizen stakeholder involvement in determining realistic conservation strategies and projects for protecting and restoring a continuous riparian corridor along the Sacramento River that address flood control and economic and environmental uses of the floodplain.<sup>i</sup>*

The CSP project in particular focused on addressing landowner questions and developing plans for habitat restoration on approximately 400 acres of land inside the levee between Princeton and Colusa. All of this land had been acquired or optioned by public agencies or The Nature Conservancy prior to the project's initiation. The CSP project's responsibility was to determine how this land could be converted from agricultural uses to riparian habitat, taking into account the impact of this conversion on flood control, endangered species, and agricultural interests. The project also featured planning and research projects that were designed to address the questions and concerns of local landowners related to habitat restoration.

The CSP was organized under the auspices of the Sacramento River Conservation Area Forum (SRCAF or Forum), a non-profit organization with the goal of promoting effective communications and ensuring that ecosystem restoration along the Sacramento River is effective and sensitive to the needs of local communities. The Forum has two local representatives – one a landowner, the other a member of the County board of Supervisors – from each of seven counties (Shasta, Tehama, Glenn, Butte, Colusa, Sutter and Yolo). These 14 local representatives plus one person appointed by the California Secretary of Resources constitute the Board's voting members. Representatives of state and federal agencies, including the California Departments of Fish and Game, Water Resources, the U.S. Fish and Wildlife Service, and the U.S. Bureau of Reclamation are ex-officio, non-voting members of the Board.

The Forum partnered with The Nature Conservancy (TNC), which was awarded a CALFED planning grant for subreach planning in the Princeton to Colusa area. Activities pursued under the grant had to conform to a grant agreement and existing state and federal statutes. An Advisory Workgroup made up of local city and county officials, landowners, business owners, and non-profit organizations interested in environmental and agricultural issues was established. The Workgroup's role was to provide input on the planning decisions to be made during the CSP project. During the project, they also contributed to planning for the Colusa/Sacramento River Recreation

Area and a recreation access plan for the Subreach as well as other research projects that addressed identified landowner questions and concerns.

The legal and procedural boundaries that framed these planning decisions – and the advisory role of the Workgroup -- may not have been clear to, or accepted by, all participants in the planning process. Many private landowners perceived conflicts between the requirements of state and federal Endangered Species Acts and the needs of agriculture. To address this issue a Forum committee had been working for several years on a “good neighbor policy.” The committee developed objectives that were called “landowner assurances.” These landowner assurances included:

- Authorization for incidental take of Threatened and Endangered Species
- Designation of the Conservation Area as a “self mitigating area” where project-specific mitigation for environmental impacts would not be required
- A simplified process for dispute resolution and landowner compensation

In late 2005 this committee process came to a head. State and federal regulatory agencies indicated that several of the proposed landowner assurances were in conflict with existing laws and procedures and could not be accepted. There was a negative response to this position, especially from Colusa County interests. The CSP project began in the midst of this ongoing discussion and related strong emotions. Its focus on habitat restoration hit squarely on private landowner concerns.

In February 2006, eight Colusa County members of the Advisory Workgroup resigned. This occurred shortly after the Forum’s Board failed to adopt a motion made by Colusa County representatives to oppose all ecosystem restoration projects until a Good Neighbor Policy was adopted that included the desired landowner assurances. In a letter explaining their resignation the members indicated that they were dissatisfied with the Colusa Subreach Planning process and felt that their voices were not being heard. In March 2006, the SRCAF Board adopted a Good Neighbor Policy as a “White Paper” but it did not include all of the desired landowner assurances. SRCAF representatives from Colusa County indicated that the adopted Good Neighbor Policy was not acceptable to them.

Thus, broad concerns over environmental regulations, acquisition of land for habitat conservation and restoration of wildlife habitat intensified during the term of Colusa Subreach Planning while local representatives withdrew from the subreach planning process. This background formed the context in which the two surveys – and particularly the follow-up survey – occurred.

Results of the pre-survey in 2005 were described in detail in a May 2005 report. The purpose of this report is to describe responses to the post-survey in Spring 2008 and to identify changes in the level of awareness of the planning effort and the agencies involved, confidence and trust in the agencies providing technical information, and beliefs about the likely outcomes of habitat restoration in the Colusa Subreach. Finally, changes in preferences for methods of receiving communications from the Forum and TNC were compared and methods used to communicate with the two organizations during the planning process are described.

## Instrument Design

ISR was provided with a list of topics that the Sacramento River Conservation Area Forum (referred to as SRCAF or the Forum) and The Nature Conservancy (TNC) wanted to cover in the two telephone interviews with landowners in the Colusa Subreach. ISR also received the Handbook and other materials that described issues surrounding habitat restoration. Building on this information, ISR staff drafted an interview schedule that went through multiple revisions as a result of input from SRCAF and TNC staff and the Advisory Workgroup. A copy of the pre-survey was included with the May 2005 report. To facilitate comparisons, only minor changes were made to the post-survey. The most important changes included modifications to the tense in framing a question and rephrasing questions on exchanging information in order to evaluate different methods by which information was obtained or comments made. The final version has five sections, covering:

- Property characteristics
- Landowner awareness of SRCAF, the Colusa Subreach Planning effort, the Nature Conservancy and agencies involved in the project
- Confidence and trust in agencies providing technical information on the environmental impact of wildlife habitat restoration
- Beliefs about the likely outcomes of habitat restoration in the Colusa Subreach
- Evaluation of methods of receiving communication about the project and a description of methods used to communicate with the Forum and The Nature Conservancy about the planning process.

A copy of the interview schedule is included in Appendix I.

## Data Collection Procedures

In December 2007, SRCAF/TNC provided ISR with information on 138 properties inside and adjoining the levee within the Colusa Subreach. Numbers for phone interviews were provided for 117 of these properties. (Table 1) In January 2008, the Forum sent a letter to landowners informing them that a telephone survey was going to be conducted starting in late January. The letter gave a broad overview of the content and purpose of the study in an effort to inform landowners about the phone survey before the initial phone calls. Interviewing began on January 24, 2008, and was completed on April 1, 2008.

Response rate. Contact information was ultimately available for 101 landowners, up from 96 in 2005. Interviews were completed with landowners from 47 properties, for a 2008 response rate of 51% (Table 2). The response rate for the earlier survey was noticeably higher at 64%. Several factors contributed to the lower response rate in the post-survey. Refusals were largely responsible for the lower response rate in the post-survey. Twenty-two private landowners declined to be interviewed – a refusal rate that was almost double that of the 2005 survey (24% vs. 13%). Another 24 private landowners could not be reached. However, this number was only slightly higher than the number that failed to respond to messages that were left in the pre-survey (24 in

2008 vs. 21 in 2005). All of the agency respondents who were reached completed the 2008 survey while 46% of the private landowners reached completed it. As a result, agency owners make up a slightly higher percentage of respondents in the 2008 data (17%) than they did in 2005 (10%). The two groups of owners are kept separate in the analysis. (Table 3)

Contact procedure. The ISR interviewer made five attempts to reach each landowner. If a request for a call back was received on the fifth attempt, the call was returned as requested. If the landowner was not available at the time of the call, messages were left on answering machines or with others in the household or office.

Interviewing protocol. Upon reaching the respondent, the interviewer identified herself by name and her affiliation with the Institute for Social Research at CSUS. She briefly described the purpose of the call and asked to speak with the landowner who is most familiar with the management and uses of the property. (Please see the script at the beginning of the interview schedule in Appendix I.) If the initial respondent referred the interviewer to a tenant, manager or co-owner, the phone number was obtained and a call was made to the person recommended. If the time of initial contact with a respondent was not convenient, a callback was scheduled at a more convenient time.

Disconnected or wrong numbers were reported to TNC. TNC then tried to provide new contact information whenever possible. There were twelve properties with incorrect or disconnected phone numbers for which no new contact information was available (Table 1). If land had been sold, the interviewer attempted to obtain the new landowner's name and phone number from the previous owner. When the attempt was unsuccessful, the sale was reported to TNC for their action. Although three properties were not included in the 2005 survey because they had been sold and the new owner could not be located, there were no sales reported in 2008.

Interview responses were recorded by hand, with extensive comments entered into the computer. Coded responses were entered into a data file for analysis.

## **Property Characteristics**

In both years, over two-thirds (72% and 69% in 2005 and 2008) of properties in private hands were used for agricultural purposes. (Table 4) Over two-thirds (71% and 72%) also had some acreage in natural vegetation. Property size ranged from one acre (or less) to over 900 acres. Roughly a third of the properties are less than 10 acres, another third between 10 and 99 acres and a third 100 or more acres. The private landowners were asked if they farmed the land themselves and were given the option of having a tenant interviewed in their place. Somewhat more of the 2008 respondents farmed the land themselves (74% vs. 61% in 2005). Among the landowners who leased their property, most (87% and 71%) completed the interview instead of their tenant(s). Many respondents lived either on the property (43% and 38%) or elsewhere in Glenn and Colusa County (34% and 23%) with 22% and 36% living in a different California county. More of the 2008 respondents had owned the property along the river for over 25 years (51% vs. 36% in 2005). The remaining respondents in both

years were equally divided between less than 10 and 10 to 25 years. The differences in property characteristics between the two years were purely random.

### **Landowner Awareness of the Colusa Subreach Planning Effort**

The Colusa Subreach Planning Project has succeeded in raising local awareness of the Forum and the Colusa Subreach planning effort. Recognition of SRCAF increased significantly from 57% in 2005 to 82% in 2008; comparable figures for the planning effort, also significant, were from 57% to 92%.<sup>1</sup> Awareness of TNC, which was not measured in 2005, was comparable (90%). More of the respondents who had heard of the Forum received its newsletter in 2008 (72% compared with 55% in 2005). (Table 5)

Respondents were asked to indicate their overall perception of the Forum on a scale from 1 (very negative) to 10 (very positive). The overall perception of the Forum did not change significantly among either private landowners or agency representatives. Means for private landowners declined from 4.77 to 4.1. Agency representatives were more positive in both years, varying randomly between 6.5 in 2005 to 6.13 in 2008. (Table 6) In 2005, landowners took a somewhat more neutral position with many commenting that, although they supported the general idea of the Forum, they felt that interference from government organizations was keeping it from meeting its goals. The overall perception of TNC in 2008 was somewhat lower than that of the Forum (3.49 vs. 4.1). By 2008, a lack of trust in the Forum and TNC was verbalized by eight respondents who feared a “slippery slope,” where some land would be converted now with more lost to agriculture in the future. A few who completed the survey expressed a feeling of frustration that the planning process went forward without landowner approval or participation while others cited this frustration as the reason for refusing to complete the interview.

Although most private landowners (92%) were aware of the Colusa Subreach planning project, only half (47%) correctly identified Princeton and Colusa as the project’s geographic boundaries (up from 29% in 2005). (Table 5) Another 8% of private landowners described the location less precisely, but with obvious knowledge of the project. These respondents defined the boundaries as “behind the State Park in Colusa,” a “big chunk of river property in Princeton” and “from Princeton to Grimes.” Fewer said they didn’t know what the boundaries were (19%, down from 39% in 2005). However, the difference in knowledge of the project’s geographic boundaries between the two years is not statistically significant. Three-fourths of agency representatives correctly identified the project’s location. The other two (25%) used less precise phrasing, defining the project as “north of the State Park” and “along the river and the Colusa basin.

When asked directly whether they knew if the planning effort involved land inside the levee, outside the levee, or both, there was a significant shift in the 2008 landowners’ response. A similar percentage (50% vs. 58% in 2005) correctly thought the planning

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<sup>1</sup> During the interviewing process, the Sacramento River Conservation Area Forum was also referred to as the Forum.



effort involved only land inside the levees and fewer thought it involved both (22% vs. 35% in 2005). But more said they didn't know (28% vs. 0 in 2005). All of the respondents who had heard about the planning project in 2005 thought they knew the area involved. The fact that half of those surveyed in 2008 either didn't know that the project was restricted to areas inside the levee or believed erroneously that it involved land inside and outside the levee may help to explain the levels of frustration and fear expressed in the telephone interviews. Some respondents expressed concern that the project would eventually extend beyond the inner levee area. More of the agency personnel understood that the project was limited to land inside the levee, but there was no change in this understanding between the two surveys (83% in 2005 vs. 75% in 2008).

There were significant improvements among private landowners in their awareness of two agencies involved in the Colusa Subreach planning effort.<sup>ii</sup> (Table 7) Awareness of TNC's involvement increased from 23% in 2005 to 53% of private landowners in 2008. Significantly more private landowners also became aware of the Department of Parks and Recreation's (DPR) involvement in the planning process (up from 0 in 2005 to 17% in 2008). The trend in increased recognition was upward for several other agencies but the changes were not significant. For example, awareness of the California Department of Fish and Game's (DFG) involvement increased from 29% to 50%. The proportion identifying the California Department of Water Resources' (DWR) involvement increased from 13% to 33% while the proportion identifying the U.S. Fish and Wildlife Service (USFWS) increased from 16% to 19%. The proportion of agency personnel that recognized agencies participating in the planning project increased noticeably for DFG (from 50% to 100%) and DWR (from 17% to 63%). Due to the small number of agency representatives, however, none of these changes were significant.

Agencies most commonly thought to be involved in the planning project were the same in both years: private landowners mentioned the DFG and TNC more often than other agencies. In 2005, DFG was identified by 29% of the respondents and TNC by 23%; by 2008, recognition levels had increased to 50% for DFG and 53% for TNC. By the time of the post survey, involvement of the remaining agencies was recognized by less than half of the private landowners. The proportions identifying each involved agency were, in order of frequency: DWR (33%), USFWS (19%), DPR (17%), local reclamation and flood control districts (14%), and the Forum (6%).

In both years, more of the agency respondents identified the agencies involved in the planning project. By the time of the post survey, agency respondents identified participating agencies in the following order: DFG (100%), DWR (63%), USFWS (63%), DPR (38%), TNC (38%), the Forum (13%) and local reclamation and flood control districts (13%).

In 2008, a few respondents in both groups erroneously thought that the U.S. Army Corps of Engineers (USACE) was involved (19% among private landowners and 13% of agency respondents); and at least that many thought that cities and communities in the area (19% and 38% respectively) were involved as well. (Table 7a)

Respondents were also asked what agencies *should have been* involved in the planning effort. The only significant change in the respondents' view of the agencies that *should have been* involved in planning for wildlife habitat restoration was a feeling among six respondents that local districts responsible for levees and reclamation, flood control and irrigation should have been included. Inclusion of these agencies did not occur to either private landowners or agency personnel in 2005. In the same vein, one private landowner identified the Forum as an agency that also *should* be involved. Finally, in 2005, half of the respondents listed entities such as local organizations, landowners, or concerned citizens as other groups that should be actively involved in the planning for habitat restoration. Less than half that number (22%) mentioned these groups in 2008. (Table 7b)

### **Confidence and Trust in Agencies Involved**

Landowners were asked to indicate their level of confidence in the technical information provided by agencies. Using a one to ten scale where one is very little confidence and ten is a great deal of confidence, private landowners registered more confidence in information supplied by local irrigation and reclamation districts (ranked second in 2005 and first in 2008), the State Reclamation Board (SRB) (ranked third in 2005 and 2<sup>nd</sup> in 2008), and Colusa and Glenn County government, which dropped from first to third over the 3 year period. (Table 8) The change in trust levels for county government was the only one that was statistically significant. In 2008, respondents had above average (a mean of 5.5+) confidence in only two agencies: SRB (5.67) and local irrigation and reclamation districts (7.03). They were essentially neutral with respect to CDWR (5.36), USACE (5.06), USBR (4.89), CDFG (4.86), CDPR (4.8) and the USFWS (4.63). They had the least confidence in CALFED (3.35) and TNC (3.11).

The amount of confidence in information supplied by hydrologists, biologists and other scientists did not change significantly among either private landowners or agency personnel between 2005 and 2008. (Table 9) However, ten respondents commented that they had much less confidence in hydrologists than they did in biologists and other scientists. So, combining scientific specialties in this question obscured distinctions that were important to respondents.

Respondents were asked how objective they thought the planning effort would be in evaluating impacts of restoration on agriculture land. They used a 10 point scale with 1 being not at all objective and 10 being very objective. Neither group of respondents significantly changed their assessment of the Colusa Subreach Planning efforts' objectivity in evaluating the impacts of restoration on agricultural land – although the agency respondents' increased belief in its objectivity from 4.8 to 7.25 came close to significance ( $p = .060$ ). Landowners were unwavering in their lack of confidence in the objectivity of the Colusa Subreach Planning effort in evaluating the impacts of restoration on agricultural land (4.58 in 2005 vs. 4.28 in 2008).

Respondents were also asked how much influence they believe local landowners had in the planning process. For this item they used a 10 point scale with 1 being no influence at all and 10 being a great deal of influence. Agency personnel thought that local landowners and other local interests had above average influence in the planning

process for the Colusa Subreach (6.5 in 2008, up from 5.8 in 2005). Landowners, in contrast, were essentially neutral about their impact on the planning process in 2005, declining significantly in that assessment by 2008 (3.42 in 2008, down from 4.73 in 2005). (Table 9)

This outcome is consistent with frequent comments made in the 2005 interviews that, although respondents were hopeful the project would be objective and allow landowners a great deal of influence, they doubted that it would happen. After the project's conclusion, during the 2008 survey, many respondents voiced strong opinions about the planning process. The most common was a feeling of futility in having any real input on the planning process (20 responses). Respondents said that critical voices were stifled during meetings and sometimes the meetings were cut short. Landowner concerns were not addressed. These respondents felt that there was no point in attending the meetings since nothing landowners did or said seemed to make a difference. They expressed anger towards TNC and the Forum for continuing the planning process without landowner approval and participation.

### **Opinions about Wildlife Habitat Restoration**

Respondents were asked to describe their perceptions of the physical changes involved in wildlife habitat restoration. Roughly half (50% and 54%) of the landowners and most of the agency personnel (100% and 75%) were aware that planting native vegetation is part of habitat restoration (Table 10). Both groups of respondents were less aware that habitat restoration involved removing agricultural crops or orchards. The proportion of private landowners mentioning this feature of habitat restoration increased significantly from 19% in 2005 to 49% in 2008. The proportion of agency personnel mentioning this feature actually declined, from 40% to 25%. Many respondents (67% and 64% of landowners in 2005 and 2008 and 60% and 50% of agency personnel) described a number of other activities too diverse to categorize. These respondents may have misunderstood the question or were in general unaware of the activities involved. When respondents in 2005 were asked this question, many expressed the opinion that wildlife habitat restoration should not take place *at all*.

Respondents were asked about a variety of outcomes that might occur as a result of wildlife habitat restoration. (Table 11) In general, private landowners and agency personnel perceived different outcomes. The most likely expected outcomes for landowners tended to be the same in both years. Almost all landowners felt that there would be:

- increased involvement by state and federal agencies in the Colusa Subreach;
- reduced local control of agricultural-related activities;
- new regulations protecting endangered species and limiting agricultural activities.

Roughly three-fourths of all landowners thought that:

- tax income would decrease as private lands are purchased for public use
- wildlife population would increase
- deer and rodent damage to crops would increase
- more trespassing would occur

- increased public access would affect the privacy and safety of area residents.

Agency personnel tended to agree that wildlife habitat restoration will increase the involvement of state and federal agencies in the Colusa Subreach (100% in 2005 and 63% in 2008). They also agreed that tax income for local government would decrease (80% and 75% respectively), public access to land along the river would increase (100% and 63%), and the wildlife population would increase (100% in both years) as a result of habitat restoration.

Private landowners changed their minds about one possible outcome of habitat restoration. They were more apt to cite an increase in fish populations as a likely outcome in 2005 (49%) than they were in 2008 (21%). An increasing number said they wouldn't increase (47% in 2008 vs. 30% in 2005) or that it would depend (16% in 2008 vs. 4% in 2005).

Due to the small number of agency respondents, none of the changes in their perceptions of possible outcomes of habitat restoration were significant. However, agency respondents clearly tended to retreat from greater support of many outcomes in 2005 to greater uncertainty. On a number of outcomes, agency respondents moved from "yes" or "no" to a more nuanced "it depends" or "I don't know." For example, while 40% thought in 2005 that increased flooding would occur on private lands, none were of this opinion in 2008. Instead, half said that "it depends" while the other half said "no." In 2005, agency personnel thought that increased access would affect the safety of residents (80%); by 2008, 50% disagreed with this assessment and another 25% said "it depends." And while 60% of agency respondents thought in 2005 that species may be removed from the endangered list, only 25% thought that in 2008 and half said that "it depends." Finally, although a majority of agency respondents thought that the ability of farmers to take irrigation water from the river would not be negatively affected (60% and 63% said "no" in 2005 and 2008 respectively), fewer said "yes" and chose "it depends" or "I don't know" (13% each) instead. (Table 11)

During the course of the 2005 interviews, many respondents indicated that the potential outcomes of habitat restoration on agricultural land depend on the details of the restoration project. According to many respondents, restoration outcomes will depend on the types of vegetation that are planted, how close to crops they are planted, and how public lands are maintained. Many landowners commented that changes to public access would depend on whether conservancy groups allowed access to the land that is restored. There were also respondents who said that whether trespassing increases depends on how public lands are regulated. These questions prompted fewer responses in 2008. It is possible that those who would have made them were among those who refused to participate in the interview. The three respondents who elaborated on this series of outcomes expressed the feeling that the well being of local landowners and farmers should be considered before saving any more wildlife; a fear was expressed of intensifying the poverty level in this agricultural county. They also felt that agencies purchasing land to restore it disregarded assurances made to landowners and failed to maintain the property. Maintenance included removing snags from the river, cleaning fish screens, etc.

## Methods of Receiving Information and Communicating Concerns

In 2005, respondents were asked about the possible usefulness of ways the Forum and Nature Conservancy could provide information about the planning process to landowners in the area. In 2008, the question asked how useful these methods actually were. (Table 12). In 2005, five methods were rated as potentially useful by more than 80% of respondents:

- Mailing brief, issue-specific flyers. According to more than half of the respondents (53%), mailing frequent, brief, issue-specific flyers would be a very useful way to communicate needed information. Almost a third (34%) of respondents thought that that this method would be somewhat useful. (Table 12)
- Attending general informational public meetings. Almost half (45%) thought that attending general informational public meetings would be somewhat helpful while another 35% thought it would be very helpful. (Table 12)
- Providing opportunities to question experts on wildlife habitat restoration. Respondents indicated that the opportunity to speak with experts would be useful; 44% said that it would be very useful and 37% thought it would be somewhat useful. (Table 14)
- Establishing a community liaison or ombudsman to field questions from landowners and provide information about the planning process. Almost half (49%) of respondents thought it would be somewhat useful to establish a community liaison and 36% thought it would be very useful. (Table 14)
- Providing opportunities for site visits. Over half (54%) thought it would be somewhat useful to provide opportunities for site visits while another 29% said it would be very useful. (Table 14)

In 2005, then, there was clear consensus that placing board meeting minutes and other documents in the local library would be the least useful strategy. (Table 12) Nearly six out of ten respondents said it would be either less useful or not at all useful. Establishing a toll-free telephone information line was also seen as a relatively less useful method of communicating information to property owners (40%). (Table 14)

Five methods of communication remained the same on the 2005 and 2008 surveys. Two new methods were introduced after the first survey – attending a meeting for landowners whose property adjoined proposed restoration sites (Table 13); and four were not incorporated into the planning process – providing opportunities to question experts on wildlife habitat restoration, establishing a community liaison, providing opportunities for site visits and establishing a toll-free telephone information line (Table 14). Four of the five communication methods that were directly comparable between the two years showed a significant change in landowner assessment of their

usefulness. In all four instances, methods thought to be somewhat or very useful at the project's initiation were described as less or not at all useful at its conclusion. The four included:

- Attending general informational public meetings
- Attending issue-specific public meetings
- Receiving brief, meeting-specific flyers, and
- visiting the Colusa Subreach Planning website

Even the agency representatives agreed on the last item. While in 2005 100% of agency respondents thought that visiting the Colusa Subreach Planning website would be somewhat or very useful, 76% found in 2008 that this was less or not at all useful. However, agency personnel disagreed with landowners on the other three communication methods, with 63% to 88% finding them somewhat or very useful. Agency representatives also disagreed with landowners on the value of the newsletters. Between 50% and 63% found the two newsletters somewhat or very useful. (Table 12)

Landowners assessed newsletters in the same way they did the four communication methods summarized above. A test of significance was not computed because the 2005 statement asked about the usefulness of newsletters in general while the 2008 survey asked separately about the usefulness of receiving an annual Colusa Subreach Planning newsletter and a quarterly SRCAF newsletter. While 72% thought that newsletters would be somewhat or very useful in 2005, a similar percentage in 2008 found the two newsletters to be not at all or less useful. (Table 12)

A parallel situation occurred with respect to respondent assessments of the usefulness of placing Board minutes and other documents in the local library for easy public access. This general statement in the 2005 survey was separated into two in the 2008 survey, separating Board minutes from the Colusa Subreach Planning documents. While 40% of the landowners thought this might be somewhat or very useful in 2005, 95% felt that placing any documents in the library was not at all useful. Agency respondents were not enthusiastic about placing documents in libraries before or after the project. (Table 12)

Landowners differed in their assessment of the usefulness of the two methods of communication introduced after the 2005 survey. While most (87%) did not find attending Advisory Workgroup meetings useful, a third said that attending a meeting for landowners whose property adjoined the proposed restoration sites was somewhat or very useful. A little more than a third of agency personnel agreed with landowners on the value of this latter meeting. However, two-thirds also found that attending Advisory Workgroup meetings was useful – a view shared by only 13% of the landowners. (Table 13)

In 2005, respondents were also asked how likely they would be to use six different methods of relaying information to the Forum and Nature Conservancy. The least popular choices among private landowners were calling a toll-free number with comments and suggestions (46% thought it would be more or very likely) and submitting

emailed comments (47% thought this more or very likely). (Table 15) The four remaining methods of communicating with the Forum and Nature Conservancy were thought to be more or very likely by a majority of respondents:

- Participating in a community group to present landowner input. (68%)
- Making oral comments at public meetings. (57%)
- Submitting written comments. (55%)
- Participating in informal workshops sponsored by the Forum and Nature Conservancy (53%)

The four agency respondents were even less interested in calling a toll-free number – 100% said they were less likely to do so. Half of the agency respondents also indicated they were less likely to make comments at public meetings while most were comfortable with emailing comments. A majority agreed with private landowners on the remaining communication methods. (Table 15)

Table 16 summarizes the communication methods actually used by respondents during the course of the project. The most common methods utilized by private landowners were making oral comments at public meetings (46%) and participating in a community group to present landowner input (30%). Consistent with their professional affiliations, agency personnel were most apt to have submitted emailed comments (63%) or made oral comments at public meetings (63%). Private landowners and agency personnel differed significantly in their use of three methods of communicating with the Forum and Nature Conservancy. Agency personnel were much more likely than private landowners to have submitted emailed comments (63% vs. 8% among private landowners), submitted written comments (50% vs. 16%), and participated in informal workshops sponsored by the Forum and Nature Conservancy (50% vs. 14%).

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<sup>i</sup> Public Outreach Plan, Sacramento River Conservation Area Forum, 9/15/04.



ii The agencies involved included: the California Department of Fish and Game, the California Department of Parks and Recreation, the California Department of Water Resources, the U.S. Fish and Wildlife Service, The Nature Conservancy, the Sacramento River Conservation Area Forum, and local districts responsible for levees, reclamation, flood control, and irrigation. **Table Error! Main Document Only.: Dispositions for Property Owners in Study Area by Property Owner Type and Survey Year**

	2005 Survey			2008 Survey		
	Private Landowner	Public or Non-Profit Agency*	Total	Private Landowner	Public or Non-Profit Agency*	Total
No phone number available	24	0	24	21	0	21
Disconnected or wrong number	11	0	11	12	0	12
Sold land, unable to locate new owner	3	0	3	0	0	0
Property owners listed twice†	3	0	3	4	0	4
No answer	3	1	4	7	1	8
Left message, no response	19	2	21	24	0	24
Refused interview	12	0	12	22	0	22
Completed interview	53	6	59	39	8	47
Total	128	9	137	129	9	138

\* The Nature Conservancy (TNC) is one of the public/non-profit agencies who own property in the Colusa Subreach study area. Although TNC representatives were interviewed during both survey years, TNC responses were not included in the distributions described in this report. Since TNC responses were included in the 2005 report summarizing baseline survey responses, there will be slight differences between distributions in the 2005 and 2008 reports.

† The initial list of properties included property owners who each owned more than one property in the study area. The primary unit of analysis for this study is the property owner and one interview was conducted with each of these property owners.

**Table Error! Main Document Only.: Response Rates by Property Owner Type and Survey Year**

	2005 Survey			2008 Survey		
	Private Landowner	Public or Non-Profit Agency	Total	Private Landowner	Public or Non-Profit Agency	Total
Left message, no response	19	2	21	24	0	24
Refused interview	12	0	12	22	0	22
Completed interview	53	6	59	39	8	47
Total contacts	84	8	92	85	8	93
Response rate	63%	75%	64%	46%	100%	51%

**Table Error! Main Document Only.: Distribution of Property Owner Type by Survey Year**

	2005 Survey			2008 Survey		
	Private Landowner	Public or Non-Profit Agency	Total	Private landowner	Public or Non-Profit Agency	Total
Number of interviews conducted	54	6	60	39	8	47
Percent of interviews conducted	90%	10%	100%	83%	17%	100%

\* In general, when more than one person owned a property, the landowner most familiar with the management and uses of the property was interviewed. However, in 2005, for one property with multiple owners, a decision was made to conduct two separate interviews because

each owner (they were business partners) was familiar with different aspects of the management and uses of the property. This means that in 2005, 54 interviews were conducted with private landowners of 53 properties.

**Table Error! Main Document Only.: Property Characteristics by Property Owner Type and Survey Year**

		Private Landowner*				Public or Non-Profit Agency			
		Percentage		Number		Percentage		Number	
		2005	2008	2005	2008	2005	2008	2005	2008
Is your property by the river used for agricultural purposes?	Yes	72%	69%	38	27	33%	38%	2	3
	No	28%	31%	15	12	67%	63%	4	5
	Total	100%	100%	53	39	100%	100%	6	8
Do you farm it yourself or lease it to others? ‡	Farm it myself	61%	74%	23	20	--	--	--	--
	Lease it to others	34%	26%	13	7	--	--	--	--
	Both	5%	0%	2	0	--	--	--	--
	Total	100%	100%	38	27	--	--	--	--
Would you like to have the tenant/lessee contacted and interviewed in your place? ‡	Yes	13%	29%	2	2	--	--	--	--
	No	87%	71%	13	5	--	--	--	--
	Total	100%	100%	15	7	--	--	--	--
Where do you live? ‡	On the property	43%	38%	23	15	--	--	--	--
	Elsewhere in Glenn County	4%	5%	2	2	--	--	--	--
	Elsewhere in Colusa County	30%	18%	16	7	--	--	--	--
	Another California county	22%	36%	12	14	--	--	--	--
	Outside California	0%	0%	0	0	--	--	--	--
	Other†	2%	3%	1	1	--	--	--	--
	Total	100%	100%	54	39	--	--	--	--
Is any part of this property along the river in natural vegetation?	Yes	71%	72%	37	28	83%	100%	5	8
	No	29%	28%	15	11	17%	0%	1	0
	Total	100%	100%	52	39	100%	100%	6	8
How long have you owned the property along the river?	1-9 years	30%	23%	16	9	17%	14%	1	1
	10-25 years	34%	26%	18	10	17%	29%	1	2
	25+ years	36%	51%	19	20	67%	57%	4	4
	Total	100%	100%	53	39	100%	100%	6	7
Property size	Less than 10 acres	32%	36%	17	14	17%	13%	1	1
	10-99 acres	30%	31%	16	12	33%	38%	2	3
	100 or more acres	38%	33%	20	13	50%	50%	3	4
	Total	100%	100%	53	39	100%	100%	6	8

\* Because this table describes property characteristics, the property for which two private landowners were interviewed in 2005 has been included only once, for a total of 53 privately owned properties. Subsequent tables describing landowner responses will include both owners, which brings the total number of private landowners to 54.

† One 2005 respondent said they live halftime in Orange County. One 2008 respondent said they live halftime in Colusa County.

‡ These questions were only asked during interviews with private landowners.

**Table 5: Awareness of Sacramento River Conservation Area Forum, The Nature Conservancy and the Colusa Subreach Planning Project by Property Owner Type and Survey Year**

		Private Landowner				Public or Non-Profit Agency			
		Percentage		Number		Percentage		Number	
		2005	2008	2005	2008	2005	2008	2005	2008
Have you heard of the Sacramento River Conservation Area Forum?	Yes	57%	82%	31	32	100%	100%	6	8
	No	39%	5%	21	2	0%	0%	0	0
	Not sure	4%	13%	2	5	0%	0%	0	0
		100	100			100	100		
	Total	%	%	54	39	%	%	6	8
Do you currently receive the Forum's newsletter?	Yes	55%	72%	16	26	67%	75%	4	6
	No	45%	28%	13	10	33%	25%	2	2
	Total	100	100			100	100		
Have you heard of The Nature Conservancy? †	Yes	--	90%	--	35	--	%	--	8
	No	--	3%	--	1	--	0%	--	0
	Not sure	--	8%	--	3	--	0%	--	0
			100				100		
	Total	--	%	--	39	--	%	--	8
Have you heard of the Colusa Subreach planning effort to develop strategies for wildlife habitat restoration along the Sacramento River?	Yes	57%	92%	31	36	100%	100%	6	8
	No (skip to q14)	37%	5%	20	2	0%	0%	0	0
	Not sure (skip to q14)	6%	3%	3	1	0%	0%	0	0
		100	100			100	100		
	Total	%	%	54	39	%	%	6	8
Could you describe what the geographic boundaries are for the planning effort?	Princeton to Colusa	29%	47%	9	17	50%	75%	3	6
	Inside the flood control levees	0%	3%	0	1	0%	13%	0	1
	The whole Sacramento River	3%	8%	1	3	0%	13%	0	1
	Other	29%	25%	9	9	17%	25%	1	2
	Don't Know	39%	19%	12	7	33%	0%	2	0
	Total			31	36			6	8
Do you know whether the planning effort involves	Inside the levee	58%	50%	18	18	83%	75%	5	6
	Outside the levee	3%	0%	1	0	0%	0%	0	0

Both inside and outside									
the levee	35%	22%	11	8	17%	25%	1	2	
Don't know	0%	28%	0	10	0%	0%	0	0	
Other	3%	0%	1	0	0%	0%	0	0	
		100	100			100	100		
Total	%	%	31	36	%	%	6	8	

\* Shaded table areas indicate that there is a statistically significant difference between 2005 and 2008 responses, controlling for property owner type. Throughout all the tables, unshaded table areas indicate that no statistically significant difference was found between 2005 and 2008 responses within property owner type. Tests of significance for nominal variables (those for which percent distributions are shown) were run using Chi-Square. Tests of significance for interval/ordinal level variables (those for which mean values are shown) were run using one-way analysis of variance.

† Significance levels are, in order:  $\leq .001$ , .001 and .020.

‡ This question was not included in the 2005 survey.

**Table 6: Perceptions of SRCAF and TNC by Property Owner Type and Survey Year**

		Private Landowner		Public or Non-Profit Agency	
		2005	2008	2005	2008
Overall perception of the Forum*	Mean	4.77	4.1	6.5	6.13
	Standard Deviation	2.57	2.68	2.17	1.25
	Number	30	30	6	8
Overall perception of TNC	Mean	--	3.49	--	6.69
	Standard Deviation	--	2.69	--	2.52
	Number	--	35	--	8

\* Only respondents that said they had heard of the SRCAF and TNC were asked follow up questions regarding overall perceptions of both SRCAF and TNC. Table 6 is reflective of those findings.

**Table 7a: Perceptions Regarding Agencies and/or Non Governmental Entities that Are involved in the Colusa Subreach Planning Project by Property Owner Type and Survey Year**

		Private Landowner				Public or Non-Profit Agency			
		Percentage		Number		Percentage		Number	
Do you know what agencies are involved in the Colusa Subreach planning effort?	<i>Agencies Involved In The Planning Project</i>	2005	2008	2005	2008	2005	2008	2005	2008
	The Nature Conservancy	23%	53%	7	19	33%	38%	2	3
	California Department of Fish and Game	29%	50%	9	18	50%	100%	3	8

California Department of Water Resources	13%	33%	4	12	17%	63%	1	5
U.S. Fish and Wildlife Service	16%	19%	5	7	83%	63%	5	5
California Department of Parks and Recreation†	0%	17%	0	6	50%	38%	3	3
Local districts responsible for levees and reclamation, flood control and drainage, resource conservation, and irrigation water	13%	14%	4	5	17%	13%	1	1
SRCAF	10%	6%	3	2	0	13%	0	1
<i>Agencies Not Involved In The Planning Project</i>								
	2005	2008	2005	2008	2005	2008	2005	2008
Cities and communities in the area	3%	19%	1	7	17%	38%	1	3
U.S. Army Corps of Engineers	0%	19%	0	7	0%	13%	0	1
State Reclamation Board	10%	14%	3	5	17%	13%	1	1
Boards of Supervisors in Colusa and/or Glenn County	3%	17%	1	6	17%	63%	1	5
U.S. Bureau of Reclamation	6%	8%	2	3	17%	0%	1	0
CALFED	3%	6%	1	2	17%	0%	1	0
Other	13%	31%	4	11	33%	50%	2	4
Total			31	36			6	8

\* Significance levels are, in order  $\leq .023$ , .027, .013.

† Percentages do not sum to 100% because categories are not mutually exclusive.

**Table 7b: Perceptions Regarding Agencies and/or Non Governmental Entities that *Are Not* involved in the Colusa Subreach Planning Project by Property Owner Type and Survey Year**

Are there other federal, state, local or non governmental agencies you feel should have been involved in planning for wildlife habitat restoration in the Colusa Subreach?		Private Landowner				Public or Non-Profit Agency			
		Percentage		Number		Percentage		Number	
	<i>Agencies Involved In The Planning Project</i>	2005	2008	2005	2008	2005	2008	2005	2008
	The Nature Conservancy	0%	0%	0	0	0%	0%	0	0
	California Department of Fish and Game	2%	3%	1	1	17%	0%	1	0
	California Department of Water Resources	0%	0%	0	0	0%	0%	0	0
	U.S. Fish and Wildlife Service	0%	0%	0	0	0%	0%	0	0
	California Department of Parks and Recreation	0%	0%	0	0	0%	0%	0	0

Local districts responsible for levees and reclamation, flood control and drainage, resource conservation, and irrigation water	0%	17%	0	6	0%	13%	0	1
SRCAF	0%	3%	0	1	0%	0%	0	0
<i>Agencies Not Involved In The Planning Project</i>								
	2005	2008	2005	2008	2005	2008	2005	2008
Cities and communities in the area	4%	14%	2	5	17%	0%	1	0
U.S. Army Corps of Engineers	2%	6%	1	2	17%	13%	1	1
State Reclamation Board	2%	3%	1	1	0%	25%	0	2
Boards of Supervisors in Colusa and/or Glenn County	7%	6%	4	2	0%	0%	0	0
U.S. Bureau of Reclamation	0%	0%	0	0	0%	0%	0	0
CALFED	0%	0%	0	0	0%	0%	0	0
Other	50%	19%	27	7	100%	38%	6	3
Total			31	36			6	8

\* Significance level  $p \leq .003$ .

† Percentages do not sum to 100% because categories are not mutually exclusive.

**Table 8: Confidence in Technical Information Provided by Agencies by Property Owner Type and Survey Year**

Confidence in technical information on the environmental impact of wildlife habitat restoration provided by		Private Landowner		Public or Non-Profit Agency	
		2005	2008	2005	2008
Local Irrigation or Reclamation Districts	Mean	6.43	7.03	5.00	6.57
	Standard Deviation	2.51	2.61	2.35	1.90
	Number	49	30	5	7
State Reclamation Board	Mean	6.27	5.67	5.40	6.86
	Standard Deviation	2.69	2.72	1.95	2.27
	Number	41	33	5	7
Colusa and Glenn County Governments	Mean	7.04	5.44	5.00	6.29
	Standard Deviation	2.32	2.41	2.55	1.50
	Number	45	36	5	7
California Department of Water Resources	Mean	5.88	5.36	6.80	7.50
	Standard Deviation	2.84	2.55	1.79	1.93
	Number	49	36	5	8

U.S. Army Corps of Engineers	Mean	5.51	5.06	6.00	6.50
	Standard				
	Deviation	3.05	3.01	1.87	2.00
	Number	47	35	5	8
U.S. Bureau of Reclamation	Mean	5.68	4.89	4.60	6.67
	Standard				
	Deviation	2.59	2.39	2.30	2.42
	Number	41	35	5	6
California Department of Fish and Game	Mean	5.75	4.86	7.60	6.63
	Standard				
	Deviation	2.95	2.53	1.95	2.72
	Number	51	37	5	8
California Department of Parks and Recreation	Mean	5.43	4.80	6.80	7.13
	Standard				
	Deviation	2.55	2.49	3.11	1.96
	Number	47	35	5	8
U.S. Fish and Wildlife Service	Mean	5.04	4.63	7.00	6.25
	Standard				
	Deviation	3.07	2.79	2.92	2.71
	Number	45	35	5	8
CALFED	Mean	3.36	3.35	6.60	6.83
	Standard				
	Deviation	2.42	2.41	2.07	2.48
	Number	28	20	5	6
The Nature Conservancy	Mean	--	3.11	--	7.13
	Standard				
	Deviation	--	2.74	--	2.70
	Number	0	37	0	8

\* Significance level  $\leq .003$ .

**Table 9: Confidence and Trust in the Colusa Subreach Planning Project by Property Owner Type and Survey Year**

		Private Landowner		Public or Non-Profit Agency	
		2005	2008	2005	2008
Confidence in info supplied by hydrologists, biologists, and other scientists	Mean	6.07	5.23	7.4	7.63
	Standard				
	Deviation	2.74	2.60	1.82	1.85
	Number	46	35	5	8
How objective the Colusa Subreach Planning effort was in evaluating the impacts of	Mean	4.58	4.28	4.8	7.25
	Standard				
	Deviation	2.79	2.99	2.59	1.67



	Number	45	25	5	8
Influence of local landowners and other local interest in Colusa Subreach Planning process	Mean	4.73	3.42	5.8	6.5
	Standard Deviation	2.96	2.48	3.03	2.88
	Number	52	38	5	8

\* Significance level  $\leq .029$

**Table 10: Perceptions of Physical Changes Involved in Wildlife Habitat Restoration by Property Owner Type and Survey Year**

What physical changes do you think are involved in wildlife habitat restoration?	Private Landowner				Public or Non-Profit Agency			
	Percentage		Number		Percentage		Number	
	2005	2008	2005	2008	2005	2008	2005	2008
Planting native vegetation	50%	54%	27	21	100%	75%	5	6
Removing any agricultural crops or orchards	19%	49%	10	19	40%	25%	2	2
Removing bank protection	0%	0%	0	0	20%	0%	1	0
Changing adjacent levees	2%	3%	1	1	0%	0%	0	0
Other	67%	64%	36	25	60%	50%	3	4
Total			54	39			5	8

\* Significance level  $\leq .004$

**Table 11: Perceptions Regarding Possible Outcomes of Habitat Restoration by Property Owner Type and Survey Year**

		Private Landowner				Public or Non-Profit Agency			
		Percentage		Number		Percentage		Number	
		2005	2008	2005	2008	2005	2008	2005	2008
Agricultural income on adjoining land will decrease	Yes	60%	66%	32	25	60%	38%	3	3
	No	23%	21%	12	8	40%	50%	2	4
	It depends	13%	13%	7	5	0%	13%	0	1
	I don't know	4%	0%	2	0	0%	0%	0	0
	Total	100%	100%	53	38	100%	100%	5	8
Agricultural land will be more difficult to lease	Yes	60%	58%	32	22	40%	25%	2	2
	No	26%	29%	14	11	40%	38%	2	3
	It depends	9%	5%	5	2	20%	38%	1	3
	I don't know	4%	8%	2	3	0%	0%	0	0
	Total	100%	100%	53	38	100%	100%	5	8
Tax income for local government will decrease as private lands are purchased for public use	Yes	74%	76%	39	29	80%	75%	4	6
	No	23%	8%	12	3	20%	13%	1	1
	It depends	0%	13%	0	5	0%	13%	0	1
	I don't know	4%	3%	2	1	0%	0%	0	0
	Total	100%	100%	53	38	100%	100%	5	8
Property values will decrease	Yes	47%	47%	25	18	20%	25%	1	2
	No	34%	29%	18	11	60%	63%	3	5
	It depends	11%	18%	6	7	20%	13%	1	1

	I don't know	8%	5%	4	2	0%	0%	0	0
	Total	100%	100%	53	38	100%	100%	5	8
Wildlife populations will increase	Yes	68%	76%	36	29	100%	100%	5	8
	No	19%	11%	10	4	0%	0%	0	0
	It depends	6%	13%	3	5	0%	0%	0	0
	I don't know	8%	0%	4	0	0%	0%	0	0
	Total	100%	100%	53	38	100%	100%	5	8
Fish populations will increase	Yes	49%	21%	26	8	80%	38%	4	3
	No	30%	47%	16	18	0%	0%	0	0
	It depends	4%	16%	2	6	0%	38%	0	3
	I don't know	17%	16%	9	6	20%	25%	1	2
	Total	100%	100%	53	38	100%	100%	5	8
Hunting and fishing activities will become a more important source of revenue for the local economy	Yes	30%	24%	16	9	100%	50%	5	4
	No	55%	61%	29	23	0%	25%	0	2
	It depends	6%	16%	3	6	0%	25%	0	2
	I don't know	9%	0%	5	0	0%	0%	0	0
	Total	100%	100%	53	38	100%	100%	5	8

\* Significance level  $\leq .012$

**Table 11: Perceptions Regarding Possible Outcomes of Habitat Restoration by Property Owner Type and Survey Year (continued)**

		Private Landowner				Public or Non-Profit Agency			
		Percentage		Number		Percentage		Number	
		2005	2008	2005	2008	2005	2008	2005	2008
Recreation related uses may become a greater source of supplemental income for farmers	Yes	23%	13%	12	5	80%	50%	4	4
	No	69%	74%	36	28	20%	25%	1	2
	It depends	4%	11%	2	4	0%	25%	0	2
	I don't know	4%	3%	2	1	0%	0%	0	0
	Total	100%	100%	52	38	100%	100%	5	8
Increased flooding will occur on private lands in the subreach	Yes	55%	66%	29	25	40%	0%	2	0
	No	28%	16%	15	6	60%	50%	3	4
	It depends	9%	13%	5	5	0%	50%	0	4
	I don't know	8%	5%	4	2	0%	0%	0	0
	Total	100%	100%	53	38	100%	100%	5	8
Insect damage to agricultural crops will increase	Yes	62%	53%	33	20	40%	25%	2	2
	No	26%	32%	14	12	60%	38%	3	3
	It depends	4%	16%	2	6	0%	13%	0	1
	I don't know	8%	0%	4	0	0%	25%	0	2
	Total	100%	100%	53	38	100%	100%	5	8
Deer and rodent damage to agricultural crops will increase	Yes	75%	76%	40	29	60%	38%	3	3
	No	15%	16%	8	6	40%	13%	2	1
	It depends	6%	8%	3	3	0%	38%	0	3
	I don't know	4%	0%	2	0	0%	13%	0	1
	Total	100%	100%	53	38	100%	100%	5	8
More trespassing will occur on private property	Yes	72%	71%	38	27	60%	50%	3	4
	No	13%	13%	7	5	40%	38%	2	3
	It depends	11%	16%	6	6	0%	13%	0	1

	I don't know	4%	0%	2	0	0%	0%	0	0
	Total	100%	100%	53	38	100%	100%	5	8
Public access to land	Yes	60%	65%	31	24	100%	63%	5	5
along the river will increase	No	29%	24%	15	9	0%	13%	0	1
	It depends	10%	11%	5	4	0%	25%	0	2
	I don't know	2%	0%	1	0	0%	0%	0	0
	Total	100%	100%	52	37	100%	100%	5	8
Public access to land	Yes	23%	22%	12	8	0%	13%	0	1
along the river will	No	73%	65%	38	24	100%	63%	5	5
decrease	It depends	4%	14%	2	5	0%	25%	0	2
	Total	100%	100%	52	37	100%	100%	5	8

**Table 11: Perceptions Regarding Possible Outcomes of Habitat Restoration by Property Owner Type and Survey Year (continued)**

		Private Landowner				Public or Non-Profit Agency			
		Percentage		Number		Percentage		Number	
		2005	2008	2005	2008	2005	2008	2005	2008
Increased public access	Yes	74%	84%	39	31	80%	25%	4	2
will affect the privacy and	No	19%	16%	10	6	20%	50%	1	4
safety of area residents	It depends	4%	0%	2	0	0%	25%	0	2
	I don't know	4%	0%	2	0	0%	0%	0	0
	Total	100%	100%	53	37	100%	100%	5	8
Some species may be	Yes	28%	27%	15	10	60%	25%	3	2
removed from threatened	No	57%	38%	30	14	40%	25%	2	2
and endangered list	It depends	6%	24%	3	9	0%	50%	0	4
	I don't know	9%	11%	5	4	0%	0%	0	0
	Total	100%	100%	53	37	100%	100%	5	8
Agricultural activities will	Yes	81%	89%	43	33	40%	38%	2	3
be limited by new	No	15%	8%	8	3	40%	50%	2	4
regulations protecting	It depends	2%	3%	1	1	20%	13%	1	1
endangered species	I don't know	2%	0%	1	0	0%	0%	0	0
	Total	100%	100%	53	37	100%	100%	5	8
The ability of farmers to	Yes	63%	76%	33	28	40%	13%	2	1
take irrigation water from	No	25%	16%	13	6	60%	63%	3	5
the river will decrease	It depends	0%	8%	0	3	0%	13%	0	1
	I don't know	12%	0%	6	0	0%	13%	0	1
	Total	100%	100%	52	37	100%	100%	5	8
Wildlife habitat restoration	Yes	87%	86%	46	32	100%	63%	5	5
will increase involvement	No	8%	5%	4	2	0%	25%	0	2
of state and federal	It depends	0%	3%	0	1	0%	13%	0	1
agencies in the Colusa	I don't know	6%	5%	3	2	0%	0%	0	0
Subreach	Total	100%	100%	53	37	100%	100%	5	8
Increasing involvement by	Yes	79%	89%	42	33	40%	25%	2	2
state and federal agencies	No	15%	8%	8	3	60%	50%	3	4
will reduce local control of	It depends	2%	3%	1	1	0%	25%	0	2

I don't know	4%	0%	2	0	0%	0%	0	0
Total	100%	100%	53	37	100%	100%	5	8

**Table 12: Usefulness of Original Methods of Receiving Communications from the Forum and Nature Conservancy by Property Owner Type and Survey Year**

		Private Landowner				Public or Non-Profit Agency			
		Percentage		Number		Percentage		Number	
		2005	2008	2005	2008	2005	2008	2005	2008
Attending general informational public meetings	Not at all useful	15%	50%	8	19	0%	0%	0	0
	Less useful	4%	16%	2	6	20%	13%	1	1
	Somewhat useful	45%	26%	24	10	60%	38%	3	3
	Very useful	36%	8%	19	3	20%	50%	1	4
		100	100			100	100		
	Total	%	%	53	38	%	%	5	8
Attending issue-specific public meetings	Not at all useful	16%	55%	8	21	0%	0%	0	0
	Less useful	12%	18%	6	7	20%	13%	1	1
	Somewhat useful	45%	18%	23	7	80%	25%	4	2
	Very useful	27%	8%	14	3	0%	63%	0	5
		100	100			100	100		
	Total	%	%	51	38	%	%	5	8
Receiving brief, meeting-specific flyers	Not at all useful	9%	50%	5	19	0%	25%	0	2
	Less useful	4%	26%	2	10	20%	13%	1	1
	Somewhat useful	34%	13%	18	5	20%	50%	1	4
	Very useful	53%	11%	28	4	60%	13%	3	1
		100	100			100	100		
	Total	%	%	53	38	%	%	5	8
News-letters Mailing in-frequent more comprehensive newsletters	Not at all useful	11%	--	6	--	0%	--	0	--
	Less useful	17%	--	9	--	20%	--	1	--
	Somewhat useful	51%	--	27	--	60%	--	3	--
	Very useful	21%	--	11	--	20%	--	1	--
		100	--			100	--		
	Total	%	--	53	--	%	--	5	--
Receiving annual Colusa Subreach Planning newsletters	Not at all useful	--	50%	--	19	--	25%	--	2
	Less useful	--	16%	--	6	--	25%	--	2
	Somewhat useful	--	21%	--	8	--	38%	--	3
	Very useful	--	13%	--	5	--	13%	--	1

		100				100			
Total		--	%	--	38	--	%	--	8
Receiving quarterly	Not at all useful	--	51%	--	19	--	13%	--	1
Sacramento River	Less useful	--	22%	--	8	--	25%	--	2
Conservation Area	Somewhat								
Forum newsletters	useful	--	19%	--	7	--	50%	--	4
	Very useful	--	8%	--	3	--	13%	--	1
Total		--	%	--	37	--	%	--	8
Newspaper articles	Not at all useful	19%	45%	10	17	0%	25%	0	2
	Less useful	19%	16%	10	6	0%	38%	0	3
	Somewhat								
	useful	40%	26%	21	10	80%	38%	4	3
	Very useful	23%	13%	12	5	20%	0%	1	0
Total		100	100	53	38	100	100	5	8
		%	%			%	%		
Visiting the Colusa Subreach	Not at all useful	26%	92%	14	35	0%	38%	0	3
Planning website	Less useful	13%	5%	7	2	0%	38%	0	3
	Somewhat								
	useful	36%	3%	19	1	40%	0%	2	0
	Very useful	25%	0%	13	0	60%	25%	3	2
Total		100	100	53	38	100	100	5	8
		%	%			%	%		

\* Significance levels are, in order: .000, .000, .000, .000, .021.

**Table 12: Usefulness of Original Methods of Receiving Communications from the Forum and Nature Conservancy by Property Owner Type and Survey Year (continued)**

			Private Landowner				Public or Non-Profit Agency			
			Percentage		Number		Percentage		Number	
			2005	2008	2005	2008	2005	2008	2005	2008
Local library	Placing Board	Not at all useful	34%	--	18	--	20%	--	1	--
	minutes and other	Less useful	25%	--	3	--	60%	--	3	--
	documents in the	Somewhat								
	local library for easy	useful	36%	--	19	--	20%	--	1	--
	public access	Very useful	6%	--	3	--	0%	--	0	--
Total			100	--	53	--	100	--	5	--
			%				%			
Board minutes and other documents in the local library	Not at all useful	--	95%	--	36	--	--	63%	--	5
	Less useful	--	3%	--	1	--	--	25%	--	2
	Somewhat									
	useful	--	3%	--	1	--	--	0%	--	0
	Very useful	--	0%	--	0	--	--	13%	--	1

			100		100	
	Total	--	%	--	%	8
Accessing Colusa	Not at all useful	--	95%	--	75%	6
Subreach Planning	Less useful	--	3%	--	13%	1
documents in	Somewhat					
the local library	useful	--	3%	--	0%	0
	Very useful	--	0%	--	13%	1
			100		100	
	Total	--	%	--	%	8

† In 2005, respondents were asked to describe how useful they *expected* these methods would be in providing information to landowners in the area. In 2008, respondents were asked to evaluate how useful they thought these methods *actually turned out to be* in providing information to landowners. Wherever possible, question wording was kept consistent to permit comparisons across survey years. However, in order to describe the way that newsletters and library resources were ultimately incorporated into the planning process, 2008 interview question wording regarding these methods was modified somewhat. This table shows responses to both versions of the questions on these methods.

**Table 13: Usefulness of New Methods of Receiving Communications from the Forum and Nature Conservancy by Property Owner Type, 2008 Only**

		2008 Private Landowner		2008 Public or Non-Profit Agency	
		Percentage	Number	Percentage	Number
Attending a meeting for landowners whose property adjoined proposed restoration sites	Not at all useful	53%	20	13%	1
	Less useful	13%	5	50%	4
	Somewhat useful	21%	8	13%	1
	Very useful	13%	5	25%	2
	Total	100%	38	100%	8
Attending Advisory Workgroup meetings	Not at all useful	71%	27	13%	1
	Less useful	16%	6	25%	2
	Somewhat useful	8%	3	13%	1
	Very useful	5%	2	50%	4
	Total	100%	38	100%	8

† Two additional communication methods (attending a meeting for landowners whose property adjoined proposed restoration sites and attending Advisory Workgroup meetings) not included in the 2005 interview were incorporated into the planning process. Questions were added to the 2008 interview to solicit feedback on these methods. Respondents' evaluations of these methods are presented in Table 13.

**Table 14: Usefulness of Discarded Methods of Receiving Communications from the Forum and Nature Conservancy by Property Owner Type, 2005 Only**

		2005 Private Landowner		2005 Public or Non-Profit Agency	
		Percentage	Number	Percentage	Number
Provide opportunities to question experts on wildlife habitat restoration*	Not at all useful	14%	7	0%	0
	Less useful	6%	3	0%	0
	Somewhat useful	37%	19	75%	3
	Very useful	44%	23	25%	1

	Total	100%	52	100%	4
Establishing a community liaison	Not at all useful	4%	2	0%	0
	Less useful	11%	6	20%	1
	Somewhat useful	49%	26	40%	2
	Very useful	36%	19	40%	2
	Total	100%	53	100%	5
Provide opportunities for site visits	Not at all useful	15%	8	0%	0
	Less useful	2%	1	0%	0
	Somewhat useful	54%	28	75%	3
	Very useful	29%	15	25%	1
	Total	100%	52	100%	4
Establishing a toll-free telephone information line*	Not at all useful	23%	12	0%	0
	Less useful	17%	9	40%	2
	Somewhat useful	42%	22	60%	3
	Very useful	17%	9	0%	0
	Total	100%	52	100%	5

\* Percentages may not sum to 100 due to rounding

† Four potential methods asked about in the 2005 interview were not incorporated into the planning process and questions about these methods were dropped from the 2008 interview. In order to present a comprehensive evaluation of all potential methods, ratings for these methods are shown in Table 14.

**Table 15: Likelihood of Using Specific Methods to Communicate Information to the Forum and The Nature Conservancy, 2005 Survey**

		2005 Private Landowner		2005 Public or Non-Profit Agency	
		Percentage	Number	Percentage	Number
Making oral comments at public meetings	Not at all likely	13%	7	0%	0
	Less likely	30%	16	50%	2
	More likely	23%	12	50%	2
	Very likely	34%	18	0%	0
	Total	100%	53	100%	4
Participating in a community group to present landowner input	Not at all likely	17%	9	0%	0
	Less likely	15%	8	0%	0
	More likely	38%	20	100%	1
	Very likely	30%	16	0%	0
	Total	100%	53	100%	4
Submitting written comments	Not at all likely	17%	9	0%	0
	Less likely	28%	15	0%	0
	More likely	30%	16	50%	2



	Very likely	25%	13	50%	2
	Total	100%	53	100%	4
Submitting e-mailed comments	Not at all likely	36%	19	0%	0
	Less likely	17%	9	25%	1
	More likely	28%	15	75%	3
	Very likely	19%	10	0%	0
	Total	100%	53	100%	4
Participating in informal workshops sponsored by the Forum and The Nature Conservancy	Not at all likely	23%	12	0%	0
	Less likely	25%	13	25%	1
	More likely	30%	16	75%	3
	Very likely	23%	12	0%	0
	Total	100%	53	100%	4
Calling a toll-free number with comments and suggestions	Not at all likely	21%	11	0%	0
	Less likely	34%	18	100%	4
	More likely	25%	13	0%	0
	Very likely	21%	11	0%	0
	Total	100%	53	100%	4

\* Percentage may not sum to 100 due to rounding.

† In 2005, respondents were asked to describe how useful they *expected* these methods of communication would be in providing information to the Forum and to the The Nature Conservancy. In 2008, respondents were asked if they *actually utilized* these methods. Table 16 shows what methods of communication were utilized by respondents in 2008.

**Table 16: Actual Methods of Communication used by Respondents during the Colusa Subreach Planning Project, 2008 Survey**

		2008 Private Landowner		2008 Public or Non-Profit Agency	
		Percentage	Number	Percentage	Number
Submitted written comments	Yes	16%	6	50%	4
	No	84%	31	50%	4
	Total	100%	37	100%	8
Submitted emailed comments	Yes	8%	3	63%	5
	No	92%	34	38%	3
	Total	100%	37	100%	8
Made oral comments at public meetings	Yes	46%	17	63%	5
	No	54%	20	38%	3
	Total	100%	37	100%	8
Participated in informal workshops sponsored by the Forum and The Nature Conservancy	Yes	14%	5	50%	4
	No	87%	32	50%	4
	Total	100%	37	100%	8
Calling a toll-free number with comments and	Yes	0%	0	0%	0
	No	100%	37	100%	8

	Total	100%	37	100%	8
Participated in a community group to present landowner input	Yes	30%	11	25%	2
	No	70%	26	75%	6
	Total	100%	37	100%	8

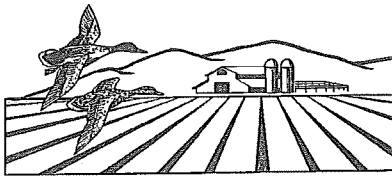
\* Percentages may not sum to 100 due to rounding

† Fischer's Exact Test significance levels are, in order, .059, .002 and .039.

## **APPENDIX J**

### **Comments to the Draft Colusa Subreach Planning Report**

The Draft Colusa Subreach Planning Report was circulated for stakeholder comments. The findings of that survey were released in May of 2008. One written response was received from Ashley Indrieri, the Executive Director of the Family Water Alliance. The text of Ms. Indrieri's comments and the response provided to them are contained in this Appendix



**FWA**  
*Family Water Alliance*

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"Every Day is Earth Day on the Farm"

P. O. Box 365, Maxwell, California 95955

July 2, 2008

Gregg Werner  
The Nature Conservancy  
500 Main Street  
Chico, CA 95928

**RE: Colusa Subreach Planning Report Comments**

Dear Gregg,

On behalf of the Family Water Alliance (FWA), I write to provide the following comments on the Colusa Subreach Planning Report (the Report).

As you know, FWA has been actively involved in the Colusa Subreach Planning process and the Sacramento River Conservation Area Forum (SRCAF) for many years. FWA serves as a grassroots voice for the protection of water rights, private property rights and the sustainability of agriculture in the Central Valley of California. We have attended many local meetings and presentations and I have even met with you personally about Colusa Subreach planning efforts.

The following is a list of our concerns with the Report:

1. The Good Neighbor Policy (GNP) is mentioned in the Report on many different occasions as a solution to neighboring landowner concerns. While the GNP was adopted in March of 2007, it was not supported by the Colusa County Public Interest Representative Gary Evans, Glenn County Public Interest Representative John Amaro or the Glenn County Landowner Representative Don Anderson. On page 121 of the report it does not adequately state the concerns that Colusa and Glenn County representatives had with the GNP. Reflected in the March 15, 2007 minutes for the SRCAF Board of Directors meeting Supervisor Gary Evans made the following statement;

"...It is time we stop playing games, it is time we stop giving the landowners lip service, it is time we stop acquiescing only to the environmental agenda, and it is time we stop reflecting in our newsletters and minutes that all is well, it is not. We are perpetrating fraud on the public by not reflecting openly and honestly the concerns and grievances within our Forum.

The Board and staff of the SRCAF have not done their part in advocating for real and tangible landowner assurances. It pains me once again to state that the current language as written is still nothing more than a policy paper outlining a process that will be set into practice on how the Forum will conduct itself. This language does nothing to provide true assurances for private landowners, while at the same time exempting State and Federal landowners from participating in local processes..."

It is important to stress that Colusa and Glenn Counties does not support the policy that is being used to provide landowner assurances to the local communities which would be impacted by the proposed Colusa Subreach restoration projects. The minutes from the March 15, 2007 SRCAF Board meeting should be added as an appendix to the report, including Supervisor Gary Evans' comments in their entirety.

2. In the landowner survey it was noted that many landowners were "frustrated" with the planning process and had concerns over local representatives withdrawing from the planning process. After the eight members of the Advisory Committee withdrew, only one agricultural interest was left on the committee. The rest of the committee consisted of state and federal agencies staff, SRCAF staff and TNC staff.
3. Throughout the entire Colusa Subreach Planning process the agricultural community as well as local County government, has expressed opposition to the plan. Through Resolutions and letters it has been made very clear that locals are not in favor of the Colusa Subreach Planning. The support has come from state and federal agency personnel and the project proponents, not the community that the projects will affect.
4. Also of great concern are the fiscal impacts stated in the Report. While the impacts to the Colusa and Glenn County budgets may seem small, to rural counties the impacts are actually much greater. Rural agricultural communities have a difficult time providing necessary general services to the public. While it may only be thousands of dollars that could provide salary and services to a community that is in desperate need of additional tax revenue. Waiting for the state and federal government to appropriate Payment In-Lieu Taxes in an unacceptable solution.
5. The Ward tract was included in the Colusa Subreach planning process. The tract was used for the Tisdale Bypass mitigation is a great example of what types of restoration activities the local community

would support. The sediment removal project directly impacted the Colusa County region and the project provided much needed flood protection for the area. Had the local community been asked they most likely would have supported the Ward Tract restoration because of the increased public safety provided.

The above comments to the Colusa Subreach Planning Report are respectfully submitted on behalf of the Family Water Alliance.

In conclusion, I would like to reiterate FWA's concerns with the Report regarding the lack of local support. Further, FWA is wholly opposed to the Colusa Subreach proposed restoration and we have voiced our opposition in many meetings and through other correspondence.

Sincerely,



Ashley D. Indrieri  
Executive Director

Cc:  
FWA Board of Directors  
Congressman Wally Herger  
Senator Sam Aanestad  
Assemblyman Doug LaMalfa  
Colusa County Board of Supervisors  
Glenn County Board of Supervisors

July 25, 2008

Ashley Indrieri, Executive Director  
Family Water Alliance  
P.O. Box 365  
Maxwell, CA 95955

**Subject: Response to the Draft Colusa Subreach Planning Report Comments**

Dear Ashley,

Thank you for commenting on the draft Colusa Subreach Planning Report (Draft Report). Your input and ideas will help to improve the final Colusa Subreach Planning Report (Final Report). This letter responds to your comments and indicates how the Final Report will incorporate the points that you raised. Both your letter and this response will be included in the Final Report.

Good Neighbor Policy - You expressed concerns with the Draft Report's references to the SRCAF Good Neighbor Policy (GNP) as suggesting that it is a "solution" to neighboring landowner concerns. We agree with you that the GNP is not in itself a solution and we do not believe that the Draft Report cited to the GNP as a solution. We would characterize it as a process that can contribute to solutions in individual situations. The policy was not adopted unanimously and the Draft Report noted that some interests were dissatisfied with the adopted GNP.

We will expand the discussion of the GNP (Chapter X) and explain that the GNP was adopted by a vote of 8 to 3 at the SRCAF Board of Directors with one board member each from Colusa, Glenn and Butte Counties casting a negative vote. The comments of Supervisor Evans will be referenced and added to the final Report in their entirety as will other written comments to the GNP that were received by SRCAF.

Landowner Survey and Local Participation - The report on the final landowner survey (Appendix G) included the following statement, "A few who complete the survey expressed a feeling of frustration that the planning process went forward without landowner approval or participation while others cited frustration as the reason for refusing to complete the interview." The summary of the final landowner survey, in the Draft Report (Chapter X), specifically noted this point.

Eight representatives on the Advisory Workgroup resigned and withdrew from formal participation in that group. This fact is explained in some detail (Chapter X) and the letter that was submitted to explain those resignations was included in the Draft Report in its entirety (Appendix D). This decision to resign resulted in reduced local participation on the Advisory Workgroup. Colusa Subreach Planning was directed to provide the opportunity for subreach landowners and other local interests to participate in an open, public process and many opportunities were provided. Individual stakeholders chose their personal level of participation. Clearly, however, the total public involvement in Colusa Subreach Planning was much greater than that which has occurred in any other subreach along the river.

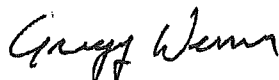
It is also important to note that all of the owners of land that directly adjoins the proposed habitat restoration sites were involved in the planning effort to varying degrees. All but one of these owners also reviewed the restoration plans with project staff. As you may be aware, many of these landowners were also involved in the various public workshops and information meetings that occurred and all owners in the Colusa Subreach received newsletters and notices of project activities.

Fiscal Impacts – As you noted, any reduction in local agency revenue is a legitimate concern is local government. The purpose of the fiscal analysis conducted in Colusa Subreach Planning was to identify the magnitude of fiscal effects that could result from the acquisition of property by state or federal agencies. That information is noted in the Draft Report (Chapter VII). Also, the Advisory Workgroup included a recommendation in the Colusa Subreach Strategy (Chapter IX) that payment in lieu of taxes (PILT) should be consistently provided to offset any such reductions.

Ward Tract Restoration – You indicated that the proposed restoration of the Ward tract is the type of restoration that the local community would support. It is notable that the Department of Water Resources staff indicated that the Ward Tract restoration was attractive to them because of the planning, technical analysis and public vetting that occurred through Colusa Subreach Planning. Also, the Colusa Subreach Strategy (Chapter IX) recommends that the State consider the other restoration Colusa Subreach tracts for flood management mitigation needs. We agree that a habitat restoration projects that can meet flood control, recreation and wildlife habitat needs are most desirable.

We appreciate your involvement and that of Jeff Sutton before you in Colusa Subreach Planning. While we recognize that there are differences between perspectives of the Family Water Alliance and that of wildlife conservation interests we think that ongoing involvement and communication can help identify solutions to concerns and improve land use compatibility along the Sacramento River. We recognize that the various products of Colusa Subreach Planning were improved by your interest and input.

Sincerely,



Gregg Werner  
Project Director

Cc: Beverly Anderson-Abbs