

# *Appendix A. Environmental Assessment*



# **Sacramento River National Wildlife Refuge**

## *Draft Environmental Assessment*

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# *Chapter 1. Purpose of and Need for Action*

## **Introduction**

This draft environmental assessment (EA) evaluates the environmental effects of three alternatives for managing the Sacramento River National Wildlife Refuge (Sacramento River Refuge). This EA will be used by the U.S. Fish and Wildlife Service (Service) to solicit public involvement in the refuge planning process and to determine whether the implementation of the Comprehensive Conservation Plan (CCP) would have a significant effect on the quality of the human environment. This EA is part of the Service's decision-making process in accordance with the National Environmental Policy Act (NEPA).

## **Proposed Action**

The Service proposes to implement Alternative B, as described in this EA. This alternative is described in more detail in Chapter 5 of the CCP.

## **Purpose of and Need for the Proposed Action**

The CCP is needed to guide the management of the Sacramento River Refuge for the next 15 years. In addition, the National Wildlife Refuge System Improvement Act of 1997 (Improvement Act) requires that CCPs be in place for all refuges within 15 years of its enactment.

## **Project Area**

The Sacramento River Refuge is part of the Sacramento National Wildlife Refuge Complex (Sacramento Refuge Complex) and is located in the Sacramento Valley of north-central California. The Valley is bordered by the Sierra Nevada Range to the east and the Coast Range to the west. The Refuge was established in 1989 and is currently composed of 26 units along a 77-mile stretch of the Sacramento River between the cities of Red Bluff and Princeton, 90 miles north of the metropolitan area of Sacramento.

The Valley is an extensive agricultural area that is a major wintering area for millions of ducks and geese. Lands that surround the Refuge are mostly orchards and irrigated rice lands with some dairy operations and safflower, barley, wheat, and alfalfa crops. The topography is flat with a gentle slope to the south. The predominant soil type is Columbia loam.

More detailed information about the project area can be found in Chapter 3 of the CCP.

## **Decisions to be Made**

Based on the analysis documented in this draft EA, the California/Nevada Operations Manager must determine the type and extent of management and public access on the Refuge and whether the selected management alternative would have a significant effect on the quality of the environment.

## **Issue Identification**

Issues, concerns, and opportunities were identified through early planning discussions and the public scoping process, which began with the mailing of the first planning update in May 2000. Other comments were received in writing and noted through personal communications. For more in depth description of the issues, see Chapter 2 of the CCP.

Issues discussed under each alternative include riparian habitat restoration, migratory birds, threatened and endangered species, monitoring, visitor services and cultural resources. Additional issues are addressed for each alternative in Table 1 and Appendix 1.

## **Public Involvement**

The Refuge sent four additional planning updates to a mailing list of over 300 individuals, groups, and agencies in May 2001, August 2001, July 2002 and December 2003. The public workshops were held in May and June of 2001 in Red Bluff, Chico, Willows, and Colusa. In addition, the Refuge distributed a brochure describing the planning process and requesting input from refuge visitors during fall 1999.

Public input received in response to these updates and workshops is incorporated into the CCP and EA, and a summary of comments is included in Chapter 2 of the CCP. The original comments are being maintained in planning team files at the Sacramento Refuge Complex headquarters in Willows, California, and are available for review.

## **Related Actions**

Please see Chapter 1 of the CCP for a description of related actions, projects, and studies in the area.

## **U.S. Fish and Wildlife Service and National Wildlife Refuge System**

The mission of the Service is to conserve, protect, and enhance the nation's fish and wildlife and their habitats for the continuing benefit of the American people. The Service is the primary Federal agency responsible for migratory birds, endangered plants and animals, certain marine mammals, and anadromous fish. This responsibility to conserve our nation's fish and wildlife resources is shared with other Federal agencies and State and Tribal governments.

As part of this responsibility, the Service manages the National Wildlife Refuge System (Refuge System). The Refuge System is the only nationwide system of Federal lands managed and protected for wildlife and their habitats. The mission of the Refuge System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.



The Refuge is managed as part of the Refuge System in accordance with the National Wildlife Refuge System Administration Act of 1966 as amended by the Improvement Act, and other relevant legislation, executive orders, regulations, and policies. Chapter 1 of the CCP summarizes these major laws, regulations, and policies and also describes the goals of the Refuge System.

## **Refuge Purposes**

The Refuge purposes are:

“... to conserve (A) fish or wildlife which are listed as endangered species or threatened species .... or (B) plants ...” 16 U.S.C. Sec. 1534 (Endangered Species Act of 1973).

".. the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions ..."16 U.S.C. 3901(b) (Emergency Wetlands Resources Act of 1986).

“... for the development, advancement, management, conservation, and protection of fish and wildlife resources ...” 16 U.S.C. 742f (a) (4) “... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ...” 16 U.S.C. Sec. 742f (b) (1) (Fish and Wildlife Act of 1956).

## **The Refuge Vision**

“The Sacramento River Refuge will create a linked network of up to 18,000 acres of floodplain forests, wetlands, grasslands, and aquatic habitats stretching over 100 miles from Red Bluff to Colusa. These refuge lands will fulfill the needs of fish, wildlife, and plants that are native to the Sacramento River ecosystem. Through innovative revegetation, the Refuge will serve as an anchor for biodiversity and a model for riparian habitat restoration throughout the Central Valley. We will forge habitat, conservation, and management links with other public and private conservation land managers.

The Sacramento River Refuge is committed to the preservation, conservation, and enhancement of a quality river environment for the American people along the Sacramento River. In this pursuit, we will work with partners to provide a wide range of environmental education programs and promote high quality wildlife-dependent recreational opportunities to build a refuge support base and attract new visitors. Compatible wildlife-dependent recreational opportunities for hunting, fishing, wildlife observation and photography, environmental education and interpretation will be provided on the Refuge.

Just as the floodplain along the Sacramento River has been important to agriculture, it is also an important natural corridor for migratory birds, anadromous fish, and threatened

and endangered species. Encouraging an understanding and appreciation for the Sacramento River will be a focus of the Sacramento River Refuge for generations to come.”

## **Refuge Goals**

### *Wildlife and Habitat Goal:*

Contribute to the recovery of endangered and threatened species and provide a natural diversity and abundance of migratory birds and anadromous fish through the restoration and management of viable riparian habitats along the Sacramento River using the principles of landscape ecology.

### *Public Use Goal:*

Encourage visitors of all ages and abilities to enjoy wildlife-dependent recreational and educational opportunities and experience, appreciate, and understand the Refuge history, riparian ecosystem, fish, and wildlife.

### *Partnership Goal:*

Promote partnerships to preserve, restore, and enhance a diverse, healthy and productive riparian ecosystem in which the Sacramento River Refuge plays a key role.

### *Resource Protection Goal:*

Adequately protect all natural and cultural resources, staff and visitors, equipment, facilities, and other property on the Refuge from those of malicious intent in an effective, professional manner.

# *Chapter 2. Alternatives, Including the Proposed Action*

## **Introduction**

This chapter describes three alternatives for managing the Sacramento River Refuge. Alternative A, Current Management (No Action); Alternative B, Optimize Habitat Restoration and Public Use (Proposed Action); and Alternative C, Accelerate Habitat Restoration and Maximize Public Use. These alternatives are summarized in Table 1, Appendix 1, and are described below.

All alternatives considered in this CCP were developed with the mission of the Refuge System and the purposes of the Refuge as guiding principles. The Service's proposed action is Alternative B. Two of the three alternatives presented in this chapter are "action alternatives" that would involve a change in the current management of the refuge. Under the No Action alternative, the Service would continue managing the refuge as it currently does.

## **Current Management**

The purpose of the Sacramento River Refuge is to preserve, restore, and enhance riparian habitat for threatened and endangered species, breeding and wintering migratory birds, anadromous fish, resident species, and native plants. The Refuge is managed to maintain, enhance and restore habitats for these species. Chapter 4 of the CCP describes the Refuge's current management practices in detail.

## **Alternatives Development Process**

The alternative development process was a process involving much repetition and review that began after the planning team developed the Refuge vision statement and goals. The first step in this process was to identify all of the important issues related to Refuge management. The core planning team, Service staff, and Refuge stakeholders generated the list of issues collaboratively. (Refuge stakeholders are those individuals or groups currently working or conducting research on the Refuge, and State natural resource agencies.) The general public also helped to identify important management issues through the scoping process. All public comments submitted at the four public scoping meetings in 2001, and written correspondence, were considered. Once the list of important management issues was generated, the planning team described the No Action Alternative. It was important to describe this alternative accurately because the No Action Alternative serves as the baseline to which all other alternatives are compared.

Next, the planning team listed a wide range of management actions that would address the issues identified and achieve one or more of the goals of the Refuge. These actions were refined during planning team meetings. The planning team then clustered these actions into logical groupings to form the action alternatives. Many actions are common to

more than one alternative, but the actions within each alternative reflect a common management approach, as described in detail below.

### **Features Common to All Alternatives**

All three alternatives, including the No Action Alternative, include a number of features in common. Under each alternative, riparian vegetation on La Barranca, Ohm, Pine Creek, Capay, Phelan Island, Dead Man's Reach, and Drumheller Slough units would be restored and enhanced. These restoration activities were addressed in an Environmental Assessment completed in February 2002 (USFWS 2002b). Other continuing activities include baseline surveys and monitoring, fire management, law enforcement, and fishing at Packer Lake.

### **Alternatives Considered but Eliminated from Detailed Analysis**

The alternatives development process under NEPA and the Improvement Act are designed to allow the planning team to consider the widest possible range of issues and feasible management solutions. These management solutions are then incorporated into one or more alternatives evaluated in the EA process and considered for inclusion in the CCP.

Actions and alternatives that are not feasible or may cause substantial harm to the environment are usually not considered in an EA. Similarly, an action (and therefore, an alternative containing that action) should generally not receive further consideration if:

- It is illegal (unless it is the No Action Alternative, which must be considered to provide a baseline for evaluation of other alternatives, even though it may not be capable of legal implementation);
- It does not fulfill the mission of the National Wildlife Refuge System;
- It does not relate to or help achieve one of the goals of the Refuge unit; or
- Its environmental impacts have already been evaluated in a previously approved NEPA document.

However, if such actions or alternatives address a controversial issue or an issue on which many public comments were received, they may be considered in detail in a NEPA document to clearly demonstrate why they are not feasible or would cause substantial harm to the environment.

During the alternatives development process, the planning team considered a wide variety of potential actions on the Refuge. The following actions were ultimately rejected and excluded from the alternatives proposed here because they did not achieve Refuge purposes or were incompatible with one or more goals.

#### *Custodial Management Alternative*

This alternative would have eliminated all restoration projects, habitat management, and precluded the development of additional public use programs. Refuge management would be limited to maintaining boundary signs and fences. Habitat goals would not have been

met and the public would be prevented from accessing the Refuge. This alternative was not analyzed in detail because it conflicts with the Refuge purpose of providing habitat for threatened and endangered species, migratory and resident birds, and other wildlife. The Improvement Act also directs the Service to provide compatible wildlife dependant recreational opportunities. This mandate would not be met under this alternative.

#### *Big 5 Public Use Alternative*

This alternative would have opened the Refuge to five of the Big 6 wildlife-dependent public uses, with only a minor amount (approximately 10 percent) open to hunting. This alternative was not analyzed in detail because hunting is compatible with the Refuge purposes and goals. In addition, one of the most common issues identified during the scoping process was to open the Refuge to hunting. Hunting currently occurs on adjacent lands and water. It is considered by the local community as a traditional recreational pursuit that many generations of families have enjoyed as part of their local heritage.

#### *Recreational Use Alternative*

This alternative would have opened the Refuge as a recreational area. All areas would have been opened to the public and many new facilities would have been built. Development might include multiple hiking trails, parking lots, boat ramps, campgrounds, hunting blinds, and fishing areas. This alternative was not analyzed in detail because it conflicts with the Refuge purpose of serving as a refuge and habitat for threatened and endangered species, migratory and resident birds, and other wildlife and the intent of the Improvement Act, putting wildlife first.

### **Proposed Action**

The planning policy that implements the Improvement Act requires the Service to select a preferred alternative that becomes its proposed action under NEPA. The written description of this proposed action is effectively the draft CCP. Alternative B is the proposed action for Sacramento River Refuge because it meets the following criteria:

- Achieves the mission of the National Wildlife Refuge System.
- Achieves the purposes of Sacramento River National Wildlife Refuge.
- Provides guidance for achieving the Refuge's 15-year vision and goals.
- Maintains and restores the ecological integrity of the habitats and populations on the Refuge.
- Addresses the important issues identified in the scoping process.
- Addresses the legal mandates of the Service and the Refuge.
- Is consistent with the scientific principles of sound fish and wildlife management and endangered species recovery.

Table 8 (Chapter 5, CCP) contains a matrix of the anticipated restoration and public use activities and Appendix L described the rationale used to determine the public use determinations for each of the Refuge units.

The proposed action described in the EA is preliminary. The action ultimately selected and described in the final CCP will be determined, in part, by the comments received on this version of the EA. The preferred alternative presented in the final CCP may suggest a modification of one of the alternatives presented here.

### **Alternative A: Current Management (No Action)**

Under this Alternative, the Refuge would continue to be managed as it has in the recent past. The Refuge currently has no unit-wide management plan. Recent management has followed existing step-down management plans:

- Environmental Assessment for Proposed Restoration Activities on Sacramento River National Wildlife Refuge
- Fire Management Plan for Sacramento River National Wildlife Refuge
- Annual Habitat Management Plan for Sacramento River National Wildlife Refuge
- Cultural Resource Overview and Management Plan

The focus of the Refuge would remain the same: to provide habitat and maintain current active management practices; restore the 9 units identified in the Environmental Assessment for Proposed Restoration Activities on Sacramento River National Wildlife Refuge (USFWS 2002b) for threatened and endangered species, migratory and resident birds, and other wildlife (Figure 1). The Refuge would remain closed to visitor services other than the limited existing opportunities for fishing at Packer Lake (Figure 2). Current staffing and funding levels would remain the same.

*Riparian Habitat Restoration:* Under Alternative A, the Service would continue to manage the existing riparian habitat on the Refuge. Only riparian habitat expansion projects described in the Restoration EA (USFWS 2002b) would occur under this alternative. The Service would continue to allow researchers to conduct research on the Refuge, but would not actively pursue new research.

*Migratory Birds:* Under this alternative, the Service would continue to restore and maintain riparian habitat identified in the Restoration EA (USFWS 2002b) to provide winter, migratory corridor, and nesting habitat for migratory landbirds, resident landbirds, migratory waterfowl, wintering and migratory shorebirds, and other colonial nesting birds.

The Service would continue its limited ground surveying and vegetation monitoring program for migratory birds and threatened and endangered species under a cooperative agreement with The Nature Conservancy (TNC), River Partners (RP), and PRBO (PRBO Conservation Science).

*Threatened and Endangered Species:* Under Alternative A, the Service would continue its restoration program to improve habitat suitability for Valley elderberry longhorn beetle, Bell's vireo, Swainson's hawk, willow flycatcher, western yellow-billed cuckoo, and bank swallow. The Service would continue to restore and protect shaded riverine aquatic

habitat along the banks of the Sacramento River to meet the habitat requirements for winter and spring run Chinook salmon and other anadromous fishes. Floodplain restoration for anadromous fish and Sacramento splittail would continue. Protection of individuals from disturbance and limited population monitoring would continue.

*Monitoring:* Under Alternative A, the Refuge, in cooperation with partners, would continue to monitor restoration projects, avian bird populations, migratory waterfowl, and other wildlife.

*Visitor Services:* Under Alternative A, Refuge visitor services would continue unchanged with over 99% of the Refuge closed to public uses. The Refuge would continue its small outreach program, which includes a yearly “Marsh Madness” youth wetland experience program and a limited number of presentations by Refuge staff at schools, and public service and conservation group meetings. The Service would also continue to maintain its existing fishing program on Packer Lake.

*Cultural Resources:* Under Alternative A, all cultural resource sites have been documented and recorded in the National Register of Historic Places. All cultural resource site locations are kept confidential and are monitored on a regular basis. The Service would also create and utilize a Memorandum of Agreement with Native American groups to implement the inadvertent discovery clause of the Native American Graves Protection and Repatriation Act.

### **Alternative B: Optimize Habitat Restoration and Public Use (Proposed Action)**

Under this Alternative, the Refuge would use active and passive management practices to achieve and maintain full restoration/enhancement of all units where appropriate, as funding becomes available (Figure 3). The agricultural program would be phased out as restoration funding becomes available. The Refuge would employ both cultivated and natural recruitment restoration techniques as determined by site conditions. Public Use opportunities would be optimized to allow for a balance of Big 6 wildlife-dependant public uses throughout the entire Refuge river reach in coordination with other agencies and programs (Figure 4). Staffing and funding levels would need to increase to implement this alternative.

*Riparian Habitat Restoration:* Management of riparian habitats under Alternative B would be the same as under Alternative A. The Service would also focus on additional habitat restoration and enhancement of the remaining Refuge units. Site-specific plans would be developed for restoration activities. Additional NEPA compliance documents may be needed depending on the size and scope of the restoration activities. The Service would continue to allow researchers to conduct research and actively pursue further investigations and long-term monitoring on the Refuge.

*Migratory Birds:* The Service would use the same tools and techniques to manage riparian habitat for migratory birds under Alternative B as it does under Alternative A. The Service would also evaluate additional sites that are currently managed under the farming program and were not considered in the Restoration EA (USFWS 2002b).

*Threatened and Endangered Species:* Under Alternative B, the Service would manage threatened and endangered species the same as under Alternative A. However, the Refuge would prepare a surveying and monitoring plan for special status species, and substantially expand research on the ecology and management of special status species. Special regulations and temporary closures would be instituted for the protection of wildlife species and their habitats during critical periods of their life cycles.

*Monitoring:* Under Alternative B, in cooperation with partners the Refuge would continue to monitor restoration projects, avian bird populations, migratory waterfowl and other wildlife. The Refuge would develop and implement a long-term monitoring program to assess the success of current management and restoration activities.

*Visitor Services:* Under Alternative B, the Service would improve and expand visitor services with a focus on a balance of Big 6 wildlife-dependent public use opportunities distributed throughout the entire reach of the Refuge. New visitor services projects under this alternative include: a new refuge brochure; developing interpretive kiosks and parking facilities on vehicle accessible units at Rio Vista, Pine Creek, Capay, Ord Bend, Sul Norte, Packer; and creating walking trails on the Rio Vista, Pine Creek, Capay, Ord Bend, Sul Norte, Codora, and Packer units.

Hunting opportunities would increase. Approximately 55% of the Refuge would be opened to hunting of dove, waterfowl, coot, common moorhen, pheasant, quail, snipe, turkey and deer. Hunting will be limited to shotgun or archery only. Twenty-three river miles and seasonally submerged areas would be opened to sport fishing consistent with State regulations. Most riverbanks would be opened to fishing as well. Camping would be allowed on gravels bars below the ordinary high water mark.

The current limited outreach program would be expanded to provide more presentations about the Refuge at schools, public events, and public service and conservation group meetings. The Service would purchase new Refuge displays for use at these events.

The environmental education and interpretation programs would be expanded. A visitor services plan would be developed and implemented and a full time public use specialist would be hired. The Service would also seek to establish new partnerships with educational institutions and local organizations for environmental education on the Refuge. In addition, new educational materials would be developed.

*Cultural Resources:* Under Alternative B, the Refuge would manage cultural resources similar to Alternative A.



### **Alternative C: Accelerated Habitat Restoration and Maximize Public Use**

Under this Alternative, the Refuge would use active and passive management practices to achieve and maintain full restoration of all units (Figure 5). The agricultural program would cease immediately and remaining orchards would be removed. Restoration of these sites would be implemented as funding becomes available. Additional NEPA compliance documents may be needed depending on the size and scope of the restoration activities. Public use opportunities would be maximized to allow for all Big 6 wildlife-dependent public uses throughout the majority of the Refuge (Figure 6). In addition, staffing and funding levels would need to increase substantially to implement the alternative.

*Migratory Birds:* Under Alternative C, management and restoration of riparian habitats would be the same as Alternative B.

*Threatened and Endangered Species:* Under Alternative C, the Service would manage threatened and endangered species similar to Alternative B.

*Visitor Services:* Under Alternative C, hunting opportunities would increase from 55 percent to 73 percent of the Refuge. Hunting would be allowed on most of the units open to the public. The Service would manage the hunting, fishing, wildlife observation, photography, environmental education and interpretation programs similar to Alternative B.

*Cultural Resources:* Under Alternative C, the Refuge would manage cultural resources similar to Alternative B.

**Table 1. Sacramento River Refuge Alternative/Issue Comparison Summary**

Issue Questions	Alternative A Current Management (No Action)	Alternative B Optimize Habitat Restoration and Public Use	Alternative C Accelerate Habitat Restoration and Maximize Public Use
<p><b>Threatened and Endangered Wildlife and Plants</b> What measures are taken to protect threatened, endangered, and candidate species and species of management concern?</p>	<p>Management for T&amp;E species consists primarily of habitat restoration, protection of individuals from disturbance, and some population monitoring.</p> <p>Over 99% of the refuge is closed to all public uses and thereby limits most disturbances.</p>	<p>Same as Alternative A and would include additional habitat restoration, expanded wildlife and habitat monitoring program.</p> <p>Special regulations/ closures would be instituted for protection of wildlife species and their habitat on the Refuge.</p>	<p>Similar to Alternative B.</p> <p>Same as Alternative B</p>
<p><b>Wildlife</b> What measures are taken to protect and manage native wildlife?</p>	<p>Management of habitat for wildlife focuses on protection. Over 99% of the refuge is closed to all public uses and thereby limits most disturbance</p>	<p>Focus on additional restoration and enhancement of all habitat types and vegetative monitoring.</p>	<p>Same as Alternative B</p>
<p><b>Riparian</b> How will riparian habitat be restored/ enhanced to support migratory birds and anadromous fish?</p>	<p>Restoration/enhancement projects will occur at the 9 locations outlined in the Restoration EA (USFWS 2002b).</p>	<p>Same as Alternative A plus additional sites would be further investigated</p>	<p>Same as Alternative B except all farming operations would cease immediately and all units would be restored as funding allows.</p>
<p><b>Upland</b> How would upland grasslands and savannahs be managed to support native wildlife species and migrating birds?</p>	<p>Native grasslands and savannahs are planted to restore historical diversity. Emphasis is on elderberry savannahs for endangered species recovery purposes. Limited repetitive monitoring occurs throughout the Refuge.</p>	<p>Similar to Alternative A. Grasslands and savannahs planted as orchards would be removed as restoration funding becomes available. Long-term habitat monitoring program initiated. Monitoring of special species occurs.</p>	<p>Similar to Alternative B; except immediate orchard removal would necessitate increased grassland and savannah habitat enhancement efforts.</p>
<p><b>Riverine</b> How are riverbanks managed on the Refuge?</p>	<p>The river is allowed to meander across the refuge except at designated hard points.</p>	<p>Same as Alternative A</p>	<p>Same as Alternative A</p>

<b>Issue Questions</b>	<b>Alternative A Current Management (No Action)</b>	<b>Alternative B Optimize Habitat Restoration and Public Use</b>	<b>Alternative C Accelerate Habitat Restoration and Maximize Public Use</b>
<p><b>Flood Management</b> To what extent are Refuge activities coordinated with flood management agencies?</p>	<p>All restoration sites have been identified and evaluated via the NEPA process.</p> <p>On-going coordination of site-specific restoration plans occurs with the State Reclamation Board.</p>	<p>Similar to Alternative A; however, additional sites may be identified and evaluated via the NEPA process.</p> <p>Same as Alternative A</p>	<p>Same as Alternative B</p> <p>Same as Alternative A</p>
<p><b>Weeds</b> To what extent are weeds (invasive, non-native plants) controlled?</p>	<p>Limited treatments of weeds occur via herbicides, grazing, and mechanical methods.</p>	<p>Similar to Alternative A however, more aggressive efforts would be made in grazing and mechanical control methods.</p>	<p>Substantial increased efforts (pesticides/mechanical) would be made in cultivated restoration sites to control weeds.</p>
<p><b>Pests</b> How are pests (mosquitoes, rodents) managed on the refuge?</p>	<p>Mosquito management occurs via an Integrated Pest Management (IPM) Plan and Special Use Permits to local Mosquito Abatement Districts.</p> <p>Refuge staff works with neighbors and County Agricultural Commissioners on pest related issues.</p>	<p>Same as Alternative A</p> <p>Same as Alternative A</p>	<p>Same as Alternative A</p> <p>Same as Alternative A</p>
<p><b>Grazing</b> Is grazing allowed on the Refuge?</p>	<p>Grazing for habitat management purposes occurs on the Ohm and Mooney Units through a Cooperative Land Management Agreement.</p>	<p>Similar to Alternative A; plus additional areas may be opened for site specific grazing for habitat/weed management purposes.</p>	<p>Same as Alternative B</p>
<p><b>Farming</b> To what extent would farming (orchards, row crops) continue?</p>	<p>Farming will be phased out on 9 Refuge units (as identified in the 2002 Restoration EA) as restoration funding becomes available and the individual orchards become less productive.</p>	<p>Same as Alternative A on all Refuge units that are included in the farming program.</p>	<p>All farming operations would cease immediately.</p>

Issue Questions	Alternative A Current Management (No Action)	Alternative B Optimize Habitat Restoration and Public Use	Alternative C Accelerate Habitat Restoration and Maximize Public Use
<b>Fire Management</b> How is fire managed on the Refuge?	The Fire Management Plan is followed. Prescribed burns are conducted and wildfires are suppressed. Cooperative agreements exist for fire suppression with local, State and other Federal agencies in the area.	Similar to Alternative A: except a seasonal fire crew/engine would be assigned to the Refuge.	Same as Alternative B
<b>Wildlife Viewing And Photography</b> To what extent are opportunities provided for wildlife viewing and photography?	Wildlife viewing and photograph opportunities are provided only at Packer Lake.	84% of the Refuge would be available for these activities. Comprehensive Watchable Wildlife brochure is available.	Same as Alternative B
<b>Environmental Education</b> What type of environmental education program is provided to the public?	Refuge staff provides a limited number of tours to schools, civic groups, and other organizations upon request.	Similar to Alternative A; however, additional educational programs would be provided. Opportunities to partner would be pursued.	Same as Alternative B
<b>Hunting</b> What types of hunting opportunities are provided on the Refuge?	No hunting occurs on the Refuge.	Selected units (55%) of the refuge would be open to hunting of migratory waterfowl, quail, doves, turkeys, pheasants, and deer consistent with State regulations. Limited to shotgun or archery hunting only.	Selected units (73%) of the refuge would be open to hunting. Same as Alternative B
<b>Fishing</b> What types of fishing opportunities are provided on the Refuge?	The Refuge provides boat and bank fishing at Packer Lake only.	23 river miles and seasonally submerged areas would be open to sport fishing consistent with State regulations. Most riverbanks open to fishing.	Same as Alternative B
<b>Camping</b> Is camping allowed?	No camping allowed.	Camping would be allowed on the gravel bars below the ordinary high water mark.	Same as Alternative B
<b>Boating</b> Is boating allowed?	Unrestricted boating occurs on the river. Boating on Packer Lake limited to non-motorized boats.	Same as Alternative A	Same as Alternative A

<b>Issue Questions</b>	<b>Alternative A Current Management (No Action)</b>	<b>Alternative B Optimize Habitat Restoration and Public Use</b>	<b>Alternative C Accelerate Habitat Restoration and Maximize Public Use</b>
<p><b>Visitor Use Level</b> What is the appropriate visitor use level of the refuge?</p>	<p>Visitor use not allowed on the Refuge, except on navigable waters and Packer Lake.</p>	<p>Visitor use would be limited by access points (i.e., designated locations and boat access only). Use levels and impacts monitored. If visitor use levels increase to a level where resource impacts occur, areas may be subject to temporary or permanent closures to protect wildlife and habitat.</p>	<p>Same as Alternative B</p>
<p><b>Access Management</b> How is access/travel managed on the Refuge?</p>	<p>No vehicle access is allowed.</p>	<p>Vehicle access would be allowed on designated roads and parking areas only. Designated units and trails would be open for pedestrian access year-round. Entry to Refuge would be via designated locations or by boat. Most of the landward boundary of the Refuge would be closed.</p>	<p>Same as Alternative B</p>
<p><b>River Access</b> How is river access managed?</p>	<p>No access to the river across the Refuge.</p>	<p>Access to the river would occur at designated locations. Parking areas for river access would be established at Rio Vista, Capay, Sul Norte, Packer and Drumheller Slough Units. Improve directional and public use signing, brochures, and website directions.</p>	<p>Similar to Alternative B; however, additional areas would be open for river access.</p>

Issue Questions	Alternative A Current Management (No Action)	Alternative B Optimize Habitat Restoration and Public Use	Alternative C Accelerate Habitat Restoration and Maximize Public Use
<p><b>Universal Access</b> To what extent is universal access to public use facilities and activities provided?</p>	<p>The Packer Lake fishing site and boat launch is a primitive facility with no improvements.</p> <p>Large print, Braille, audio tape and CD versions of brochures are available on request.</p> <p>TTY phone available at Sacramento NWRC headquarters.</p>	<p>Accessible parking lots, restrooms and trails would be available at Rio Vista, Pine Creek, Capay, Ord Bend, Sul Norte, and Packer.</p> <p>Same as Alternative A</p> <p>Same as Alternative A</p>	<p>Same as Alternative B</p> <p>Same as Alternative A</p> <p>Same as Alternative A</p>
<p><b>Resource Protection</b> How is information on the Refuge, its resources, and regulations provided to the public?</p> <p>What level of law enforcement activity occurs on the Refuge?</p>	<p>A general Refuge brochure is available on request. The Sacramento NWRC website provides specific information on the Refuge.</p> <p>Law enforcement patrols conducted on an intermittent basis by refuge officers.</p>	<p>Similar to Alternative A; however, all brochures updated and more comprehensive maps would be provided. Refuge use guidelines and regulations would be posted.</p> <p>Regular and recurring law enforcement patrols would be conducted by refuge officers. Two fulltime refuge officers on staff. More emphasis on cooperative efforts with CDFG Wardens and State Park Rangers.</p>	<p>Same as Alternative B</p> <p>Same as Alternative B, except 3 fulltime refuge officers on staff.</p>
<p><b>Cultural Resources</b> How are cultural resources protected?</p>	<p>A Cultural Resource Overview and Management Plan has been developed in conjunction with the Archaeological Research Program at Chico State University and TNC. Refuge officers make regular patrols to cultural sites.</p>	<p>Same as Alternative A</p>	<p>Same as Alternative A</p>

<b>Issue Questions</b>	<b>Alternative A Current Management (No Action)</b>	<b>Alternative B Optimize Habitat Restoration and Public Use</b>	<b>Alternative C Accelerate Habitat Restoration and Maximize Public Use</b>
<p><b>Partnerships</b> To what extent are partnership opportunities pursued with volunteers, local service groups, organizations, individuals, schools, and other agencies?</p>	<p>Memorandum of Understanding in effect for cooperative management between Refuge, CDFG, &amp; State Parks. Refuge conducts a small volunteer program. Cooperative agreements in place with TNC &amp; River Partners for habitat restoration &amp; enhancement.</p>	<p>Similar to Alternative A, plus additional volunteer assistance would be sought. Encourage and support the development of a local “Friends” organization or other cooperative association.</p>	<p>Same as Alternative B</p>





Figure 1

# Habitat Management Alternative A

Sacramento River National Wildlife Refuge



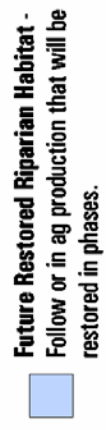
Agricultural Land



Existing Riparian Habitat



Restored Riparian Habitat - Active/passive restoration occurring



Future Restored Riparian Habitat - Follow or in ag production that will be restored in phases.



State Parks Lands



Fish and Game Lands



Bureau of Land Management



Pending Acquisitions



0 5 Miles

0 5 Kilometers

Note: Boundaries shown are approximate.

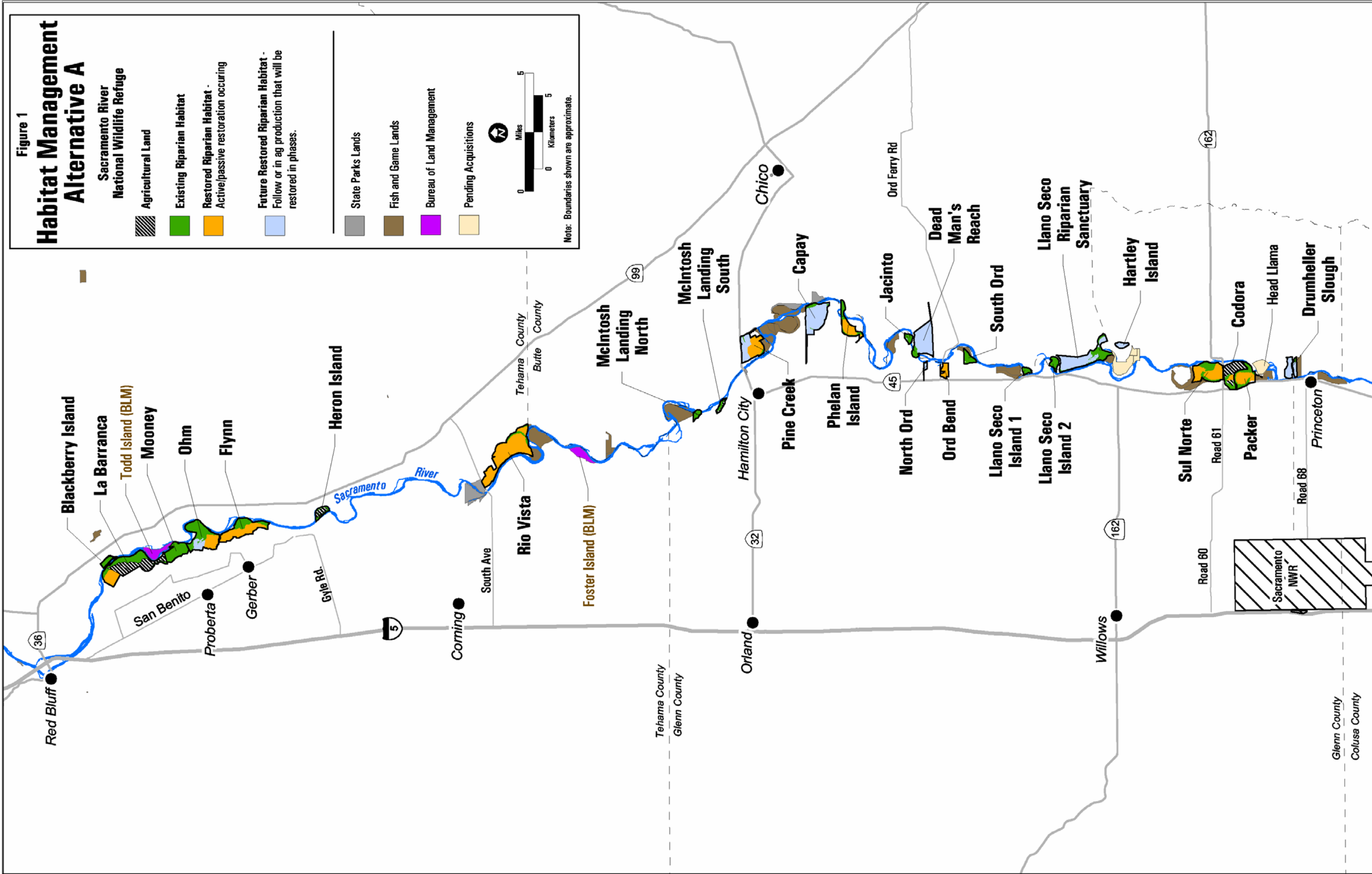
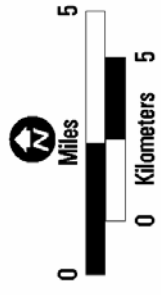


Figure 2

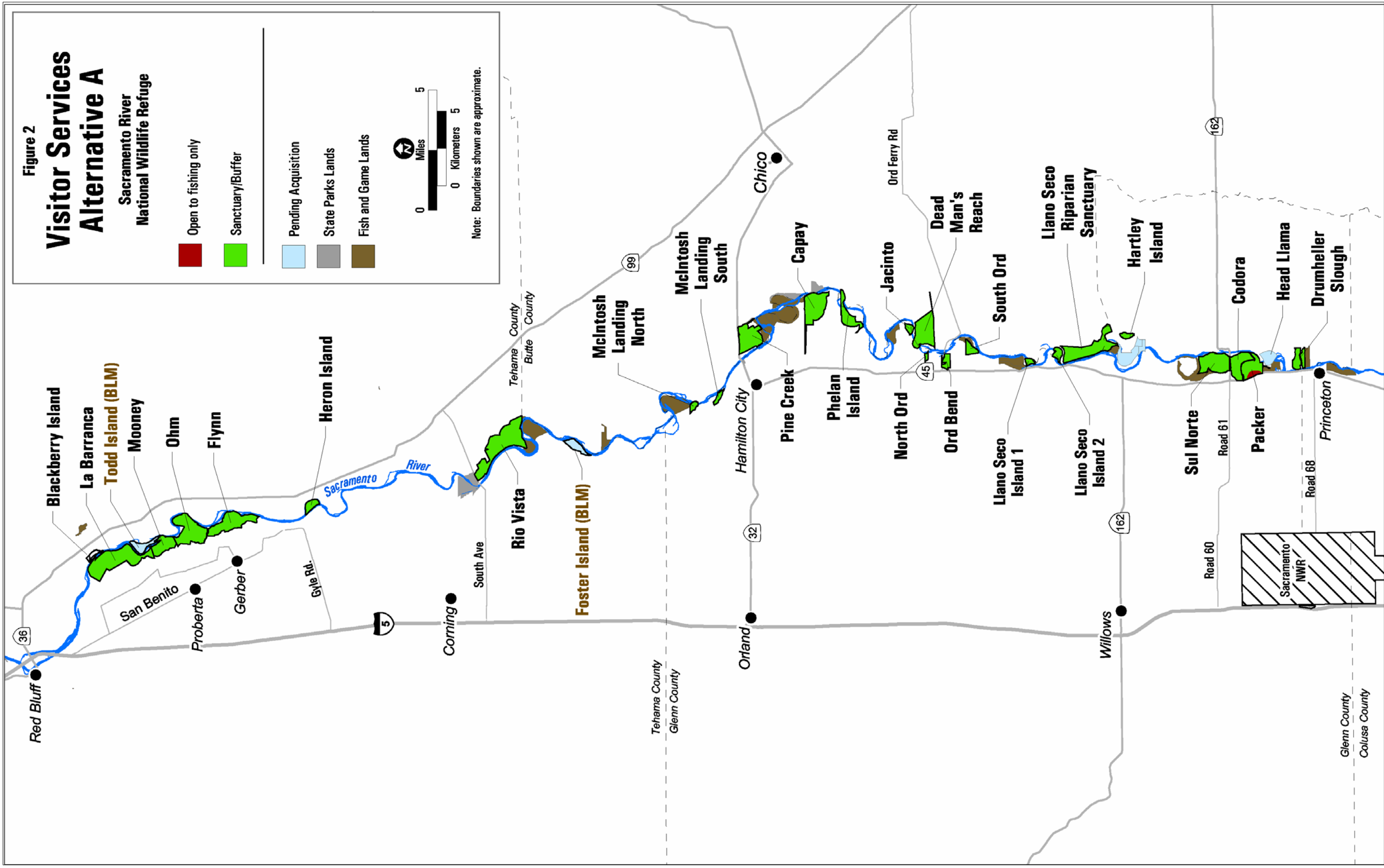
# Visitor Services Alternative A

Sacramento River  
National Wildlife Refuge

- Open to fishing only
- Sanctuary/Buffer
- Pending Acquisition
- State Parks Lands
- Fish and Game Lands











Note: Boundaries shown are approximate.



**Figure 3**  
**Habitat Management**  
**Alternative B**

**Sacramento River National Wildlife Refuge**

-  Agricultural Land
-  Existing Riparian Habitat
-  Restored Riparian Habitat - Active/passive restoration occurring
-  Future Restored Riparian Habitat - Follow or in ag production that will be restored in phases.
-  State Parks Lands
-  Fish and Game Lands
-  Bureau of Land Management
-  Pending Acquisitions

**Note:** Boundaries shown are approximate.

Miles 0 5  
Kilometers 0 5

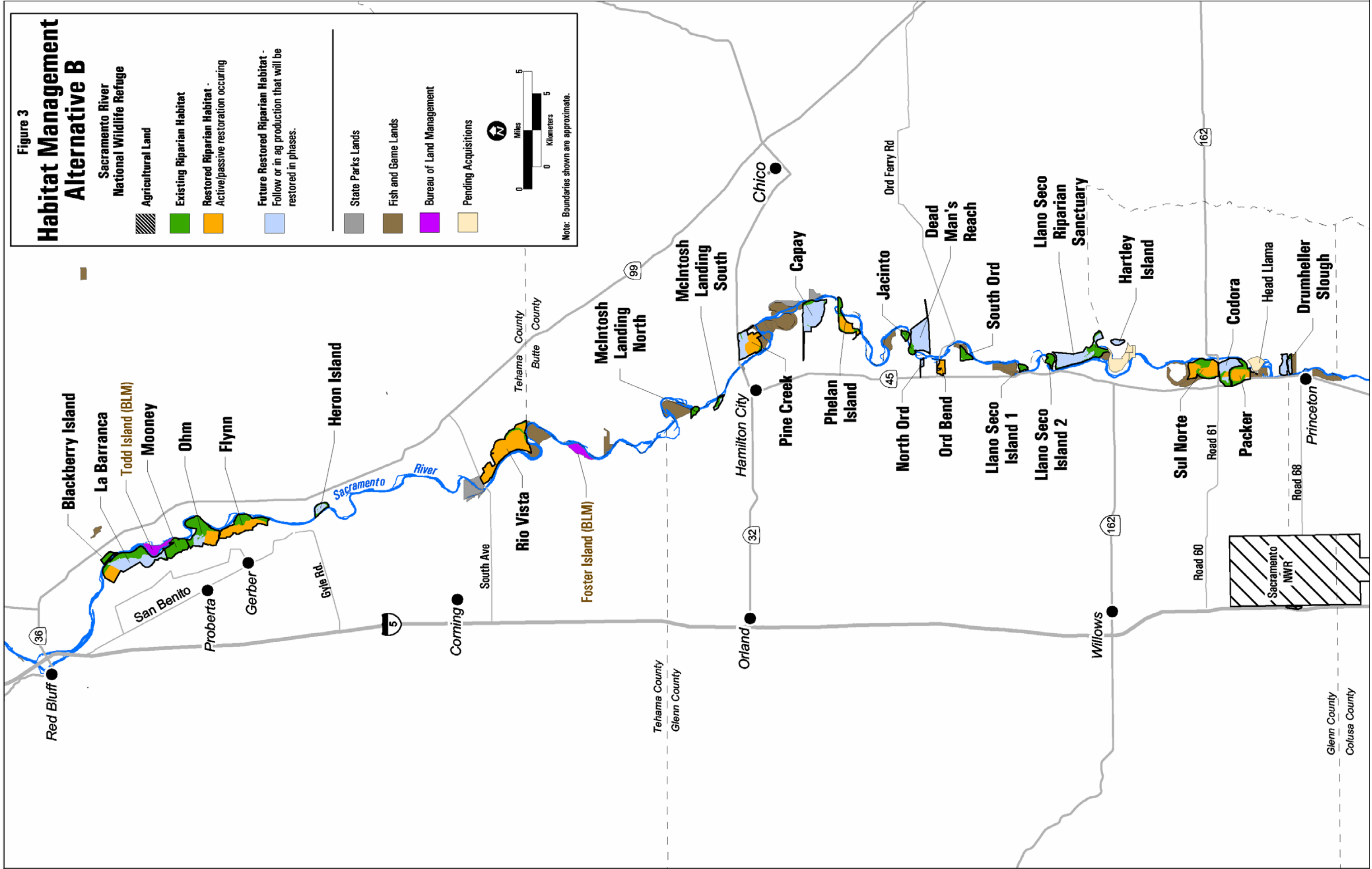
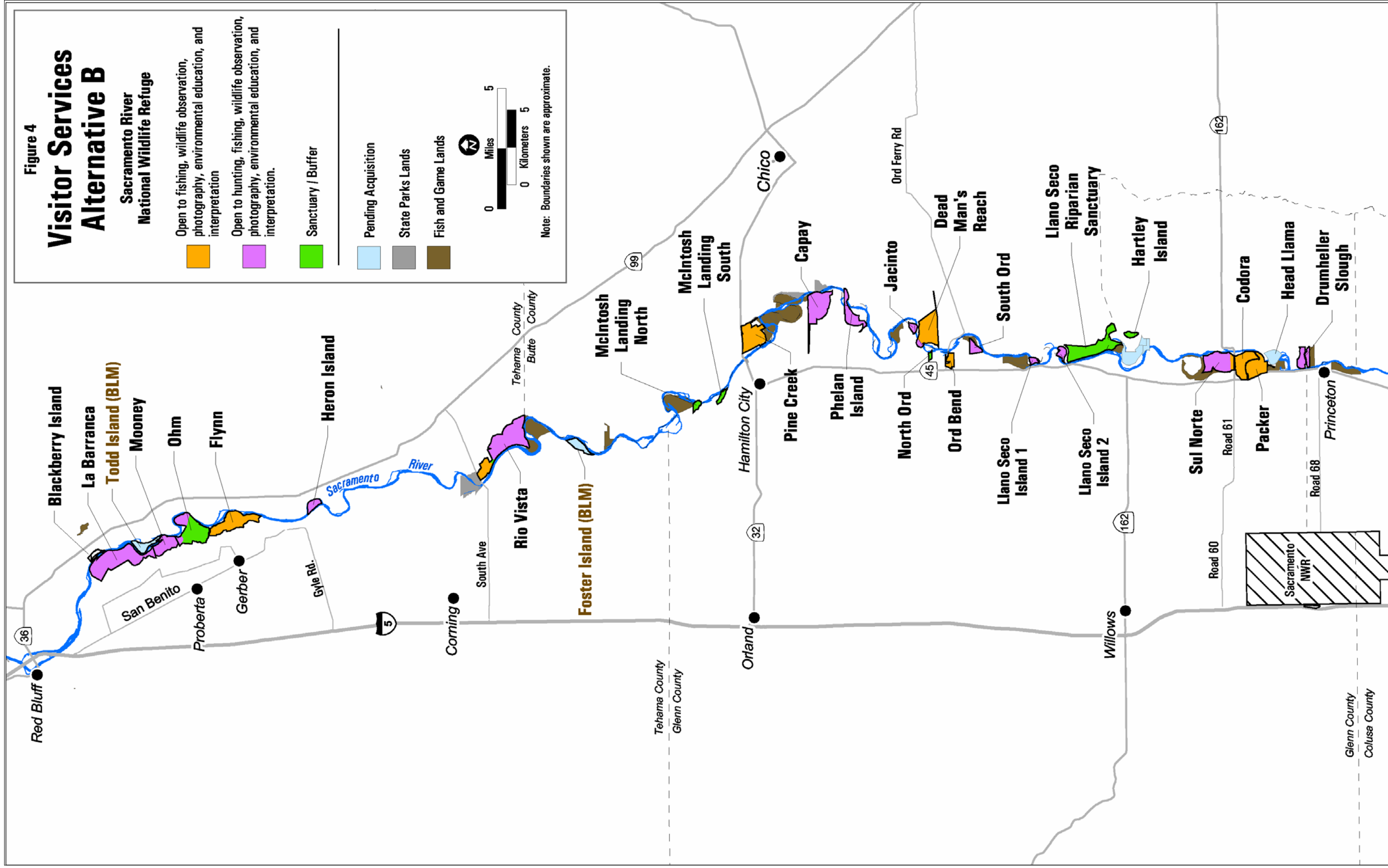
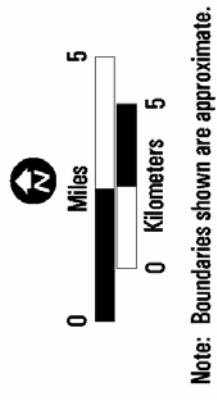


Figure 4

# Visitor Services Alternative B

Sacramento River  
National Wildlife Refuge

- Open to fishing, wildlife observation, photography, environmental education, and interpretation
- Open to hunting, fishing, wildlife observation, photography, environmental education, and interpretation.
- Sanctuary / Buffer
- Pending Acquisition
- State Parks Lands
- Fish and Game Lands





# Habitat Management Alternative C

Figure 5

Sacramento River  
National Wildlife Refuge



Agricultural Land



Existing Riparian Habitat



Restored Riparian Habitat -  
Active/passive restoration occurring



Future Restored Riparian Habitat -  
Follow or in ag production. All lands  
followed immediately and restored as  
resources become available.



State Parks Lands



Fish and Game Lands



Bureau of Land Management



Pending Acquisitions



Note: Boundaries shown are approximate.

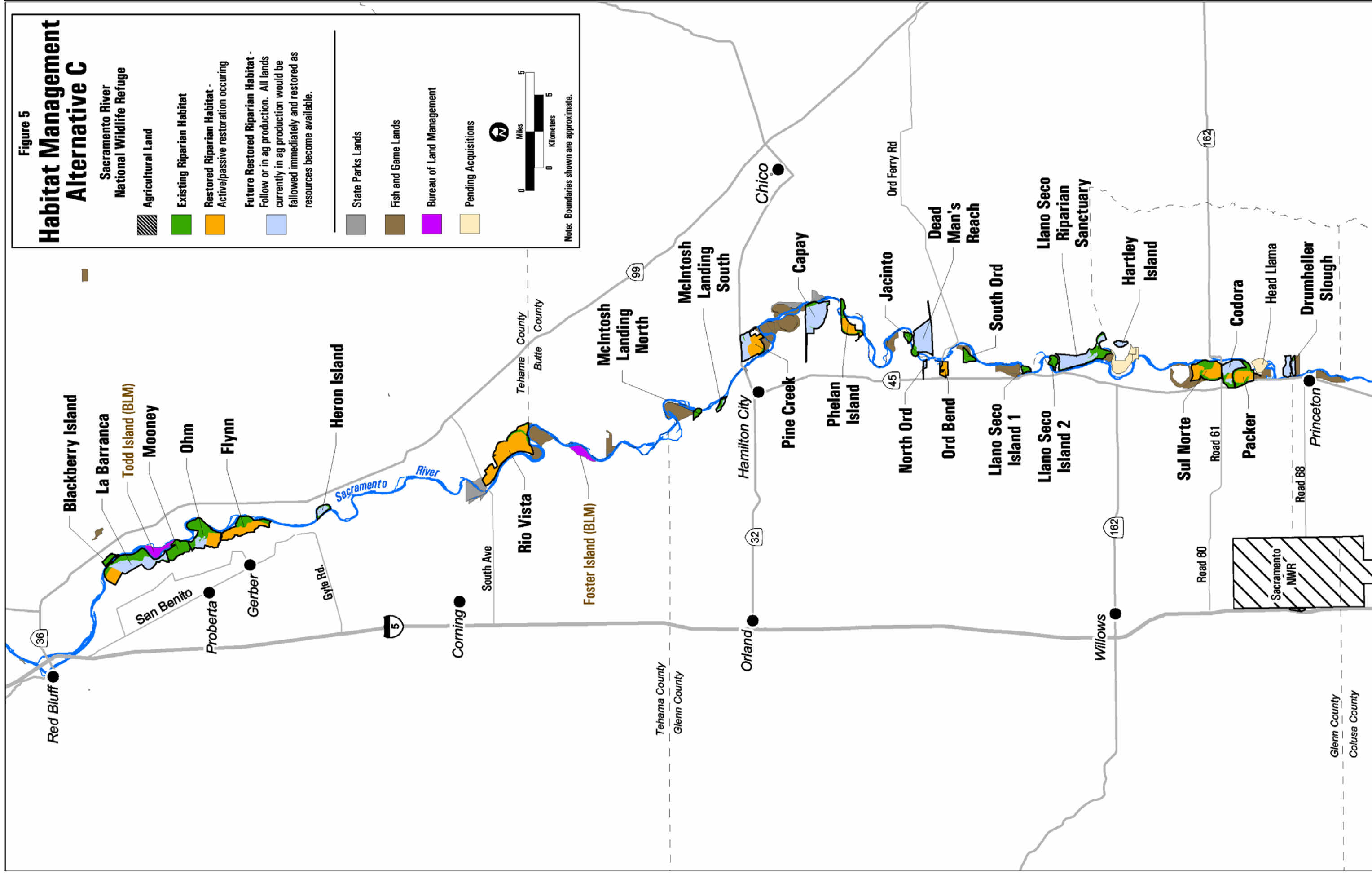


Figure 6

# Visitor Services Alternative C

Sacramento River  
National Wildlife Refuge

Open to fishing, wildlife observation,  
photography, environmental education, and  
interpretation

Open to hunting, fishing, wildlife observation,  
photography, environmental education, and  
interpretation.

Sanctuary / Buffer

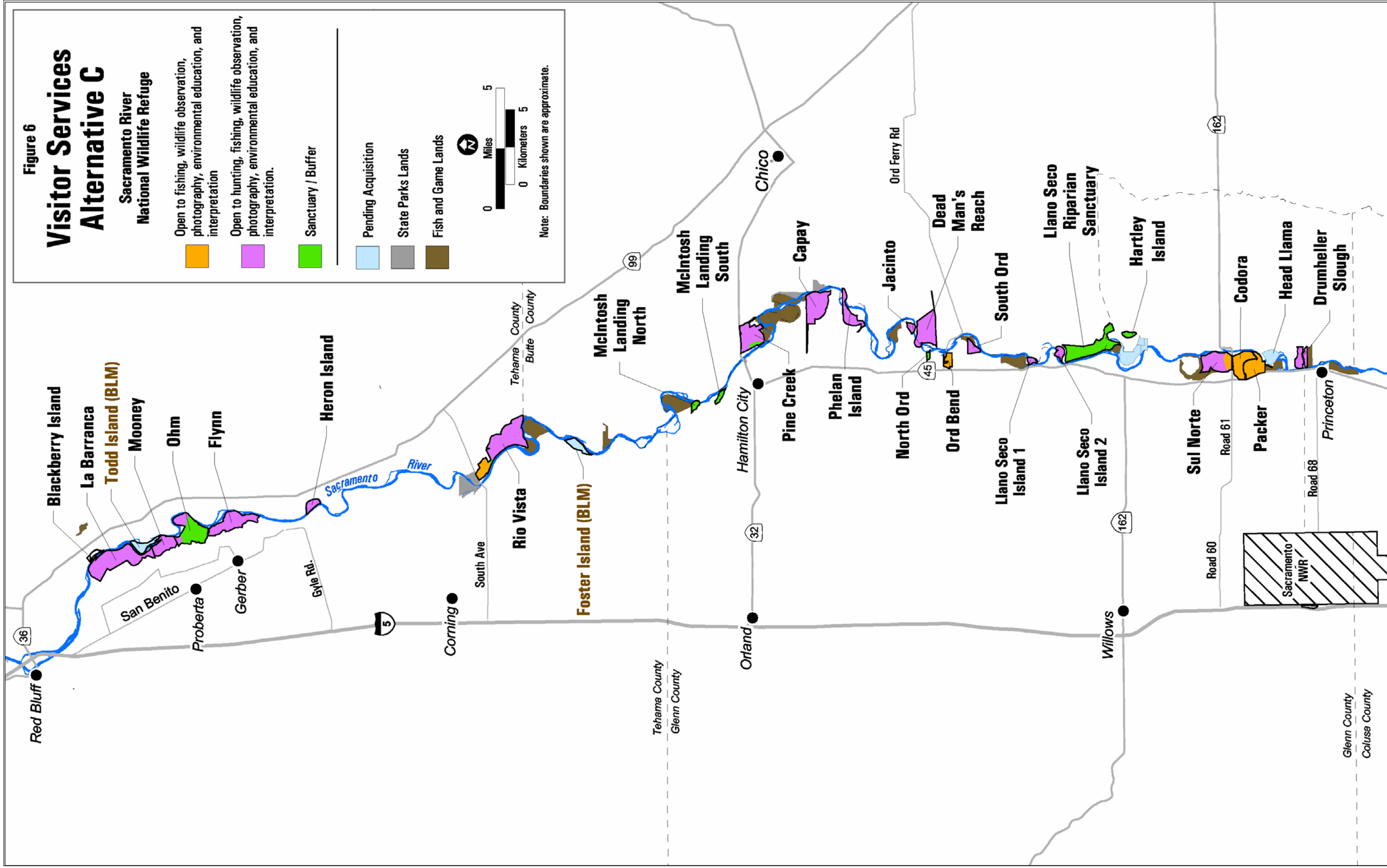
Pending Acquisition

State Parks Lands

Fish and Game Lands



Note: Boundaries shown are approximate.



## *Chapter 3. Affected Environment*

This chapter briefly outlines the physical, biological, social, and economic environment that would most likely be affected by the alternatives. See Chapter 3 of the CCP for a more detailed description.

### **Physical Environment**

Chapter 3 of the CCP provides a detailed description of the physical environment.

### **Biological Environment**

Chapter 3 of the CCP provides a detailed description of the biological environment.

### **Social and Economic Environment**

Chapter 3 of the CCP provides a detailed description of the Social and Economic environment.





## *Chapter 4. Environmental Consequences*

Chapter 4 analyzes the environmental impacts expected to occur from the implementation of the alternatives as described in Chapter 2. Direct, indirect, and cumulative impacts are described where applicable for each alternative. Alternative A (No Action) is a continuation of management practices that are in place today and serves as a baseline against which Alternatives B and C are compared.

The National Environmental Policy Act (NEPA) requires mitigation measure when the NEPA process detects possible significant impacts to habitats, wildlife, or the human environment. All of the activities proposed under Alternative B are not expected or intended to produce significant levels of environmental impacts that would require mitigation measures. Nevertheless, the CCP contains measures that would preclude significant environmental impacts from occurring.

### **Effects on the Physical Environment**

#### *Soils*

Under all alternatives, soils that are considered to be prime and important farmland would be taken out of agricultural production. Because these lands are subject to regular flooding and erosive forces, they require reoccurring maintenance to repair damage caused by flooding. As a result, these farmlands have inconsistent production and require expensive long-term maintenance. The loss of farmland and agricultural production is mitigated through continued agricultural leases administered through Cooperative Land Management Agreements (CLMA) with private, nonprofit conservation groups. The CLMAs allow the land to be leased to private farmers who, in turn, continue farming the land until the orchards and farmlands become agriculturally unproductive through attrition, are damaged to a degree that repair is not economically feasible, or restoration funding to allow their conversion becomes available.

Under all alternatives, several site preparation activities would be conducted to prepare the Refuge units for habitat restoration. Some of these activities, such as orchard removal, infrastructure removal, and light land grading, would involve soil disturbance and may temporarily increase erosion and sedimentation rates in the project area.

The overall effect on soils from implementation of Alternatives A and B is negligible. The surface erosion potential is low, and because these activities would be conducted in small increments, any temporary increase in erosion and sedimentation rates resulting from the project would likely be minor. Moreover, any temporary increase in erosion and sedimentation rates resulting from site preparation activities under alternatives A and B would be offset by the substantial long-term reduction in erosion and sedimentation rates that would result from taking the Refuge units out of agricultural production and restoring them to native riparian habitat. Under Alternative C, large scale orchard

removal could pose a temporary erosion hazard resulting in a negative effect on soils.

Standard habitat management activities, including mowing, discing, tilling, herbicide/pesticide application, fire, grazing, and irrigation may have some effect on soils. In particular, Service-approved herbicides would be used with all alternatives including both restoration and farming applications. The use of herbicides and pesticides is highly regulated through the Service's Pesticide Use Proposal (PUP) process. This approach notes environmental hazards, efficacy, costs, and vulnerability of the pest. In addition, the highly regulated Integrated Pest Management process results in minimizing the use of herbicide/pesticides and subsequently, leads to minor effects on soils.

Pesticides for the farming program have been approved with varying restrictions and may be used in the management of orchards in Alternatives A and B. Under Alternative A, approximately 1,100 acres would remain in agricultural production and there would be continued use of pesticides, resulting in a long-term negative impact. Long-term pesticide and herbicide applications would be reduced or eliminated under both Alternatives B and C, leading to a positive or negligible effect on soils.

#### *Geology and Hydrology*

All proposed alternatives would convert relatively open agricultural fields and orchards to riparian vegetation; the conversion could cause changes in the velocity of flood flows that inundate the re-vegetated areas. Potential changes in water surface elevations were evaluated in hydrologic models created by Ayres Associates (2001b) to assess the potential effects of converting agricultural land to riparian habitat on 9 units of the Refuge under the Restoration EA (USFWS 2002b). The engineering parameters used in the study found water surface elevations upstream and within the river reaches confined by the Sacramento River Flood Control Project to be flood neutral throughout the area used as a model, as a result of the proposed restoration activities. Any future restoration plans outside of these 9 units (Alternatives B & C) would be evaluated on an individual basis to assure that restoration projects would have a neutral affect on water surface elevations and no adverse effects to adjacent properties.

As agricultural operations cease and Refuge lands are restored to riparian habitat, the need for flood protection of these properties is reduced. By restoring the floodplain hydrology on Refuge lands, flooding on neighboring agricultural operations may be reduced.

Erosion and deposition would not be expected to change substantially as a result of the proposed alternatives. The conversion of properties from managed agricultural production to a more natural riparian condition is considered beneficial for reducing the direct and indirect adverse effects of erosion and sediment deposition in the river. The area in which the river can naturally erode and deposit would be increased in all alternatives, reducing the stress on those areas that have ongoing structural flood and bank stabilization activities or that could require such measures in the future. The Service

recognizes the need to protect the integrity of the system of levees, weirs, diversions, and overflow areas for the purpose of public safety and agricultural operations. Bank protection is an ongoing aspect of the Sacramento River Flood Control Project for the purpose of public safety and economic considerations. Habitat protection and restoration programs would have minimal influence on the direction of bank stabilization projects.

Mitigation Measure 1: Coordinate Site-Specific Restoration Plans with the Reclamation Board. Copies of detailed restoration plans/planting designs would be provided to the staff at the State Reclamation Board for review and comment. The specific comments from the Reclamation Board staff would be evaluated and incorporated into the localized plans.

### *Air Quality*

All alternatives would have temporary increases in dust and tailpipe emissions due to restoration work. Alternatives B and C would have long-term minor increases in tailpipe and fugitive dust emissions due to increased visitor trips (estimated to be 5,000 annually) and the construction of parking lots, but would have an overall positive effect on air quality with the implementation of full restoration over time. The potential for wind blown erosion under Alternative C may result in a temporary negative affect on air quality. Alternative A would have long-term minor impacts to air quality associated with the continuation of the agricultural practices such as orchard management, but would result in minor improvement to air quality over time as the restoration identified in the Restoration EA (USFWS 2002b) is implemented.

All alternatives would use limited prescribed fire to control nonnative weeds which may temporarily impact air quality. Burning vegetation could temporarily and substantially increase PM10 concentrations in the areas. However, adverse impacts from prescribed fire are expected to be less than significant for the following reasons. Prior to conducting a burn, the Service would develop a prescribed burn plan and obtain a burn permit from the appropriate Air Quality Management District. The Service would follow all conditions of the permit. Measures to avoid and/or minimize adverse effects would include close coordination with the appropriate Air Quality Management District; selection of a proper burn prescription and cessation of burn activities when conditions exceed predetermined prescription levels; and the use of firebreaks (cut line, existing roads) around burn units to minimize any potential for wildfire. Prescribed fire impacts are mitigated by small burn unit size, direction of winds, and distance from population centers. See Fire Management Plan for more detailed information (Appendix E). Interpretive programs, explaining the prescribed burning program, will also be conducted on and off the Refuge.

### *Water Quality/Contaminants*

Land-disturbing construction activities would occur in all alternatives, but would have minimal impacts on water quality under Alternatives A and B because restoration efforts would primarily involve planting operations entailing minimal tillage or grading. Under Alternative C, the immediate removal of all orchards could have a temporary negative impact on water quality resulting from possible soil erosion into the Sacramento River.

However, under this alternative, all agricultural-related pesticides would be eliminated immediately.

To prevent groundwater contamination, the Refuge would identify and protect wells expected to be exposed to inundation, or would abandon and seal the wells according to county specifications under each of the alternatives.

All herbicides approved by the Service through the PUP process would be applied at label rates and all label recommendations would be followed. All three alternatives would result in an overall long-term reduction in pesticide applications within the Sacramento River floodplain. In the context of the overall input of chemicals from agricultural activities (acres of land and pounds of chemicals) within the Sacramento River floodplain, the long-term reduction in pesticide applications resulting from refuge actions represents a minor improvement.

Restoration activities would involve large earthmoving equipment that could result in the introduction of various contaminants, such as fuel oils, grease, and other petroleum products, either directly from equipment or through surface runoff. Contaminants may be toxic to fish or adversely affect their respiration and feeding. With the implementation of avoidance measures described below, no adverse effects on fish are expected to occur.

Mitigation Measure 2: Implement Best Management Practices to Avoid Reduction in Water Quality. Best management practices (BMPs) could include a variety of sediment control measures such as silt fences, straw or rice bale barriers, brush or rock filters, sediment traps, fiber rolls, or other similar linear barriers that can be placed at the edge of the project area to prevent sediment from flowing off site. The exact location and placement of the various sediment control BMPs would be determined by the refuge manager.

The Refuge would establish a spill-prevention and countermeasure plan before project construction begins; this plan would include on-site handling criteria to avoid input of contaminants to the waterway. A staging, washing, and storage area would be provided away from the waterway for equipment, construction materials, fuels, lubricants, solvents, and other possible contaminants.

Over time, all of the alternatives are expected to result in positive effects on water quality on the Sacramento River. As the Refuge restores riparian habitat and agricultural operations cease, the need for flood protection of these properties is reduced. Restoring the floodplain hydrology (topography) on Refuge lands may also reduce flooding on neighboring agricultural operations. Sediment and contaminant levels could also be reduced. These effects, although beneficial, are not significant. The Sacramento River is the largest river in California, starting near Mount Shasta and flowing 382 miles to the north arm of the San Francisco Bay. The Refuge encompasses only a small portion of this river and thus its effects are not significant.

## Effects on the Biological Environment

### *Vegetation*

None of the alternatives would have adverse effects on special-status plants or sensitive natural communities due to restoration activities. No restoration activities are proposed within existing natural areas; such activity would be limited to existing fallow or agricultural areas (orchards and pastures). Special-status plants and sensitive natural communities (e.g. valley oak woodland and elderberry savanna) would benefit from implementation of all alternatives, which would increase the acreage of forest, scrub, savannah, grassland, and wetland communities throughout the Refuge. Existing riparian forest, grassland, and wetland communities would be protected and their habitat area expanded. Alternatives B and C would have greater long-term positive effects on vegetation than Alternative A, due to the increased acreage that would be restored. But, because Alternative C would require immediate removal of all orchards, the resulting fallow fields would soon likely be invaded by nonnative weed species and in turn become a troublesome source of nonnative weed species.

All alternatives would utilize herbicides for weed maintenance in existing riparian areas and in restoration sites, and Alternatives A and B would also utilize herbicides for weed maintenance in orchards. Trained applicators would apply herbicides following manufacturers' recommendations and in accordance with the Refuge's approved PUPs. Use of herbicides would have a positive effect on vegetation, since the control of nonnative weeds would result in an increase in native species with minimal environmental cost.

Alternatives B and C would have small, but dispersed, impacts on some vegetated areas due to increased public use. Areas with special-status plants and sensitive natural communities would be avoided in the placement of trails, parking lots, and other public use facilities. Foot traffic would likely increase in areas that are most easily traversed, such as gravel bar, riparian willow scrub, herbland, grassland, valley oak and elderberry savanna. The small amount of trampling that would result from public use activities would have temporary and small-scale impacts on vegetation.

The riparian restoration in Alternatives B and C would have beneficial long-term impacts on the Refuge. Approximately 2,372 acres of land on nine existing units within the Refuge will be planted or allowed to revegetate with native vegetation under Alternative A (No Action) based on the Restoration EA (USFWS 2002b). The additional 3,255 acres that would be restored under Alternatives B and C would have additional beneficial effects. Habitat restoration fulfills the Service's congressional mandate to preserve, restore, and enhance riparian habitat for threatened and endangered species, songbirds, waterfowl, other migratory birds, anadromous fish, resident riparian wildlife, and plants. However, the Refuge encompasses only a small portion of the 382 mile long Sacramento River and the Refuge is only one of many partners who have the goal to restore habitat along the river. In the context of the large amount of habitat lost along the Sacramento River compared to the amount of habitat that would be restored by Alternatives B and C, the

beneficial effects are not significant.

### *Wildlife Resources*

All alternatives would result in short-term and long-term benefits for wildlife species due to the restoration of riparian habitat. Alternatives B and C would provide more restored riparian habitat than Alternative A, and would therefore have greater positive effects for wildlife. As with the effects of riparian restoration (above paragraph), the beneficial effects of Alternative B and C are also not significant for wildlife for many of the same reasons.

Increased public use under Alternatives B and C would result in disturbance to wildlife. Alternative C would have a slightly greater effect because it allows for more public access than Alternative B. Due to the inaccessible “jungle-like” nature of a mature riparian forest; disturbance would be limited to those habitats that are more open to foot travel. These areas already receive some unpermitted public use. With the implementation of Alternatives B and C, there would also be increased public education, trails and signage, and law enforcement, all of which would help to alleviate the degree of disturbance.

### *Special Status Species*

#### Bank swallow

Indirect adverse effects on bank swallows are not likely to result from the conversion of agricultural habitats to riparian forest. Public use (Alternatives B & C) would be limited or prohibited in areas with active bank swallow colonies.

#### Valley elderberry longhorn beetle (VELB)

All alternatives are not likely to adversely affect VELBs. Every effort would be made to incorporate existing shrubs in agricultural habitats into the restoration plans, although an occasional shrub may be affected. This effect would be infrequent and offset by the substantial increase in VELB habitat created by restoration activities. If there is a situation in which a shrub cannot be saved, the Refuge has the appropriate permits allowing the “take” of up to 10 plants per year that have main stems one inch or more in diameter. The Refuge would be required to consult with the Service if individual shrubs must be removed.

Mitigation Measure 3: Translocate removed elderberry shrubs to base of mature elderberry shrubs nearby at the Refuge. If there is a situation in any of the Alternatives where an elderberry shrub cannot be saved this mitigation measure would be applied. This allows emerging VELB the opportunity to populate existing elderberry shrubs.

Alternatives B and C may have negative impacts on elderberry shrubs if persons knowingly or unknowingly harvest the plants. Refuge law enforcement officers have found evidence of elderberry harvesting on the Refuge. Public education efforts and increased law enforcement should help to decrease the potential for negative impacts to VELB and

associated habitats.

Adjacent landowners have expressed concerns that planting elderberry shrubs near their properties could lead to the spread of VELB onto their properties, with resulting special-status species issues. In response to these concerns, all restoration plans would leave a 100-foot-wide corridor along the inside of the refuge perimeter in which no elderberry shrubs would be planted, reducing the likelihood that VELB would colonize elderberry shrubs on adjacent properties.

#### Giant garter snake (GGS)

All alternatives could adversely affect the GGS if restoration activities were to occur in potential GGS habitat. The following measures would be taken to protect GGS and its habitat when threatened by restoration activities:

Mitigation Measure 4: Avoid Giant Garter Snake Habitat by Restricting Location and Timing of Project Activities. If project activities take place within 200 feet of potential habitat between April 1 and October 1, surveys would be conducted immediately prior to ground disturbance. No ground-disturbing activities would occur within 200 feet of potential habitat from October 1 through April 1 without consulting with Service Endangered Species Division staff.

Increased public use due to implementation of Alternatives B and C are unlikely to cause any adverse effects on GGS. Giant garter snakes are associated with permanent wetlands, low gradient streams and drainage and irrigation systems. It is unlikely that wildlife-dependant public use activities (hunting, fishing, wildlife observation and photography, environmental education and interpretation) will affect this species in these habitats.

#### Other Special Status Wildlife Species

All alternatives would result in short-term and long-term benefits for special status wildlife species due to restoration of riparian habitat, such as Bell's vireo, willow flycatcher, western yellow-billed cuckoo, and bald eagle. Since most of these species have declined due to loss of riparian habitats, the restoration of these habitats would benefit these species. Some species may be adversely affected by restoration activities. The conversion of fallow fields or low-growing agricultural crops into riparian habitats would reduce the amount of potential foraging habitat for Swainson's hawks and other raptor species. However, many restoration plans include areas of open native grassland, elderberry savannah, and Valley oak savannah, all of which provide excellent quality foraging habitat for raptor species. In addition, the types and quality of foraging habitat provided by fallow fields and low-growing agricultural crops are common in the region, and as a result, foraging habitat loss for Swainson's hawks is not considered substantial.

Alternatives B and C would provide greater positive effects for special status wildlife species than Alternative A, since more acreage would be restored to riparian habitat. However, the beneficial short and long-term effects on wildlife would not be significant.

The Refuge would only be able to provide habitat for a limited number of special status wildlife species. While this would be a benefit, it would probably not be enough to restore their populations. The Refuge's contribution, therefore, is only part of what maybe required for their continued long-term survival.

The implementation of Alternatives B and C could create some disturbance to special status species due to increased public use. To alleviate any negative effects, areas that are known to have sensitive species would have restricted public access and may have temporary closures instituted for protection during critical lifecycle periods such as nesting.

### *Fisheries Resources*

The implementation of riparian restoration in all alternatives would result in long-term beneficial effects on fish in the Sacramento River, including winter/spring run Chinook salmon, steelhead, and Sacramento splittail. The resulting riparian habitats would provide shaded riverine aquatic habitat and large woody debris, increasing cover, food, and other main channel and floodplain habitat components for fish. Alternatives B and C would provide more restored riparian habitat, having a greater positive effect for fish than Alternative A. These effects, although beneficial, are not significant. The loss of riparian habitat on the Sacramento River has contributed, in part, to the decline of our native fisheries resources. The Refuge encompasses only a small portion of the Sacramento River, therefore, is only part of what maybe required for the continued long-term survival of our fisheries resources.

Temporary impacts on fish species could occur during restoration implementation due to loosening of the soil during orchard removal, and grading and placement of irrigation systems, resulting in a temporary increase sediment load in the river. Increased input of sediment has the potential to increase turbidity, possibly reducing the feeding efficiency of juvenile and adult fish. Alternative C would have greater potential sediment impacts due to the large amount of acreage that would undergo orchard removal and then remain fallow. Because the Sacramento River is typically a turbid system, additional sediment input from restoration activity would be comparatively minimal and would not have any noticeable effect to the overall condition of the river. Furthermore, sediment runoff from restoration sites would occur only during storm events. After the first germinating fall/winter rains, grasses and forbs will provide ground cover which stabilizes top soil.

Alternatives B and C would allow fishing at the Refuge, but are not expected to significantly affect fish harvest since most areas along the river are accessible by boat only and are already being fished.



## Effects on the Social and Economic Environment

### *Visitor Services*

Implementing Alternative A would result in a very limited public use program, which would include a limited volunteer program that would assist in habitat restoration projects and a limited number of tours and school field trips. Only the primitive public fishing access road and boat launch at Packer Lake would be maintained. There would be no additional public use facilities developed and very limited outreach efforts for environmental education.

Under Alternatives B and C there would be an increased promotion of the Refuge with schools, the development of an educator-led curriculum for Refuge resources, and additional refuge signs, trails, restrooms, and parking lots. Visitation may increase to approximately 15,000 visits and from 300 students to 1,000 students annually. The number of visits may increase over time. The public would be allowed daytime access (one hour before sunrise to one hour after sunset) to much of the Refuge land, excluding gravel bars, for hunting, fishing, wildlife observation, photography, interpretation, and environmental education.

Although public use opportunities would substantially increase under Alternatives B and C, user conflicts may occur under the implementation of Alternative C. More contact between hunters and other visitors may lead to increased competition for recreation space. There could be more safety concerns involving hunting activities taking place simultaneously with non-hunting public use activities on more units of the Refuge under Alternative C. Long-term monitoring would be conducted to evaluate the impact of the increased public uses on the Refuge and other users in an effort to avoid adverse impacts to the recreating public.

Alternatives B and C provide the need for additional visitor opportunities which was identified and discussed in the Sacramento River Public Recreation Access Study (EDAW 2003). The increase of public use in Alternatives B and C, compared to Alternative A, is substantial, but not significant. Although public use will be allowed on the Refuge, the proposed action (Alternative B) balances these public uses with the mission of the Service and the purposes of the Refuge. Sensitive areas for wildlife, plants and cultural resources have been set aside as sanctuaries and will be closed to the public. The remaining 84 percent of the Refuge that allows wildlife-dependent public uses have been carefully planned. Compatible locations of trails and facilities including restrooms and parking lots have been chosen to minimize disturbance to wildlife. Areas outside the trails and facilities, will not receive as much visitation or as concentrated visitation due to the thick “jungle” nature of the riparian habitat. To alleviate any negative effects, areas that are known to have sensitive species would have restricted public access and may have temporary closures instituted for protection during critical lifecycle periods such as nesting. With the implementation of Alternatives B and C, there would also be increased public education, trails and signage, and law enforcement, all of which would help to

alleviate the degree of disturbance. The overall increase in wildlife-dependent recreational opportunities from Alternative B is not significant and is viewed positively because it is compatible with the purposes of the Refuge, mission of the Service, the National Wildlife Refuge System, and it is also consistent with the Improvement Act.

### *Economy*

No significant positive or negative economic impacts are expected from implementation of the alternatives. The agricultural sector of the regional economy would be most affected by riparian habitat restoration. The reestablishment of riparian habitat would result in small reductions to agricultural production, local agricultural jobs, and personal income. These changes were analyzed in the Restoration EA in Section 4.4 Effects on the Social and Economic Environment (USFWS 2002b). The Service has taken the effects on Prime and Important Farmland into account as it has considered alternatives to the CCP. Alternative B was developed because it would lessen these impacts.

During the process of identifying appropriate land to purchase and dedicate to restoration for the benefit of wildlife, the Service considered that the land along the river is subject to periodic inundation and therefore of lesser agricultural value than surrounding land. Willing sellers were sought so that the impact on lands with long-term value for crop production would be minimized. Because the lands to be converted are subject to flooding, and because of the importance of these lands to the recovery of federally protected species, the Service believes that converting these agricultural lands to habitat is appropriate. More than 90% of the riparian habitat that once existed along the Sacramento River has been lost to agriculture and urban development. When the size of the acreage converted is considered in the context of the four-county agricultural base, the conversion of this flood-prone farmland to habitat does not reach the level that would result in a significant impact on the human environment (USFWS 2002b). Additional economic information is included in the CCP, Chapter 3.

Alternatives B and C would substantially increase wildlife-dependent recreation opportunities on the Refuge and would result in some increased economic activity to the local area. Banking on Nature, a report by the USFWS (2003a), reports that recreational visits to national wildlife refuges generate substantial economic activity. In FY 2002, people visited refuges more than 35.5 million times for recreation and environmental education. Their spending generated \$809.2 million of sales in regional economies. As this spending flowed through the economy, nearly 19,000 people were employed and \$315.2 million in employment income was generated. In some areas, refuge visitors are major stimuli to the local economy. Non-consumptive use of wildlife at refuges generated about 30 percent more economic activity than hunting and fishing. Although non-consumptive wildlife users usually stay for shorter periods of time, their numbers at many refuges far exceed those of hunters and anglers. Surveys show refuge visitors would have been willing to pay more for their visit than it actually cost them. The difference between what they were willing to pay and what they actually paid is their net economic value or consumer surplus. Visitors enjoyed a consumer surplus of more than \$792 million in FY

2002. Over \$497 million of this amount accrued to non-consumptive visitors.

More information on the economic impacts of wildlife watching can be found in the report entitled “2001 National and State Economics of Wildlife Watching” (USFWS 2003b). Observing, feeding, and photographing wildlife in the United States is an important pastime for millions of Americans and contributes significantly to the national and state economies. In 2001, more than 66 million people 16 years of age and older spent over \$38.4 billion on trips and equipment in pursuit of these activities. Wildlife-watching expenditures have contributed substantially to Federal and state tax revenues (\$6.1 billion), jobs, earnings (1,027,833 jobs), and industry output (\$95.8 billion).

It is anticipated that there could be increased employment and spending in the local area for materials, services and contracts related to wildlife dependent recreation. The increase in public use could help to offset the local losses from the agricultural economy, but it would not result in a significant effect on the local economy. See Chapter 3 of the CCP for more information about the local economy.

#### *Cultural Resources*

A beneficial effect to cultural resources is anticipated under all alternatives as there are several known cultural resource sites within the Refuge boundary. Under Federal ownership, archaeological and historical resources within the Refuge receive protection under Federal laws mandating the management of cultural resources, including, but not limited to, the Archaeological Resources Protection Act; the Archaeological and Historic Preservation Act; the Native American Graves Protection and Repatriation Act, and the National Historic Preservation Act. Under all alternatives, if any additional cultural resources are discovered on the Refuge, the Service would take all necessary steps to comply with section 106 of the National Historic Preservation Act of 1966, as amended.

The Refuge has been involved in discussions/consultation with local tribes on management issues pertaining to properties with significant archeological resources. These discussions have allowed the Service to make informed management decisions as well as improve relationships with local tribes. The Refuge would continue to engage the appropriate tribes on management decisions related to culturally significant resources and incorporate the historical value in the environmental education program. Additional cultural resource information is included in the CCP, Chapter 3.

#### *Environmental Justice*

On February 11, 1994, the President issued Executive Order 12898 (“Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations”) requiring that all Federal agencies achieve environmental justice by “identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations.” Environmental justice is defined as the “fair treatment for

peoples of all races, cultures, and incomes, regarding the development of environmental laws, regulations, and policies.

The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect, and enhance fish and wildlife and their habitats for the continuing benefit of the American people. The developing environmental justice strategy of the Service extends this mission by seeking to ensure that all segments of the human population have equal access to America's fish and wildlife resources, as well as equal access to information that will enable them to participate meaningfully in activities and policy shaping.

Within the spirit and intent of Executive Order 12898, no minority or low income populations would be impacted by any Service action under any Alternative.

### **Unavoidable Adverse Impacts**

None of the alternatives would have unavoidable adverse impacts on the environment.

### **Irreversible and Irrecoverable Commitments of Resources**

None of the proposed alternatives would result in an irreversible or irretrievable commitment of resources.

### **Short-term Uses versus Long-term Productivity**

The habitat protection and management program proposed as part of the Refuge System is permanent and exclusively dedicated to maintaining the long-term productivity of the Refuge habitats. The local short-term uses of the environment would include increased management of wildlife habitats and development of public use facilities. The resulting long-term productivity would include increased protection and survival of endangered species as well as a myriad of plant and animal species. Under Alternative B, the public would gain long-term opportunities for wildlife-dependent recreational activities and an enhanced quality of life.

### **Cumulative Impacts**

Cumulative effects (or impacts) are those effects on the environment resulting from incremental consequences of the Service's proposed actions when added to other past, present, and reasonably foreseeable future actions, regardless of who undertakes these actions. Cumulative effects can be the result of individually minor impacts which can become significant when added over a period of time. Accurately summarizing cumulative effects is difficult in that while one action increases or improves a resource in an area, other unrelated actions may decrease or degrade that resource in another area.

Within all of the alternatives, the conversion farmlands would contribute to the incremental, cumulative conversion of these land resources to other land uses in Glenn, Butte, Tehama and Colusa counties, as well as in the Sacramento Valley and the state of California as a whole. The cumulative effect of these conditions would be offset by the following conditions. The loss of jobs and income resulting from farmland conversion

would be an indirect adverse effect on fiscal resources in the Sacramento Valley and the four subject counties. This effect would be most pronounced following the initial 5-10 year period of conversion and restoration. In the long term, the lost economic benefits of agricultural production could be offset by increased recreation-based income resulting from visitor use of the river and surrounding riparian habitat. In addition, cost savings associated with the reduced extent of flood damage repairs in these counties may offset some of the economic loss. The net effect is not expected to be substantial (USFWS 2002b).

All alternatives would have long-term benefits for native wildlife species and habitats within the area. The protection of wildlife habitats within the Refuge would represent a benefit to the long-term conservation of threatened and endangered species and other native wildlife species. Alternatives B and C would provide greater benefits due to the increased amount of habitat restoration that would take place. However, these long-term benefits are not cumulatively significant. There are many projects that benefit wildlife and habitats on the Sacramento River. The establishment of the Refuge and restoration that will be accomplished under the Restoration EA (USFWS 2002b) both provide beneficial effects. The Refuge is also, just one of many partners along the river that is restoring habitat for wildlife along the Sacramento River. However, despite all of these beneficial effects there are negative effects that have occurred and continue to occur on this river. The long-term cumulative negative effects of wildlife habitat degradation still outweigh the beneficial effects of the proposed action. The Refuge encompasses only a small portion of the 382 mile long Sacramento River. Moreover, the benefits derived from Alternatives B and C will only restore and protect a small fraction of the amount of habitat that has been lost on this river and within the Central Valley of California.

**Table 2. Summary of Environmental Consequences**

<b>Resource</b>	<b>Alternative A No Action</b>	<b>Alternative B Optimize</b>	<b>Alternative C Accelerated/Maximize</b>
<b>PHYSICAL ENVIRONMENT</b>			
Soils	Surface erosion potential is low, activities conducted in small increments, long-term reduction in erosion and sedimentation due to restoration	Same as Alternative A	Large scale orchard removal may cause temporary erosion hazards, activities conducted in small increments, long-term reduction in erosion and sedimentation due to restoration
Geology/Hydrology	Restoration sites have neutral effect on water surface elevations (USFWS 2002b)	Coordinate site-specific restoration plans with Reclamation Board to ensure neutral effect on water surface elevations	Same as Alternative B
Air Quality	Long-term minor impacts from agricultural practices, but improved air quality with implementation of restoration	Increased visitor use could increase tailpipe and fugitive dust emissions, but air quality could improve with implementation of restoration	Potential for wind blown erosion, increased visitor use could increase tailpipe and fugitive dust emissions, but air quality could improve with implementation of restoration
Water Quality and Contaminants	Long-term reduction of pesticide applications, Best Management Practices used during restoration	Same as Alternative A	Removal of orchards may result in temporary decrease in water quality due to increased erosion, Agricultural-related pesticides eliminated, Best Management Practices used during restoration
<b>BIOLOGICAL ENVIRONMENT</b>			
Vegetation	Riparian habitat restored under Restoration EA (USFWS 2002b)	Additional acres of riparian habitat restored	Additional acres riparian habitat restored, but immediate removal of orchards could increase nonnative weeds
Wildlife Resources	Wildlife benefits due to restoration of habitat, No increased public use disturbance	Wildlife benefits due to more restored acres, Increased disturbance by public use balanced with public education, trails, signs and law enforcement	Same as Alternative B

<b>Resource</b>	<b>Alternative A No Action</b>	<b>Alternative B Optimize</b>	<b>Alternative C Accelerated/Maximize</b>
Fishery Resources	Long-term benefit to fish	Increased long-term benefit to fish (more acres restored increases habitat components for fish)	Same as Alternative B
Special Status Species	Species benefit due to restoration of habitat	Species benefit even more due to additional acres of habitat restored	Same as Alternative B
<b>SOCIAL AND ECONOMIC ENVIRONMENT</b>			
Visitor Services	Limited public use program	Increased public use opportunities	Increased public use opportunities, user conflicts may occur
Economy	Agricultural sector most affected by incremental riparian habitat restoration	Agricultural sector most affected by incremental riparian habitat restoration, Increased wildlife-dependent opportunities may increase local economy	Same as Alternative B, except effect to agricultural sector will not be incremental and farming will cease immediately
Cultural Resources	Impacts of management activities minimized through reviews and surveys.	Same as Alternative A	Same as Alternative A
Environmental Justice	No minority or low income populations will be disproportionately impacted.	Same as Alternative A	Same as Alternative A





# *Chapter 5. List of Planning Team Members and Persons Responsible for Preparing this Document*

## **Core Planning Team**

Kevin Foerster	Project Leader, Sacramento NWRC
Kelly Moroney	Refuge Manager, Sacramento River NWR
Denise Dachner	Outdoor Recreation Planner, Sacramento NWRC
Joe Silveira	Wildlife Biologist, Sacramento NWRC
Jennifer Isola	Wildlife Biologist, Sacramento NWRC
Mark Pelz	Refuge Planner – GIS Analyst, CA/NV Refuge Planning Office
Jacqueline Ferrier	Refuge Planner, Sacramento NWRC
Miki Fujitsubo	Former CCP Planner, CA/NV Refuge Planning Office
Ramon Vega	Former Refuge Manager, Sacramento River NWR

## **Expanded Team Members**

Paul Hofmann	Wildlife Biologist, California Dept. of Fish and Game
Woody Elliot	Resource Ecologist, California Dept. of Parks and Recreation
Jason Douglas	Sr. Fish and Wildlife Biologist, FWS – Sacramento FWO
Michael Green	Nongame Landbird Coordinator, FWS – Region 1
Randy Jero	USDA -Mendocino National Forest
Teresa Leblanc	Wildlife Biologist, Dept. of Fish and Game, Sacramento, CA
Paul Ward	Fisheries Biologist, California Dept. of Fish and Game
Joel Miller	Asst. Refuge Supervisor, CA/NV Operations Office
Gregg Werner	Conservation Planner, The Nature Conservancy

## **Reviewers**

Leslie Lew	Landscape Architect, CA/NV Refuge Planning Office
Chuck Houghten	Chief, Refuge Planning, Region 1
J. Greg Mensik	Deputy Project Leader, Sacramento NWRC
Michael Wolder	Supervisory Wildlife Biologist, Sacramento NWRC
Dave Paullin	Refuge Supervisor, CA/NV Operations Office
Perry Grissom	Fire Management Officer, Sacramento NWRC
Marilyn Gamette	Interpretive Specialist, Sacramento NWRC
Jeanne Clark	Writer/Editor, Classic Communications



# *Chapter 6. Consultations and Coordination with Others*

## **Agency Coordination and Public Involvement**

The CCP and EA were prepared with the involvement of technical experts, community groups, and private citizens. The Service has invited and continues to encourage public participation through the public involvement program consisting of technical panels and project planning updates.

The public workshops, planning updates, and other coordination activities have been previously discussed in the Issue Identification and Public Involvement sections of Chapter 1.

## **Notice of Intent**

A Notice of Intent (NOI) was published in the Federal Register on June 11, 2001.

## **Environmental Review and Coordination**

As a Federal agency, the Service must comply with provisions of the NEPA. An environmental assessment was developed under NEPA to evaluate reasonable alternatives that would meet stated objectives and to assess the possible impacts to the human environment. The EA serves as the basis for determining whether implementation of the proposed action would constitute a major Federal action significantly affecting the quality of the human environment.

## **Other Federal Laws, Regulations, and Executive Orders**

In undertaking the proposed action, the Service would comply with the following Federal laws, Executive Orders (EO), and Legislative Acts: Floodplain Management (EEO 11988), Intergovernmental Review of Federal Programs (EO 12372), Protection of Historical Archaeological, and Scientific Properties (EO 11593), Protection of Wetlands (EO 11990), Management of General Public Use of National Wildlife Refuge System (EO 12996), Environmental Justice in Minority Populations and Low-Income Populations (EO 12898), Endangered Species Act of 1973, as amended, Fish and Wildlife Act of 1956, Emergency Wetlands Resources Act of 1986, Refuge Recreation Act as amended, National Wildlife Refuge System Administrative Act of 1966, as amended, National Historic Preservation Act of 1966, as amended, Responsibilities of Federal Agencies to Protect Migratory Birds (EO 13186), Migratory Bird Treaty Act of 1918, the Fish and Wildlife Conservation Act of 1980, as amended, Neotropical Migratory Bird Conservation Act of 2000, and the Coastal Zone Management Act of 1972, as amended.

## **Distribution and Availability**

The draft CCP and EA has been sent to the State of California Clearinghouse, various agencies, organizations, community groups, and individuals for review and comment.

## **List of Specific Persons Consulted**

Paul Hofmann	California Department of Fish and Game
Paul Ward	California Department of Fish and Game
Teresa Leblanc	California Department of Fish and Game
Steve Owen	California Department of Fish and Game
Woody Elliot	California Department of Parks and Recreation
Michael Fehling	California Department of Parks and Recreation
Stacy Cepello	California Department of Water Resources
Dave Means	Wildlife Conservation Board
Scott Clemons	Wildlife Conservation Board
Bob Shaffer	Bureau of Reclamation
Kelly Williams	Bureau of Land Management
Chuck Schultz	Bureau of Land Management
Greg White	Chico State University - Archaeology
Jim Camy	Butte County Mosquito and Vector Control District
Burt Bundy	Sacramento River Conservation Area Forum
Dawit Zeleke	The Nature Conservancy
Gregg Werner	The Nature Conservancy
John Carlon	River Partners
Bernard Flynn	River Partners
Dan Efsaef	River Partners
John Merz	Sacramento River Preservation Trust
Bill Gaines	California Waterfowl Association
Mark Hennelly	California Waterfowl Association

***Appendix 1. Goals, Objectives and  
Strategies Matrix.***



## 1 Wildlife and Habitat Goal:

*Contribute to the recovery of endangered and threatened species and provide a natural diversity and abundance of migratory birds and anadromous fish through the restoration and management of riparian habitats along the Sacramento River using the principles of landscape ecology.*

### 1.1 Riparian Vegetation and Habitat Objective

Restore an additional 3,255 acres of riparian vegetation and habitats (Great Valley willow scrub, Great Valley cottonwood forest, Great Valley mixed riparian forest, Great Valley valley oak riparian forest, Valley oak savannah, elderberry savanna, and grassland, herbland, and wetland) for riparian-dependent species by 2014.

<b>Riparian Vegetation and Habitat Objective Comparison by Alternative</b>			
<b>Objective 1.1: Restoration</b>	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative C</b>
Acres of Restored habitat by 2005	2,600	2,600	2,600
Acres of Restored habitat within 10 years	4,636	5,855	5,855

**Rationale:** Riparian forests and other riparian plant communities of California's Great Central Valley provide habitat for a diversity of resident and migratory terrestrial and aquatic wildlife, including rare and endangered species (Gaines 1974, 1977; Moyle 2002; Riparian Habitat Joint Venture 2003; Roberts et al. 1977; Small et al. 2000) The Partners in Flight Conservation of the Land Birds of the United States (2000), and the California Partners in Flight/Riparian Habitat Joint Venture Riparian Bird Conservation Plan (2003), and the Southern Pacific Coast Regional Shorebird Plan (2000) identify focal species and habitat conservation and restoration needs for Central Valley birds.

Wetlands and riparian forests once covered about 5 million acres of the Central Valley before intensive settlement began in the late 1800's. Flood-control and subsequent conversion of natural wetlands to agricultural production have reduced these habitats to less than one-tenth their former extent (Dahl 1990). CDFG considers Great Valley willow scrub, Great Valley cottonwood forest, Great Valley mixed riparian forest, Great Valley oak riparian forest, Valley oak and elderberry savannas, and many grassland and freshwater wetland vegetation types to be rare plant communities (Holland 1986; Holland and Roye 1989). Less than 2 percent of the pre-1850 acreage of riparian forest remain, with virtually all of the Valley oak forest type gone (Bay Institute 1998). Out of 418,916 hectares of potential riparian habitat in the Central Valley of California, only 51,927 hectares is currently forested (RHJV 2003). In addition, less than 1 percent of California's original grasslands remain (Huenneke, 1989).

Few sites on the Refuge offer conditions for successful passive restoration because of the altered hydrograph, existing weed community, and lack of native seed sources. At most sites, natural recruitment would likely include many nonnative plant species of lower habitat value for target wildlife species. As a result, modern agricultural techniques are used for restoration on Sacramento River Refuge.

Riparian restoration and management are necessary to expand and provide habitat for species associated with the Sacramento River. Opportunities for willow scrub, cottonwood, mixed riparian, Valley oak riparian forest, and associated grassland and herbland habitats exist at the mid-elevation floodplain of the Sacramento River. Opportunities exist for valley oak woodland and savanna, and associated grassland habitats, at the high-elevation floodplain of the Sacramento River. Table 8 (Chapter 5, CCP) lists the acres proposed for restoration on each Refuge unit.

Riparian Vegetation and Habitat Strategies	Alternative		
	A	B	C
1.1.1: Develop a site assessment and restoration plan for each of the restoration sites on the additional 3,255 acres of riparian habitat. Each plan will identify the site characteristics using the principles of landscape ecology and determine the site-specific restoration criteria (species composition, etc.).	✓	✓	✓
1.1.2: Maintain cooperative land management agreements (CLMA) to administer the agricultural and restoration.	✓	✓	✓
1.1.3: Maintain, monitor and evaluate existing restoration sites to provide high quality fish and wildlife habitat. Evaluate past and present restoration techniques and results to build upon the knowledge available for future restoration efforts.	✓	✓	✓
1.1.4: Continue exploring potential habitat restoration sites and implementing restoration techniques using landscape ecology along the Sacramento River Refuge.		✓	✓

### 1.2 Floodplain and River Processes Objective

Promote recruitment of fish and wildlife habitat by investigating riverbank stabilization, Refuge levees, and floodplain topography for best management options. During this investigation, the Refuge will consider impacts on public safety and water conveyance. This investigation will be conducted on 11 Refuge units (La Barranca, Ohm, Flynn, Rio Vista, McIntosh Landing South, Pine Creek, Capay, Deadman’s Reach, Llano Seco, Sul Norte, and Drumheller Slough) and a written report will be created by 2014.



<b>Floodplain and River Process Objective Comparison by Alternative</b>			
<b>Objective 1.2: Riparian Restoration</b>	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative C</b>
Units investigated by 2005 (La Barranca, Flynn, Rio Vista, Sul Norte)	4	4	4
Additional Units investigated within 10 years (Llano Seco and La Barranca not included in 2002 Restoration EA)	9	11	11

**Rationale:** Migratory birds and native anadromous fish, especially Sacramento River Chinook salmon, have adapted to the natural process of erosion and deposition along the middle Sacramento River. The meandering processes along this stretch of the river create conditions that allow natural restoration and succession of riparian vegetation and habitats to occur; migratory birds and anadromous fish will respond positively to the resulting habitat features.

Modifying or removing existing privately-constructed levees that are present and restoring floodplain topography within Refuge boundaries will provide conditions for erosion, sediment deposition, and over-bank flooding. These natural processes will enhance, restore, and maintain floodplain habitats for salmonids, other native fish, and migratory landbirds and waterbirds, including species that breed, migrate and winter along the middle Sacramento River.

As the Refuge and its partners restore riparian habitat and agricultural operations cease, the need for flood protection of these properties is reduced. Restoring floodplain hydrology (topography) on Refuge lands may also reduce flooding on neighboring agricultural operations. Floodplain hydrology is restored by removing or breaching levees and/or riprap (bank revetment) that were constructed by the previous owners to protect agriculture. It is also restored through swale construction that recreates natural topography and allows Refuge lands to convey floodwaters and provide off-channel water storage during high water events as the Sacramento River overtops the its banks and spills into the floodplains.

At the same time, bank protection remains an ongoing aspect of the Sacramento River Flood Control Project. The Service recognizes the need to protect the integrity of the system of levees, weirs, and overflow areas that facilitates public safety and agricultural operations.

Habitat protection programs may have minimal influence on the merits or direction of bank stabilization projects. The issues of concern to the Refuge are the retention of existing riparian vegetation, protection of spawning and rearing habitat for anadromous fish, and maintenance of habitat for the threatened valley elderberry longhorn beetle and migratory birds.

Floodplain Connectivity and Topographic Restoration Strategies	Alternative		
	A	B	C
1.2.1: Modify privately constructed levees and other bank stabilization features on Refuge land if supported by feasibility studies, associated hydrologic investigations, and NEPA documentation.		✓	✓
1.2.2: Coordinate with the FWS-Ecological Services, U.S. Army Corps of Engineers, NOAA-Fisheries, State Reclamation Board, and affected groups about Refuge projects on a continual basis.	✓	✓	✓
1.2.3: Work with Federal, State, county, levee and irrigation districts to investigate best management practices for habitat and flood management purposes through technical studies and agency coordination.	✓	✓	✓
1.2.4: Continue to protect and manage Refuge lands within the 100-year floodplain. This will facilitate natural geomorphic and hydrologic processes that create and maintain habitat features to which migratory birds and anadromous fish have adapted.	✓	✓	✓

### 1.3 Threatened and Endangered Species Objective

Implement monitoring surveys to evaluate threatened and endangered species and their response to habitat restoration projects by conducting, analyzing, and reporting annual survey results and habitat use data. Implement 8 surveys by 2005 and 4 additional surveys by 2015.

<b>Threatened and Endangered Species Objective Comparison by Alternative</b>			
<b>Objective 1.3: Threatened and Endangered Species</b>	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative C</b>
Target T&E Species restored habitat use monitored and evaluated by 2005	8 (Least Bell's vireo, valley elderberry longhorn beetle, American bald eagle, giant garter snake, bank swallow, western yellow-billed cuckoo, willow flycatcher, & Swainson's hawk)	8 (Least Bell's vireo, valley elderberry longhorn beetle, American bald eagle, giant garter snake, bank swallow, western yellow-billed cuckoo, willow flycatcher, & Swainson's hawk)	8 (Least Bell's vireo, valley elderberry longhorn beetle, American bald eagle, giant garter snake, bank swallow, western yellow-billed cuckoo, willow flycatcher, & Swainson's hawk)
Additional Target T&E Species habitat use monitored and evaluated within 10 years (2015)	0	4 (Winter-run Chinook salmon, spring-run Chinook salmon, fall-run and late fall-run Chinook salmon, Central Valley ESU steelhead)	4 (Winter-run Chinook salmon, spring-run Chinook salmon, fall-run and late fall-run Chinook salmon, Central Valley ESU steelhead)

**Rationale:** Federally listed threatened and endangered species are trust responsibilities under the jurisdiction of the Service. Threatened and endangered species and those proposed for Federal listing, are likely to become extinct due to environmental factors. Populations are in decline due, in part, to habitat degradation and destruction. Monitoring is necessary to determine population distribution, abundance, and survival of species and identify habitat use and restoration and management needs.

Threatened and Endangered Species Monitoring Strategies	Alternative		
	A	B	C
1.3.1: Least Bell's vireo: Cooperate with PRBO and other partners to conduct point-count surveys for the species.	✓	✓	✓
1.3.2: Conduct VELB monitoring to assess distribution, abundance, and habitat use. Coordinate activities with the Fish and Wildlife Service/Sacramento Field Office. Support VELB research by cooperators on the Refuge.		✓	✓
1.3.3-1.3.6: Winter-run Chinook salmon, spring-run Chinook salmon, fall-run and late fall-run Chinook salmon, Central Valley ESU steelhead: Coordinate research and investigations at the refuge that focus on population demographics and habitat use and requirements. Coordinate with CDFG fishery investigations (Lower Stony Creek Fish Monitoring; Redd Surveys), Service population surveys (escape/passage at Red Bluff Diversion Dam), and research investigations from universities conducting salmonid research (University of California Davis and California State University Chico).	✓	✓	✓
1.3.7: American bald eagle: Identify locations where eagles are observed during proposed routine main channel surveys. Document refuge habitat use.	✓	✓	✓
1.3.8: Giant Garter Snake: Conduct giant garter snake surveys prior to habitat work, where hibernation areas may be disturbed.		✓	✓
1.3.9: Bank swallow: Conduct annual bank swallow survey in coordination with CDFG or other partners to monitor breeding colonies, habitat use on the Refuge, and population trends. Monitor refuge restoration and management activities at bank swallow colonies to reduce disturbance. Monitor public use activities at bank swallow colonies and restrict use, if necessary, to reduce disturbance.	✓	✓	✓
1.3.10: Conduct periodic surveys at three-year intervals for western yellow-billed cuckoos at the Refuge to document their distribution, abundance, and habitat use. Coordinate surveys with other Service offices, CDFG, U.S. Geological Survey, and PRBO.	✓	✓	✓
1.3.11: Cooperate with PRBO or other partners to conduct point-count and demographic surveys for the species.	✓	✓	✓
1.3.12: Swainson's hawk: Identify locations where Swainson's hawks are observed during proposed routine main channel surveys. Document refuge habitat use for adaptive management purposes.	✓	✓	✓

### 1.4 Breeding Migratory and Resident Landbird Objective

Enhance, restore and monitor breeding migratory and resident landbird populations to source population levels (40 percent recruitment) through habitat restoration on 3,255 acres by 2014. Source populations are those where recruitment (annual increase) is high enough to replace the local breeding population with a surplus, which can repopulate other areas. Source populations recruit at levels above 35 percent for most species.

Migratory Bird and Resident Landbird Objective Comparison by Alternative			
Objective 1.4: Migratory and Resident Landbirds	Alternative A	Alternative B	Alternative C
Target Neotropical Migratory Landbirds and Resident Birds restored to Source Population status (40% recruitment) within 10 years	14 (Black-headed Grosbeak, Common Yellowthroat, Swainson's Hawk, Yellow-billed Cuckoo, Nuttall's Woodpecker, Yellow Warbler, Song Sparrow, Bell's Vireo, Spotted Towhee, Willow Flycatcher, Blue Grosbeak, Spotted Sandpiper, Bank Swallow)	14 (Black-headed Grosbeak, Common Yellowthroat, Swainson's Hawk, Yellow-billed Cuckoo, Nuttall's Woodpecker, Yellow Warbler, Song Sparrow, Bell's Vireo, Spotted Towhee, Willow Flycatcher, Blue Grosbeak, Spotted Sandpiper, Bank Swallow)	14 (Black-headed Grosbeak, Common Yellowthroat, Swainson's Hawk, Yellow-billed Cuckoo, Nuttall's Woodpecker, Yellow Warbler, Song Sparrow, Bell's Vireo, Spotted Towhee, Willow Flycatcher, Blue Grosbeak, Spotted Sandpiper, Bank Swallow)

**Rationale:** Migratory birds are trust species under the jurisdiction of the Service. Sacramento River Refuge was established under the authority of the Endangered Species Act for birds, such as the least Bell's vireo. Executive Order 13186 directs Federal agencies to ensure that agency plans and actions promote programs and recommendations of comprehensive migratory bird planning efforts such as the Partners in Flight Riparian Bird Conservation Plan. The Refuge provides summer breeding, migration, and wintering habitat for migratory landbirds. Migratory landbird populations are in decline, due in part to habitat degradation and destruction, increased nest depredation and nest parasitism. Landbird monitoring is necessary to determine population status, assess population trends, determine causes for poor productivity, identify solutions, determine habitat restoration needs, and assess restoration success.

Migratory and Resident Landbird Strategies	Alternative		
	A	B	C
1.4.1: Implement restoration of mid- and high-elevation riparian vegetation and habitats. Use principles outlined in the California Partners in Flight/Riparian Habitat Joint Venture Riparian Bird Conservation Plan (2003), including habitat features that cover all of the 14 riparian bird focal species	✓	✓	✓
1.4.2: Coordinate with FWS Office of Migratory Bird Management, California Partners in Flight, the Riparian Habitat Joint Venture, PRBO, and other partners to periodically monitor the productivity of Sacramento River birds through demographic monitoring and to evaluate riparian restoration efforts..	✓	✓	✓
1.4.3: Annually evaluate the use of various habitat types by breeding birds and adapt the restoration design and management to enhance productivity of focal species, as needed.	✓	✓	✓
1.4.4: Conduct Sacramento River main channel, fixed-route surveys for nesting osprey and other visible nesting species (e.g., kingfisher burrows). These cooperative Refuge surveys are conducted seasonally, four times a year, from Red Bluff to Colusa, and record all wildlife observed from the survey vessel (Also strategies 1.5.3 and 1.6.1).	✓	✓	✓

### 1.5 Winter Migratory Landbirds

Implement monitoring surveys for wintering migratory landbird populations on up to 8,000 acres of riparian habitat on the Refuge by 2009.

Winter Migratory Landbirds Objective Comparison by Alternative			
Objective 1.5: Winter Migratory Landbirds	Alternative A	Alternative B	Alternative C
Acres of monitoring surveys for wintering migratory landbirds	8,000	8,000	8,000

**Rationale:** Migratory birds are trust species under the jurisdiction of the Service. Migratory land bird populations are in decline, due in part to habitat degradation and destruction. Sacramento River Refuge provides winter habitat for migratory landbirds.

Winter Migratory Landbirds Strategies	Alternative		
	A	B	C
1.5.1: Coordinate with PRBO and other partners to conduct and evaluate winter landbird surveys.	✓	✓	✓
1.5.2: Annually evaluate the use of various habitat types by wintering birds and adapt the restoration design and management to enhance use.	✓	✓	✓
1.5.3: Conduct Sacramento River main channel, fixed-route surveys for wintering birds. These cooperative Refuge surveys are conducted seasonally, four times a year, from Red Bluff to Colusa, and record all wildlife observed from the survey vessel (Also strategies 1.4.4 and 1.6.1).	✓	✓	✓

### 1.6 Waterfowl and other Waterbirds Objective

By 2009, implement monitoring surveys for wintering and breeding waterfowl, shorebird populations and colonial nesting waterbirds on all main channel and floodplain wetland habitat on the Refuge. Survey, locate and map 3 egret, heron, and cormorant rookeries by 2008 and conduct 5 surveys by 2010.

Waterfowl and other Waterbird Objective Comparison by Alternative			
Objective 1.6: Waterfowl and Waterbirds	Alternative A	Alternative B	Alternative C
Number of egret, heron, cormorant rookeries located and mapped by 2008	3	3	3
Number of surveys conducted for egret, heron, cormorant rookeries located and mapped within 5 years	5	5	5

**Rationale:** Migratory birds are trust species under the jurisdiction of the Service. Many species of migratory and resident birds depend on wetlands for breeding and winter habitat. Freshwater wetlands have declined by 95 percent in the Central Valley. The North American Waterfowl Management Plan and the Central Valley Habitat Joint Venture address population and habitat objective for healthy waterfowl populations. Sacramento River Refuge provides breeding and wintering habitat for waterfowl and other waterbirds. Population monitoring is necessary to determine population status, assess trends, and identify habitat use and restoration and management needs.

Waterfowl and other Waterbird Strategies	Alternative		
	A	B	C
1.6.1: Conduct Sacramento River main channel, fixed-route surveys for waterfowl and other waterbirds. These cooperative Refuge surveys with TNC, CDFG, PRBO, and River Partners are conducted seasonally, four times a year, from Red Bluff to Colusa, and record all wildlife observed from the survey vessel (Also strategies 1.4.4 and 1.5.3).	✓	✓	✓
1.6.2: Coordinate with FWS Office of Migratory Bird Management to conduct and report Sacramento River waterfowl populations during the midwinter waterfowl survey	✓	✓	✓
1.6.3: Conduct and evaluate the results of the annual colonial waterbird surveys to estimate breeding colony sizes and productivity.	✓	✓	✓
1.6.4: Survey, locate, map and protect egret, heron and cormorant rookeries	✓	✓	✓

### 1.7 Anadromous Fisheries and Native Fisheries Objective

Provide high quality habitat for native anadromous fish by enhancing and restoring 33.5 miles of shaded riverine aquatic (SRA) habitat for temperature control and future sources of large woody debris (LWD) by 2014. Where appropriate, enhance or restore floodplain topography and connectivity with the river at 11 units (La Barranca, Ohm, Flynn, Rio Vista, McIntosh Landing South, Pine Creek, Capay, Deadman's Reach, Llano Seco Riparian Sanctuary, Sul Norte, and Drumheller Slough) of the Refuge by 2014.

Anadromous Fisheries and Native Fisheries Objective Comparison by Alternative			
Objective 1.7: Anadromous and Native Fish	Alternative A	Alternative B	Alternative C
Linear feet of Shaded Riverine Aquatic habitat restored by 2005	22,400	22,400	22,400
Additional Linear feet of Shaded Riverine Aquatic habitat restored within 5 years	6,700	14,500	14,500
Acres of Floodplain connectivity enhanced and restored by 2005	2,178	2,178	2,178
Additional Acres of Floodplain connectivity enhanced and restored within 5 years (La Barranca)	2,017	3,084	3,084
Acres of Floodplain topography enhanced and restored by 2005	208	208	208
Additional Acres Floodplain topography enhanced and restored within 5 years	889	889	889



**Rationale:** The Service and the Refuge System each identify anadromous fish conservation in their mission statements. The Sacramento River is the only river in western North America which supports four distinct salmon runs making Chinook salmon and Central Valley steelhead important ecological, recreational, and commercial fisheries. Components of high quality habitat include SRA, LWD, floodplain connectivity and restored or enhanced sloughs and oxbow wetlands. SRA habitat moderates water temperatures for immature salmonids and creates habitat for terrestrial and aquatic insects, which are a food source for salmonids and other native fishes. LWD provides food and escape cover for immature salmonids. It also traps spawning gravel, creating redd (nest) habitat for fall-run Chinook salmon that spawn in the middle Sacramento River. LWD also creates plunge pool topography on the downstream side, which provides important microhabitat features that regulate temperatures, prey distribution, and cover. LWD traps anadromous fish carcasses, the source of marine-derived nitrogen (MDN) MDN is important for maintaining the productivity of river systems, which continually drain nutrients downstream. An intact floodplain is important to immature salmonids and other native fishes that escape from large predatory fish in shallow waters. When inundated, the relatively warmer waters of the floodplain become very productive and produce an abundance of prey.

<b>Anadromous Fisheries and Native Fisheries Strategies</b>	<b>Alternative</b>		
	<b>A</b>	<b>B</b>	<b>C</b>
1.7.1: Implement restoration of mid- and high-elevation riparian forest to create 14,500 linear feet of SRA by 2009.	✓	✓	✓
1.7.2: Restore mid- and high- elevation riparian forest to create a source of LWD.	✓	✓	✓
1.7.3: Conduct feasibility studies, associated hydrologic investigations, and NEPA documentation to remove privately constructed levees on Refuge land. This, along with topographic restoration, will ensure floodplain connectivity with the main channel. Enhance 3,084 acres of floodplain connectivity at La Barranca by 2009. Enhance floodplain topography on additional 889 acres by 2009.	✓	✓	✓
1.7.4: Ensure recruitment of spawning gravel necessary for creating redd habitat for fall-run Chinook salmon by conducting feasibility studies, associated hydrologic investigations, and NEPA documentation to remove privately-constructed levees or other bank stabilization features on Refuge land.	✓	✓	✓
1.7.5: Enhance and restore slough and oxbow wetlands for Sacramento splittail and other native fishes that require a warmer temperature and slow moving water. Enhancement and restoration may include the removal of non-native fishes.	✓	✓	✓

Anadromous Fisheries and Native Fisheries Strategies	Alternative		
	A	B	C
1.7.6: Coordinate research and investigations at the Refuge that focus on population demographics, habitat use, and requirements of anadromous and other native fishes. Coordinate with CDFG fishery investigations (Lower Stony Creek Fish Monitoring; Redd Surveys), Fish and Wildlife Service population surveys (escape/passage at Red Bluff Diversion Dam), and universities conducting salmonid research (University of California, Davis; California State University, Chico) and research regarding anadromous and other native fish species	✓	✓	✓

### 1.8 Native Plant Species Objective

By 2009, on up to 9,000 acres of the Refuge, locate and map 6 populations of rare and important native plants by 2005 and 24 populations by 2010, maintain and enhance native plant populations through restoration and conservation of 3,225 acres, and restore 2 native wildflower patches by 2005 and up to 100 patches by 2010.

Native Plant Species Objective Comparison by Alternative			
Objective 1.8: Native Plants	Alternative A	Alternative B	Alternative C
Number of important native plant populations identified, mapped, and protected by 2005	6	6	6
Additional number of important native plant populations identified, mapped and protected within 5 years	24	24	24
Acres of native vegetation maintained, enhanced and restored by 2005	5,600	5,600	5,600
Additional acres of native plant populations maintained, enhanced and restored within 5 years	2,036	3,255	3,255
Number of native wildflower patches restored by 2005	2	2	2
Additional native wildflower patches restored within 5 years.	100	100	100

**Rationale:** Both the Fish and Wildlife Service and the Refuge System identify native plant conservation in their mission statements. Plants are important elements that add diversity and stability to the ecosystem. Plants have individual floristic attributes (e.g., host plants for insects and pollinators), as well as vegetation attributes (e.g., plant communities and habitat structure) that are necessary for ecosystem function and wildlife habitat.

Native Plant Species Strategies	Alternative		
	A	B	C
1.8.1: Use only local indigenous plant materials (cuttings, acorns, seeds) for restoration projects.	✓	✓	✓
1.8.2: Identify, locate, map, and conserve (protect and manage) important native plant areas, including trees, shrubs, forbs, and grasses (e.g., native vegetation reference sites, La Barranca tarweed/buckwheat association and valley oak/elderberry savanna; Ohm sandbar vegetation; Pine Creek wildflower seed source site, Llano Seco valley oaks, native grass reference site, Eddy Lake oxbow vegetation, wildflower seed source sites; Sul Norte native herbaceous understory vegetation).	✓	✓	✓
1.8.3: Annually evaluate plant species and associated vegetation for habitat management and research needs (i.e., grazing, burning, herbicides, and other mechanical methods).	✓	✓	✓
1.8.4: Update and maintain the Refuge herbarium (plant specimen) collection.	✓	✓	✓
1.8.5: Restore 2 native wildflower patches by 2005 and up to 100 additional patches by 2010.		✓	✓
1.8.6: Support botanical research of taxonomic and physiological investigations on the Refuge by university cooperators.	✓	✓	✓

### 1.9 Exotic, Invasive Species Control Objective

Locate and map exotic invasive species on 5 units of the Refuge (Pine Creek, Phelan Island, Capay, La Barranca, and Drumheller) by 2009. Implement control programs (treatment and monitoring) for exotic invasive species on 7 units of the Refuge (Pine Creek, Phelan Island, Capay, La Barranca, Drumheller, Flynn, Rio Vista) by 2009.

Exotic, Invasive Species Control Objective Comparison by Alternative			
Objective 1.9: Exotic, Invasive Species	Alternative A	Alternative B	Alternative C
Locate and map populations of exotic invasive species by 2005	5 (Pine Creek, Phelan Island, Capay, La Barranca, Drumheller)	5 (Pine Creek, Phelan Island, Capay, La Barranca, Drumheller)	5 (Pine Creek, Phelan Island, Capay, La Barranca, Drumheller)
Implement control programs (control treatment and monitoring) for populations of exotic invasive species by 2005	7 (Pine Creek, Phelan Island, Capay, La Barranca, Drumheller, Flynn, Rio Vista)	7 (Pine Creek, Phelan Island, Capay, La Barranca, Drumheller, Flynn, Rio Vista)	7 (Pine Creek, Phelan Island, Capay, La Barranca, Drumheller, Flynn, Rio Vista)

**Rationale:** Invasive non-indigenous (exotic) species have become the single greatest threat to the Refuge System and the Service’s wildlife conservation mission. More than 8 million acres within the Refuge System are infested with invasive weeds (Audubon 2002). Invasive species cause widespread habitat degradation, compete with native species, and contribute significantly to the decline of trust species (USFWS 2002e). The National Strategy for Management of Invasive Species (USFWS 2002c) has been developed within the context of the National Invasive Species Management Plan as called for by Presidential Executive Order 13112, and functions as the internal guidance document for invasive species management throughout the Refuge System. This Plan has four goals: 1) Increase the awareness of the invasive species issue, both internally and externally, 2) Reduce the impacts of invasive species to allow the Refuge System to more effectively meet its fish and wildlife conservation mission and purpose, 3) Reduce invasive species impacts on the Refuge System’s neighbors and communities, and 4) Promote and support the development and use of safe and effective integrated management techniques to deal with invasive species.

The Great Central Valley is occupied by a diversity and abundance of exotic, invasive species that are harmful because they crowd out or replace native species that are important to wildlife natural diversity and ecosystem function. These species often dominate old agricultural fields and restoration sites. In addition, some late successional stages of native vegetation are dominated by these undesirable species. For these reasons, vegetation must be managed to control exotic, invasive species so that species composition favors a diversity and abundance of native, indigenous plants.

Exotic, Invasive Species Control Strategies	Alternative		
	A	B	C
1.9.1: Manage vegetation and habitat for desired species composition and population levels of native species. Locate, map, and monitor exotic species that may trigger a management response (i.e., grazing, burning, herbicides, and other mechanical control methods)	✓	✓	✓
1.9.2: Conduct research and evaluate techniques for controlling target invasive plant species including prescribed fire, grazing, herbicide treatment, mowing, disking, and tarping.		✓	✓

### 1.10: Wildlife and Cultural Sanctuary Objective

Provide 1,663 acres (16 percent) of long-term sanctuary for general wildlife use and nesting, sensitive breeding colonies, plant populations, and cultural resource sites by 2004.

Wildlife and Cultural Sanctuary Objective Comparison by Alternative			
Objective 1.10: Sanctuary	Alternative A	Alternative B	Alternative C
Acres of long-term sanctuary for general wildlife use and nesting, sensitive breeding colonies, plant populations, and cultural resource sites.	1,663	1,663	1,663

**Rationale:** Sanctuaries are areas on the Refuge that are closed to public use. They provide places where human-caused disturbances are reduced, which also reduce interruption of wildlife activities, such as foraging, breeding, resting, feeding nestlings, and other maintenance activities. This may be especially important during high refuge visitor use periods. Sanctuaries also are important to wildlife avoiding predation by other wild animals because they can devote less energy avoiding humans and more on avoiding predators. Sanctuaries may become important nesting and fawning areas, as well as important areas for feeding and roosting.

Long-term sanctuaries are areas where wildlife concentrate and reproduce, resulting in increased populations that can lead to more wildlife-dependent public use in areas near the sanctuary. As a result, sanctuaries on public land play a key role in providing increased wildlife-dependent public use opportunities on adjacent public lands. In some cases, short-term sanctuaries may be established to protect a sensitive nesting colony or site. These seasonal sanctuaries may impose public access restrictions at some, but not necessarily all nesting colonies, such as heron/egret rookeries and bank swallow colonies, and at nesting sites for species with a low tolerance for human disturbance, such as the American bald eagle, Swainson's hawk, and osprey.

Sanctuaries also protect sensitive cultural resources. Areas of significant occupation by Native Americans and areas containing significant cultural resources warrant long-term permanent protection. Cultural resource sanctuaries strictly limit the amount of human contact and potential for accidental and intentional vandalism, and show respect for past Native American cultures and customs.

A few of the sanctuaries were designated as areas of no public use based on management issues. These units are typically small in size, surrounded by private property, have poor access and may pose a safety concern.

Wildlife and Cultural Sanctuary Strategies	Alternative		
	A	B	C
1.10.1: Provide long-term sanctuaries on about 16 percent of the Refuge to provide areas for wildlife to feed and rest with relatively little human disturbance.	✓	✓	✓
1.10.2: Provide areas of short-term sanctuary to reduce human disturbance at sensitive sites during the breeding season.	✓	✓	✓
1.10.3: Provide areas of long-term sanctuary that are closed to public use to provide permanent protection of sensitive cultural resources. These areas will be of sufficient size to provide a buffer to surrounding public uses.	✓	✓	✓

## 2. Visitor Services Goal

*Encourage visitors of all ages and abilities to enjoy wildlife-dependent recreational and educational opportunities and experience, appreciate, and understand the Refuge history, riparian ecosystem, fish, and wildlife.*

### 2.1 Hunting Objective

Provide high quality hunting opportunities on 2,979 acres (29%) by 2005 and an additional 2,592 acres (26%) within 2 to 10 years, to total 5,571 acres (55%).

Hunting Objective Comparison by Alternative			
Objective 2.1: Hunting	Alternative A	Alternative B	Alternative C
Acres open to hunting by 2005	0	2,979	3,964
Additional acres of open to hunting within 2-10 years	0	2,592	3,390

**Rationale:** Hunting is identified in the Improvement Act as a priority public use for refuges when it is compatible with other refuge purposes. As a result, the Refuge proposes dove, waterfowl, coot, common moorhen, pheasant, quail, snipe, turkey and deer hunting, all of which are currently hunted on public land along the Sacramento River (Table 9). The hunting program will be conducted in a safe and cost-effective manner and, to the extent that it is feasible, carried out in accordance with State regulations. The Hunting Plan (Appendix C) was developed to provide safe and accessible hunting opportunities, while minimizing conflicts with other priority wildlife-dependent recreational uses. Some visitor uses occur at different times of the year, therefore minimizing potential conflicts with hunters and other user groups (Figure 24). The Refuge hunting program will comply with the Code of Federal Regulations Title 50, 32.1 and be managed in accordance with Fish and Wildlife Service Manual Chapter 605 FW 2, Hunting.

Hunting Strategies	Alternative		
	A	B	C
2.1.1: Implement the Sacramento River Refuge Hunting Plan by 2005.		✓	✓
2.1.2: Identify Refuge units open to hunting, target species and Refuge-specific regulations through news releases, Sacramento River Refuge general brochure, Sacramento Refuge Complex website and publications by 2005.		✓	✓
2.1.3: Add the appropriate Sacramento River units to the information section of the CDFG regulations: Other Public Uses on State & Federal Areas for the 2005 hunting season.		✓	✓
2.1.4: Open Refuge units allowing hunting to “scouting”, including pre-season scouting.		✓	✓
2.1.5: Assess the need for turkey and deer hunting by permit only on La Barranca, Mooney, Rio Vista, and Phelan Island Units, during the 2005-7 hunting season and Sul Norte Unit when it opens to the public.		✓	✓
2.1.6: Continue to coordinate the Llano Seco Junior Pheasant Hunt with the Llano Seco Ranch, California Waterfowl Association and CDFG.		✓	✓
2.1.7: Complete the Sacramento River Refuge general brochure by 2005. The brochure will include descriptions of Refuge units open to hunting, Refuge-specific hunting regulations, parking areas, and vehicle/boat/foot access.		✓	✓
2.1.8: Post laminated Boating Trail Guide by the California Department of Boating & Waterways at existing kiosks at public boat ramps, and give copies of the Boating Trail Guide to local sporting good stores, partners, and public agencies by 2005.		✓	✓
2.1.9: Develop hunting map flyer and disseminate in the Refuge Complex visitor center and on the website by 2005.		✓	✓
2.1.10: Construct and set information kiosks, entrance and public use signs and auto counters at vehicle access points on Capay, Sul Norte, and Drumheller Slough by 2005.		✓	✓
2.1.11: Provide a parking area, gate, and portable toilet on the Capay, Phelan Island and Sul Norte units, as units open to the public and funding becomes available.		✓	✓
2.1.12: Construct an accessible one-mile walking trail on Sul Norte as funding becomes available.			
2.1.13: Place public use signs at the approximate ordinary high water mark on the following boat access only units: La Barranca, Todd Island, Mooney, Heron Island, Rio Vista, Foster Island, Phelan Island, Jacinto, Dead Man’s Reach, South Ord, Llano Seco Islands I and II, Hartley Island and Head Lama. The signs will depict the unit name, river mile, and public uses allowed/prohibited (Figures 25 & 26).		✓	✓
2.1.14: Monitor hunting visits by personal contact by law enforcement officers, comment drop box (Rio Vista Unit), Refuge website e-mail, and vehicle counters at units with parking areas by 2005.		✓	✓

Hunting Strategies	Alternative		
	A	B	C
2.1.15: Complete random, weekly hunter field-checks to assess type and number of species harvested and compliance with all regulations.		✓	✓
2.1.16: Use the Sacramento Refuge Complex Refuge Hunting Program Working Group and the Disabled Access Working Group to develop and improve the Refuge hunting program.		✓	✓
2.1.17: Collect and annually report hunting visit data for the Refuge Management and Information System (RMIS), Public Education and Recreation section.		✓	✓
2.1.18: Use the CDFG deer tag data to complete the hunting sections of the RMIS annual report.		✓	✓
2.1.19: Work cooperatively with CDFG wardens to enforce State Fish and Game hunting laws and Refuge-specific regulations to provide a quality experience for all visitors.		✓	✓

## 2.2 Fishing Objective

Open gravel bars, sloughs, oxbow lakes, and the inundated floodplain on all Refuge units to fishing. Provide 23 river-front miles for fishing. By 2004, open all seasonally submerged areas below the ordinary high water mark to the public for fishing.

Fishing Objective Comparison by Alternative			
Objective 2.2: Fishing	Alternative A	Alternative B	Alternative C
River front miles for fishing by 2004	0	23	23

**Rationale:** Fishing is identified in the Improvement Act as a priority use for refuges when compatible with other refuge purposes. The fishing program will be conducted in a safe and cost-effective manner and, to the extent that it is feasible, carried out in accordance with State regulations. The Fishing Plan (Appendix D) was developed to provide safe and accessible fishing opportunities, while minimizing conflicts with other priority wildlife-dependent recreational uses. The fishing program will comply with 50 CFR 32.4 and will be managed in accordance with Fish and Wildlife Service Manual Chapter 605 FW 3, Fishing.

Fishing opportunities in sloughs, oxbow lakes and on the inundated floodplain of Refuge lands will be limited since these habitat features are also limited. Fishing on Refuge land or from the bank is limited by the river's dynamic meander pattern, resulting in banks with steep slopes. Bank-fishing opportunities will occur where there is reasonable access and when it is safe for anglers. New boat ramps are not proposed due to problematic siltation, channel meander change, and high year-round maintenance costs. Seasonal flooding on most Refuge lands makes ADA accessible fishing access trails cost-prohibitive. ADA fishing access will be available in other areas on the river.



Fishing Strategies	Alternative		
	A	B	C
2.2.1: Implement the Sacramento River Refuge Fishing Plan by 2004.		✓	✓
2.2.2: Identify Refuge units open to fishing in sloughs, oxbow lakes, and from gravel bars, and the Refuge-specific regulations, through news releases, Sacramento River Refuge general brochure, Sacramento Refuge Complex website and publications by 2004.		✓	✓
2.2.3: Use the Red Bluff Diversion Dam fish-viewing plaza to provide visitors with information about the Sacramento River fishery and salmon migration.		✓	✓
2.2.4: Complete the Sacramento River Refuge general brochure by 2005. The brochure will include descriptions of Refuge units open to fishing, Refuge-specific fishing regulations, parking areas, and vehicle/boat/foot access.		✓	✓
2.2.5: Post laminated Boating Trail Guide by the California Department of Boating & Waterways at existing kiosks at public boat ramps, and give copies of the Boating Trail Guide to local sporting good stores, partners, and public agencies by 2005.		✓	✓
2.2.6: Construct and set information kiosks at Rio Vista, Pine Creek, Capay, Ord Bend, Sul Norte, and Packer by 2005.		✓	✓
2.2.7: Maintain a one-mile bank fishing access trail on the Capay Unit and the boat launch area at Packer Unit.		✓	✓
2.2.8: Work with local resource agencies to provide fishing access and facilities for anglers with disabilities on adjacent compatible areas.		✓	✓
2.2.9: Place public use signs at the approximate ordinary high water mark on all units at access points. The signs will depict the unit name, river mile, and public uses allowed/ prohibited.		✓	✓
2.2.10: Continue to request anglers to report catch and release of the native Sacramento splittail in Packer Lake by maintaining current regulations and posting.	✓	✓	✓
2.2.11: Work cooperatively with CDFG to obtain creel census data on the River and enforce compliance with the State fishing regulations.		✓	✓
2.2.12: Collect and annually report fishing visits for the RMIS, Public Education and Recreation section.		✓	✓
2.2.13: Work cooperatively with CDFG Wardens to enforce State Fish and Game fishing laws and Refuge-specific regulation compliance and to provide a quality experience for all visitors.		✓	✓

### 2.3 Wildlife Observation and Photography Objective

Provide quality wildlife viewing and photographic opportunities on 4,132 acres (41%) by 2004 and an additional 4,346 acres (43%) by 2014 to total 8,478 acres (84%).

<b>Wildlife Observation and Photography Objective Comparison by Alternative</b>			
<b>Objective 2.3: Wildlife Observation and Photography</b>	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative C</b>
River front miles open for Wildlife Observation/Photography by 2004	0	23	23
Acres open for Wildlife Observation/Photography by 2004	0	4,132	4,684
Additional acres open for Wildlife Observation/Photography within 2-10 years	0	4,346	3,794

**Rationale:** Wildlife viewing and photography are identified in the Improvement Act as a priority uses for refuges when they are compatible with other refuge purposes. As a result, the Refuge encourages first-hand opportunities to observe and photograph wildlife in their habitats. These activities will be managed to ensure that people have opportunities to observe wildlife in ways that do not disrupt wildlife or damage refuge habitats. Wildlife viewing and photography will be managed to foster a connection between visitors and natural resources. The wildlife observation and photography programs will be managed in accordance of Fish and Wildlife Service Manual Chapter 605 FW 4, Wildlife Observation, and 605 FW 5, Photography.

<b>Wildlife Observation and Photography Strategies</b>	<b>Alternative</b>		
	<b>A</b>	<b>B</b>	<b>C</b>
2.3.1: Use the Red Bluff Diversion Dam salmon-viewing plaza to provide visitors with information about the Sacramento River fishery and close up viewing and photographic opportunities of salmon during August-October.		✓	✓
2.3.2: Post laminated Boating Trail Guide by the California Department of Boating & Waterways at existing kiosks at public boat ramps, and give copies of the Boating Trail Guide to local sporting good stores, partners, and public agencies by 2005.		✓	✓

Wildlife Observation and Photography Strategies	Alternative		
	A	B	C
2.3.3: As units open to the public, develop and maintain a one-two mile walking trail on Rio Vista, Pine Creek, Capay, Ord Bend, Sul Norte, Codora and Packer units to provide wildlife viewing and photographic opportunities and to promote awareness about the value of riparian habitat, management efforts, and plant/wildlife identification tips.		✓	✓
2.3.4 Construct a wildlife viewing/photography blind on the Codora Unit, when it opens to the public.		✓	✓
2.3.5 Place public use signs at the approximate ordinary high water mark on the following boat access only units: La Barranca, Todd Island, Mooney, Heron Island, Rio Vista, Foster Island, Phelan Island, Jacinto, Dead Man's Reach, South Ord, Llano Seco Islands I and II, Hartley Island and Head Lama. The signs will depict the unit name, river mile, and public uses allowed/prohibited.		✓	✓
2.3.6 Collect and annually report wildlife observation and photography visits for the RMIS, Public Education and Recreation section.		✓	✓
2.3.7: Provide an entrance sign, parking area, information kiosk, public use signs, gate, auto counter, and portable toilet on the Rio Vista, Pine Creek, Ord Bend and Packer units, as units open to the public and funding becomes available.		✓	✓

## 2.4 Environmental Education Objective

Develop an environmental education program by 2005 to service about 1,000 students annually. Develop an environmental education program that promotes in-depth study of the ecological principles that are associated with the Sacramento River watershed, riparian ecosystem, and the Refuge's natural, cultural, and historical resources. The education activities will be designed to develop awareness and understanding for Refuge resources and management activities.

Environmental Education Objective Comparison by Alternative			
Objective 2.4 Environmental Education	Alternative A	Alternative B	Alternative C
Number of students	300	1,000	2,000

**Rationale:** Environmental education is identified in the Improvement Act as a priority use for refuges when it is compatible with other refuge purposes. As a result, the Refuge encourages environmental education as a process of building knowledge in students. The Refuge staff will work with schools (K-12) to integrate environmental concepts and concerns into structured educational activities. These Refuge-lead or educator-conducted activities are intended to actively involve students or others in first-hand activities that promote discovery and fact-finding, develop problem-solving skills, and lead to personal involvement and action. Refuge staff will promote environmental education that: is

aligned to the current Federal, State and local standards; is curriculum based that meets the goals of school districts adopted instructional standards; and provides interdisciplinary opportunities that link the natural world with all subject areas. The environmental education program will be managed in accordance of Fish and Wildlife Service Manual Chapter 605 FW 6, Environmental Education.

Environmental Education Strategies	Alternative		
	A	B	C
2.4.1: Use the Sacramento Refuge Complex visitor center and Discovery Room to provide presentations and exhibits about the Sacramento River Refuge purposes and management.	✓	✓	✓
2.4.2: Develop a Discovery Pack with environmental education activities and on-site information for use by scheduled groups on walking trails.		✓	✓
2.4.3: Utilize California Waterfowl Association's wetland kits and the Songbird Blues and Bird of Two Worlds trunks to further educate students about wetlands and neotropical migrants.		✓	✓
2.4.4: Continue to work cooperatively with PRBO and TNC to provide tours to school groups and develop an awareness of the purpose of the Refuge.	✓	✓	✓
2.4.5: Continue assisting Chico Junior High School in implementing their Wetlands Unit, an in-depth study of wetlands and riparian habitats.		✓	✓
2.4.6: Develop educational materials that interpret the Sacramento River fishery and utilize the Coleman National Fish Hatchery and the North Sacramento Valley Fisheries Office expertise.		✓	✓
2.4.7: Conduct or host at least 50 school groups each year utilizing the Rio Vista, Pine Creek, Phelan Island, Ord Bend, and Packer units.		✓	✓
2.4.8: Facilitate one annual resource-training workshop to provide educators and tour guides consistent and current information about the Refuge and management.		✓	✓
2.4.9: Coordinate one meeting each year with local groups that are involved with leading school groups. The goal of the meeting would be to update agencies on new issues, confirm education guidelines.		✓	✓
2.4.10: Continue to require all groups to complete the Environmental Education Program Reservation or the Event Notification Forms to schedule and record visitor use.	✓	✓	✓
2.4.11: Continue to collect and annually report environmental education use data for the Refuge RMIS, Public Education and Recreation section.	✓	✓	✓

## 2.5 Interpretation Objective

Refuge staff will develop an interpretive program to service about 15,000 annual visits. The Program will promote public awareness and support of the Refuge resources and management activities by 2005.

Interpretation Objective Comparison by Alternative			
Objective 2.5 Interpretation	Alternative A	Alternative B	Alternative C
Number of annual visits	0	15,000	30,000

**Rationale:** Interpretation is identified in the Improvement Act as a priority use for refuges when it is compatible with other refuge purposes. As a result, the Refuge encourages interpretation as both an educational and recreational opportunity that is aimed at revealing relationships, examining systems, and exploring how the natural world and human activities are interconnected. Participants of all ages can voluntarily engage in stimulating and enjoyable activities as they learn about the refuge issues confronting fish and wildlife resource management. First-hand experiences with the environment will be emphasized, although presentations, audiovisual media, and exhibits will be necessary components of the Refuge interpretive program. The interpretive program will be managed in accordance of Fish and Wildlife Service Manual Chapter 605 FW 7, Interpretation.

Interpretation Strategies	Alternative		
	A	B	C
2.5.1: Use the Sacramento Refuge Complex visitor center to provide presentations and exhibits about the Refuge purposes and management.	✓	✓	✓
2.5.2: Utilize the Woodson Bridge State Recreation Area's amphitheater and evening campfire program, during the summer, to promote the Refuge's goals and purposes (i.e., wildlife viewing opportunities, restoration, fisheries, etc.).		✓	✓
2.5.3: Promote awareness about the value of riparian habitat, management efforts, plant/wildlife identification by utilizing the walking trails for public tours.		✓	✓
2.5.4: Develop a conceptual plan for a reservation-only group campsite at Deadman's Reach Unit, when the unit is opened to the public.		✓	✓
2.5.5: Conduct or host at least 50 tour groups each year utilizing, Rio Vista, Pine Creek, Phelan, Ord Bend, and Packer units.		✓	✓
2.5.6: Continue to collect and annually report public use data for the RMIS, Public Education and Recreation section.		✓	✓

## 2.6 Public Outreach Objective

Develop an outreach program to attract about 15,000 annual visits. The program will promote public awareness and understanding of the Refuge resources and management activities by 2005.

Public Outreach Objective Comparison by Alternative			
Objective 2.6 Outreach	Alternative A	Alternative B	Alternative C
Number of annual visits	500	15,000	30,000

**Rationale:** The Refuge will develop an effective outreach program that will provide two-way communication between the Refuge and the public to establish a mutual understanding and promote involvement with the goal of improving joint stewardship of our natural resources. The outreach program will be designed to identify and understand the issues and target audiences, craft messages, select the most effective delivery techniques, and evaluate effectiveness. It will include education, interpretation, news media, information products and relations with nearby communities and local, State, Federal agencies. The refuge outreach program will follow the guidance of the National Outreach Strategy: A Master Plan for Communicating in the U.S. Fish and Wildlife Service, and America's National Wildlife Refuge System: 100 on 100 Outreach Campaign.

Public Outreach Strategies	Alternative		
	A	B	C
2.6.1: Maintain the Sacramento Refuge Complex web site to promote current recreational and educational opportunities.	✓	✓	✓
2.6.2: Continue to participate or provide information to local events, such as International Migratory Bird Day, Snow Goose Festival, Endangered Species Fair, and the State of the Sacramento River Conference.	✓	✓	✓
2.6.3: Provide a web site link to a composite Sacramento River map of multi-agency public uses and access when completed by California State University Chico.	✓	✓	✓
2.6.4: Host one annual workday/barbecue to clean up the river properties, promote awareness of Refuge management, and network with community members.		✓	✓
2.6.5: Provide interpretive boat tours of the Refuge for partners or scheduled groups annually.		✓	✓
2.6.6: Continue to collect and annually report public use data for the RMIS, Public Education and Recreation section.	✓	✓	✓
2.6.7: Participate in fire prevention education efforts to reduce fire incidence and fire damage. Provide outreach about the role of fire and management uses of fire.	✓	✓	✓

Public Outreach Strategies	Alternative		
	A	B	C
2.6.8: Write news releases for local and State newspapers and articles for magazines when appropriate. Conduct television and radio interviews upon request.	✓	✓	✓

### 2.7 Volunteer Objective

Develop a volunteer program that consists of up to 12 volunteers that support and help implement the Refuges special events, restoration, and maintenance programs by 2005.

Volunteer Objective Comparison by Alternative			
Objective 2.7 Volunteer	Alternative A	Alternative B	Alternative C
Number of volunteers	3	12	25

**Rationale:** The National Wildlife Refuge System Volunteer and Partnership Enhancement Act of 1998 (P.L. 105-242) strengthens the Refuge System’s role in developing relationships with volunteers. Volunteers possess knowledge, skills, and abilities that can enhance the scope of refuge operations. Volunteers enrich Refuge staff with their gift of time, skills, and energy. Refuge staff will initiate, support, and nurture relationships with volunteers so that they may continue to be an integral part of Refuge programs and management. The volunteer program will be managed in accordance with the Fish and Wildlife Service Manual, Part 150, Chapters 1-3, “Volunteer Services Program”, and Part 240 Chapter 9 “Occupational Safety and Health, Volunteer and Youth Program”.

Currently the Sacramento Refuge Complex volunteer program consists of 20 individuals that assist with biological, environmental education, interpretive, wildlife observation, hunting, and maintenance events and activities. Additional individuals are signed up for one-time events such as Brush Up Day of the hunting areas and trail maintenance by Audubon Society. The Refuge supports and participates in annual Eagle Scout projects.

Volunteer Strategies	Alternative		
	A	B	C
2.7.1: Use the Sacramento Refuge Complex volunteer coordinator to increase efforts of recruitment and training of volunteers.	✓	✓	✓
2.7.2: Promote the Refuge through the Sacramento Refuge Complex bookstore, the Altacal Audubon, Sacramento River Preservation Trust and other informal partners.	✓	✓	✓
2.7.3: Recruit volunteers through the Student Conservation Association, California Waterfowl Association Visitor Service Assistants, California State University Chico internship program, and other universities.	✓	✓	✓

Volunteer Strategies	Alternative		
	A	B	C
2.7.4: Recruit a variety of community groups and individuals (i.e. CSU Chico, Butte College, Boy Scouts, Girl Scouts, Audubon, etc.) with diverse expertise and experiences to complete a variety of Refuge projects.	✓	✓	✓
2.7.5: Host an annual volunteer recognition dinner for volunteers, local community leaders, and Refuge staff.	✓	✓	✓
2.7.6: Facilitate volunteer training workshops to develop skills in: field equipment use (i.e. tractors and mowers); computer data entry software programs; teaching methods to assist with environmental education program; and other skills to facilitate Refuge-specific programs.	✓	✓	✓
2.7.7: Continue to collect and annually report volunteer hours and projects for the Service's regional volunteer program report.		✓	✓

### 3 Partnerships Goal

*Promote partnerships to preserve, restore, and enhance a diverse, healthy and productive riparian ecosystem in which the Sacramento River Refuge plays a key role.*

#### 3.1 Partnership Objective

Create opportunities for 25 new and maintain existing partnerships among Federal, State, local agencies, organizations, schools, corporations, and private landowners to promote the understanding and conservation of the Sacramento River Refuge resources, activities, and management by 2014.

Partnership Objective Comparison by Alternative			
Objective 3.1 Partnership	Alternative A	Alternative B	Alternative C
Number of Partners	13	25	50

**Rationale:** The Refuge System recognizes that strong citizen support benefits the System. These benefits include the involvement and insight of citizen groups in Refuge resource and management issues and decisions, a process that helps managers gain an understanding of public concerns. Partners support Refuge activities and programs, raise funds for projects, are advocates on behalf of wildlife and the Refuge System, and provide support on important wildlife and natural resource issues. In “Fulfilling the Promise” the Service identified the need to forge new and non-traditional alliances and strengthen existing partnerships with States, Tribes, non-profit organizations and academia to broaden citizen and community understanding and support for the National Wildlife Refuge System.

A variety of people including, but not limited to, scientists, birders, anglers, hunters, farmers, outdoor enthusiasts and students have a great deal of interest in Sacramento



River Refuge’s management, fish and wildlife species, and habitats. The number of visitors to the Refuge and the partnerships that have already been developed (CCP, Chapter 1) are evidence of this growing interest. New partnerships will be formed with organizations, local civic groups, community schools, Federal and State governments, and other civic organizations, as funding and staff are available.

Partnership Strategies	Alternative		
	A	B	C
3.1.1: Maintain the Memorandum of Understanding (MOU) with CDFG and California Department of Parks and Recreation to mutually manage, monitor, restore and enhance lands for fish, wildlife, and plants along the Sacramento River.	✓	✓	✓
3.1.2: Continue to work with TNC and River Partners through the use of the Cooperative Land Management Agreements.	✓	✓	✓
3.1.3: Continue to coordinate Refuge activities with the Sacramento River Conservation Area Forum.	✓	✓	✓
3.1.4: Work closely with California Department of Water Resources and State Reclamation Board staff on floodplain management issues. Provide each agency with copies of annual habitat management plans.	✓		
3.1.5: Maintain good relations and open communication with partners.	✓	✓	✓
3.1.6: Actively look for partnering opportunities with local and regional hunting and fishing groups (e.g., California Waterfowl Association, United Sportsmen for Habitat and Access, Chico Fly Fishers).		✓	✓
3.1.7: Pursue opportunities to cost-share projects with other organizations.	✓	✓	✓
3.1.8: Identify and promote new partnerships to support restoration, enhancement, and management of riparian habitat and its flora and fauna.	✓	✓	✓
3.1.9: Expand opportunities with local Chambers of Commerce to participate in local events and improve dissemination of public recreation literature about the Refuge.		✓	✓
3.1.10: Stay actively involved in other neighboring Federal, State, and local planning processes to protect Refuge resources and foster cooperative management of those resources in the Sacramento River watershed	✓	✓	✓
3.1.11: Continue coordination with the American Bird Conservancy to publicize the Refuge’s designation as a Globally Important Bird Area.	✓	✓	✓
3.3.12: Maintain agreements with CDF and local fire departments about fire suppression, and coordinate with them in prevention and hazard reduction work.	✓	✓	✓
3.3.13: Host a Refuge open house or tour each year that will promote Service and Refuge.	✓	✓	✓

**3.2: Cooperation with Adjacent Landowners Objective:**

By 2014, create opportunities for new and maintain existing partnerships with private landowners to promote cooperation and address mutual concerns.

<b>Cooperation with Adjacent Landowners Objective Comparison by Alternative</b>			
<b>Objective 3.2 Partnership</b>	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative C</b>
Create opportunities for new and maintain existing partnerships with private landowners	All units	All units	All units

**Rationale:** It is important to communicate with our neighbors to help identify any issues at an early stage and attempt to resolve any conflicts that may exist. The Refuge will continue to participate in the Sacramento River Conservation Area Forum (SRCAF). The SRCAF is a multi-organization effort to restore the ecosystem along the river. In order to ensure that the actions of the various agencies are compatible and consistent and to maximize the effectiveness of individual actions, there is a need for ongoing management coordination. This coordination includes both public agencies and private landowners and interests.

<b>Private Landowner Cooperation Strategies</b>	<b>Alternative</b>		
	<b>A</b>	<b>B</b>	<b>C</b>
3.2.1: Maintain contact with adjacent neighbors to discuss mutual concerns and opportunities.	✓	✓	✓
3.2.2: Implement improvements and operational revisions to resolve issues with adjacent landowners that are compatible with the mission of the Service and purpose of the Refuge as well as consistent with the funding available to the Refuge.	✓	✓	✓
3.2.3: Design habitat restoration projects to address considerations of adjoining landowners including but not limited to: <ul style="list-style-type: none"> <li>▪ Provision of access controls and access for emergency and utility services</li> <li>▪ Consideration of appropriate fire access and breaks</li> <li>▪ Consideration of appropriate buffers where new planting directly adjoins agricultural crops.</li> <li>▪ Use of natural predation control strategies</li> </ul>	✓	✓	✓
3.2.4: Continue to consult with adjoining landowners as part of the development of plans for proposed restoration projects and other physical changes to the Refuge.	✓	✓	✓

Private Landowner Cooperation Strategies	Alternative		
	A	B	C
3.2.5: Continue to participate in the activities of the SRCAF including information presentations and solicitation of input regarding proposed restoration projects and other physical changes to the Refuge.	✓	✓	✓
3.2.6: Commission field surveys as needed to identify specific property boundaries where uncertainty has contributed to substantive violations of Refuge regulations.	✓	✓	✓

#### 4 Resource Protection Goal

*Adequately protect all natural and cultural resources, staff and visitors, equipment, facilities, and other property on the refuge from those of malicious intent in an effective, professional manner.*

##### 4.1 Law Enforcement Objective

Provide visitor safety, protect resources, and ensure compliance with regulations through law enforcement. Increase the number of law enforcement officers (from 1 to 2) and increase the monitoring of significant resource sites from quarterly to monthly by 2009.

Law Enforcement Objective Comparison by Alternative			
Objective 4.1 Law Enforcement	Alternative A	Alternative B	Alternative C
Law Enforcement Officers	1	2	3
LE Monitor Significant Resource Sites	Quarterly	Monthly	Monthly

**Rationale:** A common belief among neighboring landowners is that with public ownership or easements, public access could result in increase vandalism and theft of agricultural equipment, poaching, and ignoring private property rights. The layout of the refuge in terms of is elongated and fragmented nature crossing through four counties requires law enforcement coordination on the Federal, State, county and local levels. Enforcement is further complicated because many units are accessible only by water.

Law Enforcement Strategies	Alternative		
	A	B	C
4.1.1: Develop MOUs with various law enforcement agencies to improve coordination, improve safety and coordinate efforts in areas of special concern.	✓	✓	✓
4.1.2: Conduct periodic patrols of the Refuge by boat.	✓	✓	✓
4.1.3: Develop MOUs with state and local law enforcement agencies to implement river boat patrols to enforce State and Refuge regulations.	✓	✓	✓
4.1.4: Allow only public use that is compatible with the primary objective of habitat management plans and that is strictly controlled.		✓	✓

Law Enforcement Strategies	Alternative		
	A	B	C
4.1.5: Permit boat access through Refuge lands that are open to the public during high water events; close to public entry and post all sensitive areas.		✓	✓
4.1.6: Establish public access near State parks and State wildlife areas where public use is a primary purpose.		✓	✓
4.1.7: Provide public education and signage as part of law enforcement programs and provide a sufficient level of law enforcement from various agencies to address these issues.		✓	✓
4.1.8: Employ two full-time park rangers (refuge law enforcement officers) and supplement their duty schedule with dual-function officers. The officers would also support the other refuges within the Sacramento Refuge Complex and coordinate their activities with other local, State, and Federal law enforcement agencies.		✓	✓
4.1.9: Ensure all officers are fully trained, equipped, and prepared to perform preventative Refuge law enforcement duties.	✓	✓	✓
4.1.10: Maintain a daily law enforcement presence to ensure that violations are deterred or successfully detected and the violators are apprehended, charged, and prosecuted.	✓	✓	✓
4.1.11: Encourage refuge officers to work closely with the game wardens from CDFG and deputy sheriffs from Tehama, Glenn, Butte, and Colusa counties.	✓	✓	✓
4.1.12: Develop a Law Enforcement Plan for the Sacramento River Refuge.	✓		
4.1.13: Annually maintain boundary, closed area and public use signs.	✓	✓	✓
4.1.14: Conduct law enforcement patrols at all known archaeological sites on a regular basis to inspect for disturbance and illegal digging and looting.	✓	✓	✓
4.1.15: Investigate fire causes and pursue fire trespass cases.	✓	✓	✓

## 4.2 Safety Objective

By 2004, provide Refuge facilities and lands that are safe for public use and management activities through annual inspections and routine maintenance.

Safety Objective Comparison by Alternative			
Objective 4.2: Safety	Alternative A	Alternative B	Alternative C
Law Enforcement Officers	1	2	3
LE Monitoring of Significant Resource Sites	Quarterly	Monthly	Monthly

**Rationale:** Visitor and staff safety is a high priority for the Refuge. Refuge lands stretch over 77-miles of the Sacramento River, so it is extremely important to have comprehensive safety strategies. Illegal activities, such as drug cultivation, poaching, vandalism, and vehicle stripping, are present on Refuge lands where there will be public activities. Strict law enforcement and the support of partners will be necessary to provide a safe environment for visitors and staff. The Refuge is committed to training staff in the most current safety standards and practices, maintaining facilities, coordinating with law enforcement partners, and providing an effective monitoring program to provide the safest environment possible.

Safety Strategies	Alternative		
	A	B	C
4.2.1: Administer and monitor required permits, licenses, and inspections on a repetitive basis under the Federal Facility Compliance Act and Service policy.	✓	✓	✓
4.2.2: Promptly replace, upgrade, or temporarily close any facility that comprises public safety.	✓	✓	✓
4.2.3: Minimize injuries to staff and visitors through preventive measures and be prepared to respond to injuries if they occur.	✓	✓	✓
4.2.4: Ensure that safety procedures, designated personnel, equipment and supplies (e.g., first aid kits and fire extinguishers) are in place and kept current.	✓	✓	✓
4.2.5: Conduct monthly staff safety meetings covering pertinent topics and conduct annual safety inspections to ensure that Refuge facilities and lands are safe for public and staff use.	✓	✓	✓
4.2.6: Train and refresh staff in CPR and basic first aid.	✓	✓	✓
4.2.7: Maintain existing access roads and parking areas by grading, mowing, and replacing culverts, as needed, for public vehicle access, law enforcement, and habitat management activities.		✓	✓
4.2.8: Work with the State of California, Department of Boating & Waterways to modify the boat launch area at the Packer Unit to improve safety for anglers and other visitors.	✓	✓	✓
4.2.9: Investigate the need for turn lanes on Highway 45 for the Packer unit, Highway 32 for the Pine Creek unit, South Avenue for the Rio Vista unit, and Ord Ferry Road for the Ord Bend unit.		✓	✓
4.2.10: Maintain secondary roads and pathways for public pedestrian traffic by grading, mowing and replacing culverts, as needed.		✓	✓
4.2.11 Help protect refuge visitors, neighbors, and employees through fire prevention, hazard reduction, and fire trespass programs.	✓	✓	✓

