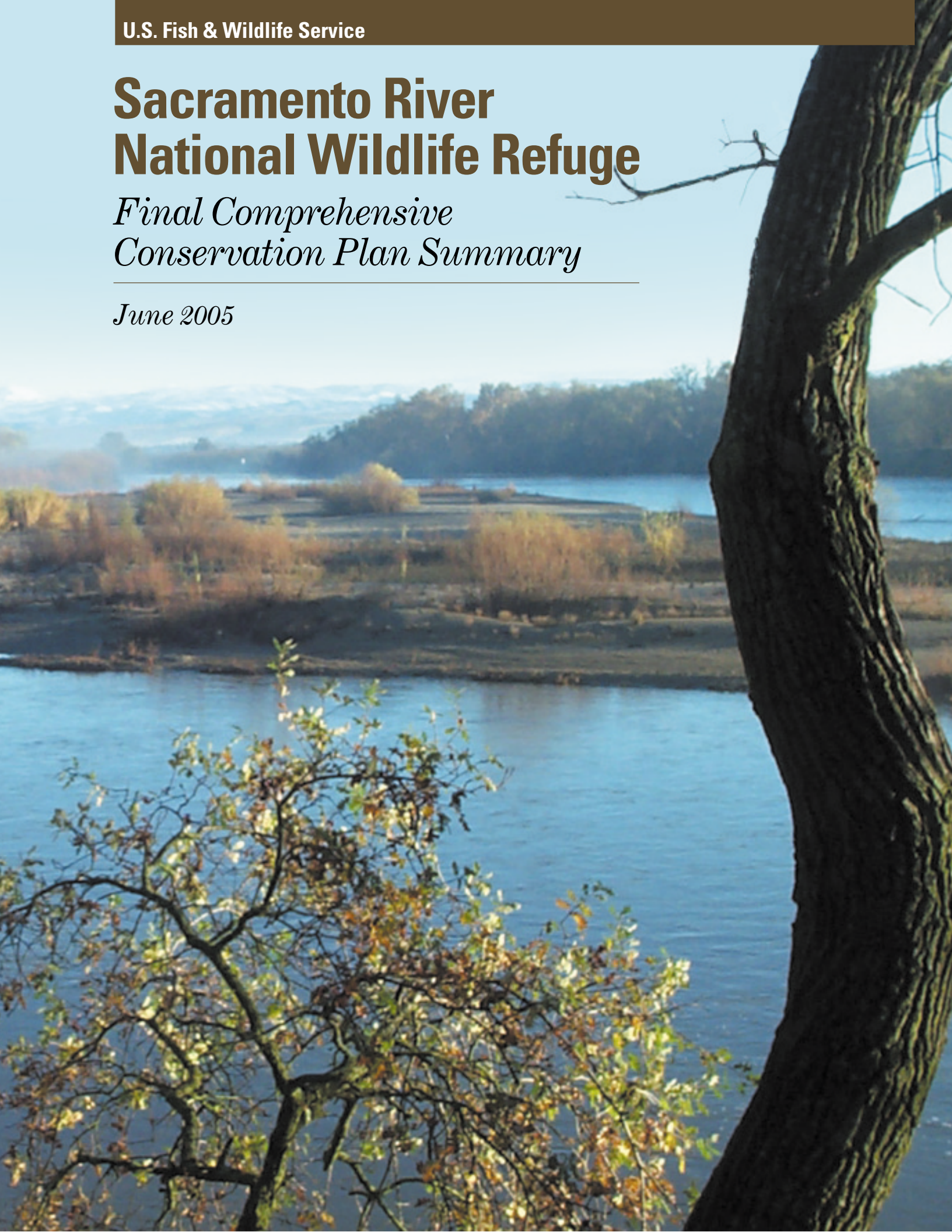
U.S. Fish & Wildlife Service

Sacramento River National Wildlife Refuge

Final Comprehensive Conservation Plan Summary

June 2005



U.S. Fish & Wildlife Service

Sacramento River National Wildlife Refuge

Comprehensive Conservation Plan Summary

Vision Statement

"The Sacramento River National Wildlife 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 National Wildlife 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 National Wildlife Refuge for generations to come."

U.S. Fish & Wildlife Service
California/Nevada Planning Office
2800 Cottage Way, Room W-1832
Sacramento, CA 95825

June 2005

Sacramento River National Wildlife Refuge

Final Comprehensive Conservation Plan

Prepared by:
U.S. Fish and Wildlife Service
Region 1

California/Nevada Refuge Planning Office
2800 Cottage Way, W-1916
Sacramento, CA 95825

Sacramento National Wildlife Refuge Complex
752 County Road 99 W
Willows, CA 95988

Approved: Steve Thompson
California Nevada Operations Manager

Date: 3/21/2005

Implementation of this Comprehensive Conservation Plan and alternative management actions/programs have been assessed consistent with the requirements of the National Environmental Policy Act (42 USC 4321 et seq.)

Table of Contents

Introduction....1
Purpose and Need for the Plan....1
The National Wildlife Refuge System....1
Our Vision for the Refuge....3
Background....3
Issues....6
  Refuge Management Issues....6
  Wildlife and Habitat Management Issues....6
  Visitor Services Management Issues....6
Vegetation....6
Wildlife....8
Fish....10
Federally Listed Species....11
Public Use....15
Current Management....15
Future Management Direction: Goals and Objectives....15
  Wildlife and Habitat Goal:....22
  Visitor Services Goal:....24
  Partnership Goal:....26
  Resource Protection Goal:....26
Plan Implementation....27
  Funding and Personnel....27
  Step-down Management Plans....28
  Partnership Opportunities....28
  Adaptive Management....29
  Plan Amendment and Revision....29

Figures and Tables

Figure 1. Sacramento River National Wildlife Refuge....2
Figure 2. Habitat and Visitor Services Management Map North Units....17
Figure 3. Habitat and Visitor Services Management Map North Central Units....18
Figure 4. Habitat and Visitor Services Management Map South Central Units....19
Figure 5. Habitat and Visitor Services Management Map South Units....20

Table 1 Sacramento River National Wildlife Refuge: Location and Size, June 2005[1]....5
Table 2 Restoration and Public Use Matrix....21

Introduction

The Sacramento River National Wildlife Refuge (Refuge) is located in the Sacramento Valley of north-central California. The Refuge meanders along 77 miles of California's largest waterway, the Sacramento River, between Red Bluff and Princeton (Figure 1). The Refuge is currently composed of 26 properties (units) spread out along both sides of this 77-mile stretch river. The Refuge preserves, restores, and enhances riparian habitat for threatened and endangered species, Neotropical migrants, waterfowl and other migratory birds, anadromous fish, and residential riparian wildlife and plants. The riparian community is one of the most important wildlife habitats in California and North America.

Purpose and Need for the Plan

The purpose of developing the Comprehensive Conservation Plan (CCP) for the Refuge is to provide managers with a 15-year strategy for achieving refuge purposes and contributing toward the mission of the National Wildlife Refuge System (Refuge System). The National Wildlife Refuge System Improvement Act of 1997 (Improvement Act) requires that all National Wildlife Refuges be managed in accordance with an approved CCP by 2012. This plan provides necessary guidance as the Refuge has no integrated plan that guides the management of all of its resources and uses. The U.S. Fish and Wildlife Service (Service) has prepared this CCP to meet the dual needs of complying with the Improvement Act and providing for long-term integrated management guidance for the Refuge.

The National Wildlife Refuge System

The 95-million acre Refuge System was established in 1903 by President Theodore Roosevelt and now includes over 540 National Wildlife Refuges, thousands of small wetlands, and other special management areas in 50 states and several territories. Most National Wildlife Refuges are strategically located along the major bird migration corridors, ensuring that ducks, geese, and songbirds have rest stops on their annual migrations. Many refuges were established to protect threatened or endangered species or key sensitive habitats.

The mission of the Refuge System, as stated in the Improvement Act, 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" (16 USC 668dd et seq.).

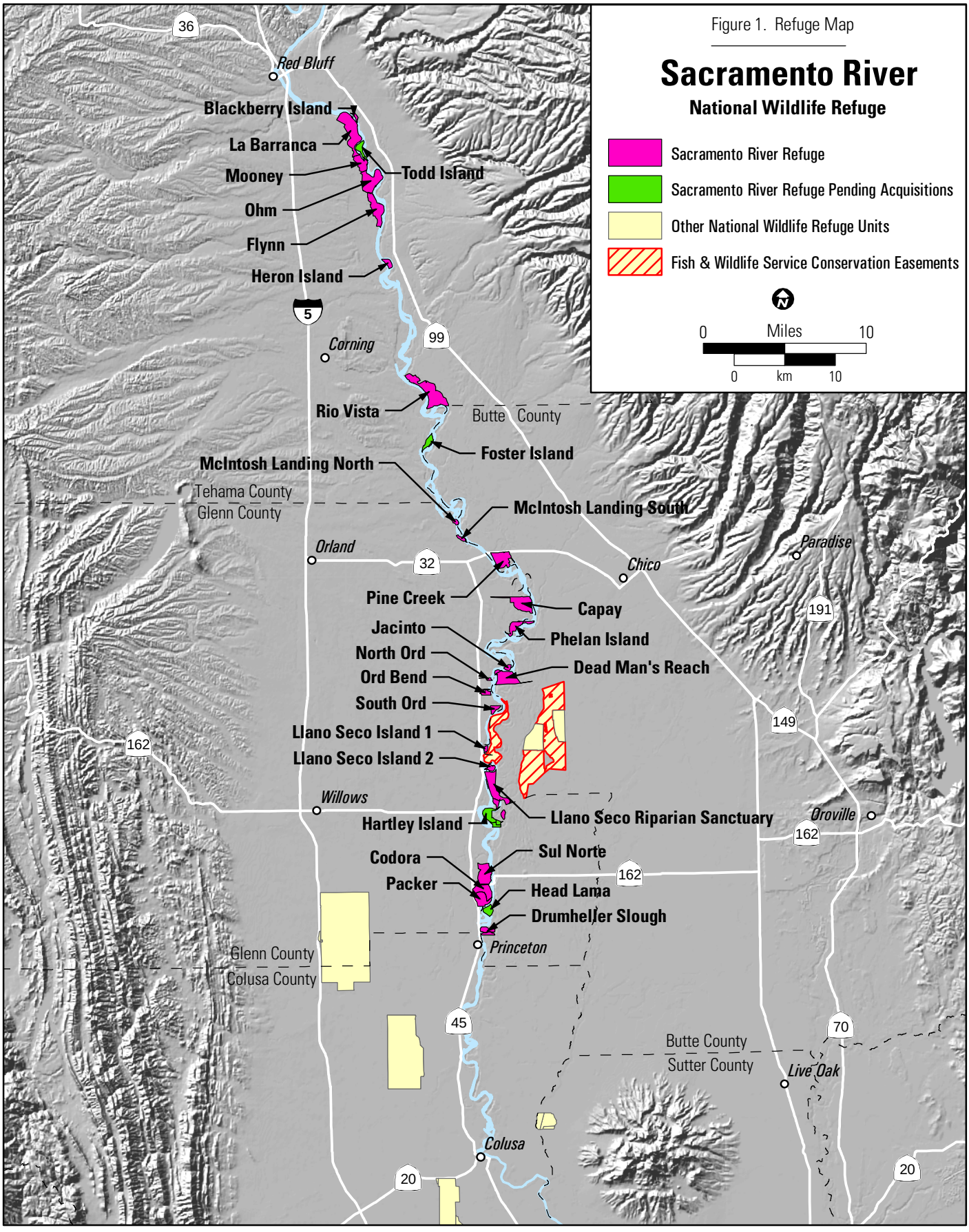


Figure 1. Refuge Map
Sacramento River
National Wildlife Refuge
Sacramento River Refuge
Sacramento River Refuge Pending Acquisitions
Other National Wildlife Refuge Units
Fish & Wildlife Service Conservation Easements
0 Miles 10
0 km 10
Red Bluff
Blackberry Island
La Barranca
Mooney
Todd Island
Ohm
Flynn
Heron Island
Corning
Rio Vista
Butte County
Foster Island
McIntosh Landing North
Tehama County
Glenn County
McIntosh Landing South
Orland
Chico
Paradise
Pine Creek
Capay
Jacinto
Phelan Island
North Ord
Dead Man's Reach
Ord Bend
South Ord
Llano Seco Island 1
Llano Seco Island 2
Willows
Hartley Island
Llano Seco Riparian Sanctuary
Oroville
Codora
Sul Norte
Packer
Head Lama
Drumheller Slough
Princeton
Glenn County
Colusa County
Butte County
Sutter County
Live Oak
Colusa
36
5
99
32
162
149
191
45
70
20

Our Vision for the Refuge

A vision statement is developed or revised for each individual refuge unit as part of the CCP process. Vision statements are grounded in the unifying mission of the Refuge System, and describe the desired future conditions of the refuge unit in the long term (more than 15 years), based on the refuge's specific purposes, the resources present on the refuge, and any other relevant mandates. This CCP incorporates the following vision statement for the Sacramento River Refuge.

"The Sacramento River National Wildlife 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 National Wildlife 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 National Wildlife Refuge for generations to come."

Background

Sacramento River National Wildlife Refuge (Refuge) is located in the Sacramento Valley of north-central California and is part of the Sacramento National Wildlife Refuge Complex (Figure 1). The Refuge was established in 1989 with a proposed

acquisition target of up to 18,000 acres of land. The area considered for acquisition is primarily located in the Sacramento River's 100-year meander zone between Red Bluff and Colusa, in Tehama, Butte, Glenn, and Colusa counties (Figure 1). As of June 2005, the Refuge consisted of 10,304 acres of riparian and agricultural habitats owned by the Service and 1,281 acres of riparian habitats in conservation easement owned by Llano Seco Ranch. These Refuge units occur along 77 miles of the Sacramento River from just below Red Bluff to Princeton in Tehama, Glenn, and Butte counties (Table 1).

The authority and corresponding Refuge purposes for the Refuge are: 1) Endangered Species Act of 1973 "... to conserve (A) fish or wildlife which are listed as endangered species or threatened species ... or (B) plants ..." 16 U.S.C. Sec. 1534, 2) Emergency Wetlands Resources Act of 1986 "…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), and 3) Fish and Wildlife Act of 1956 "... 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).

Sacramento River
Photo by Greg Golet

Table 1 Sacramento River National Wildlife Refuge: Location and Size, June 2005[1].

Refuge Unit Name	River Mile	County	Acres	Date Acquired
La Barranca	239R	Tehama	1,066	1989, 1991
Blackberry Island	239L	Tehama	52	2002
Todd Island[2]	238R	Tehama	185	BLM owned
Mooney	236R	Tehama	342	1994
Ohm	234R	Tehama	757	1989, 1991
Flynn	232R	Tehama	630	1990, 1998
Heron Island	228L	Tehama	126	1990
Rio Vista	217L	Tehama	1,149	1991
Foster Island[2]	211R	Glenn	174	BLM owned
McIntosh Landing North	202R	Glenn	63	1994
McIntosh Landing South	201R	Glenn	67	1994
Pine Creek	199L	Butte	564	1995, 2003
Capay	194R	Glenn	666	1999
Phelan Island	191R	Glenn	308	1991
Jacinto	187R	Glenn	69	1996
Dead Man's Reach	186L	Butte/Glenn	637	1999
North Ord	185R	Glenn	29	2002
Ord Bend	184R	Glenn	111	1995
South Ord	182R	Glenn	122	1999
Llano Seco Riparian Sanctuary and Islands	177L/R	Butte	906	1991
Hartley Island[3]	173L	Butte	487	2004 (67 acres), 420 acres privately owned
Sul Norte	168R	Glenn	590	1990, 1991
Codora	167R	Glenn	399	1994
Packer	168R	Glenn	404	1997
Head Lama[3]	166L	Glenn	177	Privately owned
Drumheller Slough	165L	Glenn	224	1998, 1999
Refuge Total Fee Acres			**10,304**	
Llano Seco Riparian Easement	*138L*	*Butte*	*1,281*	*1991*

[1] Acres represent original acquired acres and do not indicate eroded and accreted land. [2] Currently owned by BLM and included in total refuge acreage. [3] Privately owned and in acquisition process (included in total acreage).

Issues

Issues, concerns, and opportunities were identified through discussions with planning team members, key contacts, and the public scoping process, which began with four public workshops in May 2001. Oral and written comments were received at the meetings. The following issues, concerns, and opportunities are a compilation of information developed by the Service throughout the planning process.

Refuge Management Issues

- Consider impacts of CCP on flood control, levee removal, and bank stabilization.
- Consider adjacent landowner concerns, including trespass and potential conflicts with agriculture operations.
- Provide more law enforcement.

Wildlife and Habitat Management Issues

- Protect, restore, and enhance wildlife populations, endangered species and habitat.
- Control invasive species.
- Expand biological surveys and research on the Refuge.
- Continue to use prescribed fire and grazing practices.

Visitor Services Management Issues

- Open the Refuge to public access and recreation.
- Open the Refuge to hunting.
- Provide access for disabled people.
- Provide access to the River.
- Develop parking areas and trails.
- Provide areas for vehicle access on the Refuge.
- Develop brochures and maps.
- Post signs to identify Refuge boundary and permitted uses.
- Expand outreach, education and interpretive programs.

Vegetation

The Refuge currently consists of 10,304 acres of agricultural, wetland, grassland, and riparian habitats. Agricultural areas on the Refuge include walnut and almond orchards, pasture, and row crops; currently, these areas account for approximately 2,000 acres. Riparian habitats include open water, oxbow wetlands, gravel and sand bars, herbland cover, blackberry scrub, Great Valley riparian scrub, Great Valley cottonwood riparian forest, Great Valley mixed riparian forest, Valley oak, Valley freshwater marsh, giant reed, disturbed, and restored riparian.

Great Valley riparian scrub includes streamside thickets dominated by sandbar or gravelbar willows, or by other fast growing shrubs and vines. Great Valley cottonwood riparian forest consists of cottonwoods that are at least one year old and account for 80 percent or greater of the canopy coverage. Cottonwood forests are an early successional stage riparian vegetation type and consist of primarily of mature Fremont cottonwood trees and sparse understory (Holland 1986; Holland and Roye 1989). Great Valley mixed riparian forest is a vegetation type consisting of later successional species, such as valley oak. Valley oak accounts for less than 60 percent of the canopy coverage with black walnut, Oregon ash, and western sycamore also present. The valley oak riparian forest (VORF) consists of vegetation with at least 60 percent valley oak canopy. Restricted to the highest parts of the floodplain, VORF occurs in areas that are more distant from or higher than the active river channel. This habitat type is a medium-to-tall deciduous, closed-canopy forest dominated by valley oak and may include Oregon ash, black walnut, and western sycamore. Valley oak woodland (VOW) is found on deep, well-drained alluvial soils, far back from or high above the active river channel. VOW is an open, winter-deciduous savanna dominated by widely spaced oaks, blue elderberry, and coyote-brush, with an understory of grasses and forbs. Valley freshwater marsh is dominated by perennial emergent monocots, a type of marsh vegetation. Cattails or tules usually are the dominants, often forming monotonous stands that are sparingly populated with additional species, such as rushes and sedges.

Valley Oak Woodland
Photo by Joe Silveira

Wildlife

Many kinds of birds use the Refuge at various times throughout the year, such as gulls, terns, wading birds, diving birds, waterfowl, shorebirds, raptors, game birds, and a variety of landbirds. Also present are mammalian, amphibian, reptile, fish, and invertebrate species. While many species are common year-round, others are here only during migration, for the winter, or during spring and summer months to breed.

The primary waterfowl use of the Refuge is by wintering birds during the months of August through March. Common wintering duck species include the northern pintail, mallard, American wigeon, green-winged teal, gadwall, northern shoveler, wood duck, ring-necked duck, common goldeneye, and common merganser. Goose species consist mostly of small numbers of the western Canada goose, with occasional white-fronted geese. The primary summer nesting species include the mallard, wood duck, and common merganser, and lesser numbers of cinnamon teal and western Canada goose.

The greatest numbers of shorebirds use the Refuge during fall and spring migrations, with populations peaking in April. Common migrants include western and least sandpipers, dunlin, long-billed dowitcher, and greater yellowlegs. Killdeer and spotted sandpipers nest on gravel bars along the river's edge.

Raptor (bird of prey) abundance is greatest in the winter because of the high numbers of red-tailed hawks that winter in the Sacramento Valley. American bald eagles, white-tailed kites, and peregrine falcons are also present. Local breeding raptors include the American kestrel, turkey vulture, osprey, northern harrier, red-shouldered hawk, Swainson's hawk, red-tailed hawk, barn owl, western screech-owl, and great horned owl.

Great blue heron, great egret, and double-crested cormorant rookeries have been found in mixed riparian forests near the main channel and along oxbows and sloughs. Game birds such as the mourning dove, California quail, wild turkey, and ring-necked pheasant occupy various habitats along the Sacramento River. Ring-billed and herring gulls are common during fall and into spring. Forster's and Caspian terns are often seen in small numbers in migration during the spring and fall.

The Refuge provides a variety of habitats for a great diversity of migratory and resident landbirds. Species include the lesser nighthawk, black-chinned and Anna's hummingbirds, belted kingfisher, acorn, Nuttall's and downy woodpeckers, northern flicker, olive-sided, willow, and Pacific-slope flycatchers, western wood-pewee, black phoebe, western kingbird, tree, violet-green, northern rough-winged, bank, and cliff swallows, scrub jay, yellow-billed magpie, oak titmouse, white-breasted nuthatch, Bewick's wrens, western bluebird, Swainson's and hermit thrushes, northern mockingbird, loggerhead shrike, orange-crowned, yellow, yellow-rumped and Wilson's warblers, common yellowthroat, yellow-breasted chat, western tanager, black-headed and blue grosbeaks, lazuli bunting, spotted and California towhee, fox, song, Lincoln's, and white-crowned sparrows, red-winged, yellow-headed and Brewer's blackbirds, western meadowlark, northern oriole, purple finch, and lesser and American goldfinches.

Yellow warbler
Photo by Steve Emmons

Many mammalian species are year-round residents of the Refuge. Native beavers, mink, and river otters and non-native muskrats occur along the riparian zone and associated wetlands and waterways. Other native species include the big brown bat, Brazilian free-tailed bat, California myotis, black-tailed hare, desert cottontail, California vole, deer mouse, porcupine, western gray squirrel, beechy ground squirrel, coyote, gray fox, mountain lion, raccoon, ringtail, striped skunk, and black-tailed

deer. Occasionally, black bear are observed along the northern end of middle Sacramento River.

Reptiles are common residents in riparian and adjacent areas. They include the western rattlesnake, common garter snake, gopher snake, western yellowbelly racer, common kingsnake, western fence lizard, and alligator lizard. A few species, such as giant garter snake and northwestern pond turtle, are wetland-dependent residents. The western toad and Pacific treefrog are the only amphibians known to occur on the Refuge. Non-native species include the American bullfrog and red-eared slider.

Fish

Fish species occur at the Refuge in the main channel, sloughs, oxbow lakes, and on the inundated floodplain. The Sacramento River is important to native anadromous fish, including green and white sturgeon, pacific and river lamprey, steelhead, and four distinct runs of Chinook salmon (Moyle 2002). Three of the four Chinook salmon runs are considered unique Evolutionary Significant Units (ESU). These include the Sacramento River winter-run ESU, Central Valley spring-run ESU, and Central Valley fall-run and late-fall-run ESU Chinook salmon (Moyle 2002). The Central Valley ESU steelhead is also a unique race (Moyle 2002). Anadromous fish are migratory, using the open ocean, bays, estuaries, deltas, main river channels, floodplains, and tributaries. Anadromous fish spawn in freshwater environments and spend their adult life in marine environments.

Other native fish include blackfish, California roach, hardhead, hitch, the endemic Sacramento splittail, Sacramento squawfish, speckled dace, Sacramento sucker, threespine stickleback, redear sunfish, Sacramento perch, prickly sculpin, riffle sculpin, and staghorn sculpin (Moyle 2002). Non-native species include anadromous American shad, threadfin shad, and stripped bass (Moyle 2002). Non-native warm-water species include carp, golden shiner, channel and white catfish, black, brown and yellow bullhead, mosquito fish, Mississippi silverfish, black and white crappie, bluegill, green sunfish, largemouth, smallmouth and spotted bass, and bigscale logperch (Moyle 2002).

Federally Listed Species

The Sacramento River Refuge provides breeding, rearing, migratory staging, and wintering habitat for Federal and State threatened and endangered species and species of special status.

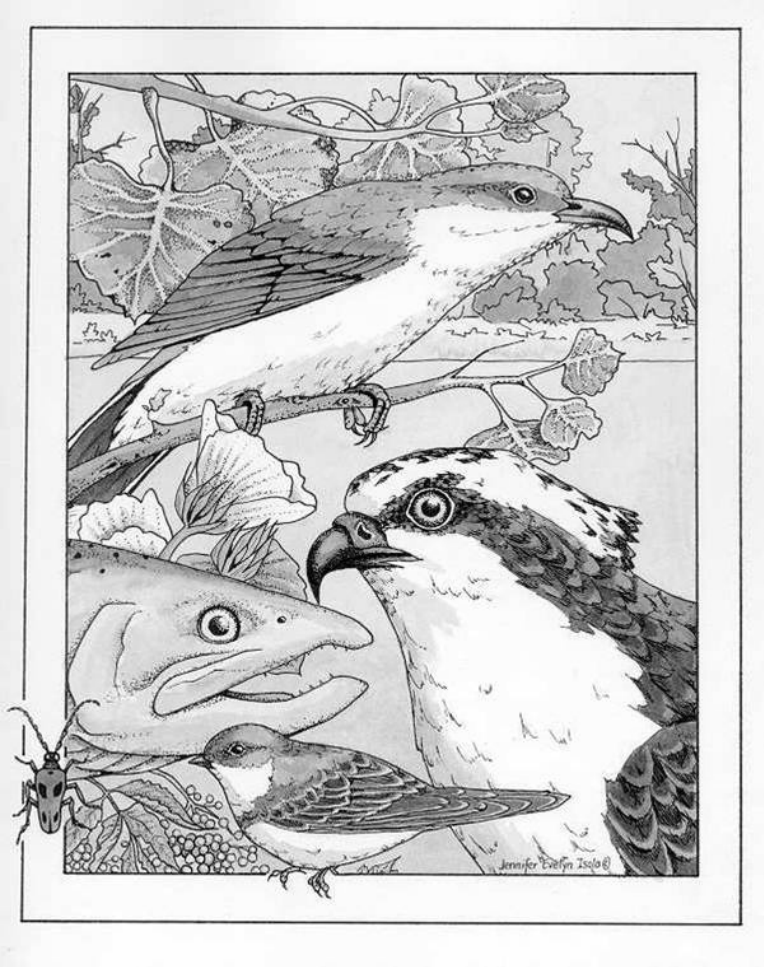


Illustration by Jennifer Isola

Chinook salmon, Sacramento River winter-run Evolutionary Significant Unit (ESU)

This federally listed endangered species only occurs in the Sacramento River watershed in California and most spawning is limited to the main stem of the Sacramento River. Adult salmon leave the ocean and migrate through the Sacramento-San Joaquin Delta and upstream into the Sacramento River from December through July. Downstream migration of juvenile winter-run Chinook salmon occurs from November through May. They rear as fry along the entire Refuge and also migrate past the Refuge as smolts. Winter-run Chinook salmon can rear in the following areas on the Sacramento River: above Red Bluff Diversion Dam (moving downstream as smolts), and probably in the lower river between river mile 70 and 164

(moving downstream as fry). Critical Habitat for the Sacramento River winter-run Chinook salmon was designated June 16, 1993 (58 CFR 33212, June 16, 1993). Critical habitat includes the river bottom and riparian zone, which are those terrestrial areas that directly affect a freshwater aquatic ecosystem. Critical Habitat for this ESU includes the Sacramento River from Keswick Dam to Chipps Island, all the waters westward from Chipps Island to the Carquinez Strait Bridge, all the waters of San Pablo Bay, and all the waters of the San Francisco Bay north of the San Francisco Bay–Oakland.

Chinook salmon, Central Valley spring-run ESU
This federally listed threatened species occurs in the main stem of the Sacramento River, and the Mill Creek, Deer Creek, Big Chico Creek, and Butte Creek tributaries. Adult salmon leave the ocean and migrate through the Sacramento-San Joaquin Delta, upstream into the Sacramento River from March through September. Downstream migration of juvenile spring-run Chinook salmon occurs from March through June, while yearlings move downstream from November through April. Most spawning occurs in headwater tributary streams. Critical habitat for this ESU is under development.

Chinook salmon, Central Valley fall-run ESU and late-fall-run ESU
This Federal candidate species occurs in the main stem and tributaries of the Sacramento River. Adult salmon leave the ocean and migrate through the Sacramento-San Joaquin Delta, upstream into the Sacramento River from July through December and spawn from October through December. Spawning occurs on the mainstem of the Sacramento River, including below the Red Bluff Diversion Dam. Late-fall-run Chinook salmon occur on the main stem of the Sacramento River. Adult salmon leave the ocean and migrate through the Sacramento-San Joaquin Delta, upstream into the Sacramento River from October through April and spawn from January through April. Spawning occurs above the Red Bluff Diversion Dam and lower tributaries of the middle and upper Sacramento River.

Steelhead, Central Valley ESU
This federally listed threatened species is an anadromous form of rainbow trout, which has traditionally supported a major sport fishery in the Sacramento River system. The historical

range of steelhead in the Central Valley has been reduced by dams and water diversions that now restrict the species to the lower portions of major rivers where habitat is less favorable for steelhead spawning and rearing. They use the Sacramento River as a migration corridor to and from spawning grounds in the mainstem of the river above the Red Bluff Diversion Dam, the tributary streams, and the Coleman National Fish Hatchery. They are present in the Sacramento River year-round, either as smolts migrating downstream or adults migrating upstream or downstream. Upstream migration begins in July, peaks in the fall, and continues through February or March. Most spawning occurs from January through March. Juvenile migration generally occurs during the spring and early summer after at least one year of rearing in upstream areas. Designation of river reaches as Critical Habitat is being considered for this ESU.

Valley elderberry longhorn beetle

This federally listed threatened species is found only in association with its host plant, the blue elderberry. These beetles are endemic to riparian habitat of the Sacramento and San Joaquin valleys. Adults feed on foliage from March through June, during which time they mate and the females lay their eggs. Eggs are laid on leaves, branches, bark crevices, and trunks and hatch within a few days. Larvae bore through the stem pith, creating a pupation gallery. After one to two years, the larva chews a hole to the stem surface and returns to the chamber to pupate (Halstead and Oldham 1990). When the host plant begins to flower, the pupa emerges as an adult and exits the chamber through a characteristic exit hole. Upon emergence, the adults occupy foliage, flowers, and stems of the host plant.

Phelan Island
Photo by Skip Jones

Bald eagle
The bald eagle (federally listed threatened species) nests in Lake, Mendocino, Trinity, Siskiyou, Modoc, Shasta, Tehama, Lassen, Plumus and Butte counties, and in the Lake Tahoe Basin. The bald eagle occurs throughout the year at and in the vicinity of Sacramento River Refuge, and is known to breed here. Individuals forage and roost throughout the northern Sacramento Valley in locations supporting various permanent and temporary wetlands. Eagles occur in areas that have relatively large, open roost trees. Suitable perch trees occur along the Sacramento River throughout the project sites and vicinity. Bald eagles are most common on the Refuge in winter.

Western Yellow-Billed Cuckoo
The western yellow-billed cuckoo's (Federal candidate species) breeding range in California includes lower Colorado, Kern and Sacramento rivers. Surveys for the western yellow-billed cuckoo identified a breeding range on the middle Sacramento River between Red Bluff and Meridian, just southeast of Colusa. The cuckoo was located on the Sacramento River Refuge during recent surveys. The cuckoo nests in larger trees, such as Fremont's cottonwood, located in close proximity to foraging habitat (mixed riparian forest and willow and herbaceous scrublands).

Least Bell's Vireo
The least Bell's vireo (federally listed endangered species) nests and forages in willow scrub vegetation. The vireo has been extirpated (eliminated) from northern California.

Giant Garter Snake
The giant garter snake (federally listed endangered species) historically ranged from the Sacramento/San Joaquin Delta to the south end of the Tulare Lake Basin. The present distribution is from Chico to central Fresno County. The giant garter snake requires freshwater wetlands, such as marshes and low gradient streams. Permanent wetlands are of particular importance, as they provide habitat over the summer and early fall, when seasonal wetlands are dry. The giant garter snake is not associated with swift streams and rivers, such as the Sacramento River. They have adapted to drainage and irrigation systems, especially those associated with rice cultivation; therefore, they may occur in agricultural areas at the Refuge, along the river below Chico.

Public Use

Over 99 percent of the Refuge is currently closed to public uses. There is no hunting program; however, fishing is allowed on Packer Lake. The Refuge has a 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 at public service and conservation group meetings.

Current Management

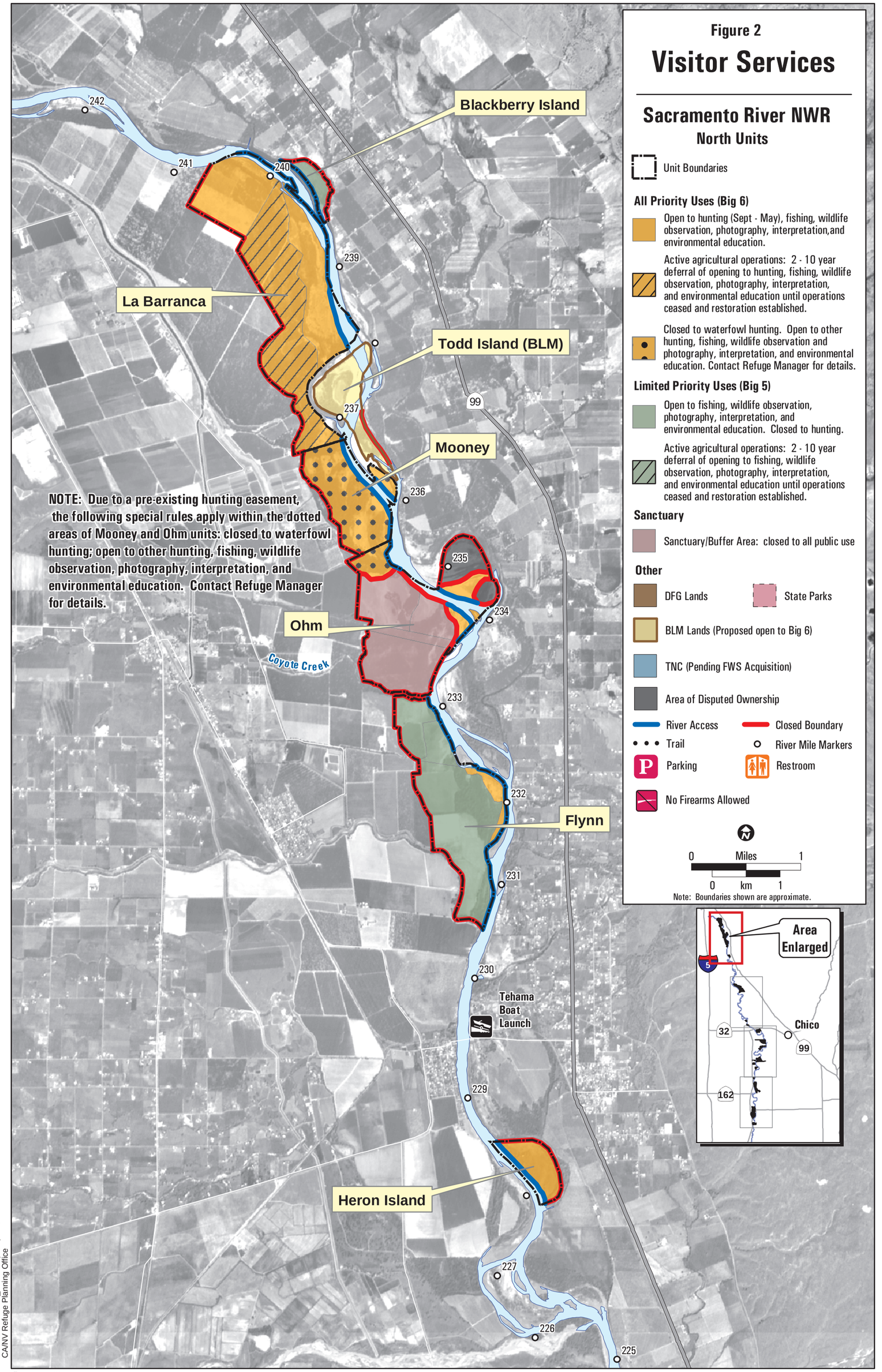
The purpose of the Sacramento River Refuge is to preserve, restore, and enhance riparian habitat for threatened and endangered species, breeding and wintering migratory birds, anadromous fish, resident species, and native plants. The Refuge is managed to maintain, enhance and restore habitats for these species.

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

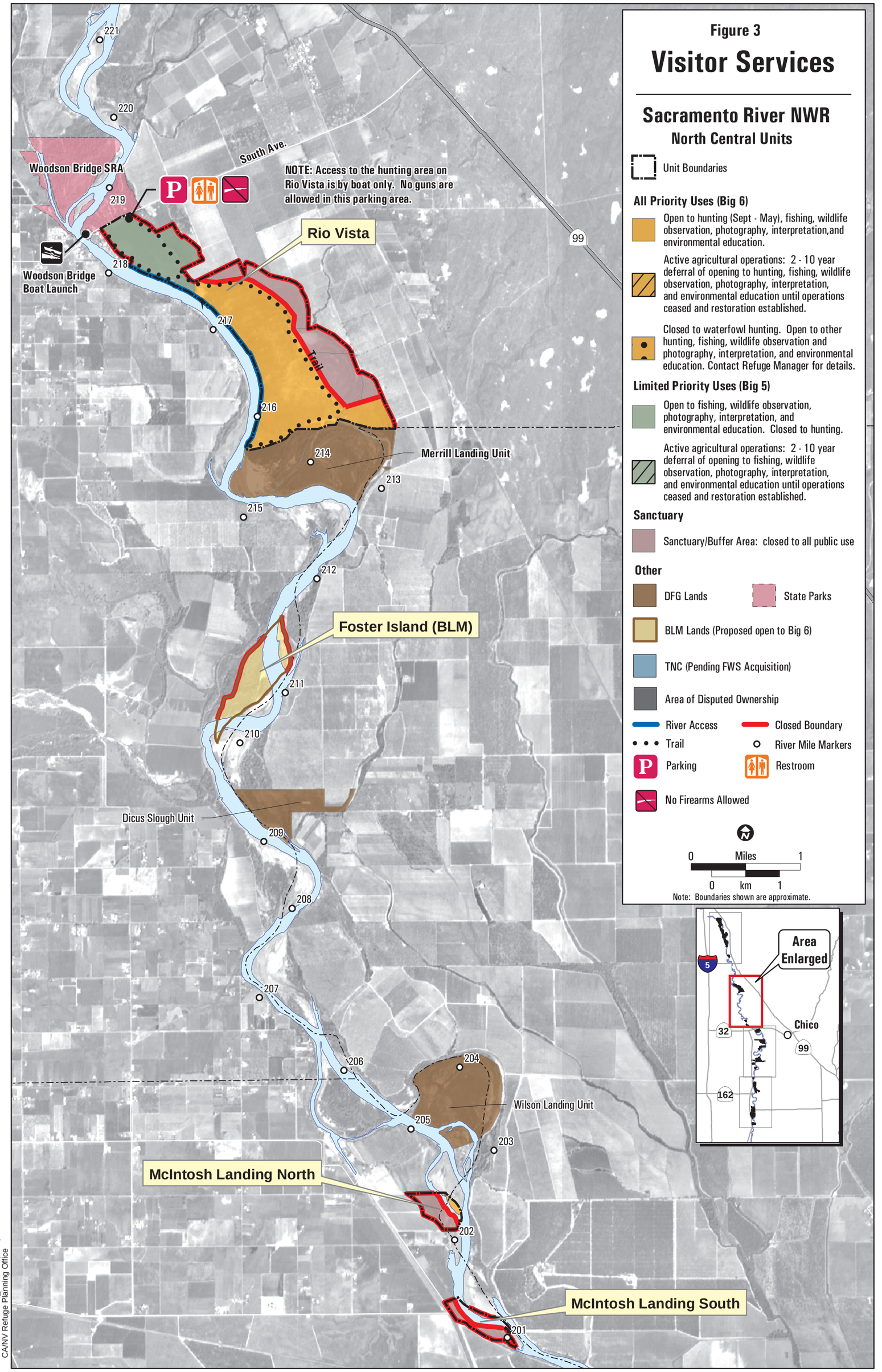
Future Management Direction: Goals and Objectives

Goals are descriptive, open-ended, and often broad statements of desired future conditions that convey a purpose but do not define measurable units. Goals translate refuge purposes into management direction. Objectives are concise statements of what we want to achieve, how much we want to achieve, when and where we want to achieve it, and who is responsible for the work. Figures 2, 3, 4, and 5 show the habitat management and visitor services plan for Sacramento River Refuge. Table 2 shows the restoration and public use planned for each Refuge unit.



File Name: visitor_services (alt B).mxd
CA/NV Refuge Planning Office

Jun 23, 2005



File Name: visitor_services (alt B).mxd
CA/NV Refuge Planning Office

Jun 23, 2005

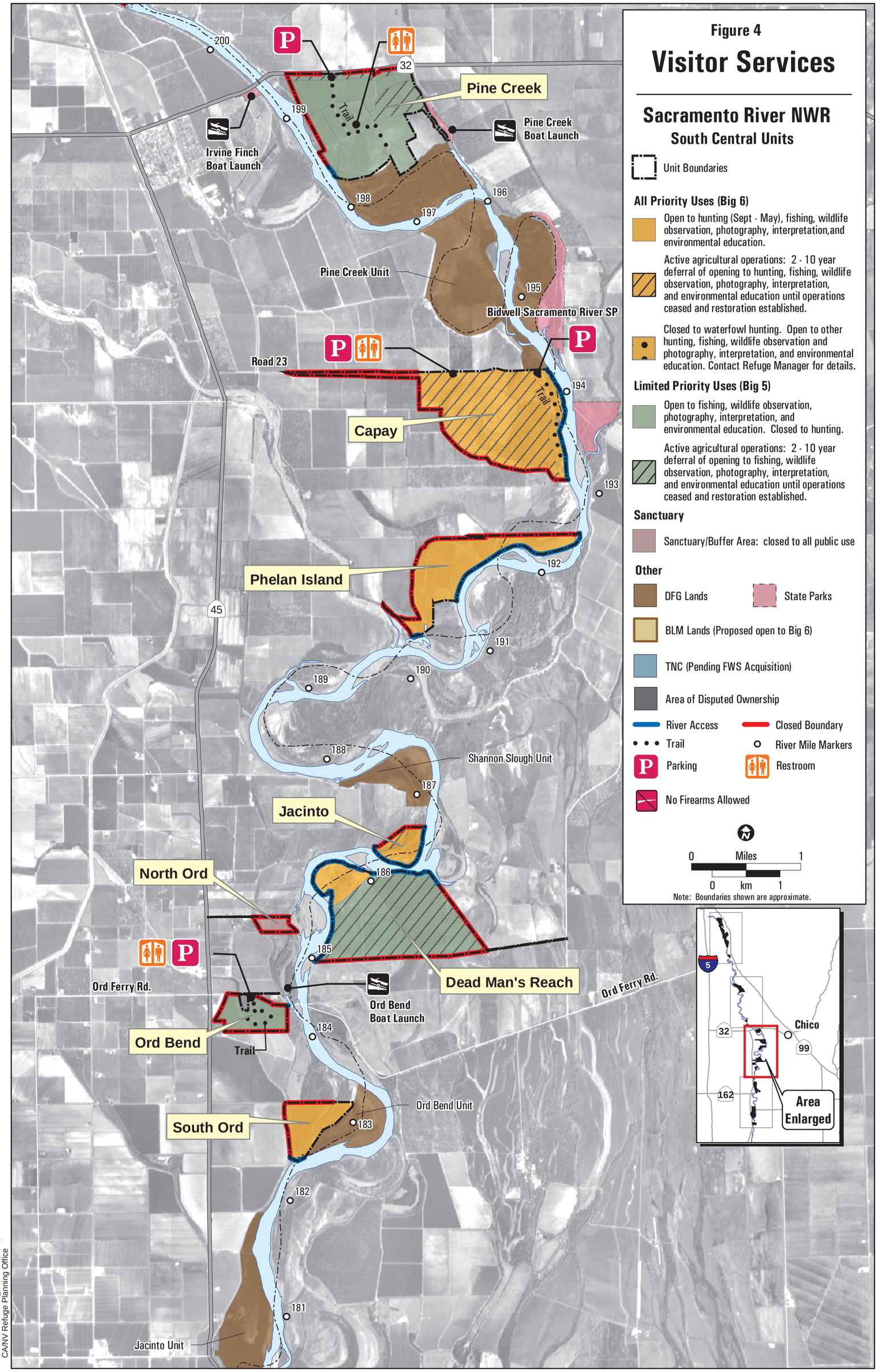


Figure 4

Visitor Services

Sacramento River NWR
South Central Units

Unit Boundaries

All Priority Uses (Big 6)

Open to hunting (Sept - May), fishing, wildlife observation, photography, interpretation,and environmental education.

Active agricultural operations: 2 - 10 year deferral of opening to hunting, fishing, wildlife observation, photography, interpretation, and environmental education until operations ceased and restoration established.

Closed to waterfowl hunting. Open to other hunting, fishing, wildlife observation and photography, interpretation, and environmental education. Contact Refuge Manager for details.

Limited Priority Uses (Big 5)

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

Active agricultural operations: 2 - 10 year deferral of opening to fishing, wildlife observation, photography, interpretation, and environmental education until operations ceased and restoration established.

Sanctuary

Sanctuary/Buffer Area: closed to all public use

Other

DFG Lands

State Parks

BLM Lands (Proposed open to Big 6)

TNC (Pending FWS Acquisition)

Area of Disputed Ownership

River Access

Closed Boundary

Trail

River Mile Markers

Parking

Restroom

No Firearms Allowed

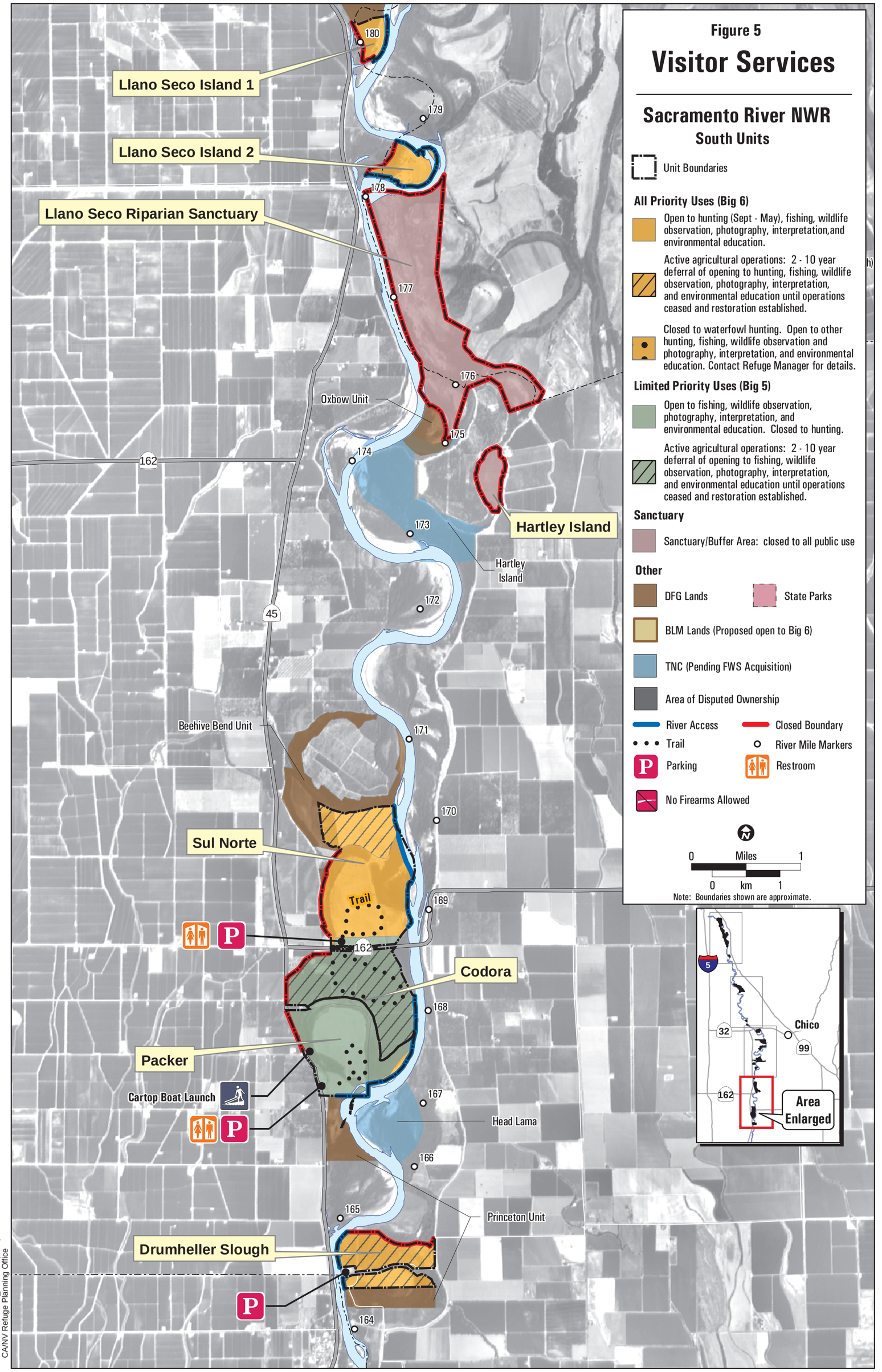
0 Miles 1

0 km 1

Note: Boundaries shown are approximate.

File Name: visitor_services (alt B).mxd
CA/NV Refuge Planning Office

Jun 23, 2005



File Name: visitor_services (alt B).mxd
CA/NV Refuge Planning Office

Jun 23, 2005

Table 2 Restoration and Public Use Matrix.

Unit Name	Total Acres[1]	Acres Riparian Habitat[2]		Permitted Public Use[4]			Public Access/Facilities						Anticipated Year Open to Public
		Existing Riparian	Future (active ag) or Current Restoration[3]	Big 5[5]	Big 6[6]	Sanctuary[7]	Walking Trail	Portable Toilet	Info Sign / Brochures	Parking Area[8]	Boat Access Only	Primitive Boat Launch	
Blackberry Island	52	52		●							●		2005
La Barranca	1066	368	193		●						●		2005
			505		●						●		2009
Todd Island	185	185			●						●		2005
Mooney	342	342			●[9]						●[9]		2005
Ohm	757	519				●							Closed
		111				●[10]							Closed
		62			●[9]								2005
		65			●						●		2005
Flynn	630	573		●							●		2005
		57			●						●		2005
Heron Island	126	126			●						●		2005
Rio Vista	1149	231		●			●	●	●	●			2005
		577			●		●		●		●		2005
		341				●							Closed
Foster Island	174	174			●						●		2005
McIntosh Landing North	63	57				●							Closed
		6			●						●		2005
McIntosh Landing South	67	40	27			●							Closed
Pine Creek	564	336		●			●	●	●	●			2005
			228	●					●	●			2006
Capay	666	91			●		●		●	●			2005
			575		●		●	●	●	●			2009
Phelan Island	308	308			●						●		2005
Jacinto	69	59			●						●		2005
			10		●						●		2010
Dead Man's Reach	637	66			●						●		2005
			571	●							●		2009
North Ord	29	29				●							Closed
Ord Bend	111	111		●			●	●	●	●			2005
South Ord	122	122			●						●		2005
Llano Seco Riparian Sanctuary	751	364	387			●							Closed
Llano Seco Island I	56	56			●						●		2005
Llano Seco Island II	99	99			●						●		2005
Hartley Island	487		67			●							Closed
		183	237		●						●		2010
Sul Norte	590	389			●		●						2005
			157		●								2006
			44	●			●	●	●	●			2005
Codora	399		245	●			●	●	●	●			2010
		126	28	●			●	●	●	●			2010
Packer	404	393		●			●	●	●	●		●	2005
		11			●						●		2005
Head Lama	177	76			●						●		2006
		101				●							Closed
Drumheller Slough	224	15	209		●				●	●			2008/9

[1]Total acreages include all acres within original acquisition boundary, including those that have eroded. [2] See habitat maps for further details, includes accreted acres. [3] Closed to the public until management is complete. [4]Permitted Public Use applies to areas above ordinary high water mark. [5]Big 5 includes fishing, wildlife observation, photography, interpretation, and environmental education. [6]Big 6 includes hunting, fishing, wildlife observation, photography, interpretation, and environmental education. [7]Sanctuary denotes areas closed to all public use. [8]Units with parking areas also have river access, except for the Ord Bend Unit. [9] Area closed to waterfowl hunting, open to other hunting and Big 6 uses. [10]Area of disputed ownership..

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.

Objective 1.1: Riparian Vegetation and Habitat: Prepare and implement site assessment and restoration plans to 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), as well as maintain existing and newly restored riparian habitats for riparian-dependent species by 2015.

Objective 1.2: Floodplain and River Processes: 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, agriculture, 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 Riparian Sanctuary, Sul Norte, and Drumheller Slough) and a written report will be created by 2015.

Objective 1.3: Threatened & Endangered Species: Evaluate the response of Federal and State threatened and endangered species to habitat restoration projects. Implement eight surveys by 2005 (least Bell's vireo, valley elderberry longhorn beetle, bald eagle, giant garter snake, bank swallow, western yellow-billed cuckoo, willow flycatcher, and Swainson's hawk) and four additional surveys by 2015 (winter-run Chinook salmon, spring-run Chinook salmon, fall-run and late-fall run Chinook salmon, and Central Valley ESU steelhead).

Objective 1.4: Migratory Bird and Resident Landbird: 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 2015. 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

Objective 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 2010.

Objective 1.6: Waterfowl and other Waterbirds: Implement monitoring surveys for wintering and breeding waterfowl and shorebird populations and colonial nesting waterbirds on all main channel and floodplain wetland habitat on the Refuge. Survey, locate and map three egret, heron, and cormorant rookeries by 2008 and conduct five surveys by 2010.

Northern pintail
Photo by Steve Emmons

Objective 1.7: Anadromous Fisheries and Native Fisheries: Provide high quality habitat for native anadromous fish by enhancing and restoring 33.5 miles of shaded riverine aquatic habitat for temperature control and future sources of large woody debris by 2015. 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 2015.

Objective 1.8: Native Plant Species: On up to 9,000 acres of the Refuge, locate and map six 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 two native wildflower patches by 2005 and up to 100 patches by 2010.

Objective 1.9: Exotic, Invasive Species Control: Locate and map exotic invasive species on five units of the Refuge (Pine Creek, Phelan Island, Capay, La Barranca, and Drumheller Slough) by 2010. Implement control programs (treatment and monitoring) for exotic invasive species on 7 units of the Refuge (Pine Creek, Phelan Island, Capay, La Barranca, Drumheller Slough, Flynn, and Rio Vista) by 2010.

Objective 1.10: Wildlife and Cultural Sanctuary: Provide 2,043 acres (20 percent) of long-term sanctuary for general wildlife use and nesting, sensitive breeding colonies, plant populations, and cultural resource sites by 2005.

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.

Objective 2.1: Provide high quality opportunities for 1,500 annual hunting visits on 3,356 acres by 2005 and open an additional 1,967 acres within two to 10 years, to total 5,323 acres (52 percent).

Junior Pheasant Hunt
Photo by Joe Silveira

Objective 2.2: Fishing: Open gravel bars, sloughs, oxbow lakes, and the inundated floodplain on all Refuge units to fishing. Provide 23 river-front miles for 1,000 annual fishing visits. By 2005, open all seasonally submerged areas below the ordinary high water mark to the public for fishing.

Objective 2.3: Provide quality opportunities for 1,000 wildlife viewing and photographic annual visits on 5,096 acres by 2005 and open an additional 3,165 acres by 2015 to total 8,261 acres (80 percent).

Wildlife Observation and Photography
Photo by Joe Silveira

Objective 2.4: Environmental Education: 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.

Objective 2.5: Interpretation: Refuge staff will develop an interpretive program to service about 1,000 annual visits. The program will promote public awareness and support of the Refuge resources and management activities by 2005.

Objective 2.6: Public Outreach: Develop an outreach program to attract about 5,500 total annual visits. The program will promote public awareness and understanding of the Refuge resources and management activities by 2005.

Objective 2.7: Volunteers: 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.

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.

Objective 3.1: Partnerships: 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 2015.

Objective 3.2: Cooperation with Adjacent Landowners: By 2015, create opportunities for new and maintain existing partnerships with private landowners to promote cooperation and address mutual concerns.

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.

Objective 4.1: Law Enforcement: 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 2010.

Objective 4.2: Safety: By 2005, provide Refuge facilities and lands that are safe for public use and management activities through annual inspections and routine maintenance.

Plan Implementation

The implementation phase for this CCP began when the FONSI was signed on March 21, 2005. During the next 15 years, the objectives and strategies presented in this CCP will be realized. The CCP will serve as the primary reference document for all Refuge planning, operations, and management until it is formally revised. The Service will implement the final CCP with assistance from existing and new partner agencies, and organizations and the public.

Percentages described in the CCP objectives and strategies represent current refuge acres and do not necessarily reflect the long-term percentages of lands open for visitor use on the Refuge. For example, we have proposed 80 percent of the Refuge open for wildlife-dependent activities. However, as the Refuge acquires new properties, additional acreages maybe opened for public use or they maybe set aside as sanctuary. This plan does not define public use or sanctuary objectives as a percentage figure, but rather seeks the most appropriate land use for individual sites within the context of the entire Refuge.

Many activities called projects in the text below are required to realize the management strategies discussed in this CCP. Every effort will be made to implement these projects by the deadlines established here; however, the timing of implementation of the management activities proposed in this document is contingent upon a variety of factors, including funding, staffing, completion of detailed step-down management plans, compliance with other Federal laws and regulations, partnerships, and the results of monitoring and evaluation.

Funding and Personnel

To implement the selected plan and to achieve the objectives and goals of this CCP, the Service will need additional funding and staff. Full implementation of all of the projects proposed in this CCP will require the Service to increase Sacramento River Refuge's current annual recurring operations budget by 47 percent to approximately $1,052,486. An additional $2,815,000 of first year (or one-time) costs will be needed to implement the CCP and the currently identified RONS projects.

Currently, the staff of the Refuge includes three positions: refuge manager, wildlife biologist, and engineering equipment operator. As the Refuge activities have expanded and Refuge visitation has increased with a demand for higher quality

wildlife-dependent recreation opportunities, it has become difficult to efficiently run the Refuge to meet the demands of the resources and the public. To meet these needs, the following positions would be added:

- Full-time Assistant Manager
- Full-time Tractor Operator
- Full-time Public Use Specialist
- Full-time Law Enforcement Officer
- Full-time Administrative Support Assistant

Step-down Management Plans

Some projects or types of projects require more in-depth planning than the CCP process is designed to provide. For these projects, the Service prepares step-down management plans. In essence, step-down management plans provide the additional planning details necessary to implement management strategies identified in a CCP. Sacramento River Refuge currently has a number of step-down plans already completed. These include plans for habitat management, cultural resource overview and management, hunt plan (Appendix C), fishing plan (Appendix D), fire management (Appendix E), and integrated pest management plans for mosquito control and walnut production (Appendix P & Q). This CCP proposes several new step-down plans that are identified below along with their target date for completion.

- Law Enforcement Plan (2006)

Eddy Lake on the Sacramento River Refuge
Photo by Joe Silveira

Partnership Opportunities

A number of partners play an important role in helping the Service achieve its goals and objectives for Sacramento River

Refuge. The Service will continue to rely on these and other partners in the future to help implement this CCP and provide input for future CCP updates. This CCP identifies many projects that provide new opportunities for existing or new partners. There is great potential for more public participation and assistance in the management and interpretation of all of the Complex refuges. The Service welcomes and encourages more public participation in the refuges.

Adaptive Management

This CCP provides for adaptive management of Sacramento River Refuge. Adaptive management is a flexible approach to long-term management of biotic resources that is directed by the results of ongoing monitoring activities and new data. Management techniques, objectives, and strategies are regularly evaluated in light of monitoring results, new scientific understanding, and other new information. These periodic evaluations are used to adapt management objectives and techniques to better achieve the Refuge's goals. Monitoring is an essential component of adaptive management in general, and of this CCP. Specific monitoring strategies have been integrated into the goals and objectives described in this CCP whenever possible.

Plan Amendment and Revision

CCPs are meant to evolve with each individual refuge unit, and the Improvement Act specifically requires formal revision and updating of CCPs at least every 15 years. The formal revision process will follow the same steps as the CCP process (see Figure 3). In the meantime, the Service will review and update this CCP periodically (at least as often as every five years) based on the results of the adaptive management program. This CCP will also be informally reviewed by Refuge staff while preparing annual work plans and updating the Refuge database. It may also be reviewed during routine inspections or programmatic evaluations. Results of any or all of these reviews may indicate a need to modify the plan. The goals described in this CCP will not change until they are re-evaluated as part of the formal CCP revision process. The objectives and strategies, however, may be revised to address changing circumstances or take advantage of increased knowledge of the resources on the Refuge. If changes are required, the level of public involvement and associated NEPA documentation will be determined by the project leader in accordance with Service policy.