COSUMNES RIVER PRESERVE MANAGEMENT PLAN

FINAL

MARCH 2008

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The Cosumnes River Preserve Partners envision the permanent protection of a continuous riparian corridor extending from the Cosumnes headwaters to the Delta, including adjacent floodplain and wetland habitats, and a vast vernal pool grassland complex supporting endangered species. The Partners will utilize stewardship and compatible ranching and farming activities as methods to sustain native plant and wildlife communities and the processes that perpetuate a dynamic mosaic of habitats. We will provide opportunities for people of all ages to appreciate the flora and fauna of the Cosumnes River Preserve and to experience being part of a natural landscape.

Cosumnes River Preserve
Management Plan

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Executive Summary

The Cosumnes River Preserve (Preserve) consists of approximately 45,859 acres of wildlife habitat and agricultural lands owned by seven land-owning Partners. The Partners include The Nature Conservancy, Bureau of Land Management, California Department of Fish & Game, Sacramento County, Department of Water Resources, Ducks Unlimited, and the California State Lands Commission. The Preserve is centered along the Cosumnes River, its floodplains and riparian habitat. This habitat is buffered by a variety of agricultural operations.

"Aerial Wetlands" – Photo courtesy of Preserve Photo Library

The Preserve provides numerous social, economic, and recreational benefits to local communities and to people residing in the larger Sacramento and San Joaquin areas. The habitat supports wildlife, including birds that migrate throughout the Pacific Flyway.

This Management Plan contains a total of eight chapters that describe how the Preserve will be managed over the next 10 years. The most important result of the planning effort was reaching consensus among the participating Partners on a long-term vision for the Preserve. The Preserve's Vision Statement is as follows:

> "The Cosumnes River Preserve Partners envision the permanent protection of a continuous riparian corridor extending from the Cosumnes headwaters to the Delta, including adjacent floodplain and wetland habitats, and a vast vernal pool grassland complex supporting endangered species. The Partners will utilize stewardship and compatible ranching and farming activities as methods to sustain native plant and wildlife communities and the processes that perpetuate a dynamic mosaic of habitats. We will provide opportunities for people of all ages to appreciate the flora and fauna of the Cosumnes River Preserve and to experience being part of a natural landscape."

To achieve this vision, the Partners agreed on two o*verarching goals* describing broad and long-term aspirations, which form the second tier (after the Vision Statement) in the Plan hierarchy. The Overarching Goals are:

I. Native biological communities and the resident and migratory species dependent on them are restored and maintained to sustainable conditions and population levels.
II. Compatible uses improve stewardship of the lands in the Cosumnes River Watershed.

Tiered under the Overarching Goals is a series of sub-goals. These sub-goals create the framework for the Management Plan and are summarized below.

Chapter 2: Description of Watershed and Preserve Sub-goal

1. Actively manage the Preserve, including implementing the flow augmentation project, collecting physical process data, regularly updating infrastructure databases, and collaborating with regional planning processes.

Chapter 3: Natural Resource Stewardship Sub-goals

1. Protect the free-flowing Cosumnes River within an ecologically functional landscape.
2. Protect, maintain, and restore riparian and floodplain communities, the natural hydrologic processes that sustain the habitat, and the native species that depend on the habitat.
3. Protect, maintain, and restore vernal pool and grassland communities, maintain the ecological processes that sustain the habitat, and promote the native species that depend on the habitat.
4. Maintain and restore a mosaic of freshwater wetland habitats (seasonal and permanent) that support native species.
5. Maintain and enhance the population of the giant garter snake in the Badger Creek watershed.
6. Restore and maintain a population of fall-run Chinook salmon in the Cosumnes River, with an average annual spawning run of 2,000 adults (10-year average, range of 1,000–5,000 adults).

Chapter 4: Agricultural Stewardship Sub-goal

1. Agricultural stewardship will continue to serve as an important land-management tool and will be compatible with the Preserve's overall mission and goals.

Chapter 5: Public Use Sub-goals

1. Recreational use of the Preserve will be compatible with the Management Plan's Natural Resources Stewardship goals, will promote the teaching of environmental stewardship, and will have adequate and stable funding sources.
2. The Preserve's Volunteer Program will be compatible with the Management Plan's Natural Resources Stewardship goals, will promote the teaching of environmental stewardship, and will have adequate and stable funding sources.
3. Scientific research conducted at the Preserve will be compatible with the Management Plan's Natural Resources Stewardship goals, will promote the teaching of environmental stewardship, and will have adequate and stable funding sources.

4. The Preserve's Education Program will be compatible with the Management Plan's Natural Resources Stewardship goals, will promote the teaching of environmental stewardship, and will have adequate and stable funding sources.

Chapter 6: Cultural and Visual Resources Sub-goals

1. Cultural resources located on the Preserve will be protected.
2. The Preserve's scenic and visual resources will be protected and enhanced.

Chapter 7: Property Management Sub-goal

1. Properties will be actively managed to achieve the vision and overarching goals described in this Management Plan.

Chapter 8: Operations, Maintenance, and Monitoring Sub-goals

1. The Preserve will be financially sustainable.
2. The Partners will work together to counteract future challenges (*e.g.*, dwindling financial and staffing resources, etc.).
3. This Management Plan will be fully implemented and will use an adaptive management approach.

The Management Plan is structured around two common themes: adaptive management and partnerships. Adaptive management is a systematic process for continually improving management policies and practices by learning from the outcomes of operational programs. Partnership is a relationship among parties usually involving close cooperation and sometimes having specified and joint rights and responsibilities.

IMPLEMENTATION AND REVISION OF THE MANAGEMENT PLAN

This Management Plan will be implemented by the Preserve Partners as they make decisions regarding management practices. The electronic tools (*i.e.*, GIS maps and associated databases) that were developed as part of this planning process will be updated continuously as new information is obtained. The Management Plan recommends the preparation of several additional topical plans and studies. Development of these plans will result in new information and ideas that can be incorporated into Preserve policies. In this way, the Management Plan is a dynamic tool that may evolve to address emerging concerns. Additionally, the Management Plan may be revised or amended upon consent of the Partners and will be reviewed formally at least once every five years.

Site-specific projects that comply with the Management Plan may be developed in the future. Those projects will be evaluated to ensure compliance with this Plan and environmental reviews will be completed as appropriate. Chapter 8 contains more information about the implementation of this Management Plan.

1 Introduction

The Cosumnes River is the last large river in California's Central Valley with relatively natural and unregulated stream flows that vary from higher winter-spring flood flows to reduced or intermittent summer flows (Booth *et al.* 2006; Fleckenstein *et al.* 2004). With a watershed of nearly 1,300 square miles, the Cosumnes River is a small, low-gradient river whose headwaters begin at 7,500 feet above sea level and whose course from the Sierra Nevada to the Sacramento–San Joaquin Delta is a mere 80 miles long. The Cosumnes River is more important than its size would indicate. In its lower reaches, on its way to the confluence with the Mokelumne River and the San Joaquin Delta, the Cosumnes River flows through a landscape composed of a rich array of native trees and plants, diverse aquatic habitats, productive row-crop agriculture and pasture lands, and rural homes and businesses.

The Central Valley once contained vast expanses of native streamside forest and wetland habitat. Along with cottonwoods (*Populus spp.*), willows (*Salix spp.*), ash (*Fraxinus spp.*), and other flood-compatible trees, great forests of valley oaks (*Quercus lobata*) studded its fertile floodplains. The rich river bottom soil that nourished the streamside forests and wetlands was also coveted by early settlers who, beginning in the mid-to-late 1800s, cleared most of the land and drained nearly all of the wetlands for agriculture. Today, only tiny remnants of the once abundant streamside forests and wetlands can be found in the Central Valley. Along the lower Cosumnes River, only small stands of valley oaks have survived. These groves cover only 1,500 acres or so but, along with the remaining patches of other streamside forests and wetlands, they continue to provide habitat for wildlife within an ever-increasing urban and agricultural landscape.

While the Cosumnes River, its floodplain, and upland habitat are closer to a natural state than any other river in the Central Valley, the watershed still faces threats to its biological integrity. The greatest threat is habitat loss and fragmentation as a result of continued urbanization and agricultural conversion. Other threats include groundwater depletion, land conversion to more intensive agriculture, introduction of non-native species (especially invasive plants), alteration of the hydrologic regime, levees that prevent winter floods from reconnecting the river and floodplain, and altered disturbance regimes in vernal pool grasslands and in chaparral and oak woodland.

"CRP Entry Sign with Partners" – Photo courtesy of Preserve Photo Library

The Cosumnes River Preserve was created not only to protect the last remaining stands of valley oak forests, but also to protect and restore Central Valley wetlands; wetlands that once supported millions of migratory waterfowl and waterbirds such as the greater sandhill crane (*Grus canadensis*), a species listed as threatened by the State of California, and the northern pintail (*Anas acuta*), a species of special concern. In fact, up to 60 percent of the Pacific Flyway bird species and 20 percent of continental waterfowl populations winter in or migrate through

the Central Valley (Central Valley Joint Venture 2006). This makes the Cosumnes River Preserve a critical stopover or wintering area for these migrating birds.

Waterfowl and waterbirds are not the only species benefiting from the Cosumnes River and the creation of the Cosumnes River Preserve. Chinook salmon (*Oncorhynchus tschawytscha*), Pacific lamprey (*Lampetra tridentata*), and other native and non-native Delta fish still spawn and rear offspring in the shallow waters. The giant garter snake (*Thamnophis gigas*), a state- and federally listed threatened species, inhabits tributary creeks and sloughs; and California tiger salamanders (*Ambystoma californiense*), vernal pool tadpole shrimp (*Lepidurus packardi*) and vernal pool fairy shrimp (*Branchinecta lynchi*), other federally threatened and endangered species, still breed and survive in vernal pools located throughout the Preserve's extensive grassland areas.

1.1 PURPOSE OF THE COSUMNES RIVER PRESERVE

1.1.1 Brief History and Setting

The Cosumnes River Watershed Project began in 1984 with The Nature Conservancy's purchase of an 85-acre parcel of rare riparian valley oak forest along the Cosumnes River. This acquisition was followed by the purchase of an additional 320-acre parcel by Ducks Unlimited. In 1987, following a second land acquisition by The Nature Conservancy, the two organizations partnered to establish the 1,000-acre Cosumnes River Preserve (Preserve). Between 1989 and 1994, the U.S. Bureau of Land Management (BLM), California Department of Fish & Game (DFG), Sacramento County, and California Department of Water Resources (DWR) all joined The Nature Conservancy (TNC) and Ducks Unlimited (DU) as formal Preserve Partners. In 1994 the Cosumnes River Preserve Visitor Center opened and the first Cooperative Management Agreement was signed by the Preserve Partners. Following a devastating fire, the Visitor Center was re-opened in 1997. The University of California, Davis (UC Davis), began a formal research program at the Preserve in 1998. The Preserve now consists of 60 properties, bringing the total acreage to nearly 46,000 acres owned in fee title or through conservation easements.

1.1.2 Vision

The Cosumnes River Preserve Partners envision the permanent protection of a continuous riparian corridor extending from the Cosumnes headwaters to the Delta, including adjacent floodplain and wetland habitats and a vast vernal pool grassland complex supporting endangered species. The Partners will utilize stewardship and compatible ranching and farming activities as methods to sustain native plant and wildlife communities and the processes that perpetuate a dynamic mosaic of habitats. We will provide opportunities for people of all ages to appreciate the flora and fauna of the Cosumnes River Preserve and to experience being part of a natural landscape.

1.1.3 Mission Statement

"We seek to protect and enhance the habitat within the Cosumnes River Preserve project area, including riparian forest, wetland, vernal pool grassland, oak woodland, riverine, marsh, and

farm habitat, in order to preserve biodiversity and benefit declining, threatened, and endangered species of wildlife and plants. We attempt to accomplish this using a cooperative management approach by developing both short- and long-term integrated conservation and management projects, as well as supporting policies compatible with our goals. We believe that effective conservation integrates the preservation of natural lands as well as agricultural lands and practices" (Cosumnes River Preserve 1996).

1.1.4 Site Significance: Cosumnes River Preserve

SITE VALUES AND SIGNIFICANCE OF THE PRESERVE

A) Eco-Reserve Designation

Section 1580 of the Fish and Game Code allows the Fish and Game Commission to acquire, designate, and manage property to protect threatened and endangered plants, animals, and specialized habitat types as "Ecological Reserves." On October 3, 2003, the Commission held an adoption hearing to approve designation of 11,895 acres of the Cosumnes River Preserve as an Ecological Reserve in order "to protect great valley oak riparian forest, coastal and valley freshwater marsh and vernal pools" for numerous species of plants, birds, and animals.

B) Important Bird Area by Audubon Society

The Preserve has been designated as a "Globally Important Bird Area" by the National Audubon Society and the American Bird Conservancy. California's Important Bird Area (IBA) Program is part of a worldwide effort to identify and protect sites deemed most critical to birds. Begun in the mid-1990s as a volunteer-driven effort, and expanded in 2000 into a fully-funded research project, the program has identified approximately 150 IBAs.

California Partners in Flight's Riparian Bird Conservation Plan for California designated 14 priority species recommended as focal species for research and monitoring, 10 of which are present at the Preserve.

C) Western Shorebird Hemisphere

The Preserve lies in the heart of California's Central Valley, which has been deemed "an internationally significant area for wintering and migrating shorebirds" by the Southern Pacific Shorebird Conservation Plan. After the Great Salt Lake in Utah, the Central Valley is the second most important inland site for shorebirds on fall migration. Restored and managed wetlands are among the most important shorebird habitats in the Valley today. Of the more than 250 species of birds occurring at the Preserve, at least 34 are shorebirds.

D) National Natural Landmark

A portion of the Preserve's valley oak riparian forests is designated as National Natural Landmarks by the National Park Service.

STATE AND REGIONAL CONTEXT

The Preserve is centrally located in California on the edge of the Sacramento–San Joaquin Delta, approximately 20 miles south of the greater Sacramento metropolitan area. With the State's population nearing 38 million (CA Dept. of Finance 2007), providing clean water, food, education, land for homes, recreational opportunities, and open space to the State's residents are challenges facing many federal, state, and local agencies, including the Preserve Partners. The Preserve serves as a model in the Sacramento region for developing win-win solutions that foster pioneering techniques and partnerships in the agricultural sector, innovative water management practices, multi-organization collaboration, and innovative ecosystem restoration methods.

1.1.5 Cooperative Management Agreement

A Cooperative Management Agreement (CMA) was first entered into in April 1994. It was amended on August 15, 1996, to include additional Partners as signatories to the agreement. Today, the BLM, DFG, Ducks Unlimited, the Sacramento County Regional Parks, The Nature Conservancy, and the DWR are signatory Partners to the agreement (Partners). The California State Lands Commission is a land-owning partner at the Preserve, and the Wildlife Conservation Board and Natural Resources Conservation Service hold conservation easements at the Preserve; but as of the writing of this Management Plan, they have not become signatories to the CMA.

> **"I WAS RAISED IN THE CENTRAL VALLEY. THE PRESERVE GIVES YOU ANOTHER IDEA OF WHAT THE VALLEY FLOOR USED TO LOOK LIKE. WHEN YOU SIT OUT HERE AND LOOK AT THIS GROUND, YOU CAN IMAGINE ELK AND GRIZZLY BEAR MEANDERING AROUND ON THE PROPERTY."**
>
> —RICK COOPER, PRESERVE MANAGER FROM 1993 TO 2006, BUREAU OF LAND MANAGEMENT

The CMA defines the goals, roles, and responsibilities of the above signatories for managing and administering all portions of lands currently owned by the Partners in the vicinity of the lower Cosumnes River in Sacramento and San Joaquin Counties.

The Partners recognize that their respective interests in those lands are subject to different authorities and policies, but that the CMA is intended by the Partners to define an administrative process and facilitate cooperation among them to the greatest extent possible.

PRIMARY GOALS OF THE CMA

- Cooperative management of the Preserve as a single ecological unit for the protection, restoration, and maintenance of the quality and diversity of two rare communities in California—the valley oak riparian forest and the freshwater seasonal wetlands—and their associated wildlife habitat values.
- Cooperative management of the Preserve to protect, maximize, and enhance the benefits to declining, threatened, and endangered species of wildlife and plants.
- Provide protected habitat and wintering grounds on the Preserve for migrating waterfowl and shorebirds in the Pacific Flyway.
- Protect and manage adjacent river habitats, such as grasslands, to promote growth of native flora and provide habitat for wildlife.

SECONDARY GOALS OF THE CMA

- Accommodate and facilitate research, teaching, nature study and appreciation, historical and cultural interpretation, and other compatible recreational, educational, and scientific activities that are appropriate to the Preserve without detrimentally impacting its intrinsic ecological and wildlife values.
- The Partners agree that these goals may ultimately be best accomplished by integrating certain human and economic pursuits, such as agriculture, in a "buffer" area that will enhance and complement the lands' habitat values so long as such secondary uses do not detract from the primary goals of the Preserve.
- On a case-by-case basis, facilitate mitigation for off-site habitat loss by maximizing the synergistic benefits of consolidated wildlife habitat areas, corridors, and ecological systems on the Preserve.

"Cranes" – Photo courtesy of Preserve Photo Library

1.2 OVERVIEW OF MANAGEMENT PLAN

1.2.1 Definition

A Management Plan is a planning tool that serves as a roadmap for the management and use of a property's natural resources and the development of staffing, funding, facilities, equipment, and programs needed to support that management and use.

1.2.2 Purpose and Importance

The purpose of this Management Plan is to document existing conditions, identify and prioritize needs, and describe future desired conditions for the Cosumnes River Preserve over the next 10 years. It also provides the Preserve Partners with a framework for determining budget and personnel required to implement long-term management of the Preserve over the next 10 years.

Preserve Partners developed this Management Plan in order to

- Maintain continuity of mission and vision
- Agree upon priorities and goals
- Organize information and data
- Gain consensus amongst Preserve staff and Partners
- Incorporate a broad range of input on Preserve issues through public workshops

This Management Plan considers biodiversity as a whole and is not intended to be a recovery plan or a management plan for specific individual species, nor does it dictate land use on properties located outside the Preserve. This Plan does not constitute a commitment for staffing increases, operational and maintenance increases, or funding for future land acquisitions.

1.2.3 Process for Preparing the Plan

STEERING COMMITTEE

A Steering Committee, made up of representatives from the Preserve's land-owning Partners, met on a quarterly basis during the planning process from March 2006 to October 2007. Participants were responsible for making basic decisions, setting the strategy and objectives, and providing oversight on the process of preparing the Management Plan as shown below in Figure 1.1: *Schematic of the Planning Process*. They also were responsible for holding public workshops and updating the public on the Plan's development.

CORE WORK GROUP

A Core Work Group, composed of staff from the Partner organizations, met monthly during the planning process to provide technical work. This work included regulatory guidance and biological information, the collection of data, preparation of draft documents, completion of the Lower Cosumnes River Watershed Assessment (RBI 2006), formulation of management alternatives, and compilation of technical information for developing a management database, GIS maps, and conservation posters.

PUBLIC INPUT AND REVIEW PROCESS

Community surveys and four public workshops were conducted in 2006 to allow for public input and community involvement as part of this management planning process. This gathering of information helped the Partners better understand the concerns of the community, adjacent landowners, and Preserve volunteers, and it helped to ensure that the Preserve Partners considered those concerns during the preparation of this Management Plan.

1.2.4 Plan Organization

This Plan is organized into nine Chapters as described in the Table of Contents. Chapters 1 and 2 provide an introduction and description of the Cosumnes River watershed, the Preserve, and the Management Plan process. Chapters 3 through 8 contain the goals, objectives, and actions that will be implemented to achieve the Preserve's Vision. These goals, objectives, and actions

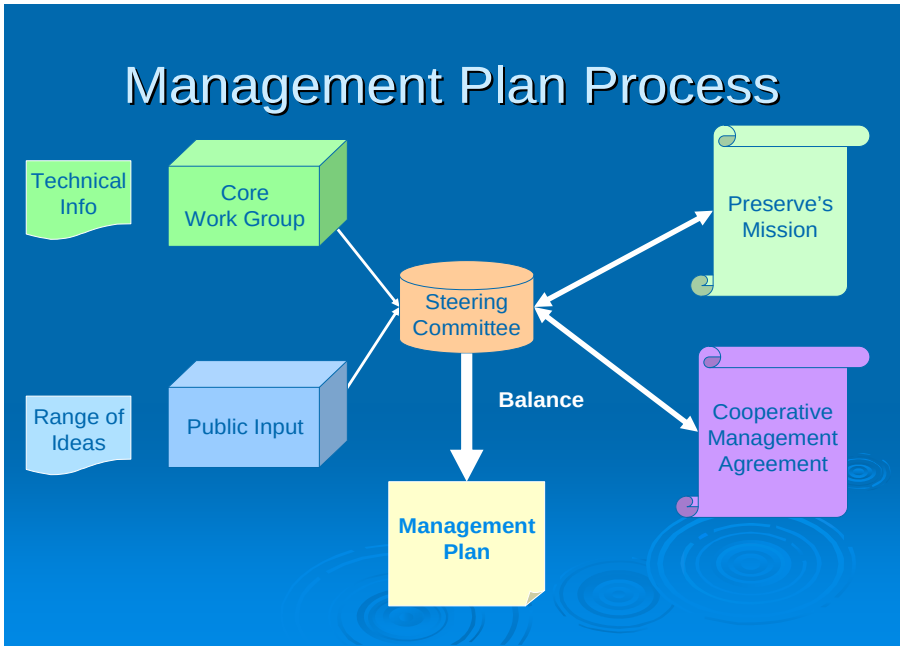
are organized explicitly and hierarchically for the purposes of planning, implementing, and monitoring management actions, as well as for adjusting management over time to reflect knowledge gained via monitoring (*i.e.*, adaptive management). Chapter 9 consists of public comments received on the draft Plan and responses to those comments.

Two *overarching goals* describe broad and long-term aspirations and form the second tier (after the Vision Statement) in the Plan hierarchy. The overarching goals are:

I. Native biological communities and the resident and migratory species dependent on them are restored and maintained to sustainable conditions and population levels.
II. Compatible uses improve stewardship of the Cosumnes River Watershed.

Sub-goals further refine and organize the goals.

FIGURE 1.1: SCHEMATIC OF THE PLANNING PROCESS



Biological sub-goals are measures to sustain, restore, and enhance biological diversity and ecological functionality. A fundamental approach used for setting biological goals was The Nature Conservancy's Conservation Action Plan (CAP) approach, which focused on using representative samples of ecosystems or ecological communities (course filter) as well as individual species (fine filter) as an "umbrella" to encompass the habitat requirements of many additional species, including many special status species. These representative samples are called "conservation targets." See Chapter 3 for additional details on the CAP process and outcomes.

Compatible Use sub-goals are measures that describe the desired types and levels of uses (education, recreation, research, facilities) that are compatible with the overarching goals.

Objectives tier off the goals and can be measurable or can be in the form of a policy statement. Objectives are statements of intended results of management actions.

Actions are the individual projects, studies, or work elements that implement the objectives and can be useful as an aid in staff and budget allocation at the Preserve.

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2 Description of the Cosumnes River Watershed and the Preserve

This Chapter provides background information on the Cosumnes River Watershed, on the Preserve in particular, and on a variety of planning considerations that affect the Preserve's management. This background information sets the context for the goals, objectives, and actions that appear in later Plan Chapters. This Chapter is comprised of three main sections: Section 2.1 is "Description of the Watershed," Section 2.2 is "Description of the Preserve," and Section 2.3 is "Planning Framework."

2.1 DESCRIPTION OF THE WATERSHED

The Cosumnes River watershed encompasses over 830,000 acres (1,297 square miles) and contains over 2,000 linear miles of natural waterways. The Cosumnes River watershed includes portions of Sacramento, El Dorado, and Amador Counties. Elevations range from a peak of 7,500 feet in the Sierra Nevada Mountains in Amador County to a low of slightly below mean sea level where the river terminates at the confluence with the Mokelumne River in Sacramento County, just before flowing into the Sacramento–San Joaquin Delta. Several tributaries drain into the lower portion of the Cosumnes River near the Preserve, including Deer Creek, Badger Creek, and Laguna Creek (Figure 2.1). The Preserve Partners also manage property located in the adjacent watershed of the Mokelumne River located in San Joaquin County.

The text within this section is primarily based upon the "Lower Cosumnes River Watershed Assessment" which was previously prepared for the Preserve (RBI 2006). Additionally, scientific literature, GIS data, and Preserve staff information is included herein. These sources provided information on climate, geology, hydrology, and soils characteristics throughout the Preserve and surrounding watershed. This information is provided in this Management Plan because physical processes (such as flooding) drive the biological processes (such as forest regeneration) upon which the Preserve's diverse matrix of ecological communities depend. Information about the land cover in the watershed is provided by the Preserve's GIS database. Both the physical and the land cover information will be helpful for those staff who are charged with implementing the actions listed in later chapters of this Plan, as well as for the general public to understand the rationale of the proposed actions.

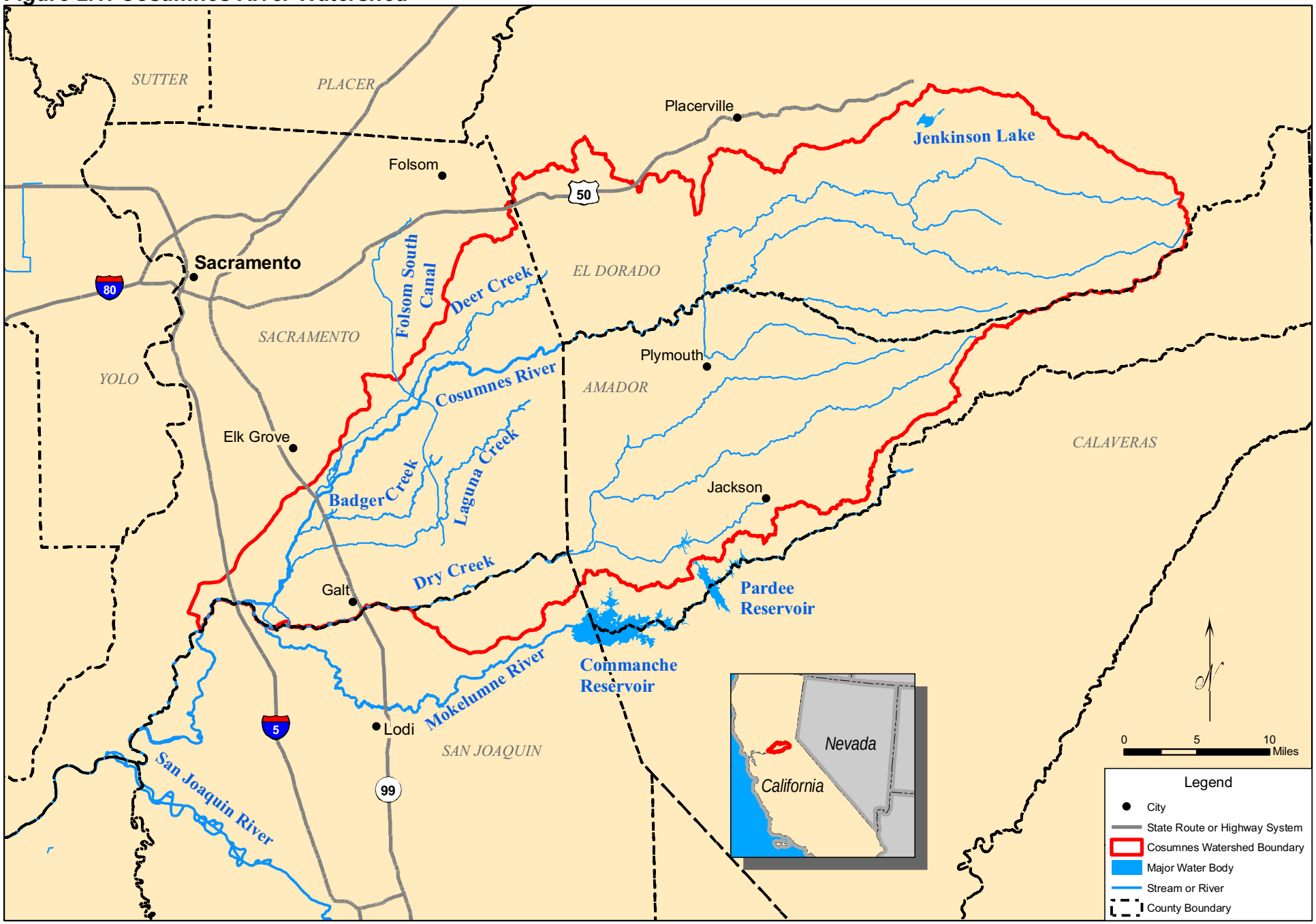
2.1.1 Climate, Geology, Topography, Hydrology, Soil Resource

This section describes the climate, geology, topography, hydrology, and soil resource characteristics of the Preserve.

CLIMATE

Sacramento and northern San Joaquin Counties have a Mediterranean climate characterized by hot, dry summers and temperate, wet winters. A marine air influence from the Delta region to the southwest moderates the temperature extremes of the Central Valley. During the summer months (June–August), average daily high temperatures are in the mid-90s Fahrenheit (ºF), and average daily lows are in the high-70s. During the winter months (December–February), average highs are in the mid-60s ºF, and average lows are in the high 40s ºF (NOAA 2005).

Figure 2.1: Cosumnes River Watershed



In most years, virtually all precipitation in the Central Valley falls as rain between November and April. Annual rainfall typically ranges from 22 inches in the lower Cosumnes River watershed to 60 inches in the upper portion of the watershed. Rain and spring snowmelt cause some level of flooding along the Cosumnes River each year, except during extreme drought conditions. The frost-free season is approximately 360 days annually (NOAA 2005).

Future effects of climate change are a concern, and the potential impacts of climate change are expected to be mostly negative to many of the species that inhabit the Preserve. For example, since the mid-20th century it appears that the pattern of flood timing has shifted toward more frequent early winter flooding with fewer late spring floods as described by water year types. (Booth *et al.* 2006; Stewart *et al.* 2005). Changes in flooding timing and duration could affect habitat availability and aquatic productivity of seasonal wetlands on the floodplain (Ahearn *et al.* 2006; Gallo *et al.* 2004; Grosholz and Gallo 2006). Future effects of, and solutions to, climate change may bring challenges, as well as possible opportunities, to the Preserve.

GEOLOGY AND HYDROLOGY

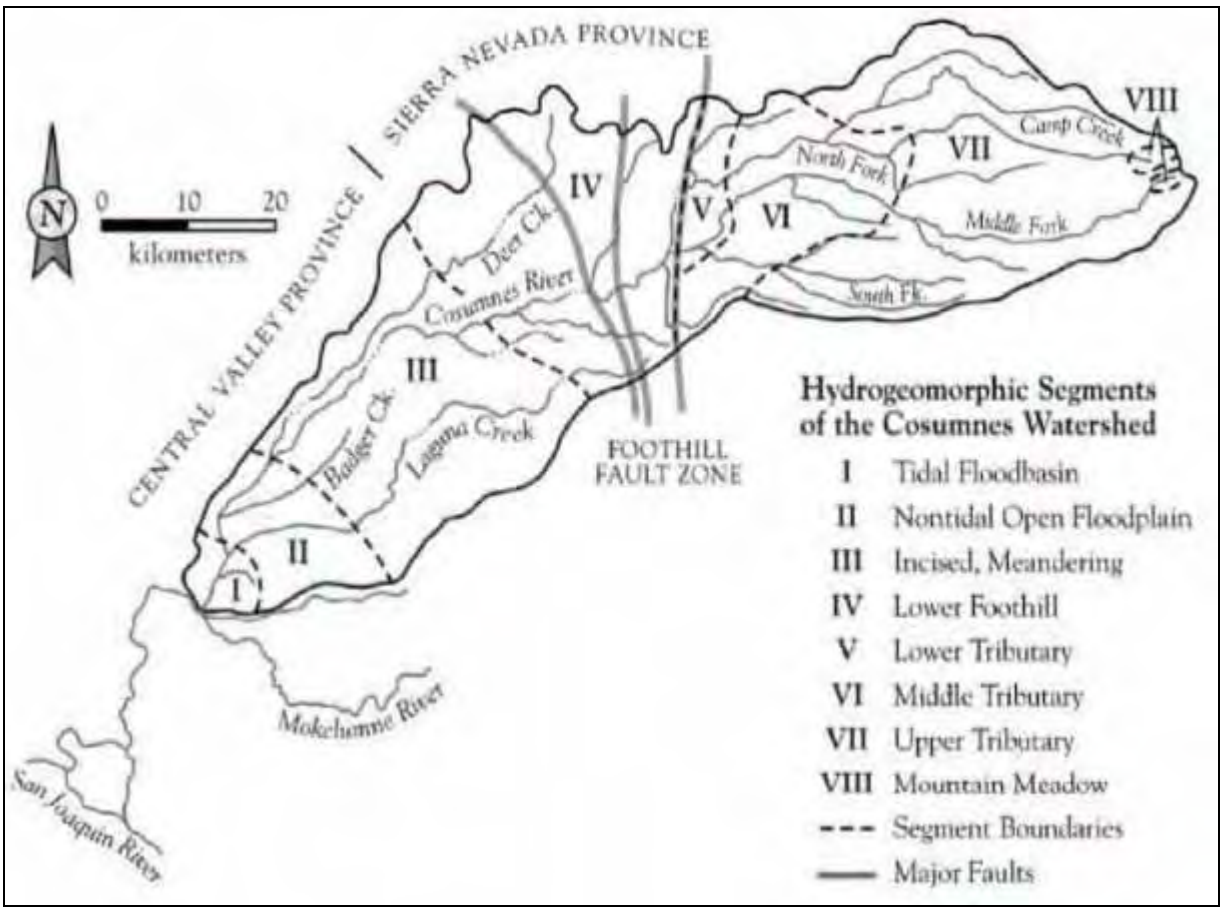
The Preserve is located in the Sacramento Valley in the Great Valley geomorphic province of California. The Cosumnes River watershed consists of three major river forks (North, Middle, and South) that join into a mainstem. Each river fork is comprised of a complex network of creeks, streams, and springs. The Cosumnes River is unique in that it has retained natural processes such as natural river-bank cutting, meander, and sediment transport that are characteristic of free-flowing rivers. Dams, upstream diversions, downstream flood control, mining, timber harvest, and urbanization all occur within the Cosumnes River watershed, and these in turn influence the hydrology and the ecology of the river. The Cosumnes River is generally considered to be an un-dammed river, meaning there is not a major hydroelectric dam on the river. There is, however, a small dam on Camp Creek, a tributary of the North Fork Cosumnes River, that impounds a relatively small percentage of the watershed runoff. This dam has a relatively small impact on the entire river's flow pattern. (RBI 2006).

The relationship between natural physical processes such as flooding, human activities, and the native flora and fauna is complex and not completely understood. To better understand the Cosumnes River watershed processes, Moyle *et al.* (2003) defined eight distinctive segments of the Cosumnes River using a hydrogeomorphic classification of the watershed (Figure 2.2).

- Segment I is the Tidal Floodbasin segment where the river consisted of multiple shifting channels in a broad floodplain, which supported a mosaic of aquatic and terrestrial habitats. Today, farms utilize the rich tidally influenced floodplain soil and the fields are protected by low levees that do not prevent seasonal flooding. This area is the focus of major efforts to restore natural habitats, including seasonally flooded areas.
- Segment II is an Open Floodplain with no tidal influence. The river is composed of multiple shallow channels with beds dominated by sand. Riparian forest and short levees flank the river channel. River flows decline in the summer, in part due to lowered groundwater conditions along the river.

- In Segment III the river is incised and meandering and is contained in a narrow valley with Pleistocene alluvial fan deposits. Agricultural levees and past attempts to stabilize banks have induced a long-term cycle of channel degradation.
- Segment IV is the Lower Foothill segment where the three upper forks converge to form the mainstem Cosumnes River. Here, flows are perennial but typically low by summer. Portions of this reach were heavily altered by hydraulic mining during the late 1800s.
- The upper watershed (Segment V, Lower Tributary; Segment VI, Middle Tributary; Segment VII, Upper Tributary; and Segment VIII, Mountain Meadow) includes steep-gradient, bedrock-controlled perennial streams that start in mountain meadows. Above Highway 49, the Cosumnes River is divided into three tributaries, the North, Middle, and South Forks.

FIGURE 2.2: HYDROGEOGRAPHIC SEGMENTS OF THE COSUMNES WATERSHED



Source: Moyle et al. 2003

FLOODING

Many of the management actions recommended in this Management Plan relate to flooding and floodplain processes. Effective management of the river and its tributaries, and maintenance of associated ecosystem services, requires an understanding of the seasonal and inter-annual hydrologic variability of water flow in the channels. For this reason, basic information about flood processes and classification is provided here.

Flooding is the most critical ecological process structuring riparian floodplain systems (Florsheim and Mount 2002). It is the key process driving regeneration of riparian forest and recharge of natural seasonal wetlands that are vital to migratory waterfowl and waterbirds and numerous other flora and fauna.

UC Davis researchers have developed a method of classifying flood events for the Cosumnes River according to the events' hydrologic, geomorphic, and ecological significance to the river's lowland floodplain (Booth *et al.* 2006). Based on flood duration and peak daily flow during each flood period over a 98-year time series (1908–2005), the researchers described 12 potential flood types and found that the Cosumnes has demonstrated 10 of those types (Table 2.1). The frequency of each flood type was calculated to estimate how certain types of floods occur on the floodplain. This method of obtaining a frequency distribution of particular flood types can aid managers who are interested in restoring flood regimes to lowland rivers such as the Cosumnes.

TABLE 2.1: TEN FLOOD TYPES ON THE COSUMNES RIVER

Flood Type	Duration	Duration (days)	Magnitude	Peak Flow (cms)	Start Season	# of occurrences	emp freq 1 or more	emp freq 2 or more	emp freq 3 or more	emp freq 4 or more
S1	short	< 7	small to med	< 100	All seasons	278	0.91	0.72	0.54	0.33
S2	short	< 7	large	100-400	Fall to Early Spring	31	0.29	0.03	0.00	0.00
M1	medium	7-20	very large	< 100	Winter to Late Spring	42	0.33	0.09	0.01	0.00
M2	medium	7-20	small to med	100-400	Winter	44	0.36	0.07	0.02	0.00
M3	medium	7-20	large	> 400	Fall to Winter	5	0.05	0.00	0.00	0.00
L1	long	21-70	small to med	< 100	Early Spring	20	0.18	0.02	0.00	0.00
L2	long	21-70	large	100-400	Winter to Early Spring	31	0.28	0.04	0.00	0.00
L3	long	21-70	very large	> 400	Winter	12	0.11	0.01	0.00	0.00
V2	very long	> 70	large	100-400	Winter to Early Spring	10	0.10	0.00	0.00	0.00
V3	very long	> 70	very large	> 400	Winter to Early Spring	6	0.06	0.00	0.00	0.00
ALL						479	0.94	0.88	0.83	0.70

Source: Booth et al. 2006

Short-duration flood types, such as S1, S2, M1, M2, and M3, are essential in jump-starting the productivity of the food web because they provide periods of disconnection throughout the flood season, which is essential for effective productivity. These floods start a positive trophic cascade in which algae and other primary producers are consumed by aquatic zooplankton, which are in turn consumed by macro-invertbrates such as ephemeropta, which are consumed by small fish, which are then consumed by larger fish such as salmon (Ahearn *et al.* 2006). At least one such flood occurred on average in two out of every three years during the 98-year streamflow record. At least two effective floods occurred in roughly half the years (Booth *et al.* 2006).

The physical variability of hydrological processes supports a diverse food web, which in turn maintains the overall biodiversity of the system. For example, the fish and invertebrates produced as a result of the flooding and food web productivity serve as eventual food items for waterfowl and mammals. In addition to the benefits of food-web productivity, floods and other hydrologic events are very important physical processes that maintain the ecological integrity of

aquatic ecosystems. For example, flooding resets ecological succession during large floods, provides ecological cues, and discourages the persistence of non-native plant species that are not adapted to natural conditions (Stewardson and Gippel 2003). Large floods export large woody debris and coarse particulate organic matter from the floodplain to the river channel and are also important avenues for energy transfer across the river–floodplain system (Booth *et al.* 2006).

The most serious flood events within the area of the Preserve (measured at Michigan Bar) are summarized in Table 2.2 below.

TABLE 2.2 FLOOD HISTORY ALONG COSUMNES RIVER AT MICHIGAN BAR

Date	Peak Flows (cfs)[1]	3-Day Volume (taf)
March 1907	71,000[3]	N/A
November 1950	27,600	94
December 1955	42,000	108
April 1958	29,300	69
February 1963	39,400	74
December 1964	37,500	111
January 1980	34,200	62
February 1982	37,000	78
February 1986	45,100	196
January 1997	93,000	177
December 2005	35,100	73
April 2006	32,600	90

*Source: *USGS Surface Water for USA: Peak Streamflow*

Notes

1. *cfs is cubic feet per second*
2. *taf is total acre feet*
3. *Discharge is an estimate*

Some of the floods summarized in Table 2.2 caused property damage to farm fields, roads, homes and related structures as a result of levee failures, land erosion, and silt deposition. However, the floods also provided ecological benefits as described above. The key to successful restoration of floodplains and habitats at the Preserve will be to find the appropriate balance between continued protection of neighboring landowners and the amount of seasonal flooding necessary for proper ecological functioning. To that end, the low-lying areas of the Preserve, and especially the restored floodplains, serve an important role in the storage of flood waters and can sometimes delay inundation of downstream areas near the Delta. This in turn can provide protection from flooding for local landowners and others downstream of the Preserve.

LEVEE BREACHES

As described above, the ecological productivity of the floodplain depends on the timing and duration of seasonal flooding. Natural and intentional levee breaches reconnect the river to its floodplain, which results in periodic flooding, sediment deposition and scour, and groundwater recharge. Habitat complexity is automatically generated by letting hydrogeomorphic processes sculpt the floodplain (Florsheim and Mount 2002), which then provides different microhabitats

for vegetation and aquatic biota (Crain *et al.* 2004; Grosholz and Gallo 2006). This consequently increases habitat diversity for birds (Wood *et al.* 2006) and trophic support for bats and other species dependent on emerging aquatic insects (Rainey *et al.* 2007).

Ecologically significant levee breaches have occurred both naturally and intentionally at the Preserve (Figure 2.3). The1985 floods accidentally breached a levee located two miles downstream of Twin Cities Road. The accidental breach resulted in substantial sand deposition onto the floodplain. Within a few years a 15-acre area now known as the "Accidental Forest" contained a rich mosaic of 15- to 20-foot high cottonwood trees, Oregon ash, and willow thickets. By 2000, the Accidental Forest had cottonwoods over 40 feet tall, valley oak trees naturally regenerating in the understory (Tu 2000), and a variety of nesting migratory songbirds (PRBO Conservation Science 2004).

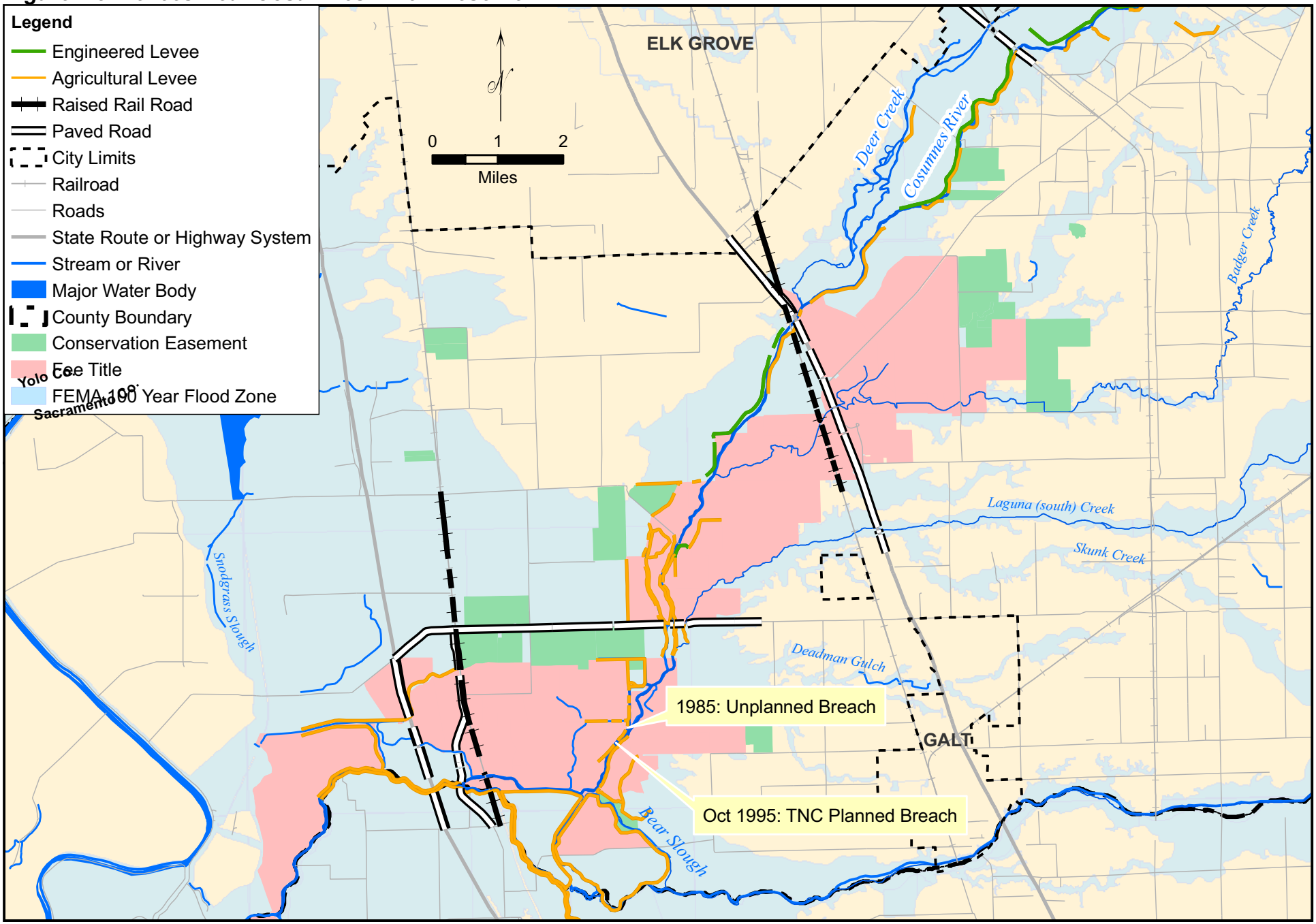
Following the 1985 levee breach, the Preserve acquired the farm field adjacent to the Accidental Forest. Following the acquisition, the Preserve conducted hydrologic modeling to determine the feasibility and outcomes of an intentional levee breach along the Cosumnes River. The modeling demonstrated that water surface elevations in the river would be reduced upstream of a levee breach because waters would spread out on the expanded floodplain (Swanson and Hart 1994). Thus, the models predicted that a levee breach would reduce flood levels elsewhere on the river.

Levee breach – Photo courtesy of Preserve Photo Library

In October 1995, the Preserve intentionally created a 50-foot gap in the levee along the Cosumnes River south of the 1985 levee breach (Figure 2.3). This reopened approximately 200 acres to natural flooding, including a 100-acre leveled farm field. Flooding first occurred in December 1995 and by March 1996, high flows had scoured the channel and deposited a 500-foot-long sand splay that was quickly covered with cottonwood and willow seedlings.

In January 1997, a massive flood struck the entire Central Valley and caused many levee breaks and extensive flooding along the Cosumnes River. This event was a record flood for the Cosumnes River, peaking at approximately 93,000 cfs, and several homes, roads, and related structures were damaged as a result. In the wake of this flood, the Preserve, local landowners, and the Army Corps of Engineers implemented a non-structural flood-management project in lieu of traditional levee repairs (Swenson *et al.* 2003). This 100-acre project was located north of the 1985 and 1995 levee breach project and was completed in the winter of 1998–1999. In total, the two levee breaching projects restored natural flooding to approximately 300 acres of floodplain.

Figure 2.3: Levees Near Cosumnes River Preserve

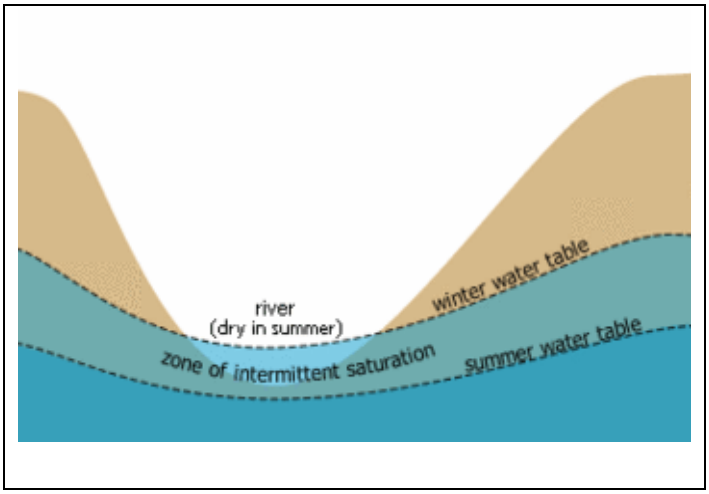


GROUNDWATER

Groundwater withdrawls have resulted in localized overdrafts, referred to as cones of depression, in the water table located north and south of the Cosumnes River (Mount *et al.* 2001). Fleckenstein *et al.* (2004) reported groundwater elevations as low as 79 feet below mean sea level. This is a serious problem because groundwater discharge to the river (aka base flow) is the major source of surface flow in the river during the dry season. Since the 1940s, data have shown that there has not been enough groundwater to maintain a river connection during the months of October and November (Fleckenstein *et al.* 2004). As shown in Figure 2.4, during the dry fall season the Cosumnes River bed dries up, blocking access to the river for salmon. This is significant for species such as fall-run Chinook salmon that are returning to spawn in the river. To allow fish migration to spawning habitat, there is a need to maintain a minimum river depth of seven inches, which corresponds to a flow of 20.13 cfs at the McConnell gage (Fleckenstein *et al.* 2004).

Groundwater-level decline also can result in shifts in community population structure due to variations in plant tolerance to water table depth and sediment saturations (Stromberg *et al.* 1996). The Cosumnes River near Highway 99 has a system of perched aquifers and low-permeability sediment layers that recharge quickly during floodplain inundation, but drain slowly (Fleckenstein *et al.* 2004 and 2006). Perched systems can provide a shallow water table to support riparian vegetation (Niswonger 2006). Thick riparian vegetation may, however, diminish stream seepage to perched aquifers by as much as 30 percent due to evapotranspiration losses (Niswonger 2006).

FIGURE 2.4: SEASONAL FLUCTUATIONS IN THE WATER TABLE



Source of graphic: http://en.wikipedia.org/wiki/Water_table

To solve the problem and to maintain minimum flows for salmon, the Preserve has supported an approach to add surface flows to the Cosumnes River to compensate for the groundwater withdrawls. This is referred to as "flow augmentation." The Flow Augmentation Program has been implemented in two ways. First, a document called the "Memorandum of Agreement for the Management for Water and Environmental Resources Associated with the Lower Cosumnes River: A Collaboration of the Sacramento County Water Agency, The Nature Conservancy, and

Southeast Sacramento County Agricultural Water Authority" was signed in March 2005. This MOA has three main tenets:

- Surface Flow Augmentation: American River water resulting from an Aerojet settlement. Water transported via the Folsom South Canal would be released into the Cosumnes River channel.
- Conjunctive Use.
- Reclaimed Water Reuse.

This MOA has not yet been fully implemented. Secondly, in the interim, water was purchased in 2005 from the Environmental Water Account and utilized to enhance surface water flows in the River. The year 2006 brought high natural flows and the augmentation was not necessary.

WATER QUALITY

The primary water quality concerns along the lower Cosumnes River are high levels of nitrogen, phosphorus, suspended sediments, and mercury (Dahlgren, no date; Conaway *et al.* 2007). The Central Valley Regional Water Quality Control Board (CVRWQCB) is developing Total Maximum Daily Loads (TMDL) for total mercury and methyl mercury and a Basin Plan Amendment for mercury in the Delta.

Compliance with water quality regulations is managed by the CVRWQCB through its "Regional Board Water Quality Control Plan for the Sacramento and San Joaquin Rivers, 1998." The Preserve is responsible for complying with federal and state water quality regulations, including the following four programs:

- Agriculture drainage (Ag Waiver Program)
- Aquatic Pesticide Program
- Water Quality Certification Program
- National Pollution Discharge Elimination System (NPDES) Phase II in designated urbanized areas

The Preserve complies with the CVRWQCB Agricultural Drainage Program via active participation and financial contributions to the Sacramento Valley Water Quality Coalition and its sub-watershed program, the South Sacramento/Amador Water Quality Alliance.

The Preserve also complies with the CVRWQCB's Aquatic Pesticide Program. This water quality program regulates use of herbicides and pesticides within a water conveyance, detention basin, or other aquatic area via a permit process through the Regional Water Quality Control Board.

Compliance with the Water Quality Certification Program is required for activities such as dredging, filling, pipeline construction, levee reconstruction, wetland habitat improvement, pier installation, boat harbor dredging, gravel mining, flood control excavation, minor stream crossings, and other construction-related activities that are located in a wetland or "waters of the U.S." A permit from the Regional Water Quality Control Board is required if the Preserve proposes to conduct activities such as those described above within or near waters of the U.S.

Because the Preserve is located in a rural area and does not generally alter stormwater flows, the NPDES requirements are not applicable.

SOILS

Because the distribution of plants and agricultural crops may be dependent on soil characteristics, understanding the variety and distribution of soils is important. Soil surveys provide information about soil properties and features, including descriptions of the soils, maps of their locations, and a discussion of their suitability, limitations, and overall management concerns for specified uses. Figure 2.5 illustrates the distribution of 39 different soil components across the Preserve (USDA 1993).

2.1.2 Watershed Land Cover

Land cover types were classified into 25 different categories throughout the watershed by combining several previously existing GIS datasets for Sacramento, Amador, San Joaquin, and El Dorado Counties. These datasets included the California Department of Water Resources (DWR) County Land Surveys, the Central Valley Holland Vernal Pool Classification, and California GAP Analysis Layer. Since the DWR Land Survey data was not available for El Dorado County, irrigated agricultural land in this county was extracted from the LCMMP layer compiled by the California Department of Forestry and Fire Protection. Developed land in El Dorado County was incorporated from the Department of Conservation's Farmland Mapping and Monitoring Program. The land cover GIS layer of Preserve properties underwent an additional process of review by Preserve staff and Ducks Unlimited staff. During a series of meetings, a group of Preserve staff visually reviewed land cover maps of each property and compared them to existing aerial photos. Staff also updated the land cover layer based on their knowledge of recent restoration actions or changes to farming practices on the Preserve.

As shown in Figures 2.6 and 2.7, the western part of the watershed is characterized by lowland Delta and Valley habitat types such as tule, sedge, riparian forests, and freshwater marshes located adjacent to the Cosumnes River and its tributaries. The lower floodplain has some of the best remaining valley oak riparian forest in the Central Valley. Chinook salmon spawn in the river downstream of Latrobe Falls, and native fishes rear on the seasonally flooded floodplains. Unique terrace and mudflow vernal pool systems are found embedded within annual grasslands on the eastern edge of Sacramento and San Joaquin Counties. Agricultural land, particularly irrigated agriculture, is concentrated on the fertile upland valley soils of the valley floor in the lower watershed.

The middle portion of the watershed contains blue oak (*Quercus douglasii*) woodlands, vernal pool grasslands, and mixed blue oak-foothill pine (*Pinus sabiniana*). Agricultural uses include rangeland and, increasingly, vineyards.

The eastern part of the watershed, with higher elevations, has land cover dominated by conifer forests of Ponderosa pine (*Pinus ponderosa*), incense cedar (*Calocedrus decurrens*), and Douglas fir (*Pseudotsuga menziesii*). Developed areas are located in the Cities of Galt and Elk Grove. Table 2.3 below, shows the acreage associated with each land cover category.

TABLE 2.3: COSUMNES RIVER WATERSHED LAND COVER ACREAGE

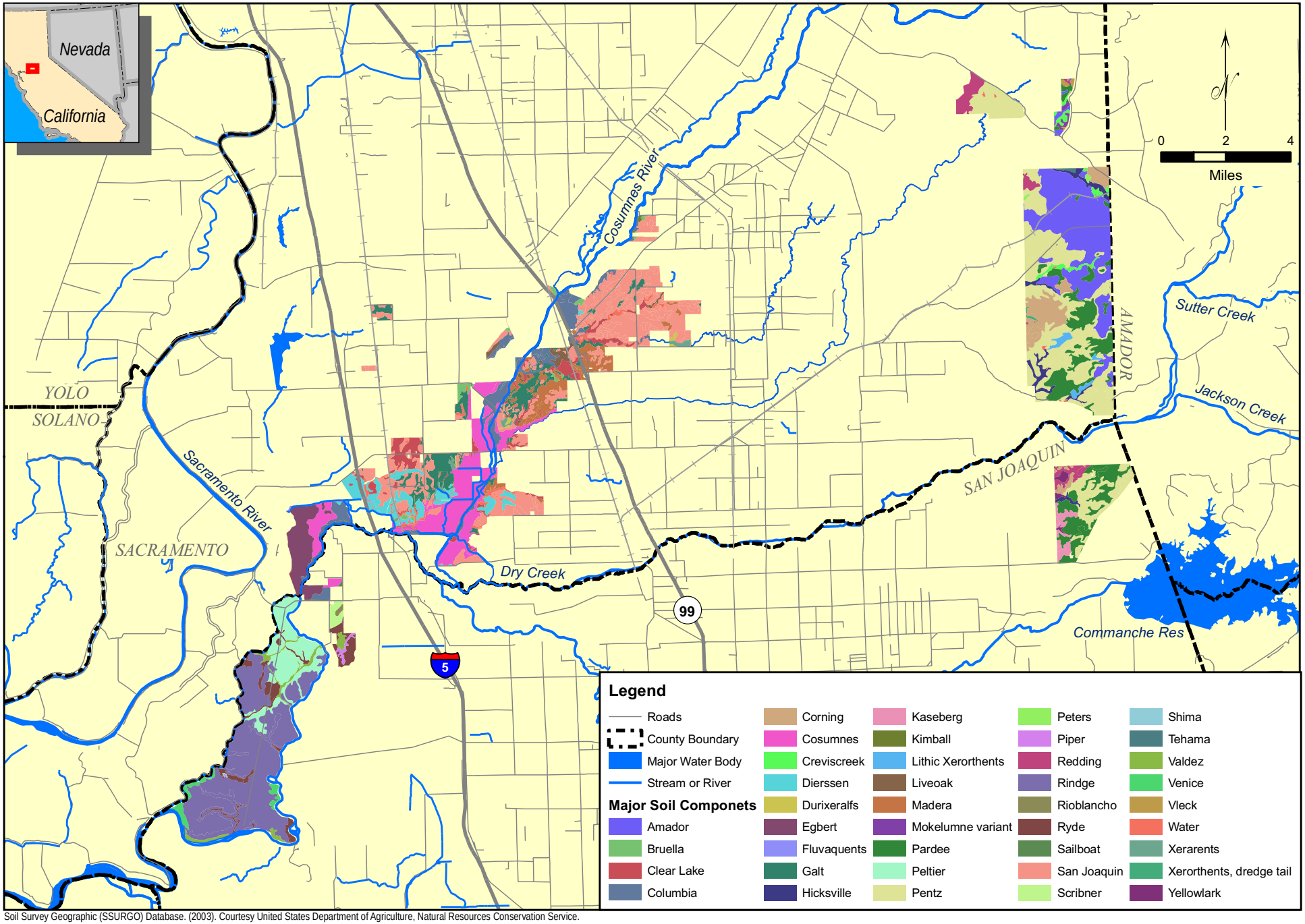
Land Cover Type	Acreage	Square Miles
Agricultural Infrastructure	2,637	4.1
Barren and Wasteland	2,382	3.7
Blue Oak Woodland	91,190	142.5
Blue Oak-Vernal Pool-Savannah	3,065	4.8
Chaparral	28,064	43.8
Conifer	254,232	397.2
Crops – Annual or Truck & Berry	22,034	34.4
Developed	40,978	64.0
Dry Land Farmed	360	0.6
Freshwater Marsh	699	1.1
Grain and Hay Crop	4,477	7.0
Grasslands	180,351	281.8
Idle	3,013	4.7
Irrigated Pasture	24,365	38.1
Managed Marsh	878	1.4
Mixed Blue Oak-Foothill Pine	69,562	108.7
Montane Hardwood	17,011	26.6
Perennial Woody Crops	27,473	42.9
Rice	1,023	1.6
Riparian Trees & Shrubs	5,319	8.3
Riparian Vegetation	2,379	3.7
Tule and Sedge	285	0.4
Urban Landscaped	753	1.2
Vernal Pool Grassland	42,507	66.4
Water	5,254	8.2

2.2 DESCRIPTION OF THE PRESERVE

The Preserve and associated lands encompass approximately 45,859 acres of floodplain, riparian forest, vernal pools, grasslands, blue oak woodlands, and compatible agriculture. Approximately 24,588 (54 percent) acres are held in fee title and 21,271 (46 percent) acres are held under conservation easements. The Preserve has restored approximately 1,800 acres of high quality riparian and wetland habitat (Florsheim *et al.* 2002). Approximately 3,000 acres of agricultural lands are seasonally flooded annually to support wintering migratory birds. (Please note that all acreages provided throughout this Management Plan are based on data contained in the Preserve's GIS system.)

Conservation easements protect approximately 11,000 acres of vernal pool grasslands, nearly 4,000 acres of wildlife compatible agriculture, and 6,300 acres of other habitat in the Cosumnes Lowlands. Almost 90 percent of the protected lands are maintained in compatible agricultural production, including grazing, annual crops, and organic rice. More information on the Preserve property descriptions and management are included in Chapter 7.

Figure 2.5: Soils On the Preserve



Soil Survey Geographic (SSURGO) Database. (2003). Courtesy United States Department of Agriculture, Natural Resources Conservation Service.

Figure 2.6: Land Cover for Cosumnes River Watershed

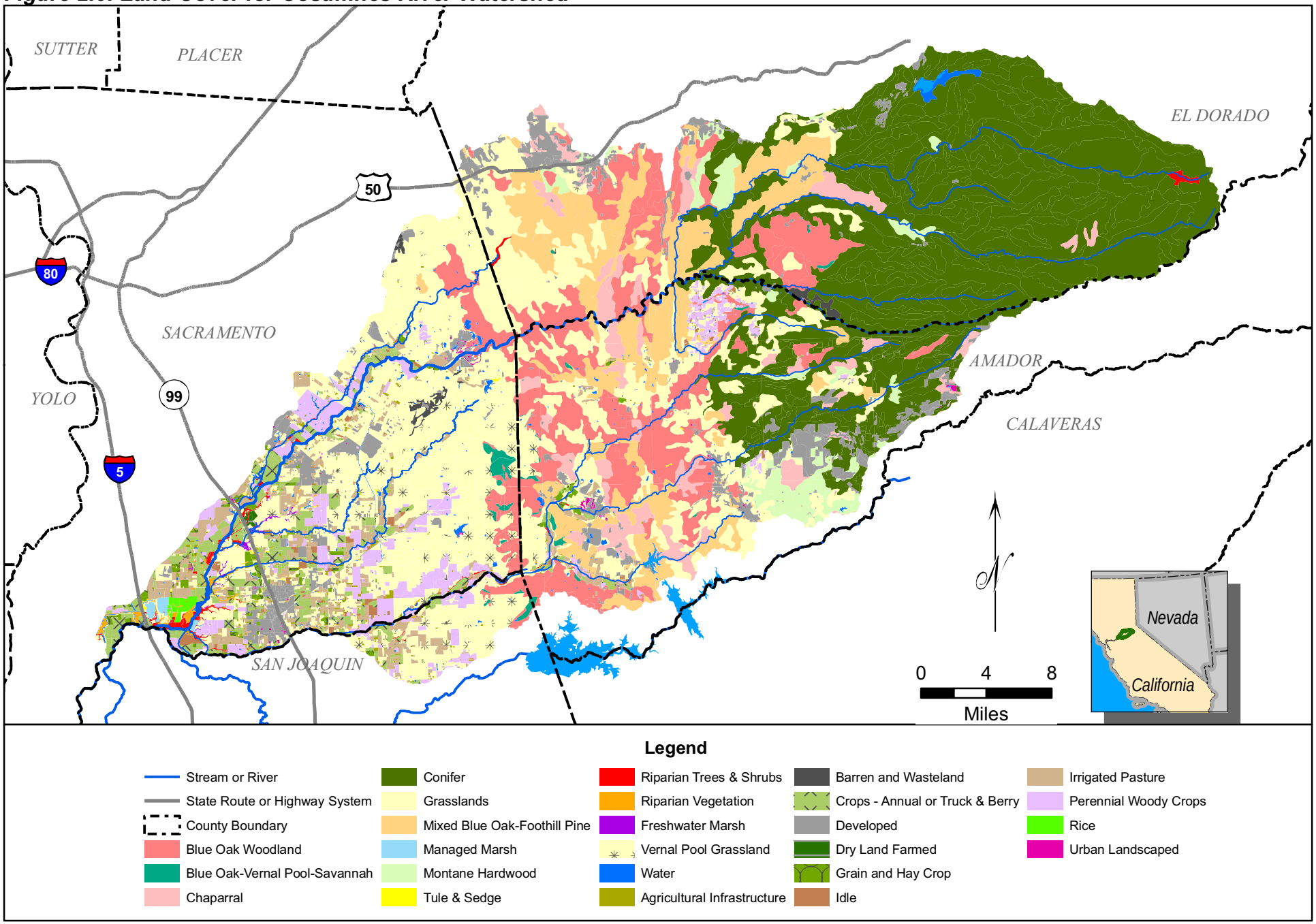
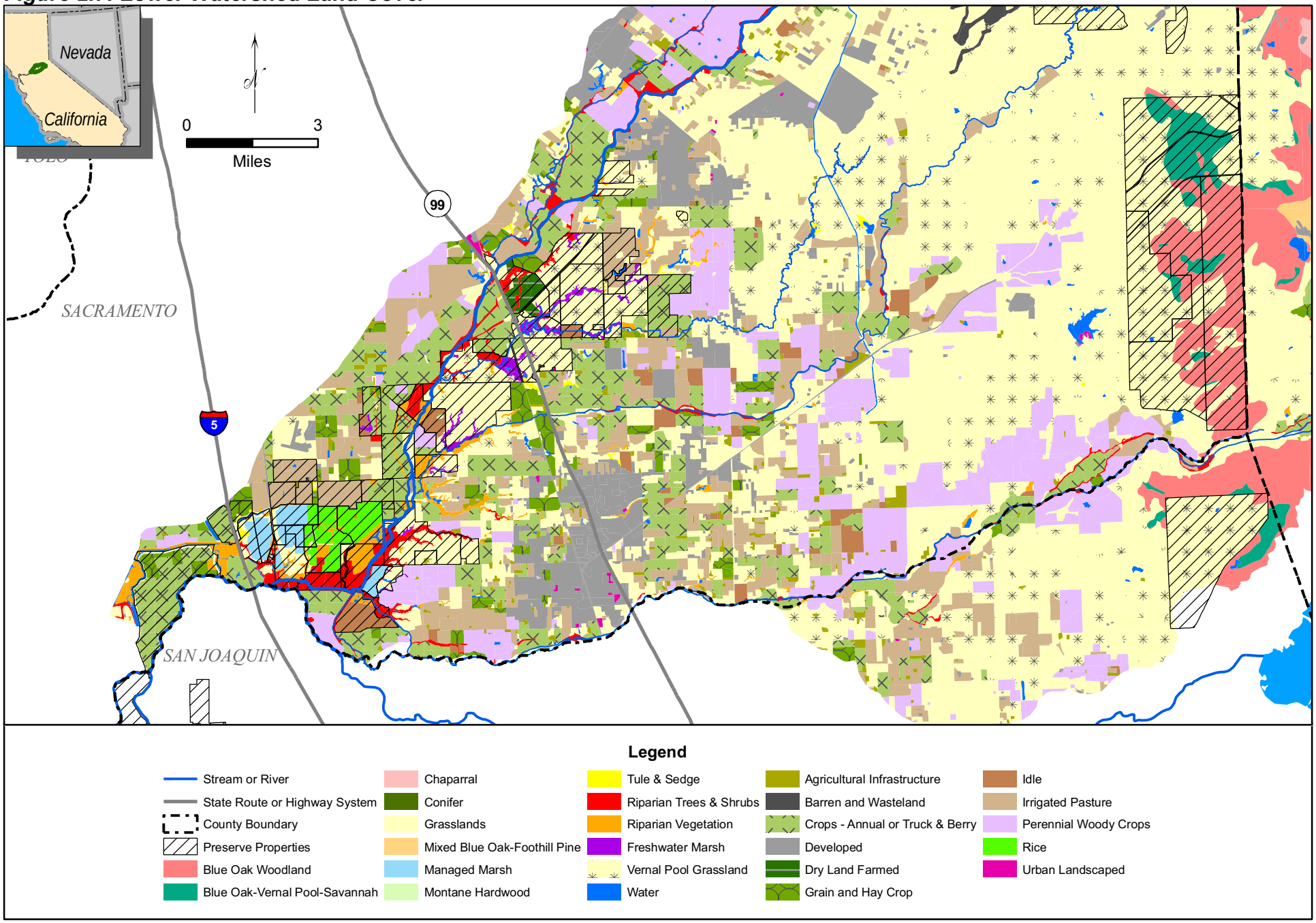


Figure 2.7: Lower Watershed Land Cover



2.2.1 Existing Preserve Facilities

There are currently 10 structures on the Preserve, including the Visitor Center, Farm Center, various barns and outbuildings, and private residences (Figure 2.8). Not included in this number are the existing structures on the Staten Island property. Maintenance of existing structures is discussed in Chapter 8, Operations and Maintenance.

A number of utilities cross the Preserve, including overhead power lines, telephone lines, underground gas lines, and fiber optic networks. Some of these facilities service the Preserve, in particular the power lines and phone lines, whereas others simply traverse the Preserve en route to surrounding urban areas. In addition to the structures and utilities, several public roads provide access to Preserve properties, including Twin Cities Road, Franklin Boulevard, Salas Road, Dillard Road, Desmond Road, Walnut Grove Road, New Hope Road, Orr Road, and Staten Island Road (Figure 2.8).

"Visitor Center" – Photo courtesy of Preserve Photo Library

The Preserve has approximately eleven miles of existing trail system, four miles located near the Visitor Center on Franklin Boulevard, and a seven-mile trail starting at Rancho Seco and looping on the Howard Ranch property. Approximately one mile of the trail system near the Visitor Center is concrete and/or boardwalk with bridges, viewing platforms, restrooms, and ramps that are all accessible to mobility-impaired visitors. The Visitor Center also has a concrete trail leading to the boat ramp that is accessible to mobility-impaired visitors. The River Walk trail is a three-mile unsurfaced trail that begins at the Visitor Center and meanders along the river. This trail is not easily accessible to mobility-impaired visitors. The Rancho Seco-Howard Ranch Trail is a seven-mile loop trail that starts and ends at Rancho Seco Park, winds along Rancho Seco Lake and up onto the Howard Ranch property. The first mile of this trail is accessible to mobility-impaired visitors.

LEVEES

Many of the levees that currently exist on the Preserve were originally constructed to protect agricultural fields from flooding. In the future, some of these levees will be maintained and others will be breached to allow additional seasonal flooding. Over 30 linear miles of levees exist on the Preserve (Figure 2.3). Although not shown on Figure 2.3, Staten Island is completely surrounded by levees.

2.3 PLANNING FRAMEWORK

Planning for the Preserve encompasses issues that cross regional, local, and project-area boundaries. This section identifies the federal, state, county, and local agency policies and other planning influences that affect the function and management planning of the Preserve.

The Preserve is unique in that it includes numerous Partners who each rely on their own set of institutional policies and plans. Together, these form a complex web of policies and other influences that need to be identified and coordinated to achieve mutual goals. The success of the Preserve is based on the premise that partnerships and cooperative planning will continue into the future.

As part of the planning process for this Management Plan, the Partners formed a "Planning Framework" Subcommittee which met several times in 2006 and early 2007 to collect data on the numerous planning efforts that affect the Preserve. They identified three major categories of planning efforts: Water Planning, Land-Use Planning, and Habitat Planning. Within these categories they identified a total of 22 separate planning processes. In the future, Preserve staff will continue to assess whether a particular planning effort is consistent with the Preserve's mission, vision, and goals. It is not the intent of the Partners to insist that other planning efforts share the same mission, vision, and goals; rather, the strategy is to support areas of mutual benefits among the planning participants that will move the effort towards increased compatibility with the implementation of this Management Plan.

2.3.1 Transportation Corridors

Two major highways, Interstate 5 (I-5) and State Route 99 (SR99), cross the Preserve in a north/south direction. These two highways carry high traffic volumes and both have numerous interchanges that have recently been modified and/or are planned to be modified to support new residential and commercial development in the region (Figure 2.10).

Franklin Field, a general aviation facility, is located northwest of Twin Cities Road and east of Bruceville Road. Originally established in 1943, the airport is currently operated by the Sacramento County Department of Airports. The Airport Land Use Commission adopted a Comprehensive Land Use Plan for Franklin Field in December 1988 and amended it in December 1992. This plan contains restrictions on building heights, noise, and safety hazards. Interactions between birds and aircraft may be a concern, particularly if aircraft activity increases in the future.

Mustang Airport is a public-use airport located near the intersection of Arno Road and Valensin Road, in Sacramento County's Southeast Community Planning Area. The airport consists of a runway, executive and "T" hangers, tie-downs, aircraft maintenance, flight instruction, fuel storage, aircraft sales, and pilot supplies. Plans to expand aircraft activity at this airport have been proposed and are being reviewed by Sacramento County. This expansion will likely adversely impact the habitat surrounding the Mustang Airport and ideally those impacts will be analyzed in the project's CEQA document. The Preserve Partners have submitted numerous comments to the County over the years regarding the potential for bird-aircraft strikes and other potentially negative impacts to wildlife if the airport is allowed to expand its operations in the future. Specifically, the airfield is close to a known heron and egret rookery at Horseshoe Lake,

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Figure 2.8: Structures and Public Roads on the Preserve

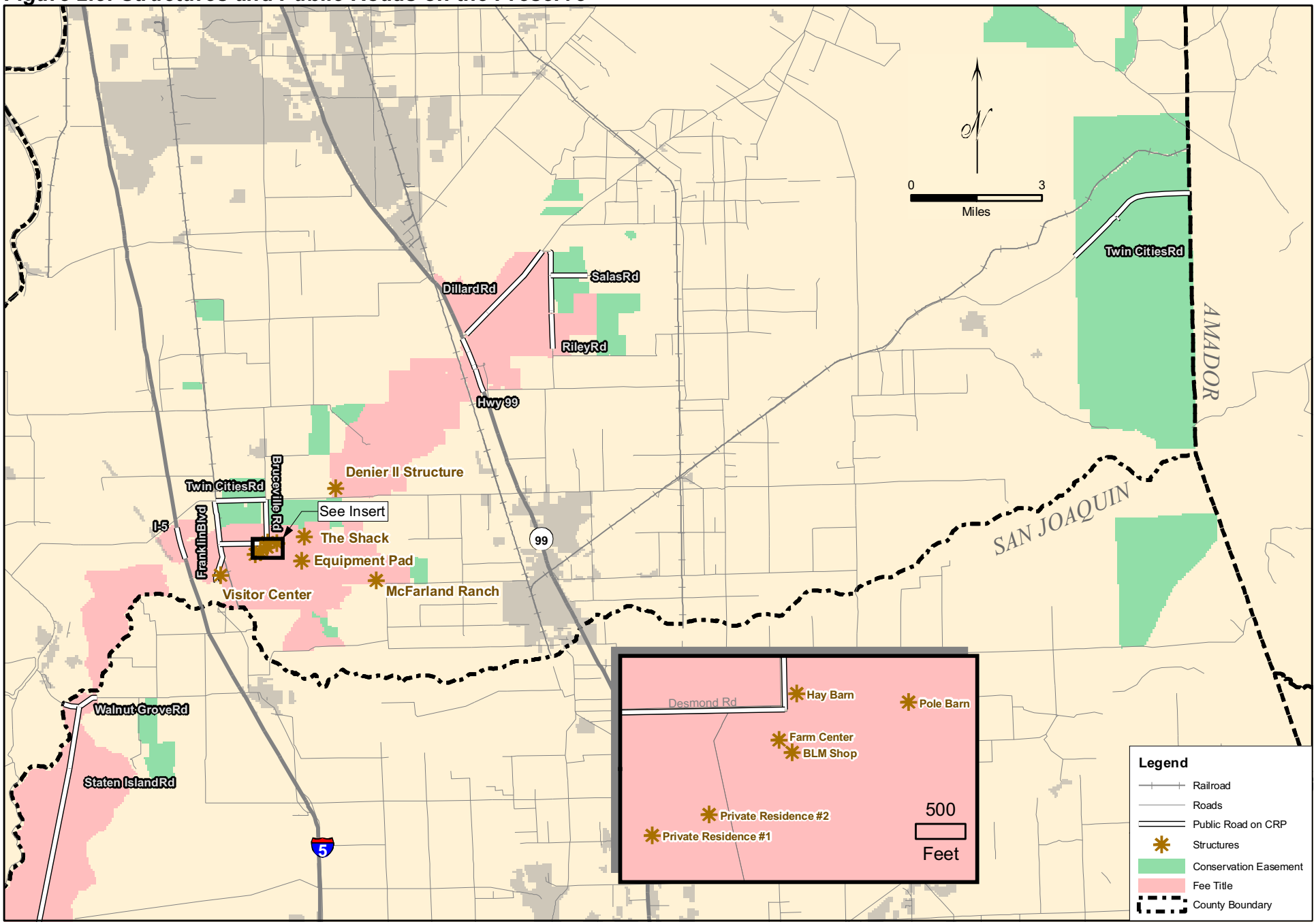


Figure 2.9: Managed Wetlands on the Preserve

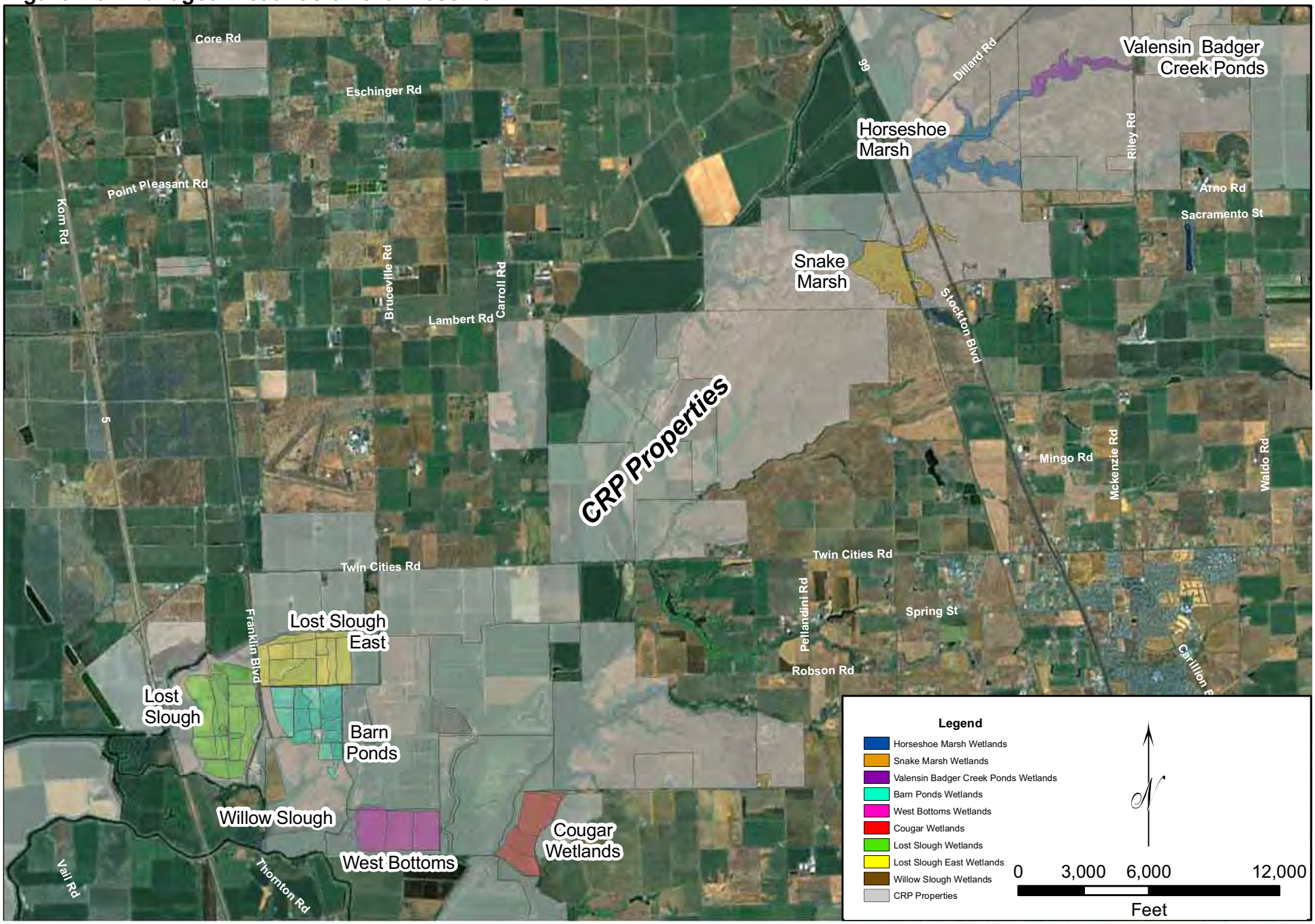


Figure 2.10: County and City General Plan Designations

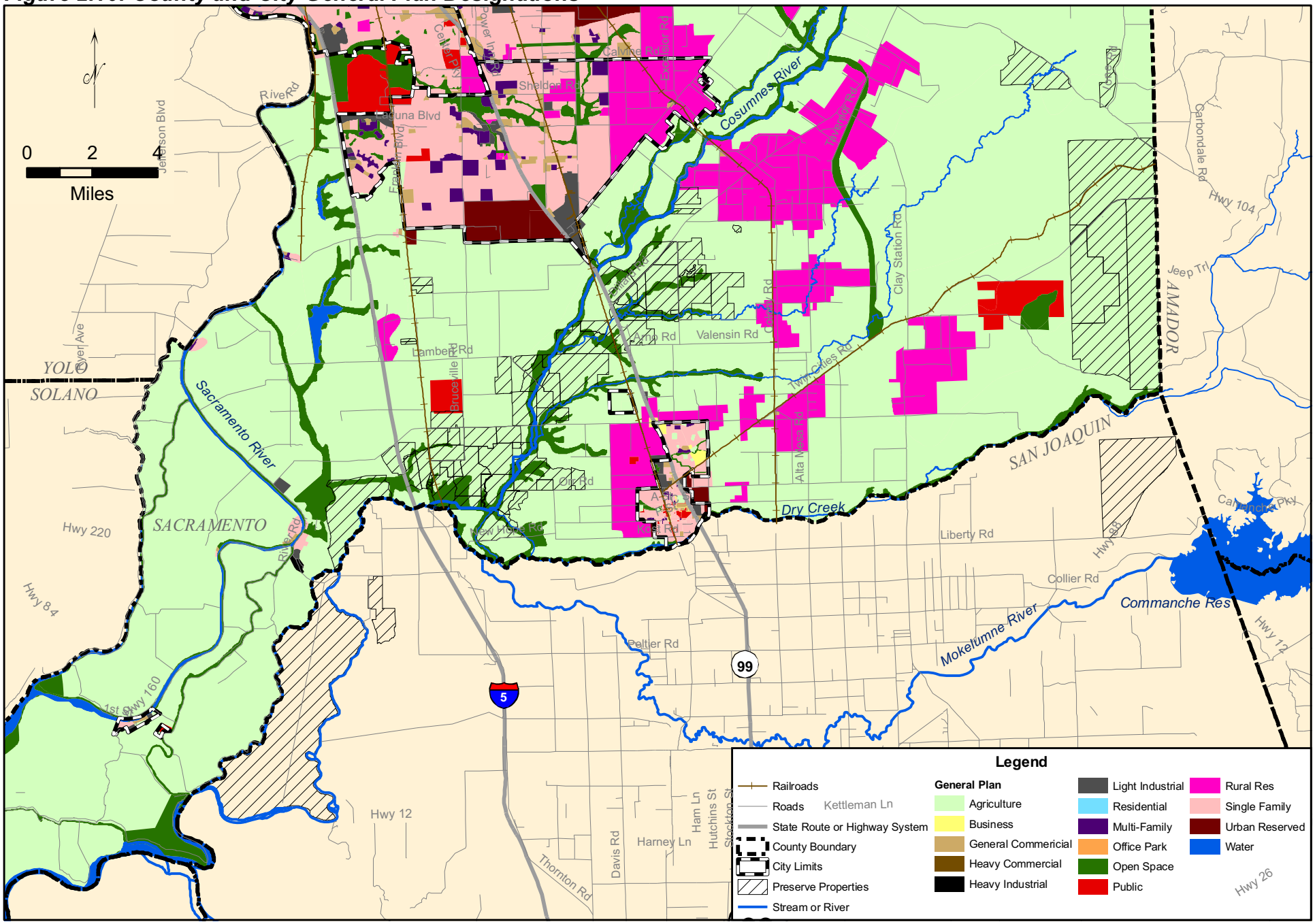
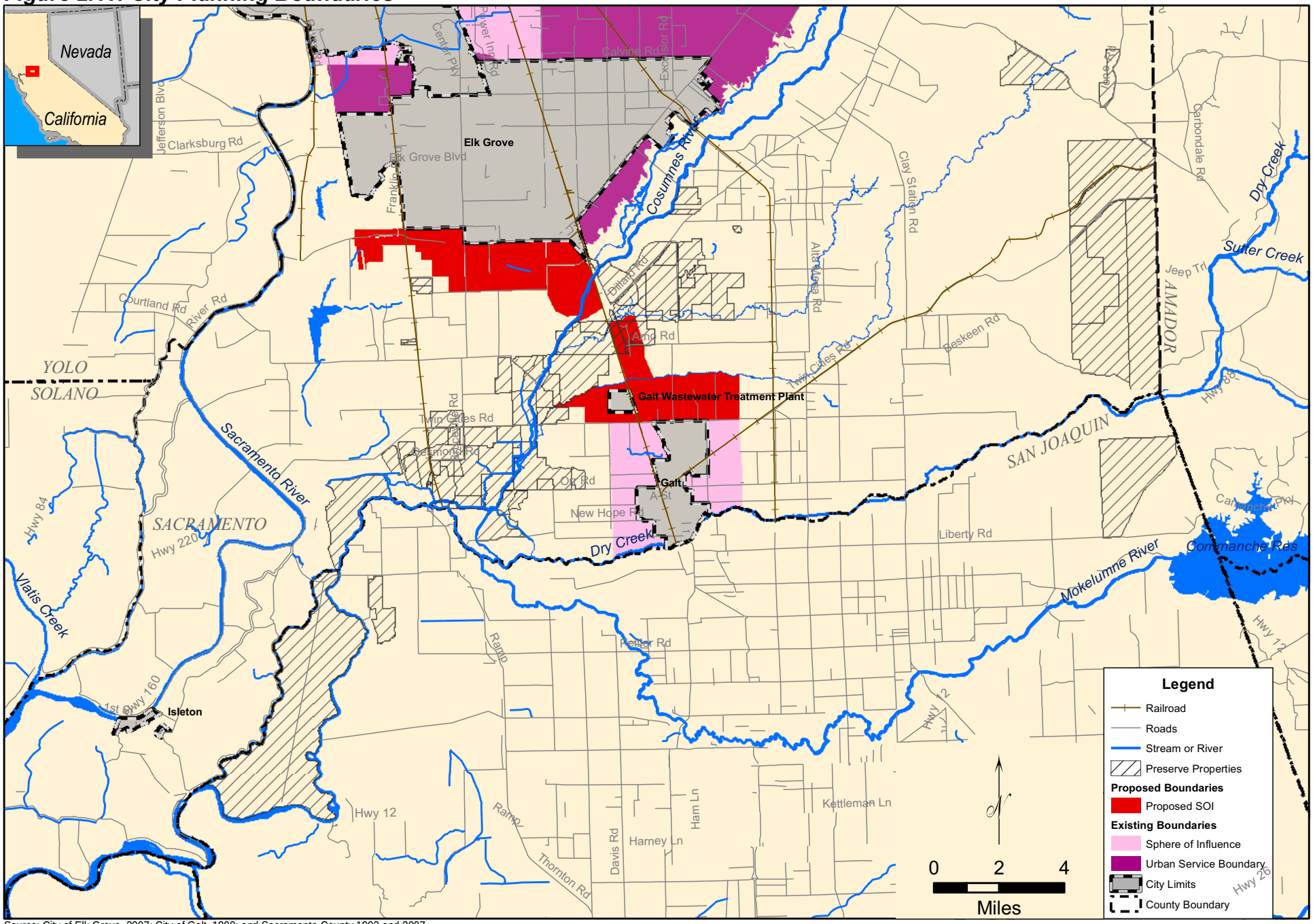


Figure 2.11: City Planning Boundaries



Source: City of Elk Grove, 2007; City of Galt, 1990; and Sacramento County 1993 and 2007.

and it is adjacent to pasture and agricultural fields that are used regularly by flocks of waterfowl and other large waterbirds such as the greater sandhill crane, a species listed as threatened by the State of California.

Several railroad corridors pass through and near the Preserve as shown in Figures 2.10 and 2.11. The Union Pacific and Central Traction Railroad lines are used primarily for the transportation of goods (City of Elk Grove 2003).

URBAN INTERFACE ISSUES

The Central Valley is growing rapidly, with population increasing almost 50 percent between 1980 and 1995 (Sokolow 1997). The Sacramento region in particular has experienced explosive growth and the population is expected to increase by 1.7 million over the next 40–45 years (County of Sacramento 1993 and 2007). Two new cities, Elk Grove to the north and Rancho Cordova to the northeast of the Preserve, are poised to expand beyond County growth limits (City of Elk Grove 2003 and 2007). The City of Elk Grove recently approved moving forward with their Sphere of Influence study, which would move the existing Urban Services Boundary southward towards the Preserve. To the east, the City of Galt is also growing, albeit more slowly (City of Galt 1990), as shown in Figure 2.10 and 2.11.

Ranchette development, generally defined as low-density rural development on 2-acre to 20-acre parcels, continues to fragment the agricultural landscape; landscape that serves as a buffer land between the Preserve and the urban areas. The trend projected in Sacramento County is continued residential development and concomitant loss of farmlands (~ 2 percent annually). This will significantly increase demands on water supply, including groundwater. Residential growth is also accelerating in the foothills to the east in Amador County along Highway 49 and other road corridors (The Nature Conservancy 1992). New development of residential, commercial, industrial, or public infrastructure within the Cosumnes River watershed has the potential to negatively impact the Preserve's natural resources via the following mechanisms:

- Increased impervious surfacing (*i.e.*, concrete and asphalt), with corresponding changes to hydrological patterns and water quality.
- Increased habitat loss and fragmentation. Because habitat area and dispersal corridors correlate with species and genetic diversity, the potential exists for a decline in species richness and abundance as a result of local population extirpations and/or local or species-wide extinction.
- Increased loss of wildlife due to conflicts with human activities (*e.g.*, road kill, bird collisions with power lines, etc.).
- Increased impacts from non-native invasive species (*e.g.*, weeds, cats, rats, etc.).
- Decreased ability to utilize compatible habitat management tools such as prescribed burning and grazing.

Increasing development continues to fragment and degrade habitat, including wildlife-friendly agriculture. Continuing fragmentation and degradation of habitat (both natural and surrogate agricultural lands) will erode ecological function of the larger landscape by isolating populations, disrupting species movements, altering ecosystem processes, increasing edge effects, and

decreasing species richness (*e.g.*, Hansen *et al.* 2005; MacArthur and Wilson 1967). In particular, this threatens species that cross eco-tones (areas of transition between two habitat types or ecosystems) and depend on upland habitat areas like agricultural lands as well as protected riparian and wetland habitat (*e.g.*, Semlitsch and Bodie 2003).

Some of the potentially negative impacts can be mitigated through careful selection of development envelopes and through appropriate site design. Cumulative regional impacts are more difficult to mitigate and will be tracked by Preserve staff as staffing and budgeting constraints permit. Appropriately planned development could provide new opportunities to share stewardship responsibilities and to increase public support for the Preserve's programs. Balancing the potential positive effects with the potential negative effects of new development will be an ongoing effort over the long term for the Preserve.

NEARBY RESERVES

The south Sacramento County region contains several parks, wildlife refuges, and public open space areas (Figure 2.13). The open space areas shown on this map include:

- City parks and playgrounds in the Cities of Elk Grove, Sacramento, and Galt
- Stone Lakes National Wildlife Refuge
- Yolo Basin
- Natomas Basin Conservancy
- SMUD's Rancho Seco Preserve
- Sacramento Regional County Sanitation District
- Private mitigation sites

Figure 2.12: Boundary of South Sacramento HCP/NCCP

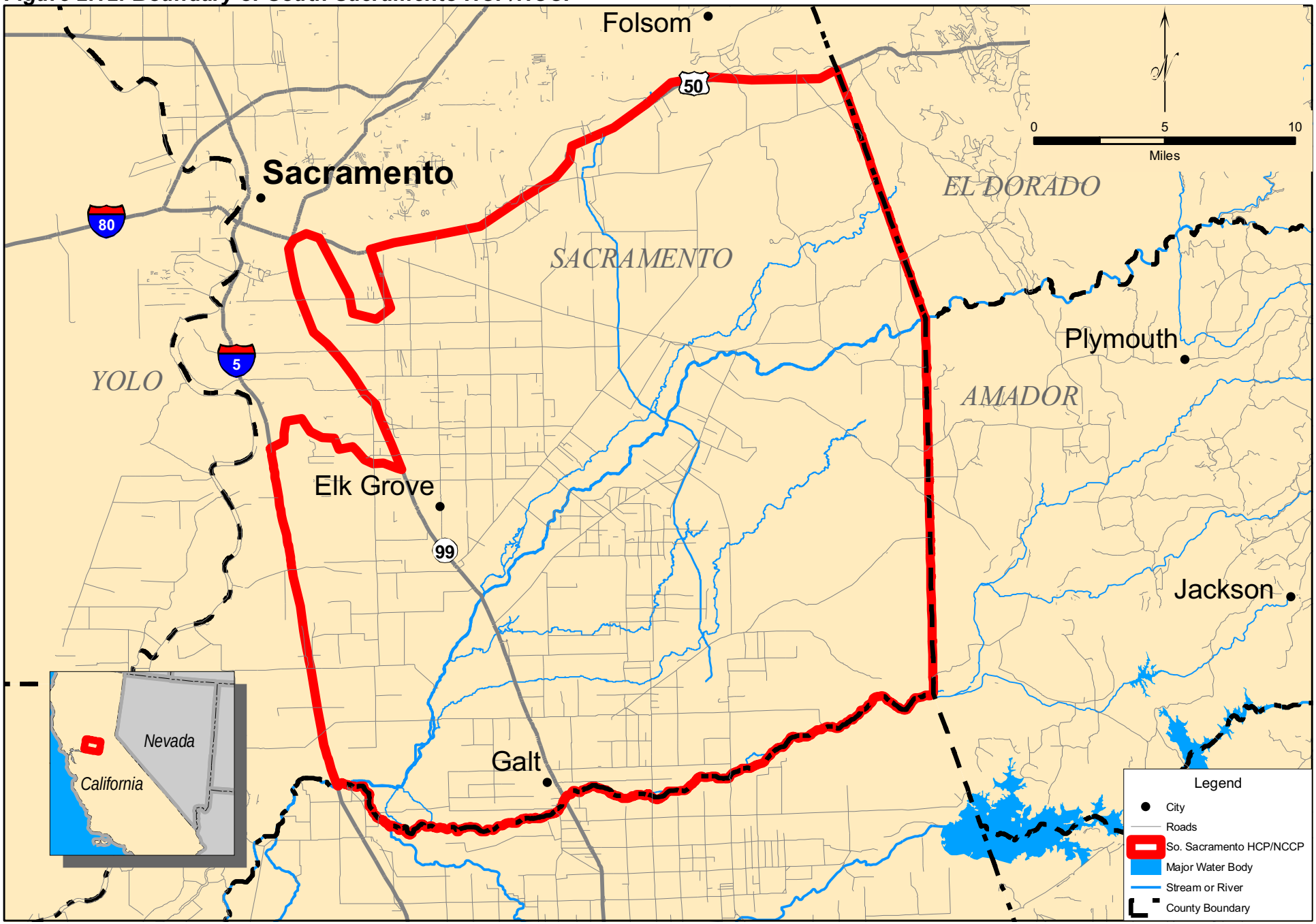
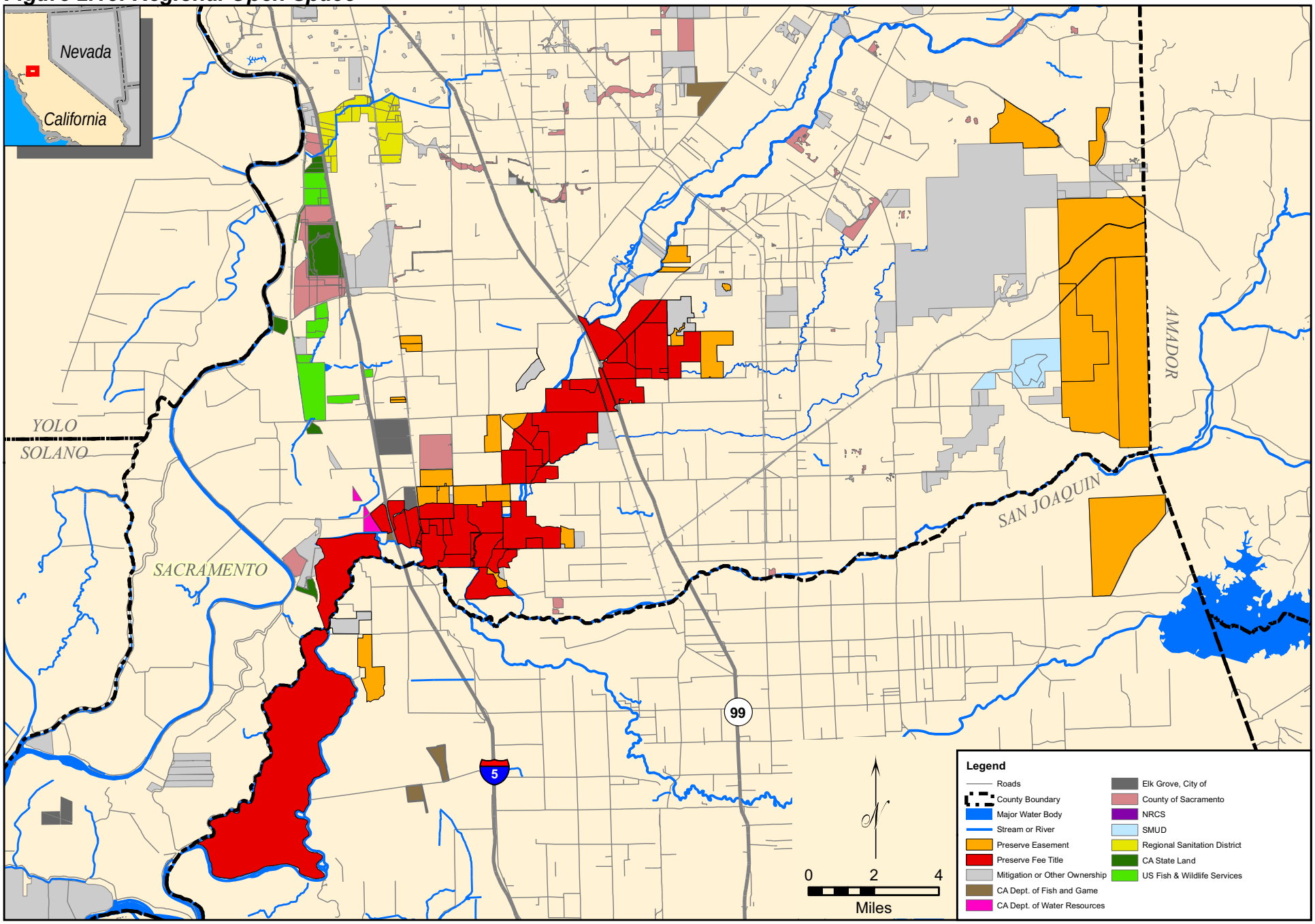


Figure 2.13: Regional Open Space



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3 Natural Resource Stewardship

The Cosumnes River and its watershed currently support an extraordinarily rich and complex mosaic of habitat types. This Chapter provides goals, objectives, and actions to conserve the Preserve's natural resources, specifically, its native flora and fauna.

3.1 BIODIVERSITY OF THE CENTRAL VALLEY AND COSUMNES RIVER WATERSHED

At one time much of the Central Valley was dominated by native grassland and extensive freshwater marsh. Riparian woodlands extended along lowland streams and vernal pools lay scattered in pockets amid the grasslands. The valley perimeter was ringed by oak woodland and chaparral. Since 1850, however, most of the Central Valley has been converted to intensive agriculture. The lowland floodplains have been severed from their rivers by levees, channelization, and flow regulation by dams (Mount 1995). This hydrologic disconnection facilitated the conversion of more than 90–95 percent of historic riparian forests, wetlands, and basins into farmland, rangeland, and urban centers as previously described in Chapter 2 (USFWS 1998; Griggs and Golet 2002).

The Cosumnes River floodplain has long been recognized as an outstanding wetland and riparian site. Today, the Preserve, with its wetlands, grasslands, agricultural land, and remnant stands of valley oak riparian forest, supports tens of thousands of migratory waterfowl and waterbirds, including about half of the Central Valley's population of greater sandhill cranes. Neo-tropical migratory songbirds, Swainson's hawks (*Buteo swainsoni*), mammals, native and non-native fish, and other state- and federal-listed threatened and endangered species are also found at the Preserve.

There are four known and ten potentially occurring special status plant species on the Preserve. These special status plant species are described in more detail in the Lower Cosumnes River Watershed Assessment (RBI 2006). Of the plant species occurring on the Preserve, 63 percent are native to California; the remaining 37 percent are exotic species (RBI 2006).

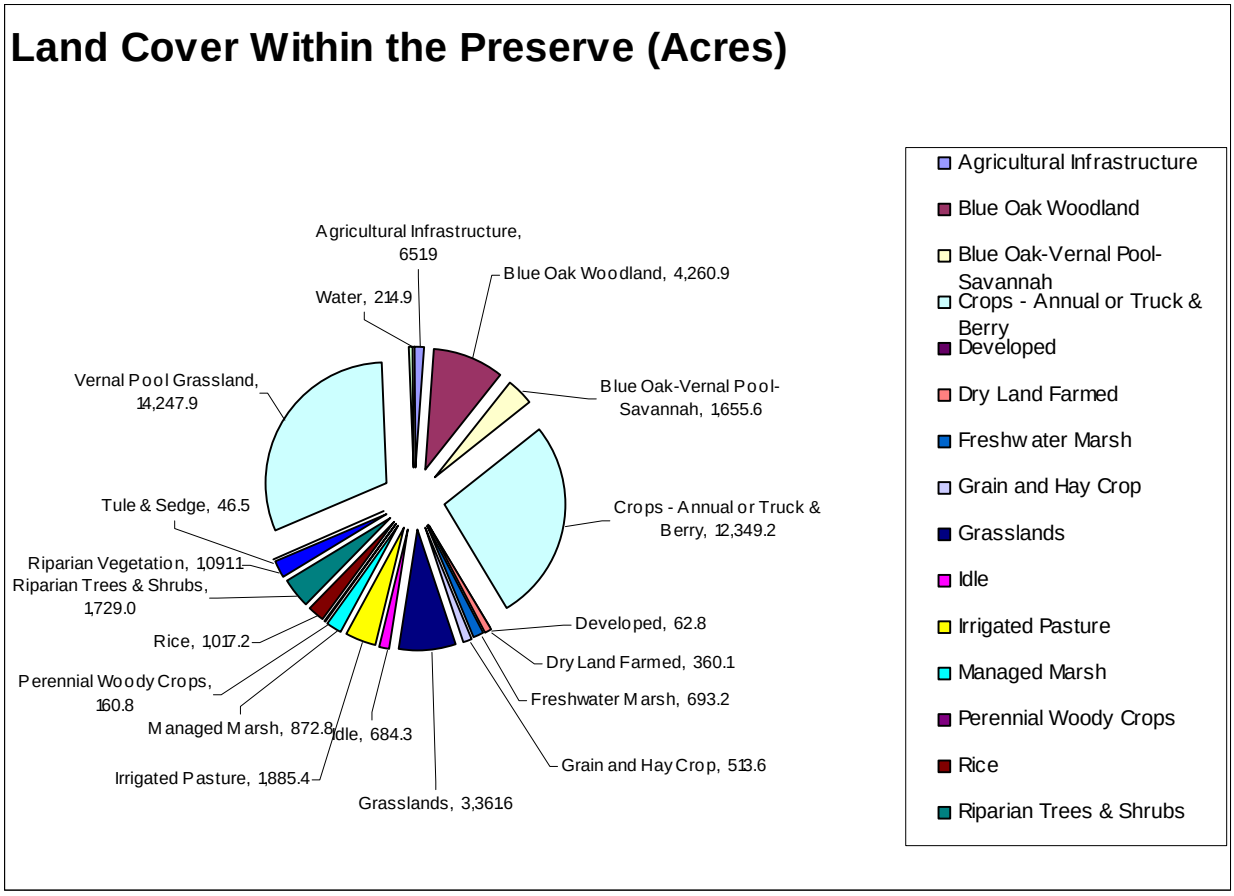
Wildlife diversity on the Preserve is high, with a total of 295 known wildlife taxa, including 30 species of mammals, 18 species of amphibians and reptiles, and 247 species of birds (RBI 2006). A few of the species have been identified as special status, meaning that they have been designated as rare, threatened, or endangered by state and/or federal wildlife agencies. These special status species include vernal pool fairy shrimp (*Branchinecta lynchi*), vernal pool tadpole shrimp (*Lepidurus packardi*), valley elderberry longhorn beetle (*Desmocerus californicus dimporphus*), California tiger salamander (*Ambystoma californiense*), western pond turtle (*Clemmys marmorata*), giant garter snake (*Thamnophis gigas*), greater sandhill crane (*Grus canadensis*), and Swainson's hawk (RBI 2006).

3.2 CONSERVATION ACTION PLANNING

A process called "Conservation Action Planning" (CAP) was used to develop the goals, objectives, and actions listed in the table at the end of this Chapter. The CAP process was originally developed by The Nature Conservancy and has been used successfully in public planning processes throughout the United States and internationally (The Nature Conservancy 2007). The CAP process was applied to the Preserve and its surrounding lands in order to identify biological targets for conservation, assess ecological requirements for long-term viability of these targets, identify threats, and develop specific strategies to restore target viability and reduce threats.

Several conservation targets were identified for the Preserve. Conservation targets are species, communities, or ecological systems that represent the biological diversity of a specified area. Ideally, targets are elements of the system that, if properly conserved, will result in the conservation of the full diversity of the landscape. Coarse-filter targets serve as "umbrellas" that capture the smaller-scale biodiversity, both common and rare, that tier within them. Fine-filter targets include those small-scale elements that "fall through" the coarse filter and require individual attention.

FIGURE 3.1: LAND COVER WITHIN THE PRESERVE (ACRES)



Land cover types are described in more detail in the Lower Cosumnes River Watershed Assessment (RBI 2006).

The Steering Committee selected six targets for the Preserve (described below), including five "coarse-scale," system-level targets and one species-level target. The number of targets was purposely kept small in order to facilitate the tracking of each target. The process used by the Steering Committee was to nominate a broad range of targets and to selectively funnel and consolidate the targets based on a collaborative discussion and the professional expertise of Committee members.

An assessment of each target, including a conceptual model, was prepared. Ecological requirements were identified for a range of attributes, such as viable habitat area, population size, community structure, species composition, hydrologic regime, disturbance processes, landscape connectivity, and others. Acreage goals for protection and restoration of each target were based on the current extent of habitat (land-cover mapping) and the inferred potential or historic habitat (based on location of appropriate soils, hydrology, and topography).

The assessment of conservation targets also included identification of major data gaps and these gaps are incorporated into the actions attached to the goals and objectives through this planning process, and listed in the monitoring elements discussed later in this chapter. Posters documenting the results of each target assessment were displayed at the first round of public workshops held in July and August 2006 to solicit public comments on this process. A summary of each target is provided below.

Riparian Forest – Less than 10 percent of the historic riparian forest remains in the Central Valley and in California (Great Central Valley 2005), and less than five percent remains in South Sacramento County (Sacramento County Municipal Services Agency 2007). The Cosumnes River floodplain has exceptionally large stands of remnant valley oak riparian forests (80–200 acres) and an intact flooding regime. Much of the area along the 14 miles of the lower Cosumnes River (below Wilton Road) that is suitable for riparian forest is now protected (approximately 1,700 acres [69 percent] of existing forest; 5,900 acres [44 percent] of existing and restorable lands) and a mosaic of successional stages of riparian forests occur at the Preserve. River-floodplain connectivity has been restored via levee breaches in the lower five to six miles of the river. Those breaches support the natural processes that facilitate restoration of additional stands of riparian forest.

Vernal Pool Grasslands – These seasonal wetlands are oases of endemic species in a sea of non-native grasses. Southeast Sacramento County has some of the most intact Laguna and Valley Springs vernal pool complexes remaining in the Central Valley, including more than 16 globally rare species and communities. Less than 10 percent of vernal pool complexes remain in the Central Valley (Holland 1998). Based on GIS mapping, approximately 42,503 acres of vernal pool grassland exist today within the Cosumnes

"Grasslands 2" – Photo courtesy of Preserve Photo Library

River watershed. Approximately 40 percent of the existing vernal pool grassland in the watershed is protected and managed by the Preserve for the benefit of the vernal pools and their endemic species.

Freshwater Emergent Wetlands – Less than 10 percent of historic wetlands remain in the Central Valley (Central Valley Joint Venture 1990). These wetlands historically supported millions of wintering waterfowl and waterbirds in the Central Valley. Today, the Preserve provides a portion of this critical stopover and wintering habitat by maintaining approximately 1,800+/- acres of managed seasonal wetlands and flooded organic rice on the floodplain. An additional 2,000+/- acres of cropland is flooded on Staten Island each year. Perennial natural marsh also exists along the Cosumnes River and in sloughs.

Giant Garter Snake – Badger Creek supports a unique sub-population of this state- and federally listed threatened species, one of only 13 sub-populations remaining in the state (Miller *et al.* 1999). This sub-population is assumed to be relatively safe due to permanent habitat protection by the Preserve; however, habitat conditions have been declining for several years due to a reduction in surface flows and the expansion of an invasive subspecies of water primrose (*Ludwigia* spp). Because no formal surveys have been conducted within the past few years, the current status of the species at the Preserve is unknown at this time.

Blue Oak Woodland – Blue oak woodland is an important and widely distributed matrix community in the foothills ringing the Central Valley. In the Cosumnes River watershed, 9,443 acres (10 percent) are protected. Lack of recruitment and altered fire regimes are a widespread and poorly understood problem for blue oak woodlands. Urbanization occurring within the blue oak woodland communities is cited as a major and continued threat to this community. Blue oak woodlands occur on the Howard Ranch property, located at the far eastern edge of the Preserve.

Fall-run Chinook Salmon – The Cosumnes supports a small population of fall-run Chinook salmon. Annual returns in the last decade (1997–2005) have ranged from 100 to 1,200 adults, roughly a quarter of historic levels (sometimes over 4,000 during 1953–1973). Chinook salmon are an umbrella species for the aquatic system of the river, its floodplain, and tributaries. The Preserve is involved in a program to provide adequate flows during the fall season for the fall run of Chinook salmon.

The next step in the CAP process was to identify and assess Critical Threats. Threats are defined as factors that reduce the viability of conservation targets. These threats were ranked according to three criteria in order to gauge the degree of the threat: scope, severity, and urgency. Identified threats to the Preserve's conservation targets include the following:

- Continuing fragmentation and degradation of habitat (both natural and surrogate agricultural lands) will erode ecological function of the larger landscape by isolating populations, disrupting species movements, altering ecosystem processes, increasing edge effects, and decreasing species richness (*e.g.*, Hansen *et al.* 2005; McArthur and Wilson 1967). Urbanization and other forms of land development are the primary cause of habitat fragmentation and direct loss of habitat area.
- Depletion of groundwater has reduced stream baseflow.

Figure 3.2: Land Cover on the Preserve

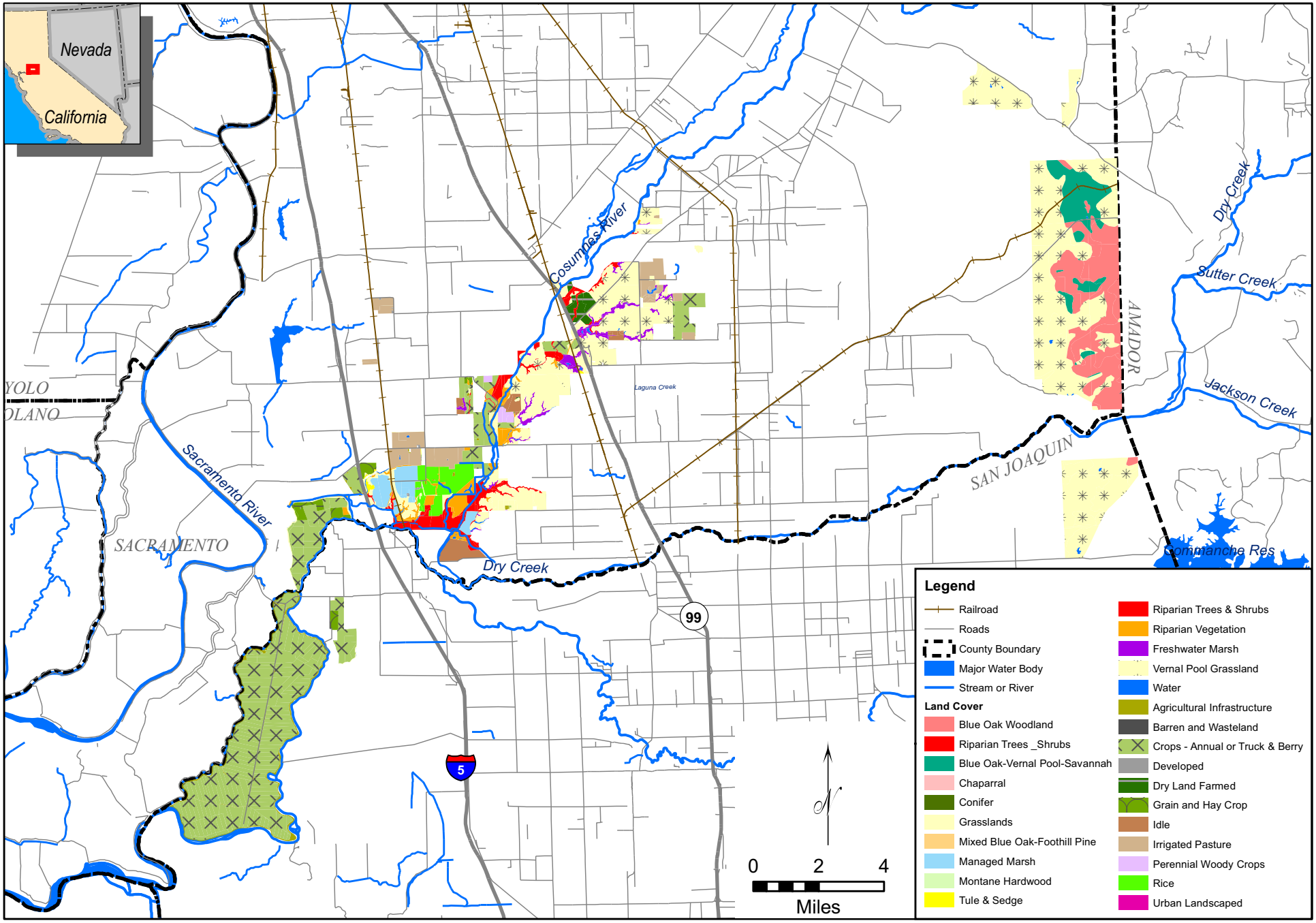
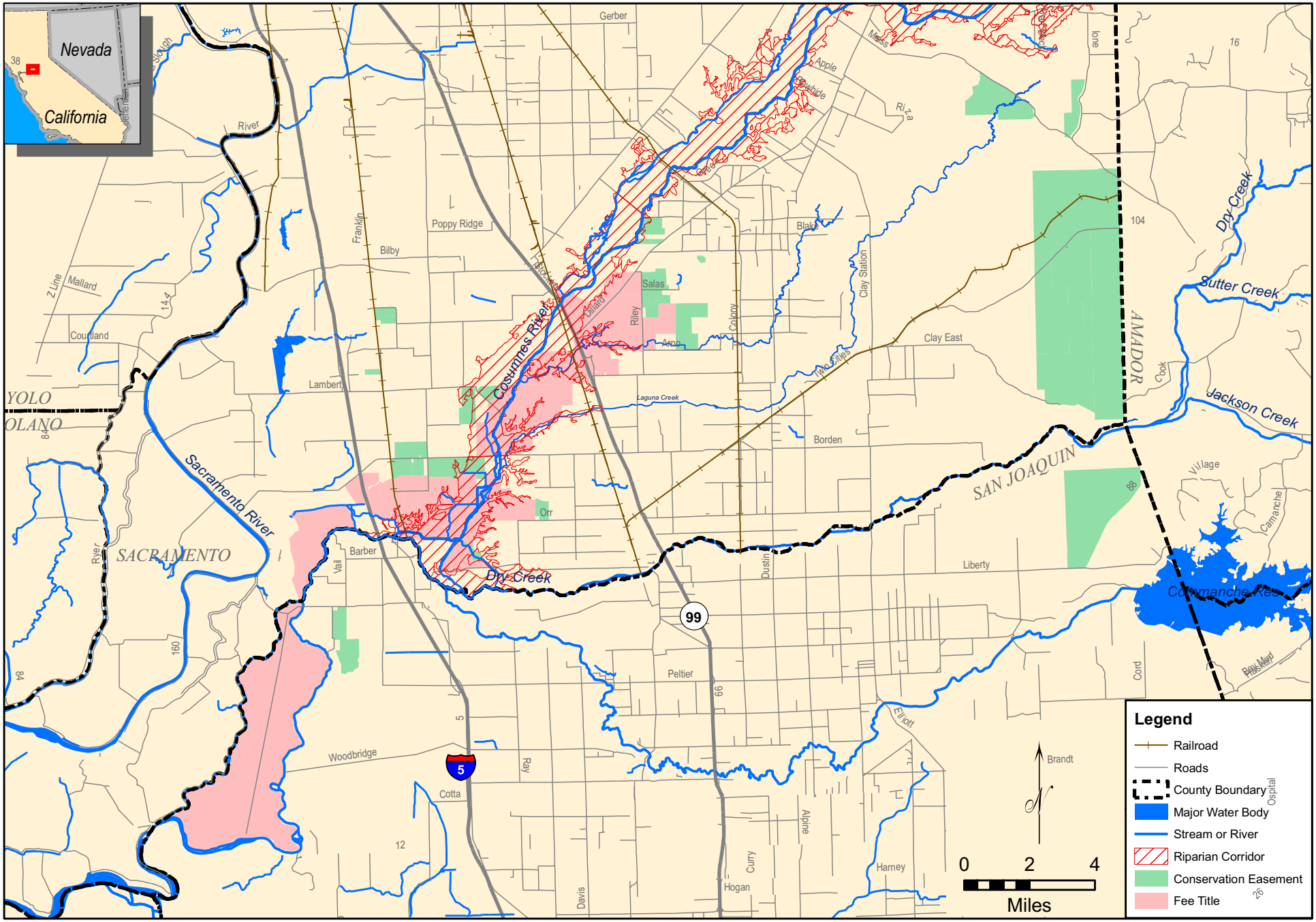


Figure 3.3: Riparian Corridor Along the Cosumnes River



- Land conversion to more intensive, less wildlife-friendly agriculture.
- Invasive species.
- Levees that limit river meandering and floodplain connectivity.
- Altered flooding regimes that affect riparian forest.
- Altered fire regimes that affect vernal pool grasslands and oak woodlands.

3.2.1 Ecological Restoration

Restoration of ecological function has been a cornerstone of the Preserve since its inception. Many studies and restoration projects have been implemented on Preserve properties over the years by Preserve staff and UC Davis researchers. Restoration efforts have focused on the reestablishment of three habitat types: riparian forests, floodplains, and managed wetland ponds. The Lower Cosumnes River Watershed Assessment (RBI 2006) describes these past efforts in more detail. As part of restoration activities, land cover and habitat types should be monitored and managed using adaptive management techniques.

In the restoration of riparian forests, success seems to be dependent on the suitability of the soils, hydrology, and elevation. Early efforts to enhance and restore habitats along the lower Cosumnes focused on active measures, such as wetland construction and hand planting of trees. However, a 1994 study found that hand planting was expensive and some plantings failed or grew slowly (Reiner 1996). For example, this occurred on the Valensin Access Road property as described in Chapter 7. Furthermore, natural regeneration of oaks was occurring in many areas, particularly where natural flooding and sediment deposition still occurred. TNC reoriented the forest restoration program in 1995 to identify areas where natural regeneration could be encouraged by reestablishing natural flooding (Reiner 1996).

"River" – Photo courtesy of Preserve Photo Library

Riparian forest systems occur only on streamside lands with appropriate soils, elevation, and hydrology (Keller and Quinn 2003; Viers *et al.* 2006). A GIS analysis compared current extent of forest, survival of various planted restoration sites, and soil characteristics. Depth to hardpan layer was best apparent correlate, specifically those areas where depth to hardpan layer was >2 meters. The lands with the potential to support riparian forest ("riparian zone") include both current existing habitat and potentially restorable land. The potential riparian zone was mapped from the confluence with the Mokelumne River (River Mile 0) upstream to Freeman Road (RM 15, just due south of Wilton Road). Upstream of Hwy 99,

the leveed river channel becomes too incised to allow frequent overbank flooding (Vick and Williams 1997; Florsheim and Mount 2003). Table 3.1 summarizes the potential riparian zone along the lower Cosumnes River (approximately 14 river miles, from Mokelumne River up to Freeman Road near Wilton Road).

As of December 2006, 5,877 acres (44 percent) of land were protected within this corridor (Table 3.1). Some of the potential riparian lands in conservation ownership are not natural habitat; they are currently managed as agricultural lands or fallow that could be restored to riparian habitat in the future. Currently, approximately 2,200 acres of riparian forest (canopy cover) exist along the lower Cosumnes River below Freeman Road, with approximately 1,700 acres protected within the Preserve. The extent of riparian forest ranges from several large patches (100–200 acres) down to narrow, discontinuous strips of trees along the river and small tributaries. The approximate length of this mapped riparian corridor is 36 miles and its average width is 1 mile. Several Preserve properties are located within this corridor.

TABLE 3.1: RIPARIAN ZONE OF THE LOWER COSUMNES RIVER

River Reach	**Rivermile**	**Riparian Zone (acres of existing and potential forest)**		**Riparian Forest (acres existing)**	
		Total	Protected	Total	Protected
Mokelumne River –Twin Cities Road	RM 0-6	5,121	2,887	1,180	982
Twin Cities Road – Hwy 99	RM 6-11	5,083	2,166	582	393
Hwy 99 – Freeman Road/ Wilton	RM 11-15	3,124	824	435	136
Total Acres		13,327 (100%)	5,877 (44%)	2,197 (16% of zone)	1,511 (69% of existing)

Area (acres) of riparian corridor (existing and potential forest) and riparian forest (existing and restoring) along the lower Cosumnes River. Forest area is measured from GIS of canopy cover. Protected area is land protected by the Cosumnes River Preserve (fee title or conservation easement).

Goals, Objectives, Actions, and Monitoring

OVERARCHING GOAL I: NATIVE BIOLOGICAL COMMUNITIES AND THE RESIDENT AND MIGRATORY SPECIES DEPENDENT ON THEM ARE RESTORED AND MAINTAINED TO SUSTAINABLE CONDITIONS AND POPULATION LEVELS.

Natural Resource Stewardship Sub-goal 1: Protect the free-flowing Cosumnes River within an ecologically functional landscape.

Objectives	Actions	Monitoring Elements
1.1 Ensure the Cosumnes River remains free-flowing by preventing major dams, impoundments, or significant increases in surface water diversions.	**1.1.1** Monitor public policy regarding water supply and flood management.	◂ Flood management policy by DWR and Sacramento Area Flood Control Agency (SAFCA). ◂ Review planning documents for south Sacramento County and San Joaquin County. ◂ Status of dams on river.
	1.1.2 Engage, as necessary, in public policy to prevent construction of dams or significant increases in surface water diversion.	◂ Flood management policy by DWR and SAFCA. ◂ Status of dams on river. ◂ Monitor surface water rights and diversions, especially of major users like El Dorado Irrigation District.
	1.1.3 Map the Preserve's flooding and levee breaches in a comprehensive way. Update this data set on an annual basis.	◂ Annually map new levee breaches, fire, etc.
1.2 Maintain a landscape that supports natural processes and habitat for the Preserve's focal conservation targets consisting of natural lands and suitable agriculture at and surrounding the Preserve (100-year floodplain up to Sacramento County's Urban Services Boundary).	**1.2.1** Map land-use patterns and change in the lower watershed every two years using available GIS data and aerial photos.	◂ GIS data and aerial maps of lower watershed every two years (*e.g.*, DWR land-use mapping, aerial photos from Farm Services Administration Services [annual, 1–2m resolution]). ◂ Maintain GIS layers of protected lands surrounding the Preserve (fee title and conservation easement). ◂ Annually document status of conservation easements in online tool "Conservation Track."

Objectives	Actions	Monitoring Elements
		◄ Track land-use designations, zoning, and general plans in the area.
	1.2.2 Participate in regional land-use planning and floodplain management efforts (*e.g.*, South Sacramento County HCP, City of Elk Grove General Plan, county general plans, LAFCO decisions) that may affect Preserve resources (*e.g.*, habitat destruction, degradation, or fragmentation) or complement conservation goals (*e.g.*, open space and wildlife corridors among other natural lands).	◄ Review local planning documents.
	1.2.3 Coordinate regional land management with other natural lands managers (*e.g.*, Stone Lakes NWR, CDFG Woodbridge ecological reserve, Sacramento Valley Conservancy) and with guidance from regional natural resource plans (*e.g.*, Central Valley Joint Venture, Riparian Habitat Joint Venture). Review plans and provide comments and technical assistance where appropriate.	◄ Review goals and objectives of local and regional plans. ◄ Maintain list of contacts for all reserves.
	1.2.4 Secure funding to protect surrounding lands that support Preserve biota and provide linkages to other natural lands, working with willing sellers and available resources.	◄ Annual review of new funding opportunities and financial expenditures.
	1.2.5 Assess availability and needs for linkages and migration corridors for targets (*e.g.*, giant garter snake, vernal pool species).	◄ Linkages and corridors
	1.2.6 Assess habitat values of different land uses. Develop and conduct standardized site assessments to identify areas that have high ecological value for the Preserve, using existing information.	◄ Distribution and abundance of indicator species, including sandhill cranes and Swainson's hawks.

Objectives	Actions	Monitoring Elements
	1.2.7 Determine habitat needs (amount, type, landscape ecology) of indicator species whose life history needs cross Preserve boundaries (*e.g.*, sandhill cranes and Swainson's hawks).	◂ Distribution and abundance of indicator species, including sandhill cranes and Swainson's hawks.
	1.2.8 Promote landscape-scale linkages and corridors along the Cosumnes River and tributaries (*e.g.*, from Delta to headwaters), among vernal pool sites, and among protected areas (*e.g.*, Stone Lakes NWR, Deer Creek Hills).	◂ GIS mapping of protected lands
	1.2.9 Update and implement the overall weed control plan **every 5 years** to address Preserve-wide invasive species threats and priorities.	◂ GIS mapping of weed infestations and comparison with status. ◂ Targeted weed distribution monitoring and research for high-threat species
	1.2.10 Ensure wildlife-friendly agriculture on the Preserve's farmlands, and promote these practices on surrounding lands (*e.g.*, annual crops, pasture, rangeland, truck crops).	◂ GIS map of DWR land use designations ◂ Habitat use by indicator species.
	1.2.11 Update the Preserve Management Plan **every 10 years** and implement.	◂ Perform annual review of plan through the development of annual work plans.
	1.2.12 Conduct feasibility study of potential Cosumnes River meander scenarios and implement river meandering scenarios as funding allows.	
1.3 Enhance local groundwater conditions to support riparian, floodplain, and aquatic communities.	**1.3.1** Engage in public policy forums to improve regional groundwater management (*e.g.*, Central Sacramento County Groundwater Forum, South Area Water Council).	◂ Review local water policy documents and plans.

Objectives	Actions	Monitoring Elements
	1.3.2 Design and implement next phase of groundwater-surface water studies, in collaboration with research partners, in order to refine understanding of groundwater-surface water status and relationships and to determine groundwater and surface flow requirements of riparian and aquatic species. This includes locating groundwater levels that enhance river baseflow.	◂ GIS map of lower watershed every 3–5 yrs, with DWR land use designations and natural habitat. ◂ Integrated monitoring of groundwater levels and targets thought to be sensitive to GW depletion. ◂ Surface water hydrology in Cosumnes River and tributaries (Badger Creek).
	1.3.3 Design and implement experimental flow releases and other measures to recharge local groundwater levels and enhance surface flows for salmon migration (potential sources of water and/or funding include AFRP and CVPIA, b2 Program).	◂ Groundwater monitoring ◂ Surface water hydrology in Cosumnes River and tributaries (Badger Creek).
1.4 Support overall biodiversity of the Cosumnes River watershed.	**1.4.1** Support conservation of Ione chaparral by Partners working to implement CDFG's CAPP in order to protect, manage, and restore at least three geographically dispersed populations, totaling at least 400 acres of high-quality Ione chaparral habitat.	◂ Evaluate GIS data and aerial photos. ◂ Annually evaluate status of land protection and conversion. ◂ Viability surveys (include fungal analysis).
	1.4.2 Promote protection of blue oak woodland habitat (particularly along the river corridor), by Partners and on protected Preserve lands where present. Ensure viability of protected oak habitat through proper management and early detection and control of invasive species.	◂ Evaluate GIS data and aerial photos. ◂ Annually evaluate status of land protection and conversion. ◂ Targeted weed surveys where necessary.
1.5 Achieve the Plan Vision by coordinating with state, federal, and local government agencies and non-profit organizations.	**1.5.1** Track and, if warranted, participate in the 22 planning efforts identified above and in new efforts that begin in subsequent years.	◂ Annually document where and how staff participates in regional planning efforts.

Natural Resource Stewardship Sub-Goal 2: Protect, maintain and restore riparian and floodplain communities, the natural hydrologic processes that sustain the habitat, and the native species that depend on the habitat.

Objectives	Actions	Monitoring Elements
2.1 Permanently protect the entire 13,200-acre mapped riparian core area (existing habitat and restorable lands) by securing the remaining 7,450 acres of unprotected land up to Wilton Road. *Note:* Parcel acreage does not directly correspond to habitat acreage (existing and potential in the riparian core area) due to parcel configurations.	**2.1.1** Identify and prioritize key parcels necessary to secure remaining unprotected 7,450 riparian core acres within the riparian corridor.	◂ GIS map of suitable riparian corridor, based on soils and hydrology. ◂ Parcel map and protection status of lands within the riparian core area.
	2.1.2 Acquire unprotected key parcels remaining in the riparian corridor between McCormack-Williamson Tract and Highway 99 (5,150 riparian core acres remaining within corridor) by 2018, on a willing seller, as-available basis.	
	2.1.3 Acquire or protect key parcels in the riparian corridor between Highway 99 and Wilton Road (2,300 riparian core acres remaining within the corridor) by 2028, on a willing-seller, as-available basis.	
2.2 Maintain a mosaic of existing and restored habitats for riparian and floodplain dependent species. Habitat mosaic can include Great Valley willow scrub, G.V. cottonwood forest, G.V. mixed riparian forest, G.V. valley oak riparian forest, valley oak savannah, elderberry savanna, grassland, and wetland.	**2.2.1** Develop standardized vegetation classification and conduct habitat mapping (similar to scale of CDFG mapping) of existing and restored habitats to monitor status and guide management.	◂ Habitat mapping (similar to CDFG mapping) from aerial photos and field surveys of potential, existing, and restoring riparian communities. ◂ Species composition, successional stage, canopy cover, and physical structure of vegetation.
	2.2.2 Assess condition of habitats within the riparian core area by evaluating vegetation cover and successional trajectory of all sites (existing and restoring habitats) every 3 to 5 years.	

Objectives	Actions	Monitoring Elements
	2.2.3 Develop and implement restoration and management actions (*e.g.*, planting, re-contour, weed control) as necessary to enhance development of a diverse riparian-wetland mosaic (*i.e.*, successional stage, physical structure, species composition) and to maintain population levels of native species.	
	2.2.4 Evaluate the response of special status species and indicator species to riparian and floodplain restoration and management actions (*e.g.*, valley elderberry longhorn beetle; Riparian Habitat Joint Venture focal bird species such as yellow-billed cuckoo, song sparrow, Swainson's hawk, ringtail cats, and other state and federal protected species).	◂ Riparian birds (point counts) ◂ VELB surveys and elderberry mapping
	2.2.5 Conduct and support research to evaluate factors potentially limiting floodplain-river connectivity, forest recruitment and survival (*e.g.*, water table levels, soil conditions, stream channel incision, levees).	◂ Database of researchers and projects
	2.2.6 Conduct and support other research as necessary to guide management of the Preserve.	◂ Database of researchers and projects
	2.2.7 Increase cottonwood/willow between Accidental Forest and Tall Forest to support cuckoos, willow flycatchers, least bell's vireos, and other neo-trops.	
2.3 Minimize the impact of non-native invasive species in riparian and floodplain habitats through early detection and control.	**2.3.1** Locate, map, and evaluate invasive plant species in targeted riparian habitats along the Cosumnes River (annual effort rotated among sites, with most areas visited at least once every three years).	◂ Weed surveys

Objectives	Actions	Monitoring Elements
	2.3.2 Implement control programs (treatment and monitoring), as necessary, to maintain desired species composition and population levels of native species.	◂ Weed surveys before and after control ◂ Vegetation surveys for native species
	2.3.3 Conduct and support research to evaluate threats from invasive animal species (*e.g.*, black rat, cowbirds) and techniques for control (*e.g.*, trapping, baiting).	◂ Black rat studies ◂ Cowbird survey (part of bird monitoring)
	2.3.4 Conduct and support research to evaluate threats from invasive plants (*e.g.*, perennial pepperweed, Himalayan blackberry) and techniques for control (*e.g.*, prescribed fire, grazing, herbicide treatments, mowing, disking, and weed mat tarping).	◂ Weed surveys before and after control ◂ Vegetation surveys before and after control
2.4 Restore an additional 1,000 acres of existing Preserve lands to riparian and floodplain habitats by 2018.	**2.4.1** Restore ~500 acres of seasonally flooded riparian habitat on the Preserve's Denier II property by completing and implementing plans to restore a natural flooding regime and to plant native riparian vegetation. Incorporate experimental design to test approaches that could be applied to restoration of other upstream sites (*e.g.*, Castello).	◂ Elevation, topography, channel geomorphology ◂ Hydrology (magnitude, duration, frequency of flood flows) ◂ Sediment transport ◂ Habitat mapping ◂ Species composition and successional stage ◂ Fish and bird surveys ◂ Physical habitat structure and cover
	2.4.2 Develop and implement restoration plans for an additional 500 acres of riparian-floodplain habitat.	
	2.4.3 Investigate opportunities to restore river-floodplain connectivity and create 300 acres of seasonally flooded habitat (long-duration flooding to support fishes and aquatic food web) to offset any losses due to succession of previously restored habitat. Site assessment includes elevations, hydrology (flooding extent, frequency, duration, depth, and velocity), and sediment supply.	

Objectives	Actions	Monitoring Elements
2.5 Actively participate in the management of water resources and flooding along the lower Cosumnes River.	**2.5.1** Work with local irrigation districts and water managers to manage surface flows in the river to support the natural variability and frequencies of specific flood types and water year types as outlined in Booth et al.	◂ Visit the river each fall to assess water levels and whether or not augmentation is needed.
	2.5.2 Focus water and flood management activitities on maintaining the hydrologic connectivity between surface and subsurface waters, while recognizing that periodic connection and disconnection of the floodplain within the river channel is vital to the functioning of the floodplain.	◂ Create a decision tree to assess whether or not we need augmentation in a particular year.
	2.5.3 Manage floodplains to ensure that multiple, repeated inundation events occur within a two-to-three year period from at least early January through early May.	
	2.5.4 Work with property owners to minimize flooding of residences in the lower Cosumnes River area.	

Natural Resource Stewardship Sub-Goal 3: Protect, maintain, and restore vernal pool and grassland communities, maintain the ecological processes that sustain the habitat, and promote the native species that depend on the habitat.

Objectives	Actions	Monitoring Elements
3.1 Permanently protect 17,655 acres of vernal pool grassland habitat by the year 2012 by securing an additional ~3,417 acres of habitat. *Note:* As of 2007, 40 percent of vernal pool grassland in the watershed is protected.)	**3.1.1** Annually evaluate status of land protection and conversion in the vernal pool grassland region (rangeland and uplands of south and east Sacramento county).	◂ Annually track status of key parcels. ◂ Evaluate GIS data and aerial photos of vernal pool grassland region.
	3.1.2 Annually monitor vernal pool grassland easements for compliance with easement terms and conditions. (Note: compliance monitoring is less intensive than biological monitoring. TNC requires annual monitoring on all easements.)	◂ Visit each property and interview landowner. ◂ Conduct residual dry matter (RDM) monitoring to evaluate grazing intensity (as stipulated in applicable conservation easements or management agreements). ◂ Complete easement report and upload to Conservation Track (TNC).
	3.1.3 Participate in the South Sacramento County Habitat Conservation Planning Process to ensure consistency with USFWS Vernal Pool Recovery Plan and Preserve goals.	◂ Review planning documents and provide input.
	3.1.4 Identify and prioritize key parcels necessary to secure remaining unprotected 3,417 acres vernal pool habitat.	◂ Annually track status of key parcels.
	3.1.5 Protect key parcels by 2012, on a willing-seller, as-available basis.	◂ Update GIS database.
3.2 Ensure the management of protected vernal pool grassland habitat supports the maintenance of overall native biodiversity and target species.	**3.2.1** Continue fire management activities in vernal pool grassland habitat in partnership with local landowners and agencies (*e.g.*, fire staff from California Department of Forestry and Fire Protection, BLM, and USFWS Refuges) to burn at least 500 acres of vernal pool grassland per year.	◂ Acres burned ◂ Species response to fire

Objectives	Actions	Monitoring Elements
	3.2.2 Conduct field surveys and data analysis to assess the status of biodiversity in vernal pool and grassland habitats as a baseline for future evaluation.	◂ Species inventories for each property ◂ Locations of rare species
	3.2.3 Assess effects of grazing on vernal pool plant and animal community by: ◂ Continuing data collection and analyzing data from Howard Ranch grazing study to determine long-term grazing impacts on native and non-native plants as well as vertebrate/invertebrate taxa. ◂ Participating in TNC statewide grazing study.	◂ Pool inundation period ◂ Native species diversity ◂ Rare plant presence ◂ Rare invertebrate/vertebrate presence
	3.2.4 Assess effects of fire on vernal pool plant community by: ◂ Completing analysis of fire effects data from the Howard Ranch and Valensin Ranch to determine an appropriate fire management regime for these sites. ◂ Continuing data collection and analyzing data from study of goat grass control using prescribed fire.	◂ Goat grass population response to fire
3.3 Minimize the impact of noxious weeds on vernal pool grasslands through early detection and control efforts.	**3.3.1** Conduct field surveys to evaluate extent of invasion of *Glyceria declinata* in vernal pools on the Preserve. Use results of surveys and other information to develop and implement a weed control plan for vernal pools.	◂ Glyceria cover and distribution in vernal pools
	3.3.2 Evaluate extent of *Aegilops triuncialis* invasion in grasslands.	◂ Goat grass population mapping

Objectives	Actions	Monitoring Elements
	3.3.3 Perform periodic weed surveys to document new outbreaks or spread of existing weeds in vernal pool grasslands (at least once every three years).	◂ Targeted weed surveys
3.4 Restore native species diversity in degraded grassland habitat using appropriate species and restoration methods.	**3.4.1** Develop a map showing grassland restoration potential on Preserve lands.	◂ GIS data and field surveys
	3.4.2 Study use of native forb species and best methods for establishment in grassland restoration plantings.	◂ Survival of native forbs under different treatments
	3.4.3 Document best practices for grassland restoration with guidelines for the best methods and species.	◂ Vegetation surveys on restoration projects
	3.4.4 Implement best practices on Preserve lands and encourage their use by others.	
3.5 Develop a classification system for annual grasslands on the Preserve.	**3.5.1** Develop a classification system for annual grasslands on the Preserve, in collaboration with the California Native Plant Society (CNPS) and other botanical experts.	◂ Grassland community monitoring ◂ GIS data layers
3.6 Develop accurate and objective data sets that describe the physical processes occurring on the Preserve (fire, floods, etc.) to support better models and better understanding of management approaches.	**3.6.1** Map the Preserve's fire history in a comprehensive way. Update this data set on an annual basis.	◂ Annually map fires

Natural Resource Stewardship Sub-Goal 4: Maintain and restore a mosaic of freshwater wetland habitats (seasonal and permanent) that support native species.

Objectives	Actions	Monitoring Elements
4.1 Maintain a minimum of 1,000 acres of seasonal managed ponds and evaluate the need for more managed wetland ponds on a case-by-case basis.	**4.1.1** Evaluate needs for seasonal wetland habitat every three years, based on regional waterbird and waterfowl populations and habitat availability, in coordination with other natural lands managers (*e.g.*, Stone Lakes NWR, CDFG Woodbridge, SVC), and with guidance from regional natural resource plans (*e.g.*, CVJV) and adjust CRP wetland restoration and maintenance goal to support.	◂ Waterfowl and crane population surveys at Cosumnes and in Delta. ◂ Map acres of managed and natural seasonal wetlands on the Preserve and nearby.
	4.1.2 Annually evaluate condition of managed ponds, and develop and implement plans to maintain desired mosaic of physical habitat using flooding schedule and/or vegetation treatments (*e.g.*, mowing, discing, or spraying).	◂ Habitat mapping of wetland structure.
	4.1.3 Develop and implement an annual wetlands operations plan for all Preserve properties (*e.g.*, waterfowl ponds, Staten Island, Grizzly Slough, and agricultural lands) that provides for roosting and foraging habitat throughout the migratory and winter season for migratory and wintering waterfowl, sandhill cranes, shorebirds, and waterbirds.	◂ Number and location of greater sandhill crane roosts. ◂ Seasonal waterfowl and crane population surveys at Cosumnes and in Delta.
	4.1.4 Manage fall flood-up schedules that maximize the temporal and spatial habitat values across all of the managed wetlands and rice fields (*e.g.*, July/August flooding for shorebird migrations, August/September for early arriving cranes, etc.).	◂ Monitor the timing, duration, depth, and spatial distribution of flood-ups across the Preserve (as they relate to the numbers of shorebirds, waterfowl, and waterbirds, using ponds consistent with the North American Waterfowl Management Plan (NAWMP) and the Central Valley Joint Venture 2006 Implementation Plan).

Objectives	Actions	Monitoring Elements
	4.1.5 Maintain approximately 15 percent of managed wetland ponds as brood habitat for waterfowl (currently 111 acres), consistent with wetland BMPs for waterfowl and wildlife.	◂ Map acres of managed and natural seasonal wetlands. ◂ Crane and waterfowl survey.
	4.1.6 Coordinate management of CDFG mitigation land on the DWR-owned Grizzly Slough property.	
4.2 Create and maintain at least 2,750 acres of flooded agriculture as seasonal wetland habitat for target species (sandhill cranes and waterfowl).	**4.2.1** Work with tenant farmers to create and maintain at least 750 acres of seasonally flooded rice on the Preserve.	◂ Crane and waterfowl survey
	4.2.2 Work with Staten Island farm managers to create and maintain 2,300–3,000 acres of seasonally flooded agriculture.	◂ Map acreage of seasonally flooded agriculture
4.3 Restore tidal freshwater wetlands and associated habitats on McCormack-Williamson Tract.	**4.3.1** Develop a restoration plan for McCormack-Williamson Tract to create up to 1,600 acres habitat mosaic (tidal wetlands, seasonal wetlands, floodplain, and riparian habitat) by breaching levees to restore tidal inundation. Work cooperatively with stakeholders (*e.g.*, DWR North Delta Group, CALFED) to develop, fund, and implement the plan.	
4.4 Restore mosaic of tidal freshwater wetlands and associated habitats on tidal sloughs.	**4.4.1** Assess the feasibility of restoring tidal wetlands along slough channels (*e.g.*, Tihuecheme Slough, near Lost Slough). Develop and implement a restoration plan if feasible.	
4.5 Restore and/or create freshwater wetlands to support waterfowl, cranes, and other wetland species.	**4.5.1** Restore approximately 140 acres of managed freshwater wetlands on the Preserve's Wong property.	◂ Acreage of Preserve's freshwater wetland landcover.

Objectives	Actions	Monitoring Elements
	4.5.2 As funding becomes available, evaluate the potential to restore freshwater wetlands on other Preserve properties.	
4.6 Ensure that habitat requirements of special status species are incorporated into wetland restoration and management plans, as appropriate.	**4.6.1** Maintain greater sandhill crane roosts on managed and natural wetlands in proximity to foraging habitat (within one-to-two miles), minimize disturbance from other land uses, and reduce sources of mortality (*e.g.*, power lines).	◂ GIS mapping of roost locations. ◂ GIS map of powerlines and mortality incidents.
	4.6.2 Maintain and restore perennial wetland habitat in the Badger Creek watershed for giant garter snake (see also Objectives 5.2 – 5.5).	◂
4.7 Minimize the impact of non-native invasive species in wetlands through early detection and control efforts.	**4.7.1** Locate, map, and annually evaluate invasive plant species in wetland habitats along the Cosumnes River (*e.g.*, perennial pepperweed, water primrose, water hyacinth).	◂ Weed survey
	4.7.2 Implement control (*i.e.*, grazing, burning, herbicides, and other mechanical control methods) and post-treatment monitoring as necessary to maintain desired species composition and population levels of native species.	◂ Weed survey ◂ Species composition, successional stage, canopy cover, and physical structure of vegetation.
	4.7.3 Conduct and support research to evaluate threats and control techniques (*e.g.*, prescribed fire, grazing, herbicide treatments, mowing, discing, and weed mat tarping) for controlling target invasive plant and animal species in wetland habitats.	

Objectives	Actions	Monitoring Elements
4.8 Reduce risk of mosquito-borne and avian diseases where feasible and consistent with wetlands goals.	**4.8.1** Work cooperatively with vector control to reduce mosquito production in a manner that is consistent with the pond flooding schedule.	
	4.8.2 Monitor for occurrence of avian diseases (*e.g.*, botulism, cholera, West Nile Virus, etc.) and implement control measures as appropriate and in coordination with National Wildlife Refuges.	
	4.8.3 Develop an avian disease rapid response plan to facilitate immediate and appropriate management response to an outbreak of avian diseases (*e.g.*, immediate flooding, scaring birds, etc.).	
4.9 Maintain and enhance water quality.	**4.9.1** Engage in water quality policy forums as necessary to track measures and regulations that affect wetlands management (*e.g.*, CVRWQCB, Agricultural waiver program).	
	4.9.2 Implement best management practices as appropriate to maintain and enhance water quality.	
	4.9.3 Support research on potential impacts and management of methyl mercury.	◆ Aqueous methyl mercury monitoring.

Natural Resource Stewardship Sub-Goal 5: Maintain and enhance the population of giant garter snake in the Badger Creek watershed

Objectives	Actions	Monitoring Elements
5.1 Monitor status of giant garter snake population in the Badger Creek watershed. ~200 adults in Snake Marsh (2002 status)	**5.1.1** Conduct monitoring studies of Snake Marsh every five years to document status of population.	◂ Trapping and mark-recapture studies in Snake Marsh
	5.1.2 Survey suitable habitat east of Hwy 99 to detect new population expansion, if funding available or in preparation for potential repatriation (Objective 5.5).	◂ Trapping during active season in NF & SF Badger Creek and Horseshoe Lake
5.2 Maintain and restore existing 135 acres of perennial wetland habitat at Snake Marsh.	**5.2.1** Map habitat and characterize vegetation of Snake Marsh, including extent of water primrose.	◂ Aerial photos ◂ Vegetation surveys
	5.2.2 Characterize the seasonal hydrology, water sources, and water needs of the Snake Marsh and Badger Creek system. Determine whether changes in hydrology are adversely impacting the Snake Marsh population.	◂ Surface water flow gage on Badger Creek and Willow Creek ◂ Extent and depth of water March-October ◂ Upstream landowner interviews
	5.2.3 If water supplies are inadequate, develop and implement plan to provide water, including supplementation if necessary (*e.g.*, surface flow augmentation, wells). Coordinate with local partners in conjunction with regional groundwater and surface water planning efforts (*e.g.*, South Sacramento County Groundwater Plan).	◂ Local groundwater wells ◂ Regional surface water supplies
5.3 Assess effects of invasive water primrose on giant garter snake habitat and implement control measures if necessary.	**5.3.1** Map extent of water primrose in Snake Marsh and upstream sources in Badger and Willow Creeks.	◂ Water primrose mapping in Snake Marsh and upstream sources

Objectives	Actions	Monitoring Elements
	5.3.2 Assess whether changes in vegetation are adversely impacting the GGS population in Snake Marsh.	◂ Habitat use by GGS (radio telemetry, trapping) ◂ GGS population survey
	5.3.3 Review and test control methods for water primrose. Develop and implement control plan if feasible.	◂ Water primrose mapping in Snake Marsh and upstream sources
5.4 Manage uplands surrounding Snake Marsh to maintain GGS refugia.	**5.4.1** Assess status of upland refugia (burrows for summer, aestivation sites for winter) and potential disturbances (*e.g.*, vehicles, livestock, agriculture).	◂ Presence of emergent vegetation and burrows
	5.4.2 Minimize disturbances of aestivation sites during winter (Oct–Mar) along railroad grade at Snake Marsh and other potential high-ground sites (if GGS population spreads).	◂ Railroad construction activities in winter
5.5 Support expansion of GGS range in Badger Creek watershed east of Highway 99 by restoring habitat and possibly repatriating snakes, in accordance with the GGS Recovery Plan.	**5.5.1** Evaluate habitat potential (physical and hydrologic) of Badger Creek watershed east of Hwy 99. Characterize the seasonal hydrology, water sources, and water needs.	◂ Surface water flow gage on Badger Creek and Willow Creek. ◂ Extent and depth of water March–October.
	5.5.2 Develop and implement plan to maintain sufficient water supply to restore perennial wetlands east of Hwy 99 (Horseshoe Lake, SF and/or NF Badger Creek), in conjunction with regional groundwater and surface water planning efforts (*e.g.*, South Sacramento County Groundwater Plan).	◂ Local groundwater wells ◂ Regional surface water supplies
	5.5.3 Ensure connectivity between Snake Marsh population and area east of Hwy 99.	◂ Badger Creek flow and habitat survey east of Snake Marsh

Objectives	Actions	Monitoring Elements
	5.5.4 Restore perennial wetland habitat on NF and SF Badger Creek (*e.g.*, channelized reaches on Bjelland and George Dairy properties). Provide aestivation sites above winter flooding adjacent to any habitat restored for GGS.	◂ Presence/absence GGS surveys in new habitat ◂ Habitat survey
	5.5.5 Implement weed control measures as necessary to minimize impact of invasive water primrose.	◂ Weed survey
	5.5.6 Assess opportunities to repatriate giant garter snakes to suitable habitat on the Preserve if re-colonization does not occur within 10 years of habitat restoration. Work with USFWS to develop, fund, and implement a restoration and repatriation plan according to Draft Recovery Plan (USFWS 1998) goals and guidelines.	◂ Presence/absence GGS surveys in new habitat ◂ Habitat survey in unoccupied sites

Natural Resource Stewardship Sub-Goal 6: Restore and maintain a population of fall-run Chinook salmon in the Cosumnes River, with an average annual spawning run of 2,000 adults (10-year average, range of 1,000–5,000 adults).

Objectives	Actions	Monitoring Elements
6.1 Improve passage for migrating adult salmon by enhancing river flows to reconnect the river during October–December (60–200 cfs flows for at least two periods totaling 10–25 days).	**6.1.1** Secure, monitor, and adaptively manage releases of water from Folsom South Canal to pre-wet the stream channel in early fall (as per February 2005 MOA of the Central Sacramento County Groundwater Forum).	◂ Continuous surface flows during fall. ◂ Adult escapement (number of adults observed on spawning grounds). ◂ Baseline monitoring of invasive plants along river (inadvertent introductions from American River).
	6.1.2 Evaluate purchases of additional water rights to provide ecological flows for key targets such as Chinook salmon, giant garter snake, and riparian forest. Investigate opportunities for funding and implementation (*e.g.*, Anadromous Fish Restoration Program [AFRP]).	
6.2 Maintain river free of physical passage barriers.	**6.2.1** Monitor passage status in river and to maintain river free from physical passage barriers (culverts, road crossings, seasonal impoundments). Work with the Fisheries Foundation and others to complete this action.	◂ Survey of river channel for passage barriers once flow reconnects.
6.3 Enhance spawning habitat in the Cosumnes River between Hwy 16 and Meiss Road (6 river miles) within 10 years.	**6.3.1** Support Fisheries Foundation and/or CDFG in monitoring spawning activity (redd counts in fall/winter) in the Cosumnes River.	◂ Presence of redds (nests)
	6.3.2 Support local partners (*e.g.*, Fishery Foundation, NRCS, local RDs, Cosumnes River Task Force) in efforts to evaluate causes of spawning habitat degradation upstream of the Preserve (erosion, scour, and/or siltation) and to develop strategies to improve conditions (*e.g.*, gravel augmentation, erosion control).	◂ Extent of stream with suitable gravel

Objectives	Actions	Monitoring Elements
6.4 Restore and maintain at least 300 acres of seasonal floodplain habitat for juvenile rearing.	**6.4.1** Map every three years extent of seasonal open water floodplain habitat (long-duration floods during January–March).	◄ Floodplain area inundated at least 30 days during January–March (when flows >800 cfs at Michigan Bar gage).
	6.4.2 Adaptively manage floodplain habitat and, if necessary, plan restoration of additional seasonal open water habitat to maintain 300 acres (to offset succession of seasonal open water habitat to riparian forest, maintain mosaic of habitat types, and to support any changing levels of salmon production). Obtain funding and implement restoration plan (Action 2.4.2).	

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4 Agricultural Stewardship

The Preserve's agricultural resources and current practices are described in this section. A brief introduction to agriculture in the local region and the various state and federal programs to support agriculture are also described in this Chapter to provide a regional context for the activities that occur on the Preserve.

4.1 AGRICULTURE IN THE REGION AROUND THE PRESERVE

The Preserve includes properties in two counties, Sacramento and San Joaquin. Most of the Preserve's agricultural activities occur within Sacramento County, with the exception of Staten Island, which is just below the County line in San Joaquin County. For this reason, this section presents mostly Sacramento County information in order to establish a regional context for the purposes of this Management Plan.

Agriculture has a long history in Sacramento County, beginning with the original settlers who reclaimed the marshy areas and used innovative techniques in flood and drought management to increase agricultural productivity in the Central Valley of California. As of 2005, the Sacramento County Agricultural Commissioner's Office estimated the County's agricultural production value was nearly $350 million, with the top ten agricultural commodities being (in descending order): wine grapes, market milk, nursery stock, Bartlett pears, cattle and calves, poultry, field corn, alfalfa, rice, and asparagus (Sacramento County Agricultural Commissioner 2005). The Preserve's agricultural and grazing operations produce four of the top ten agricultural commodities: cattle and calves, field corn, alfalfa and other hay, and organic rice.

"Farm with Rainbow" – Photo courtesy of Preserve Photo Library

Most of the local farms and ranches in the South Sacramento County area are owned and managed by families that have a multi-generational history of farming in this area. Recent trends show that agricultural land conversion for urban and environmental uses in the South Sacramento County area has resulted in substantially less irrigated crop land in production. Cities in South Sacramento County with ongoing and future possible agricultural land conversions that have the potential to affect the Preserve include Elk Grove, Rancho Cordova, Rancho Murieta, and Galt.

The total value of agricultural production in the Sacramento Metropolitan Region is decreasing. Between 1990 and 2002, nearly four percent (or 283,277 acres) of the Central Valley's irrigated farmland was converted to other uses, primarily for housing and other urban uses (Great Valley Center 2005).

The Agricultural Sector in the region surrounding the Preserve is feeling economic pressure to convert land to urban development. Many factors may influence the long-term feasibility of agriculture in the region, including:

- Incremental land conversion of farms in the region and associated reduction in the number of farmers and acreage in production.
- Incremental reduction in social and physical infrastructure that supports farmers.
- Increased regulation of dust, pesticides, noise, water quality, and other agricultural by-products.
- Economic incentives to convert agricultural land by receiving significant funds for sale of land to support retirement or other personal needs.
- World competition for existing markets.
- Commodity prices.
- Reduced viability of the local agricultural economy.
- Water and energy costs.

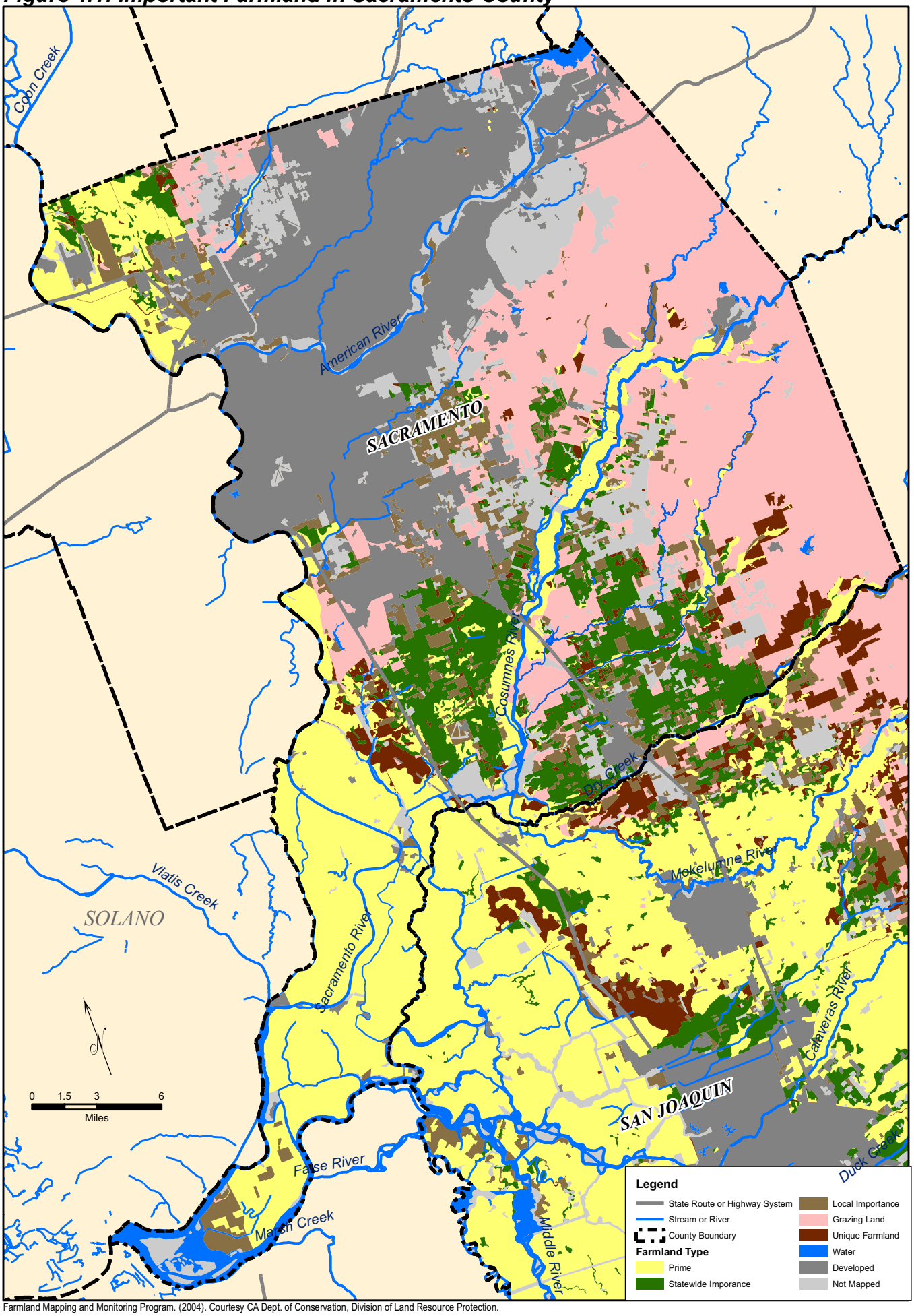
4.2 STATE AND FEDERAL AGRICULTURAL PROGRAMS

The United States Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) offers several programs to support farmers while at the same time supporting wildlife and conservation practices. Two of the most popular NRCS programs that are most applicable to the Preserve are the Wetland Reserve Program (WRP) and the Environmental Quality Incentives Program (EQIP).

The Wetland Reserve Program is a voluntary federal program that provides technical and financial assistance to eligible landowners to address wetland, wildlife habitat, soil, water, and related natural resource concerns on private lands in an environmentally beneficial and cost-effective manner. Two Preserve parcels currently have WRP easements: Howard Ranch WRP and Valensin WRP 2, with easement acreages of 5,354 and 946 acres respectively.

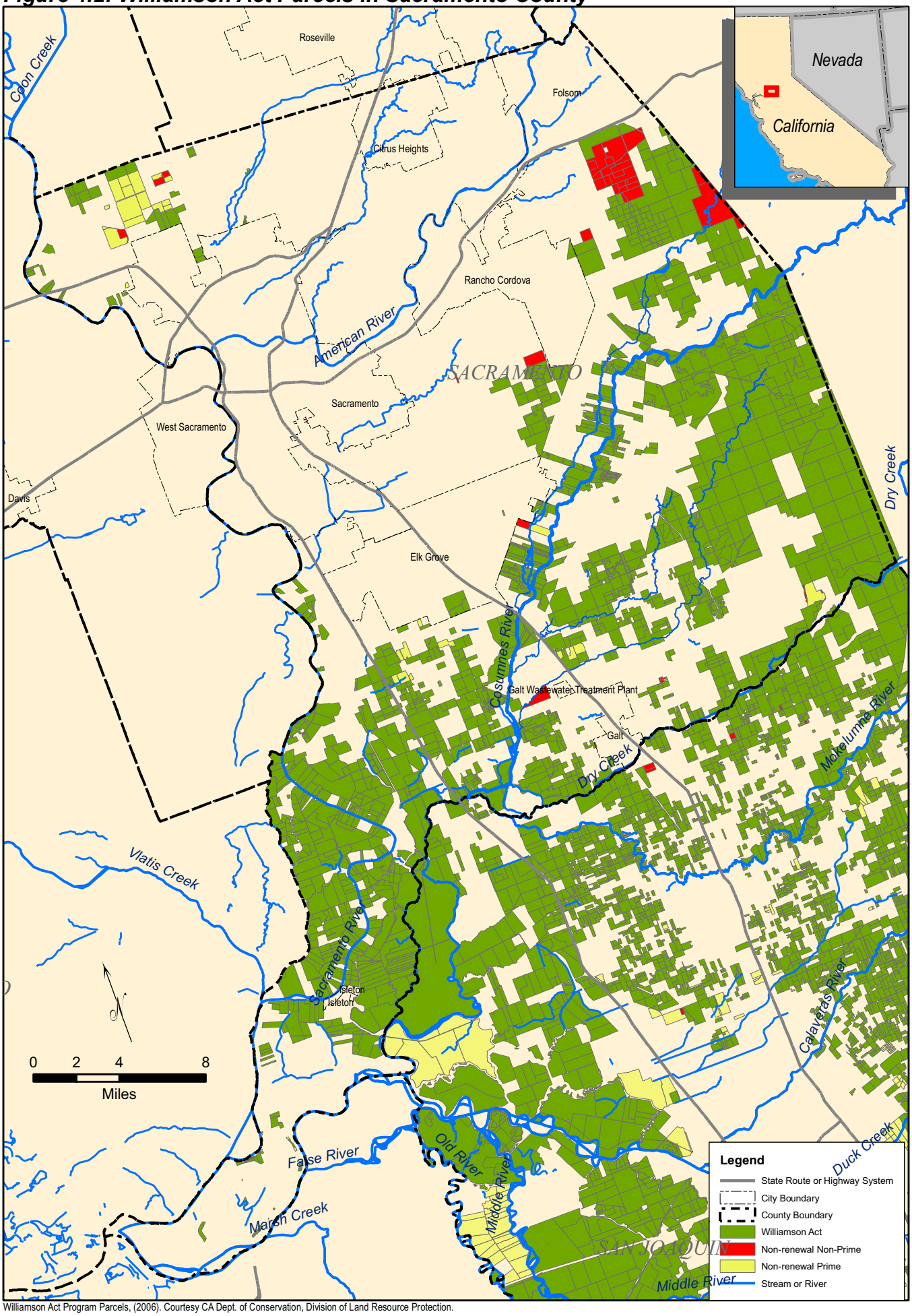
The Environmental Quality Incentives Program (EQIP) is another voluntary federal program that is designed to provide assistance to agricultural producers. The assistance is intended to promote agricultural production and environmental quality as compatible goals, optimize environmental benefits, and help farmers and ranchers meet federal, state, tribal, and local environmental requirements. Although the Preserve Partners do not receive EQIP funds directly, some of the Preserve's agricultural lessees participate in the EQIP, resulting in upgrades to the Preserve's agricultural infrastructure system or habitat enhancement.

Figure 4.1: Important Farmland in Sacramento County



Farmland Mapping and Monitoring Program. (2004). Courtesy CA Dept. of Conservation, Division of Land Resource Protection.

Figure 4.2: Williamson Act Parcels in Sacramento County



Williamson Act Program Parcels, (2006). Courtesy CA Dept. of Conservation, Division of Land Resource Protection.

The California Land Conservation Act of 1965, commonly referred to as the Williamson Act, helps prevent the conversion of agricultural land to other land uses by enabling the County to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or related open space use. In exchange, the property owner receives a tax break that decreases the property tax on acreage held in contract under the Program. There are different programs offered under the Act, including a "Super Williamson Act" program for a longer term. The Preserve has a total of 120 parcels under Williamson Act contracts, including 22,830 acres in Sacramento County and 12,417 acres in San Joaquin County (Figure 4.2).

Pesticide Program: Pesticides are commonly used on agricultural lands outside of the Preserve boundaries and occasionally on the croplands within the Preserve. Additionally, organic farms utilize organic pest control methods and materials registered for organic use. Because both pesticides and organic pest control methods are also used by the Preserve in natural habitat areas, we have included a discussion of pesticides in Chapter 7, Section 7.2.1: Property Descriptions and Management.

4.3 AGRICULTURE ON THE PRESERVE

The vast majority of the Preserve's agricultural lands (*e.g.*, row crops such as corn) are farmed in a "wildlife-friendly" manner that benefits primarily wintering migratory waterfowl and waterbirds, especially sandhill cranes and Swainson's hawks. Post-harvest treatment of wildlife-friendly crops is the most essential aspect of the operation in order for the full benefit of the land to be realized by wildlife. For example, sandhill cranes begin arriving at the Preserve around the time of the corn harvest; so while they do not use standing corn, they do forage extensively on post-harvest corn fields that have been flooded at Staten Island (Ivey and Herziger 2003; Gause *et al.* 2003).

The types of crops grown at the Preserve vary annually according to specific land-management considerations, market conditions, and the needs of the local farmers. As of 2000, approximately 21 different types of crops were grown on Preserve lands, including apricots, beans (green), beans (dry), cherries, corn, general field crops, general grain and hay, melons, squash, cucumbers, miscellaneous mixed grain and hay, irrigated pasture alfalfa and mix, irrigated pasture clover, irrigated pasture general, irrigated pasture mixed, rice, safflower, sudan, tomatoes, vineyards, and non-irrigated grassland (Department of Water Resources 2000). While many of those crops may have changed over the past few years, the overall Preserve acreage in active agricultural production remained fairly stable. Figure 4.3 depicts the current distribution of agricultural lands and crops across the Preserve.

The Preserve receives many benefits from agriculture, including:

- Income from the leased properties.
- Buffer between more urban land uses and wildlife habitat near the river.
- Provision of an on-site farmer to help deter illegal activities such as trespass or dumping on the property.
- Maintenance of aesthetics and open space for local residents and Preserve visitors.

- Habitat value for target species.
- Creation of long-term social capital by retaining the trust of local farmers and communities and their ability to contribute to the local economy through agricultural production and taxes.

4.4 PRESERVE PARCELS AND ACRES IN ACTIVE AGRICULTURE PRODUCTION

The Preserve contains 45,859 acres. According to the Preserve's GIS data, approximately 37,500 acres are used for agricultural production (*e.g.*, crops and grazing), 16,500 on fee-owned lands and 21,000 on easement lands. On the fee-owned lands, approximately 4,200 acres are utilized for grazing and 12,300 acres are used to grow crops.

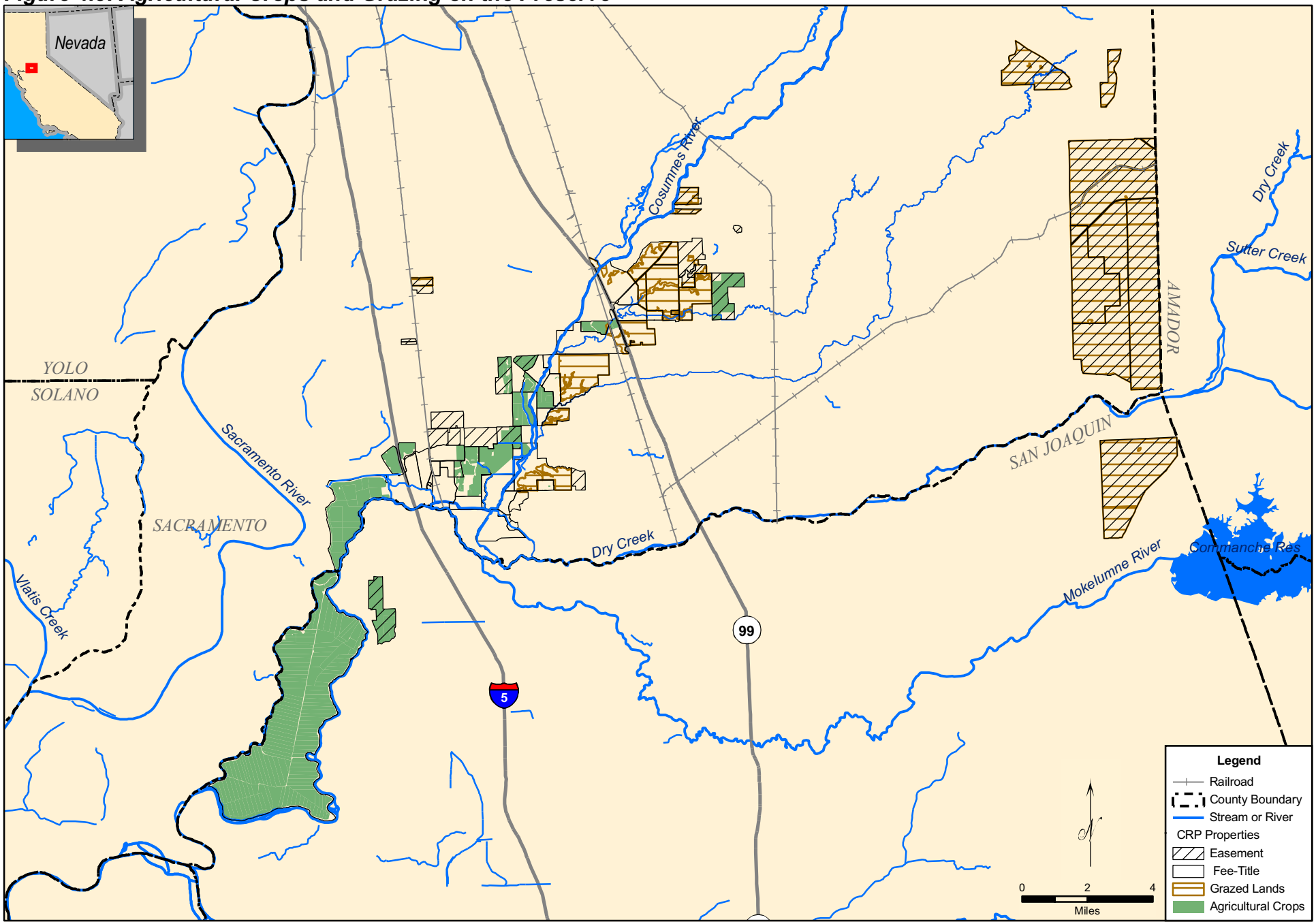
The most well-known area of the Preserve identified by agricultural activities is Staten Island, which is located in San Joaquin County and within the Sacramento–San Joaquin Delta. Staten Island is managed as part of the Preserve, although day-to-day agricultural decisions are made by an affiliate organization called Conservation Farms & Ranches (formerly managed as M&T Staten Ranch under previous ownership). The Island is a 9,200-acre farm, of which approximately 8,400 acres are suitable for farming. Finding the balance between profitable farming and wildlife habitat is an ongoing process and is being conducted using an adaptive management approach. The current farming program includes approximately 7,000–7,400 acres of corn and 1,200–1,400 acres of wheat. The remaining land is composed of levees, roads, ditches, canals, buildings, and operational facilities.

The Preserve is also well known for its organic rice operations. Currently, approximately 1,000 acres in the lower floodplain of the Preserve are leased for organic rice, of which approximately 750 acres is farmed annually, rotating among the fields. After harvest, fields are rotationally flooded to support wintering waterfowl and waterbirds that feast on grain, crayfish, mice, and invertebrates found in the fields. The birds assist with the breakdown of the rice straw and add fertilizer to the fields (Bird *et al.* 2000). Organic rice production creates excellent habitat, but it also creates a challenge for managing mosquito abatement needs. Vector control options are limited due to the lack of agrochemicals registered for use in organic rice. The lessee and the Preserve work closely with the Sacramento–Yolo Mosquito & Vector Control District on this issue. More information about the Preserve's organic rice production is provided in the Lower Cosumnes River Watershed Assessment (RBI 2006).

4.5 AGRICULTURAL WATER

Farmers and ranchers on the Preserve obtain their water from a variety of local sources. Staten Island obtains water by siphoning it from the Mokelumne River. Other Preserve properties and easement lands obtain water from sources such as nearby sloughs and river channels, as well as from existing appropriative water rights issued by the State Water Resources Control Board.

Figure 4.3: Agricultural Crops and Grazing on the Preserve



Crop data are from the CA Department of Water Resources Land Survey, Sacramento 2000 and San Joaquin 1996, Staten Island crops are from Ducks Unlimited survey, 2006. Grazing data are from personal communication with CRP staff, 2006.

A stable source of water is imperative for agricultural operations on the Preserve. The average amount of irrigation water that crops utilize varies according to the type of crop and specific site conditions. For example, the Preserve's organic rice operations require approximately 3.2 acre-feet of applied water per acre (Schaffer 2001).

Much of the agricultural water used by local farmers and the Preserve is returned to the natural ecosystem through surface water discharge and/or percolation. Surface water discharge and percolation are extremely important in the sense that the groundwater in the Cosumnes watershed is hydrologically connected with surface water, and those interactions are essential to many of the Preserve's restoration efforts, especially for valley oak riparian forest restoration. Continuation of water conservation practices to protect flows in the river for fish, amphibians, benthic macroinvertbrates, and riparian plant species is needed by all who use the Cosumnes River resources, especially as the County continues to review and approve urbanization projects that affect the river (*e.g.*, Rancho Murieta developments). Additionally, the Preserve will need to continually consider and balance the tradeoff between using water for agricultural purposes, which generate income for the Preserve and provide habitat for certain species, and maintaining in-stream water for the protection of fish and other aquatic biota.

"Staten sland" –Photo courtesy of Preserve Photo Library

Water quality is an equally important issue for the Preserve's agricultural lessees, and measures are taken to reduce sedimentation and chemical inputs into surface water sources, including the reduced use of fertilizers and pesticides on organic farms. Riparian or grassland habitat between the aquatic habitats and the agricultural operations serves as a buffer that can significantly decrease the amount of sedimentation and/or pesticide reaching the natural system. One of the proposed actions in this Management Plan is to promote the use of wildlife-friendly farming and other conservation practices that will result in increased water quality and quantity for everyone in the community.

4.6 LEASES AND EASEMENTS

The Preserve supports wildlife-friendly agriculture predominantly using two mechanisms:

- Leases: Land currently owned by a Preserve Partner is leased to a private farmer or rancher for use in active agricultural or grazing production and management.

- Easements: Preserve Partners purchase a conservation easement on privately owned farms and ranches near the Preserve and the owner continues to farm or graze the land at their discretion, provided that it is within the terms and conditions of the easement.

Income from leased properties is an especially important benefit to the Preserve as this agriculture generates a portion of the funding necessary to cover the annual operating and maintenance costs of the Preserve. For example, the Preserve's organic rice operations provide critical funding to the Preserve while still providing an additional 1,000 acres of wetland habitat, post-harvest. The additional wetland acres supplement the more traditionally managed wetlands on the Preserve and help to support state-listed threatened species such as the greater sandhill crane, and species of concern such as the northern pintail. Additionally, other Preserve properties are managed using cattle grazing, which also provides a steady, reliable income for the Preserve while appropriately managing the habitat.

Easements are a real estate tool used to purchase the future right to develop the land or other rights from willing sellers. Easements are extremely important to the Preserve: they are less expensive than fee-title to acquire, they support the local economy by keeping the land in production by the landowner, and they create a buffer of privately owned and managed lands between urban areas and the Preserve's natural habitat areas. Landowners benefit by receiving money for the sale of the development rights and a reduction in annual property taxes, as well as the ability to withstand the pressure to subdivide and develop the property, thereby keeping the land in agricultural production. Farmers and/or landowners with easements have indicated that they appreciate the flexibility that the Preserve provides in terms of allowing the farmer to retain control of agricultural management decisions, as long as management is consistent with the terms of the easement.

The Preserve promotes some basic preferences that they request farmers (*i.e.*, lessees or easement holders) to consider in carrying out their agricultural practices. They are as follows:

- Planting of annual crops that provide suitable habitat for wildlife.
- Utilization of organic agriculture techniques when possible.
- Pesticide use must follow appropriate local, state, and federal regulations.
- Farming practices that consider wildlife needs (*e.g.*, flooding rice stubble rather than discing or burning it).

It is important to note that agriculture at the Preserve helps to sustain the local rural farm economy, contributes to the long-term viability of the agriculture tradition, and promotes positive social relationships among neighbors. However, tradeoffs associated with agricultural activity on the Preserve do exist, with water and pesticide use being the two most prominent.

4.7 MANAGEMENT GOALS

As the needs and conditions of the Preserve change over time, it will be necessary for the Preserve to reassess and continue to balance its agricultural enterprises with habitat preservation goals so as to maintain multiple natural resource, social, and economic values. This will be accomplished using adaptive management and associated monitoring to ensure that new information is taken into account.

Agriculture is intimately related to the provision of native habitat and water on the Preserve. Also, many land-management tools used in agricultural practices are utilized for management of native habitats. Given these areas of overlap, readers are encouraged to consult the following chapters for additional and related goals: Chapter 3, Natural Resource Stewardship; and Chapter 2, Description of the Cosumnes River Watershed and the Preserve (contains information on water resources).

Goals, Objectives, Actions, and Monitoring

OVERARCHING GOAL II: COMPATIBLE USES IMPROVE STEWARDSHIP OF THE LANDS IN THE COSUMNES RIVER WATERSHED.

Agricultural Stewardship SubGoal 1: Agricultural stewardship will continue to serve as an important land management tool and will be compatible with the Preserve's overall mission and goals.

Objectives	Actions	Monitoring Elements
1.1 Balance the Preserve's agricultural land uses with the Preserve's overall mission and goals.	**1.1.1** Assess all of the existing Preserve properties for their potential to contribute to accomplishing the Preserve's overall mission and goals through the implementation of agricultural and/or grazing practices. **1.1.2** Implement agriculture and grazing on all Preserve properties where implementation is deemed suitable and complimentary to the Preserve's overall mission and goals. **1.1.3** Conduct outreach regarding the importance of agriculture to the Preserve's overall goals. **1.1.4** Collaborate with adjacent landowners and tenants regarding common land-management issues. **1.1.5** Continue to communicate and collaborate with agricultural agencies and organizations by attending meetings, conferences, and workshops sponsored by entities such as NRCS, the local RCDs, CCA, FSA, CFBF, etc. **1.1.6** Continue to communicate and collaborate with policymakers to ensure that local and regional agriculture remains viable, as reflected in documents such as County General Plans, the South Sacramento County HCP, etc. **1.1.7** Continue to promote wildlife-friendly farming approaches and organic farming methods to local farmers and the general public.	

Objectives	Actions	Monitoring Elements
	1.1.8 Address water quality issues by supporting efforts to research and collect site-specific data on aquatic parameters, including production of methyl mercury.	
1.2 Use traditional and innovative agricultural and grazing techniques to ensure proper ecological functioning of the Preserve's landscapes.	**1.2.1** Use grazing strategies and other land-management tools to maximize native plant biodiversity while minimizing and controlling invasive plant species infestations. **1.2.2** Minimize the impact of grazing on sensitive habitats such as riparian areas and vernal pools (*e.g.*, design livestock infrastructure systems such as exclusionary fencing and gates, stock water placement). **1.2.3** Maintain approximately 1,000 acres of organic rice operations, in rotation, on the Preserve in order to supplement the managed wetland program's habitat availability. **1.2.4** Manage grazing and agricultural lands (especially Howard Ranch, Valensin Ranch, and irrigated pastures), as necessary, in order to support and maintain viable populations of federal-listed vernal pool species and state-listed wildlife species such as the Swainson's hawk. **1.2.5** Continue to utilize economically viable agriculture and grazing as a land-management tool to support federal- and state-listed species and overall biodiversity. For example, Staten Island agriculture supports greater sandhill crane. **1.2.6** Use a range of agricultural practices and land-management tools, as necessary and appropriate, to supplement wildlife-friendly farming and grazing techniques.	**1.2.1** Species diversity, invasive plant distribution and abundance in relation to management techniques.

Objectives	Actions	Monitoring Elements
1.3 Maintain the Preserve's agricultural capacity by ensuring that existing infrastructure is maintained and that new infrastructure is installed as necessary.	**1.3.1** Maintain and replace, as necessary, the Preserve's agricultural infrastructure, including pumps, water control structures, roads, levees, etc. **1.3.2** Require all agricultural and grazing lessees to maintain the leased agricultural infrastructure as a term and condition of their lease. **1.3.3** Maintain the Preserve Partners' existing State water rights. **1.3.4** Examine the feasibility of water conservation practices and equipment on the Preserve, especially for agricultural operations (*e.g.*, recycle, recapture).	**1.3.1** Bi-annually inspect (prior to and after the season) all agricultural infrastructure to ensure proper functioning. **1.3.2** Routinely monitor and renew leases as necessary. **1.3.3** Prepare State water rights reports every three years, or as required by the State.

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5.1 PUBLIC USE: RECREATION

5.1.1 Existing Conditions and User Groups

The Preserve currently offers a wide range of wildlife-compatible recreational activities, including wildlife viewing, hiking, boating, canoeing, hunting, fishing, sightseeing, and geocaching. Designated areas of the Preserve are open to the public, including trails and facilities located on parcels owned or managed by the BLM, SMUD, and TNC, as well as along public roads and on the river channel. Currently, there is no fee charged to visit the main Preserve or to park in the parking lot.

TYPES OF RECREATION ACTIVITIES

Popular activities are described in more detail below.

- Boating/Paddling: Only non-gas-powered boats (*e.g.*, kayaks, canoes, etc.) are allowed to launch from the Preserve's dock. Paddling (canoe or kayak) is a very popular activity at the Preserve. In addition to the guided paddle tours led by Preserve volunteer naturalists, there are independent paddlers, paddling clubs, and commercial paddling companies that use the Preserve's facilities. This recreational use is growing slightly each year and numbers have increased dramatically since the completion of the new launch site.

  "Paddling at Cosumnes 2" – Photo courtesy of Preserve Photo Library

  There are no restrictions to motorized boats on the Cosumnes waterways in accordance with State laws. However, motorized boat use is difficult due to shallow and varying water depths and vegetative overgrowth. The closest boat ramp for motorized boat launching is located outside the Preserve, farther downstream at Wimpy's Marina on the Mokelumne River, which offers better motorized boating opportunities.

- Wildlife Viewing: Birding is very popular at the Preserve. Individual bird watchers and clubs, including the Audubon Society and Central Valley Birding Club, visit the Preserve on a regular basis, especially during crane and waterfowl migrations. Thousands of ducks, geese, swans, sandhill cranes, and various shorebirds are visible from the roads and trails in fall and winter. Many people come year-round to view the smaller passerine birds as well. Crane season usually lasts from mid-September until mid-March.

- Hiking: Hiking and general sightseeing are the two leading recreational activities at the Preserve. In addition to the guided walking tours led by volunteer naturalists on a regular basis, there are independent and group hikes organized by walking and hiking clubs.

- Fishing: Fishing in the Cosumnes River has a long history. Native Americans, farm settlers, and current sportfishing enthusiasts have pursued native fall-run Chinook salmon and steelhead (*Oncorhynchus mykiss*), as well as non-native sunfish and several species of bass in the river. Although bank fishing is not allowed within the Preserve boundaries, fishing from a boat in the navigable waterways is allowed in accordance with State law and the California Freshwater Sport Fishing Regulations.

- Geocaching: Geocaching is a modern adventure game that utilizes a hand-held Global Positioning System (GPS) unit and spatial coordinates to locate a cache site posted on the Internet. Currently, there are four approved geocaching sites on the Preserve that are accessible from the public trails. The Preserve's Volunteer Coordinator monitors the geocaching sites through regular contact with the geocacher user-group. Currently, there is no special use permit required for the four geocache sites on the Preserve.

- Photography: Photographers are often seen taking photographs of waterfowl, waterways, and other natural features on the Preserve. Photography enthusiasts can participate in guided photo-walks that offer advice on photo techniques and locations as well as in self-guided photography opportunities. There are currently no specific photography facilities on the Preserve.

- Rural Road Sightseeing: Rural roads that pass through the Preserve offer unique viewing opportunities. The Preserve's Driving Tour has become very popular with visitors. The tour allows visitors to see the scope of the Cosumnes River Preserve by highlighting Preserve properties that are accessible by public roadway, but are not open to the public for walking, etc. While the tour focuses primarily on the lower Cosumnes, it has optional Preserve destinations in the North Delta, such as Staten Island and the foothills at Howard Ranch.

- Hunting: The Preserve currently operates four active hunts:

  1. *Weekend Dove Hunt*: Organized by the California Department of Fish & Game (DFG), this hunt occurs over one weekend per year, generally on the first weekend of September. Only 100 hunters are allowed to hunt on the property and these are chosen via a lottery system. The hunt occurs on DFG's Castello and Valensin properties, which are currently managed using grazing and dryland farming.
  2. *Cosumnes Lame Duck Shooters (CLDS) Duck Hunt*: Each year, the CLDS applies to the BLM for a special use permit to hunt waterfowl at the Cougar Wetlands area. The CLDS is a group of mobility-impaired hunters that typically hunt Sunday and Wednesday at the Preserve during the three-month duck-hunting season. This group coordinates all the logistics associated with organizing this event.

3. *GreenWings Duck Hunt*: Ducks Unlimited (DU) typically offers a junior hunting opportunity via their GreenWings Program at the Cougar Wetlands area. Each year DU applies to the BLM for issuance of a special use permit for this hunt. The GreenWings typically hunt on Saturdays throughout the waterfowl hunting season.
4. *Staten Island*: Staten Island is privately owned by The Nature Conservancy (TNC), which generally does not allow hunting of any kind on its properties. In this case, due to the important historic and social considerations of this unique site, TNC granted a compatible-use variance to continue the past practice of limited waterfowl and pheasant hunting by Conservation Farms & Ranches.

Species that inhabit the Preserve and are legally hunted in California include deer, pheasant, turkey, quail, dove, and waterfowl. Of these, only turkeys, pheasants, doves, and waterfowl are currently present in numbers large enough to be considered for a public hunting program. Neither deer hunting nor target shooting are allowed at the Preserve.

The land-ownership pattern plays a significant role in the timing and location of existing and future hunting programs at the Preserve. Each Preserve Partner has existing policies and practices regarding hunting and these are available in the Preserve's files. The Partners will examine all opportunities to expand the hunting program, provided that expansion does not adversely affect their ability to achieve their natural resources goals and does not conflict with the policies of the land-owning entity.

In addition to ownership issues and policies, other complicating factors are lease arrangements and requirements of funding sources that were originally used to purchase specific parcels. Easements across privately owned parcels can also define hunting activities that are compatible with the goals and terms of the easement. Individual parcels have unique topographic, biologic, and other site constraints, which are very site-specific. Additional evaluation of these complicating factors is needed before modifications to the existing hunting program can be approved.

RECREATIONAL FACILITIES, SIGNS, AND LITERATURE

Recreational facilities on the Preserve include the Visitor Center with its attached administrative offices, several kiosks, and trails.

- Visitor Center: The 2,000-square-foot Visitor Center is located on an elevated pad that is above the high water mark, adjacent to Willow Slough. The original Visitor Center, built in 1994, was unfortunately burned in an arson fire in 1995. It was quickly rebuilt in 1996 and has served as the primary visitor area and administrative offices since that time. The site includes upper and lower parking areas, visitor benches, a kiosk, a dock for non-motorized boats, restored riparian (valley oak) forest, native plantings, and a mini-wetland area adjacent to the building. The Visitor Center houses interpretive exhibits that describe the natural and cultural history of the region as well as the restoration and management of the Preserve. The Visitor Center is staffed by Volunteer Naturalists every weekend and by Preserve staff during the week. The conference room in the Visitor Center may be reserved for use by small public groups of up to 20 persons. The Visitor Center is accessible to mobility-impaired visitors.

- Trails**:** The Preserve offers two self-guided tour trails open year-round, sunrise to sunset. The Cosumnes River Walk is a three-mile dirt loop nature trail along the rivers and sloughs and through the area known as the Savanna. This trail is subject to flooding. The Lost Slough Wetlands Walk is a one-mile paved mobility-impaired accessible loop trail. A wooden boardwalk, one-half-mile round-trip, is accessible off of the Wetlands Walk. In 2006, a mobility-impaired accessible crane viewing platform was built across from the Visitor Center by a volunteer naturalist for his Eagle Scout project. A map of the trails is shown as Figure 5.1.

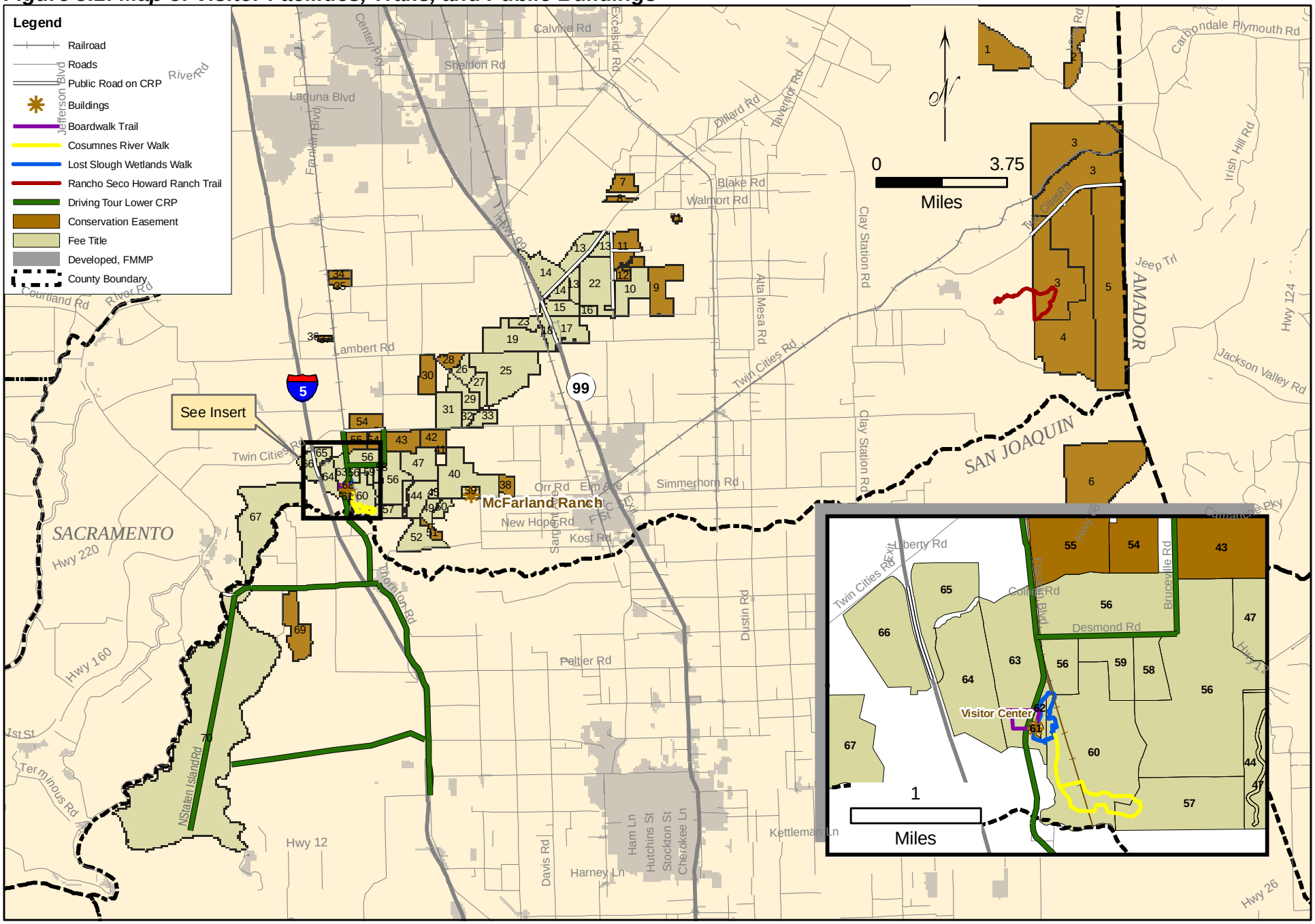
  Visitors may also hike the Rancho Seco Howard Ranch Trail. This trail was created in 2006 via a public/private partnership between Sacramento Municipal Utilities District (SMUD), TNC, and the private property owner of the Howard Ranch. Funding for the construction of this trail was provided to TNC by an anonymous donor. The Rancho Seco Howard Ranch Trail is a seven-mile loop trail that passes along Rancho Seco Lake and goes onto the Howard Ranch, a working private cattle ranch. Currently the trail is open to the public for a ten-year time frame in accordance with contractual arrangements that TNC has established with both the private landowner and SMUD. Under this contract, SMUD is responsible for trail maintenance and public-use management.

"Kids on Trail" – Photo courtesy of Preserve Photo Library

  Trail Maintenance: As a majority of the recreational activities and educational walks occur on trails, it is imperative that they be well-maintained at all times. Trails are subject to dense vegetation, erosion from water, and damage from mammals such as beavers. Flooding and vegetation also damage the concrete of the mobility-impaired accessible trails, so it is necessary to continually inspect and repair these trails to the standards of the Americans with Disabilities Act (ADA).

  The Site Coordinator position is responsible for overseeing trail maintenance, among other duties. The Sheriff's Work Crew and volunteers also assist with trail maintenance. At certain times of the year, large numbers of volunteers do trail work during special workdays. Additional Preserve staff time and equipment is needed to tend to regular routine maintenance of trails and amenities. The Preserve does not currently have the financial resources to support additional staff or acquire the necessary equipment. Therefore, the Preserve relies heavily on volunteers and the Sacramento County Sheriff's Work Crews to maintain the trails.

Figure 5.1: Map of Visitor Facilities, Trails, and Public Buildings



- Paddling Facilities**:** A dock for the launching of non-gas-powered boats was constructed in 2006 and funded by a California Department of Boating and Waterways grant. The dock, located off Middle Slough, fluctuates with changing water levels and tides. This is the only legal public river access point on the lower Cosumnes River. There are also two allowed pull-out locations at the "Tall Forest" and "The Point" within the Preserve.

  Paddle routes currently cover approximately three miles of the Cosumnes River waterways. Other sections of the river and sloughs are overgrown with vegetation and/or otherwise blocked by dams. Future improvements and expansion of existing routes may be possible by removing bushes or removing or slotting dams, especially upstream into Wood Duck Slough and the Cosumnes and Mokelumne Rivers.

- McFarland-Orr Ranch: The McFarland-Orr Ranch is currently the site of many public events, including Pioneer Day, Fall Pumpkin Patch, Future Farmers of America (FFA) livestock demonstrations, antique car and tractor shows, and the Kite Festival. The McFarland-Orr Ranch is almost 103 acres in size and is owned by Sacramento County, which leases 35 acres of the Ranch to the Galt Historical Society. The Master Plan for the McFarland Living History Ranch contains many goals, objectives, and actions for management of the Ranch. Potential future recreational opportunities include the development of a visitor center, campground, and a trail. DFG owns the remainder of the property called McFarland Ranch and this property is 1,017 acres in size.

- Signs: Standard directional and safety signs are currently posted throughout the Preserve. Implementation of the Preserve's Signage Plan is an ongoing activity.

- Kiosks: Informational kiosks for visitors are located in the upper parking lot, boardwalk parking lot, the Visitor Center, Howard Ranch trailhead, boat launch area, and approximately six panels along the trails.

- Recreational Literature**:** The Preserve has a number of brochures available to assist and educate members of the public during their visit to the Preserve. Please check on-site for additional and current information.

PRESERVE'S CURRENT RECREATION REGULATIONS

The Preserve's Recreation Program and facilities are subject to a number of local, state, and federal regulations. Local regulations are primarily recreation-related policies adopted by Sacramento County and the Cities of Elk Grove and Galt. The primary regulations that affect activities at the Preserve are agency special use permits, Preserve Visitor Rules, DFG Ecological Reserve Designation, and California fishing and hunting regulations. Each is described in the following paragraphs.

Special Use Permits: The Preserve issues an assortment of special recreation permits for commercial use, research, competitive use, filming, special area use, and organized group activity and event use. Special recreation permits are required for specific recreational uses of the public

lands and related waters. They are issued as a means to manage visitor use, protect natural and cultural resources, and provide a mechanism to accommodate commercial recreational use. Although each agency (BLM, DFG, TNC) has its own directives and form for special use permits, the Preserve has standardized some forms for ease of use and issuance.

Ecological Reserve Designation: A portion of the Preserve (11,895 acres) is designated as an Ecological Reserve in accordance with the Fish and Game Commission's October 3, 2003, decision (Figure 5.2). The Ecological Reserve designation is codified as amendment to Section 630, Title 14, California Code of Regulations. This action adopted special regulations for the Preserve that restrict access. Of the 11,895 acres designated as an Ecological Reserve, most are owned by TNC and a small portion is owned by DFG. This situation is a bit unusual because, normally, DFG owns and controls the land it designates as an Ecological Reserve.

Fishing Regulations: California Freshwater Sport Fishing Regulations that apply to the Preserve are available on the DFG website.

Hunting on Navigable Waterways and Floodplains: Hunting on navigable waterways within the Preserve boundary and the Eco-Reserve boundary is regulated by multiple laws including, but not specifically limited to, the Fish and Game Code, Harbor and Navigation Code, and Section 4 of Article X of the State Constitution. These and other related laws, policies, and guidance can be found on the California Fish and Game Commission website.

INAPPROPRIATE USE AND VIOLATIONS

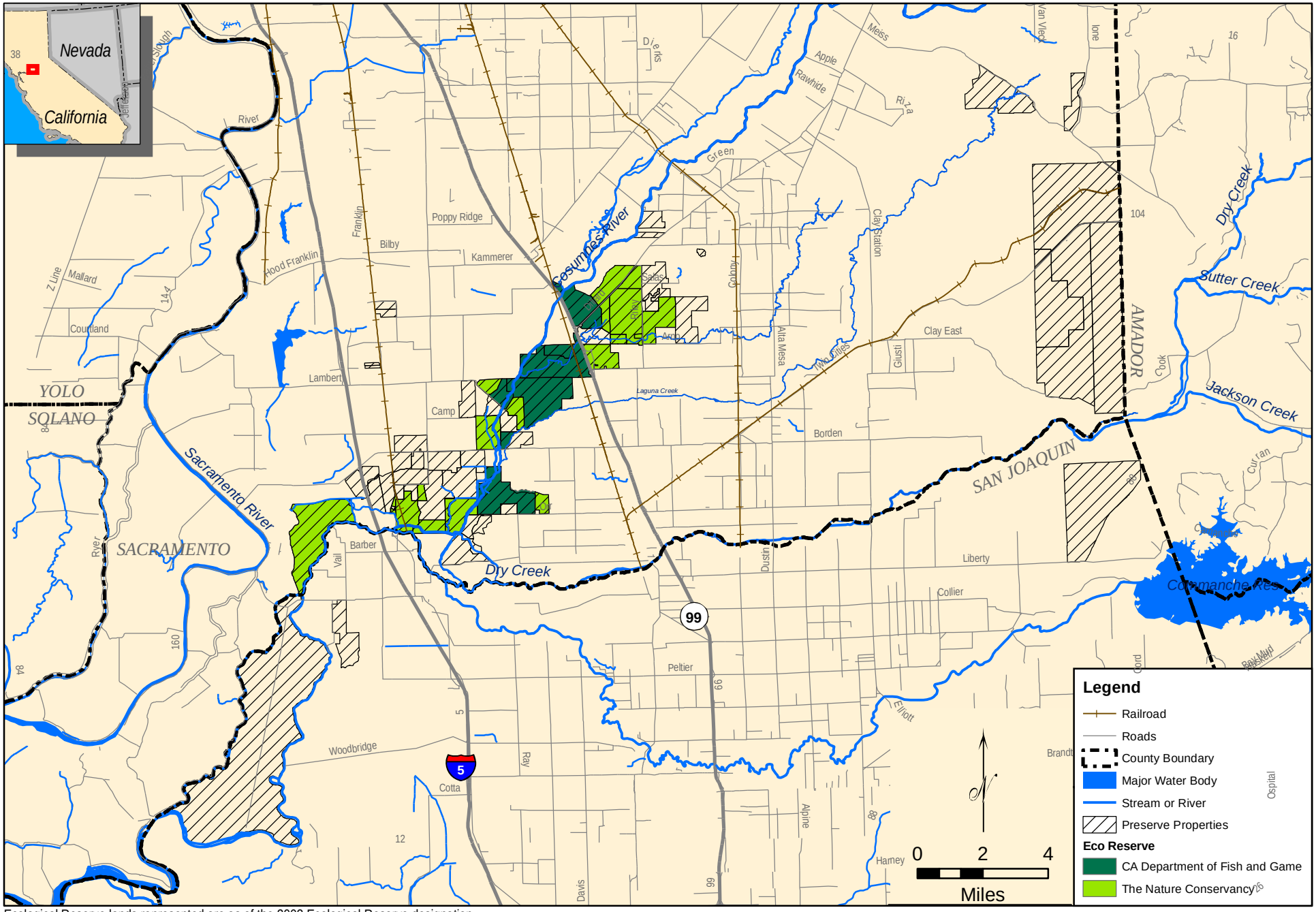
Inappropriate uses can be tiered into two categories:

- Minor violations, such as trail cutting and littering, can be addressed through education.
- Major violations, such as trash dumping, poaching, marijuana growing, and off-highway vehicle (OHV) use, need to be addressed through increased law enforcement.

Below is a list of the law enforcement entities that have some responsibility for enforcing laws at the Preserve and/or the surrounding area:

- Fish and Game Warden: Fish and Game Wardens make up the law enforcement staff of the DFG. They enforce fish, wildlife, and habitat protection laws, including criminal and civil statutes on DFG-managed lands. The wardens are sworn peace officers (all of whom have certain state hiring and training requirements) and can secure and serve search warrants, make arrests, and testify in court.
- BLM Law Enforcement: The BLM's law enforcement program is responsible for protecting public safety and resources across the 230,000 acres of BLM-managed public lands within the Folsom Field Office's jurisdiction, which it does in partnership with state and local law enforcement agencies. The Folsom Field Office has four full-time Law Enforcement Officers in addition to one full-time Special Agent.

Figure 5.2: Lands Within the Preserve Designated as an Ecological Reserve



Ecological Reserve lands represented are as of the 2003 Ecological Reserve designation.

- County Sheriff: County Sheriff patrols county roads and the unincorporated areas. Because portions of the Preserve lie in two counties, Sacramento and San Joaquin, and directly adjacent to a third county, Amador, the specific location of an incident will determine which County Sheriff is contacted.
- California Highway Patrol: The CHP patrols State Highways.
- Sacramento County Ranger: Conducts routine patrols of those portions of the Preserve that are within Sacramento County boundaries.

The most frequent violations include:

- Dumping of trash, abandoned vehicles, etc.
- "No Parking" violations
- Trespassing (hunters, birders, and OHV users entering "Closed Areas")
- Uncontrolled fires
- Vandalism of Preserve facilities, visitors' vehicles, fences
- Theft
- Firewood collection
- Marijuana growing

Illegal hunting and poaching are sporadic. Illegal OHV use on the Preserve is particularly problematic on certain properties. Trash and appliance dumping occurs several times per week along rural roads throughout the Preserve area. Marijuana growing is a particularly dangerous criminal activity that occurs at the Preserve because of the access to remote wooded areas adjacent to ample supplies of water. Vandalism and parking violations are sporadic and typically occur in the visitor use areas.

5.1.2 Use Levels and Trends

Volunteer Naturalists track the number of visitors who come into the Visitor Center on the weekends. The number of people entering the Visitor Center ranges from 20,000 to 25,000 on an annual basis. However, most regular visitors—typically bird watchers—enter the Preserve without coming into the Visitor Center. It is estimated that the actual number of visitors is closer to 60,000 per year. The Preserve does experience steady, and at times heavy, public use. Peak recreation times are spring, early summer, and fall, which encompasses bird migration and the paddling season. Busloads of people visit every November for the sandhill crane season. On busy days, all three parking lots fill to capacity and overflow parking occurs on both sides of Franklin Boulevard.

Due to the Preserve's proximity to growing urban areas (including Sacramento, the San Francisco Bay Area, and Reno) and easy vehicular access from Interstate 5 and Highway 99, it is expected that future demands for recreational use, public access, and use of existing facilities will increase. Further compounding the growing population issue is the fact that publicly accessible open space is limited. Although the Preserve is not actively pursuing an increase in visitor numbers, this is occurring by word of mouth and educational programs. The anticipated increase in visitors brings both challenges and opportunities to the Preserve.

5.1.3 Future Challenges

The Preserve faces four important challenges in the provision of recreational services:

1. Provision of additional public access in a manner that is compatible with the overarching goal to protect natural resources. Sensitive species and their habitats are currently protected from recreational activities by gate closures and restricted public access to nesting and breeding areas.
2. Maintenance and security of existing facilities, including trails.
3. Compatibility of different recreational uses.
4. Staffing and financial resources to support the recreation program are highly constrained. It is possible that the Preserve will lack the staff and finances needed to accommodate future anticipated increases in demand. Ideally, from a management perspective, as visitation to the Preserve increases, the level of staff and funding devoted to the Public Use Program should also see a corresponding increase.

Exploring new recreational opportunities is complex and constraints are dependent on the restrictions associated with ownership, easements, and stipulations associated with the original funding source. Further complications are the varying policies of the land-owning Partners, lack of facilities, limited parking, staffing constraints, and insufficient budgets.

The Preserve is slowly undergoing a transition in focus from acquiring new lands for Preserve expansion to managing and restoring existing Preserve lands. This transition may or may not include a transition in roles among the Partners' management and the role that recreation plays in differing management approaches.

In terms of providing and managing public access, the Preserve Partners each have somewhat different missions. The institutional missions of BLM, CDFG, and Sacramento County tend to promote public access, whereas promoting biodiversity in natural habitats is the core mission for TNC and public access is a lesser priority. On the other hand, Ducks Unlimited's mission is waterfowl and wetland conservation, with an emphasis on the recreational aspects of waterfowl hunting. It will be an ongoing challenge for the Preserve to balance these differing missions along with other competing needs.

<u>Proposed New Facilities</u>
This Management Plan anticipates that new recreational facilities will likely be needed on the Preserve in the future. For the provision of new recreation facilities, five key factors must be considered:

1. Feasibility
2. Preferred methods
3. Costs and financing
4. Implementation schedule
5. Maintenance

A process to evaluate the feasibility of new recreational facilities and amenities is needed. The U.S. Fish and Wildlife Service (USFWS), for example, utilizes a compatibility determination that requires projects to have funding, be a wildlife-dependent use, and be consistent with the refuge. A similar process would allow Preserve Partners a review procedure to ensure that the proposed recreational facility is consistent with the intent of this Management Plan. New recreational facilities are feasible if they meet the following three criteria:

- Compatible with the Natural Resource Stewardship goals described in Chapter 3 of this Management Plan and with the existing natural resources present on the site.
- Provide an opportunity to teach stewardship.
- Have adequate funding for both short-term construction costs and long-term maintenance and operations costs (including staff).

If a proposed recreational use is not compatible with the Natural Resource Stewardship goals in this Management Plan, then it will not be approved. The goals, objectives, and actions listed at the end of this Chapter provide mechanisms for the Preserve to overcome potential future challenges.

5.2 PUBLIC USE: VOLUNTEER PROGRAM

5.2.1 Existing Conditions and User Groups

Volunteerism along the lower Cosumnes River began prior to the 1987 establishment of the Preserve. Once the Preserve was established, Preserve Partners began advertising for volunteers to assist with overall Preserve management. Today, volunteers are essential to the operation of the Preserve. Each year the Preserve benefits from the efforts of approximately 125 active volunteers who assist with a variety of projects. Volunteers staff the Visitor Center, lead guided tours for Preserve visitors, perform trail work and vegetation management, monitor wildlife, and conduct habitat restoration projects. An estimated 5,000 hours of volunteer services are contributed annually to the Preserve.

DESCRIPTION OF VOLUNTEER TEAMS

The people who volunteer at the Preserve are very diverse professionally and include attorneys, doctors, teachers, engineers, and state employees. Their ages range widely, from elementary school children to retirees and, overall, there is no dominant gender. They donate their many talents in photography, science, natural history, communication, teaching, canoeing, and hiking to support the Preserve and its efforts to protect the river.

The Preserve offers a diverse range of volunteer opportunities structured around seven teams, as described below.

- Volunteer Naturalist Team: Volunteer Naturalists provide visitor services that improve the quality of experience enjoyed by guests at the Preserve. The primary mission of the Volunteer Naturalists is to staff the Visitor Center, and each commits to a minimum of four hours each month on weekends. Leading guided tours is the next priority for this team. Approximately 500 visitors annually attend the guided tours, which include photo walks, nature walks, and paddling trips. Other tasks that the Volunteer Naturalists assist with include roving the trails to be available to answer visitors' questions or participating in special projects, such as landscaping around the Visitor Center. The Preserve provides training to each Volunteer Naturalist on such matters as technical information on Central Valley wildlife, plants, history, and a variety of other specific topics. The majority of Preserve volunteers are Volunteer Naturalists. Between 2000 and 2005, an average of 15 Volunteer Naturalists per year were trained. As of mid-2007 the total number of active Volunteer Naturalists was 80.

- Paddle Team: Formally established in 2001, the Paddle Team provides tours to visiting kayakers and canoers for purposes of orientation to the Preserve's waterways, testing paddle skills, and demonstrating safe boating practices. For many newcomers this opens up the natural world of the Cosumnes River and actively engages them in learning about the river environment and the Preserve's goal of protecting the river and its environs. Approximately 100 visitors participate annually in the guided paddle tours. This number is not expected to increase substantially as most people take the guided tour only once in order to familiarize themselves with the river.

The Paddle Team leaders are Volunteer Naturalists who have undergone a special paddling training session provided by Preserve staff. The Paddle Team generally guides one paddle per month on the Cosumnes River between March and October. As of 2006 the Paddling Team consisted of 14 volunteers.

- Habitat Restoration Team (HRT): The volunteers who make up this team are instrumental in protecting and restoring native habitats within the Preserve. The program consists of active volunteers who attend the workdays on a regular basis, as well as one-time volunteers. Many of the volunteers participating in the HRT are dedicated, long-term volunteers. The HRT Workdays, which began in 1988, occur twice per month.

From 1988 to 1996, HRT focused on restoration and the reintroduction of a wide variety of native plants. Between 1996 and 2007, HRT's primary emphasis shifted towards invasive plant species removal. Today, with transitions in staff and management focus, future HRT projects will contribute more directly towards implementing the Preserve's Management Plan, including research and biological monitoring. Currently, this team has approximately 40 active volunteers. HRT workday participation levels range from 6 to 20 people, with about half being one-time volunteers.

"Volunteering" – Photo courtesy of Preserve Photo Library

Within the HRT is a cadre of volunteers known as "Hard Corps," some of whom have been coming to the Preserve for more than 15 years. The Hard Corps not only implement projects but also play a critical role in training, recruiting, and supervising new volunteers. Additionally, they leverage their skills and experience through a number of other volunteer groups, including high school and college students, various youth groups, and the Sheriff's work crews. The Hard Corps maintain a consistently high level of experience and knowledge.

The Habitat Restoration Team has noticed that restoration practices have evolved from hand planting to natural process restoration, whereby the reintroduction of flooding is used to restore the habitat. This approach requires fewer and more highly skilled volunteers. Invasive species management also requires smaller numbers of highly skilled volunteers to achieve control objectives and minimize negative impacts. Training volunteers to give them the necessary skills—and retaining those volunteers—will be an ongoing challenge for the Preserve.

- Biological Inventory Team (BIT): This team conducts monitoring of three wildlife taxa (butterflies, wood ducks, and birds) on the Preserve. The general public is invited to participate in these programs, which serve to introduce those who have no prior experience in the methodology of scientific monitoring.

  Butterfly Count: The annual butterfly count is part of an ongoing program of the North American Butterfly Association (NABA) to census the butterflies of North America. The butterfly count has been consistently conducted at the Preserve in late June on an annual basis since 1993. The number of volunteers participating in the butterfly count fluctuates yearly, ranging from 5 to 27. The volunteers are comprised of several regulars, professional scientists, and a mix of interested individuals, which include students, teachers, and retirees.

  Bird Counts: Volunteers whose experience ranges from novice to expert birder conduct set transect counts on four different Preserve-managed parcels each month. The total number of bird species counted varies depending upon the season and water conditions and typically ranges from 65 to 95 species. While two of the four bird surveys are open to the public (*), the other two are not advertised to the general public in order to avoid excessive trampling of habitat. Specific dates and times for the public bird surveys are listed on the Preserve's website, and generally follow this monthly schedule:

  First week: Lost Slough
  Second week: Tall Forest Walk *
  Third week: Willow Slough on the River Walk *
  Fourth week: McFarland-Orr Ranch

  The Lost Slough bird counts are usually conducted by only one person, as a matter of convenience, but occasionally one or two additional volunteers provide assistance. Tall Forest surveys typically attract 3–6 participants although this varies significantly, anywhere from 1 to more than 20 participants. Willow Slough surveys attract approximately 3–7 participants each month, accruing 4,369 volunteer hours over the past 12 years (*i.e.*, an average of 364 volunteer hours per year). McFarland-Orr Ranch surveys usually have 4 or 5 volunteers who take part by invitation only, and over the past 12 years it has accrued 2,709 volunteer hours, (*i.e.*, an average of 225.75 hours per year). Overall, the number of volunteers and volunteer hours for all 4 surveys has stayed fairly consistent over the past 12 years.

  Wood Duck Team: Monitoring of wood duck (*Aix sponsa*) populations on the Preserve began in the 1980s. Today, the Preserve Wood Duck Program is associated with a statewide effort that has been supported and coordinated by the California Waterfowl Association since 1991, when the California Wood Duck Program first began. On the Preserve, six team leaders, with the assistance of other active volunteers, are responsible for monitoring 160 boxes located at various sites along the Cosumnes River from Middle Slough to McFarland-Orr Ranch. Volunteers monitor the boxes once or twice a month (depending on weather and flooding) from February

to July, usually checking each set 8–10 times per season. The team also builds, sets up, and cleans out nesting boxes; they replace about 15 boxes each year due to losses to bee infestation and disrepair.

The number of volunteers participating in the Wood Duck Team has increased over the past four or five years. If additional volunteer team leaders are trained and available, new sets of boxes could be added on the Preserve in the future.

- Howard Ranch Rancho Seco Trail Docent Project: In 2006 a new trail was opened on the Rancho Seco property and with it, a new program began to train docents to lead vernal pool tours. Vernal pool docents lead public tours along the trail every Saturday from mid-March to mid-May. Special training on the ecology of vernal pools is provided to the volunteer docents in conjunction with the Jepson Prairie Docent Training program. The training includes hands-on field experience and technical information on invertebrates, plants, soils, etc.

Sometimes third-party organizations are interested in managing a volunteer-based activity at the Preserve. In these instances, the organizations obtain permission from the Preserve before beginning work. However, the Preserve does not contribute any staff or financial resources to these efforts. Two such volunteer efforts are:

- Annual Christmas Bird Count (CBC): The CBC is a one-day count that has occurred at the Preserve every year (except 1996) since 1995. Birds are counted within a 24-hour period and the objective is to document all bird species and abundance, thereby providing a one-day snapshot of birds present in the winter. The count usually takes place between December 18th and January 5th. Over the past 10 years, the number of participants each year has remained fairly consistent, ranging between 54 and 79 people. Because this volunteer effort is staffed by birdwatchers who are not necessarily biologists, sampling efforts can vary; therefore, it is not considered a standardized scientific study. Data is compiled and sent to the Audubon Society.

- Bird Nest Box Monitoring: Volunteers take an active role in managing and monitoring bird nest boxes for western blue birds (*Sialia mexicana*) and tree swallows (*Tachycineta bicolor*), although few bluebirds have ever been documented in the boxes. Today, most boxes are utilized exclusively by tree swallows. Nest box monitoring began in 2003 and is currently an ongoing effort largely implemented by Preserve volunteers. Sixty-seven boxes are visited weekly or bi-weekly from March to August. This effort is part of a larger effort, the Golondrinas de las Americas, a community of biologists dedicated to studying tree swallows and their tropical nearest relatives from Alaska to Argentina. They combine detailed studies of the breeding biology of the birds with standardized sampling of the swallows' aerial insect prey.

ONE-TIME VOLUNTEERS

The Spring Work Day Extravaganza occurs annually in April and draws an average of 50 one-time volunteers each year. Started in 1996 as a bi-annual event that took place in the spring and fall, it has been an annual event, occurring in the spring only, since 2001. Volunteers, many of

whom are local residents, complete numerous work projects at the Preserve, including planting and landscaping, painting, trail maintenance, invasive species removal, McFarland-Orr Ranch renovation, and bird surveys for children.

Other one-time volunteer activities occur occasionally. For example, in 2005 the California Native Plant Society (three or four volunteers) and Preserve staff participated in a one-time monitoring effort, surveying two properties, Schneider Ranch and Howard Ranch, for rare vernal pool plant species.

VOLUNTEER RECRUITMENT

The Preserve Volunteer Coordinator uses a variety of methods to recruit new volunteers:

- Advertisements in local newspapers
- Notices on the Preserve website
- Outreach during special events (usually held at locations other than the Preserve)
- Contact at the Visitor Center with interested members of the public

The best tool for recruiting new volunteers, however, seems to be through "veteran" volunteers encouraging friends or co-workers whom they think might be interested in volunteering at the Preserve.

Individuals from the general public who are interested in learning more about volunteer opportunities are asked to complete a "Volunteer Interest Form." Preserve staff then contact interested individuals and share information about the Preserve. Once an arrangement is reached, all volunteers are required to fill out a Volunteer Agreement Form. Volunteer Naturalists sign an Annual Commitment Form each January.

Continual attraction of new volunteers to the Preserve is needed to deal with normal attrition and transition among volunteers. This will be an ongoing challenge. Preserve staff have suggested utilizing an Ameri-Corp volunteer, college intern, or similar person to assist the Volunteer Coordinator with this and other tasks.

"Restoration – Volunteers" – Photo courtesy of Preserve Photo Library

VOLUNTEER RETENTION

In the future, Preserve staff may need to rely on volunteers to perform stewardship work to a greater degree than they have in the past. This will likely mean that an increased skill or knowledge level will be needed. Experience is the best way to train volunteers and to ensure they have the necessary skills to help in a productive way. After making the investment in training the volunteers, it will become increasingly important to

retain skilled volunteers. To accomplish this, the management actions listed at the end of this chapter recommend an increased emphasis on the provision of incentives and rewards for volunteers, in order to increase their "job" satisfaction and to increase retention levels. Volunteers are important community and organizational assets and Preserve staff should strive to make the best use of their time and commitment by trying to ensure the best fit between the volunteer, their volunteer activities, and the Preserve.

One important future challenge facing the Preserve is to accurately document the many contributions provided by the volunteers. Key baseline information about volunteer contributions is currently estimated rather than based on hard data. This is problematic when applying for grants that contain volunteer requirements or allow volunteer hours to be counted as in-kind contributions.

5.2.2 Use Levels and Trends

Existing trends indicate that staffing levels at the Preserve will remain stagnant or decline, while the need for active land management and stewardship will increase. As population increases in the greater Sacramento Metropolitan region, the pool of potential visitors to the Preserve will correspondingly increase. Given these trends, the demand for the visitor and stewardship services that volunteers provide is also likely to increase in the future.

Socioeconomic trends on the national, state, and local level may influence the number of volunteers the Preserve is able to recruit and retain. Volunteering is an essential component of the attitude, spirit, and willingness of Americans to help others and a key indicator of what is called a community's "social capital." Establishing and building social relationships across boundaries of economic, geographic, and racial/ethnic differences will be an ongoing challenge for the Preserve, especially considering local demographic factors.

STAFF RESOURCES

The Preserve's Volunteer Program is currently supported by several staff. The most critical position is the Volunteer Coordinator position, created in 1996, and currently staffed by an employee from the Sacramento County Regional Parks Department. The Volunteer Coordinator's role is to maintain and grow an active volunteer program at the Preserve, to facilitate the operation of the Visitor Center, and to support recreation, education and restoration activities. The Volunteer Coordinator oversees the recruitment, training, and deployment of volunteers. Other staff at the Preserve contribute anywhere from 10 percent to 40 percent of their time to support volunteer activities.

Most of the financial support for the Preserve's Volunteer Program is dedicated to funding the Volunteer Coordinator's position. Sacramento County funds the Volunteer Coordinator position with revenue from the sale of organic rice from fields that are managed by the Preserve on behalf of the County. The amount of funds available varies, depending on the rice crop quantity and the current price of rice leases for the property. There is always a concern that receipts from the future rice crops may not be sufficient to fully fund the County's staff position at the Preserve, especially given the uncertainty of both labor costs of staff and prices for rice leases. It will be beneficial to secure a more permanent source of funding for the Program in the future.

Current and possibly future limited budget and staff resources will likely place a practical constraint on expansion of the number of new volunteer programs on the Preserve. Volunteers are not free; staff time and resources are needed to create an infrastructure that can recruit, place, and manage prospective volunteers. Staff effort is needed to ensure that volunteers enjoy their experience at the Preserve so they will continue to return. Additional staff support (*i.e.*, in addition to current levels) will likely be needed to support the Volunteer Program in the future. Preserve staff have indicated that one full-time employee is desired to manage the volunteers for the Habitat Restoration Team.

To some extent, use of volunteer labor can help ease staff shortages. One key to success will be for Preserve staff to retain flexibility to ramp up and ramp down the number of active volunteers and the number and type of projects they support. Overall, the Preserve's staffing and its financial resources to support the volunteer program are highly constrained. It is possible that the Preserve will lack the staff and finances required to accommodate future anticipated increases in demand.

5.2.3 Programmatic Overlaps

The Preserve's Volunteer Program has a close relationship with the Preserve's Education Program via shared responsibilities among staff and volunteers. The Preserve's Volunteer Coordinator assists with the Education Program's teacher training, outreach at special events, and other duties. Outreach during special events serves the dual purposes of providing education to the public while simultaneously attracting potential volunteers to the Preserve. Another example of the interrelationship between the two programs is that students who participate in school field trips at the Preserve sometimes volunteer at the Preserve later in their lives.

A similar overlap in programs exists between the Recreation Program and the Volunteer Program. Volunteer Naturalists are tasked with enriching the visitor's experience at the Preserve by staffing the Visitor Center and providing guided walks. Conversely, visitors who have a positive experience at the Preserve may someday volunteer at the Preserve to assist with stewardship activities.

5.3 PUBLIC USE: RESEARCH

The Preserve has long advocated, supported, and conducted basic, as well as practical, scientific research because sound scientific information is essential to the management of the Preserve. Research is typically conducted by visiting researchers from academic institutions who utilize the Cosumnes River, its associated floodplain, and upland ecosystems as a living laboratory. The Preserve benefits from scientific research in numerous ways, including:

- New scientific research and adaptive management techniques that improve Preserve staff's technical know-how and ability to achieve even more success in restoration and management efforts.
- Cross-fertilization of ideas occurs between the Preserve's land-management staff involved in day-to-day operations and the diverse research community.

5.3.1 Cooperative Partners

Between the years 2001 and 2006, over 90 researchers representing 18 institutions conducted research at the Preserve (Table 5.1). Partnerships with these 18 institutions and other similar institutions are critical to the future success of the Preserve. Given the complexity of managing habitat for the numerous species that occupy the Preserve in an adaptive management context, it is important for the Preserve's scientists and other staff to keep updated on new scientific research and conceptual models. This is best accomplished by maintaining close relationships and partnerships with the research institutions. Additionally, these research institutions conduct research onsite, which increases the level of certainty that the results will be directly applicable to the Preserve's ecosystems. Chapter 8 discusses the importance of cooperative partnerships such as those between the Preserve and research institutions in more detail.

TABLE 5.1: INSTITUTIONS THAT HAVE CONDUCTED RESEARCH AT THE PRESERVE

California Energy Commission	Natural History Museum of Los Angeles
California Archaeological Site Stewardship	Sacramento Valley Conservancy
CRP – Volunteer Naturalist	Stanford University
California State University Sacramento	Towill, Inc.
California Department of Fish & Game	UC Berkeley
Estep Environmental Consulting	UC Davis
H.A.R.T. Inc.	US Geological Survey
May Consulting	US Fish and Wildlife Service
Point Reyes Bird Observatory (PRBO)	USDA/Agricultural Research Service (ARS)

The UC Davis Center for Watershed Sciences is the most active institution conducting research at the Preserve. The Center obtained grants to support two phases of research, the first of which, called Cosumnes I, focused primarily on the relationship between hydrologic conditions and aquatic ecosystems. The second phase, Cosumnes II, built on this earlier work but emphasized the influence of flood regimes and vegetative and geomorphic structures on the links between

aquatic and terrestrial systems. The results of these studies may be viewed on their website. This research is applicable to CALFED restoration and watershed monitoring strategies.

Research projects are conducted by scientists at various stages of professional development. These include high school students, undergraduates, graduate students, professional scientists, and public agency personnel. Research activities are mostly extramurally funded.

5.3.2 Types of Research Projects

Studies conducted at the Preserve generally fall into either a short-term or long-term timeline. Short-term studies are typically conducted by an individual or small group for one-to-three-year projects, such as those conducted by graduate students for completion of a thesis or dissertation. Long-term studies are typically conducted with support from an institution, such as the Point Reyes Bird Observatory (PRBO) or UC Davis, and may require access to specific permanent vegetation productivity plots, mapped forest stands, etc. Long-term studies can preclude the use of some land for other uses, potentially for a very long time. The Preserve's permit process tracks the geographic locations of long-term studies so that future researchers studying that land can find out where the previous studies have been conducted, as well as what associated historical data may be available. Markers for the research sites may also be required.

Two types of research projects are conducted on Preserve properties:

- Non-manipulative projects in which the basic ecosystem is not modified to suit the purposes of the researcher. The most common type of non-manipulative research is population- and community-level monitoring that provides baseline data and ongoing information about the ecosystems, plant and animal populations, and community relationships. Monitoring enables managers to detect changes in populations, communities, and community processes and to document impacts or threats. Future monitoring needs are described in Chapter 3.
- Manipulative studies are usually directly related to management treatments (*e.g.*, grazing, hydrologic manipulations, prescribed burning, etc.). Manipulative uses of the land may preclude other future ecological or genetic studies. Specific recommendations to reduce conflicts regarding manipulation of sites for research are provided below.

"Fish Monitoring" – Photo courtesy of Preserve Photo Library

In 2006 there were 23 research and/or monitoring projects conducted on Preserve properties, 5 of which were new projects. Preserve staff and volunteers led 9 of the 23 projects and collaborated on 2 additional projects with UC Davis. UC Davis led 4 of the 23 projects (Table 5.2). In addition to the two they collaborated on with the Preserve, they also collaborated on one with the Audubon Society, bringing their total to seven projects during the year 2006. Approximately 15 of the existing Preserve projects continued in 2007.

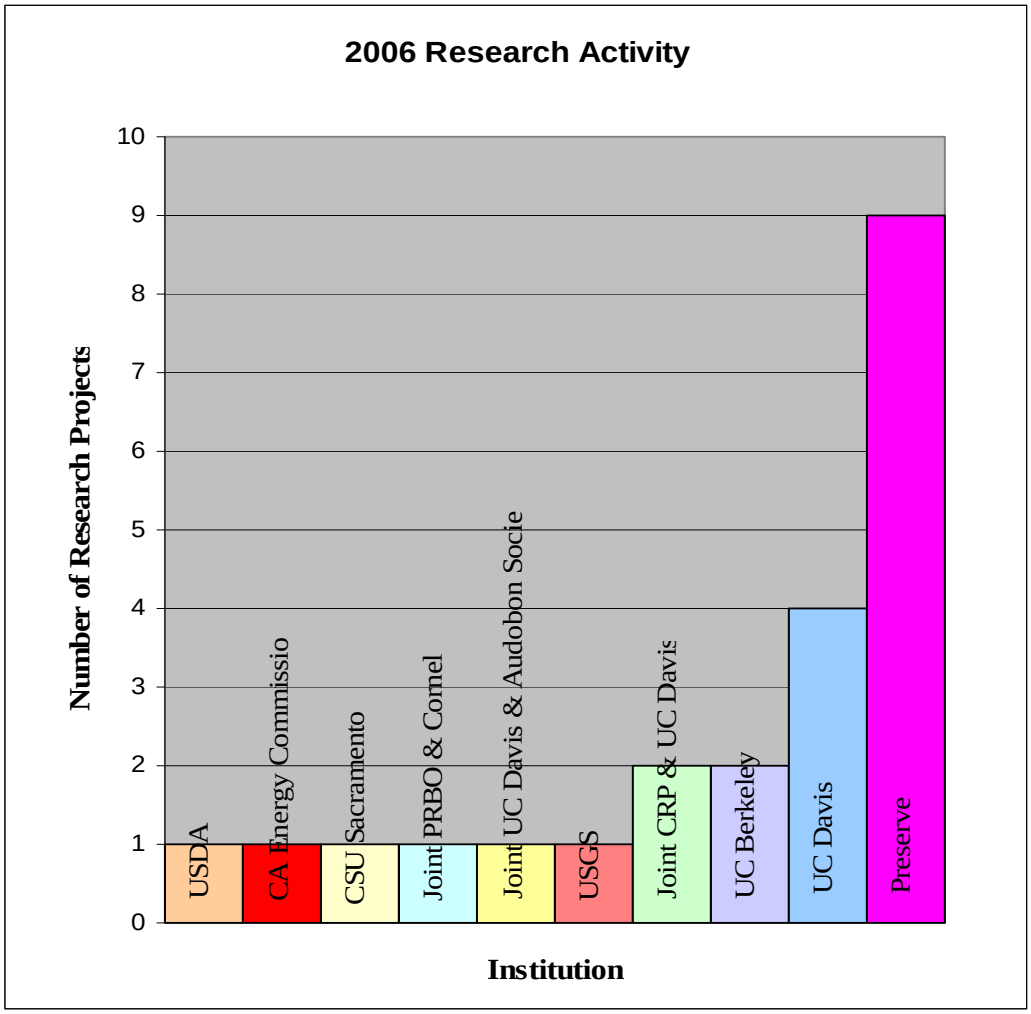
During 2006, research at the Preserve covered an extensive range of topics, including species monitoring, bird dispersal, chemical content of a plant, effects of grazing, effects of fire, native bees, mercury, and many more.

5.3.3 Preserve Permit Process

Permission to enter Preserve properties not open to the public is granted via a permit process used to track researchers, the nature of proposed research, and its impact on other current research projects. Permits are issued consistent with the following Preserve documents and policies:

- Researcher Guidelines
- Access Permit
- Access Protocol
- Collection Permit
- Release Form

TABLE 5.2: INSTITUTIONS LEADING RESEARCH AT THE PRESERVE



Permission to enter is limited to the person, hours, and location as designated on the permit. Permittees are also required to read and sign the Preserve's Release of Liability. As part of the permitting process, researchers are required to submit a brief written research proposal for all studies conducted on Preserve properties. Proof of federal and state permits is often required at the time of Preserve permit application. Researchers are required to submit annual reports of their research findings and provide copies of any data collected on the Preserve.

Access to Preserve property may be granted, denied, or restricted at any time by the Preserve Manager or designated representative for any reason.

5.3.4 Resources for Research

"Installation 001" – Photo courtesy of Preserve Photo Library

Currently, the Preserve's resources to support external research efforts are very limited and consist of tracking researchers via the permit process and associated databases. Preserve staff have expressed an interest in the future development of a research institute to be located at the Preserve and affiliated with an academic organization to generate productive learning. Options include a Long-Term Ecological Research (LTER) site or a UC Natural Reserve site. This item is addressed in Management Action 3.1.1. Sometimes a Preserve Partner may collaborate on a specific project with research institutions and may provide staff time or equipment towards the research.

5.3.5 Research and Monitoring Needs

During the planning process for this Management Plan, the Preserve Partners identified research and monitoring needs based on identified goals and objectives. These needs frame long-term questions that the Preserve Partners would like to have answered and that are intended to help the Preserve in the following ways:

- Direct the research efforts on the Preserve and guide future proposals.
- Serve as a basis for developing collaborative research proposals between Partners and other institutions that can be submitted to a variety of funding sources.

Ideally, researchers will integrate these identified needs with proposed projects. Studies pertinent to a national, regional, or local conservation issue are desirable. Research of unique areas, species, etc., that could not be done effectively elsewhere will be considered as well.

5.4 PUBLIC USE: EDUCATION AND OUTREACH PROGRAM

5.4.1 Existing Conditions and User Groups

The intent of the Preserve's Education and Outreach Program is to share information with the public regarding:

- The mission of the Preserve itself and the role the Preserve plays in the larger region.
- The importance of biodiversity (both aquatic and terrestrial).
- The important role that citizens play in land stewardship.
- The mission of the agencies and organizations that built and support (in perpetuity) the Preserve.

Due to its natural setting, the Preserve offers unique outdoor education opportunities for all visitors, including the general public, various user groups, and students of all ages. Education Programs occur on those parcels that are open to the public (approximately 500 acres), including the McFarland-Orr Ranch.

The Preserve's overall Education and Outreach Program consists of five distinct sub-programs:

- K–12th Grade Education
- Higher Education
- Informal Education
- Adult Education
- Stewardship Outreach

K–12TH GRADE EDUCATION

The Preserve's K–12th Grade Education Program began in the early 1990s and currently achieves the following:

- Provides teacher and student informational resources about the Cosumnes Watershed.
- Provides teacher training and staff development for more than 100 teachers annually.
- Prepares students and teachers for field trips through classroom presentations.
- Directs field trip activities for more than 6,000 youth visiting the Preserve annually.
- Coordinates service learning projects that support stewardship, restoration, and monitoring for K–12 students.

The Preserve's K–12th Grade Education Program has gained state and national recognition. It has been featured in a State-adopted 4th-grade Social Studies textbook published by National Geographic and featured on several TV and radio programs.

Many school districts in the region utilize the Preserve's K–12th Grade Education Program. During the 2005/2006 and 2006/2007 school years, classes from 10 districts, including elementary, middle, and high schools, visited the Preserve (Table 5.3). Additionally, several private and home schools participated in Preserve education programs. Most field trips occur

during the school day; however an increasing number of after school programs are beginning to utilize the Preserve as a field trip destination.

TABLE 5.3: SCHOOL DISTRICTS UTILIZING CRP'S EDUCATION PROGRAM

School District	Number of Schools in District
Arcohe Union Elementary School District (K–8)	1
Elk Grove Unified School District (K–12)	63
Escalon Unified School District (K–12)	7
Galt Joint Union Elementary School District (K–8)	7
Galt Joint Union High School District (9–12)	2
Lincoln Unified School District (K–12)	12
New Hope Elementary School District (K–8)	1
Oak View Union Elementary School District (K–8)	1
Sacramento City Unified School District (K–12)	90
Stockton Unified School District(K–12)	57

Galt Joint Union Elementary School District (GJUESD) has the highest student involvement due to its proximity to the Preserve and its early collaboration with TNC in 1993 to develop an education program at the Preserve. The Preserve's Education Coordinator is also a GJUESD employee who serves as district Service Learning Coordinator, actively recruiting teachers within the GJUESD to participate in field trips and restoration projects. Beginning in 2000 and continuing through 2007, the GJUESD has taken a significant role in funding the Preserve's Education Program. Given the small size of the GJUESD, both in terms of the number of students and the financial resources, it will be important in future years for GJUESD to share costs associated with its support of the Preserve with the many other school districts throughout the region that utilize the Preserve.

An increasing number of field trips are being scheduled from Elk Grove Unified School District (EGUSD), one of the largest districts in the state with a population exceeding 60,000 students. The EGUSD has supported the Education Program to a limited extent through the coordination of teacher workshops.

The majority of the students taking part in the Education Program are in elementary grades, likely due to the self-contained classroom setting and the logistics of field trip planning. High school students also participate in the Preserve's Education Program, during events such as HRT Workdays or the Spring Extravaganza where they can earn extra credit or accumulate community service hours. Agriculture students from several high schools have been active at the McFarland-Orr Ranch.

Students visit the Preserve throughout the year and activities vary seasonally. Both the Preserve and McFarland-Orr Ranch experience the highest student use in fall and spring. In addition to trail hikes and wildlife viewing, fall activities include acorn collecting at the Preserve and the McFarland-Orr Ranch Pumpkin Patch. Winter activities include acorn planting and wetland and grassland restoration. Fall and winter field trips offer the best opportunities for sandhill crane

and waterfowl viewing. In spring, students participate in the McFarland-Orr Ranch Pioneer Days and they participate in the Preserve's duck egg rescue and butterfly census. An increasing number of students are expected to use the Howard Ranch trail in spring. The number of students visiting fluctuates with variations in weather and the availability of restoration projects.

The Preserve's K–12 Education Program provides a critical service to an underserved, minority, and low-income student population. The student population in the local area reflects the wide range of languages, socioeconomic status, and cultural diversity. For example, in Galt schools, 50 percent of the students are low income and qualify for free or reduced-fee lunches; 29 percent are English language learners; and 50 percent are Hispanic. Students visiting the Preserve from urban and suburban areas of Sacramento and Stockton speak more than 30 languages and represent multiple ethnicities. Although there are no special programs for disabled or minority students at the Preserve, and students with special needs are not tracked, the parking lot, Visitor Center, and certain trails are accessible to mobility-impaired students and other visitors. More funding would be needed to pursue opportunities for students with special needs. These socio-economic statistics illustrate both the complexity of the task to provide education to this diverse community and the importance of this type of outdoor education, which the students would otherwise not receive.

"Boardwalk Class" – Photo courtesy of Preserve Photo Library

Curriculum: The Preserve's K–12th Grade Curriculum Resources provide teachers with pre-visit, site visit, and post-visit activities. Curriculum guides are available on the Preserve's website for primary, intermediate, and secondary grades. At the workshops teachers are provided with additional information about appropriate curriculum for teaching environmental studies, including materials from the International Crane Foundation, Project Wild, California Waterfowl Association, DFG, Project Wet, Splash, and others.

Field Trips: The Education Coordinator works with teachers prior to a field trip to provide investigations and preparation that will enhance the time on the trails. During the 2006/2007 school year (September to June), 62 field trips were conducted at the Preserve and McFarland-Orr Ranch, accommodating a total of 3,944 students. Field trips have an average of 59 students per trip. A majority of these field trips were for elementary students; although five of the field trips were for college classes.

Service Learning: Service learning is a teaching and learning strategy whereby students are engaged in thoughtfully organized service that:

- Is integrated into and enhances the academic curriculum.
- Is coordinated with community partners and meets the needs of the community.

- Helps foster civic responsibility.
- Provides structured time for students to reflect on the service experience.

Through service learning, students at the Preserve are able to apply what they have learned in their science, social studies, mathematics, and environmental studies classes to stewardship activities.

Involvement: Parents and family members also take part in field trips and service learning projects. Parents join their school-age children as both chaperones and assistant educators. To prepare the parents, the Education Coordinator trains them or sends written information home for them to read prior to the field trip. The parents are expected to be knowledgeable about the Preserve, to actively support the teacher, and to engage the students. At McFarland-Orr Ranch, parent involvement is critical as the parents lead group activities and assist with instruction. Teachers, school administrators, board members, and other school staff are involved in the Preserve's Education Program; supporting policies that allow students to visit the Preserve and helping to build support for service learning.

Other community representatives involved in service learning include:

- Non-faith-based community organizations
- Faith-based organizations
- Private, non-profit K–12th schools
- Public agencies
- Businesses
- AmeriCorps members
- Seniors and Youth Engaged in Service
- Other senior citizens
- Legislators and community officials

Teacher Workshops/Presentations: Since 1995 all school teachers who participate in the Preserve's K–12th Grade Education Program are required to attend the Preserve's teacher workshop. The Preserve's Education Coordinator and Volunteer Coordinator are the instructors, providing a minimum of four annual teacher workshops (two in fall and two in spring) at the Visitor Center and at the McFarland-Orr Ranch.

The Preserve also provides all-day teacher workshops for Project Wet, Project Wild, Wild About Wetlands, Bay and Delta studies, World Water Monitoring Day, and Crane-specific Programs. The DFG sponsors Project Wet and Project Wild and the California Waterfowl Association sponsors the Wild about Wetlands workshops. In conjunction with the Preserve's Education Coordinator and Volunteer Coordinator, these program organizations lead the instruction and provide materials and supplies. The International Crane Foundation provides the extensive crane curriculum and the DFG provides the Crane Kits.

School Programs: The Education Coordinator provides various presentations at the schools, including assembly-type programs and classroom visits. Programs include information about wildlife, field trip preparation, expectations, and trail etiquette.

Preserve staff also support school teachers during service learning and restoration projects, and provide supervision and tools for specific projects while schools provide the manpower.

Teacher Resources: Resources are provided to teachers during the Preserve's Teacher Workshops and resources typically include a Teacher Activity Guide and logistical information. Other resources provided by the Preserve for teachers are "kits" available for check-out: Crane Kits (includes feathers, bones, and information on crane behavior) and Wetland Kits (includes bird skulls, bird eggs, and bird beaks to complement an extensive curriculum on migration, habitat, and the food chain). These kits are provided through a partnership with other organizations or agencies. While the kits are extraordinary, they are underutilized.

The continual development and/or distribution of high-quality, Preserve-specific educational and outreach resources and materials, given the Preserve's limited resources, is an ongoing challenge. In the future teacher resource materials available for distribution may include:

- Traveling Preserve Kit (pressed oak leaves, acorns, artifacts, feathers, bones, seeds, and information about invasive species).
- PowerPoint presentations on migratory birds, common birds, flooding, and seasonal changes.
- Wildlife-friendly farming curriculum, which is currently available through the Rice Growers Association.
- The California Native Plant Society and Mosquito Abatement curriculums, which are currently available.

Teaching Facilities: The Preserve has no facilities specifically designated for formal instruction, although approximately 30 primary or 15 middle school students can sit on the floor at one time in the Exhibit Hall at the Visitor Center. The outdoor trails provide exceptional opportunities for observation and interpretation, but additional facilities are needed to take full advantage of the Preserve as a premier learning destination.

Transportation: Students are transported from school to the Preserve mainly by school buses, although personal vehicles are occasionally used to save money.

McFarland-Orr Ranch: The McFarland Living History Ranch (McFarland-Orr Ranch) is located on the Preserve on property owned by Sacramento County and leased to the Galt Area Historical Society. School groups have been visiting this Ranch since 2000.

All activities and renovations at the McFarland-Orr Ranch are accomplished through the efforts of volunteers, including school and church groups, scout troops, and local service clubs. Students have participated in a number of service learning projects, including the construction of the bunkhouse, the rebuilding of the chicken house, and numerous landscape, irrigation and tree planning projects. The restoration of the historic 1870s Victorian ranch house is an enormous accomplishment and is nearing completion. The Pioneer Days and Pumpkin Patch events held in the spring and fall, respectively, attract thousands of students and the general public. The McFarland Living History Ranch Program is expected to continue to expand and draw students and teachers from throughout the region.

The McFarland-Orr Ranch provides an area for Scout troop activities and FFA livestock demonstrations. It is also the site for several large public events, including the Antique Engine and Tractor Show, Old Car Show, the Kite Festival, and Native American programs. The current teaching facilities at the McFarland-Orr Ranch are limited to outdoor areas, but in time the Victorian home and some of the outbuildings may provide room for an entire class. The Master Plan for the McFarland Living History Ranch proposes a future Visitor Center.

Currently, the Preserve's Education Coordinator also coordinates the education programs at McFarland-Orr Ranch; however a full-time education coordinator focused on the McFarland-Orr Ranch (*i.e.*, separate from Preserve's Education Coordinator) is needed.

Use Level and Trends (K–12th): During the last seven years, the growth of the Preserve's Education Program has been significant. In 1999 fewer than 400 students were involved in service learning projects at the Preserve. Over each of the last seven years, more than 3,000 students from GJUESD alone have participated in high quality service learning projects at the Preserve. Although only the number of Galt students was accurately tracked over the past decade, it is estimated that annually 6,000 students from Galt, Sacramento, Stockton, and the surrounding region visited the Preserve to participate in education and restoration projects.

"Boy with Binoculars" – Photo courtesy of Preserve Photo Library

Currently, the demand for field trips exceeds the staff capacity. No additional Preserve staff are available to lead activities. Teachers lead tours with the help of parents, but with such large classes (60–90 students out on the trail at one time), the students located in the rear of the group often have difficulty hearing and seeing during the tour. To increase the quality of the field trip and allow for smaller group interaction, a higher volunteer-to-student ratio is necessary.

HIGHER EDUCATION PROGRAM

The Preserve also offers guided field tours and research opportunities to college students. College classes that have visited the Preserve on field trips typically originate from the following local colleges:

- University of the Pacific (UOP)
- University of California, Davis (UCD)
- American River College (ARC)
- Cosumnes River College (CRC)
- Sacramento City College
- Sacramento State University
- Delta College

A college may send several different classes to the Preserve for field tours supporting student course work in environmental science, geology, geography, and water resources. Field tour topics typically include restoration design, land management, floodplains, land use, wetlands management, Staten Island, and birds. The number of classes, students, and professors has not been specifically tracked; however, a trend of increased interest (increased number of students and tours) in college tours has been noted by staff.

INFORMAL (NON-SCHOOL-BASED) EDUCATION

This program involves outdoor groups that are not school-based, including Girl Scouts, Boy Scouts, Eagle Scouts, FFA, and 4-H. These groups usually participate on regular HRT Work Days or come to the Preserve to visit the Visitor Center and hike the trails. After contacting the Volunteer Coordinator for a list of potential projects, many Eagle Scouts get involved in individual projects (*e.g.*, maintenance, facilities, etc.) under the supervision of the Preserve's Site Coordinator. In the future it is likely that more Scouts will visit the McFarland-Orr Ranch with the completion of the youth activities and campout area. Although the number of groups, leaders, or Scouts visiting the Preserve is not specifically tracked, several troops visit on an annual basis.

ADULT EDUCATION

Since 2004, the Preserve has hosted adult education classes in conjunction with Galt Elementary and Galt High School Districts. Adult English-language learners attend evening classes with multiple components often linking science and language skills. For example, in the Crane Program, adult students practice literacy and English language, focusing on crane and wetland vocabulary words, as they learn about their environment and about service learning opportunities. The number of students fluctuates, depending on grant funding. In 2007, the number of schools participating decreased from four to two, yet the student demand for these classes exceeds funding and staff capacity.

Seasonal Employee Program: This program began in 1999 and typically employs recent college graduates with B.S. degrees. Hired as full-time, short-term employees by TNC, these seasonal workers are paid an hourly wage as they gain experience in the field of conservation science. Seasonal employees typically begin work in April and continue until the end of September. TNC tracks the number of seasonal employees and over the past nine years, TNC has hired a cumulative total of 30 seasonal employees. Seasonal employees often go on to pursue an advanced degree or other types of work. The purposes of the Preserve's Seasonal Employee program are numerous:

- Allow young professionals an opportunity to gain valuable work experience.
- Learn about Preserve Partners and operations.
- Learn about the Preserve's flora and fauna.
- Foster the next generation of conservation scientists.
- Conduct scientific monitoring in accordance with the Preserve's Monitoring Plan.

The seasonal employees conduct research and monitoring on a variety of subjects, including grazing, native vegetation, invasive plants, vernal pools, and prescribed burning. In the past,

TNC has supported (paid) these employees utilizing a variety of private funding sources, including foundation grants. If TNC, or any of the other Partners, were to secure permanent funding for the seasonal employee program, it would enable the Preserve to continue to provide mentoring and training to future professional biologists.

Tours: Specialized tours of the Preserve are offered upon reservation. Nine tours of the Preserve were provided to agencies and non-profit organizations between September 2006 and June 2007. Past tour groups included Bay Nature, Elkhorn Slough Reserve, Audubon Society, Wildlife Society, The Bay Institute, California State Parks, and the Contra Costa Hiking Club, among others.

Enrichment Programs: The Preserve currently hosts enrichment presentations for the volunteers and teachers. In the past these programs have included:

- Bat Night, held in August 2007
- Mountain lion information, held in March 2007
- Duck Days (California Waterfowl Association presented information on wood ducks)
- Crane workshops (held for teachers only)

The Preserve would like to increase the level of the public's understanding of basic physical and biological science. An action item has been included in this Management Plan to actively promote these types of enrichment presentations.

STEWARDSHIP OUTREACH

Stewardship outreach consists of presentations, Preserve-hosted public events, off-site outreach events, and written material such as brochures, newspaper and magazine articles.

Presentations: Preserve staff members give presentations to community groups, such as the National Wild Turkey Federation and the Audubon Society, among others, to provide information about the impacts of public access and the need for increased stewardship.

Preserve-Hosted Public Events: Several times a year, the Preserve invites the general public to the Preserve to actively participate in special events designed to draw a large number of visitors for a single day. The Preserve and the McFarland-Orr Ranch hosted nine events between September 2006 and June 2007. The special events held at the Preserve (proper) include:

- Spring Extravaganza
- Salmon Fest Schools Day
- Lodi Crane Festival
- Anniversary Festival
- Howard Ranch Trail Grand Opening (one-time event)
- Nature Bowl (a cooperative team competition for local 3rd–6th graders)

Special events held in the past at the McFarland-Orr Ranch include:

- McFarland Ranch Old Car Show
- McFarland Ranch Fall Festival
- McFarland Ranch Concert
- McFarland Ranch Craft Fair
- McFarland Ranch Antique Engine & Tractor Show
- McFarland Ranch Pumpkin Patch

Off-site Outreach Events: Preserve staff participates in events hosted at off-site locations to distribute outreach materials and to interact with the general public, as well as to recruit potential volunteers. A booth staffed by Volunteer Naturalists is typically set up and stocked with brochures and other outreach materials. Preserve staff participated in six off-site public outreach events between September 2006 and June 2007. Outreach events that Preserve staff and volunteers have participated in include:

- Earthfest at Sacramento Zoo
- Wings of Spring at the Sacramento Zoo
- Walk on the Wildside at the Beach Lake Preserve
- Migration Celebration at the Micke Grove Zoo in Lodi
- Salmon Festival
- Sandhill Crane Festival

Written Outreach Materials: The Preserve website posts a variety of the Preserve's written outreach materials. Brochures are also available at the Visitor Center. A variety of magazine and newspaper articles have been written about the Preserve, providing public information. The most prominent recent article was published in *Bay Nature Magazine* (January/March 2006) entitled, "Dance of the Cranes: Winter Revels Along the Cosumnes."

5.4.2 Use Levels and Trends

California's public education system is immense: more than 6 million students in more than 9,500 schools and programs that are provided by the County Offices of Education (COEs). The State's residents have high expectations for public schools, but school districts have limited resources with which to reach those expectations. Locally, population growth in the greater Sacramento Metropolitan region results in increasing numbers of students. Additionally, the population is increasing in diversity; both in culture and language, making the task of public outreach more complex.

STAFF RESOURCES

This section describes the staff resources that are allocated to the Education and Outreach Program at the Preserve.

Existing Staff Resources: The Preserve's Education Coordinator position is staffed via a teaching position funded through the GJUESD. The Education Coordinator is the lead person for the K–12th Grade Education Program and, currently, is responsible for securing funding,

managing grants, supporting local school districts, coordinating education efforts at the McFarland-Orr Ranch, and managing the Preserve's Education Program. Since 2003, a much larger portion of the Education Coordinator's staff time has been devoted to program management at the school-district level, with more grant writing, grant budgeting, and grant reporting. Due to a reliance on grant funds, which are uncertain from year-to-year, the Coordinator must pursue school funding to support new initiatives. While grants support the Coordinator's work at the Preserve, they also entail huge responsibilities, including the following roles:

- After-school Service Learning Coordinator
- Regional Service Learning Coach
- Youth Development Coordinator through the REACH program

The following Preserve Staff also support the Education and Outreach Program:

- Volunteer Coordinator: Serves as the staff leader for the Stewardship Outreach Program, organizing general outreach and special public events, designing brochures, etc. Assists the Education Coordinator by co-leading teacher workshops, makes school field trip reservations, assists with scheduling and logistics for Higher Education restoration projects. The Preserve's Stewardship Outreach Program is funded by the Sacramento County Regional Parks Department through their funding of the Volunteer Coordinator position.
- BLM Staff: Leads college classes and field tours.
- TNC Lead Regional Ecologist: Assists with grant requests.
- TNC Restoration Ecologist: Assists with college tours for the Higher Education Program. Coordinates planting and restoration projects that are completed by students and volunteers.
- TNC Site Coordinator: Assists the Education Coordinator with service learning projects, such as acorn collection and grass planting/cutting. Larger student groups of 30–40 receive an overview of the project and lessons on proper field techniques, before dividing into smaller work groups. The current Site Coordinator offers bilingual services and is chair person of an English language program. The Site Coordinator also supervisors college students with HRT projects.

<u>Need for Additional Staff Support</u>: Educators interact with multiple students who have many needs to address on a daily basis. Over the last several years, the job responsibilities of the Education Coordinator have greatly expanded, so that now many of his duties are related to program management and administration rather than direct teaching. Also, the number of work days required to accomplish this position's duties has increased beyond that supported by the school contract.

One method to counteract this problem would be to more carefully define the Education Coordinator's responsibilities to allow him/her to focus on strategic program management items and long-term solutions such as outreach to schools, funding, development of classroom facilities, development of more specific curriculum, organization of student service learning projects, and organization of school-based and Preserve-based programs.

Ideally, instructional assistants and grant managers could be hired to assist the Education Coordinator in the future. It is anticipated that up to three full-time education staff may be needed over a 10–15 year time horizon, including a full-time Education Coordinator for the Preserve with a focus on Galt Joint Union Elementary and High School Districts, one position focused on the Elk Grove School District and the other eight Districts, and one position focused on the McFarland-Orr Ranch Project.

EXISTING FUNDING RESOURCES

The Preserve relies solely on grant funding to the GJUESD for the Education Program (K–12th Grade and Adult Education Programs). These grants come to the GJUESD through California Department of Education's CalServe initiative, Youth Service CA, and the Sierra Health Foundation. Over the past seven years (*i.e.*, from the school year 2000/2001 to 2006/2007) the Education Coordinator secured a grand total of $692,200 in funds. This represents an average of $98,885 per year. These funds have been used to pay coordinator salary and benefits and teacher stipends, provide bus transportation, purchase optical equipment and supplies, and for miscellaneous office expenses.

One drawback to relying on grants is that they are limited to covering new initiatives and do not support existing programs. Current grant funds are all related to service learning and youth development. There are no existing grant funds to support environmental education. This indicates that reliance on grants as the only source of funding for the Preserve's Education Program is problematic and a more secure funding source needs to be found. In 2006, the Program completed the second of the three-year funding cycle through the CalServe grant and was not eligible to reapply. The $50,000 grant represents about half of the annual budget for GJUESD's Service Learning Program. Further compounding the problem, several grants for the Education Program (including community learning) are available through 2009, but these will run out in 2010.

Developing a more sustainable funding source is the biggest challenge that the Education Program faces in the future. Existing grants are scheduled to expire in the 2010/2011 school year, and the Preserve is not eligible to re-apply or extend these grants. An average of $99,000 annually is needed in order to maintain the program at its current level. However, anticipated future needs of the education program will include the allocation of sufficient resources in facilities (*e.g.*, outdoor education staging area, environmental education center, office space for two new positions, etc.) and equipment (*e.g.*, microscope, computers, etc.).

INSTITUTIONAL STRUCTURE OF THE EDUCATION PROGRAM

The Preserve Partners value the involvement of youth and adults in recreation, education, restoration, and stewardship projects. Outreach to school districts and the general public is a key strategy in building community understanding and support for the Preserve and its mission. Due to differing institutional missions and philosophies that the Partner organizations have inherited, education for K–12th and college students may not be a primary consideration for many of the land-owning Partners; rather their missions stem from the pressing needs to conserve habitat and conduct basic land-management activities. Many believe that the local school districts should

support a Preserve Education Program to provide services to the traditional constituencies of the schools. This has resulted in an informal structure for the Education Program that is based upon various agreements associated with grants. Implementation of the Program has largely depended on solid working relationships among the Education Coordinator, various school districts, and the Preserve Partners. However, as the Program grows, and as the future funding situation becomes increasingly uncertain, and as transitions among staff occurs, the Preserve has identified a need to formalize the structure of the Education Program.

One proposed management action that is critical is to find a new model for the Education Program's institutional structure. The education programs at Yolo Basin Foundation have been suggested as a potential model. Yolo Basin Foundation is a 501(c)(3) with an advisory board that represents the community, business, and elected officials. They have been very successful at securing a variety of funding sources, including grants from the Intel Foundation and others. An alternative model that has been suggested is the Effie Yeaw Nature Center, a regional park operated by the County of Sacramento. Ideally, whatever model is ultimately chosen will enable shared decision-making and responsibilities among Preserve Partners and create appropriate teams of teachers, staff, students, and volunteers who can share responsibility in an equitable manner and offer support to each other. Although individual Partner organizations may not benefit directly from an education program at the Preserve; the Preserve as a whole benefits from a high-quality education program.

5.4.3 MANAGEMENT OF EDUCATION AND OUTREACH PROGRAM

The Preserve has the potential to become the leader in the field of environmental education. Existing partnerships with higher education and local school districts could lead to a first class student- and teacher-education program. To achieve this, the Preserve will need to capitalize on its existing resources, such as spectacular trails with parking access, unique ecosystems, world class birding, a multitude of opportunities for scientific research, a captivating Visitor Center, and its location only 30 minutes from downtown Sacramento. Additionally, the Preserve will need to implement the goals, objectives, and actions listed in the following section of this Plan that provide strategies and mechanisms to take advantage of future opportunities. If the Education Program grows beyond what is currently predicted in this Management Plan, or if new funding is received that allows for expansion of the Education Program, it is recommended that an Education Program Plan be developed to outline steps necessary to accommodate that growth.

"School Buses" – Photo courtesy of Preserve Photo Library

Goals, Objectives, Actions, and Monitoring

OVERARCHING GOAL II: COMPATIBLE USES IMPROVE STEWARDSHIP OF THE LANDS IN THE COSUMNES RIVER WATERSHED.

Public Use Sub-goal #1: Recreational use of the Preserve will be compatible with the Management Plan's Natural Resource Stewardship goals, will promote the teaching of environmental stewardship, and will have adequate and stable funding sources.

Recreation Objectives	Actions	Monitoring Elements
1.1 Improve tracking of visitor use.	**1.1.1** Collect, compile, and evaluate data on visitor use and experiences at the Preserve.	**1.1.1** Car counters at parking lots; metal rangers at trailheads and parking lots, Visitor Center tally sheets, activity sign-in sheets, self-registration book at boat dock, exit surveys to evaluate visitor experiences. Development and use of a single-use permit acceptable to all Preserve Partners.
	1.1.2 Determine the future recreational carrying capacity of the Preserve based on the information gathered through the recreational monitoring activities.	**1.1.2** Assess the need to add facilities (*e.g.*, buildings, trails, signs, etc.) to support the Preserve.
	1.1.3 Apply adaptive management techniques to recreation programs and facilities that may be negatively impacting natural resources.	**1.1.3** Biological monitoring (See Chapter 3).
1.2 Promote and enhance existing recreational opportunities.	**<u>General Recreation Activities</u>**	
	1.2.1 Continue to design, construct, install, and maintain interpretive signs throughout the Preserve (*e.g.*, for the wetlands area, sandhill cranes, trails, etc.) as needed.	**1.2.1** Number of interpretive signs
	1.2.2 Continue to design and distribute high quality public use/educational brochures (*e.g.*, driving tour, walking tour, paddling guide, etc.) and update them as necessary.	**1.2.2** Number and type of brochures and visitor feedback.
	1.2.3 Continue to provide safety information to visitors on current conditions (*e.g.*, floods, fires, mountain lions, etc.) within the Preserve.	**1.2.3** Content and quantity of flyers or advisories.

Recreation Objectives	Actions	Monitoring Elements
	Hiking **1.2.4** Continue to provide a minimum of 12 guided walks led by the Volunteer Naturalists per year.	**1.2.4** Number of guided walks and trail condition.
	Non-gas powered boating (including kayaking and canoeing) **1.2.5** Maintain existing paddling routes.	**1.2.5** Maintenance tasks completed on paddling routes and boat dock access; number of paddlers signed in.
	1.2.6 Maintain the existing boat dock ·	
	1.2.7 Improve coordination and scheduling with the commercial paddling companies	**1.2.7** Number of commercial paddling trips.
	1.2.8 Increase the number of commercial paddling companies program with secured permits.	**1.2.8** Number of secured permits.
	Fishing **1.2.9** Provide information about existing fishing opportunities, parking, and safety hazards (*e.g.*, mercury levels in fish).	
	Geocaching **1.2.10** Continue to monitor the existing geocaching sites along on-trail locations. Expand geocaching activities in the future if deemed necessary and appropriate.	
	Hunting **1.2.11** Continue to provide existing hunting opportunities at the current level, unless that level is determined to be incompatible with the mission and goals of the Preserve.	**1.2.11** Number of cache seeks and number of cache sites.
	1.2.12 Study the potential to allow additional tightly defined specialty hunts based on a limited permit approach in a comprehensive manner using consistent criteria for all Preserve parcels. Consistent parcel-based criteria should be used.	**1.2.12** Determination of feasibility to hunt.

Recreation Objectives	Actions	Monitoring Elements
	1.2.13 Implement additional limited-entry hunting opportunities if and when possible to meet the management objectives of a particular property.	**1.2.13** Quantity and type of hunts, number of hunters.
1.3 Explore opportunities for additional recreational amenities that are consistent with the five key factors and three feasibility factors discussed in the text of this document.	**1.3.1** Design of new recreation facilities should be consistent with the natural landscape of the Preserve and utilize materials with natural colors that blend in with surroundings. **1.3.2** Conduct a facilities need assessment to ascertain the anticipated future needs for new recreational facilities. This assessment will also include an analysis of the feasibility of these facilities, consistent with Objective 1.6. Potential future facilities considered in this assessment could include the following: - Additional boat launching at Willow Slough. - Additional wildlife viewing platforms. - Portable photography blinds. - Trails described in the McFarland Ranch Master Plan. - Permanent or portable photography blinds in key wildlife viewing locations. **1.3.3** Explore potential for improvement and/or expansion of paddling routes upstream at Wood Duck Slough, Cosumnes River as needed. An example of a possible improvement is to remove overgrown brush from the paddling route along the river or slough. **1.3.4** Encourage CALTRANS, Sacramento County, and San Joaquin County to develop an implementation plan for the construction of road pullouts near the Preserve, that allow visitors to view wildlife and habitat. **1.3.5** Participate in discussions with Sacramento County and other Preserve Partners regarding the potential for future regional trails, including one to connect Stone Lakes Refuge to the Preserve.	**1.3.2** Car counters at parking lots; metal rangers at trailheads and parking lots, Visitor Center tally sheets, activity sign-in sheets, self-registration book at boat dock, exit surveys to evaluate visitor experiences. Development and use of a single use permit acceptable to all Preserve Partners. **1.3.4** Communications with CALTRANS, Sacramento County and San Joaquin County **1.3.5** Regional trail planning discussions and activities

Recreation Objectives	Actions	Monitoring Elements
1.4 Explore the feasibility of providing a wider range of recreational experiences not currently allowed on the Preserve (*e.g.*, horseback riding, camping, OHV use, and mountain biking) that are consistent with the five key factors and three feasibility factors discussed in the text of this document.	**1.4.1** Assess possible locations for additional recreation activities, and implement if compatible and feasible. **1.4.2** Examine the feasibility of developing and implementing a wetlands/rice operations driving tour route similar to routes established at National Wildlife Refuges. If feasible, design and construct a route and implement an "auto tour route" program in coordination with all applicable agencies, counties, etc.	**1.4.1** Locations and feasibility. **1.4.2** Locations and feasibility.
1.5 Continue to provide a safe and functional trail system, including boardwalks and viewing platforms for visitors, throughout the Preserve.	**1.5.1** Evaluate current trail maintenance practices and assess practices for effectiveness. - Provide new maintenance standard for trails. - Secure resources to implement new standard (volunteers, funding, equipment). - Ensure accessible trails and viewing platforms continue to meet ADA standards. **1.5.2** Recruit YCC, CCC, and/or other service groups to help maintain trails. **1.5.3** Continue to work with county work crews to help maintain trails. **1.5.4** Hire landscapers or other contractors to maintain public areas more efficiently, as needed.	**1.5.1** Trail maintenance practices and effectiveness. - Condition of trails. - Resources secured. - ADA accessibility. **1.5.2** Recruitment and use of service groups. **1.5.3** Frequency and number of County work crews.
1.6 Maintain a safe, functional, and orderly environment for visitors and staff.	**1.6.1** Add new security features to the Preserve Visitor Center, parking lots, trails, and other facilities, as necessary (*e.g.* security cameras, security signs, gates, alarms, etc.) **1.6.2** Increase law enforcement presence or patrols (*e.g.*, game wardens, Sacramento County Rangers, DFG, etc.) on the entire Preserve by working cooperatively and/or cost-sharing a position with local, state, and federal law enforcement officials.	

Recreation Objectives	Actions	Monitoring Elements
	1.6.3 Improve tracking and recording of security events to analyze and determine any patterns of the violations occurring on the Preserve.	
1.7 Reduce inappropriate uses through ongoing management, outreach and education efforts, and law enforcement activities.	**1.7.1** Provide educational outreach (*e.g.* brochures, presentations, etc.) to various user groups that contribute to inappropriate use (*e.g.*, poachers, OHV riders, etc.). **1.7.2** Install and maintain signage, gates, fences, barricades, K-rails, etc. at sites with high incidences of inappropriate use and throughout the Preserve as necessary. **1.7.3** Update and implement the Preserve's Sign Plan, as needed. **1.7.4** Limit visitors to authorized trails in order to reduce the potential spread of invasive species. **1.7.5** Restore those areas of the Preserve that are damaged by inappropriate uses. **1.7.6** Increase law enforcement presence (*e.g.* game wardens, Sacramento County Rangers, DFG, etc.) throughout the entire Preserve to assist staff with the management of inappropriate uses. **1.7.7** Improve recording of violations and illegal uses occurring on the Preserve. **1.7.8** Analyze and determine any patterns of the violations and illegal uses occurring on the Preserve; focus law enforcement patrol in these areas.	**1.7.1** Outreach efforts, number and content of presentations and brochures. **1.7.2** Signage. **1.7.4** Spread of invasive species. **1.7.6** Presence of law enforcement, location of incidents, and reoccurrences of incidents. **1.7.7** Violations and illegal uses record. Locations of violations and illegal uses.

Recreation Objectives	Actions	Monitoring Elements
1.8 Secure funding source(s) to support the staff and facilities needed to manage recreational uses of the Preserve.	**1.8.1** Work with Preserve Partners to assess annual budgets, farm revenue, grant opportunities, and potential for establishment of an endowment or other financing tool that can be used to support the staff and facilities necessary to meet recreational demands at the Preserve. **1.8.2** Maintain sufficient levels of staffing and funding to actively manage existing and future visitor use and to minimize inappropriate use of facilities and habitats. **1.8.3** Assess the feasibility of charging visitors a vehicle parking fee similar to the State Parks System (*e.g.*, $6 per car and $100 per bus). Implement if determined to be feasible. **1.8.4** Seek funding for the construction and maintenance of any needed new recreation facility. **1.8.5** Conduct a review of best practices among similar preserves, parks, or refuges to ascertain how they charge, fund, and determine recreational use.	**1.8.1** Annual dollar amount allocated to recreation program**.** **1.8.4** Grant applications/proposals submitted and amount of funding obtained.

Public Use Sub-goal #2: The Preserve's Volunteer Program will be compatible with the Management Plan's Natural Resource Stewardship goals, will promote the teaching of environmental stewardship, and will have adequate and stable funding sources.

Volunteer Objectives	Actions	Monitoring Elements
2.1 Provide a mutually beneficial volunteer experience that yields tangible benefits for both the volunteer and the Preserve.	**2.1.1** Ensure that the Preserve's Volunteer Program continues to serve a variety of functions and ongoing programs, including the following examples: ◂ Outreach • Volunteers staff the Visitor Center on the weekends as a minimal threshold. • Volunteers help staff booths for special events (*e.g.*, Earthfest, Walk on the Wild Side, Salmon Festival, Davis Duck Days, Crane Festival). ◂ Habitat protection and restoration. ◂ Habitat Restoration Team has a minimum of 12 work days a year. ◂ Recreation. ◂ Maintain trails annually as needed. ◂ Education (e.g., guided walks and paddling tours and/or school activities). ◂ Research as covered by the Biological Inventory Team. ◂ Monitoring (*e.g.*, research, easement, mitigation, and biological). {Monitoring Plan (not yet written) will provide details on what the volunteers will be monitoring.} **2.1.2** Staff provide appropriate training, direction, and communication to volunteers.	**2.1.1** Number and type of functions and programs that volunteers provide. ◂ Number of volunteers that staff the Visitor Center and special events. ◂ Number of workdays that HRT conducts. ◂ Document locations of trails maintained by volunteers. ◂ Number educational activities that volunteers have led. ◂ Description of BIT activities. ◂ Type of monitoring e volunteers participate in. Summarize relationship between the training provided by staff and improvements in the quality of monitoring data collected by volunteers. **2.1.2** Annual quantification of training provided to volunteers.

Volunteer Objectives	Actions	Monitoring Elements
	2.1.3 Hold an annual meeting with volunteers to share how their efforts contribute to the CRP's Monitoring Plan, Research Agenda, Management Plan, and other Preserve Programs.	**2.1.3** Meeting notes that summarize the annually meeting and utilize these notes as the documentation.
	2.1.4 Develop and implement a volunteer commitment process designed to balance the level of training provided to volunteers and time donated by volunteers.	**2.1.4** Data in the Volunteer Database.
	2.1.5 Include a section in the CRP annual work plan that focuses HRT efforts on accomplishing goals of the Management Plan and research agenda.	
	2.1.6 By 2010, establish a training session for dedicated volunteers to become team leaders of various volunteer programs.	**2.1.6** Number of volunteer team leaders.
	2.1.7 Provide annual Volunteer Naturalist Training, including updated training materials and maps.	**2.1.7** Number of trainings offered, topics discussed, and attendance at each training.
	2.1.8 Provide volunteers effective recognition and incentives (*e.g.*, certificates of merit, media highlights, and social networking activities).	**2.1.8** Quantity and type of recognition and incentives given to volunteers.
	2.1.9 Provide enrichment activities, such as a series of scientifically oriented lectures (*e.g.*, natural history of local species, conservation biology, etc.) twice per year.	**2.1.9** Quantity of enrichment activities
	2.1.10 Inform volunteers about CRP activities, updates, future goals, suggestions, and achievements through newsletters, meetings, and social networking activities.	**2.1.10** Quantity of newsletters, meetings, and social network activities.
	2.1.11 Develop additional volunteer opportunities or programs (*e.g.*, Junior Naturalist Program, K–12 education, High School Summer School/Spring Break Program, Adopt-an-acre Program, etc.) as needed and if staff and financial resources are sufficient.	**2.1.11** Type of volunteer programs offered.

Volunteer Objectives	Actions	Monitoring Elements
2.2 Recruit and maintain a diverse volunteer base.	**2.2.1** Maintain a diverse overall Volunteer Program at sufficient numbers of active volunteers to staff all volunteer programs. Recruit new volunteers as needed **2.2.2** Through the Preserve's Work Plan, annually evaluate the number of volunteers and the work that they accomplish to ensure that we are balancing quantity and quality (*i.e.*, skill level of work). **2.2.3** Expand and improve Vernal Pool Tour Program at the Howard Ranch Trail by developing a sufficient number of vernal pool docents over the next five years. **2.2.4** Pursue opportunities to coordinate, communicate, and collaborate on volunteer programs, activities, scheduling, and outreach with other local land managers (*e.g.*, Stone Lakes National Wildlife Refuge, Delta Meadows State Park, SMUD, Yolo Bypass, etc.)	**2.2.1** Numbers of active volunteers. (Ideally, the overall Volunteer Program will have a total of 125 volunteers, 80 of them dedicated to the Volunteer Naturalist Program and 50 to HRT. Vernal Pool Tour Program is expected to have 15–25 volunteers.) - Effectiveness of recruitment and retainment strategy by documenting numbers of volunteers and their longetivity. - Demographic data (age, location, etc.) on volunteers. **2.2.4** Communication with other local land managers.
2.3 Develop and maintain an infrastructure to support and direct volunteer efforts.	**2.3.1** Develop a permanent funding source to carry out the Volunteer Program. (*e.g.*, establishment of a foundation or similar endowment). **2.3.2** Obtain grants to support the volunteer program. **2.3.3** Update the volunteer database. **2.3.4** The Volunteer Coordinator will prepare an annual report that documents the activities of the Volunteer Program.	**2.3.1** Funding for volunteer program **2.3.2** Number of grants awarded. **2.3.3** Annual Report

Public Use Sub-goal #3: Scientific research conducted at the Preserve will be compatible with the Management Plan's Natural Resource Stewardship goals, will promote the teaching of environmental stewardship, and will have adequate and stable funding sources.

Research Objectives	Actions	Monitoring Elements
3.1 Promote and encourage basic ecological research that provides a basis for management decisions and increases our understanding of natural conditions and processes.	**3.1.1** Evaluate the feasibility of establishing a research institute at the Preserve to provide place-based research on a variety of scientific and ecological topics, including flooding and floodplain management. As part of the evaluation process, assess the possibility of affiliation with an academic organization such as LTER or UC Natural Reserve Site.	**3.1.1** Results of evaluation
	3.1.2 Utilize the Preserve's Goals, Objectives and Actions to**:** • Assist in directing research efforts of Preserve Partners and serve to guide future proposals. • Serve as a basis for developing collaborative research proposals between Partners and other institutions that can be submitted to a variety of funding sources. • Alert scientists to important but relatively neglected research areas.	**3.1.2** Type and quantity of research projects at the Preserve, as documented in the Preserve's research database. Use 2006 report as a template.
	3.1.3 If any manipulative studies are conducted on Preserve lands, the following guidelines are recommended: • The area should be mapped so that future research conducted on previously manipulated sites can take into account the effects of past manipulations.	**3.1.3** Research database.

Research Objectives	Actions	Monitoring Elements
	◂ Research that implements long-term markers for manipulated sites will be removed when study is complete. ◂ Sites should be surveyed with GPS and entered in a GIS. Paper maps of manipulated sites should be archived. **3.1.4** Develop a strategy to obtain funding to help meet ecological research needs as identified in the goals, objectives, actions, and monitoring noted in Chapter 3, Natural Resources Stewardship.	

Public Use Sub-goal #4: The Preserve's Education Program will be compatible with the Management Plan's Natural Resource Stewardship goals, will promote the teaching of environmental stewardship, and will have adequate and stable funding sources.

Education Objectives	Actions	Monitoring elements
4.1. Educate the public about the importance of the Preserve, resulting in increased numbers of volunteers, broader cultural diversity of volunteers and visitors, and increased participation in environmental stewardship.	**4.1.1** Maintain existing Preserve programs that provide educational and volunteer stewardship opportunities at the Preserve. **4.1.2** Evaluate the need to institute additional programs that provide educational and volunteer stewardship opportunities at the Preserve (*e.g.*, biological monitoring, Adopt-an-Acre Program, etc.), and institute those that are feasible. **4.1.3** Develop and distribute outreach materials to educate a diverse public about the importance of the Preserve, its Partners, and their missions, and citizen participation in environmental stewardship. **4.1.4** Utilize Volunteer Naturalists to provide education to the public.	**4.1.1** Type, number, and function of educational and volunteer stewardship programs at the CRP. **4.1.3** Annually compile list to whom the outreach materials were distributed. **4.1.4** Number and type of education programs provided by volunteers (*e.g.*, guided hikes and paddles, interpretation at Visitor Center, outreach at special events, education to school children).

Education Objectives	Actions	Monitoring elements
	4.1.5 Beginning in 2008, host at least two science-related presentations for the general public annually. **4.1.6** By 2010, obtain at least one grant to support translation of interpretative signs, brochures, displays, and/or educational/classroom materials into several languages. **4.1.7** By 2009, update the Preserve's media distribution list to include bilingual media outlets from a variety of geographic areas, including small towns and the larger cities of Stockton and Sacramento.	**4.1.5** Attendance and topics of the science-related programs. **4.1.6** Number of grants submitted and to whom submitted. Develop a file of potential funding sources. **4.1.7** Occurrences or mention of the Preserve in the media.
4.2 Educate K–12th and college students, resulting in increased volunteers, broader cultural diversity of volunteers and visitors, and increased participation in environmental stewardship.	**4.2.1** By 2009, develop and implement a formalized Cosumnes River Preserve Environmental Education Program based on the institutional model that best fits the Preserve's needs; including a permanent, sustainable funding source for the Education Program. **4.2.2** Prior to 2012, evaluate the feasibility of developing and implementing an environmental education center at the Preserve. **4.2.3** Continue Service Learning activities at the Preserve at least at current levels (*e.g.*, provide opportunity for students in local school districts to visit the Preserve at least three times during K–12). **4.2.4** Improve quality of the field trip experience by lowering the ratio of students to teacher/volunteer. A ratio of 15 students to 1 teacher/volunteer is ideal. **4.2.5** Update the Preserve's teaching resources as needed to be consistent with state standards and grade-level specific topics and activities. **4.2.6** Annually provide at least four on-site teacher training workshops.	**4.2.1** Institutional models assessed and funding sources considered. **4.2.2** Prior to 2009, feasibility study completed including Partner agreement, costs,, and location. Based on results of study, implement funding quest and develop construction plans by 2012. **4.2.3** Number of districts and number of student visits, class grade. **4.2.4** Ratio of students to teacher/volunteer. **4.2.5** Dates resources updated. **4.2.6** Number of on-site teacher training workshops.

Education Objectives	Actions	Monitoring elements
	4.2.7 Annually provide at least eight off-site teacher trainings. **4.2.8** Increase number of teachers participating in each on-site workshop up to a maximum of 25 teachers per workshop. **4.2.9** Develop an education program database to accurately track educational activity at the Preserve. **4.2.10** Develop and begin implementation of a plan to upgrade existing facilities and/or provide new facilities (*e.g.*, new drinking fountain, bathrooms) as needed to support the educational program by 2009.	**4.2.7** Number of teacher trainings. Also, document how off-site teacher trainings provide strategies related to teaching science (*i.e.*, salmon and crane workshops), service learning, and youth and community stewardship. **4.2.8** Number of teachers participating. **4.2.9** Database metrics could include data regarding teachers, students, grade levels, field trip days, workshops held, and/or Preserve locations visited.
4.3 Enhance relationships with neighboring communities in order to build awareness and support of the Preserve's mission and its contribution to those communities.	**4.3.1** Participate in local community events on an ongoing basis by hosting exhibit booths, providing literature, leading tours, and/or making presentations to the public at large. **4.3.2** Make presentations to City and County leaders (*e.g.*, at public meetings, tours) on an ongoing basis.	**4.3.1** Number and type of outreach and community events. **4.3.2** Number of presentations made.
4.4 Improve the compatibility of adjacent land-use practices with the Preserve's mission and goals by conducting outreach and building partnerships with neighboring landowners and agricultural leaders.	**4.4.1** Develop additional outreach materials that are specific to the Preserve and its mission, as needed, in order to provide information to neighboring landowners. **4.4.2** Attend a minimum of two agriculture-related meetings (*e.g.*, Farm Bureau, California Cattlemen's Assn., California Rice Growers Assn., RCD) per year.	**4.4.1** Document the additional outreach materials prepared. **4.4.2** Annually document the number and type of meetings attended.

6 Cultural and Visual Resources

This chapter provides goals, objectives, and actions related to the cultural and visual resources at the Preserve.

6.1 CULTURAL RESOURCES

Sacramento County contains a rich and diverse mix of prehistoric and historic cultural resources. This section provides an overview of the cultural resources within the floodplain and the surrounding watershed within and nearby the Preserve. Five types of cultural and historic resources may be present on the Preserve:

- Paleontological resources
- Prehistoric Era (focuses on Native American resources, specifically Miwok)
- Spanish/Mexican Era
- Early American Era (Gold Rush and farming)
- Modern history of conservation at the Preserve

6.1.1 Paleontological Resources

California has a rich fossil record identified by scientists as "Paleontological resources," which refer to the fossilized remains of plant and animal life from throughout most of geological history, including the Paleozoic (600–225 million years ago), the Mesozoic (225–70 million years ago), and the Cenozoic (70 million years ago to the present). Fossilized animals found in northern California include mammoths, horses, mastodons, camels, ground sloths, bison, and pronghorn antelope.

A number of geologic formations located in the Central Valley have the potential for containing significant paleontological resources (Windmiller *et al.* 2002). It is possible that as-yet undiscovered paleontological resources may exist on Preserve properties. This should be further analyzed during the environmental review process for all Preserve-related projects. The professional standards of practice, such as those adopted by SVP's (Society of Vertebrate Paleontology) Conformable Impact Mitigation Guidelines Committee in 1995, can offer additional guidance for control and mitigation of adverse impacts on paleontological resources.

6.1.2 Pre-historic Era

The Cosumnes River served as a natural boundary for communities of Native Americans, although boundaries fluctuated depending on the varying levels of affability or animosity among neighboring groups. Archeologists generally agree that the Preserve is located in the former territory of the Plains Miwok tribelets who are known to have inhabited river terraces.

An archival record search was conducted during the preparation of the Lower Cosumnes River Watershed Assessment (RBI 2006); 60 documented cultural studies completed for this geographic area in the past 30 years were found. These studies documented 179 known

archeological sites, indicating that the area is extremely sensitive for archeological remains, particularly prehistoric and ethnographic-period Native American sites (RBI 2006).

A variety of site types have been identified within Sacramento County and the Cosumnes River watershed, including village sites with artifacts; housepits; the remains of dance houses, cemeteries, and cry sites; petroglyphs (rock art); quarries where materials for stone tools were collected and sometimes processed; temporary campsites; bedrock milling areas where acorns and other seeds were processed; scatters of artifacts and tool production waste materials; and ceremonial sites with little or no physical remnants (Forbes 1969; City of Elk Grove 2003; Jones & Stokes 2006; EDAW 2006).

A number of Preserve properties contain known pre-historic-era cultural resources and it is possible that as-yet undiscovered cultural resources may also exist. As such, further analysis will be required through the environmental review process for site-specific projects as they are developed. If necessary, this process should offer guidance for control and mitigation of adverse impacts on pre-historic cultural resources.

6.1.3 Spanish/Mexican Era

Although most of the Spanish explorers of the 1600s and 1700s concentrated in areas near the California coast, the Spanish did venture inland in the 1800s. Gabriel Moraga led the first Spanish expedition in 1808 through the San Joaquin and Sacramento Valleys; along the way they explored the Mokelumne, Cosumnes, and American Rivers (Jones & Stokes 2001). The influence of the California Missions and the later Spanish land grants did extend into the Cosumnes watershed.

Settlement in the San Joaquin Valley began with the holders of land grants issued by the Mexican government for agricultural purposes. These land grants ranged in size from 20,000 to 50,000 acres and established the enduring patterns of land use and ownership in the region. Five historic Mexican land grants were located in the vicinity of the Preserve, listed here from north to south: San Juan, Rio de los Americanos, Omochumnes, Sanjon de los Moquelumnes, Cosumnes, and Camp de los Franceses (Beck and Haase 1974, as cited in Jones & Stokes 2001).

6.1.4 Early American Era

The Preserve is located immediately west of the gold fields of the Sierra Nevada foothills, the discovery of which dramatically altered the Miwok people's history. The Master Plan for the McFarland Living History Ranch (Jones & Stokes 2001) provides a wonderful overview of the local history during the Early American era and interested readers are encouraged to review this document. The following paragraphs provide a brief summary of this information.

Gold was discovered in 1848 and the Cosumnes River was soon inhabited by miners seeking their fortunes. Many of the place names along the upper river are reminiscent of this era:

- Michigan Bar (SRL 468) was an early gold camp on the Cosumnes.
- Cook's Bar was founded by Dennis Cook, two miles below Michigan Bar.

- Sebastopol was a lively camp from 1854 to 1859.
- Katesville arose in 1854 and had several stores and saloons.

Today, three State Historical Landmarks associated with the Early American era are located in the general vicinity of the Preserve:

- No. 680 Murphy's Ranch (Murphy's Corral): Located near the southwest corner of Grant Line Road and State Route 9, site of the beginning of the United States' conquest of California.
- No. 657 Grave of Alexander Hamilton: Located in Franklin Cemetery, gravesite of a member of the Lewis and Clark expedition.
- No. 719 Grave of Elitha Cumi Donner Wilder: Located in Elk Grove Masonic Cemetery, gravesite of a Donner party survivor.

The most notable historic structure of this period actively supported by the Preserve Partners is the McFarland-Orr Ranch. John McFarland (1823–1902) came to the Sacramento Valley in 1857 and purchased 3,500 acres of the Chabolla ranch for farming grain. He chose the Galt area for its rich soil, ample water, and its location, which was equidistant from Sacramento to the north and Stockton to the south. Shipping ports in both Sacramento and Stockton were used to send his crops to market. In 1878, McFarland began building a home on his ranch. Other improvements around the homestead included a tank house, carriage house, blacksmith shop, barn and corrals, chicken coop, and three sheds. He also built a bunkhouse for the local Miwok Indians he employed to work his fields (Jones & Stokes 2001). Today, 35 acres of the ranch are managed by the Galt Historical Society.

McFarland Ranch – Photo courtesy of Preserve Photo Library

6.2 REGULATORY FRAMEWORK

No state or local agencies have specific jurisdiction over paleontological resources on private lands such as those owned by TNC and DU. Generally, a paleontological collecting permit is not required to recover fossil remains discovered as a result of construction-related earthmoving on state or private land at a project site. However, a variety of federal, state, and local regulations and policies protect paleontological resources that may be impacted by projects undertaken by state or federal agencies. Additionally, there is a suite of local, state, and federal laws that protect cultural resources associated with the Native American period, and historic resources associated with the Gold Rush and pioneer periods. These include the National Environmental

Policy Act (NEPA), the California Environmental Quality Act (CEQA), the Federal Antiquities Act of 1906, the California Public Resources Code, and the recently enacted federal Paleontological Resources Preservation Act.

6.3 EXISTING CONDITIONS AND USER GROUPS

The programs and facilities at the Preserve that support interpretation of cultural resources are primarily located at the McFarland-Orr Ranch, with an emphasis on the early American Era. The educational program at the McFarland-Orr Ranch is supported by the Preserve's Partners, and coordinated by the Preserve's Educational Coordinator and the Galt Area Historical Society, as the primary caretakers of the Ranch. The Prehistoric (Native American) era is represented through exhibits of baskets and other Native American artifacts in the Preserve Visitor Center.

The Galt Historical Society is seeking grants to support continued efforts on the McFarland-Orr Ranch, and the BLM will continue to support cultural resources activities through their staff members in the Folsom Field Office.

6.3.1 Future Opportunities and Challenges

The Master Plan for the McFarland Living History Ranch outlines a variety of planned improvements to historic structures on the ranch. Enhancement of existing education programs are also proposed, which will create a pioneer experience on this "living history" ranch and engender a sense of time and place on a turn-of-the-century pioneer ranch. The agricultural and natural landscapes are an important part of this historic complex.

Additionally, Native American basket weavers have noted that living cultural resources, which are essential to native culture, are jeopardized by modern industrial timber harvest practices, herbicide uses, development, and other types of impacts. Basket weavers today may have to travel great distances to obtain a small amount of the materials necessary for weaving traditional baskets. It is anticipated that basket weavers will continue to seek permission to utilize native vegetation on the Preserve to support traditional basket-making activities.

6.4 VISUAL RESOURCES

6.4.1 Existing Conditions

In this section, visual resources of the Preserve are described in terms of scenic quality, and management goals, objectives, and actions are provided. Scenic quality is the overall impression retained after traveling through an area of land. The Preserve has many special scenic resources that attract visitors, including:

- Distant views of the Sierra Nevada Mountains to the east under clear conditions.
- Distant views of the Coast Ranges (including Mt. Diablo) to the west, under clear conditions.

- Close and distant views of natural landscape features, such as riparian forests, stream buffers, wetlands, vernal pool grasslands, and oak trees.
- Close and distant views of the Cosumnes and Mokelumne River.
- Many opportunities to view a diversity of wildlife, with bird-watching being among the most popular.
- Close and distant views of agricultural features, such as field borders, hedgerows, windbreaks, crops, and farm animals.
- Wildflower displays.

In their *Sierra Proposed Resource Management Plan* (May 2007), the BLM has utilized a Visual Resource Management (VRM) assessment to rank the Preserve as a visual "Class III," described as "retain partial character (changes may be evident but subordinate)."

The Preserve is located close to cities that have undergone substantial transformation over the past 20 years from predominantly agricultural/rural characteristics to more urbanized visual characteristics. The Preserve offers a break from the urban landscape by providing an important open space visual resource. For example, the Preserve's riparian habitat provides textures and colors that are not commonly seen in nearby urban areas. Also, the Preserve's agricultural lands offer a break from the urban landscape by providing an open visual resource, characterized by no form, line, color, or textural features.

The management of visual resources at the Preserve is important because of the high level of recreational use and other programmatic attention it receives. For example, in 1994 the production staff for an important British Broadcasting Company (BBC) TV production on sandhill cranes considered including footage from the Preserve in their broadcast but decided not to because of the many visual intrusions, such as power lines. Still photography is also an important recreational use at the Preserve, as described earlier in Chapter 5.

"Wetlands by Barn" – Photo courtesy of Preserve Photo Library

Additionally, in January 1996 the National Park Service, administrators of the National Natural Landmarks (NNL) Program, designated a small portion of the riparian and bluff area along the Cosumnes River as an NNL site. The NNL designation includes portions of four properties, one private parcel, and three Preserve properties. The three Preserve properties—the Valensin Pocket, Denier, and Shaw Central properties—are owned by DFG.

During the public workshops for this Management Plan, concern was expressed regarding outdoor nighttime lighting, which could contribute to sky glow, create glare, reduce star-gazing

views, and adversely affect nighttime views of the Preserve area (Harder 2002; Longcore and Rich 2004). Sky glow is the brightening of the night sky due to man-made lighting. Some studies have indicated that artificial light from urban areas can diffuse deep into some of the most remote, wild places (Harder 2004). The Preserve receives nighttime outdoor light emission from three primary sources:

- Lights on Preserve facilities (*e.g.*, the Visitor Center).
- Lights located outside of Preserve boundaries, but within close proximity, including vehicle and overhead lights along I-5.
- Lights from nearby urban areas.

While permanent lighting is necessary for operations during nighttime hours and for security at Preserve facilities, it does have an adverse affect on visitors wishing to view the stars as well as on species that have evolved with specific natural patterns of light and dark (Frank 1988; Longcore and Rich 2004; Moore *et al.* 2000; Perry and Fisher 2006; Wise and Buchanan 2006).

Goals, Objectives, Actions, and Monitoring

OVERARCHING GOAL II: COMPATIBLE USES IMPROVE STEWARDSHIP OF THE LANDS IN THE COSUMNES RIVER WATERSHED.

Cultural & Visual Resources Sub-Goal 1: Protect cultural resources located on the Preserve.

Objectives	Actions	Monitoring Elements
1.1 Protect the history of the tribes and early settlers who lived on the parcels that are now part of the Preserve, while promoting an understanding of cultural resources protection.	**1.1.1** Incorporate, as appropriate, information about Native American Indian tribes and early settlers into the Preserve's interpretative programs and materials as they are updated in the future. **1.1.2** Provided that it does not adversely affect the Preserve, continue to permit Native Americans physical access to plants to carry out practices such as pruning, digging, sowing, burning, and selective harvesting to create plant growth characteristics conducive to supplying basket-weaving materials. **1.1.3** Establish a productive relationship with persons or organizations interested in cultural resources protection at the Preserve (*e.g.*, California Basket Weavers Association.)	**1.1.1** Updates to interpretive programs and materials. **1.1.2** Track number of permits issued. **1.1.3** Document meeting dates, topics, and participants.
1.2 Continue the McFarland-Orr Ranch program.	**1.2.1** Assist, as needed and able, in the implementation of the Master Plan for the McFarland Living History Ranch by working with Sacramento County and the Galt Historical Society.	**1.2.1** Track assistance provided towards implementation of actions listed in Master Plan for the McFarland Living History Ranch.

Cultural & Visual Resources Sub-Goal 2: The Preserve's scenic and visual resources will be protected and enhanced.

Objectives	Actions	Monitoring Elements
2.1 All partners should manage their land in a manner that retains and/or improves the existing visual character of the landscape. Proposed land-management changes should not disrupt the distant and close views.	**2.1.1** Manage BLM lands in the Preserve to achieve VRM Class III classification. The other Partners should follow suit to a similar standard, using their own visual classification system.	**2.1.1** BLM VRM Class III classification review.
	2.1.2 Coordinate with the utility companies and other entities to relocate to underground the existing and future power lines crossing the Preserve. This will enhance the visual resources as well as reduce collision impacts to sandhill crane and other birds.	**2.1.2** Document the removal/relocation of above-ground utilities.
	2.1.3 As improvements are made to roads and other infrastructure, ask Project proponents not only to reduce the level of impact but also to take steps to improve the aesthetic quality of the project area.	**2.1.3** Document the aesthetic improvements of local road and infrastructure projects.
	2.1.4 As new development projects proposed around the Preserve, either in close proximity or in nearby urban areas, undergo environmental review (CEQA), ensure that project proponents consider potential effects on visual resources at the Preserve, including the effects of outdoor nighttime lighting.	**2.1.4** Publicly available CEQA documents. Monitor all projects affecting visual resources.
	2.1.5 When vegetation is removed, altered, or restored, ensure that it is done in a manner consistent or complementary to the previously existing or historical visual condition (*e.g.*, valley oak trees are replaced with same species or similar, not non-native dissimilar trees).	

Objectives	Actions	Monitoring Elements
2.2 Minimize the negative effects of outdoor nighttime lighting.	**2.2.1** Review any new outdoor lighting proposed on the Preserve to ensure it meets the following characteristics: - High quality design that is consistent with natural setting of Preserve. - Controlled and shielded to shine down. - Timed to ensure that there is light is there only when needed. - The minimum amount (intensity) of light (*i.e.*, wattage), is used to accomplish the light's purpose. - Energy efficient. - Installed only where absolutely necessary.	**2.2.1** Document how the type of lighting purchased meets the characteristics of Action.

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7 Property Descriptions and Management

This Chapter contains two main sections. Section 7.1 describes the properties that the Preserve Partners own in fee title and/or hold an easement interest. Section 7.2 describes the tools used to manage those properties, including grazing, fire, invasive species control, vector control, irrigation, flooding, mowing, and others.

Disclaimer: All acreages shown in this Management Plan are approximations based on low-resolution GIS data, which is often inexact. Also, there are varying spatial methods available for calculating acreages and each method has associated standard errors in measurement. For consistency one standard method was utilized in this Management Plan and this method used the summary statistics and frequency tools in ESRI's ArcGIS 9.2 software to generate acreage calculations. The specific boundaries of properties and their acreages are specified in the actual property deeds on file at the Preserve.

7.1 PROPERTY DESCRIPTIONS

The Preserve holds a total of 60 properties, 38 of which are owned in fee-title. The remainder are privately owned, but have conservation easements as shown in Table 7.1 below.

TABLE 7.1: SUMMARY OF EASEMENT AND FEE-TITLE PRESERVE PROPERTIES

	Fee	Easement
Number of properties	38	22
Acres	24,588	21,271

In addition to the easements held by the Preserve Partners, there are a few conservation easements on lands located near the Preserve that are not held by Partners. In two of these cases, on the properties commonly known as Cowell and Dumas, TNC provides support to those easement holders separately by monitoring the easements on an annual basis. Funding for this monitoring is provided from private sources.

The total area protected by the Preserve through easements and fee-title ownership is approximately 45,859 acres. The properties are owned and managed by eight private and public organizations. Fee-title properties are classified by owner in Table 7.2, below, along with information on the number of properties and the associated acreages.

Seven organizations and agencies own in fee-title 38 properties on the Preserve as shown in Figure 7.1: Preserve Land Owners. The Nature Conservancy is the largest landowner. The Preserve holds easements, to preclude future suburban development and/or to support conservation targets, on 22 properties as shown in Figure 7.2: Preserve Lands in Easements. As shown in Figure 7.3: Acquisition Timeline for Preserve Properties, the core of the Preserve was acquired during the 1985–1993 timeframe. Since then the Preserve has grown in size and extended spatially out to the east and west, generally along the river corridor. Maps and detailed

information on each of the 60 properties that comprise the Preserve are provided on the following pages. Please note that the land cover information provided below was developed in accordance with the methodologies described in Chapter 3.

TABLE 7.2: LAND-OWNING PARTNERS

Owner	# Properties Owned in Fee-Title	Acreage
Bureau of Land Management	7	1,789
California Department of Fish & Game	8	4,541
Department of Water Resources	1	487
Ducks Unlimited	1	245
Sacramento County	3	980
State Lands Commission	1	193
The Nature Conservancy	17	16,353

Note: Acreages are approximations and have been rounded.

Table 7.3 is an index to the Preserve properties owned in fee title and/or easement. This index shows the page number of the property description. Two maps are provided for each property: one is a land cover map and one is a property boundary map. The index in Table 7.3 also references each property to its associated maps.

Figure 7.1: Preserve Land Ownership

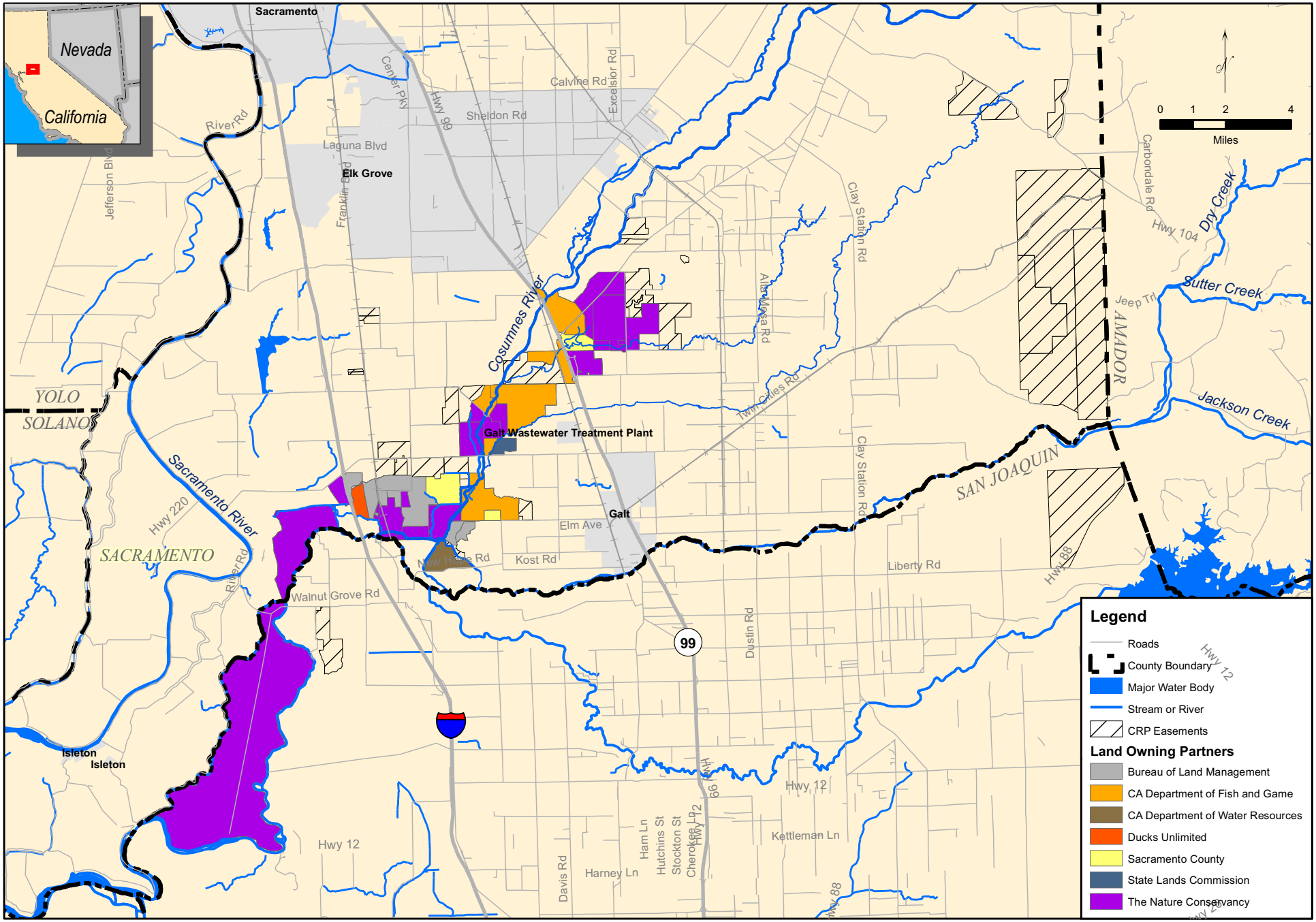


Figure 7.2: Preserve Lands in Easements

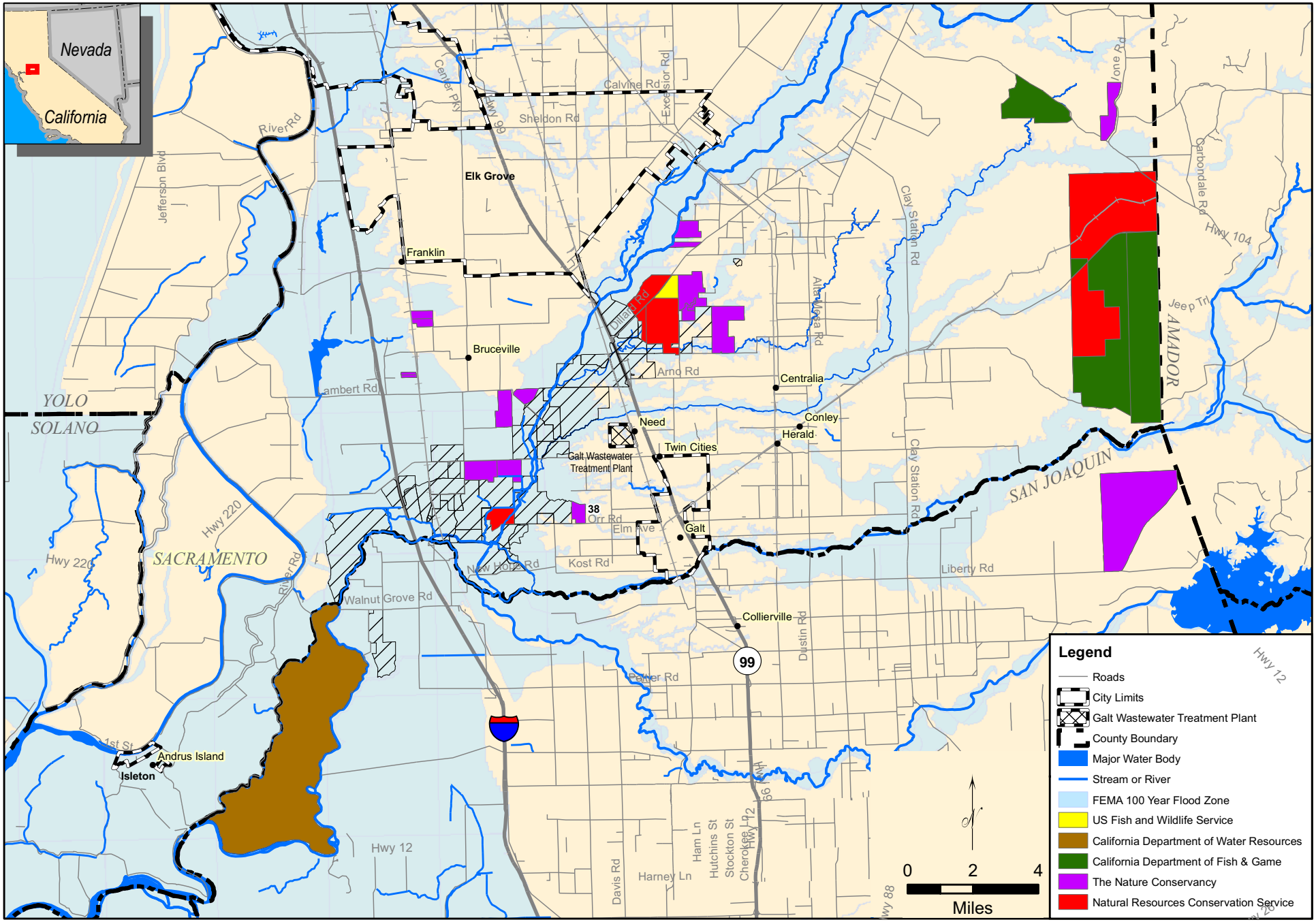


Figure 7.3: Acquisition Timeline for Preserve Properties

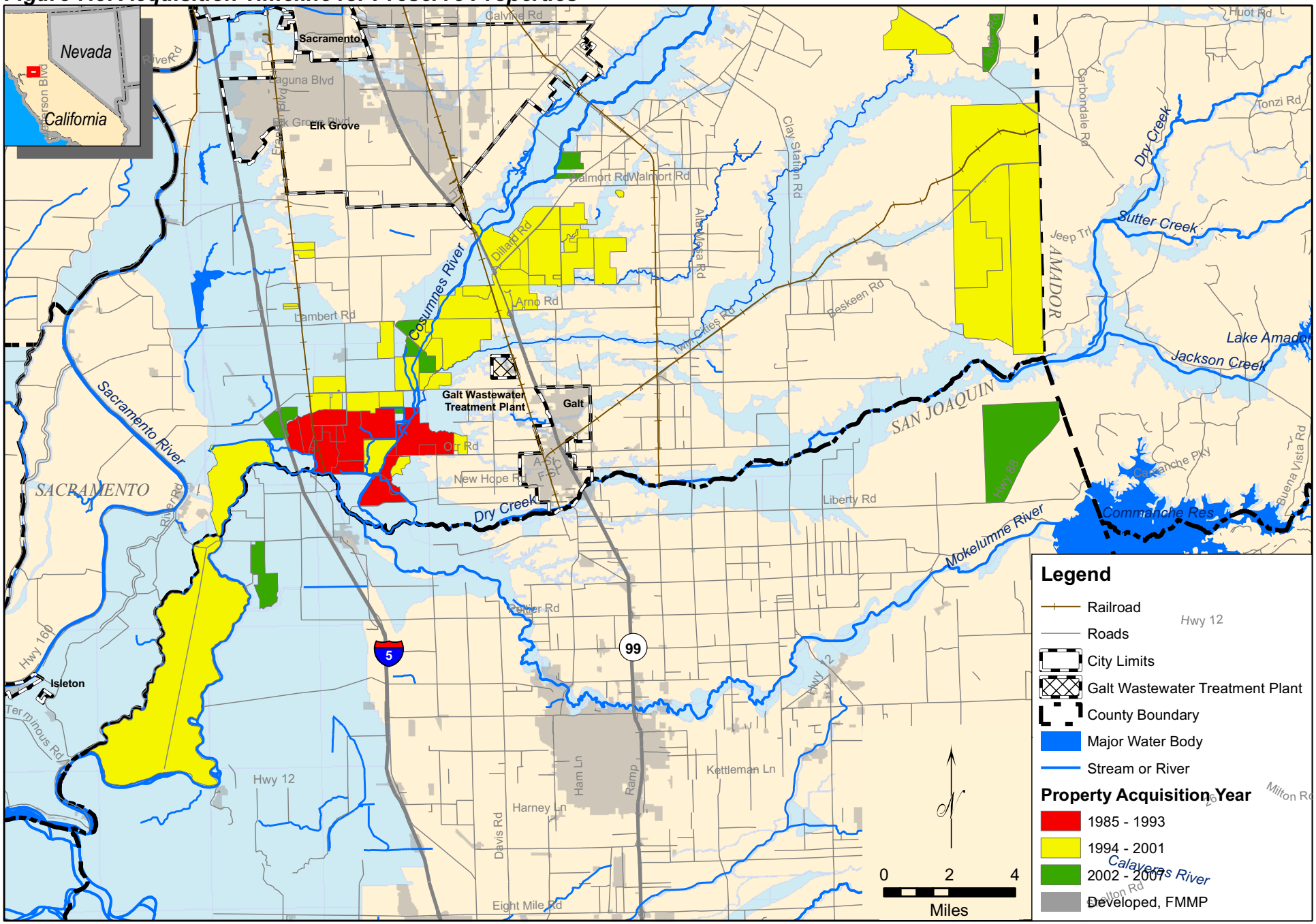


TABLE 7.3: PRESERVE PROPERTY AND EASEMENT INDEX

Property Name	Page Number of Property Description	Property Boundary Map Figure Number	Land Cover Map Figure Number
Beacon Farms	7-8	7.14	7.15
Bjelland	7-9	7.28	7.29
Castello	7-11	7.30	7.31
Cougar Wetlands	7-13	7.18	7.19
Crump	7-14	7.14	7.15
Crump Ranch	7-15	7.14	7.15
Denier	7-16	7.24	7.25
Denier II	7-17	7.22	7.23
Desmond, Flint, et al.	7-18	7.16	7.17
Farm and Wetlands 1	7-19	7.10	7.11
Farm and Wetlands 2	7-20	7.18	7.19
Fitzgerald	7-21	7.14	7.15
Fitzgerald Farms	7-22	7.14	7.15
Grizzly Slough DWR	7-23	7.18	7.19
Kraus BLM	7-24	7.10	7.11
Kraus DU	7-25	7.10	7.11
McCormack-Williamson (Bean Ranch)	7-26	7.8	7.9
McFarland	7-27	7.20	7.21
McFarland–Orr Ranch	7-28	7.20	7.21
Nicolaus Ranch	7-29	7.18	7.19
Oneto Horseshoe	7-30	7.22	7.23
Shaw Central	7-31	7.22	7.23
Shaw South	7-32	7.22	7.23
Silverado	7-33	7.18	7.19
Staten Island	7-34	7.4	7.5
Stokes	7-35	7.10	7/11
Valensin - Access Road	7-36	7.28	7.29
Valensin Badger Creek Unit	7-37	7.26	7.27
Valensin - East Riley	7-38	7.34	7.35
Valensin - Horseshoe	7-39	7.28	7.29
Valensin - Pocket	7-40	7.26	7.27
Valensin - Ranch House	7-41	7.28	7.29
Valensin - West Riley	7-42	7.32	7.33
Valensin WRP 2	7-43	7.32	7.33
Visitor Center	7-45	7.10	7.11
Whaley CDFG	7-46	7.22	7.23
Whaley SLC	7-47	7.22	7.23
Wong	7-48	7.10	7.11

Easement Name	Page Number of Property Description	Property Boundary Map Figure Number	Land Cover Map Figure Number
AKT Easement	7-50	7.34	7.35
Allen Ranch	7-51	7.22	7.23
Ben Brown Ranches	7-52	7.42	7.42
Desmond	7-53	7.16	7.17
Flint 2	7-54	7.16	7.17
Forster	7-55	7.46	7.47
Giovannoni	7-56	7.6	7.7
Hoertling	7-57	7.38	7.39
Horizon Dairy 1	7-58	7.34	7.35
Horizon Dairy 2	7-59	7.34	7.35
Howard Ranch DFG #1	7-60	7.44	7.45
Howard Ranch DFG #2	7-61	7.44	7.45
Howard Ranch WRP	7-62	7.44	7.45
Kneppel	7-63	7.38	7.39
Larkin 1	7-64	7.36	7.37
Larkin 2	7-65	7.36	7.37
Machado	7-66	7.12	7.13
Martin	7-67	7.12	7.13
Pellandini II	7-68	7.34	7.35
Ragsdale	7-69	7.38	7.39
Shaw North	7-70	7.22	7.23
Schneider	7-71	7.40	7.41
Van Steyn	7-72	7.38	7.39
Wilder Ranch	7-73	7.16	7.17
Wilkinson	7-74	7.18	7.19
Woods	7-75	7.20	7.21

Beacon Farms
Owner: The Nature Conservancy

Acquisition Date: 1985 Property Acreage: 234
USGS Quad: Bruceville

Property Description
The boundaries and location of this property is shown in Figure 7.14 Beacon Farms has over one linear mile of frontage along the Cosumnes River and lies within the 100-year FEMA flood zone. Property is subject to a Williamson Act contract with the County.

Land Cover Summary
As shown in Figure 7.15, land cover for the Beacon Farms property is as follows:

Land Cover Type	*Acreage*
Riparian Trees & Shrubs	225.9
Riparian Vegetation	1.8
Water	6.4

Conservation Targets
Beacon Farms property currently supports three of the six conservation targets: riparian, freshwater wetlands, and salmon. The riparian and freshwater wetland habitat will be protected and enhanced, although the spatial extent is not planned to be increased. This property supports existing salmon passage in the Cosumnes River, which passes through this property. Adult salmon swim upstream and, later, juveniles swim downstream. During flood events, this site's floodplains are very productive for fish and provide salmon-rearing habitat.

Land Management Notes
- Levee present on Beacon Farm property.
- Remnants of attempted seasonal waterfowl habitat development, including levees, water lines, and water control structures, exist on the property.

Bjelland
Owner: The Nature Conservancy

Acquisition Date: 1998 Property Acreage: 92.0
USGS Quad: Galt

Property Description
The boundaries and location of this rectangular-shaped property are shown in Figure 7.28. The 92-acre site is owned in fee title by TNC. The Bjelland tract consists of leveled agricultural land, created years ago by cutting and filling of wetlands and stream channel associated with the South Fork Badger Creek, which runs channelized through the middle of the property. The property is located within a mapped FEMA flood zone. The property is bound on three sides (north, east, and west) by the Preserve's Valensin Ranch and by a private airport (Mustang Airport, owned by Richard Bjelland) to the south.

Although the property is not part of a Williamson Act contract, it does contain soils designated as important farmland in Sacramento County. Additionally, the soils have been identified as suitable for restoration of riparian forests.

The property contains no structures or public trails. The nearest public roads are Arno Road, located directly to the south, and Riley Road to east. The property contains no gates, railroad crossings, or levees. The property contains fences around its perimeter.

Land Cover Summary
As shown in Figure 7.29, land cover for the Bjelland property is as follows:

Land Cover Type	*Acreage*
Freshwater Marsh	4.4
Grasslands	0.1
Idle	87.4
Vernal Pool Grassland	0.1

Conservation Targets
The Bjelland property currently supports freshwater wetlands. The Preserve intends to implement future restoration actions to increase the spatial area that the wetlands occupy on this site. Such restoration activities may include utilizing water from the north fork of Badger Creek as in input into the freshwater system and may also include restoring the existing canal to a more natural creek formation.

The site is located in an area (Badger Creek) identified by the U.S. Fish and Wildlife Service as being critical for giant garter snakes (USFWS 1999). While there is a giant garter snake population currently in Snake Marsh downstream of this property (west of Highway 99), surveys done in 2001 and 2002 failed to document any GGS upstream of there in either the south fork or north fork of Badger Creek.

A 25-acre portion of this property is subject to a conservation easement, purchased as GGS mitigation by a developer (AKT Development Corporation). The developer is required to carry out wetlands restoration of this site, and a plan was developed in 1997 and subsequently updated with input from Preserve staff. However, no action has been taken to date, due in part to uncertainties about surface water availability through the summer.

Land Management Notes

- Routine maintenance of on-site water lines.

Castello
Owner: CA Department of Fish & Game

Acquisition Date: 1998 Property Acreage: 729.3
USGS Quad: Galt

Property Description
The boundaries and location of this property are shown in Figure 7.30. The Castello property has over 3,000 linear feet of frontage on the Cosumnes River. It is within the 100-year FEMA zone and has soils that are suitable for restoration to riparian forest. Soils are designated as Prime, Unique, and of Local and Statewide Importance. Crops, primarily wheat, on this site are "dry land farmed." Dillard Road, a public road, bisects this site and provides vehicular access.

Land Cover Summary
As shown in Figure 7.31, land cover for the Castello property is as follows:

Land Cover Type	*Acreage*
Developed	0.4
Dry Land Farmed	360.1
Freshwater Marsh	19.4
Grain and Hay Crop	0.8
Grasslands	129.1
Riparian Trees & Shrubs	144.6
Vernal Pool Grassland	74.9

Conservation Targets
The Castello property currently supports four of the six conservation targets and has the potential to support a fifth target in the future. The existing vernal pool grassland and freshwater wetlands will be protected and maintained by the Preserve. Additionally, the Preserve may take steps to enhance the quality of the existing habitats. A riparian forest exists on the northern portion of the site near the Cosumnes River. The Preserve will take future actions to restore this habitat and increase its spatial area. The existing floodplains on this site support salmon floodplain rearing. A past survey for giant garter snake did not find the snake on this property; however, this species has previously been found downstream in Snake Marsh. Additionally, the north fork of Badger Creek located nearby has the potential to support the snake.

Land Management Notes

The Preserve's Habitat Restoration Team has previously completed work to reduce OHV access to this site and thereby protect the valuable habitat that this site offers.

- In the past, this site was subject to invasion by tree of heaven and management actions to control this plant have been implemented.

- Routine maintenance of on-site pumps and water lines needed.
- Routine maintenance of on-site levee.
- Routine maintenance of on-site pond.
- Agricultural lease.
- Dove and turkey hunts.

Cougar Wetlands
Owner: Bureau of Land Management

Acquisition Date: 12/13/1990 Property Acreage: 154.0
USGS Quad: Bruceville

Property Description
The boundaries and location of this property are shown in Figure 7.18. This site contains over one-half linear mile of frontage along the Cosumnes River.

Land Cover Summary
As shown in Figure 7.19, land cover for the Cougar Wetlands property is as follows:

Land Cover Type	*Acreage*
Grasslands	0.4
Managed Marsh	132.8
Riparian Trees & Shrubs	20.8

Conservation Targets
The Cougar Wetlands property currently supports three conservation targets: riparian forests, freshwater wetlands, and salmon. Over 20 acres of riparian forest currently exist on this site and young trees can be seen growing on this site. Future management of the riparian forests will focus on reestablishing a historic slough that previously existed on this site to enhance connectivity with the Cosumnes River and the Silverado property. Managed ponds provide freshwater wetland habitat. At least some of the ponds are only wet on a seasonal basis. The Preserve anticipates a continuation of pond management activities for the short-term to facilitate existing youth and disabled-person hunting programs. Over the long-term, when the historic slough is reestablished, this restoration activity will likely result in the managed wetlands converting to riparian forest habitat given the physical and hydrologic drivers. Giant garter snake is not documented on this site; however, suitable snake habitat is found here. Salmon habitat is provided via the Cosumnes River that supports salmon passage. Floodplains located on this site support salmon floodplain rearing.

Land Management Notes
- Property is sometimes commonly referred to as Ness Christian.
- Levee present on Cougar Wetlands property.
- Routine maintenance of on-site pumps, water lines, and water control structures.

Crump
Owner: Bureau of Land Management

Acquisition Date: 1987 Property Acreage: 89.4
USGS Quad: Bruceville

Property Description
The boundaries and location of this property are shown in Figure 7.14. This property lies within the 100-year FEMA zone.

Land Cover Summary
As shown in Figure 7.15, land cover for the Crump property is as follows:

Land Cover Type	*Acreage*
Developed	0.1
Managed Marsh	89.3

Conservation Targets
The Crump property currently supports one conservation target, freshwater wetlands (*i.e.*, managed marsh). This wetland habitat will be maintained and if feasible, enhanced through future management strategies. Suitable habitat for the GGS may exist on this site; however, the presence of this species has not been documented.

Land Management Notes
- Routine maintenance of existing water lines, valves, and water control structures.

Crump Ranch
Owner: The Nature Conservancy

Acquisition Date: 1987 Property Acreage: 464.8
USGS Quad: Bruceville

Property Description
The boundaries and location of this property are shown in Figure 7.14. Property has 0.8 linear miles of frontage along the Cosumnes River and 0.65 linear miles of frontage along the Mokelumne River. Portions of this site are within the 100-year FEMA flood zone. Site is subject to a Williamson Act contract with the County.

Land Cover Summary
As shown in Figure 7.15, land cover for the Crump Ranch property is as follows:

Land Cover Type	*Acreage*
Developed	16.7
Grasslands	160.1
Managed Marsh	100.5
Riparian Trees & Shrubs	88.0
Riparian Vegetation	85.7
Water	13.9

Conservation Targets
The Crump Ranch property currently supports three of the six conservation targets, including riparian, freshwater wetlands, and salmon. These conservation targets will be preserved and maintained. Management strategies to enhance the quality of these existing habitats may be undertaken. At this time there are no plans to expand the spatial area of the targets on this particular piece of property. Habitat also exists for the giant garter snake although the species has not been documented on this site and it is unknown if it actually occurs here. The Ranch property also contains oak savannah habitat and although this is not a conservation target, the Preserve will maintain it.

Land Management Notes
- Routine maintenance of on-site pump, water lines, and water control structures.
- Levee present on-site.
- Invasive plant, pepperweed, present on the site.

Denier
Owner: CA Department of Fish & Game

Acquisition Date: 8/19/1998 Property Acreage: 1,259.2
USGS Quad: Galt

Property Description
The boundaries and location of this property are shown in Figure 7.24. The Denier property has over 2,500 linear feet of frontage along the Cosumnes River and over a mile along Laguna Creek. It is within the 100-year FEMA zone.

Land Cover Summary
As shown in Figure 7.25, land cover for the Denier property is as follows:

Land Cover Type	*Acreage*
Freshwater Marsh	98.6
Grain and Hay Crop	0.7
Grasslands	898.7
Riparian Trees & Shrubs	27.2
Riparian Vegetation	9.2
Vernal Pool Grassland	216.0
Water	8.8

Conservation Targets
The Denier Property supports four of the six conservation targets, including riparian forests, vernal pool grassland, freshwater wetlands, and salmon. This site contains small wetland sloughs that are classified as freshwater wetlands. Vernal pools on this property are geologically younger than other nearby vernal pools. These wetland sloughs and vernal pools will be protected and maintained. Preserve staff will also use management tools to enhance the quality of this existing habitat, if feasible, but there are no plans to increase the spatial area of these habitat types. The existing riparian forests will be protected and there is the potential for future restoration of riparian habitat in the northwest corner of this site. It is likely that such a future restoration effort would be part of a larger restoration project including the Shaw, Oneto, and Denier II properties.

The Cosumnes River crosses the northwest corner of the site and provides salmon passage. This salmon passage will be protected and maintained. Giant garter snake has not been documented on this site. However, some suitable snake habitat may exist. As the river is incised in this area, floodplain habitat and snake habitat may be limited.

Land Management Notes
- Levee on-site
- Water lines on-site

Denier II
Owner: The Nature Conservancy

Acquisition Date: 2000 Property Acreage: 490.9
USGS Quad: Bruceville

Property Description
The boundaries and location of this rectangular-shaped property are shown in Figure 7.22. This property has almost 1.2 linear miles of frontage along the Cosumnes River and it is within the 100-year FEMA flood zone. Soils are classified as Prime and Unique. An existing on-site building is used for agricultural operations.

Land Cover Summary
As shown in Figure 7.23, land cover for Denier II property is as follows:

Land Cover Type	*Acreage*
Agricultural Infrastructure	2.6
Crops - Annual or Truck & Berry	335.0
Grasslands	83.9
Perennial Woody Crops	0.9
Riparian Trees & Shrubs	0.2
Riparian Vegetation	68.3

Conservation Targets
Although the Denier II property is predominantly used for agriculture, it currently contains three of the six conservation targets: riparian forest, freshwater wetlands, and salmon habitat. Future land management tools (*i.e.*, restoration and other tools) will be used to increase the spatial extent of riparian forests and freshwater wetlands. The spatial area of riparian habitat is proposed to be increased in the future via levee breaching and planting of native plants. The existing salmon habitat contained within the Cosumnes River and its floodplain will be maintained and, if feasible, the quality of this habitat may be enhanced in the future. The north-east triangle portion of this property may be converted from agricultural use to grasslands. Extensive hydrological modeling has been completed for this property and will serve as the foundation for future analytical and restoration work.

Land Management Notes
- Levee is present on-site.
- Trash dumping at the gate at Twin Cities is an ongoing problem.

Desmond, Flint, et al.
Owner: Sacramento County

Acquisition Date: Transferred in 1993 Property Acreage: 586.2
USGS Quad: Bruceville

Property Description
The boundaries and location of this property are shown in Figure 7.16. This property has almost one-half linear mile of frontage along the Cosumnes River and lies within the 100-year FEMA flood zone. Soils on this site are classified as Prime, Unique, and of Statewide Importance.

Land Cover Summary
As shown in Figure 7.17, land cover for the Desmond, Flint, et al is as follows:

Land Cover Type	*Acreage*
Crops - Annual or Truck & Berry	3.4
Grasslands	4.4
Irrigated Pasture	2.7
Rice	437.0
Riparian Trees & Shrubs	22.7
Riparian Vegetation	97.7
Water	18.3

Conservation Targets
Desmond, Flint, et al supports three conservation targets. Riparian forest occurs on this property. Past restoration efforts have been undertaken through a breach of a levee located in the Triangle Field. The Triangle Field currently supports riparian forests as well as seasonal floodplain habitat for native fish. Future restoration actions are expected to increase the spatial area of forest on this site. An existing shack may be removed in the future to allow an expansion of the rice fields. Freshwater wetlands exist here.

The Cosumnes River that crosses through this site supports both salmon passage and salmon floodplain rearing. The giant garter snake has not been documented on this site; although suitable habitat conditions may exist.

Land Management Notes
- Riparian water rights were retained by previous private property owner.
- Levee present on Desmond, Flint, et al.
- Routine maintenance of on-site pumps, water lines, and water control structures.
- Invasive plant, pepperweed, present on the site.
- Agricultural lease (rice).

Farm and Wetlands 1
Owner: The Nature Conservancy

Acquisition Date: 1985 Property Acreage: 33.2
USGS Quad: Bruceville

Property Description
The location and boundaries for this property are shown in Figure 7.10. This small, oddly-shaped property is nestled between Franklin Boulevard and the Crump Ranch property, east of the Visitor Center. The Willow Slough property is enrolled in a Williamson Act contract with the County.

Land Cover Summary
As shown in Figure 7.11, land cover for Farm and Wetlands 1 is as follows:

Land Cover Type	*Acreage*
Developed	1.6
Grasslands	3.3
Managed Marsh	0.9
Riparian Trees & Shrubs	21.4
Riparian Vegetation	5.9
Water	0.1

Conservation Target
The Farms and Wetlands 1 property supports riparian vegetation and freshwater emergent wetlands that are managed. A portion of this property was previously restored. It was one of the first restoration projects. The existing conservation targets on this property will be protected and maintained. Staff may invest routine effort to maintain and to enhance quality of existing habitat.

Land Management Notes
- Property line extends across the parking lot.
- Routine maintenance of on-site water lines and water control structures.
- Levee present on-site.

Farm and Wetlands 2
Owner: The Nature Conservancy

Acquisition Date: 1985 Property Acreage: 36.8
USGS Quad: Bruceville

Property Description
The boundaries and location of this triangular-shaped property are shown in Figure 7.18. This fee-owned property was once part of old Nicolaus Ranch. It has 0.5 linear miles of frontage along the Cosumnes River and lies within the designated 100-year FEMA flood zone.

Land Cover Summary
As shown in Figure 7.19, land cover for the Farm and Wetlands Inc. 2 property is as follows:

Land Cover Type	*Acreage*
Riparian Trees & Shrubs	36.8

Conservation Targets
Farm and Wetlands 2 currently contains three conservation targets: riparian forests, freshwater wetlands, and salmon. The freshwater wetlands will be protected and maintained. The riparian forests will likely be subject to future restoration efforts to expand the spatial area of forest on this site. The Cosumnes River, which passes through this site, supports both salmon passage and salmon floodplain rearing. Giant garter snake has not been documented on this site; although suitable snake habitat may exist.

Land Management Notes
- Sometimes commonly referred to as Mac World or old Nicolaus Ranch.
- Levee present on Farm and Wetlands Inc. 2.

Fitzgerald
Owner: Bureau of Land Management

Acquisition Date: 1992 Property Acreage: 1019.2
USGS Quad: Bruceville

Property Description
The boundaries and location of this property are shown in Figure 7.14. This property is owned in fee title by BLM. A portion of this property is within the 100-year FEMA zone. Soils are classified as Prime, Unique, and of Statewide and Local Importance. The property contains five structures: an Equipment Pad, Pole Barn, Hay Barn, Farm Center, and BLM Shop. Desmond Road and Bruceville Road, both public roads, cross this site and provide vehicular access. The railroad track crosses this site.

Land Cover Summary
As shown in Figure 7.15, land cover for the Fitzgerald property is as follows:

Land Cover Type	*Acreage*
Agricultural Infrastructure	7.0
Grasslands	75.8
Managed Marsh	245.6
Rice	527.3
Riparian Trees & Shrubs	49.8
Riparian Vegetation	111.2
Water	2.6

Conservation Targets
The Fitzgerald Property is known to contain three of the six conservation targets: riparian forest, freshwater wetland, and salmon. An additional conservation target, GGS, may be present due to habitat conditions but has not been documented on this site. The existing extent of the riparian forest will be maintained and it is proposed that future management strategies include work to convert the southeast corner of the property to riparian forests. The existing freshwater wetlands on the site will be maintained and if feasible, the quality of this habitat will be enhanced. Floodplains located on the site currently support rearing of juvenile salmon. This habitat will be protected and possibly enhanced in the future.

Land Management Notes
- Levee present on Fitzgerald property.
- Routine maintenance of existing pumps, water lines, and water control structures.
- Invasive plants, pepperweed and starthistle, are present on the site.
- Agricultural lease (rice)

Fitzgerald Farms
Owner: The Nature Conservancy

Acquisition Date: 1992 Property Acreage: 75.4
USGS Quad: Bruceville

Property Description
The boundaries and location of this property are shown in Figure 7.14. A portion of Fitzgerald Farms lies within the 100-year FEMA zone. This property contains two residential structures, which are rented out. The site is subject to a Williamson Act contract with the County. Soils are classified as Prime, Unique, and of Statewide Importance.

Land Cover Summary
As shown in Figure 7.15, land cover for the Fitzgerald Farms property is as follows:

Land Cover Type	*Acreage*
Developed	9.6
Grasslands	7.8
Managed Marsh	0.3
Rice	56.8
Riparian Vegetation	1.1

Conservation Targets
The Fitzgerald Farms property contains one conservation target, freshwater wetland (*i.e.*, managed marsh). These wetlands will be protected and, if feasible, the habitat quality will be enhanced through future land-management strategies. Another conservation target, GGS, may exist on this property as this species is known to utilize rice fields as habitat. However, the presence of this species on the property has not been documented.

Land Management Notes
- Invasive plant, pepperweed, present on site.
- Routine maintenance of existing, pumps, water control structures and two residences.
- Agricultural least (rice)

Grizzly Slough DWR
Owner: CA Department of Water Resources

Acquisition Date: 1990 Property Acreage: 486.5
USGS Quad: Bruceville and Thornton

Property Description
The boundaries and location of this property are shown in Figure 7.18. This property contains 429 linear feet of frontage along the Cosumnes River, 1,707 linear feet along Bear Slough, and 5,886 linear feet along Grizzly Slough. It is within the 100-year FEMA zone. Soils are classified as Prime, Unique, and Locally Important.

Land Cover Summary
As shown in Figure 7.19, land cover for the Grizzly Slough property is as follows:

Land Cover Type	*Acreage*
Idle	386.2
Riparian Trees & Shrubs	52.6
Riparian Vegetation	41.6
Water	5.9

Conservation Targets
The Grizzly Slough DWR property currently supports both riparian forest and freshwater wetland conservation targets. Preserve staff will invest future effort to expand the spatial habitat area of both the riparian forest and the freshwater wetland by following a conceptual restoration plan previously developed by the Department of Water Resources for this property. Giant garter snake has not been documented on this site although suitable snake habitat may exist. It should be noted that the northern portion of this site was previously restored as a mitigation site.

Land Management Notes
- An easement was granted to CDFG along a small northern portion of the site.
- 34.6 acres dedicated as mitigation for Thorton New Hope Flood Control project.
- Conceptual restoration plan developed to restore the site to valley oak forest and upland.
- Existing dam diverts flows.
- Two pumps supply water from Grizzly Slough and Bear Slough, which intersect on this property.

Kraus BLM
Owner: Bureau of Land Management

Acquisition Date: 1991 Property Acreage: 242.6
USGS Quad: Bruceville

Property Description
The location and boundaries for this property are shown in Figure 7.10. Kraus BLM is located along Franklin Boulevard, across the street from the Visitor Center. A portion of this site is within the 100-year FEMA flood zone.

Land Cover Summary
As shown in Figure 7.11, land cover for Kraus BLM is as follows:

Land Cover Type	*Acreage*
Developed	0.3
Grasslands	28.2
Managed Marsh	182.5
Riparian Trees & Shrubs	2.9
Riparian Vegetation	21.7
Water	7.2

Conservation Targets:
The Kraus BLM currently supports two conservation targets: riparian and freshwater wetlands. Most of the area classified as freshwater wetlands are ponds that are managed by BLM staff with a specified flood-up and draw-down schedule. One of the freshwater wetlands on this site exhibits some vernal pool characteristics. These habitat types will be protected and maintained on this site in the future. Giant garter snake is not documented; however the Preserve may plan for future restoration to provide suitable habitat for this species.

Land Management Notes:
- Site contains boardwalk, vault toilet, and parking lot.
- Routine maintenance of on-site pumps, water lines, and water control structures.
- Levee present on-site.

Kraus DU
Owner: Ducks Unlimited

Acquisition Date: 1991 Property Acreage: 245.0
USGS Quad: Bruceville

Property Description
The location and boundaries for this property are shown in Figure 7.10. A portion of this property lies within the 100-year FEMA flood zone. This site is enrolled in a Williamson Act Contract with the county.

Land Cover Summary
As shown in Figure 7.11, land cover for Kraus DU property is as follows:

Land Cover Type	*Acreage*
Grasslands	66.5
Managed Marsh	120.3
Riparian Trees & Shrubs	19.6
Riparian Vegetation	3.7
Tule & Sedge	31.3
Water	3.6

Conservation Targets
The Kraus DU property currently supports two conservation targets: riparian forest and freshwater wetlands. A previous restoration effort on this site has now resulted in maturing cottonwoods and other riparian forest plants. These habitat types will be protected and maintained. It is anticipated that the amount of riparian habitat present on this site will increase over time due to passive trends in plant growth. The Preserve anticipates future management actions to restore habitat suitable for the giant garter snake on the Krauss DU property.

Land Management Notes
- Routine maintenance of on-site water lines and water control structures.
- Levee present on-site.

McCormack-Williamson (Bean Ranch)
Owner: The Nature Conservancy

Acquisition Date: 1999 Property Acreage: 1,713.4
USGS Quad: Bruceville and Thorton

Property Description
The location and boundaries of this property are shown in Figure 7.8. This property is located west of I-5 and north of Staten Island. It has four linear miles of frontage along the Mokelumne River and is within the 100-year FEMA flood zone. This site is enrolled in a Williamson Act contract with the County. Soils are classified as Prime and Unique.

Land Cover Summary
As shown in Figure 7.9, land cover for the McCormack Williamson property is as follows:

Land Cover Type	*Acreage*
Agricultural Infrastructure	2.9
Crops - Annual or Truck & Berry	1,231.0
Developed	1.1
Grain and Hay Crop	264.2
Grasslands	130.8
Riparian Vegetation	56.5
Water	26.9

Conservation Targets
The McCormick Williamson Tract currently supports two conservation targets: riparian forest and salmon. The Mokelumne River passes through this site and allows salmon passage. An Environmental Impact Report prepared by the Department of Water Resources for the North Delta project will address future management of this site and anticipate restoration efforts within the 2008–2018 timeframe. Future management actions are anticipated to restore freshwater wetlands and riparian scrub habitat on this site. An existing small marsh supports a small stand of willow trees. Giant garter snake has not been documented although suitable habitat may exist for this species. The riparian scrub habitat on this property supports elderberry shrubs and exit holes of the valley elderberry longhorn beetle have been found in some of the elderberry shrubs. The levees ringing this island are being re-sloped in order to accommodate future flooding of the island and restoration to marsh habitat. Native species are being restored on the re-sloped levees.

Land Management Notes
- Routine maintenance of on-site water lines.
- Levee present on-site.
- Agriculture managed via lease to private farmer.
- Invasive plants, fig and locust present on site.
- TV tower lease.

McFarland
Owner: California Department of Fish & Game

Acquisition Date: 1991 Property Acreage: 1116.9
USGS Quad: Galt and Bruceville

Property Description
The location and boundaries of this property are shown in Figure 7.20. The McFarland property has 1.6 linear miles of frontage along the Cosumnes River. Soils are classified as Prime and Locally Important. A portion of this site is within the 100-year FEMA zone.

Land Cover Summary
As shown in Figure 7.21, land cover on the McFarland property is as follows:

Land Cover Type	*Acreage*
Agricultural Infrastructure	9.1
Crops – Annual or Truck & Berry	48.5
Freshwater Marsh	15.6
Grasslands	714.9
Perennial Woody Crops	1.2
Riparian Trees & Shrubs	263.4
Riparian Vegetation	62.8
Water	1.2

Conservation Targets
The McFarland property currently supports riparian forests and salmon conservation targets. The existing riparian habitat includes a riparian scrub with oak and cottonwood trees located in the northwest corner of the site and willows trees located along the borrow ditch. The Preserve anticipates future management actions to expand the spatial extent of the riparian forest covered on this site. The Cosumnes River crosses this site and allows salmon to swim upstream. Giant garter snake has not been documented on this site although suitable snake habitat may exist.

Land Management Notes
- Levee present on McFarland Ranch.
- Routine maintenance of on-site water lines.
- Grazing lease.

McFarland–Orr Ranch
Owner: Sacramento County

Acquisition Date: 1991 Property Acreage: 102.7
USGS Quad: Galt & Bruceville

Property Description
The location and boundaries of this property are shown in Figure 7.20. Soils are classified as Prime and Important both statewide and locally. A portion of this site is within the 100-year FEMA flood zone.

Land Cover Summary
As shown in Figure 7.21, land cover on McFarland–Orr Ranch property is as follows:

Land Cover Type	*Acreage*
Agricultural Infrastructure	9.1
Crops – Annual or Truck & Berry	1.9
Grasslands	90.4
Perennial Woody Crops	1.3

Conservation Targets
The McFarland–Orr property is not known to support any conservation targets.

Land Management Notes
See the McFarland Ranch Master Plan.

Nicolaus Ranch
Owner: The Nature Conservancy

Acquisition Date: 1988 Property Acreage: 465.1
USGS Quad: Bruceville

Property Description
The boundaries and location of this property are shown in Figure 7.18. This property has 1.4 linear miles of frontage along the Cosumnes River and is within the 100-year FEMA flood zone. In addition to fee ownership by TNC, this property is protected through a WRP easement granted to NRCS on May 13, 1996, covering 271 acres. This property is enrolled in a Williamson Act Contract with the County.

Land Cover Summary
As shown in Figure 7.19, land cover for Nicolaus Ranch is as follows:

Land Cover Type	*Acreage*
Grasslands	34.2
Riparian Trees & Shrubs	237.8
Riparian Vegetation	190.1
Water	3.0

Conservation Targets
The Nicolaus Ranch property currently supports three of the six conservation targets: riparian forests, freshwater wetland, and salmon. The existing freshwater wetland will be protected and maintained on this site. Future management actions are anticipated to expand significantly the spatial extent of riparian forests because in 1995 the floodplain was re-integrated with the hydrologic flooding cycle on the Cosumnes River and this flooding is anticipated to passively restore riparian habitat. The Cosumnes River allows existing salmon passage and the associated floodplains support salmon floodplain rearing. Although giant garter snake has not been documented at this site, suitable snake habitat may exist.

Land Management Notes
- Levee present on Nicolaus Ranch.
- Invasive plant, locust, present on site.

Oneto Horseshoe
Owner: The Nature Conservancy

Acquisition Date: 2007 Property Acreage: 324.2
USGS Quad: Galt and Bruceville

Property Description
The boundaries and location of this triangular-shaped property are shown in Figure 7.22. The Oneto Horseshoe property has almost 1,600 linear feet of frontage along the Cosumnes River and is within the 100-year FEMA flood zone. Soils are classified as Prime, Unique, and of Statewide Importance.

Land Cover Summary
As shown in Figure 7.23, the land cover for the Oneto Horseshoe property is as follows:

Land Cover Type	*Acreage*
Crops - Annual or Truck & Berry	151.3
Grain and Hay Crop	2.6
Grasslands	1.2
Perennial Woody Crops	123.3
Riparian Trees & Shrubs	11.1
Riparian Vegetation	33.5
Water	1.6

Conservation Targets
The Oneto Horseshoe property currently supports two conservation targets: riparian forest and salmon. This site is within the mapped riparian corridor of the Cosumnes River. Future management actions are anticipated to restore riparian habitat. Although the site is dry and sandy, it does experience flooding and this allows salmon passage and supports salmon floodplain rearing. Giant garter snake is not documented on this site, but suitable snake habitat may exist here.

Land Management Notes
- The site's existing vineyard will be converted to irrigated pasture or annual crops as mitigation for environmental impacts incurred by a third party elsewhere.
- A future easement may be overlayed on top of agricultural areas.
- Low-flow culverts and sand deposition.
- A levee is located on the Oneto Horseshoe property.
- Water lines present.

Shaw Central
Owner: California Department of Fish & Game

Acquisition Date: 1996 Property Acreage: 223.1
USGS Quad: Galt and Bruceville

Property Description
The boundaries and location of this property are shown in Figure 7.22. This 223 acre property, acquired by the Preserve in 1996, is owned in fee title by the California Department of Fish & Game. The Shaw Central property has approximately 3,355 linear feet of frontage along the Cosumnes River. The property has no structures, fences, gates, railroad crossings, or public trails on it. The site is designated as having Prime soils suitable for farmland and grazing, although only one-half acre is actually farmed. Soils on the site are also identified as suitable for restoration to riparian forests. The site contains no ponds or vernal pools. It is located within a mapped FEMA flood zone.

Lambert Road, a public road, provides access to the property via an access easement across neighboring private property. Another road leading from Twin Cities Road also provides vehicular access.

Land Cover Summary
As shown in Figure 7.23, land cover for the Shaw Central property is as follows:

Land Cover Type	*Acreage*
Crops - Annual or Truck & Berry	0.5
Riparian Trees & Shrubs	122.0
Riparian Vegetation	94.5
Grassland	0.8
Water	5.3

Conservation Targets
The Shaw Central property currently supports three conservation targets: riparian forest, freshwater emergent wetlands, and salmon. The Preserve will continue to maintain and protect the freshwater emergent wetland and salmon habitat on this site. The Cosumnes River passes through this site and provides the salmon passage. The river is seasonal here, drying up during periods with reduced flow (primarily summer and fall). Preserve staff will invest future effort to expand the spatial habitat area of riparian forest on this site.

Land Management Notes
- Invasive plants have been identified on this property, including black locust, chinese pistache, giant reed, osage orange, perennial pepperweed, tree of heaven, and white mulberry.
- Along the southwest boundary, an open area surrounded by forest was previously planted with acorns.
- Approximately 3,645 linear feet of levee is located on the Shaw Central property.

Shaw South
Owner: The Nature Conservancy

Acquisition Date: 1996 Property Acreage: 219.4
USGS Quad: Galt and Bruceville

Property Description
The boundaries and location of this property are shown in Figure 7.22. This property has over 500 linear feet of frontage along Laguna Creek and is within the 100-year FEMA flood zone. Soils are classified as Prime, Unique, and Important both statewide and locally.

Land Cover Summary
As shown in Figure 7.23, land cover for the Shaw South property is as follows:

Land Cover Type	*Acreage*
Freshwater Marsh	12.9
Grain and Hay Crop	3.3
Grasslands	45.1
Idle	153.5
Perennial Woody Crops	0.1
Riparian Trees & Shrubs	1.2
Riparian Vegetation	2.3
Vernal Pool Grassland	0.6
Water	0.4

Conservation Targets
The Shaw South property currently supports two conservation targets: riparian forest and freshwater emergent wetland. The riparian habitat is located at the southern end of this site and is relatively small in size. There is no realistic potential for restoring additional riparian habitat here. The Preserve will continue to protect and maintain the habitat for these two conservation targets. The giant garter snake has not been documented on this property; however, Laguna Creek is perennial and may be suitable habitat for the snake.

Land Management Notes
- Approximately 4,500 linear feet of levee is located on the Shaw South property.
- Water lines present

Silverado
Owner: Bureau of Land Management

Acquisition Date: 9/4/2001 Property Acreage: 129.3
USGS Quad: Bruceville

Property Description
The boundaries and location of this property are shown in Figure 7.18. Soils are classified as Prime and Important Statewide. A portion of this site lies within the 100-year FEMA zone.

Land Cover Summary
As shown in Figure 7.19, land cover for the Silverado property is as follows:

Land Cover Type	*Acreage*
Freshwater Marsh	8.5
Grasslands	99.8
Managed Marsh	0.7
Perennial Woody Crops	1.1
Riparian Trees & Shrubs	5.9
Water	13.3

Conservation Targets
The Silverado property currently supports the riparian forest and the freshwater wetland conservation targets. The Preserve will protect and maintain these habitats. If feasible, management tools may be used to enhance the quality of these existing habitats. The giant garter snake is not documented on this site. However, the lower portions do experience flooding and this is conducive to providing suitable habitat conditions for the giant garter snake.

Land Management Notes
- Field survey by a licensed land surveyor is needed to verify that fence marks the correct boundary line between adjacent properties.
- Levee present on Silverado property.
- Routine maintenance of on-site water lines and water control structures.
- Invasive plant, pepperweed, is present on the site.

Staten Island
Owner: The Nature Conservancy

Acquisition Date: 11/15/2001 Property Acreage: 9,218.4
USGS Quad: Thornton and Isleton

Property Description
The location and boundaries of this property are shown in Figure 7.4. Staten Island has approximately 25 linear miles of frontage on the Mokelumne River, on both the north and the south forks. The property is completely surrounded by levees and is within a mapped FEMA flood zone. The property is enrolled in a Williamson Act contract and soils on the property are classified as Prime agricultural soils. The property contains many privately managed structures including houses, shops, the mill, and silos. North Staten Island Road provides vehicular access.

Land Cover Summary
As shown in Figure 7.5, a large majority of the Island is utilized for farming crops, such as annual, truck, and berry crops. Approximately 609.6 acres are developed for roads, housing, and agricultural infrastructure. Open water surface area is included in this acreage. Grasslands are located on the land-side levee slopes.

Land Cover Type	*Acreage*
Agricultural Infrastructure	609.7
Crops - Annual or Truck & Berry	8,608.9

Conservation Targets
Staten Island does not currently support any of the Preserve's conservation targets. It does provide several thousand acres of prime habitat for sandhill cranes and other waterbirds.

Land Management Notes
The Department of Water Resources holds a flood easement on the property. The water infrastructure includes two pumping plants, miles of ditches, and 20+ siphons. Other on-site infrastructure includes a few fences and gates located at the north end of the island. The farming operation on Staten Island is currently managed by Conservation Farms & Ranches (CF&R), a non-profit organization that is a subsidiary of The Nature Conservancy. The majority of the CF&R staff live on-site with their families.

The 26 miles of levee along Staten Island require a significant annual maintenance investment by The Nature Conservancy.

Stokes
Owner: The Nature Conservancy

Acquisition Date: 2006 Property Acreage: 209.3
USGS Quad: Bruceville

Property Description
The location and boundaries for this property are shown in Figure 7.10. Stokes is located west of and adjacent to I-5. The southern boundary of this property lies adjacent to a small slough. Soils are classified as Prime and of Statewide Importance.

Land Cover Summary
As shown in Figure 7.11, land cover for the Stokes property is as follows:

Land Cover Type	*Acreage*
Agricultural Infrastructure	7.4
Crops – Annual or Truck & Berry	191.2
Developed	2.1
Riparian Vegetation	6.9
Water	1.7

Conservation Targets
The Stokes property supports one conservation target, riparian forest. This habitat will be protected and maintained. Staff may invest routine effort to maintain and to enhance the quality of existing habitat.

Land Management Notes
- Agricultural activities on this property are managed via a lease agreement with a private farmer.
- Routine maintenance of on-site water lines.
- Levee present on-site.

Valensin - Access Road
Owner: CA Department of Fish & Game

Acquisition Date: 1997 Property Acreage: 204.9
USGS Quad: Galt

Property Description
The boundaries and location of this property are shown in Figure 7.28. This 204.9-acre property is located west of Highway 99. It has over 1,500 linear feet of frontage along Badger Creek; however a portion of the creek is channelized in this region. Site is within the 100-year FEMA zone. Soils are designated as Prime, Unique, Locally Important, and Important Statewide.

Land Cover Summary
As shown in Figure 7.29, land cover for the Valensin - Access Road property is as follows:

Land Cover Type	*Acreage*
Crops - Annual or Truck & Berry	37.5
Developed	5.2
Freshwater Marsh	24.8
Grasslands	124.2
Riparian Vegetation	2.6
Tule & Sedge	7.1
Water	3.5

Conservation Targets
Valensin - Access Road property currently supports three conservation targets: riparian forest, freshwater emergent wetlands, and giant garter snakes. The Preserve will continue to protect and maintain these conservation targets. Ecological enhancements to the quality of the existing marsh habitat by controlling invasive plants and enhancing water flows are planned.

Land Management Notes
- Several years ago, a restoration project was attempted on one portion of this site, Dillard West field. This restoration was assisted by school children who planted acorns. Unfortunately the result is stunted vegetation that staff believe may be due to clay pan soils, which are known to hamper the growth of oak trees. The clay pan soils are spatially distributed in a non-continuous, patchy arrangement. It may be possible to find nearby areas without clay pan hard soils that would better support oak tree growth.
- An invasive plant, water primrose, exists on the property and management may be needed to avoid future threats to conservation targets.
- Known giant garter snake habitat.
- CRP staff commonly refers to part of this property as “Snake Marsh.”
- EQIP grant recently funded irrigation improvements.
- Routine maintenance of on-site pond.
- Routine maintenance of on-site water lines.

Valensin Badger Creek Unit
Owner: California Department of Fish & Game

Acquisition Date: 12/21/1995 Property Acreage: 826.9
USGS Quad: Galt

Property Description
The boundaries and location of this property are shown in Figure 7.26. This property has almost 2.5 miles of frontage on Badger Creek and 0.7 miles of frontage on the Cosumnes River. It is within the 100-year FEMA flood zone. TNC originally acquired the property and then sold the fee title to the California Department of Fish & Game.

Land Cover Summary
As shown in Figure 7.27, land cover for the Valensin Badger Creek Unit is as follows:

Land Cover Type	*Acreage*
Crops - Annual or Truck & Berry	0.2
Freshwater Marsh	113.2
Grasslands	53.9
Riparian Trees & Shrubs	170.2
Riparian Vegetation	20.8
Vernal Pool Grassland	454.5
Water	14.1

Conservation Target
The Badger Creek property supports four of the six conservation targets: riparian forest, vernal pool grasslands, freshwater wetlands, and giant garter snake. Although the spatial extent that these conservation targets occupy will not be expanded on this property, the Preserve does intend to enhance the quality of the existing habitat. For example, giant garter snakes utilize a freshwater wetland area commonly referred to as “Snake Marsh.”

Land Management Notes
- A weed, water primrose, has invaded Snake Marsh and reduced the habitat quality. Preserve staff will utilize management tools to manage the primrose to reduce its extent and, if possible, eradicate it.
- Levee is present on-site.
- Agricultural lease.

Valensin - East Riley
Owner: The Nature Conservancy

Acquisition Date: 1994 Property Acreage: 587.3
USGS Quad: Galt

Property Description
The boundaries and location of this property are shown in Figure 7.34. It has over 3,400 linear feet of frontage on two forks of Badger Creek and is in the 100-year FEMA flood zone. The Valensin - East Riley property is enrolled in a Williamson Act contract. On-site soils are classified as being Important Statewide.

Land Cover Summary
As shown in Figure 7.35, land cover on the Valensin - East Riley property is as follows:

Land Cover Type	*Acreage*
Agricultural Infrastructure	0.1
Crops - Annual or Truck & Berry	1.9
Freshwater Marsh	70.2
Grain and Hay Crop	0.4
Grasslands	15.8
Irrigated Pasture	0.6
Vernal Pool Grassland	498.3

Conservation Targets;
Valensin - East Riley property is known to support two conservation targets, vernal pool-grassland and freshwater emergent wetlands. It is not known whether giant garter snakes are found on this property.

Land Management Notes
- Routine management of ponds and water lines needed.
- Prescribed burn has been used to actively manage this property.
- Invasive plant species, water primrose and waxy mannagrass, are present.
- There is a small amount of money in a reserve account held by The Nature Conservancy for management, such as repairs and restoration, for this parcel. These funds were tied to the purchase and restricted to use on this parcel.

Valensin - Horseshoe
Owner: Sacramento County

Acquisition Date: 1994 Property Acreage: 291.5
USGS Quad: Galt

Property Description
The boundaries and location of this property are shown in Figure 7.28. This site is named for the existing lake, called Horseshoe Lake. The site has over 2,400 linear feet of frontage on the North and South Forks of Badger Creek and 500 feet along Badger Creek. The property is within the designated 100-year FEMA zone.

Land Cover Summary
As shown in Figure 7.29, land cover for the Valensin - Horseshoe property is as follows:

Land Cover Type	*Acreage*
Developed	0.3
Freshwater Marsh	112.5
Grasslands	43.3
Idle	0.1
Riparian Trees & Shrubs	11.9
Vernal Pool Grassland	113.8
Water	9.6

Conservation Targets
The Valensin - Horseshoe property is known to support three conservation targets: riparian forest, vernal pool-grassland, and freshwater wetlands. The Preserve will continue to protect and maintain these conservation targets. Enhancements to these existing conservation targets will also be assessed and implemented if feasible. Preserve staff believes this site is probable giant garter snake habitat and will invest future effort to assess the potential for expanding the spatial habitat area for this species.

Land Management Notes
- Routine maintenance of on-site water lines.
- Routine maintenance of on-site pond.
- Invasive plant species, water primrose, present.

Valensin - Pocket
Owner: California Department of Fish & Game

Acquisition Date: 2/4/1994 Property Acreage: 180.1
USGS Quad: Galt

Property Description
The boundaries and location of this property are shown in Figure 7.26. This property also has an agricultural easement granted to the American Farmland Trust. Acreage of the easement is not specified. Soils are classified as Prime, Unique, and of Statewide Importance. The property is also within the 100-year FEMA zone. A railroad track crosses through this site.

Land Cover Summary
As shown in Figure 7.27, land cover for the Valensin - Pocket property is as follows:

Land Cover Type	*Acreage*
Crops - Annual or Truck & Berry	156.5
Freshwater Marsh	0.2
Grasslands	10.2
Riparian Trees & Shrubs	10.8
Vernal Pool Grassland	2.4

Conservation Targets
The Valensin - Pocket supports two conservation targets, riparian forest and giant garter snake. Giant garter snake habitat is located near the railroad tracks that cross this site. The Preserve will protect the existing habitat for these targets and, if feasible, enhance the habitat quality.

Land Management Notes
- Levee is on-site.
- Dove hunts.
- Agricultural lease.

Valensin - Ranch House
Owner: The Nature Conservancy

Acquisition Date: 1996 Property Acreage: 439.0
USGS Quad: Galt

Property Description
The boundaries and location of this property are shown in Figure 7.28. The property has over 7,000 linear feet of frontage along a tributary of Badger Creek and is located with the 100-year FEMA zone. The site is enrolled in a Williamson Act contract with the County.

Land Cover Summary
As shown in Figure 7.29, land cover for the Valensin - Ranch House is as follows:

Land Cover Type	*Acreage*
Crops - Annual or Truck & Berry	0.6
Developed	0.7
Freshwater Marsh	8.4
Grasslands	0.4
Vernal Pool Grassland	428.9

Conservation Target
Valensin - Ranch House Property currently supports three conservation targets: riparian forest, vernal pool-grassland, and freshwater wetlands. Staff will maintain and enhance the quality of this existing habitat.

Land Management Notes
- Routine maintenance of on site levee.
- Routine maintenance of on site water lines.

Valensin - West Riley
Owner: The Nature Conservancy

Acquisition Date: 1996 Property Acreage: 803.7
USGS Quad: Galt

Property Description
The location and boundaries of this property are shown in Figure 7.32. This property fronts along the North Fork Badger Creek. The property is located within the 100 year FEMA zone. Attempts were made to plant oak trees, but all the planted trees died due to soil hardpan. A Williamson Act contract applies to this site. Dillard Road bisects this property and provides vehicular access.

Land Cover Summary
As shown in Figure 7.33, land cover for the Valensin - West Riley property is as follows:

Land Cover Type	*Acreage*
Developed	4.8
Freshwater Marsh	39.2
Grasslands	65.7
Irrigated Pasture	2.3
Riparian Trees & Shrubs	59.8
Riparian Vegetation	2.0
Vernal Pool Grassland	629.7

Conservation Targets
The Valensin - West Riley property currently supports two conservation targets, riparian forest and vernal pool/grassland. Staff will maintain and enhance the quality of the existing habitat.

Land Management Notes
- Routine maintenance of on-site levee needed.
- Routine maintenance of on-site pond.

Valensin WRP 2
Owner: The Nature Conservancy

Acquisition Date: 5/30/1997 Property Acreage: 945.7
USGS Quad: Galt

Property Description
The location and boundaries of this property are shown in Figure 7.32. Located between Arno Road to the South and Dillard Road to the north, this flag-shaped property includes approximately 945 acres owned in fee-title by The Nature Conservancy. This property also has a WRP easement granted to NRCS over 940 acres. This property has frontage along Badger Creek and is within the 100-year FEMA flood zone.

Land Cover Summary
As shown in Figure 7.33, land cover for Valensin WRP 2 is as follows:

Land Cover Type	*Acreage*
Crops - Annual or Truck & Berry	0.3
Developed	0.1
Grasslands	48.4
Idle	0.2
Riparian Vegetation	95.9
Vernal Pool Grassland	796.7
Water	4.1

Conservation Targets
The Valensin WRP 2 currently supports three conservation targets: riparian forests, vernal pool-grassland, and freshwater emergent wetlands. The Preserve will protect and maintain the riparian forests and the vernal pool-grassland. Staff will invest future efforts to restore and enhance the restored freshwater wetland ponds that were previously created in the north fork of Badger Creek. This site currently supports several freshwater ponds that are classified as freshwater emergent wetlands. Some of the ponds are seasonal and dry out during the summer and fall; others hold water all year, partially due to the water control structures which supply fresh water. The ponds may also receive water from nearby alfalfa farm irrigation, which drains towards this site. The ponds support waterfowl and shorebirds. Willows and cottonwoods were previously planted by Preserve staff as part of a former restoration effort. The dam on the north fork of Badger Creek was designed to be “flow over” so water flows over the top. Field surveys conducted in 1997/1998 and in 2002 did not find giant garter snakes here.

Land Management Notes
- The fate of the restoration on North Fork Badger Creek (by California Waterfowl Association and/or Ducks Unlimited) has not yet been determined.

- Invasive plant species, water primrose, present on site.
- Wetlands restoration maintenance requirements and responsibilities should be detailed.
- Although dam removal might provide future benefits to conservation targets, staff need to assess the feasibility of dam removal and determine if the terms of the WRP easement would allow this restoration action.
- Potential for alteration of hydrology due to impoundments and willow and water primrose evapotranspiration.

Visitor Center
Owner: Bureau of Land Management

Acquisition Date: Deed dated 1991 and recorded in 1992
Property Acreage: 5.7
USGS Quad: Bruceville

Property Description

The location and boundaries for this property are shown in Figure 7.10. This property is owned in fee-title by BLM and houses the Preserve's Visitor Center and associated parking lot. A portion of the site is within the 100-year FEMA flood zone. Franklin Road provides vehicular and pedestrian access to the site.

Land Cover Summary
As shown in Figure 7.11, land cover on the Visitor Center property is as follows:

Land Cover Type	*Acreage*
Developed	2.0
Grasslands	2.1
Riparian Trees & Shrubs	1.6

Conservation Targets
The Visitor Center property supports two conservation targets, riparian forests and freshwater wetlands. These habitats will be protected and maintained. If feasible, the Preserve may undertake actions to enhance the quality of this existing habitat. However, a future effort to expand the spatial area occupied by these habitats on this site is not anticipated. Giant garter snake has not been documented on this site; although suitable habitat conditions may exist here.

Land Management Notes
- Levee present on-site.

Whaley DFG
Owner: California Department of Fish & Game

Acquisition Date: 1998 Property Acreage: 100.8
USGS Quad: Galt and Bruceville

Property Description
The boundaries and location of this property are shown in Figure 7.22. This site has approximately 3,800 linear feet of frontage along Laguna Creek. Soils are classified as Prime.

Land Cover Summary
As shown in Figure 7.23, land cover for the Whaley CDFG property is as follows:

Land Cover Type	*Acreage*
Crops - Annual or Truck & Berry	1.2
Grasslands	0.2
Riparian Vegetation	96.8
Water	2.6

Conservation Targets
The Whaley CDFG property is known to support two existing conservation targets, riparian forest and freshwater emergent wetland areas, which will continue to be protected and maintained by the Preserve.

It is unknown if giant garter snake occurs on this property. This site does experience some periodic flooding, mostly during high precipitation events, making it more conducive towards some conservation targets. Although Laguna Creek crosses this property, it is unlikely that salmon smolts travel up here due to lack of spawning locations and barriers, such as beaver dams.

Land Management Notes
- Levee present on-site.

Whaley SLC
Owner: State Lands Commission

Acquisition Date: 1998 Property Acreage: 193.0
USGS Quad: Galt and Bruceville

Property Description
The boundaries and location of this property are shown in Figure 7.22. Laguna Creek crosses this site. Soils are classified as Prime and of Statewide Importance. Railroad tracks cross this property.

Land Cover Summary
As shown in Figure 7.23, land cover for the Whaley SLC property is as follows:

Land Cover Type	*Acreage*
Freshwater Marsh	23.2
Grasslands	124.5
Riparian Vegetation	39.5
Vernal Pool Grassland	1.6
Water	4.1

Conservation Target
The Whaley SLC property currently supports the riparian forest conservation target. Preserve staff may invest routine effort to maintain and to enhance quality of existing habitat.

Land Management Notes
- Levee present on-site.
- Invasive plant species, water primrose, present.

Wong
Owner: Bureau of Land Management

Acquisition Date: 2003 Property Acreage: 149.2
USGS Quad: Bruceville

Property Description
The location and boundaries for this property are shown in Figure 7.10. This property is located at the southeast corner of the I-5 and Twin Cities Road interchange. A portion of this property lies within the 100-year FEMA zone. Soils are classified as Prime, Unique, and of Statewide and Local Importance.

Land Cover Summary
As shown in Figure 7.11, land cover for the Wong property is as follows:

Land Cover Type	*Acreage*
Developed	0.4
Grain and Hay Crop	112.8
Grasslands	27.0
Tule & Sedge	5.6
Water	3.4

Conservation Targets
The Wong property supports the freshwater emergent wetland conservation target. The Preserve staff will invest future effort to expand the spatial habitat area of wetlands on this site via funding provided by a grant from the North American Wetlands Conservation Act (NACWA) grant program. Federal environmental review and permitting requirements will also be met. A native grass restoration was previously completed on this site. Although giant garter snakes have not been documented on this site, it is possible that suitable habitat for this species exists here.

Land Management Notes
- Property is located adjacent to reclamation district.
- Routine maintenance of on-site water lines and water control structures.
- Levee present on-site.

EASEMENT PROPERTIES

The following pages provide information about the easements on the Preserve. Many of the easements are located on private property. There are several types of easements including conservation easements and agricultural easements.

AKT Easement
Owner: Tsakapolous, Angelo

Easement Holder: TNC
Easement Type: Conservation Easement
Acquisition Date: 1/5/99
Easement Acres: 28.8
USGS Quad: Elk Grove and Galt

Property Description
The boundaries and location of this circular shaped property are shown in Figure 7.34.

Land Cover Summary
As shown in Figure 7.35, the land cover for the AKT easement is as follows:

Land Cover Type	*Acreage*
Vernal Pool Grassland	28.8

Conservation Target:
AKT Easement property currently contains one conservation target, vernal pool grasslands. TNC will continue to monitor this easement to ensure that the vernal pool grassland habitat is maintained.

Land Management Notes
None.

Allen Ranch
Owner: Allen, William F. and Carol

Easement Holder: TNC
Acquisition Date: 2000
USGS Quad: Bruceville

Easement Type: Conservation Easement
Easement Acres: 329.0

Property Description
The boundaries and location of this property are shown in Figure 7.22.

Land Cover Summary
As shown in Figure 7.23, land cover for Allen Ranch easement area is as follows:

Land Cover Type	*Acreage*
Agricultural Infrastructure	4.2
Crops - Annual or Truck & Berry	188.0
Freshwater Marsh	28.3
Grain and Hay Crop	27.5
Grasslands	7.7
Idle	56.9
Irrigated Pasture	0.4
Perennial Woody Crops	0.1
Riparian Trees & Shrubs	9.0
Riparian Vegetation	6.9

Conservation Target:
The Allen Ranch property currently contains two conservation targets, riparian forest and freshwater wetlands.

Land Management Notes
None.

Ben Brown Ranches
Owner: Ben Brown Ranches, Inc.

Easement Holder: TNC
Acquisition Date: 10/4/2002
USGS Quad: Carbondale

Easement Type: Conservation Easement
Easement Acres: 373.6

Property Description
The boundaries and location of this property are shown in Figure 7.42

Land Cover Summary
As shown in Figure 7.43, land cover for Ben Brown Ranches is as follows:

Land Cover Type	*Acreage*
Grasslands	0.7
Vernal Pool Grassland	371.4
Water	1.5

Conservation Targets
The Ben Brown property currently supports vernal pools within a matrix of grassland habitat. TNC will monitor this easement to ensure that conservation targets are protected.

Land Management Notes
None.

Desmond
Owner: Johnson, Michael and Laura

Easement Holder: TNC
Acquisition Date: January 8, 1996
USGS Quad: Bruceville

Easement Type: Conservation Easement
Easement Acres: 371.3

Property Description
The boundaries and location of this easement area are shown in Figure 7.16. This privately owned property is located on the southeast corner of Twin Cities Road and Bruceville Road.

Land Cover Summary
As shown in Figure 7.17, land cover for the Desmond easement is as follows:

Land Cover Type	*Acreage*
Developed	1.7
Irrigated Pasture	368.7
Rice	0.9

Conservation Targets
The Desmond property is not known to currently support any conservation targets. Giant garter snake has not been documented on this site property; although suitable habitat conditions do exist to support this species.

Land Management Notes
None.

Flint 2
Owner: Flint, Robert Wendel

Easement Holder: TNC Easement Type: Conservation Easement
Acquisition Date: 6/7/2006 Easement Acres: 30.1
USGS Quad: Bruceville

Property Description
The boundaries and location of this rectangular-shaped property are shown in Figure 7.16. This privately owned property is used predominantly for agriculture.

Land Cover Summary
As shown in Figure 7.17, land cover on the Flint 2 easement area is as follows:

Land Cover Type	*Acreage*
Crops - Annual or Truck & Berry	28.9
Riparian Vegetation	1.2

Conservation Targets:
The Flint 2 easement currently supports riparian habitat on the levees located along its southern property line. This riparian habitat will be protected and maintained by Preserve staff via routine monitoring of the easement and other tools. Giant garter snake has not been documented here; although suitable snake habitat may exist here.

Land Management Notes
- Although not a conservation target, this site provides Swainson's hawk habitat.
- A small residential structure (cabin) is for the personal use of the private property owner's family.

Forster
Owner: Chance, Judith and Jim

Easement Holder: TNC
Acquisition Date: 3/10/2004
USGS Quad: Goose Creek and Clements

Easement Type: Conservation Easement
Easement Acres: 2,908.2

Property Description
The location and boundaries of this property are shown in Figure 7.46. This large triangular-shaped property is privately owned.

Land Cover Summary
As shown in Figure 7.47, land cover on the Forster property is as follows:

Land Cover Type	*Acreage*
Blue Oak Woodland	47.5
Grasslands	14.6
Vernal Pool Grassland	2832.2
Water	13.9

Conservation Targets
The Forster easement area currently supports vernal pool grassland and blue oak woodland conservation targets. Blue oak woodland is located in the northeast corner of the property. Vernal pools are located in the northwest corner of the site. TNC will monitor this easement to ensure conservation targets are protected.

Land Management Notes
None.

Giovannoni
Owner: Giovannoni, Louie and Renata; Ed and Ruth Giovannoni

Easement Holder: California Department of Fish & Game, assisted by TNC
Easement Type: Conservation Easement
Acquisition Date: 8/26/2004
Easement Acres: 642.1
USGS Quad: Thornton

Property Description
The location and boundaries of this property are shown in Figure 7.6. This privately owned property is used predominantly for agriculture

Land Cover Summary
As shown in Figure 7.7, land cover for the Giovannoni is as follows:

Land Cover Type	*Acreage*
Agricultural Infrastructure	0.6
Crops - Annual or Truck & Berry	533.8
Grain and Hay Crop	99.5
Grasslands	7.7
Water	0.5

Conservation Targets
The agricultural use of the land provides a buffer between growing urbanized areas and the native habitats of the Preserve.

Property Management Notes
None.

Hoertling
Owner: Van Steyn, Anthony and Linda

Easement Holder: TNC
Acquisition Date: 2001
USGS Quad: Bruceville

Easement Type: Conservation Easement
Easement Acres: 103.7

Property Description
The location and boundaries of this property are shown in Figure 7.38. This is privately owned land and is located about 1.5 miles south of the Elk Grove city boundary. TNC holds a conservation easement across this property to facilitate the retention of agricultural land use.

Land Cover Summary
As shown in Figure 7.39, land cover on the Hoertling easement area is as follows:

Land Cover Type	*Acreage*
Developed	2.3
Irrigated Pasture	101.4

Conservation Targets
Agriculture on this site provides a buffer between urban uses and native habitats.

Land Management Notes
None.

Horizon Dairy 1
Owner: Vorhees, Ryan

Easement Holder: TNC
Acquisition Date: 3/2/2000
USGS Quad: Galt

Easement Type: Conservation Easement
Easement Acres: 500.4

Property Description
The boundaries and location of this property are shown in Figure 7.34.

Land Cover Summary
As shown in Figure 7.35, land cover for the Horizon Dairy 1 property is as follows:

Land Cover Type	*Acreage*
Freshwater Marsh	10.9
Grasslands	41.9
Irrigated Pasture	447.2
Riparian Vegetation	0.1
Water	0.3

Conservation Targets
The Horizon Dairy 1 easement area currently supports the riparian forest conservation target. Preserve staff will continue to monitor this easement to ensure that the riparian forest is protected and maintained.

Land Management Notes
None.

Horizon Dairy 2
Owner: Vorhees, Ryan

Easement Holder: TNC
Acquisition Date: 3/2/2000
USGS Quad: Galt

Easement Type: Conservation Easement
Easement Acres: 109.1

Property Description
The boundaries and location of this easement area are shown in Figure 7.34. The Horizon Dairy 2 is located directly south of the Horizon Dairy 1 easement.

Land Cover Summary
As shown in Figure 7.35, land cover for the Horizon Dairy 2 property is as follows:

Land Cover Type	*Acreage*
Agricultural Infrastructure	0.6
Freshwater Marsh	2.7
Grasslands	38.9
Irrigated Pasture	53.2
Water	13.7

Conservation Targets
The Horizon Dairy 2 easement area currently supports two conservation targets, vernal pool grassland and freshwater emergent wetlands. The vernal pools are located on the southern edge of the property, south of the North Fork of Badger Creek and will be protected and maintained. Future restoration actions are anticipated to expand the spatial area occupied by freshwater wetlands on this site. The landowner may also choose to utilize restoration as a management tool to create riparian habitat. Giant garter snakes have not been documented on this site but future restoration actions by the Preserve may provide suitable habitat for this species. This action is supported by the easement that TNC designed to support giant garter snake on this site.

Howard Ranch DFG #1
Owner: Chance, Judith and Jim

Easement Holder: Department of Fish & Game
Acquisition Date: 1999
USGS Quad: Carbondale and Goose Creek

Easement Type: Conservation Easement
Easement Acres: 3,448.0

Property Description
The location and boundaries of this property are shown in Figure 7.44. This privately-owned property lies adjacent to the other Howard Ranch easements including DFG #2 and WRP. DFG #1 and #2 easements were originally purchased with funding from the State Wildlife Conservation Board.

Land Cover Summary
As shown in Figure 7.45, land cover for Howard Ranch DFG #1 easement area is as follows:

Land Cover Type	*Acreage*
Blue Oak Woodland	2,653.9
Blue Oak-Vernal Pool-Savannah	154.3
Grasslands	72.5
Vernal Pool Grassland	567.4

Conservation Targets
The Howard Ranch currently supports two conservation targets, vernal pool grassland and blue oak woodlands. On this site, these habitat types support a rich diversity of wildlife including golden eagles and tiger salamanders. Both habitat types will be protected and maintained.

Land Management Notes
- Prescribed burning has been used successfully at this site to control invasive weed species.
- Extensive grazing studies are ongoing on this site to study the effects of cattle grazing on vernal pool habitat.

Howard Ranch DFG #2
Owner: Chance, Judith and Jim

Easement Holder: Department of Fish & Game
Easement Type: Conservation Easement
Acquisition Date: 1999
Easement Acres: 3,565.9
USGS Quad: Carbondale

Property Description
The location and boundaries of this property are shown in Figure 7.44. This privately-owned property lies adjacent to the other Howard Ranch easements including DFG #1 and WRP. DFG #1 and #2 easements were originally purchased with funding from the State Wildlife Conservation Board.

Land Cover Summary
As shown in Figure 7.45, land cover for Howard Ranch DFG #2 easement area is as follows:

Land Cover Type	*Acreage*
Blue Oak Woodland	1,287.8
Blue Oak-Vernal Pool-Savannah	212.4
Grasslands	21.9
Vernal Pool Grassland	2,041.0
Water	2.8

Conservation Targets
The Howard Ranch currently supports two conservation targets, vernal pool grassland and blue oak woodlands. On this site, these habitat types support a rich diversity of wildlife including golden eagles and tiger salamanders. Both habitat types will be protected and maintained.

Land Management Notes
- Prescribed burning has been used successfully at this site to control invasive weed species.
- Extensive grazing studies are ongoing on this site to study the effects of cattle grazing on vernal pool habitat.

Howard Ranch WRP
Owner: Chance, Judith and Jim

Easement Holder: NRCS
Acquisition Date: 1999
USGS Quad: Carbondale

Easement Type: Wetland Reserve Program
Easement Acres: 5,352.4

Property Description
The location and boundaries of this property are shown in Figure 7.44. This privately-owned property lies adjacent to the other Howard Ranch easements including DFG #1 and DFG #2.

Land Cover Summary
As shown in Figure 7.45, land cover for Howard Ranch WRP easement area is as follows:

Land Cover Type	*Acreage*
Blue Oak Woodland	271.7
Blue Oak-Vernal Pool-Savannah	1,288.9
Grasslands	3.7
Vernal Pool Grassland	3,779.2
Water	8.9

Conservation Targets
The Howard Ranch currently supports two conservation targets, vernal pool grassland and blue oak woodlands. On this site, these habitat types support a rich diversity of wildlife, including golden eagles and tiger salamanders. Both habitat types will be protected and maintained.

Land Management Notes
- Prescribed burning has successfully been used at this site to control invasive weed species.
- Extensive grazing studies are ongoing on this site to study the effects of cattle grazing on vernal pool habitat.

Kneppel
Owner: Kneppel, Darla

Easement Holder: TNC
Acquisition Date: 2000
USGS Quad: Bruceville

Easement Type: Conservation Easement
Easement Acres: 24.1

Property Description
The location and boundaries of this property are shown in Figure 7.38. This privately owned property is located east of Stones Lake and I-5. Agriculture is the predominant land use on this property.

Land Cover Summary
As shown in Figure 7.39, land cover on the Kneppel easement area is as follows:

Land Cover Type	*Acreage*
Grasslands	0.1
Irrigated Pasture	24.0

Conservation Targets
The easement on the property provides an agricultural buffer between nearby urbanizing areas and the native habitat on the Preserve.

Land Management Notes
A PG&E pipeline passes through the easement area.

Larkin 1
Owner: Larkin, Michael and Mary, et al

Easement Holder: TNC
Acquisition Date: 3/27/2004
USGS Quad: Elk Grove
Easement Type: Conservation Easement
Easement Acres: 226.0

Property Description
The location and boundaries of this property are shown in Figure 7.36. This privately owned property is located north of Dillard Road and south of the middle fork of the Cosumnes River.

Land Cover Summary
As shown in Figure 7.37, land cover on the Larkin 1 easement area is as follows:

Land Cover Type	*Acreage*
Developed	0.4
Freshwater Marsh	4.0
Grain and Hay Crop	0.1
Irrigated Pasture	8.8
Riparian Trees & Shrubs	4.9
Riparian Vegetation	5.8
Vernal Pool Grassland	201.9

Conservation Targets
The Larkin 1 and Larkin 2 properties currently support three conservation targets: riparian forests, vernal pool grassland, and freshwater wetlands. On this site (and on similar sites) the riparian stringers are associated with the freshwater marsh. Vernal pools are scattered across the Larkin property. TNC will monitor this easement to ensure protection of the conservation targets.

Land Management Notes
None.

Larkin 2
Owner: Larkin, Michael and Mary, et al

Easement Holder: TNC
Acquisition Date: March 27, 2004
USGS Quad: Elk Grove

Easement Type: Conservation Easement
Easement Acres: 82.4

Property Description
The location and boundaries of this property are shown in Figure 7.36. This privately owned property is located north of Dillard Road and south of the middle fork of the Cosumnes River.

Land Cover Summary
As shown in Figure 7.37, land cover on the Larkin 2 easement area is as follows:

Land Cover Type	*Acreage*
Riparian Trees & Shrubs	8.5
Vernal Pool Grassland	73.9

Conservation Targets
The Larkin 1 and Larkin 2 properties currently support three conservation targets: riparian forests, vernal pool grassland, and freshwater wetlands. On this site (and on similar sites) the riparian stringers are associated with the freshwater marsh. Vernal pools are scattered across the Larkin property. TNC will monitor this easement to ensure protection of the conservation targets.

Property Management Notes
None.

Machado
Owner: Machado, Frank

Easement Holder: BLM
Acquisition Date: 7/6/2000
USGS Quad: Bruceville

Easement Type: Conservation Easement
Easement Acres: 436.0

Property Description
The location and boundaries of this property are shown in Figure 7.12. This privately owned property is located north and east of the Martin Easement. Two types of easements are on this property: a typical conservation easement of 376 acres, and an additional easement of 60 acres with reduced restrictions where a house has since been built. Both easements were originally acquired by TNC and then later sold to BLM.

Land Cover Summary
As shown in Figure 7.13, land cover on the Machado easement area is as follows:

Land Cover Type	*Acreage*
Agricultural Infrastructure	0.2
Crops - Annual or Truck & Berry	38.5
Developed	5.0
Grain and Hay Crop	1.5
Grasslands	5.0
Irrigated Pasture	379.8
Riparian Vegetation	0.3
Tule & Sedge	2.4
Water	3.3

Conservation Targets
Giant garter snakes have not been documented on the Machado property; although suitable habitat may exist.

Land Management Notes
None.

Martin
Owner: Martin, Duane

Easement Holder: BLM
Acquisition Date: 9/25/1999
USGS Quad: Bruceville

Easement Type: Not specified
Easement Acres: 206.7

Property Description
The location and boundaries of this property are shown in Figure 7.12. This privately owned property is located southwest or the Machado easement. Agriculture is the primary land use on this site.

Land Cover Summary
As shown in Figure 7.13, land cover on the Martin easement is as follows:

Land Cover Type	*Acreage*
Agricultural Infrastructure	1.9
Developed	2.9
Irrigated Pasture	200.0
Riparian Vegetation	0.3
Water	1.6

Conservation Targets
Giant garter snakes have not been documented on the Martin Property; although suitable habitat may exist.

Land Management Notes
None.

Pellandini II
Owner: Pellandini, Robert E., et al.

Easement Holder: TNC
Acquisition Date: October 31, 2001
USGS Quad: Galt

Easement Type: Conservation Easement
Easement Acres: 648.5

Property Description
The boundaries and location of this easement area are shown in Figure 7.34. This privately owned property is located between Arno Road and the South Fork Badger Creek.

Land Cover Summary
As shown in Figure 7.35, land cover for the Pellandini II easement area is as follows:

Land Cover Type	*Acreage*
Agricultural Infrastructure	0.4
Crops - Annual or Truck & Berry	542.9
Grasslands	1.3
Irrigated Pasture	103.5
Perennial Woody Crops	0.3
Vernal Pool Grassland	0.1

Conservation Targets
The agriculture on this property provides an important buffer between urban uses and natural habitats.

Land Management Notes
None.

Ragsdale
Owner: Ragsdale, Jack and Marcia

Easement Holder: TNC
Acquisition Date: 2000
USGS Quad: Bruceville

Easement Type: Conservation Easement
Easement Acres: 24.4

Property Description
The location and boundaries of this property are shown in Figure 7.38. This privately owned property is located east of Stones Lake and I-5. Agriculture is the predominant land use on this property.

Land Cover Summary
As shown in Figure 7.39, land cover on the Ragsdale easement area is as follows:

Land Cover Type	*Acreage*
Irrigated Pasture	24.4

Conservation Targets
The conservation easement facilitates continued agricultural activities by the private property owner. This also serves as a buffer between urbanizing areas and the native habitats on the Preserve.

Land Management Notes
None.

Shaw North
Owner: Oneto, Melvin and Lena

Easement Holder: TNC
Acquisition Date: April 2007
USGS Quad: Bruceville

Easement Type: Agricultural Conservation Easement
Easement Acres: 151.9

Property Description
The boundaries and location of this triangular-shaped property are shown in Figure 7.22. TNC acquired the property in 1997 and later sold it to a private property owner, retaining an agricultural conservation easement.

Land Cover Summary
As shown in Figure 7.23, land cover for the Shaw North property is as follows:

Land Cover Type	*Acreage*
Agricultural Infrastructure	0.5
Crops - Annual or Truck & Berry	117.0
Perennial Woody Crops	33.4
Riparian Trees & Shrubs	1.0

Conservation Targets
Agriculture on this site provides a buffer between urbanizing areas and native habitat.

Land Management Notes
None

Schneider
Owner: Curran, Jill

Easement Holder: California Department of Fish & Game
Easement Type: Conservation Easement
Acquisition Date: 2000 (original date)
Easement Acres: 1,140.7
USGS Quad: Carbondale

Property Description
The location and boundaries of this property are shown in Figure 7.40. This privately owned property is the northern-most part of the Preserve, located off Meiss Road and along Laguna (south) Creek. This property was originally acquired by TNC in 2000 and the conservation easement was transferred to CDFG on April 4, 2001.

Land Cover Summary
As shown in Figure 7.41, land cover on the Schneider easement area is as follows:

Land Cover Type	*Acreage*
Grasslands	1.4
Vernal Pool Grassland	1133.9
Water	5.4

Conservation Targets
The Schneider property contains the vernal pool grassland conservation target. This habitat will be protected and maintained.

Land Management Notes
None.

Van Steyn
Owner: Van Steyn, Anthony and Linda

Easement Holder: TNC
Acquisition Date: 2001
USGS Quad: Bruceville

Easement Type: Conservation Easement
Easement Acres: 89.1

Property Description
The location and boundaries of this property are shown in Figure 7.38. This privately owned property is located approximately 1.6 miles south of the City of Elk Grove. Agriculture is the predominant land use on this property.

Land Cover Summary
As shown in Figure 7.39, land cover on the Van Steyn easement area is as follows:

Land Cover Type	*Acreage*
Developed	5.0
Grasslands	0.4
Irrigated Pasture	83.7

Conservation Targets
The agricultural land use provides a buffer between urbanizing areas and the native habitats on the Preserve.

Land Management Notes
None

Wilder Ranch
Owner: Johnson, Michael and Laura

Easement Holder: TNC
Acquisition Date: 1996
USGS Quad: Bruceville

Easement Type: Conservation Easement
Easement Acres: 239.1

Property Description
The location and boundaries for this rectangular-shaped property are shown in Figure 7.16. The Wilder Ranch is privately owned and managed for agriculture.

Land Cover Summary
As shown in Figure 7.17, land cover for Wilder Ranch is as follows:

Land Cover Type	*Acreage*
Crops - Annual or Truck & Berry	171.8
Irrigated Pasture	46.1
Riparian Vegetation	21.2

Conservation Targets
The Wilder Ranch property currently supports the riparian forest conservation target. A thin strip of riparian forest exists at the southern end of this property. Although giant garter snake has not been documented on this property, suitable habitat may exist.

Land Management Notes
None.

Wilkinson
Owner: McKnight, Tim

Easement Holder: TNC
Acquisition Date: 1986
USGS Quad: Bruceville and Thornton

Easement Type: Conservation Easement
Easement Acres: 87.7

Property Description
The boundaries and location of this property are shown in Figure 7.18.

Land Cover Summary
As shown in Figure 7.19, land cover for the Wilkinson property is as follows:

Land Cover Type	*Acreage*
Perennial Woody Crops	0.1
Riparian Trees & Shrubs	86.0
Water	1.6

Conservation Targets
The Wilkinson property currently contains the riparian forest conservation target. The Preserve will continue to monitor this easement and the riparian forest to ensure its protection and maintenance.

Land Management Notes
Remnant riparian forest, diverse native plants/ecosystems

Woods
Owner: Norris, Gregory R. and Yvette

Easement Holder: TNC
Acquisition Date: 1999 (original)
USGS Quad: Galt

Easement Type: Conservation Easement
Easement Acres: 151.3

Property Description
The location and boundaries of this property are shown in Figure 7.20. Located directly east of the McFarland property, this site has frontage along a tributary of the Cosumnes River. Acquired in fee title in 1999, TNC sold property to a private landowner and retained a conservation easement in 2002.

Land Cover Summary
As shown in Figure 7.21, land cover for the Woods easement area is as follows:

Land Cover Type	*Acreage*
Crops - Annual or Truck & Berry	0.5
Grasslands	141.3
Perennial Woody Crops	0.2
Riparian Trees & Shrubs	9.3

Conservation Targets
The Woods property supports the riparian forest conservation target. The small patch of riparian forest that exists along the northern edge of this property will be protected and maintained.

Land Management Notes
None.

FIGURE 7.4: BOUNDARY FOR STATEN ISLAND PROPERTY

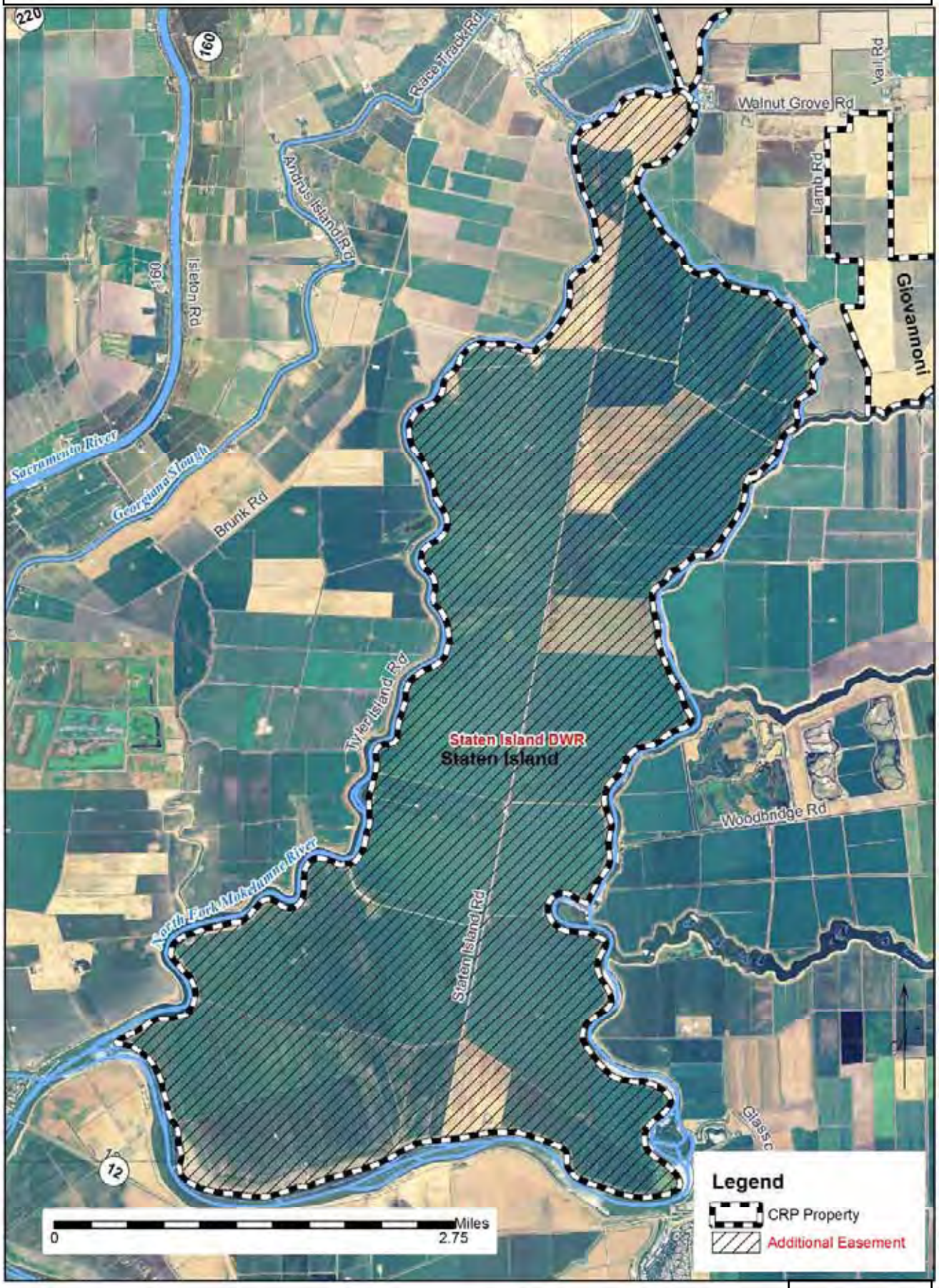


FIGURE 7.5: LAND COVER FOR STATEN ISLAND PROPERTY

Legend

- CRP Property
- Additional Easements

Land Cover

- Blue Oak Woodland
- Blue Oak-Vernal Pool-Savannah
- Grasslands
- Managed Marsh
- Tule & Sedge
- Riparian Trees & Shrubs
- Riparian Vegetation
- Freshwater Marsh
- Vernal Pool Grassland
- Water
- Agricultural Infrastructure
- Crops - Annual or Truck & Berry
- Developed
- Dry Land Farmed
- Grain and Hay Crop
- Idle
- Irrigated Pasture
- Perennial Woody Crops
- Rice

FIGURE 7.6: BOUNDARY FOR GIOVANNONI PROPERTY

FIGURE 7.7: LAND COVER FOR GIOVANNONI PROPERTY

Legend

- CRP Property
- Additional Easements

Land Cover

- Blue Oak Woodland
- Blue Oak-Vernal Pool-Savannah
- Grasslands
- Managed Marsh
- Tule & Sedge
- Riparian Trees & Shrubs
- Riparian Vegetation
- Freshwater Marsh
- Vernal Pool Grassland
- Water
- Agricultural Infrastructure
- Crops - Annual or Truck & Berry
- Developed
- Dry Land Farmed
- Grain and Hay Crop
- Idle
- Irrigated Pasture
- Perennial Woody Crops
- Rice

FIGURE 7.8: BOUNDARY FOR MCCORMACK-WILLIAMSON PROPERTY

FIGURE 7.9: LAND COVER FOR MCCORMACK-WILLIAMSON PROPERTY

Legend

- CRP Property
- Additional Easements

Land Cover

- Blue Oak Woodland
- Blue Oak-Vernal Pool-Savannah
- Grasslands
- Managed Marsh
- Tule & Sedge
- Riparian Trees & Shrubs
- Riparian Vegetation
- Freshwater Marsh
- Vernal Pool Grassland
- Water
- Agricultural Infrastructure
- Crops - Annual or Truck & Berry
- Developed
- Dry Land Farmed
- Grain and Hay Crop
- Idle
- Irrigated Pasture
- Perennial Woody Crops
- Rice

FIGURE 7.10: BOUNDARY FOR KRAUS BLM, KRAUS DU, FARM AND WETLANDS 1, STOKES, WONG, AND VISITOR CENTER PROPERTIES

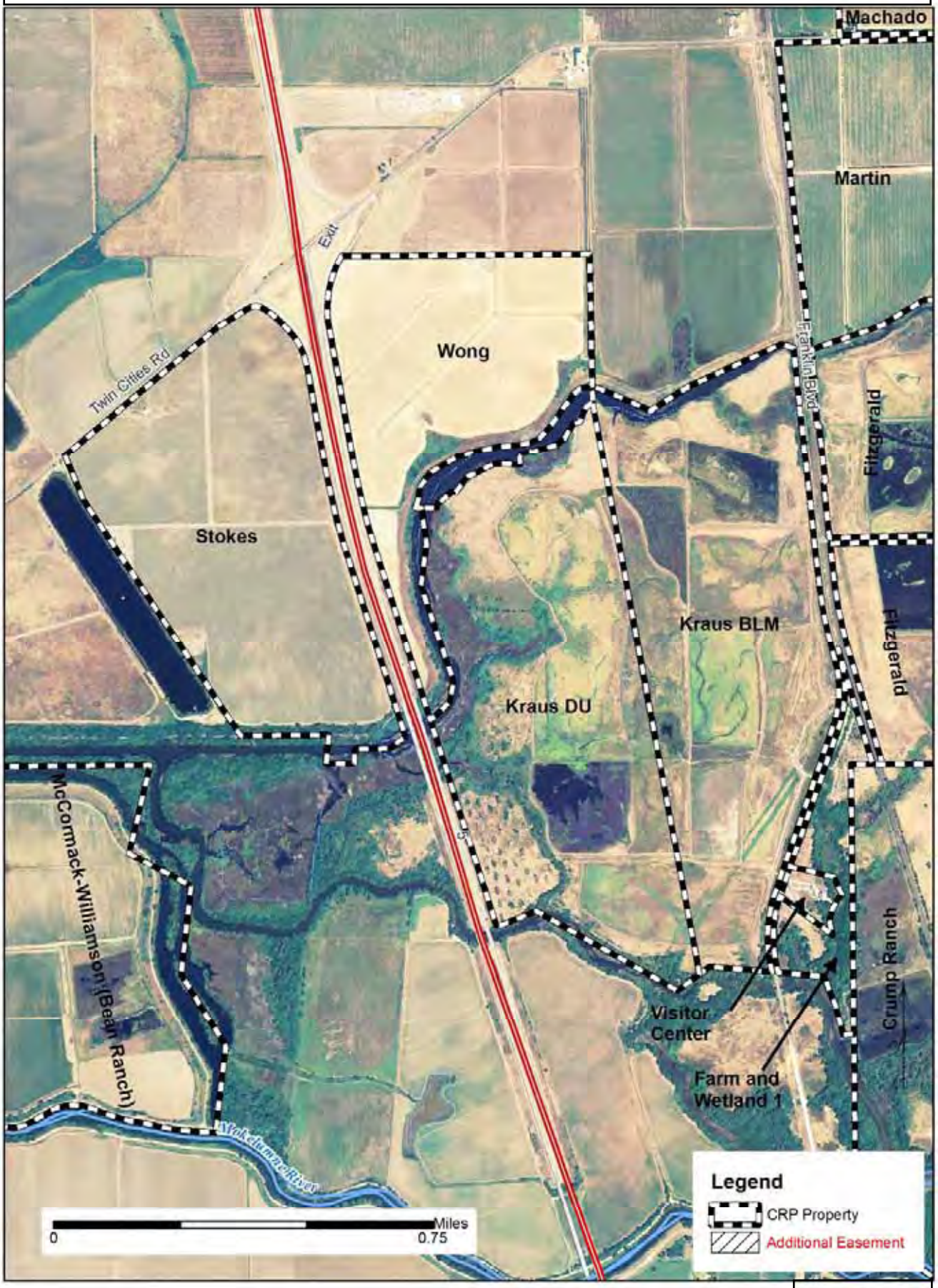
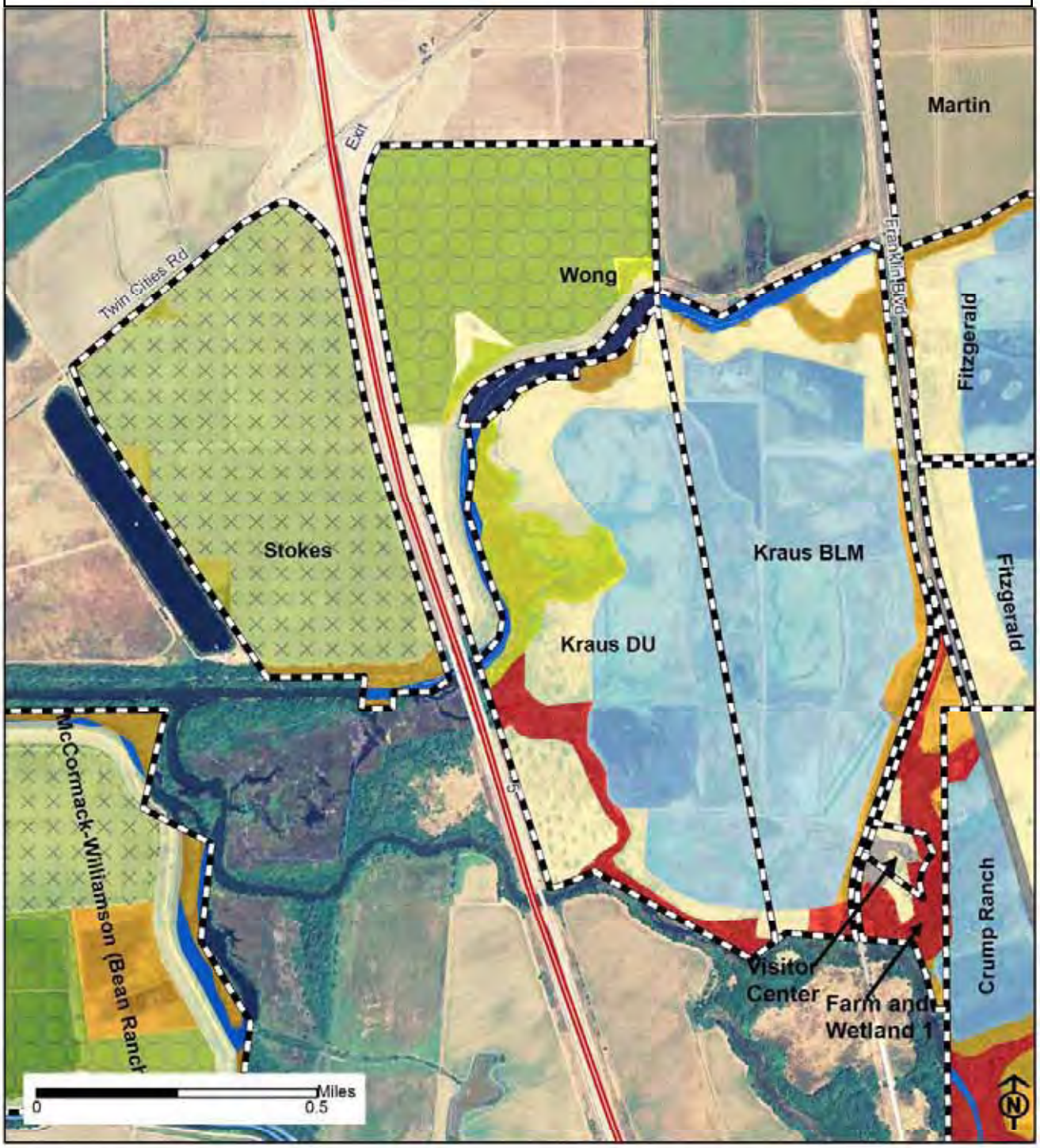


FIGURE 7.11: LAND COVER FOR KRAUS BLM, KRAUS DU, FARM AND WETLANDS 1, STOKES, WONG, AND VISITOR CENTER PROPERTIES



Legend

- CRP Property
- Additional Easements

Land Cover

- Blue Oak Woodland
- Blue Oak-Vernal Pool-Savannah
- Grasslands
- Managed Marsh
- Tule & Sedge
- Riparian Trees & Shrubs
- Riparian Vegetation
- Freshwater Marsh
- Vernal Pool Grassland
- Water
- Agricultural Infrastructure
- Crops - Annual or Truck & Berry
- Developed
- Dry Land Farmed
- Grain and Hay Crop
- Idle
- Irrigated Pasture
- Perennial Woody Crops
- Rice

FIGURE 7.12: BOUNDARY FOR MACHADO AND MARTIN PROPERTIES

FIGURE 7.13: LAND COVER FOR MACHADO AND MARTIN PROPERTIES

Legend

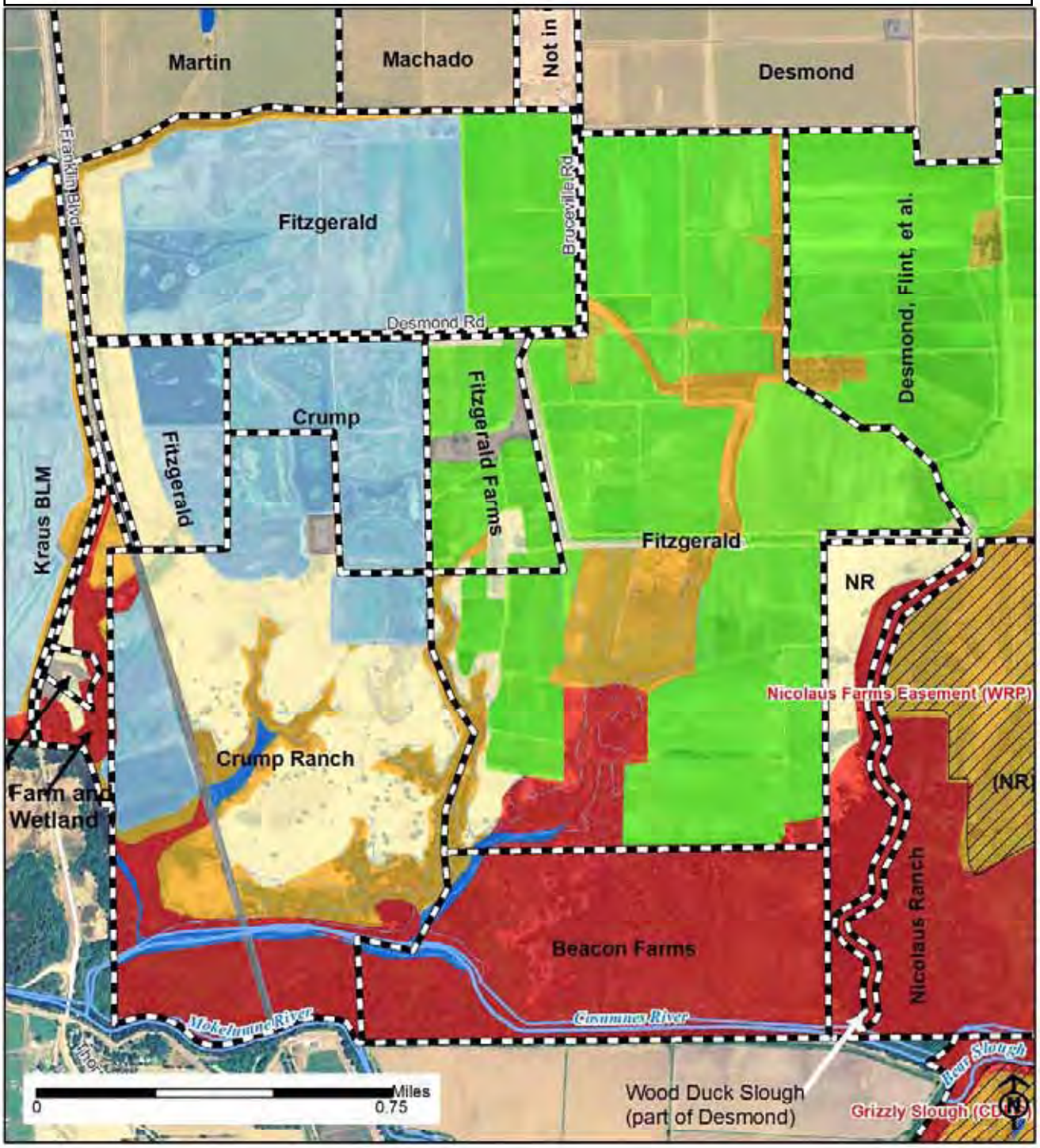
- CRP Property
- Additional Easements

Land Cover

- Blue Oak Woodland
- Blue Oak-Vernal Pool-Savannah
- Grasslands
- Managed Marsh
- Tule & Sedge
- Riparian Trees & Shrubs
- Riparian Vegetation
- Freshwater Marsh
- Vernal Pool Grassland
- Water
- Agricultural Infrastructure
- Crops - Annual or Truck & Berry
- Developed
- Dry Land Farmed
- Grain and Hay Crop
- Idle
- Irrigated Pasture
- Perennial Woody Crops
- Rice

FIGURE 7.14: BOUNDARY FOR BEACON FARMS, CRUMP, CRUMP RANCH, FITZGERALD, AND FITZGERALD FARMS PROPERTIES

FIGURE 7.15: LAND COVER FOR BEACON FARMS, CRUMP, CRUMP RANCH, FITZGERALD, AND FITZGERALD FARMS PROPERTIES



Legend

- CRP Property
- Additional Easements

Land Cover

- Blue Oak Woodland
- Blue Oak-Vernal Pool-Savannah
- Grasslands
- Managed Marsh
- Tule & Sedge
- Riparian Trees & Shrubs
- Riparian Vegetation
- Freshwater Marsh
- Vernal Pool Grassland
- Water
- Agricultural Infrastructure
- Crops - Annual or Truck & Berry
- Developed
- Dry Land Farmed
- Grain and Hay Crop
- Idle
- Irrigated Pasture
- Perennial Woody Crops
- Rice

FIGURE 7.16: BOUNDARY FOR DESMOND; DESMOND, FLINT ET AL; FITZGERALD, FLINT 2, AND WILDER RANCH PROPERTIES

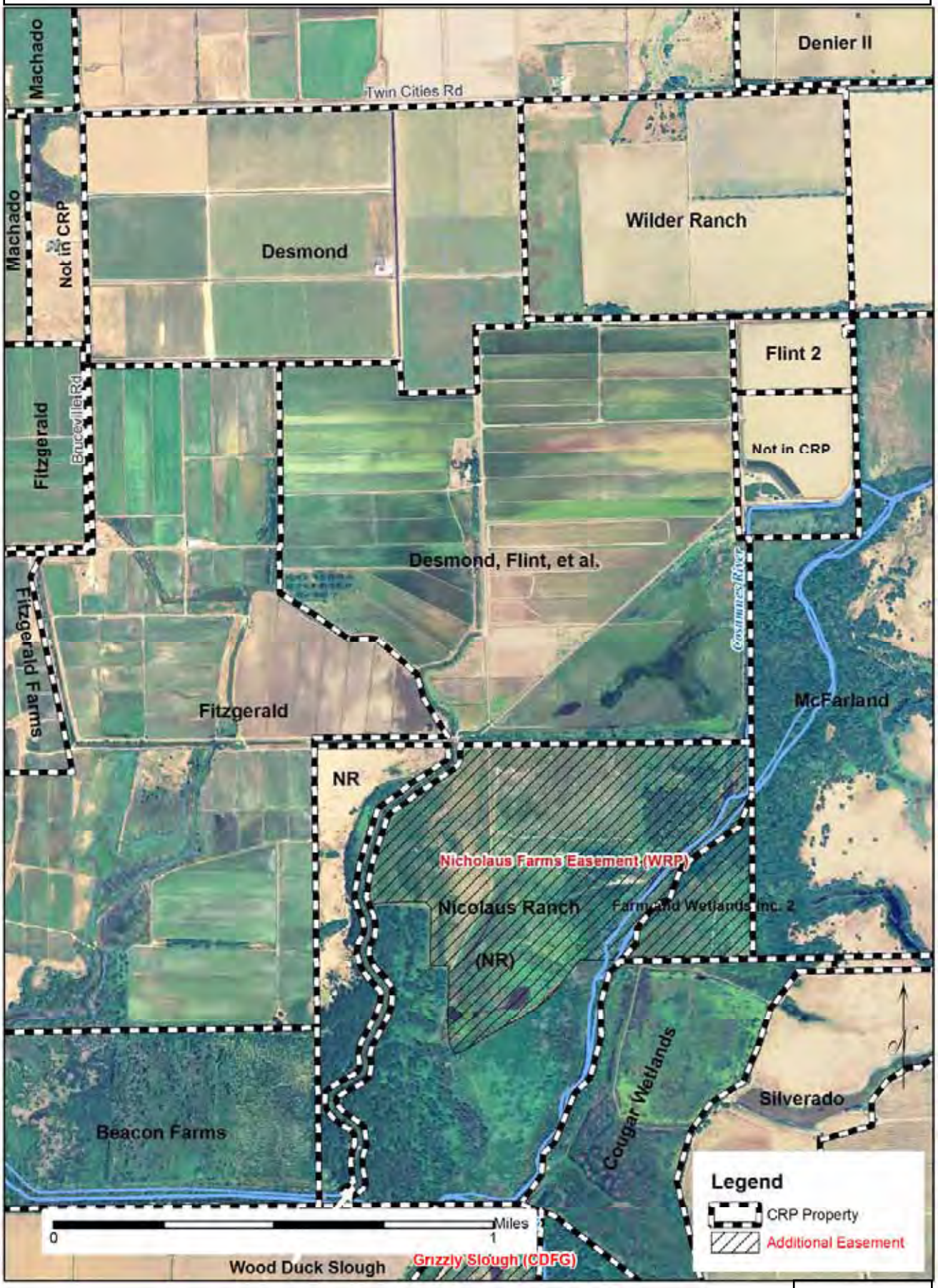
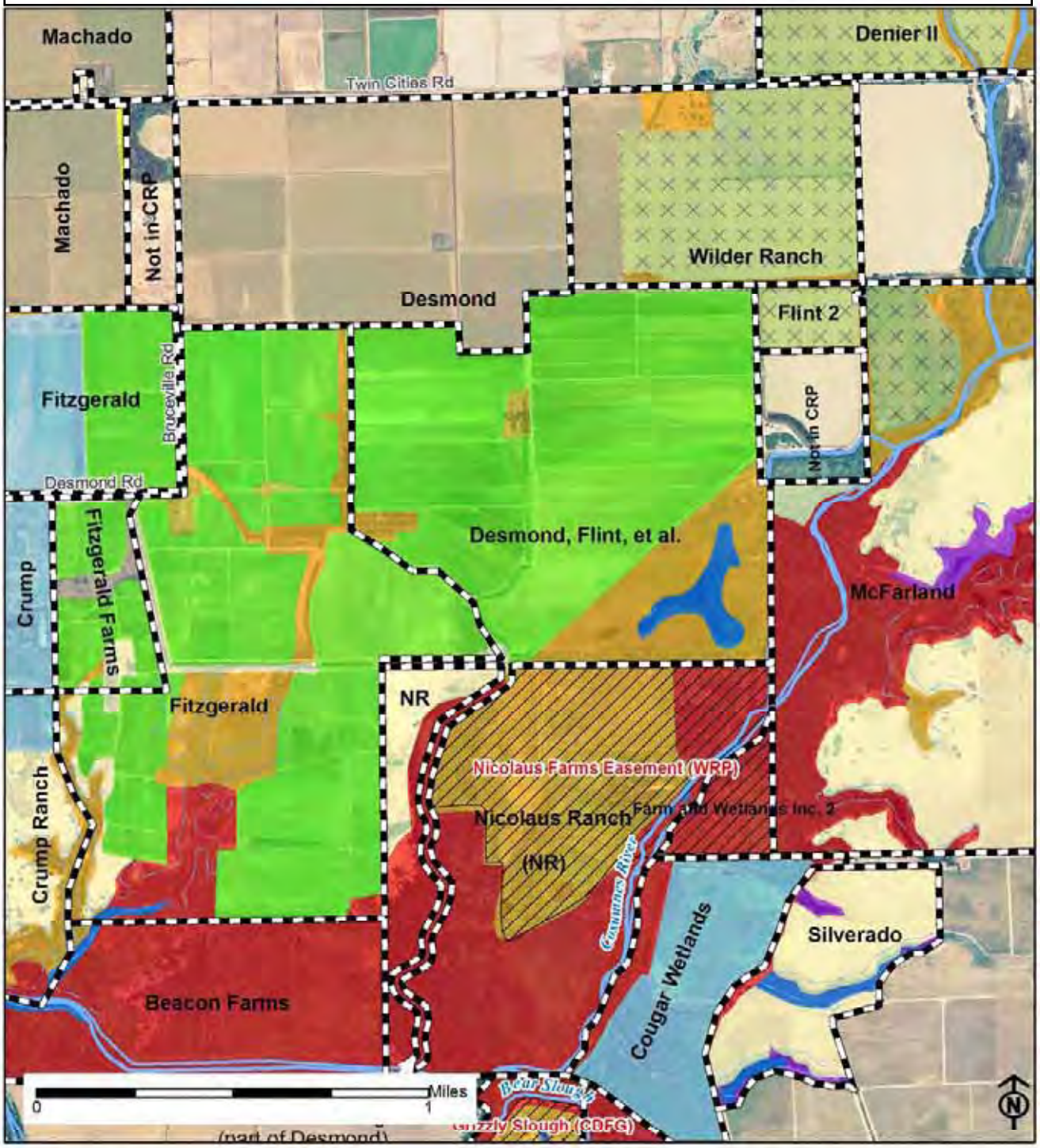


FIGURE 7.17: LAND COVER FOR DESMOND; DESMOND, FLINT ET AL; FITZGERALD, FLINT 2, AND WILDER RANCH PROPERTIES



Legend

- CRP Property
- Additional Easements

Land Cover

- Blue Oak Woodland
- Blue Oak-Vernal Pool-Savannah
- Grasslands
- Managed Marsh
- Tule & Sedge
- Riparian Trees & Shrubs
- Riparian Vegetation
- Freshwater Marsh
- Vernal Pool Grassland
- Water
- Agricultural Infrastructure
- Crops - Annual or Truck & Berry
- Developed
- Dry Land Farmed
- Grain and Hay Crop
- Idle
- Irrigated Pasture
- Perennial Woody Crops
- Rice

FIGURE 7.18: BOUNDARY FOR COUGAR WETLANDS, FARM AND WETLANDS 2, GRIZZLY SLOUGH, NICOLAUS RANCH, SILVERADO, WILKINSON PROPERTIES

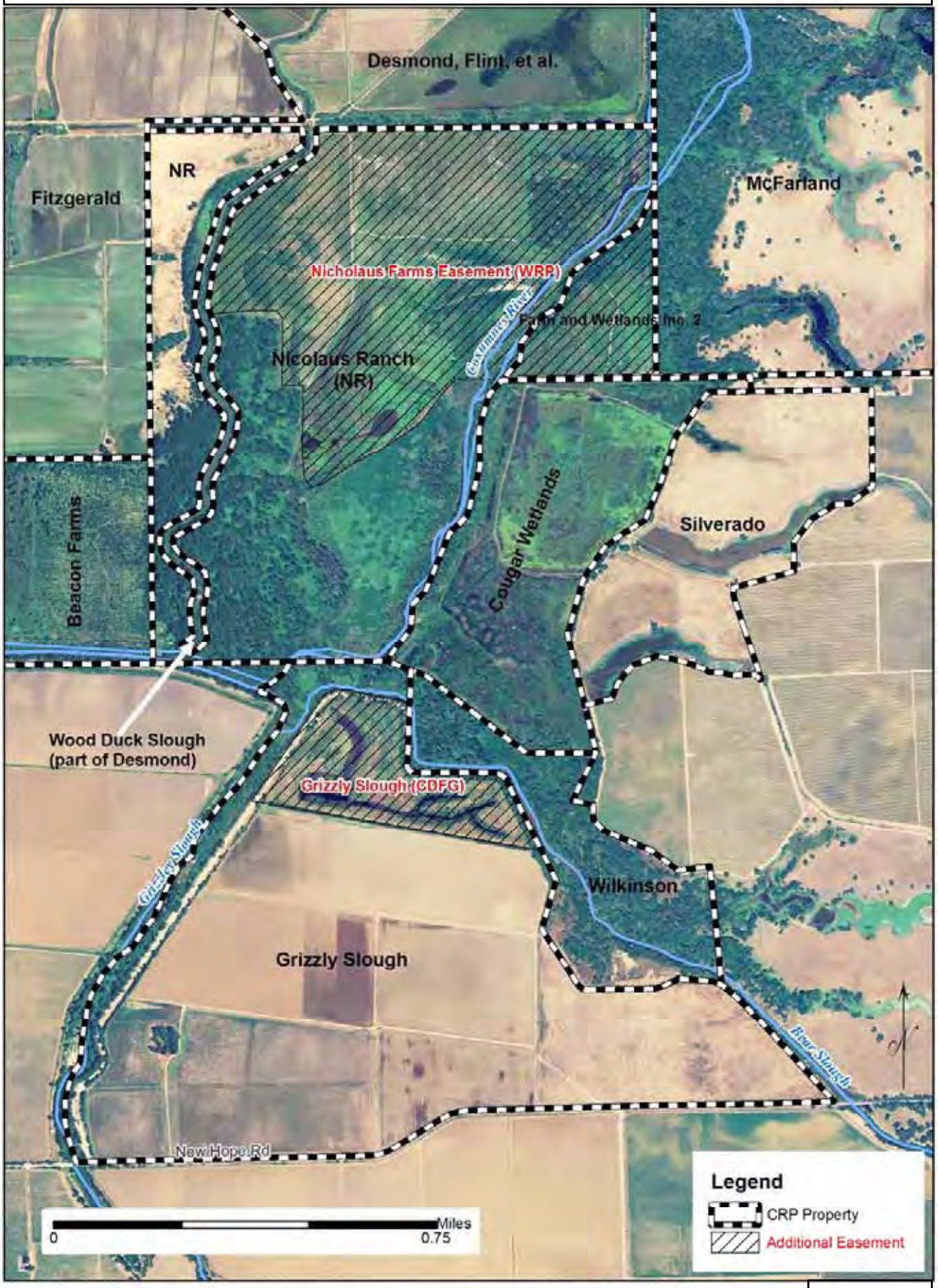
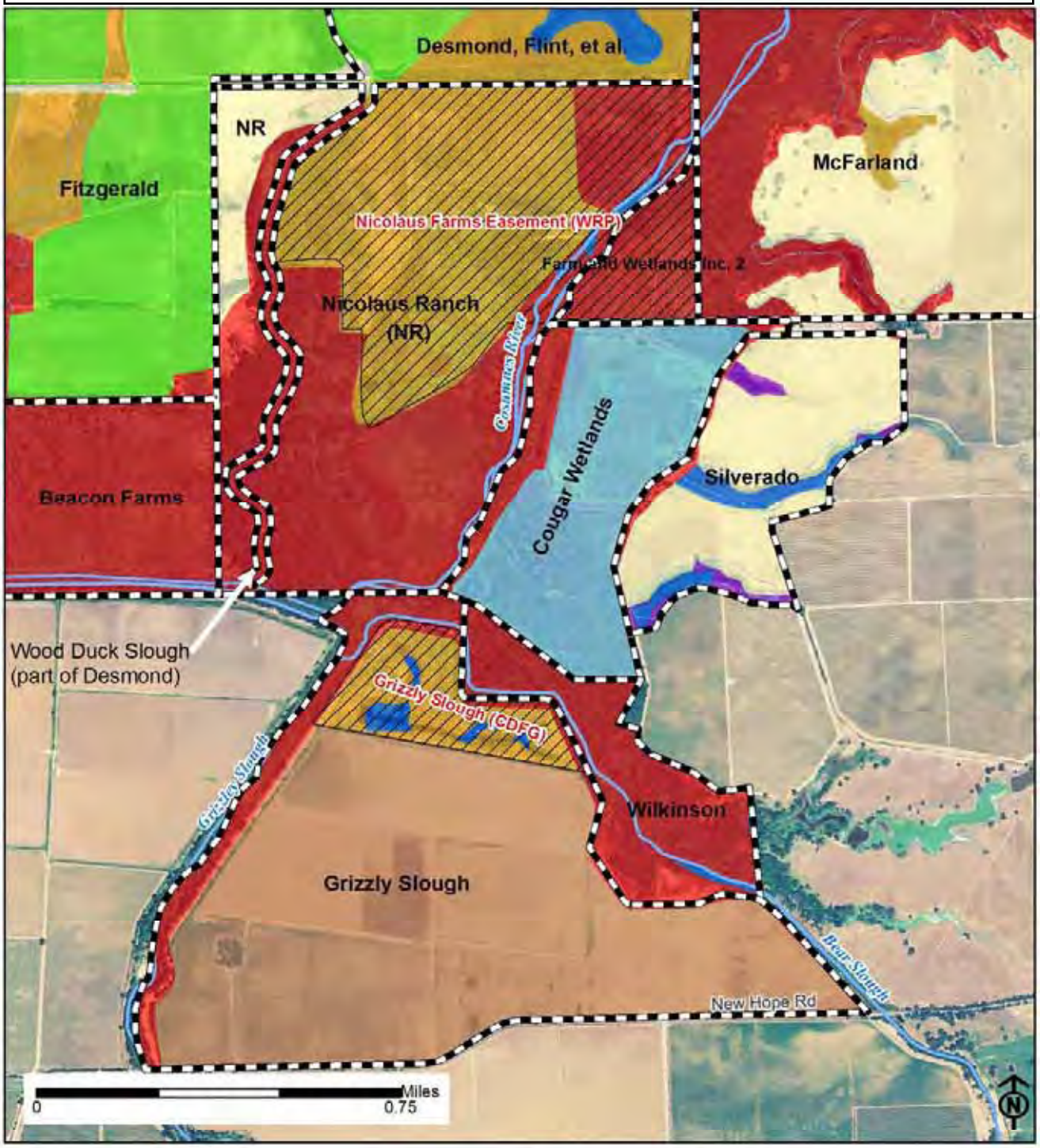


FIGURE 7.19: LAND COVER FOR COUGAR WETLANDS, FARM AND WETLANDS 2, GRIZZLY SLOUGH, NICOLAUS RANCH, SILVERADO, WILKINSON PROPERTIES



Legend

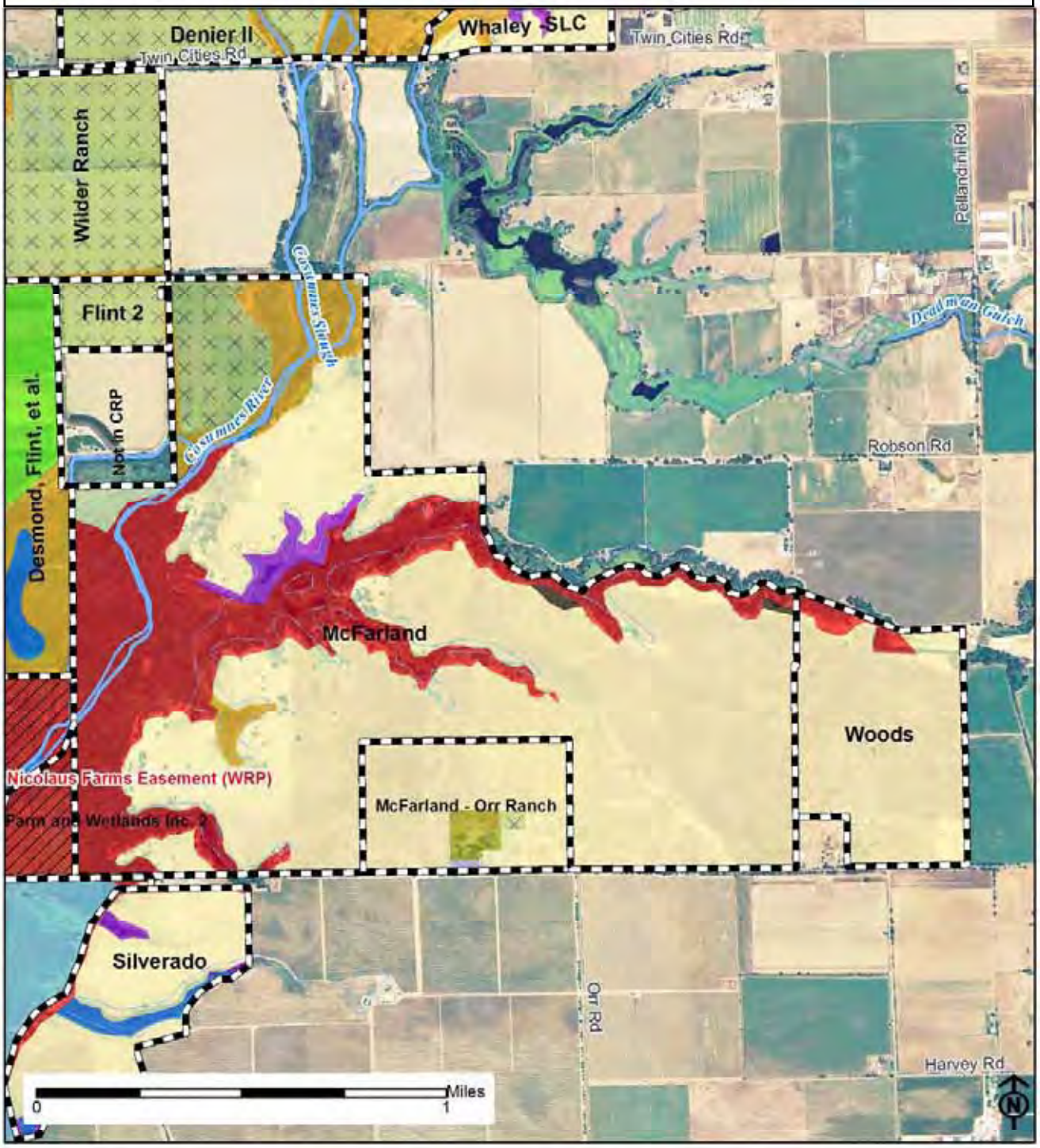
- CRP Property
- Additional Easements

Land Cover

- Blue Oak Woodland
- Blue Oak-Vernal Pool-Savannah
- Grasslands
- Managed Marsh
- Tule & Sedge
- Riparian Trees & Shrubs
- Riparian Vegetation
- Freshwater Marsh
- Vernal Pool Grassland
- Water
- Agricultural Infrastructure
- Crops - Annual or Truck & Berry
- Developed
- Dry Land Farmed
- Grain and Hay Crop
- Idle
- Irrigated Pasture
- Perennial Woody Crops
- Rice

FIGURE 7.20: BOUNDARY FOR MCFARLAND, MCFARLAND-ORR RANCH, AND WOODS PROPERTIES

FIGURE 7.21: LAND COVER FOR MCFARLAND, MCFARLAND-ORR RANCH, AND WOODS PROPERTIES



Legend

- CRP Property
- Additional Easements

Land Cover

- Blue Oak Woodland
- Blue Oak-Vernal Pool-Savannah
- Grasslands
- Managed Marsh
- Tule & Sedge
- Riparian Trees & Shrubs
- Riparian Vegetation
- Freshwater Marsh
- Vernal Pool Grassland
- Water
- Agricultural Infrastructure
- Crops - Annual or Truck & Berry
- Developed
- Dry Land Farmed
- Grain and Hay Crop
- Idle
- Irrigated Pasture
- Perennial Woody Crops
- Rice

FIGURE 7.22: BOUNDARY FOR ALLEN RANCH, DENIER II, ONETO HORSESHOE, SHAW CENTRAL, SHAW NORTH, SHAW SOUTH, WHALEY CDFG, AND WHALEY SLC PROPERTIES

FIGURE 7.23: LAND COVER FOR ALLEN RANCH, DENIER II, ONETO HORSESHOE, SHAW CENTRAL, SHAW NORTH, SHAW SOUTH, WHALEY CDFG PROPERTIES

Legend

- CRP Property
- Additional Easements

Land Cover

- Blue Oak Woodland
- Blue Oak-Vernal Pool-Savannah
- Grasslands
- Managed Marsh
- Tule & Sedge
- Riparian Trees & Shrubs
- Riparian Vegetation
- Freshwater Marsh
- Vernal Pool Grassland
- Water
- Agricultural Infrastructure
- Crops - Annual or Truck & Berry
- Developed
- Dry Land Farmed
- Grain and Hay Crop
- Idle
- Irrigated Pasture
- Perennial Woody Crops
- Rice

FIGURE 7.24: BOUNDARY FOR DENIER PROPERTY

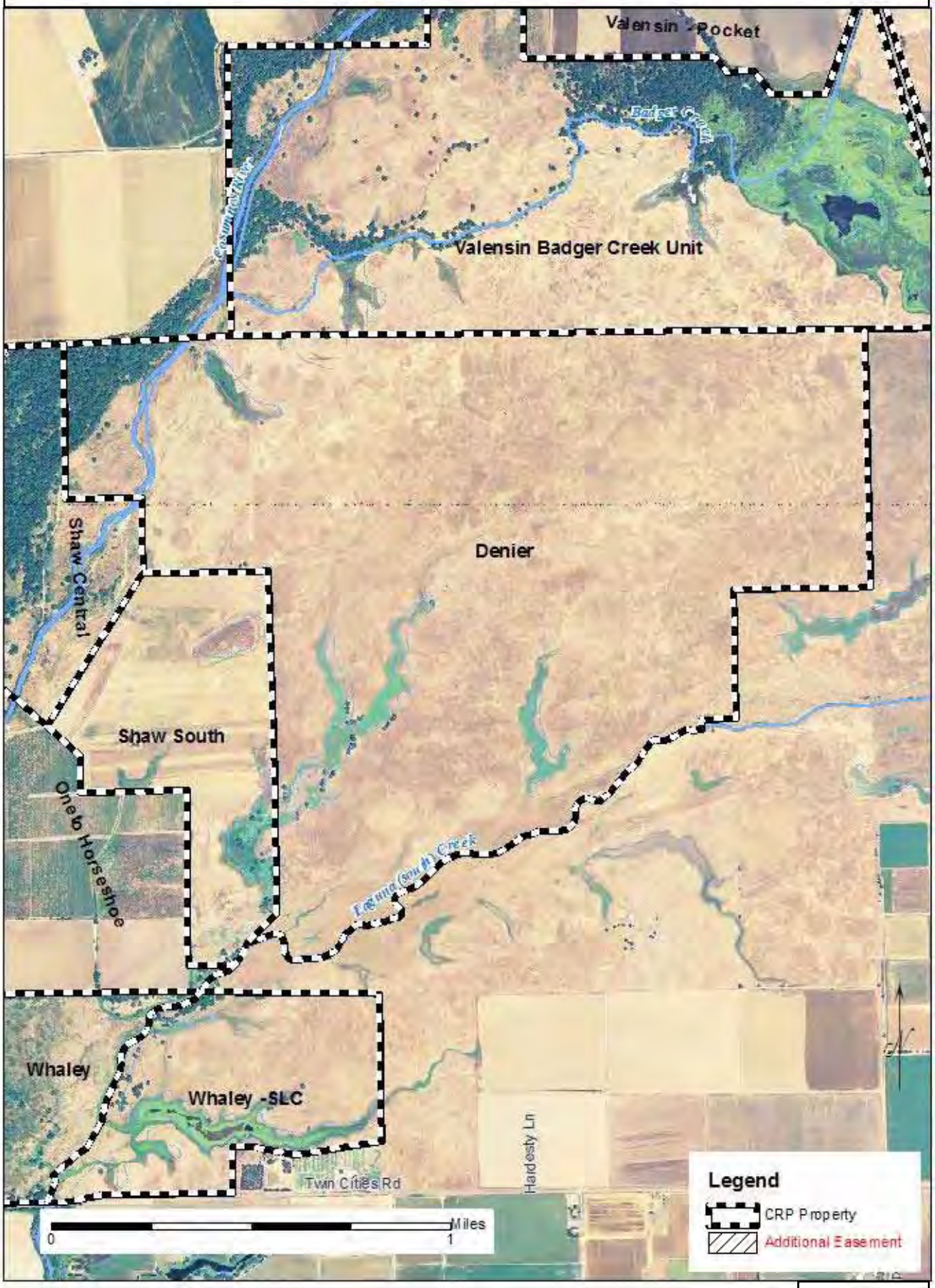
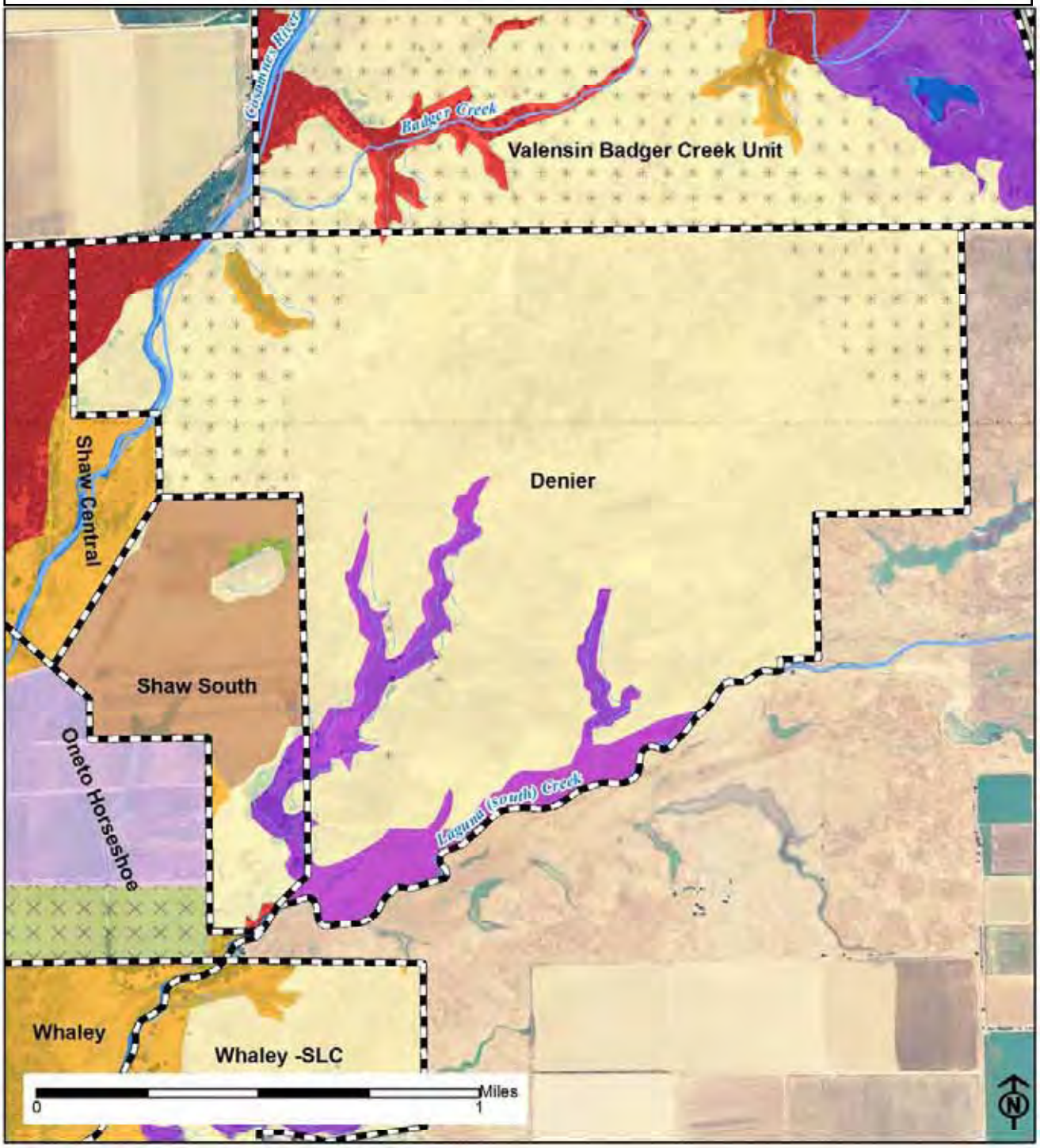


FIGURE 7.25: LAND COVER FOR DENIER PROPERTY



Legend

- CRP Property
- Additional Easements

Land Cover

- Blue Oak Woodland
- Blue Oak-Vernal Pool-Savannah
- Grasslands
- Managed Marsh
- Tule & Sedge
- Riparian Trees & Shrubs
- Riparian Vegetation
- Freshwater Marsh
- Vernal Pool Grassland
- Water
- Agricultural Infrastructure
- Crops - Annual or Truck & Berry
- Developed
- Dry Land Farmed
- Grain and Hay Crop
- Idle
- Irrigated Pasture
- Perennial Woody Crops
- Rice

FIGURE 7.26: BOUNDARY FOR VALENSIN BADGER CREEK UNIT AND VALENSIN - POCKET PROPERTIES

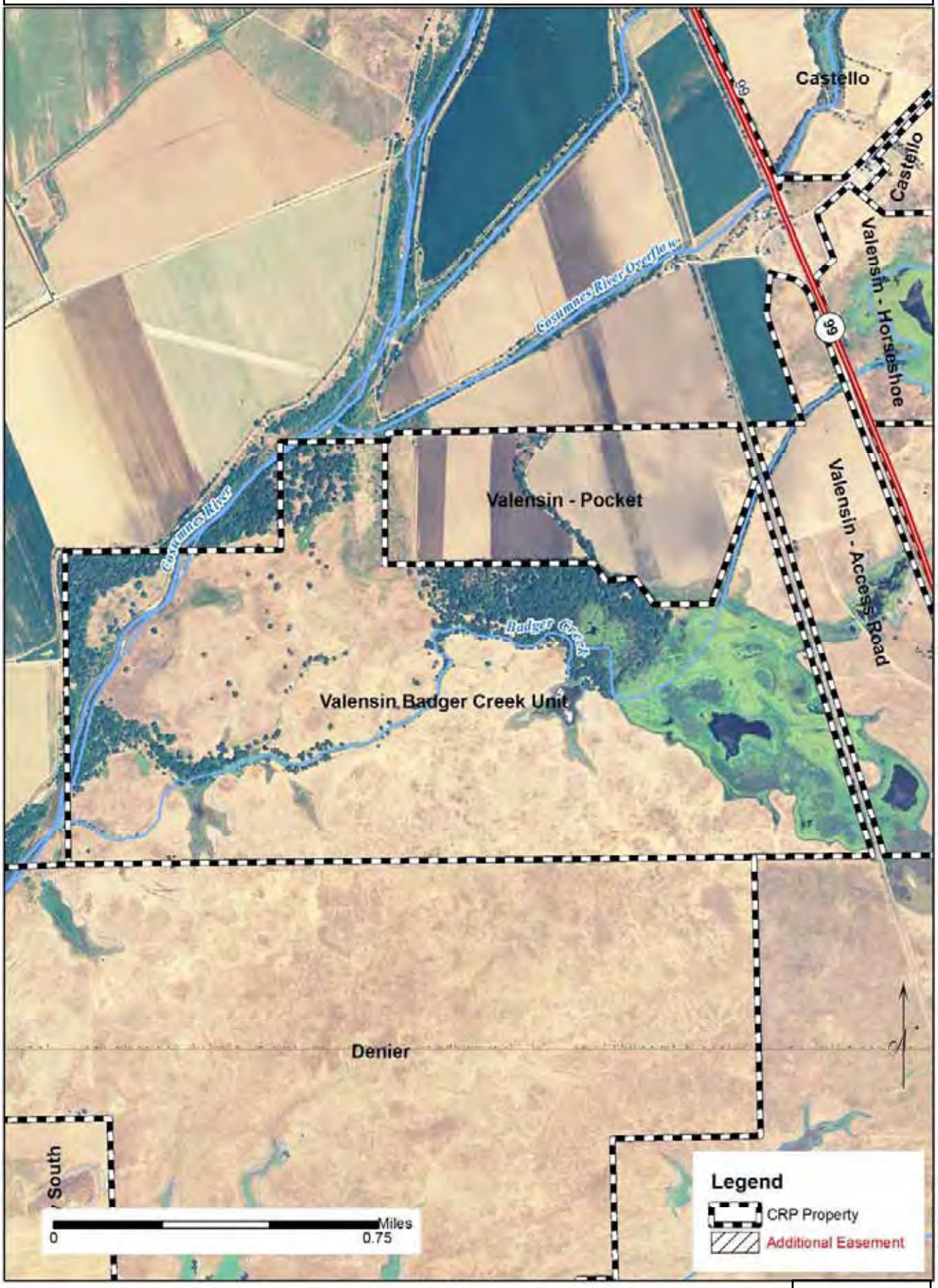
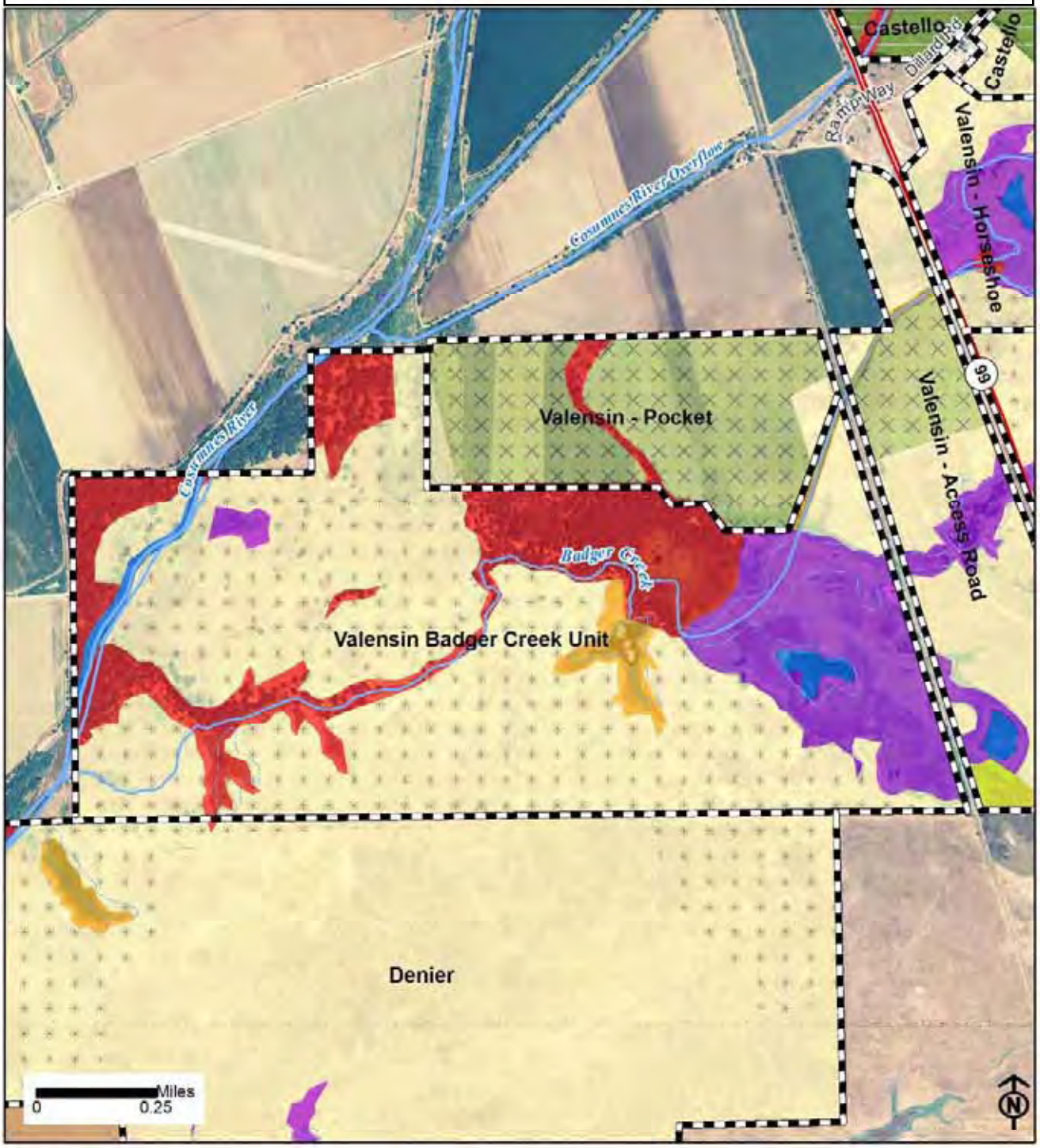


FIGURE 7.27: LAND COVER FOR VALENSIN BADGER CREEK UNIT AND VALENSIN - POCKET PROPERTIES



Legend

- CRP Property
- Additional Easements

Land Cover

- Blue Oak Woodland
- Blue Oak-Vernal Pool-Savannah
- Grasslands
- Managed Marsh
- Tule & Sedge
- Riparian Trees & Shrubs
- Riparian Vegetation
- Freshwater Marsh
- Vernal Pool Grassland
- Water
- Agricultural Infrastructure
- Crops - Annual or Truck & Berry
- Developed
- Dry Land Farmed
- Grain and Hay Crop
- Idle
- Irrigated Pasture
- Perennial Woody Crops
- Rice

FIGURE 7.28: BOUNDARY FOR BJELLAND, VALENSIN – ACCESS ROAD, VALENSIN – HORSESHOE, AND VALENSIN – RANCH HOUSE PROPERTIES

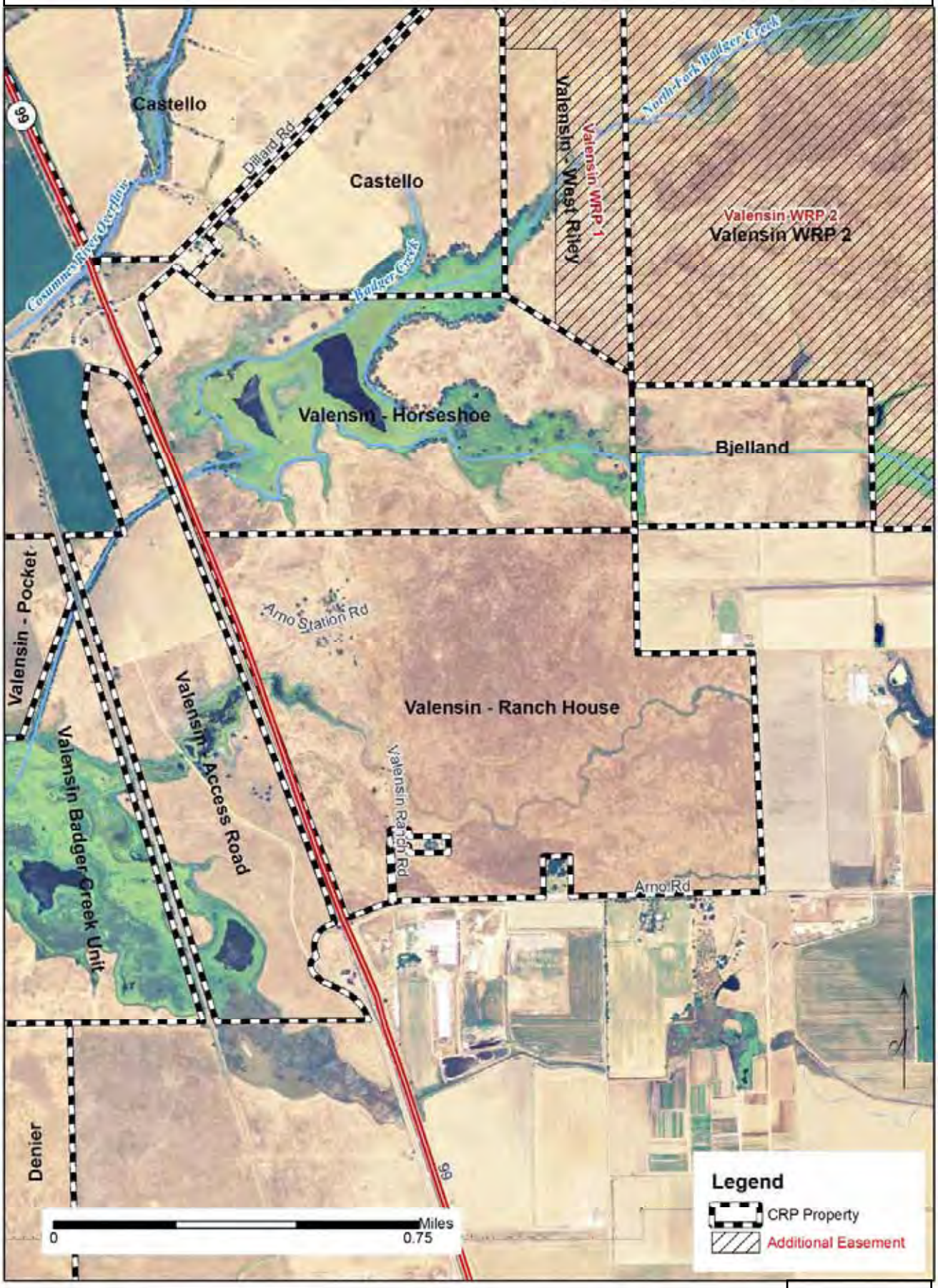
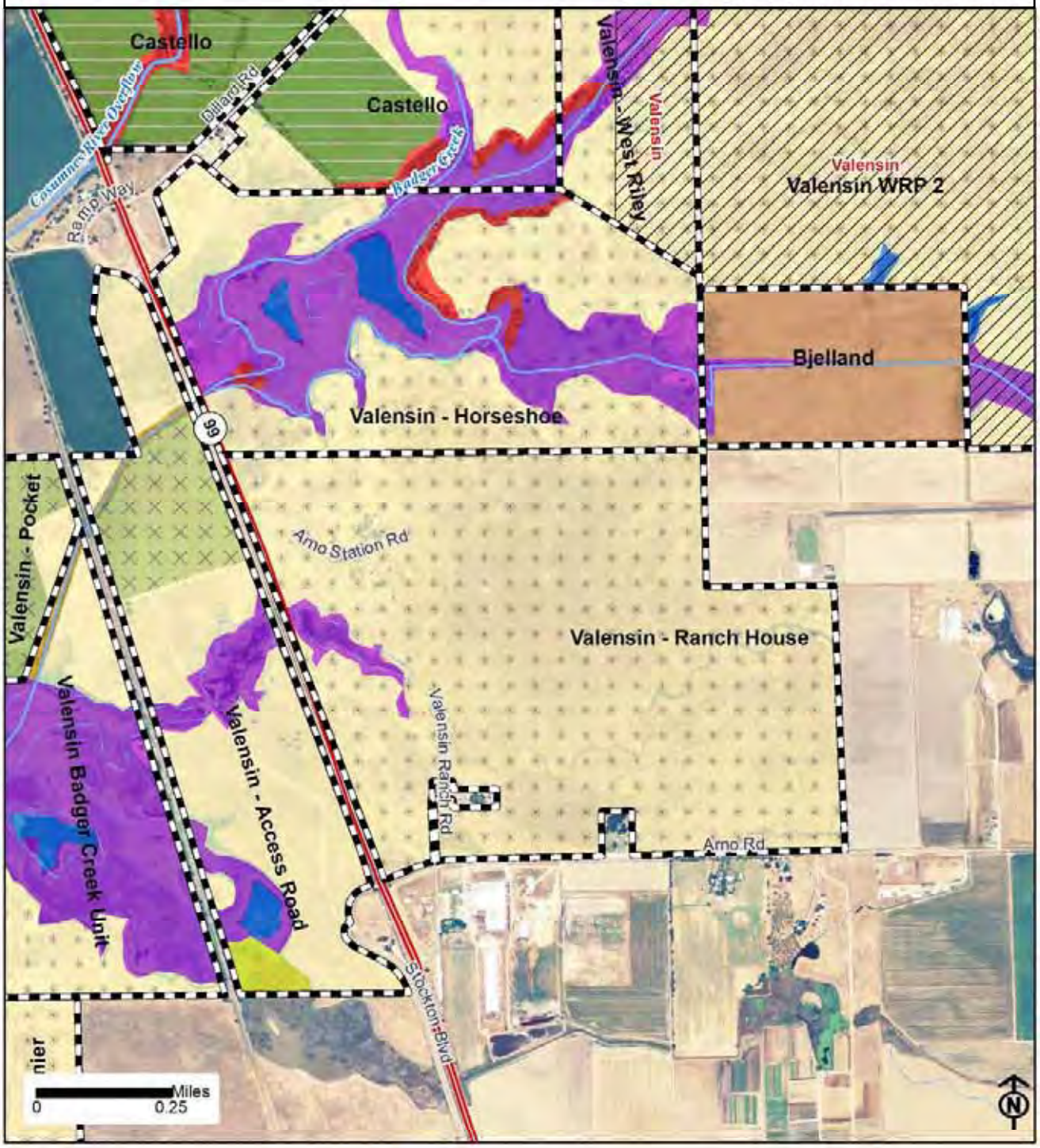


FIGURE 7.29: LAND COVER FOR BJELLAND, VALENSIN – ACCESS ROAD, VALENSIN – HORSESHOE, AND VALENSIN – RANCH HOUSE PROPERTIES



Legend

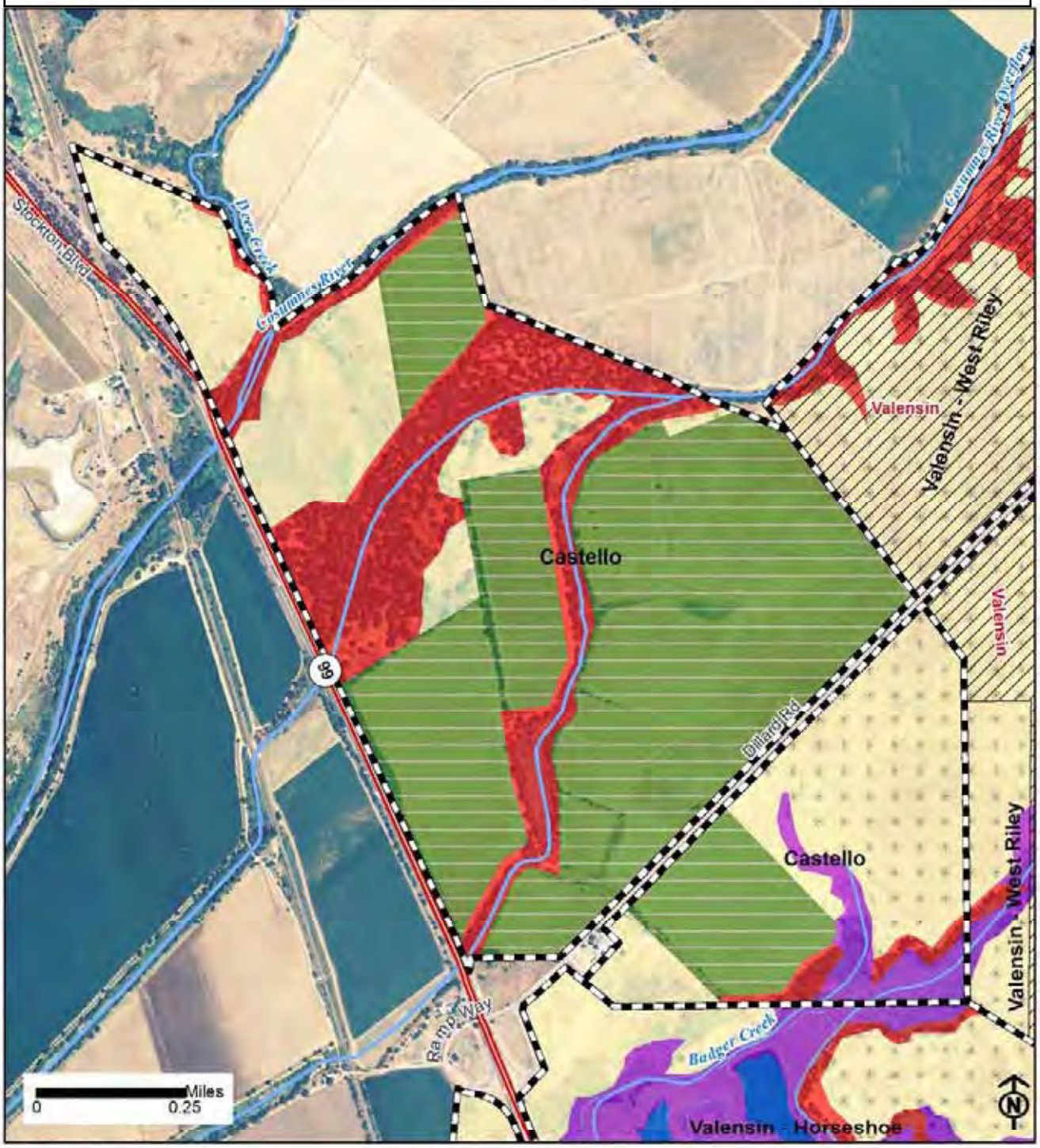
- CRP Property
- Additional Easements

Land Cover

- Blue Oak Woodland
- Blue Oak-Vernal Pool-Savannah
- Grasslands
- Managed Marsh
- Tule & Sedge
- Riparian Trees & Shrubs
- Riparian Vegetation
- Freshwater Marsh
- Vernal Pool Grassland
- Water
- Agricultural Infrastructure
- Crops - Annual or Truck & Berry
- Developed
- Dry Land Farmed
- Grain and Hay Crop
- Idle
- Irrigated Pasture
- Perennial Woody Crops
- Rice

FIGURE 7.30: BOUNDARY FOR CASTELLO PROPERTY

FIGURE 7.31: LAND COVER FOR CASTELLO PROPERTY



Legend

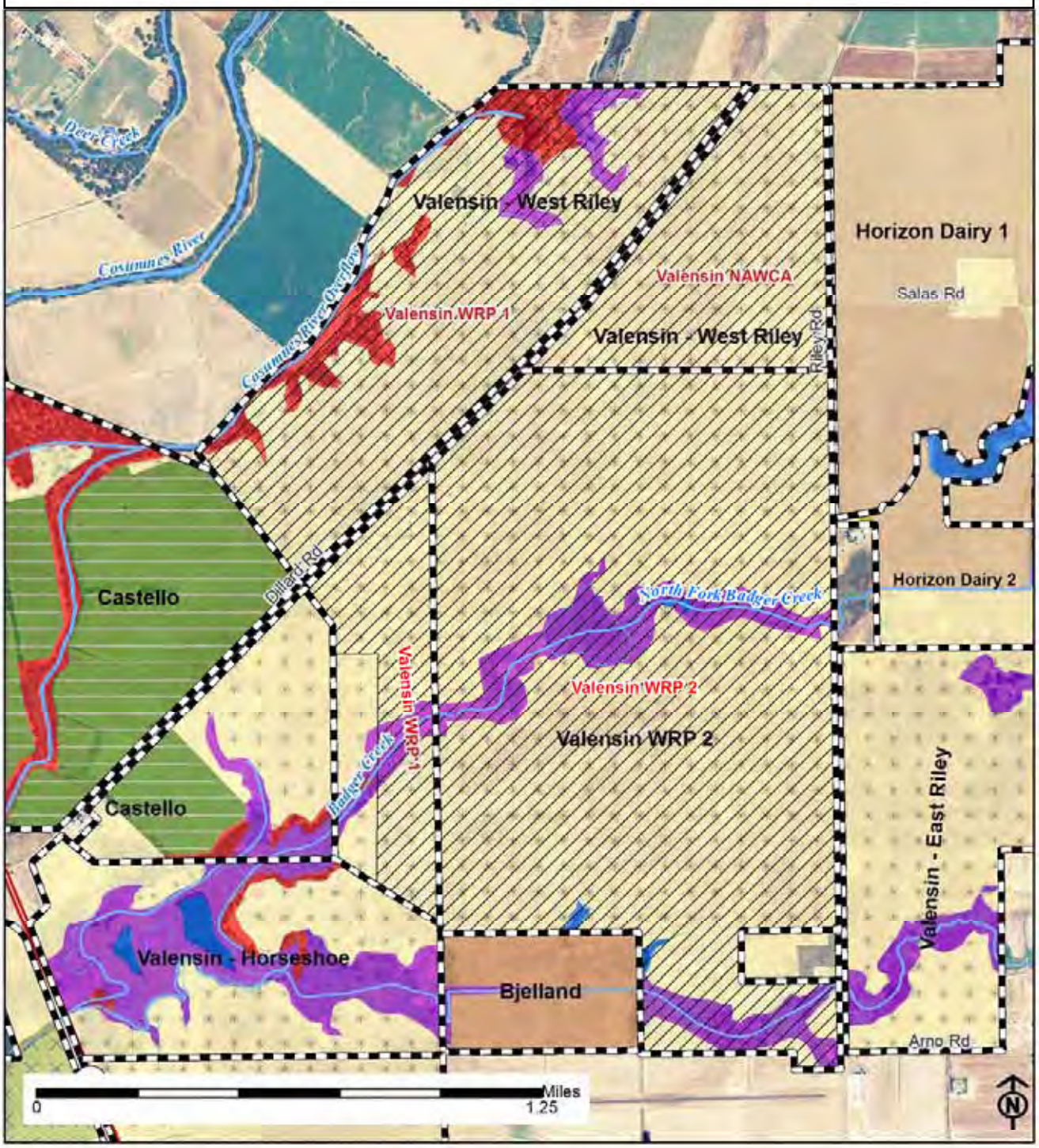
- CRP Property
- Additional Easements

Land Cover

- Blue Oak Woodland
- Blue Oak-Vernal Pool-Savannah
- Grasslands
- Managed Marsh
- Tule & Sedge
- Riparian Trees & Shrubs
- Riparian Vegetation
- Freshwater Marsh
- Vernal Pool Grassland
- Water
- Agricultural Infrastructure
- Crops - Annual or Truck & Berry
- Developed
- Dry Land Farmed
- Grain and Hay Crop
- Idle
- Irrigated Pasture
- Perennial Woody Crops
- Rice

FIGURE 7.32: BOUNDARY FOR VALENSIN - WEST RILEY AND VALENSIN WRP 2 PROPERTIES

FIGURE 7.33: LAND COVER FOR VALENSIN - WEST RILEY AND VALENSIN WRP 2 PROPERTIES



Legend

- CRP Property
- Additional Easements

Land Cover

- Blue Oak Woodland
- Blue Oak-Vernal Pool-Savannah
- Grasslands
- Managed Marsh
- Tule & Sedge
- Riparian Trees & Shrubs
- Riparian Vegetation
- Freshwater Marsh
- Vernal Pool Grassland
- Water
- Agricultural Infrastructure
- Crops - Annual or Truck & Berry
- Developed
- Dry Land Farmed
- Grain and Hay Crop
- Idle
- Irrigated Pasture
- Perennial Woody Crops
- Rice

FIGURE 7.34: BOUNDARY FOR AKT EASEMENT, HORIZON DAIRY 1, HORIZON DAIRY 2, PELLANDINI II, AND VALENSIN – EAST RILEY PROPERTIES

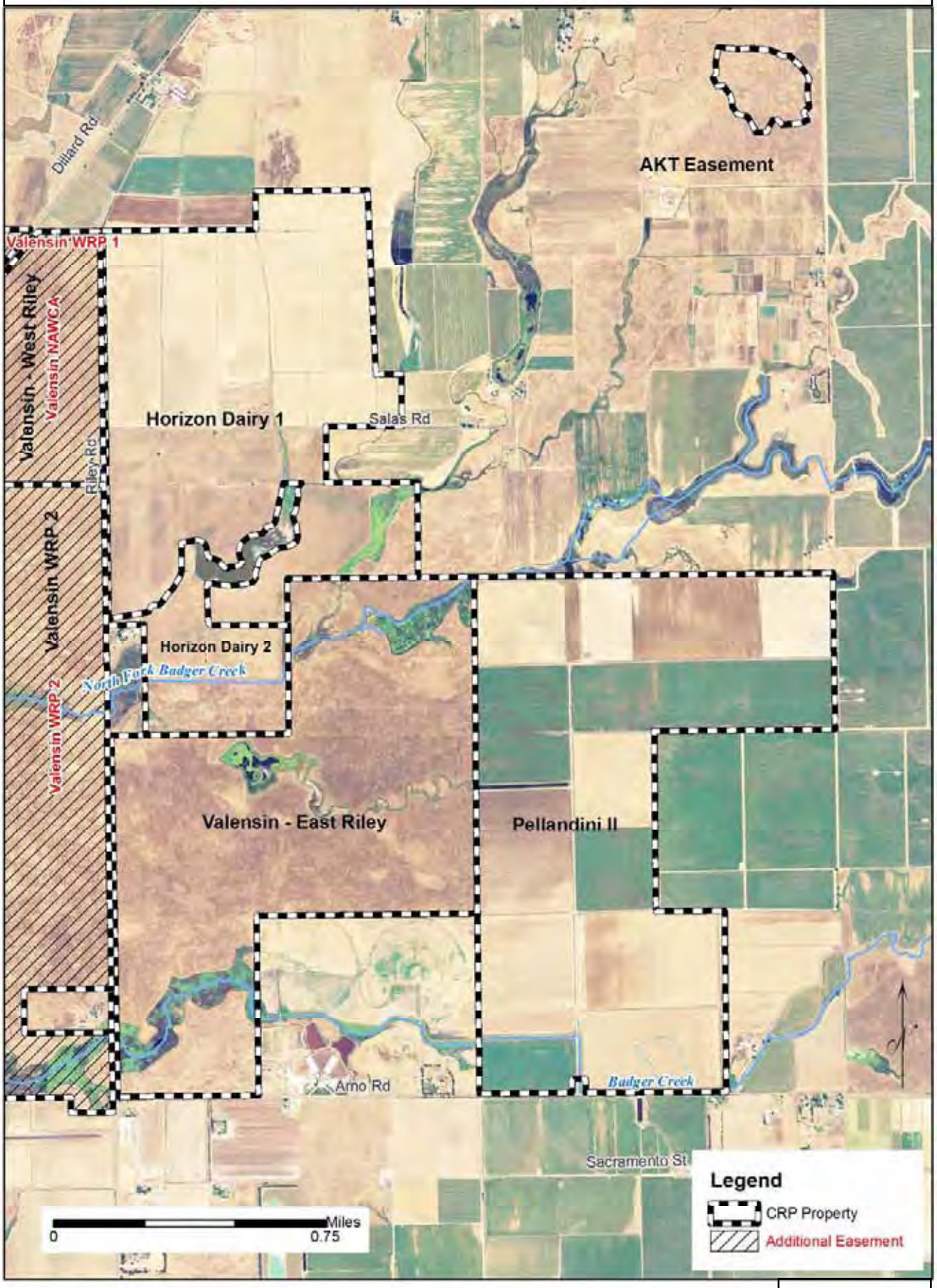
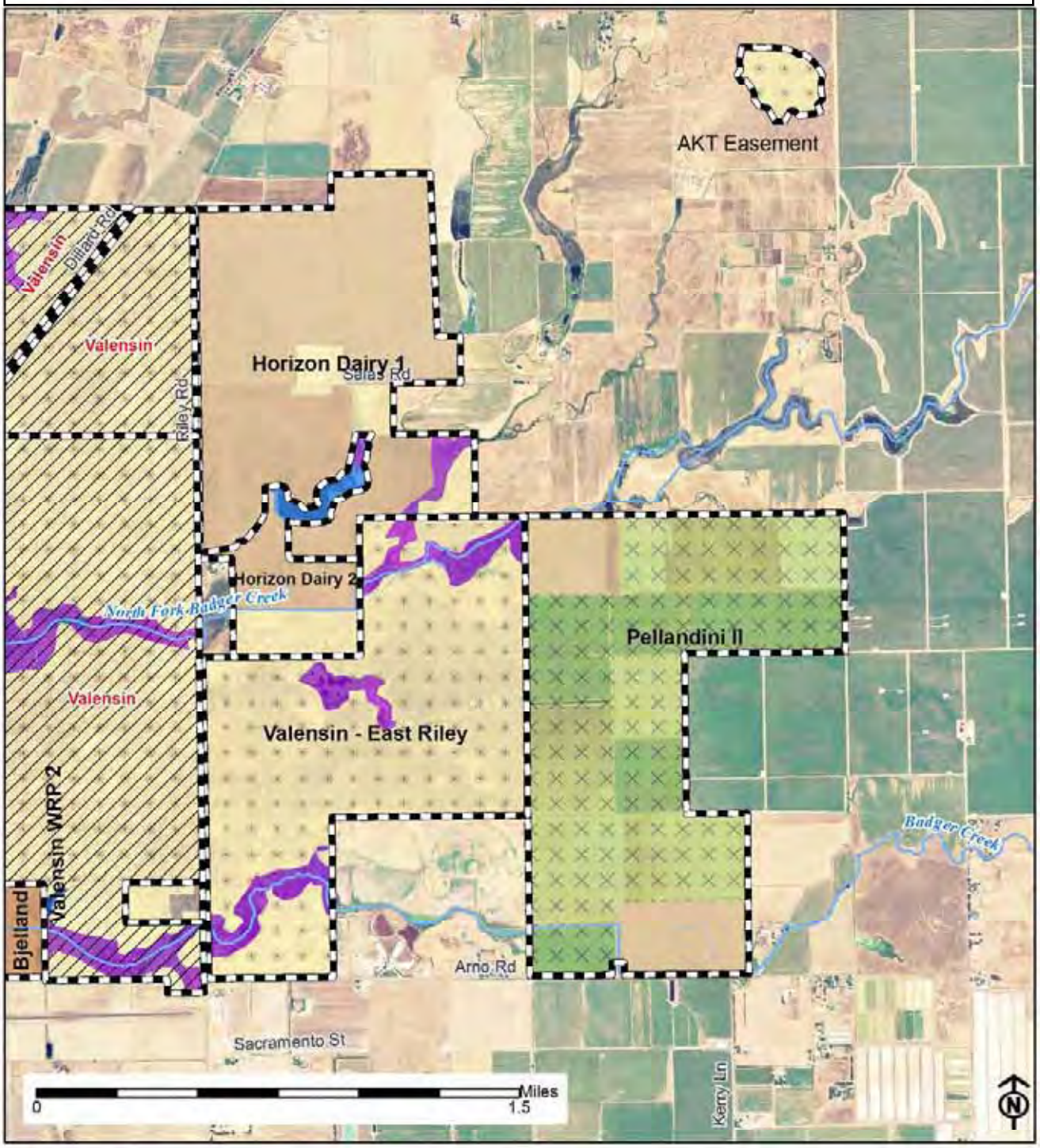


FIGURE 7.35: LAND COVER FOR AKT EASEMENT, HORIZON DAIRY 1, HORIZON DAIRY 2, PELLANDINI II, AND VALENSIN – EAST RILEY PROPERTIES



Legend

- CRP Property
- Additional Easements

Land Cover

- Blue Oak Woodland
- Blue Oak-Vernal Pool-Savannah
- Grasslands
- Managed Marsh
- Tule & Sedge
- Riparian Trees & Shrubs
- Riparian Vegetation
- Freshwater Marsh
- Vernal Pool Grassland
- Water
- Agricultural Infrastructure
- Crops - Annual or Truck & Berry
- Developed
- Dry Land Farmed
- Grain and Hay Crop
- Idle
- Irrigated Pasture
- Perennial Woody Crops
- Rice

FIGURE 7.36: BOUNDARY FOR LARKIN 1 AND LARKIN 2 PROPERTIES

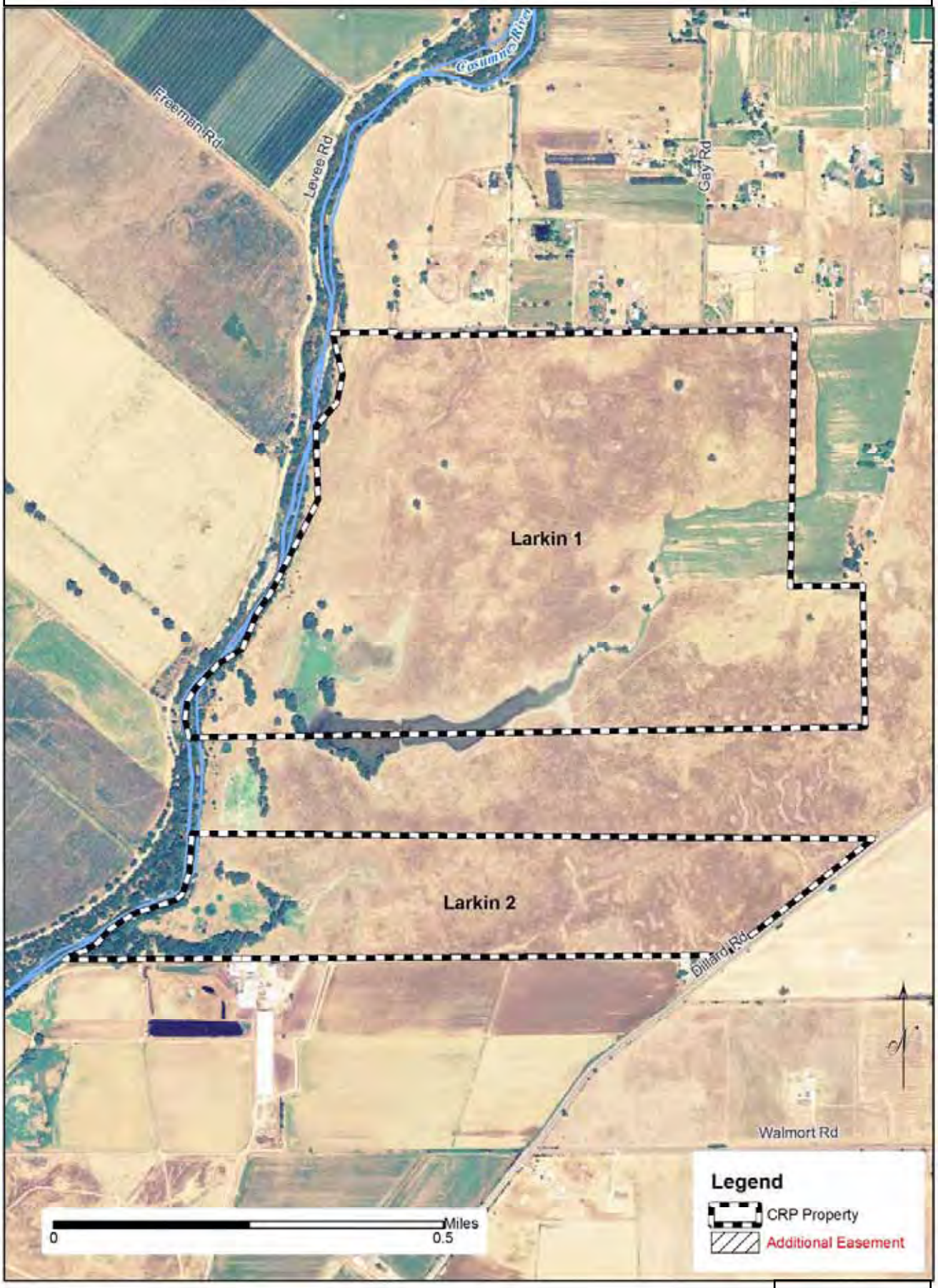
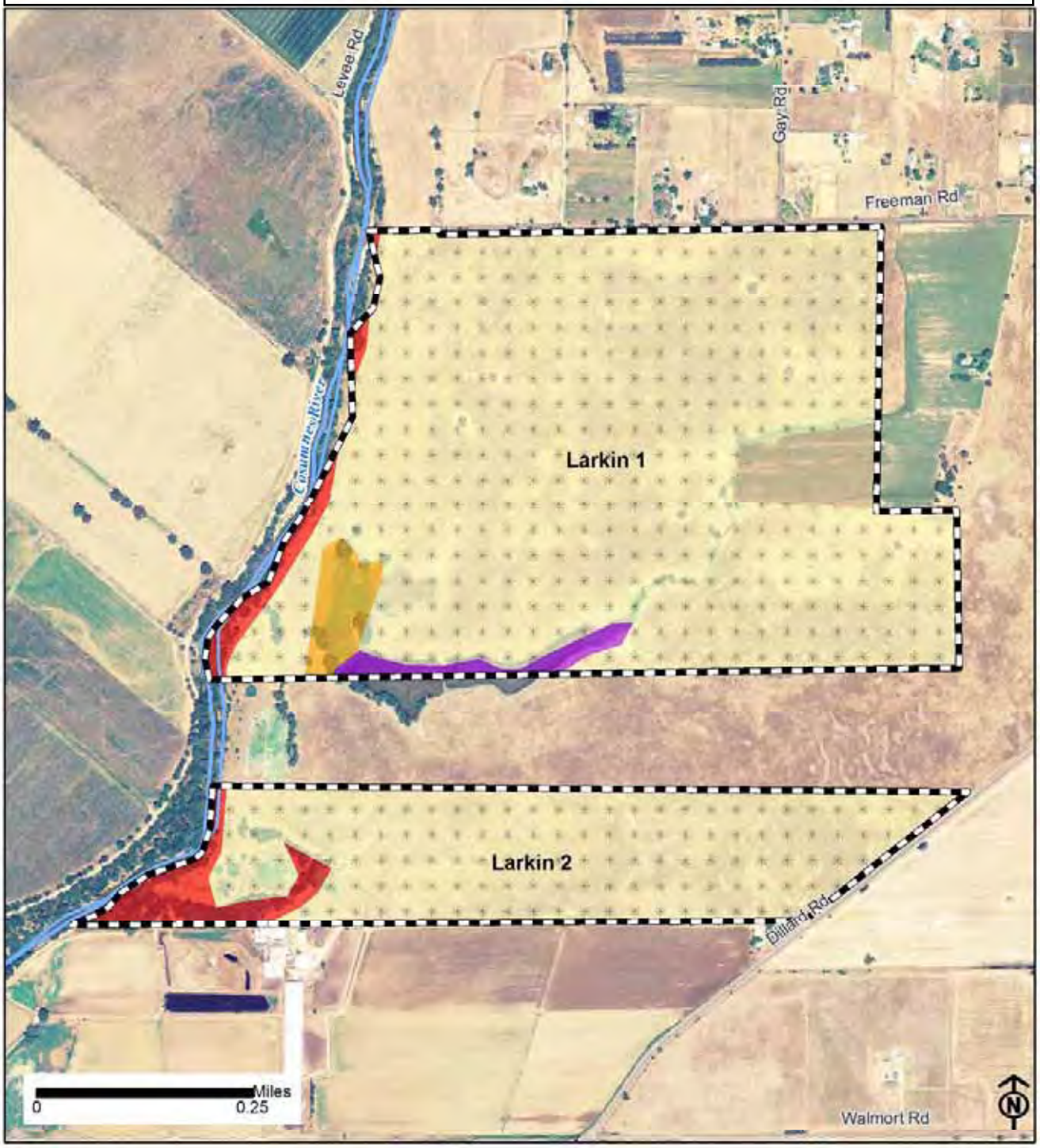


FIGURE 7.37: LAND COVER FOR LARKIN 1 AND LARKIN 2 PROPERTIES



Legend

- CRP Property
- Additional Easements

Land Cover

- Blue Oak Woodland
- Blue Oak-Vernal Pool-Savannah
- Grasslands
- Managed Marsh
- Tule & Sedge
- Riparian Trees & Shrubs
- Riparian Vegetation
- Freshwater Marsh
- Vernal Pool Grassland
- Water
- Agricultural Infrastructure
- Crops - Annual or Truck & Berry
- Developed
- Dry Land Farmed
- Grain and Hay Crop
- Idle
- Irrigated Pasture
- Perennial Woody Crops
- Rice

FIGURE 7.38: BOUNDARY FOR HOERTLING, KNEPPEL, RAGSDALE, AND VAN STEYN PROPERTIES

FIGURE 7.39: LAND COVER FOR HOERTLING, KNEPPEL, RAGSDALE, AND VAN STEYN PROPERTIES

Legend

- CRP Property
- Additional Easements

Land Cover

- Blue Oak Woodland
- Blue Oak-Vernal Pool-Savannah
- Grasslands
- Managed Marsh
- Tule & Sedge
- Riparian Trees & Shrubs
- Riparian Vegetation
- Freshwater Marsh
- Vernal Pool Grassland
- Water
- Agricultural Infrastructure
- Crops - Annual or Truck & Berry
- Developed
- Dry Land Farmed
- Grain and Hay Crop
- Idle
- Irrigated Pasture
- Perennial Woody Crops
- Rice

FIGURE 7.40: BOUNDARY FOR SCHNEIDER PROPERTY

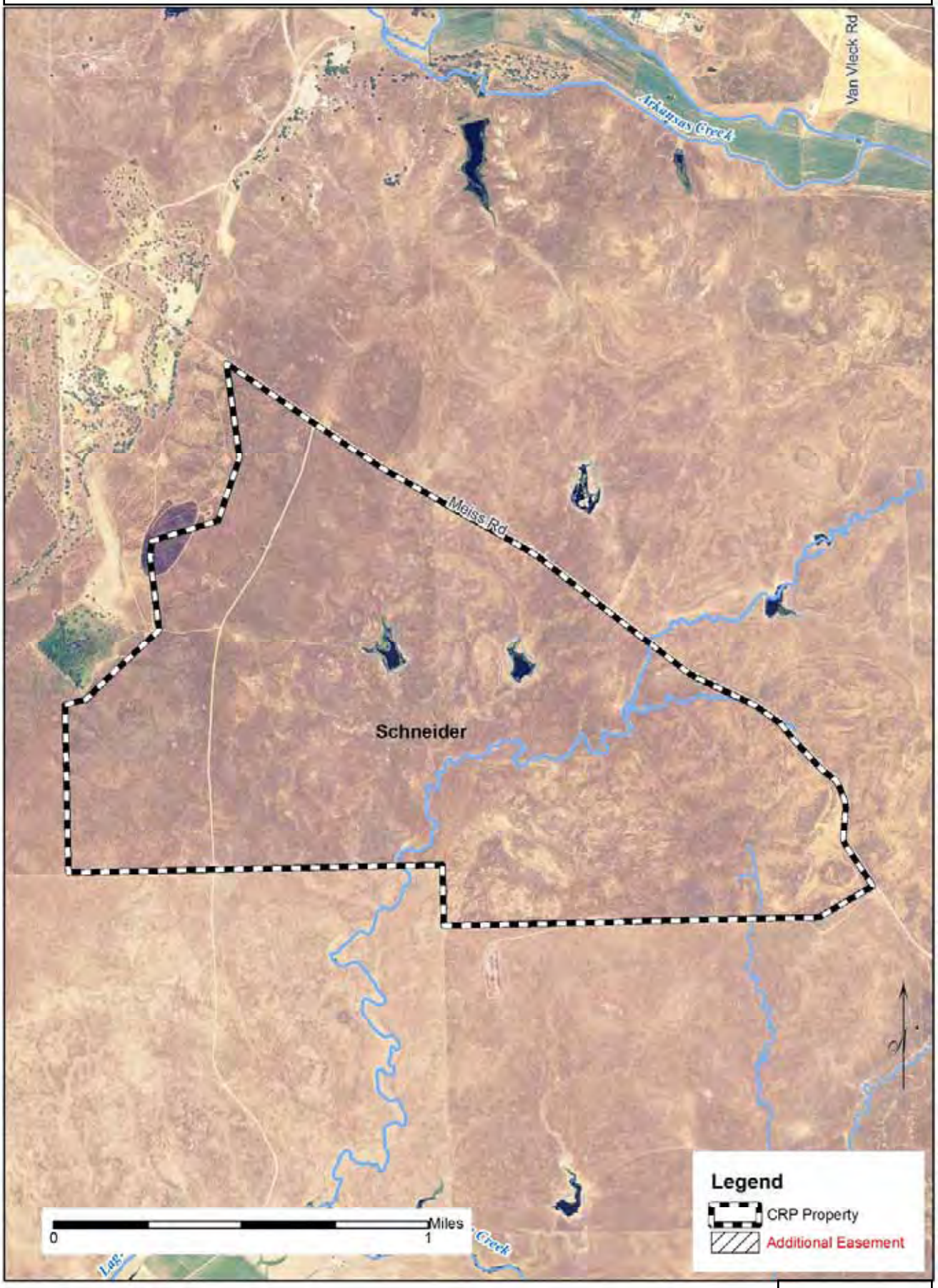
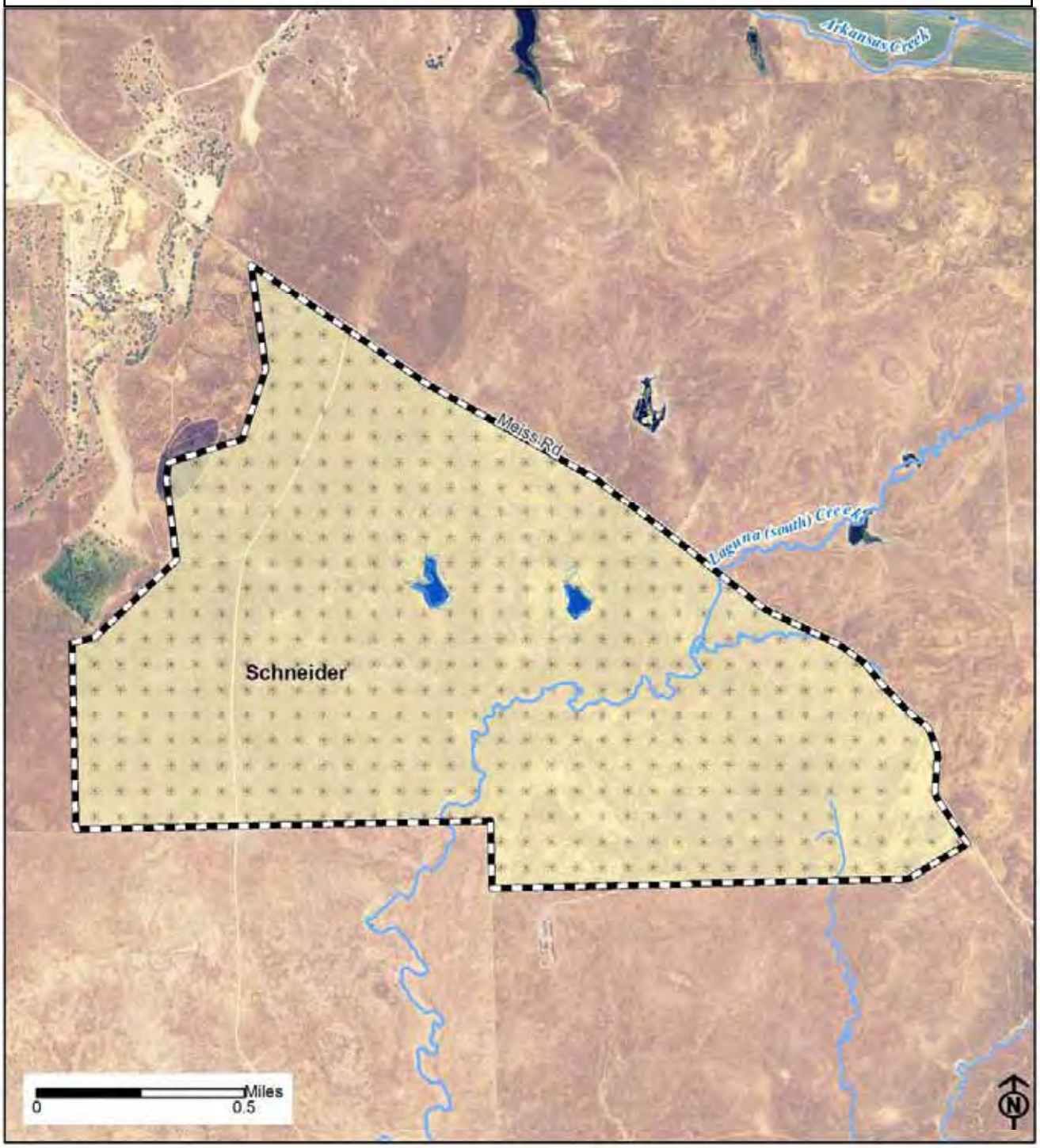


FIGURE 7.41: LAND COVER FOR SCHNEIDER PROPERTY



Legend

- CRP Property
- Additional Easements

Land Cover

- Blue Oak Woodland
- Blue Oak-Vernal Pool-Savannah
- Grasslands
- Managed Marsh
- Tule & Sedge
- Riparian Trees & Shrubs
- Riparian Vegetation
- Freshwater Marsh
- Vernal Pool Grassland
- Water
- Agricultural Infrastructure
- Crops - Annual or Truck & Berry
- Developed
- Dry Land Farmed
- Grain and Hay Crop
- Idle
- Irrigated Pasture
- Perennial Woody Crops
- Rice

FIGURE 7.42: BOUNDARY FOR BEN BROWN RANCHES PROPERTY

FIGURE 7.43: LAND COVER FOR BEN BROWN RANCHES PROPERTY

Legend

- CRP Property
- Additional Easements

Land Cover

- Blue Oak Woodland
- Blue Oak-Vernal Pool-Savannah
- Grasslands
- Managed Marsh
- Tule & Sedge
- Riparian Trees & Shrubs
- Riparian Vegetation
- Freshwater Marsh
- Vernal Pool Grassland
- Water
- Agricultural Infrastructure
- Crops - Annual or Truck & Berry
- Developed
- Dry Land Farmed
- Grain and Hay Crop
- Idle
- Irrigated Pasture
- Perennial Woody Crops
- Rice

FIGURE 7.44: BOUNDARY FOR HOWARD RANCH PROPERTIES

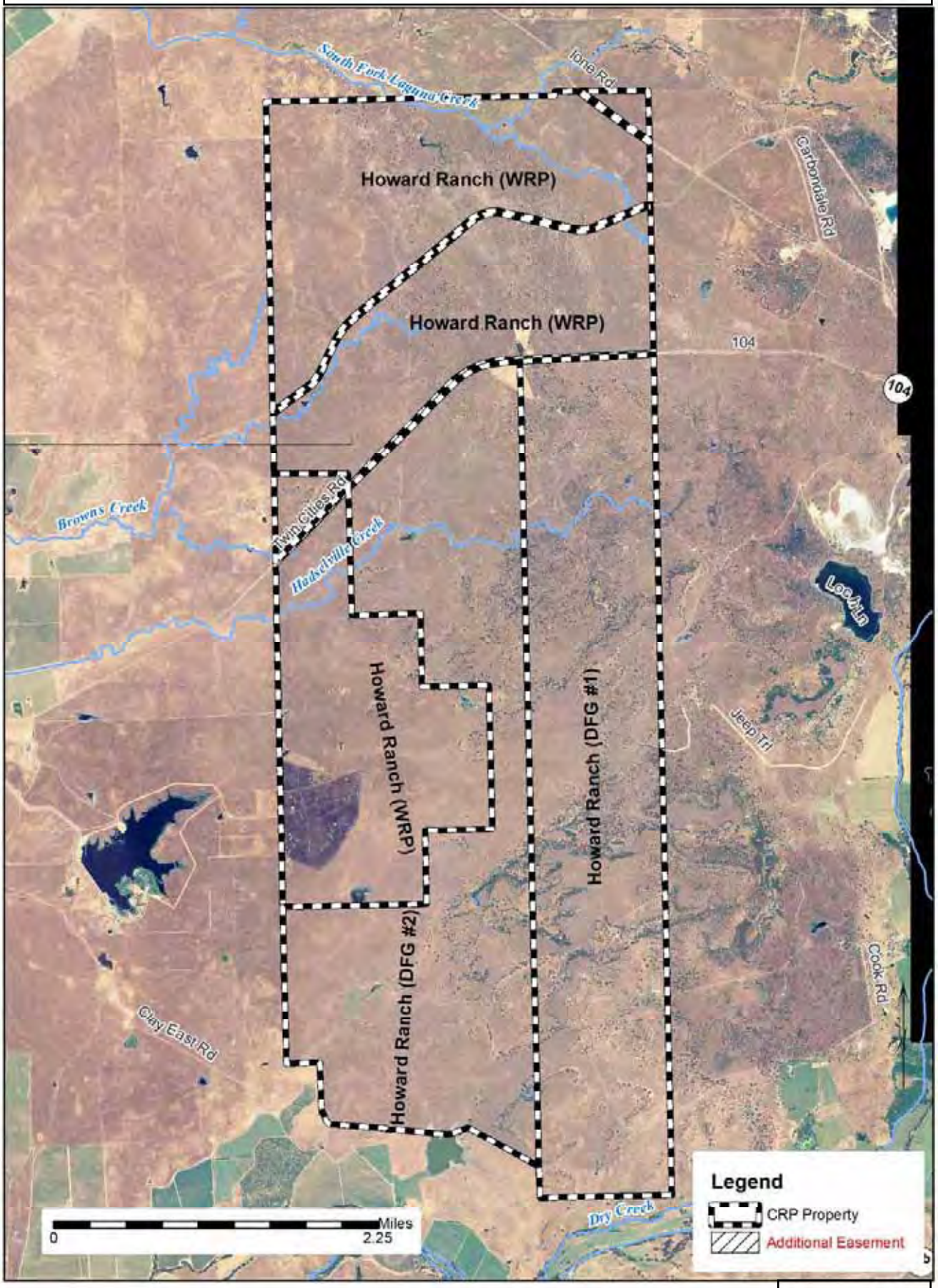
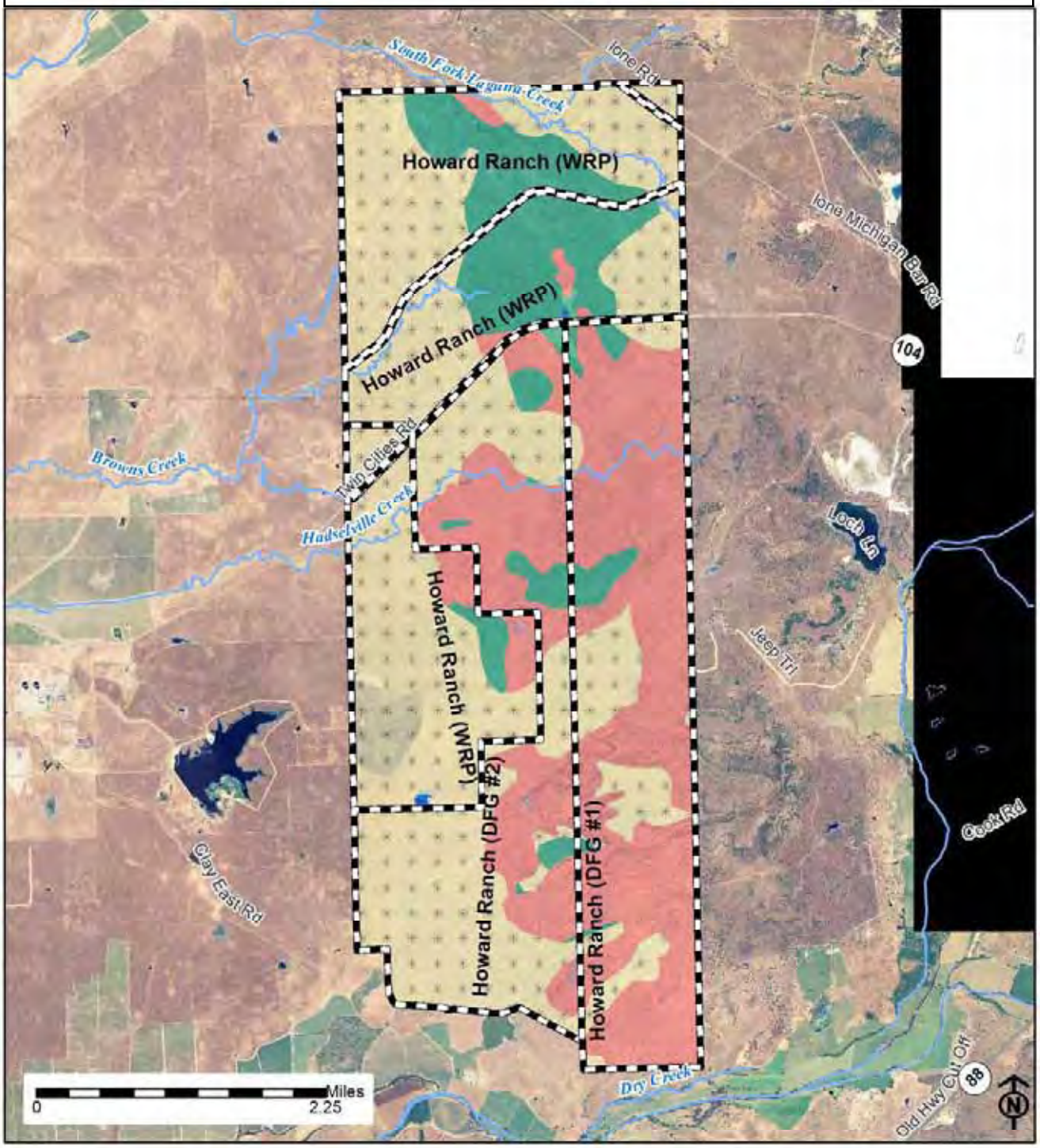


FIGURE 7.45: LAND COVER FOR HOWARD RANCH PROPERTIES



Legend

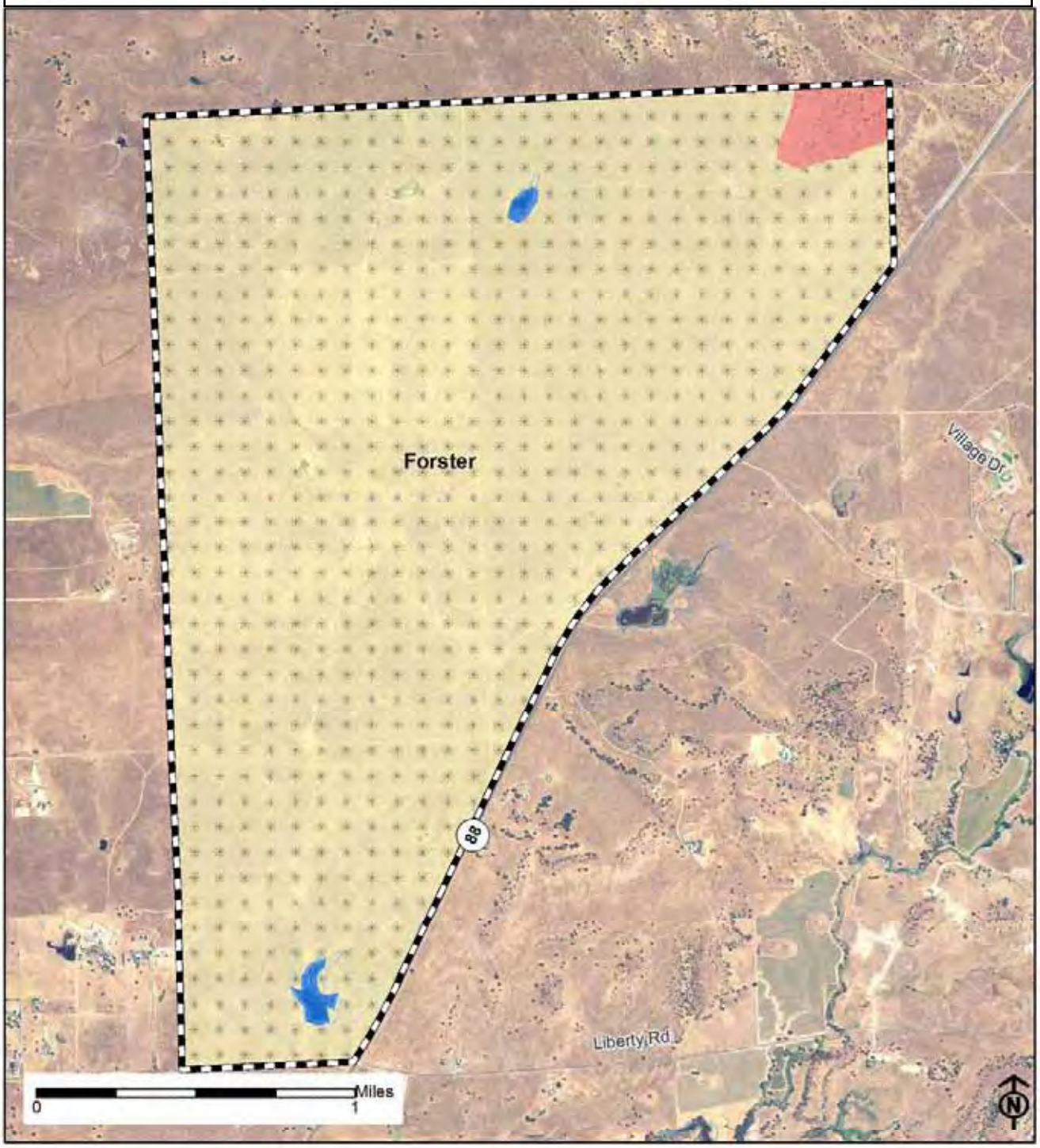
- CRP Property
- Additional Easements

Land Cover

- Blue Oak Woodland
- Blue Oak-Vernal Pool-Savannah
- Grasslands
- Managed Marsh
- Tule & Sedge
- Riparian Trees & Shrubs
- Riparian Vegetation
- Freshwater Marsh
- Vernal Pool Grassland
- Water
- Agricultural Infrastructure
- Crops - Annual or Truck & Berry
- Developed
- Dry Land Farmed
- Grain and Hay Crop
- Idle
- Irrigated Pasture
- Perennial Woody Crops
- Rice

FIGURE 7.46: BOUNDARY FOR FORSTER PROPERTY

FIGURE 7.47: LAND COVER FOR FORSTER PROPERTY



Legend

- CRP Property
- Additional Easements

Land Cover

- Blue Oak Woodland
- Blue Oak-Vernal Pool-Savannah
- Grasslands
- Managed Marsh
- Tule & Sedge
- Riparian Trees & Shrubs
- Riparian Vegetation
- Freshwater Marsh
- Vernal Pool Grassland
- Water
- Agricultural Infrastructure
- Crops - Annual or Truck & Berry
- Developed
- Dry Land Farmed
- Grain and Hay Crop
- Idle
- Irrigated Pasture
- Perennial Woody Crops
- Rice

7.2 TOOLS FOR PROPERTY MANAGEMENT

The Preserve is well known for its ability to identify, test, and promote locally developed management practices, including floodplain restoration and wildlife-friendly agriculture. The Preserve's approach combines scientific knowledge and practical approaches with innovative tools and technologies to enhance land-management practices. The land-management tools described in Table 7.4 may be applicable to both natural land-cover properties and to agricultural properties. Many of the tools described in the following pages help the Preserve maintain landscapes, biodiversity, and ecosystem services while ensuring sustainable production systems and providing for other public and human-compatible uses.

TABLE 7.4: LAND-MANAGEMENT TOOLS

Tool	Description	Positive Benefits	Negative Aspects	Notes
Prescribed Burns (Fire)	Fire is applied to predetermined areas under conditions that control intensity, duration, and speed. Prescribed burning is generally conducted in vernal pool-grasslands between May and July to control non-native, invasive plant species while promoting growth and establishment of desired native plant species.	◂ Promotes flowering of herbaceous species and fruit production of woody species. ◂ Enhances nutrient cycling of some elements in soil and elevates soil pH. ◂ Maintains required habitat conditions for fire-adapted plant and animal species. ◂ Results in more diverse and heterogeneous habitat—if fires are patchy—leaving pockets of unburned areas. ◂ Reduces risk of catastrophic wildfire conditions from developing (*i.e.*, vast accumulation of highly flammable, dead vegetation). ◂ Effectively controls some non-native plant species (medusa-head grass and goat grass).	◂ Temporary (2–12 months) degradation of aesthetic quality until vegetation recovers. ◂ Some danger of fire leaving a prescribed area. ◂ Smoke and soot impacting off-site areas. ◂ Careful planning and permitting needed. ◂ Short-term effects.	◂ A permit is needed from the Sacramento Metropolitan Air Quality Management District. ◂ Prescribed burning on NRCS easement parcels requires a "compatible-use permit" from NRCS. ◂ Plan for equipment such as hoses and protective gear.

Tool	Description	Positive Benefits	Negative Aspects	Notes
Livestock Grazing (cattle, goats, and sheep)	A parcel may be grazed by a large herbivore to facilitate the management of some native plant species by assisting in the removal and/or control of non-native plant species (*e.g. non-native annual grass*).	◂ May benefit short-lived annual plants (wildflowers) relying on open space for their seeds to germinate and grow. ◂ Simulating historic disturbance regime may facilitate maximum biodiversity. ◂ Creates a source of financial revenue for the Preserve	◂ Trampling of plants habitat areas where salt licks, water troughs, corrals, etc. are installed. ◂ Inappropriate timing, duration, and intensity of grazing can adversely affect targeted plant species establishment and maintenance. ◂ Spread of weed seeds.	◂ It is recommended that salt licks be placed a minimum of 300 feet away from a natural water source (springs, creeks, wetlands). ◂ Carefully plan installation of water tanks, troughs, or fencing needed to facilitate grazing. ◂ Grazing should be monitored yearly.
Discing	Discing is used to disturb the soil and reduce dense grass cover.	◂ Occasional disturbance via discing may stimulate growth of desirable vegetation while retarding the growth of non-target species.	◂ Discing is not suitable for certain species of undesirable plants (*e.g.*, perennial pepperweed) as individual segments of cut plants and/or roots will regenerate.	
Mowing	Mowing is used to control non-target plant species as well as to promote desirable species. Tractor is often used for mowing (not plowing).	◂ Variables such as mowed height of vegetation or mowing schedule can be adjusted to achieve management goals. ◂ Mowing can be used to remove excessive grass or weed cover where the use of livestock may not be possible.	◂ Mowing is not suitable for certain species of undesirable plants (*e.g.*, perennial pepperweed) since individual segments of cut plants and/or roots will regenerate. ◂ Impact on wildlife.	

Tool	Description	Positive Benefits	Negative Aspects	Notes
Hunting	Managed hunting programs can be used to control populations of non-native animals such as turkey.	◂ Small, limited entry, managed hunts may provide opportunity for environmental education and stewardship.	◂ Potential conflicts with other compatible and public uses.	◂ Requires a detailed assessment of suitability of particular properties to host hunting.
Flooding	Importance of flooding described in Chapter 2.	◂ Enhances the ecological productivity of the floodplain.	◂ Damage to structures, levees, or crops sometimes occurs.	
Hand-pulling and mechanical control of invasive plants	Manage infestations of invasive plants per the Preserve's Weed Control Plan (2001).	◂ Hand-pulling of weeds creates less impact as compared to use of pesticides. ◂ Opportunity for volunteers to assist with land stewardship.	◂ Labor intensive. ◂ Some species of non-target plant species cannot be controlled via hand pulling alone (*e.g.*, perennial pepperweed.)	
Pesticides	Modern agrochemicals such as Roundup® can be used to manage invasive plants or other pest species.	◂ Efficient and successful when compared to alternative approaches or no action. ◂ Useful as a tool of last resort, where other tools such as mowing or hand pulling are ineffective or negatively impact natural habitats.	◂ Regulatory requirements. ◂ Potential for environmental impacts.	

Tool	Description	Positive Benefits	Negative Aspects	Notes
Vector Control (animals)	Manage infestations of insects and other pest animals to reduce potential for diseases (*e.g.*, mosquitos), reduce damage to infrastructure (*e.g.*, beavers), and/or to reduce adverse effects on plant growth.	◂ Creates a safer and healthier environment that enhances the visitor's experience at the Preserve.	◂ Potential chemical trespass concerns in areas such as the organic rice operations. ◂ Negative public perception.	
Fire Break	Fire breaks are used in strategic areas to reduce the risk of habitat or facility loss due to catastrophic or intentional wildfires.	◂ Protects resources from fire. ◂ Effective at controlling the advancement of fires. ◂ Relatively cost-effective strategy compared to other fire control strategies. ◂ May help in management of prescribed burns.	◂ Creates bare ground and disturbance for the introduction of exotic plant species.	◂ Fire breaks should not be constructed through wetland areas or other sensitive habitat. ◂ It is recommended that a fire break be located at least 100 feet away from a vernal pool. ◂ CEQA compliance and permits may be needed prior to construction of a fire break.

Tool	Description	Positive Benefits	Negative Aspects	Notes
Ecological Restoration	Specific restoration techniques such as tree planting and native grass seeding can be used to promote desirable future conditions at the Preserve.	◂ Helps to meet multiple goals, such as those listed in Chapter 3 of this Management Plan.	◂ Labor intensive. ◂ Success is difficult to predict. ◂ Costs vary depending on whether active or passive restoration techniques are used. Capital costs include seeding, site preparation, supply/ delivery of material, and planting. Labor operating costs include weed control, water, cultivation, and fences/tree guards.	
Wildlife-friendly Farming	Wildlife- friendly farming (*e.g.*, corn, organic rice, etc.) can be used to increase the amount of total available habitat for migratory species such as waterfowl.	◂ Helps to meet multiple management goals. ◂ Creates good will among neighboring landowners and communities by allowing them to be a part of the Preserve through their farming operations ◂ Creates a source of financial revenue for the Preserve. ◂ Retains the restoration potential.	◂ Land that could be restored to native communities is still used for farming.	

Tool	Description	Positive Benefits	Negative Aspects	Notes
Habitat Creation	A new habitat type is created by actively shaping a new ecosystem that might be different from current or pre-1850s conditions.	▪ May help wildlife agencies meet management goals for special status species.	▪ Labor-intensive. ▪ Success is difficult to predict.	
Fencing	Fencing is used for animal control; and is also desirable for management options such as grazing and/or excluding livestock from particular areas.	▪ Provides some measure of control over movement of livestock and wildlife. ▪ Delineates property lines.	▪ Winter flooding can destroy fencing frequently. ▪ Trespassers frequently cut fencing. ▪ Capital costs include purchase of materials and labor. ▪ Operating costs include maintenance and repairs.	
Water Supplies	Includes both landscape-level management through flow-augmentation program and property-specific water supply management related to agricultural needs, wetland operations, or restoration.	▪ Opportunity to install water conservation features on irrigated agricultural fields. ▪ Enhances habitat quality for many species dependent on river flows and the groundwater table.	▪ Routine operations and maintenance costs. ▪ High water costs may be associated with augmentation projects.	

7.2.1 Herbicide and Pesticide Use at the Preserve

According to the California Department of Pesticide regulations, the term "pesticide" includes any product intended to repel, kill, prevent, destroy, control, or mitigate any pest. Pesticides include insecticides, herbicides, plant growth regulators, rodenticides or other vertebrate control agents, repellents, dessicants, fungicides, miticides, disinfectants, sterilants, and sanitizers. Spray adjuvants are pesticides under California law (see: www.cdpr.ca.gov).

The term "herbicide" is commonly used to indicate a subset of pesticides (*i.e.*, those pesticides that target plants). It is our assumption that the regulations and policies pertaining to herbicides are identical to those pertaining to pesticides. Therefore, in this chapter, the term "pesticide" is used broadly to include herbicides, fungicides, and defoliants.

PRESERVE POLICIES ON PESTICIDE USE

The Preserve uses pesticides as necessary to supplement its vegetation-control program. As such, the Preserve's pesticide activities are subject to all of the regulatory requirements imposed on all other entities including, but not limited to, regulations imposed by the U.S. Environmental Protection Agency, the California Department of Pesticide Regulation, the State Water Resources Control Board, the California Environmental Quality Act (CEQA), the National Environmental Policy Act (NEPA), the Sacramento County Agricultural Commissioner, and each individual Partner's policies regarding the use of pesticides on their lands.

Every three years the BLM reviews and revises its Pesticide Use Proposals (PUPs) for all pesticides proposed for use on all Preserve lands owned or managed by Preserve Partners. The PUPs are reviewed and revised in coordination with all Partners and in coordination with a certified pesticide consultant (*e.g.*, a PCA from Wilbur Ellis). Once all PUPS are reviewed and revised, the BLM coordinates with the California Department of Fish & Game for compliance with CEQA and prepares an Environmental Assessment (EA) in accordance with NEPA. The EA is released to the public for a minimum of a 30-day comment period and then submitted to the BLM California State Office for review and approval. When approved, all pesticides are applied per the manufacturer's labeled instructions under the guidance of certified pesticide applicators.

Although each Partner has the discretion to follow their own individual policies regarding pesticide use, the Preserve has an overarching Weed Management Plan (2001). This Plan is currently out of date and is scheduled to be updated upon completion of this Management Plan and every five years thereafter. The Weed Management Plan is based on two fundamental principles:

1. Rather than manage against weeds, the philosophy is to manage for the target species and communities desired. In this spirit, weed species that threaten the survival of the desired conservation targets are identified and controlled using the most appropriate method.
2. To minimize the total, long-term weed control workload, Preserve staff act to prevent new infestations and contain the spread of plants with expanding ranges.

A brief list of some of the typical invasive plant species targeted by pesticides on the Preserve is shown below in Table 7.5.

TABLE 7.5: TYPICAL INVASIVE PLANT SPECIES TARGETED BY PESTICIDES ON THE PRESERVE

Common Name	Scientific Name	State Noxious Listing	Distribution and Origin
Perennial pepperweed	*Lepidium latifolium*	B	waterways, riparian restoration sites, grasslands and along roadsides
Yellow starthistle	*Centaurea solstitialis*	C	grasslands, roadsides
Water hyacinth	*Eichornia crassipes*	none	waterways, permanent wetlands, lakes
Brazilian elodea	*Egeria densa*	none	waterways, permanent wetlands, lakes
Black locust	*Robinia pseudoacacia*	none	
Medusa-head grass	*Taeniatherum caput-medusae*	C	grasslands
Himalayan blackberry	*Rubus armeniacus*		riparian areas

A complete list of invasive plants found on the Preserve is provided in the Watershed Assessment (RBI 2006) and the Weed Management Plan (2001).

PESTICIDES USED AT THE PRESERVE

Pesticides that have been used at the Preserve between the years 2001 and 2006 are listed in Table 7.6, below.

TABLE 7.6: PESTICIDES USED AT THE PRESERVE

Herbicide	Perennial pepperweed	Exotic Trees	Black berry	Yellow Starthistle	Generic Forb	Generic Grass	Ludwigia	Aquatic-Approved	Note
Telar	■								
Transline				■					
Garlon 4		■	■		■				
Garlon 3A		■	■		■		■	■	Status of approval for aquatic use is uncertain.
Roundup Ultra*	■	■	■	■	■	■			
Aquamaster	■						■	■	

Source: Waegell, personal communication.

TABLE 7.7: PARTNER POLICIES REGARDING PESTICIDE USE ON THE PRESERVE

Partner	Policies regarding Pesticide Use	Notes
BLM	◂ Federal rules limit the types of herbicides that can be used on BLM land. Federal lands do not have to comply with state or local regulations. ◂ Comply with Preserve Weed Management Plan (2001).	
CDFG	◂ A CDFG expert called a Pesticide Certified Advisor (PCA) is required to visit the infestation and provide a recommendation for the pesticide to be used based on problem. CDFG coordinates any CEQA requirements. ◂ Comply with Preserve Weed Management Plan (2001). ◂ Comply with State and County guidelines.	Contact the Environmental Services Division of the California Department of Fish & Game at (415) 358-2952 for details.
State Lands Commission	◂ The State Lands Commission-owned lands are managed by the BLM.	TNC staff has not conducted any weed control on this site (Waegell, personal communication).
Sacramento County	◂ Comply with Preserve Weed Management Plan (2001). ◂ Comply with State and County guidelines.	
TNC	◂ Comply with Preserve Weed Management Plan (2001). ◂ Comply with State and County guidelines. ◂ Comply with TNC's Policies & Procedures regarding use of Pesticides on TNC properties.	TNC does not dictate the pesticides to be used at its regional sites; rather they encourage an ecological approach to weed management.
Ducks Unlimited	◂ Comply with Preserve Weed Management Plan (2001). ◂ Comply with State and County guidelines.	

Mosquito Control

The Sacramento-Yolo Mosquito Vector Control District (SYMVCD) works with the Preserve to treat mosquitoes with the goal of reducing risks of mosquito-borne diseases. The SYMVCD utilizes a full range of IPM techniques to manage mosquito populations, including biological control and chemical control of larval or adult mosquitoes. SYMVCD also has regulations and fees associated with the management of seasonal ponds and wetlands (for more information, see the SYMVCD website at: www.fightthebite.net).

Goals, Objectives, Actions, and Monitoring

OVERARCHING GOAL I: NATIVE BIOLOGICAL COMMUNITIES AND THE RESIDENT AND MIGRATORY SPECIES DEPENDENT ON THEM ARE RESTORED AND MAINTAINED TO SUSTAINABLE CONDITIONS AND POPULATION LEVELS.

Objectives	Actions	Monitoring Elements
1.1 Actively manage weeds on the Preserve.	**1.1.1** Update the Preserve's Weed Management Plan (2001) to include the entire Preserve, including, Staten Island and MW Tract.	◂ Final plan every five years.
	1.1.2 Track pesticide use via a variety of mechanisms including the WIMS database, annual reports of pesticide use submitted to the State, etc.	◂ Regular updates to WIMS database.
	1.1.3 Ensure that at least one Preserve staff person is licensed with DPR as a Qualified Applicator, and one person is licensed as a Federally certified pesticide applicator.	◂ Initial certifications and appropriate continuing education credits to maintain certifications.
	1.1.4 Ensure that all farm and grazing lease agreements reiterate the policies associated with pesticide use on Preserve-owned lands. This includes ensuring that lessees following all state, federal, and local laws regarding the use of pesticides on Preserve-owned lands.	◂ Review all existing and new lease agreements to ensure compliance.
	1.1.5 Acquire, maintain, and replace, as necessary, the equipment needed to support the Preserve's land-management capacity (*e.g.*, tractors, mowers, graders, etc.).	◂ Type, quantity, and quality of equipment.

BIBLIOGRAPHY

Miller, K.J., Hornaday, K., U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office; and The Giant Garter Snake Recovery Team. 1999. Draft Recovery Plan for the Giant Garter Snake *(Thamnopsis gigas)*. U. S. Fish and Wildlife Service. Portland, Oregon. Available at: www.fws.gov/pacific/news/1999/ garter.pdf

Robertson-Bryan, Inc. (RBI). 2006. Lower Cosumnes River Watershed Assessment. Prepared for The Nature Conservancy.

8 Operations, Maintenance and Monitoring

The purpose of this chapter is to describe the staffing and other resources necessary to perform the operations and maintenance associated with existing ongoing operation of the Preserve, and the future implementation of this Management Plan. This Plan proposes to manage the Preserve's habitat and public use areas at or above existing conditions and levels; therefore, the implementation of this Management Plan will require changes in staff organization, and additional staffing and financial resources. This Management Plan is intended to help the Partners develop long- and short-term priorities via preparation of annual work plans. This Management Plan does not constitute a commitment for staffing increases, operational and maintenance increases, or funding for future land acquisitions.

8.1 EXISTING STAFF

Staff resources for the Preserve are currently provided by BLM, TNC, GJUESD, DFG, and Sacramento County. Although the total number of staff supporting the Preserve varies from year to year, typical Preserve staff positions are listed in Figure 8.1. Individual Partner staffing responsibilities are outlined in the 1996 Cooperative Management Agreement, as amended.

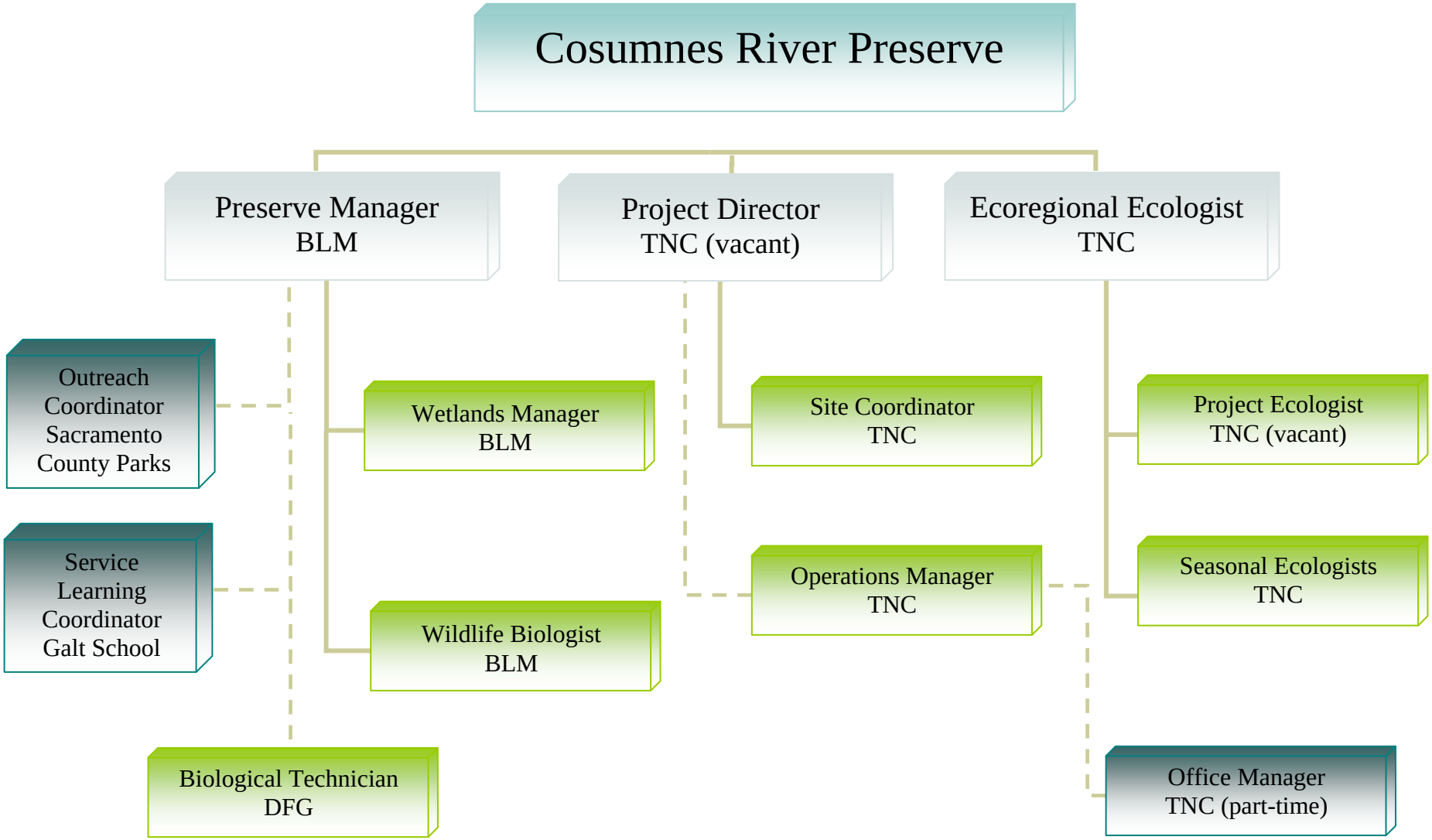
Seasonal employees, as described in Chapter 5, provide staff support to the Preserve. In addition to the staff shown on the organization chart (Figure 8.1) below, most of the Partners contribute specialized expertise from their parent organizations on an as-needed basis. For example, BLM's Folsom Field office has experts on cultural resources, geology, and computer services. Ducks Unlimited staff contribute expertise in wetland development and management. DFG's pesticide experts have supported the Preserve. TNC has staff members with expertise in diverse areas, such as water resources, geographic information systems (GIS), and various scientific disciplines. Additionally, TNC has three full-time staff with the California Water Program who assist with Delta policy and work from the Sacramento office. All Partners typically provide legal and financial support positions to their staff as well. TNC attorneys provide legal support for all land-related deals on the Preserve, for all Partners. Consultants and contracts are retained by the Partners on a periodic basis to support specific projects. The availability of these types of specialized expertise from the Partner organizations is a benefit to the Preserve.

The Partners' funding of staff and related expenses to support restoration, public use, management, improvements, research, and monitoring is significant.

8.2 ADDITIONAL PERSONNEL NEEDS TO IMPLEMENT PLAN

Table 8.3 summarizes actions identified throughout this Management Plan and the estimated labor required to implement them. As shown in this Table, a combination of additional site management, technical expertise, public use staff, and maintenance staff is needed to fully implement this Management Plan. It is anticipated that the continuation of the seasonal employee program will also be needed.

FIGURE 8.1: ORGANIZATION CHART



In addition to the existing positions previously described, it is anticipated that several new staff positions will be needed in the future. Preserve staff have suggested that the following potential future positions would be necessary in order to manage the Preserve for the long term:

TABLE 8.1: POTENTIAL FUTURE STAFF POSITIONS

Title	Role	Partner	Status
Supervisory Biologist, other	Assistant Preserve Manager	BLM, DFG	FT
Wildlife Biologist, Field Representative, other	Land Stewardship and Project Management	DFG, TNC, DU	FT

8.3 CAPITAL EQUIPMENT AND MAINTENANCE

In addition to proposed staffing resources, operation and maintenance of the Preserve requires capital equipment, materials, and supplies. Examples of capital equipment necessary to implement this Management Plan include, but are not limited to, work vehicles, tractors, mowers, backhoes, graders, bulldozers, common hand and power tools, office equipment and supplies, and field supplies.

The Preserve's barn, Visitor Center, farm center, vehicles, tools, trails, boat launch, fences, gates, parking areas, and kiosks are the primary facilities and property that need to be maintained. Wetland pumps, water control structures, and Preserve-owned roads and levees also require ongoing routine maintenance. Agricultural operators work with Preserve staff to maintain farm pumps, water troughs, irrigation systems, and other agricultural infrastructure as part of their farming or grazing leases. Major levee maintenance and repair is an ongoing challenge and often requires a substantial investment in capital improvements (*e.g.*, Staten Island, McCormack-Williamson Tract, Denier II).

8.4 OPERATIONS AND FINANCE

Currently, the Partners contribute financially to the operations and maintenance of the Preserve through the allocation of funding for staff, maintenance, contractors, vehicles, field and office supplies, and tools to support management of the Preserve. Typical land-management expenses include purchase of fuel for vehicles and equipment, parts and repairs, replacement of worn or damaged equipment, replacement of field supplies, purchase of pesticides for control of invasive species, garbage collection, contracted maintenance, etc. Costs for materials and supplies can be considerable for some tasks, such as the eradication of extensive invasive species or the repair of levees and pumps. The budgeting procedure for the Partner organizations varies and, although existing funding sources are anticipated to continue, they are not guaranteed in the future. Funding levels could change at any time.

In addition to the "base" funding that is provided by the Partner organizations, the Preserve also generates a substantial amount of its own income through its agricultural and grazing operations,

especially through the organic rice operations. The farm and grazing leases, therefore, are essential to the continued operation of the Preserve, as most Partner budgets are not expected to increase over time.

8.4.1 Funding Sources

Sources of funding for the Preserve are derived primarily from the Partner organizational budget allocations at this time; specifically the BLM, TNC, Sacramento County, and GJUESD. Staff has indicated that complete dependence on agency/organization annual budget allocations is not reliable because these budgets are highly variable and are unlikely to be sufficient to serve in the long term. For example, federal funding of the Preserve through BLM is typically dependent on the annual congressional allocations to the BLM in any given fiscal year. Private funding through non-profit partners such as TNC and DU varies with philanthropic donations to foundations, grant funding, and other sources. To some extent the capacity of these sources varies with the overall economy. In addition, as partners like TNC continue to expand their geographic reach into other areas, current funding and staffing levels are expected to be responsible for those areas as well. This will stretch the same amount of staff and funds over a larger area.

The Preserve has been very successful in obtaining grant funding in the past. While it is hoped that grant funding will continue, significant dependence on grant funds is not a viable, long-term solution to providing funding for the Preserve in perpetuity. Grant funds are sometimes available for preserves to purchase new properties; however, grant funding for major restoration projects, major capital improvements, or to “jump-start” new programs is very limited and often not available for operations and maintenance. Moreover, the grant application and management process requires the commitment of staff time to administer. Given that future financial needs of the Preserve will likely focus on operations and maintenance, it is anticipated that few grant opportunities will be available. Private foundations have funded small public-use improvements over the past decade, and those funds are likely to continue to be available to non-profit partners such as TNC and DU.

As the Preserve’s management emphasis shifts from start-up expansion to one of long-term management of existing parcels and routine operations and maintenance, it is anticipated that funding sources will shift from grants to other more sustainable sources, such as endowments and general government funds. To help reduce funding constraints, several management actions are proposed on the following pages. The most important of these actions is to explore the feasibility of establishing an endowment or foundation for the Preserve. Successful implementation of this action will take a concerted effort by the Preserve Partners.

A list of potential funding sources from public funds, private foundations, and other private sources is provided in Table 8.2 below. These funding sources may be available for capital improvements, restoration, and enhancement projects within the Preserve. However, each of these funding sources has application constraints and is highly competitive. Additional research would be needed to determine the applicability of these potential funding sources to the Preserve, given timing and other application constraints.

TABLE 8.2: POTENTIAL PUBLIC AND PRIVATE FUNDING SOURCES

- USFWS Programs (*e.g.*, State Wildlife Grant Program, Federal Aid in Wildlife Restoration Program)
- CBDA Ecosystem Restoration Program (*e.g.*, through public solicitation process or submittal of an unsolicited proposal)
- Central Valley Project, Wildlife Habitat Augmentation Plan
- California Wildlife Conservation Board, Habitat Acquisition and Restoration Program
- Department of Fish & Game programs (*e.g.*, Comprehensive Wetlands Program)
- DWR grants available for mitigation of water projects and levee maintenance activities
- U.S. Environmental Protection Agency grant programs
- National Fish and Wildlife Foundation grant programs (*e.g.*, Bring Back the Natives [BBN], Five Star Restoration Challenge Grants)
- North American Wetland Conservation Act (NAWCA)
- Wetlands Conservation Fund
- IRWMP-DWR Bond fund
- U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) Farm Bill programs
- Central Valley Project, Wildlife Habitat Augmentation Plan
- Wildlife Conservation Board Inland Wetlands Conservation Program
- Funding from Sacramento County HCP/NCCP
- Ducks Unlimited, Wetland Restoration Program
- The James Irvine Foundation (www.irvine.org)
- Resources Legacy Fund (www.resourceslegacyfund.org)
- Intel Community Grants (www.intel.com/intel/intel-in-your-community.htm)
- David and Lucile Packard Foundation (www.packard.org)
- Richard and Rhoda Goldman Fund (www.goldmanfund.org)
- The Pew Charitable Trusts (www.pewtrusts.com)

8.5 ADMINISTRATION OF THE PRESERVE

PROGRAMS

The Preserve has successfully implemented many innovative projects, programs, and concepts; including its wetlands management program, migratory bird program, volunteer program, education program, restoration projects, and the Wetland Reserve Program (WRP) (monitored by NRCS). One of the Preserve's greatest achievements to date is the establishment of the Partnership and the CMA. At this Preserve, government agencies and private organizations with differing priorities and constraints work together in a private/public venture towards the common mission of establishing and maintaining the Preserve and protecting the river. Similar partnerships are rare and the partnerships established at this Preserve have served as a model for others. Both the number of participating organizations and the significant leadership roles that

TNC and BLM have assumed are particularly noteworthy. The support and respect the Preserve has received from within the public community—from neighboring landowners and from within each Partner organization—has been remarkable. The Preserve has achieved these successes by having a committed and dedicated staff and by having Partners that are fully committed to the Preserve's mission. A large financial commitment was required to realize the Preserve's current level of success. The financial contributors include numerous donations, grants, TNC, CALFED, BLM, and many others. The early success of several of the Preserve's restoration projects helped garner attention from the scientific and regulatory community, which in turn fostered additional funding used to restore even more habitat. Building on this past success, this Management Plan describes several actions to enhance existing habitat, to add more parcels to the Preserve, and to expand the public-use programs.

"Prescribed Burn" – Photo ***courtesy of Preserve Photo Library***

PARTNER ROLES

The Cooperative Management Agreement (CMA) defines the goals, roles, and responsibilities of the signatories for managing and administering all portions of lands currently owned, in fee or in easement, by the Partners. The Partners recognize that their respective interests in those lands are subject to different authorities and policies, but that the CMA is intended by the Partners to define an administrative process and facilitate cooperation among them to the greatest extent possible.

The CMA is updated every five years; however, the last update occurred in December 2005 via a brief letter indicating consensus to extend the agreement as written previously. The next CMA update process has already begun and the updated agreement is anticipated to be finalized in July 2008. It is anticipated that at that time, two new signatories to the CMA will be added: The NRCS, which owns several easements on the Preserve, and the GJUESD.

The role of the Preserve Partners is changing and is anticipated to change even more in the future. In the past, the focus of the Preserve has been on growth, acquisition, and research. For the first 20 years, the Preserve was in a "start-up" mode, and the original acquisition of Preserve properties required expertise in real estate, grants, law, finance, science, and restoration. As most of this expertise was provided by TNC, it was logical that TNC played the most significant leading role. However, as the Preserve transitions from an acquisition focus to more emphasis on operations, management, maintenance, and monitoring, the roles of each Partner will also change. This transition may result in a shift from TNC's expertise in acquisitions and science to the agencies' expertise in long-term land management. Regardless of the transitions, all Partners will continue to have a valuable role at the Preserve and to pursue their organizations' goals as they relate to management of the Preserve.

The role of specific Partners is variable but each Partner plays an important role. For example, some Partners focus on the provision of funding, such as DWR funding an easement on Staten Island. Daily land management duties may be less of a role for some Partners.

COOPERATIVE PARTNERS

In addition to the land-owning Partners (referred to as the "Preserve Partners"), several important programs at the Preserve are dependent on other agencies that may not own land or be involved in day-to-day management activities but are nonetheless critical to the Preserve's success. These Partners are called Cooperative Partners and are described briefly below.

- GJUESD sends thousands of children to visit the Preserve as part of their educational careers. GJUESD has successfully obtained many grants to support the work of the Preserve's Education Coordinator position. Details are provided in Section 5-4 of Chapter 5. As mentioned above, GJUESD is likely to become a formal Preserve Partner when the CMA is updated in 2008.
- University of California, Davis, has taken the lead in research and science activities at the Preserve for many years. See Section 5-3, Public Use: Research, for details.
- NRCS routinely provides technical advice to local farmers and ranchers. They provide funding for numerous land-improvement projects through the WRP and EQIP programs and they provide helpful technical advice to the Preserve and its farm lessees. They also hold conservation easements across two Preserve properties totaling approximately 6,292 acres. As mentioned above, NRCS is likely to become a formal Preserve Partner when the CMA is updated in 2008.
- Sacramento Valley Conservancy (SVC) administers an agricultural easement on a portion, 180 acres, of the Valensin property.

SUPPORTERS

Several organizations and agencies support the Preserve's mission because they have similar missions and goals. In this case, the term "supporter" indicates that the organization promotes the interests or cause of stewardship at the Preserve. Examples of Supporter organizations are Save Our Sandhill Cranes (SOS Cranes), Point Reyes Bird Observatory (PRBO), the California Department of Boating and Waterways, Stone Lakes National Wildlife Refuge, Sacramento Regional County Sanitation District's Bufferlands project, the Lodi Sandhill Crane Festival, International Crane Foundation, the Elk Grove School District, the Galt Historic Society, and the California Native Plant Society. In the upper watershed, organizations that the Preserve will likely work with include land-owning stakeholders such as BLM, U.S. Forest Service (El Dorado National Forest), and American River Conservancy. The Bureau of Reclamation and El Dorado Irrigation District manage Sly Park Reservoir on the North Fork Cosumnes River. These supporters contribute to the long-term success of the Preserve by offering technical advice, assistance in achieving overall stewardship goals, grants, and/or contributions to scientific research that ultimately leads to improved land-management practices.

PARTNERSHIPS WITH NEIGHBORS

The support of neighboring landowners has been critical to the past success of the Preserve. Sometimes neighbors may be reluctant to work with governmental agencies or environmental organizations because of perceived differences in ideals or long-term visions of land stewardship. However, the Preserve's neighbors have made an effort to learn more about the Preserve and its mission and goals. Many of the Preserve's neighbors have made a concrete commitment to the Preserve's goals by selling conservation easements to the Preserve Partners. Others support research and monitoring efforts for Preserve researchers to better understand the land. Working together, the Preserve's neighbors have helped the Preserve make great strides in achieving stewardship goals.

POTENTIAL NEW PARTNERS

As the Preserve expands and management roles change, the Preserve may find other organizations and agencies with similar missions that might be potential new partners. These include state agencies such as California State Parks and CALTRANS (who funded an easement on the Valensin property), local agencies such as Sacramento County's HCP/NCCP program, and local non-profits such as land trusts. The Cities of Galt and Elk Grove are important local partners and they have referenced the Preserve in their General Plans.

The Preserve's primary challenge is to broaden the base of support for the Preserve. This entails broadening support among the Preserve Partners, Cooperative Partners, Supporters, neighboring landowners, and potential new partners. The management actions listed within this Management Plan are intended to help the existing Partners in this endeavor.

8.6 IMPLEMENTATION AND MONITORING CONTINGENCIES

Once the Management Plan is finalized, the implementation phase of the planning process begins. Implementation of this Management Plan is anticipated to occur over a 10-year period, at which time the Management Plan will be updated. The Preserve Partners will assume responsibility for implementing this Management Plan with assistance from any new partners, neighboring landowners, Preserve volunteers, and the public at large. The Preserve Partners will make every effort to implement the planned actions by the agreed-upon schedule (Table 8.3). However, implementation of the actions is contingent upon a variety of factors, including:

- Updating existing plans that tier off of this Management Plan (*e.g.*, Weed Management Plan, five-year Wetlands Management Plan, etc.).
- Completing new focused studies and assessments (*e.g.*, assessment of needed recreation facilities).
- Funding and staffing.
- Compliance with local, state, and federal regulations.
- Partnerships.
- Adaptive management actions resulting from continued research and monitoring.

Each of these factors is described briefly below.

UPDATING EXISTING FOCUS PLANS

This Plan outlines the need to update several existing planning documents that the Preserve has relied upon in the past but have become outdated due to new acquisitions, management techniques, and scientific understanding. Updating these plans (*e.g.*, Weed Management Plan) will provide the additional planning details necessary to implement future management actions.

COMPLETING NEW FOCUSED STUDIES AND ASSESSMENTS

Many of the proposed actions within this Management Plan require more in-depth planning and analysis than the Management Planning process was designed to provide. This Management Plan outlines the need to complete a few new assessments to ascertain the feasibility of proceeding with the anticipated actions. In addition to the needed assessments, a new comprehensive monitoring plan is proposed as part of this Management Plan.

FUNDING AND STAFFING

In order to maintain the Preserve's management at or above its current level, a certain amount of staffing, equipment, facilities, and supplies are needed. Some of these expenses may require an initial capital outlay; for example, for new recreation facilities. Others currently require, and will continue to require, recurrent operations, maintenance, and staffing expenses. These expenses are detailed above in Section 8.3.

COMPLIANCE WITH LOCAL, STATE, AND FEDERAL REGULATIONS

This Management Plan outlines numerous activities that will require compliance with local, state, and federal regulations. CEQA and NEPA documents will soon be prepared to evaluate the potential environmental effects of this Management Plan. However, future implementation of some of the actions described herein will be subject to further regulatory and legal review that will be undertaken and accomplished prior to the implementation of the planned activity.

PARTNERSHIPS

Management of the Preserve is dependent upon a wide array of Partners, including the land-owning Partners, Cooperative Partners, Supporters, and neighboring landowners and communities. The Preserve will continue to rely on these and other partners in the future to help implement this Plan and to provide input into future Plan updates. This Management Plan identifies many actions that provide new opportunities for existing and new partners. There is great potential for more public participation and assistance in the management and interpretation of the Preserve's natural resources.

8.7 ADAPTIVE MANAGEMENT

This Management Plan provides for adaptive management of the Preserve. Used internationally, "adaptive management" is defined by some as "a systematic process for continually improving management policies and practices by learning from the outcomes of operational programs" (Nyberg 1998). The Preserve will continually review its management tools, actions, and objectives and make modifications as necessary based on the results of ongoing monitoring activities, new scientific information, and other new studies. These periodic evaluations and course corrections will be used to better achieve the Preserve's goals and vision. Since monitoring is an essential component of adaptive management, we have integrated specific monitoring strategies into this Management Plan whenever possible.

MONITORING ELEMENTS

The Preserve will monitor certain areas for specific monitoring elements. The initial year of monitoring will be undertaken to establish baseline data for those elements that currently lack such data. After the first year of baseline data gathering, staff will compare results to the initial surveys. Ideally, monitoring data will be compiled over a several-year period to identify trends (either negative or positive). Should monitoring results indicate a significant change in environmental conditions (*e.g.*, target species or habitat not meeting goals); the Preserve will implement more intensive or different management strategies.

8.8 SEVERABILITY

If any provisions of this Management Plan or its application to any person or legal entity or parcel of land or circumstances is held invalid, the remainder of the Management Plan, or the application of the provisions to other persons or legal entities or parcels of land or circumstances, shall not be affected.

TABLE 8.3: IMPLEMENTATION TIMELINE FOR MANAGEMENT PLAN

Cosumnes River Preserve Management Plan
Action Implementation Table for Ecological Actions

CHAPTER 3 – ACTIONS		Partners Responsible	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Annually	As Needed
1.1.1	Monitor public policy regarding water supply and flood management	All																	■	
1.1.2	Engage, as necessary, in public policy to prevent construction of dams or significant increases in surface water diversion.	All																		■
1.1.3	Map the Preserve's flooding and levee breaches in a comprehensive way. Update this data set on an annual basis.	All																	■	■
1.2.1	Map land-use patterns and change in the lower watershed every 2 years using available GIS data and aerial photos.	All		■		■		■		■		■		■		■		■		
1.2.2	Participate in regional land use planning and floodplain management efforts (e.g., South Sacramento County HCP, City of Elk Grove General Plan, county general plans, LAFCO decisions) that may affect Preserve resources (e.g., habitat destruction, degradation or fragmentation) or complement conservation goals (e.g., open space and wildlife corridors among other natural lands).	All																		■
1.2.3	Coordinate regional land management with other natural lands managers (e.g., Stone Lakes NWR, DFG Woodbridge ecological reserve, Sacramento Valley Conservancy) and with guidance from regional natural resource plans (e.g., Central Valley Joint Venture, Riparian Habitat Joint Venture). Review plans and provide comments and technical assistance where appropriate.	All																		■
1.2.4	Secure funding to protect surrounding lands that support Preserve biota and provide linkages to other natural lands, working with willing sellers and available resources.	All with leadership from TNC																	■	
1.2.5	Assess availability and needs for linkages and migration corridors for targets (e.g., giant garter snake, vernal pool species).	All with leadership from DFG			■															
1.2.6	Assess habitat values of different land uses. Develop and conduct standardized site assessments to identify areas that have high ecological value for the Preserve, using existing information.	All			■															
1.2.7	Determine habitat needs (amount, type, landscape ecology) of indicator species whose life history needs cross Preserve boundaries (e.g., sandhill cranes and Swainson's hawks).	All			■															
1.2.8	Promote landscape-scale linkages and corridors along the Cosumnes River and tributaries (e.g., from Delta to headwaters), among vernal pool sites, and among protected areas (e.g., Stone Lakes NWR, Deer Creek Hills).	All																	■	
1.2.9	Update and implement the overall weed control plan every 5 years to address Preserve-wide invasive species threats and priorities.	TNC and BLM					■					■					■			
1.2.10	Ensure wildlife-friendly agriculture on the Preserve's farmlands, and promote these practices on surrounding lands (e.g., annual crops, pasture, rangeland, truck crops).	All																	■	
1.2.11	Update the Preserve Management Plan every 10 years and implement.	All										■								
1.2.12	Conduct feasibility study of potential Cosumnes River meander scenarios and implement river meandering scenarios as funding allows	All										■							■	
1.3.1	Engage in public policy forums to improve regional groundwater management (e.g., Central Sacramento County Groundwater Forum, South Area Water Council).	All																	■	
1.3.2	Design and implement next phase of groundwater-surface water studies, in collaboration with research partners, in order to refine understanding of groundwater-surface water status and relationships and to determine groundwater and surface flow requirements of riparian and aquatic species. This includes locating groundwater levels that enhance river baseflow.	TNC and CDFG			■															
1.3.3	Design and implement experimental flow releases and other measures to recharge local groundwater levels and enhance surface flows for salmon migration (potential sources of water and/or funding include AFRP and CVPIA, b2 Program.)	TNC and CDFG			■															
1.4.1	Support conservation of Ione chaparral by Partners working to implement CDFG's CAPP in order to protect, manage, and restore at least three geographically dispersed populations, totaling at least 400 acres of high-quality Ione chaparral habitat.	CDFG and TNC																		■
1.4.2	Promote protection of blue oak woodland habitat (particularly along the river corridor), by Partners and on protected Preserve lands where present. Ensure viability of protected oak habitat through proper management and early detection and control of invasive species.	CDFG and TNC																	■	
1.5.1	Track and, if warranted, participate in the 22 planning efforts identified above and in new efforts that begin in subsequent years.	All																	■	
2.1.1	Identify and prioritize key parcels necessary to secure remaining unprotected 7,450 riparian core acres within the riparian corridor.	All with leadership from TNC			■															
2.1.2	Acquire unprotected key parcels remaining in the riparian corridor between McCormack-Williamson Tract and Highway 99 (5,150 riparian core acres remaining within corridor) by 2018, on a willing-seller, as-available basis.	All with leadership from TNC																		■

Cosumnes River Preserve Management Plan

Action Implementation Table for Ecological Actions

CHAPTER 3 – ACTIONS		Partners Responsible	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Annually	As Needed
2.1.3	Acquire or protect key parcels in the riparian corridor between Highway 99 and Wilton Road (2,300 riparian core acres remaining within the corridor) by 2028, on a willing-seller, as-available basis.	All with leadership from TNC																		■
2.2.1	Develop standardized vegetation classification and conduct habitat mapping (similar to scale of CDFG mapping) of existing and restored habitats to monitor status and guide management.	All with leadership from CDFG			■															
2.2.2	Assess condition of habitats within the riparian core area by evaluating vegetation cover and successional trajectory of all sites (existing and restoring habitats) every 3 to 5 years.	All with leadership from TNC				■				■				■				■		
2.2.3	Develop and implement restoration and management actions (e.g., planting, re-contour, weed control) as necessary to enhance development of a diverse riparian-wetland mosaic (i.e., successional stage, physical structure, species composition) and to maintain population levels of native species.	All																		■
2.2.4	Evaluate the response of special status species and indicator species to riparian and floodplain restoration and management actions (e.g., valley elderberry longhorn beetle; Riparian Habitat Joint Venture focal bird species such as yellow-billed cuckoo, song sparrow, Swainson's hawk, ringtail cats, and other state and federal protected species).	All																	■	
2.2.5	Conduct and support research to evaluate factors potentially limiting floodplain-river connectivity, forest recruitment and survival (e.g., water table levels, soil conditions, stream channel incision, levees).	All																		■
2.2.6	Conduct and support other research as necessary to guide management of the Preserve.	All with leadership from UC Davis																		■
2.2.7	Increase cottonwood/willow between Accidental Forest and Tall Forest to support cuckoos, willow flycatchers, least bell's vireos, and other neo-trops.	All																		■
2.3.1	Locate, map, and evaluate invasive plant species in targeted riparian habitats along the Cosumnes River (annual effort rotated among sites, with most areas visited at least once every three years).	All with leadership from UC Davis																		■
2.3.2	Implement control programs (treatment and monitoring), as necessary, to maintain desired species composition and population levels of native species.	All																		■
2.3.3	Conduct and support research to evaluate threats from invasive animal species (e.g., black rat, cowbirds) and techniques for control (e.g., trapping, baiting).	All with leadership from TNC and UC Davis																		■
2.3.4	Conduct and support research to evaluate threats from invasive plants (e.g., perennial pepperweed, Himalayan blackberry) and techniques for control (e.g., prescribed fire, grazing, herbicide treatments, mowing, disking, and weed mat tarping).	All with leadership from TNC and UC Davis																		■
2.4.1	Restore ~500 acres of seasonally flooded riparian habitat on the Preserve's Denier II property by completing and implementing plans to restore a natural flooding regime and to plant native riparian vegetation. Incorporate experimental design to test approaches that could be applied to restoration of other upstream sites (e.g., Castello).	TNC					■													
2.4.2	Develop and implement restoration plans for an additional 500 acres of riparian-floodplain habitat.	TNC					■													■
2.4.3	Investigate opportunities to restore river-floodplain connectivity and create 300 acres of seasonally flooded habitat (long-duration flooding to support fishes and aquatic food web) to offset any losses due to succession of previously restored habitat. Site assessment includes elevations, hydrology (flooding extent, frequency, duration, depth and velocity), and sediment supply.	All									■								
2.5.1	Work with local irrigation districts and water managers to manage surface flows in the river to support the natural variability and frequencies of specific flood types and water year types as outlined in Booth et al.	All																		■
2.5.2	Focus water and flood management activities on maintaining the hydrologic connectivity between surface and subsurface waters, while recognizing that periodic connection and disconnection of the floodplain within the river channel is vital to the functioning of the floodplain.	All																		■
2.5.3	Manage floodplains to ensure that multiple, repeated inundation events occur with a two-to-three year period from at least early January through early May.	All																		■
2.5.4	Work with property owners to minimize flooding of residences in the lower Cosumnes River area.	All																		■
3.1.1	Annually evaluate status of land protection and conversion in the vernal pool grassland region (rangeland and uplands of south and east Sacramento county).	TNC																	■	
3.1.2	Annually monitor vernal pool grassland easements for compliance with easement terms and conditions.	TNC																	■	
3.1.3	Participate in the South Sacramento County Habitat Conservation Planning Process to ensure consistency with USFWS Vernal Pool Recovery Plan and Preserve goals.	TNC																		■
3.1.4	Identify and prioritize key parcels necessary to secure remaining unprotected 3,417 acres vernal pool habitat.	TNC			■															
3.1.5	Protect key parcels by 2012, on a willing-seller, as-available basis.	All with leadership from TNC					■													■
3.2.1	Continue fire management activities in vernal pool grassland habitat in partnership with local landowners and agencies (e.g., fire staff from California Department of Forestry and Fire Protection, BLM, and USFWS Refuges) to burn at least 500 acres of vernal pool grassland per year.	TNC, BLM																	■	

Cosumnes River Preserve Management Plan

Action Implementation Table for Ecological Actions

CHAPTER 3 – ACTIONS		Partners Responsible	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Annually	As Needed
3.2.2	Conduct field surveys and data anlysis to assess the status of biodiversity in vernal pool and grassland habitats as a baseline for future evaluation.	TNC																	■	
3.2.3	Assess effects of grazing on vernal pool plant and animal community by: • Continuing data collection and analyze data from Howard Ranch grazing study to determine long-term grazing impacts on native and non-native plants as well as vertebrate/invertebrate taxa. • Participating in TNC statewide grazing study.	TNC																	■	
3.2.4	Assess effects of fire on vernal pool plant community by: • Completing analysis of fire effects data from the Howard Ranch and Valensin Ranch to determine an appropriate fire management regime for these sites. • Continuing data collection and analyze data from study of goat grass control using prescribed fire	TNC																	■	
3.3.1	Conduct field surveys to evaluate extent of invasion of *Glyceria declinata* in vernal pools on the Preserve. Use results of surveys and other information to develop and implement a weed control plan for vernal pools.	TNC																	■	
3.3.2	Evaluate extent of *Aegilops triuncialis* invasion in grasslands.	TNC																		■
3.3.3	Perform periodic weed surveys to document new outbreaks or spread of existing weeds in vernal pool grasslands (at least once every three years).	TNC			■			■			■			■			■			
3.4.1	Develop a map showing grassland restoration potential on Preserve lands.	All with leadership from TNC			■															
3.4.2	Study use of native forb species and best methods for establishment in grassland restoration plantings.	All					■													
3.4.3	Document best practices for grassland restoration with guidelines for the best methods and species.	All					■													
3.4.4	Implement best practices on Preserve lands and encourage their use by others.	All					■													
3.5.1	Develop a classification system for annual grasslands on the Preserve, in collaboration with the California Native Plant Society (CNPS) and other botanical experts.	All					■													
3.6.1	Map the Preserve's fire history in a comprehensive way. Update this data set on an annual basis.						■													
4.1.1	Evaluate needs for seasonal wetland habitat every 3 years, based on regional waterbird and waterfowl populations and habitat availability, in coordination with other natural lands managers (e.g., Stone Lakes NWR, DFG Woodbridge, SVC), and with guidance from regional natural resource plans (e.g., CVJV) and adjust CRP wetland restoration and maintenance goal to support.	All with leadership from BLM			■			■			■			■			■			
4.1.2	Annually evaluate condition of managed ponds, and develop and implement plans to maintain desired mosaic of physical habitat using flooding schedule and/or vegetation treatments (e.g., mowing, discing, or spraying).	BLM																	■	
4.1.3	Develop and implement an annual wetlands operations plan for all Preserve properties (e.g., waterfowl ponds, Staten Island, Grizzly Slough and agricultural lands) that provides for roosting and foraging habitat throughout the migratory and winter season for migratory and wintering waterfowl, sandhill cranes, shorebirds, and waterbirds.	All with leadership from BLM																	■	
4.1.4	Manage fall flood-up schedules that maximize the temporal and spatial habitat values across all of the managed wetlands and rice fields (e.g., July/August flooding for shorevird migrations, August/September for early arriving cranes, etc.).	BLM																	■	
4.1.5	Maintain approximately 15 percent of managed wetland ponds as brood habitat for waterfowl (currently 111 acres), consistent with wetland BMPs for waterfowl and wildlife.	BLM																	■	
4.1.6	Coordinate management of CDFG mitigation land on the DWR-owned Grizzly Slough property.	CDFG and DWR			■															
4.2.1	Work with tenant farmers to create and maintain at least 750 acres of seasonally flooded rice on the Preserve.	All with leadership from BLM					■													
4.2.2	Work with Staten Island farm managers to create and maintain 2,300–3,000 acres of seasonally flooded agriculture.	All with leadership from TNC					■													
4.3.1	Develop a restoration plan for McCormack-Williamson Tract to create up to 1,600 acres habitat mosaic (tidal wetlands, seasonal wetlands, floodplain, and riparian habitat) by breaching levees to restore tidal inundation. Work cooperatively with stakeholders (e.g., DWR North Delta Group, CALFED) to develop, fund and implement the plan.	All with leadership from TNC and DWR										■								
4.4.1	Assess the feasibility of restoring tidal wetlands along slough channels (e.g., Tihuecheme Slough, near Lost Slough). Develop and implement a restoration plan if feasible.	All					■													
4.5.1	Restore approximately 140 acres of managed freshwater wetlands on the Preserve's Wong property.	TNC																	■	
4.5.2	As funding becomes available, evaluate the potential to restore freshwater wetlands on other Preserve properties.	All																		■
4.6.1	Maintain greater sandhill crane roosts on managed and natural wetlands in proximity to foraging habitat (within 1–2 miles), minimize disturbance from other land uses, and reduce sources of mortality (e.g., power lines).	BLM																	■	

	CHAPTER 3 – ACTIONS	Partners Responsible	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Annually	As Needed
4.6.2	Maintain and restore perennial wetland habitat in the Badger Creek watershed for giant garter snake (see also Objectives 5.2–5.5)	All with leadership from CDFG					■													
4.7.1	Locate, map, and annually evaluate invasive plant species in wetland habitats along the Cosumnes River (e.g., perennial pepperweed, water primrose, water hyacinth).	All																	■	
4.7.2	Implement control (i.e., grazing, burning, herbicides, and other mechanical control methods) and post-treatment monitoring as necessary to maintain desired species composition and population levels of native species.	All																	■	
4.7.3	Conduct and support research to evaluate threats and control techniques (e.g., prescribed fire, grazing, herbicide treatments, mowing, disking, and weed mat tarping) for controlling target invasive plant and animal species in wetland habitats.	All																	■	
4.8.1	Work cooperatively with vector control to reduce mosquito production in a manner that is consistent with the pond flooding schedule.	All																	■	
4.8.2	Monitor for occurrence of avian diseases (e.g., botulism, cholera, West Nile Virus, etc.) and implement control measures as appropriate and in coordination with National Wildlife Refuges.	All with leadership from BLM																	■	
4.8.3	Develop an avian disease rapid response plan to facilitate immediate and appropriate management response to an outbreak of avian diseases (*e.g.,* immediate flooding, scaring birds, etc.).	All with leadership from BLM																		■
4.9.1	Engage in water quality policy forums as necessary to track measures and regulations that affect wetlands management (e.g., CVRWQCB, Agricultural waiver program).	All																		■
4.9.2	Implement best management practices as appropriate to maintain and enhance water quality.	All																	■	
4.9.3	Support research on potential impacts and management of methyl mercury.	All																	■	
5.1.1	Conduct monitoring studies of Snake Marsh every 5 years to document status of population.	All with leadership from CDFG					■					■					■			
5.1.2	Survey suitable habitat east of Hwy 99 to detect new population expansion, if funding available or in preparation for potential repatriation (Objective 5.5).	All with leadership from CDFG					■													
5.2.1	Map habitat and characterize vegetation of Snake Marsh, including extent of water primrose.	All with leadership from CDFG					■													
5.2.2	Characterize the seasonal hydrology, water sources, and water needs of the Snake Marsh and Badger Creek system. Determine whether changes in hydrology are adversely impacting the Snake Marsh population.	All with leadership from TNC					■													
5.2.3	If water supplies are inadequate, develop and implement plan to provide water, including supplementation if necessary (e.g., surface flow augmentation, wells). Coordinate with local partners in conjunction with regional groundwater and surface water planning efforts (e.g., S. Sacramento County Groundwater Plan).	All with leadership from TNC and Sacramento County																		■
5.3.1	Map extent of water primrose in Snake Marsh and upstream sources in Badger and Willow Creeks.	All with leadership from CDFG					■													
5.3.2	Assess whether changes in vegetation are adversely impacting the GGS population in Snake Marsh.	All with leadership from CDFG																	■	
5.3.3	Review and test control methods for water primrose. Develop and implement control plan if feasible.	All with leadership from TNC and UC Davis					■													
5.4.1	Assess status of upland refugia (burrows for summer, aestivation sites for winter) and potential disturbances (e.g., vehicles, livestock, agriculture).	All with leadership from CDFG					■													
5.4.2	Minimize disturbances of aestivation sites during winter (Oct–Mar) along railroad grade at Snake Marsh and other potential high-ground sites (if GGS population spreads).	All																	■	
5.5.1	Evaluate habitat potential (physical and hydrological) of Badger Creek watershed east of Hwy 99. Characterize the seasonal hydrology, water sources, and water needs.	All					■													
5.5.2	Develop and implement plan to maintain sufficient water supply to restore perennial wetlands east of Hwy 99 (Horseshoe Lake, SF and/or NF Badger Creek), in conjunction with regional groundwater and surface water planning efforts (e.g., South Sacramento County Groundwater Plan).	All with leadership from CDFG and TNC																	■	
5.5.3	Ensure connectivity between Snake Marsh population and area east of Hwy 99.	All with leadership from CDFG																	■	
5.5.4	Restore perennial wetland habitat on NF and SF Badger Creek (e.g., channelized reaches on Bjelland and George Dairy properties). Provide aestivation sites above winter flooding adjacent to any habitat restored for GGS.	All with leadership from TNC					■													
5.5.5	Implement weed control measures as necessary to minimize impact of invasive water primrose.	All																	■	
5.5.6	Assess opportunities to repatriate giant garter snakes to suitable habitat on the Preserve if recolonization does not occur within 10 years of habitat restoration. Work with USFWS to develop, fund and implement a restoration and repatriation plan according to Draft Recovery Plan (FWS 1999) goals and guidelines.	All																		■
6.1.1	Secure, monitor, and adaptively manage releases of water from Folsom South Canal to pre-wet the stream channel in early fall (as per February 2005 MOA of the Central Sacramento County Groundwater Forum).	All with leadership from TNC																	■	

Cosumnes River Preserve Management Plan

Action Implementation Table for Ecological Actions

CHAPTER 3 – ACTIONS		Partners Responsible	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Annually	As Needed
6.1.2	Evaluate purchases of additional water rights to provide ecological flows for key targets such as Chinook salmon, giant garter snake, and riparian forest. Investigate opportunities for funding and implementation (e.g., Anadromous Fish Restoration Program [AFRP]).	All																		
6.2.1	Monitor passage status in river and to maintain river free from physical passage barriers (culverts, road crossings, seasonal impoundments). Work with the Fisheries Foundation and others to complete this action.	All																		
6.3.1	Support Fisheries Foundation and/or CDFG in monitoring spawning activity (redd counts in fall/winter) in the Cosumnes River.	All with leadership from CDFG																		
6.3.2	Support local partners (e.g., Fishery Foundation, NRCS, local RDs, Cosumnes River Task Force) in efforts to evaluate causes of spawning habitat degradation upstream of the Preserve (erosion, scour, and/or siltation) and to develop strategies to improve conditions (e.g., gravel augmentation, erosion control).	All																		
6.4.1	Map every 3 years extent of seasonal open water floodplain habitat (long-duration floods during January–March).	All with leadership from TNC																		
6.4.2	Adaptively manage floodplain habitat and if necessary plan restoration of additional seasonal open water habitat to maintain 300 acres (to offset succession of seasonal open water habitat to riparian forest, maintain mosaic of habitat types, and to support any changing levels of salmon production). Obtain funding and implement restoration plan (Action 2.4.2).	All with leadership from TNC																		

Cosumnes River Preserve Management Plan

Action Implementation Table for Agricultural Stewardship

	CHAPTER 4 – ACTIONS	Partners Responsible	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Annually	As Needed
1.1.1	Assess all of the existing Preserve properties for their potential to contribute to accomplishing the Preserve's overall mission and goals through the implementation of agricultural and/or grazing practices.	All with leadership from BLM						■												
1.1.2	Implement agriculture and grazing on all Preserve properties where implementation is deemed suitable and complementary to the Preserve's overall mission and goals.	All with leadership from BLM						■												
1.1.3	Conduct outreach regarding the importance of agriculture to the Preserve's overall goals.	BLM																	■	
1.1.4	Collaborate with adjacent landowners and tenants regarding common land-management issues.	All with leadership from BLM																		■
1.1.5	Continue to communicate and collaborate with agricultural agencies and organizations by attending meetings, conferences, and workshops sponsored by entities such as NRCS, the local RCDs, CCA, FSA, CFBF, etc.	BLM																	■	
1.1.6	Continue to communicate and collaborate with policymakers to ensure that local and regional agriculture remains viable, as reflected in documents such as County General Plans, the South Sacramento County HCP, etc.	All with leadership from TNC																		■
1.1.7	Continue to promote wildlife-friendly farming approaches and organic farming methods to local farmers and the general public.	All with leadership from NRCS																	■	
1.1.8	Address water quality issues by supporting efforts to research and collect site-specific data on aquatic parameters, including production of methyl mercury.	All with leadership from UC Davis						■												
1.2.1	Use grazing strategies and other land-management tools to maximize native plant biodiversity while minimizing and controlling invasive plant species infestations.	All																	■	
1.2.2	Minimize the impact of grazing on sensitive habitats such as riparian areas and vernal pools (e.g., design livestock infrastructure systems such as exclusionary fencing and gates, stock water placement).	All																		■
1.2.3	Maintain approximately 1,000 acres of organic rice operations, in rotation, on the Preserve in order to supplement the managed wetland program's habitat availability.	BLM																		■
1.2.4	Manage grazing and agricultural lands (especially Howard Ranch, Valensin Ranch, and irrigated pastures), as necessary, in order to support and maintain viable populations of federal-listed vernal pool species and state-listed wildlife species such as the Swainson's hawk.	All																	■	
1.2.5	Continue to utilize economically viable agricultural and grazing as a land management tool to support federal- and state-listed species and overall biodiversity. For example, Staten Island agriculture supports greater sandhill crane.	All																	■	
1.2.6	Use a range of agricultural practices and land-management tools, as necessary and appropriate, to supplement wildlife-friendly farming and grazing techniques.	All																	■	
1.3.1	Maintain and replace, as necessary, the Preserve's agricultural infrastructure, including pumps, water control structures, roads, levees, etc.	All with leadership from BLM																		■
1.3.2	Require all agricultural and grazing lessees to maintain the leased agricultural infrastructure as a term and condition of their lease.	BLM																	■	
1.3.3	Maintain the Preserve Partners' existing State water rights.	BLM																		■
1.3.4	Examine the feasibility of water conservation practices and equipment on the Preserve, especially for agricultural operations (e.g., recycle, recapture).	All with leadership from BLM																	■	

Action Implementation Table for Public Use: Recreation, Volunteers, Research, and Education

	CHAPTER 5 – ACTIONS	Partners Responsible	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Annually	As Needed
1.1.1	Collect, compile, and evaluate data on visitor use and experiences at the Preserve.	Sacramento County																	■	
1.1.2	Determine the future recreational carrying capacity of the Preserve based on the information gathered through the recreational monitoring activities.	Sacramento County					■													
1.1.3	Apply adaptive management techniques to recreation programs and facilities, which may be negatively impacting natural resources.	Sacramento County																	■	
1.2.1	Continue to design, construct, install, and maintain interpretive signs throughout the Preserve (e.g., for the wetlands area, sandhill cranes, trails, etc.) as needed.	All with leadership from Sacramento County																	■	
1.2.2	Continue to design and distribute high quality public use/educational brochures (e.g., driving tour, walking tour, paddling guide, etc.) and update them as necessary.	All with leadership from Sacramento County																	■	
1.2.3	Continue to provide safety information to visitors on current conditions (e.g., floods, fires, mountain lions, etc.) within the Preserve.	Sacramento County																		■
1.2.4	Continue to provide a minimum of 12 guided walks led by the Volunteer Naturalists per year.	Sacramento County																	■	
1.2.5	Maintain existing paddling routes.	All																	■	
1.2.6	Maintain the existing boat dock.	All																	■	
1.2.7	Improve coordination and scheduling with the commercial paddling companies.	Sacramento County																	■	
1.2.8	Increase the number of commercial paddling companies program with secured permits.	BLM and Sacramento County				■														
1.2.9	Provide information about existing fishing opportunities, parking, and safety hazards (e.g., mercury levels in fish).	All																	■	
1.2.10	Continue to monitor the existing geocaching sites along on-trail locations. Expand geocaching activities in the future if deemed necessary and appropriate.	Sacramento County																	■	
1.2.11	Continue to provide existing hunting opportunities at the current, existing level unless that level is determined to be incompatible with the mission and goals of the Preserve.	All																	■	
1.2.12	Study the potential to allow additional tightly defined specialty hunts based on a limited permit approach in a comprehensive manner using consistent criteria for all Preserve parcels. Consistent parcel-based criteria should be used.	All		■																
1.2.13	Implement additional limited-entry hunting opportunities if and when possible to meet the management objectives of a particular property.	All			■															
1.3.1	Design of new recreation facilities should be consistent with the natural landscape of the Preserve and utilize materials with natural colors that blend in with surroundings.	All																		■
1.3.2	Conduct a facilities need assessment to ascertain the anticipated future needs for new recreational facilities. This assessment will also include an analysis of the feasibility of these facilities, consistent with Objective 1.6. Potential future facilities considered in this assessment could include the following: • Additional boat launching at Willow Slough. • Additional wildlife viewing platforms. • Portable photography blinds. • Trails described in the McFarland Ranch Master Plan. • Permanent or portable photography blinds in key wildlife viewing locations.	All with leadership from Sacramento County				■														
1.3.3	Explore potential for improvement and/or expansion of paddling routes upstream at Wood Duck Slough, Cosumnes River as needed. An example of a possible improvement is to remove overgrown brush from the paddling route along the river or slough.	All with leadership from Sacramento County		■																
1.3.4	Encourage CALTRANS, Sacramento County, and San Joaquin County to develop an implementation plan for the construction of road pullouts near the Preserve, that allow visitors to view wildlife and habitat.	BLM and Sacramento County		■																
1.3.5	Participate in discussions with Sacramento County and other Preserve Partners regarding the potential for future regional trails, including one to connect Stone Lakes Refuge to the Preserve.	All																	■	
1.4.1	Assess possible locations for additional recreation activities, and implement if compatible and feasible.	Sacramento County				■														
1.4.2	Examine the feasibility of developing and implementing a wetlands/rice operations driving tour route similar to routes established at National Wildlife Refuges. If feasible, design and construct a route and implement an "auto tour route" program in coordination with all applicable agencies, counties, etc.	BLM and Sacramento County					■													
1.5.1	Evaluate current trail maintenance practices and assess practices for effectiveness. • Provide new maintenance standard for trails. • Secure resources to implement new standard (volunteers, funding, equipment). • Ensure accessible trails and viewing platforms continue to meet ADA standards.	BLM and Sacramento County					■													
1.5.2	Recruit YCC, CCC, and/or other service groups to help maintain trails.	BLM and Sacramento County																	■	
1.5.3	Continue to work with county work crews to help maintain trails.	BLM and Sacramento County																	■	
1.5.4	Hire landscapers or other contractors, as needed.	All																	■	
1.6.1	Add new security features to the Preserve Visitor Center, parking lots, trails, and other facilities, as necessary (e.g. security cameras, security signs, gates, alarms, etc.).	All			■															

	CHAPTER 5 – ACTIONS	Partners Responsible	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Annually	As Needed
1.6.2	Increase law enforcement presence or patrols (e.g., game wardens, Sacramento County Rangers, DFG, etc.) the entire Preserve by working cooperatively and/or cost-sharing a position with local, state and federal law enforcement officials.	All			■															
1.6.3	Improve tracking and recording of security events to analyze and determine any patterns of the violations occurring on the Preserve.	BLM and Sacramento County		■																
1.7.1	Provide educational outreach (e.g. brochures, presentations, etc.) to various user groups that contribute to inappropriate use (e.g., poachers, OHV riders, etc.).	BLM and Sacramento County																	■	
1.7.2	Install and maintain signage, gates, fences, barricades, K-rails, etc. at sites with high incidences of inappropriate use and throughout the Preserve as necessary.	BLM and Sacramento County																	■	
1.7.3	Update and implement the Preserve's Sign Plan, as needed.	BLM and Sacramento County																		■
1.7.4	Limit visitors to authorized trails in order to reduce the potential spread of invasive species.	All																	■	
1.7.5	Restore those areas of the Preserve that are damaged by inappropriate uses	All																	■	
1.7.6	Increase law enforcement presence (e.g. game wardens, Sacramento County Rangers, DFG, etc.) throughout the entire Preserve to assist staff with the management of inappropriate uses.	All	■																	
1.7.7	Improve recording of violations and illegal uses occurring on the Preserve.	All	■																	
1.7.8	Analyze and determine any patterns of the violations and illegal uses occurring on the Preserve; focus law enforcement patrol in these areas.	Sacramento County		■																
1.8.1	Work with Preserve Partners to assess annual budgets, farm revenue, grant opportunities, and potential for establishment of an endowment or other financing tool that can be used to support the staff and facilities necessary to meet recreational demands at the Preserve.	All	■																	
1.8.2	Maintain sufficient levels of staffing and funding to actively manage existing and future visitor use and to minimize inappropriate use of facilities and habitats.	All																	■	
1.8.3	Assess the feasibility of charging visitors a vehicle parking fee similar to the State Parks System (e.g., $6 per car and $100 per bus). Implement if the action is determined to be feasible.	All	■																	
1.8.4	Seek funding for the construction and maintenance of any needed new recreation facility.	All								■										
1.8.5	Conduct a review of best practices among similar preserves, parks, or refuges to ascertain how they charge, fund, and determine recreational use.	All	■																	
2.1.1	Ensure that the Preserve's Volunteer Program continues to serve a variety of functions and ongoing programs, including, for example, the following: • Outreach ▫ Volunteers staff the Visitor Center on the weekends as a minimal threshold. ▫ Volunteers help staff booths for special events (e.g., Earthfest, Walk on the Wild Side, Salmon Festival, Davis Duck Days, Crane Festival). • Habitat protection and restoration. • Habitat Restoration Team has a minimum of 12 work days a year. • Recreation • Maintain trails annually as needed. • Education (e.g., guided walks and paddling tours and/or school activities). • Research as covered by the Biological Inventory Team. • Monitoring (e.g., research, easement, mitigation, and biological). {Monitoring Plan (not yet written) will provide details on what the volunteers will be monitoring.}	Sacramento County																	■	
2.1.2	Staff provides appropriate training, direction, and communication to volunteers.	Sacramento County																	■	
2.1.3	Hold an annual meeting with the Volunteers to share how their efforts contribute to the CRP's Monitoring Plan, Research Agenda, Management Plan, and other Preserve Programs.	Sacramento County																	■	
2.1.4	Develop and implement a volunteer commitment process designed to balance the level of training provided to volunteers and time donated by volunteers.	Sacramento County																	■	
2.1.5	Include a section in the CRP annual work plan that focuses HRT efforts on accomplishing goals of the Management Plan and research agenda.	All with leadership from TNC																	■	
2.1.6	By 2010, establish a training session for dedicated volunteers to become team leaders of various volunteer programs.	Sacramento County			■															
2.1.7	Provide annual Volunteer Naturalist Training, including updated training materials and maps.	Sacramento County																	■	
2.1.8	Provide volunteers effective recognition and incentives (e.g., certificates of merit, media highlights, and social networking activities).	Sacramento County																	■	
2.1.9	Provide enrichment activities, such as a series of scientifically oriented lectures (e.g., natural history of local species, conservation biology, etc.) twice per year.	All																	■	
2.1.10	Inform volunteers about CRP activities, updates, future goals, suggestions, and achievements through newsletters, meetings, and social networking activities.	Sacramento County																		■
2.1.11	Develop additional volunteer opportunities or programs (e.g., Junior Naturalist Program, K–12 education, High School Summer School/Spring Break Program, Adopt-an-Acre Program, etc.) as needed and if staff and financial resources are sufficient.	Sacramento County																		■

Action Implementation Table for Public Use: Recreation, Volunteers, Research, and Education

CHAPTER 5 – ACTIONS		Partners Responsible	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Annually	As Needed
2.2.1	Maintain a diverse overall Volunteer Program at sufficient number of active volunteers to staff all volunteer programs. Recruit new volunteers as needed.	Sacramento County																		■
2.2.2	Through the Preserve Work Plan, annually evaluate the number of volunteers and the work that they accomplish to ensure that we are balancing quantity and quality (i.e., skill level of work).	Sacramento County																		■
2.2.3	Expand and improve the Vernal Pool Tour Program at the Howard Ranch Trail by developing a sufficient number of vernal pool docents over the next five years.	TNC and Sacramento County					■													
2.2.4	Pursue opportunities to coordinate, communicate, and collaborate on volunteer programs, activities, scheduling, and outreach with other local land managers (e.g., Stone Lakes National Wildlife Refuge, Delta Meadows State Park, SMUD, Yolo Bypass, etc.).	All																	■	
2.3.1	Develop a permanent funding source to carry out the Volunteer Program (e.g., establishment of a foundation or similar endowment).	All with leadership from Sacramento County		■																
2.3.2	Obtain grants to support the volunteer program.	All																	■	
2.3.3	Update the volunteer database.	Sacramento County																	■	
2.3.4	The Volunteer Coordinator will prepare an annual report that documents the activities of the Volunteer Program.	Sacramento County																	■	
3.1.1	Evaluate the feasibility of establishing a research institute at the Preserve to provide place-based research on a variety of scientific and ecological topics, including flooding and floodplain management. As part of the evaluation process, assess the possibility of affiliation with an academic organization such as LTER or UC Natural Reserve Site.	All with leadership from TNC and UC Davis								■										
3.1.2	Utilize the Preserve's Goals, Objectives, and Actions to: • Assist in directing the research efforts of the Preserve Partners and serve to guide future proposals. • Serve as a basis for developing collaborative research proposals between Partners and other institutions. • Alert scientists to important but relatively neglected research areas.	TNC																	■	
3.1.3	If manipulative studies are conducted on Preserve lands, the following guidelines are recommended: • The area should be mapped so that future research conducted on previously manipulated sites can take into account the effects of past manipulations. • Research that implements long-term markers for manipulated sites will be removed when study is complete. • Sites should be surveyed with GPS and entered in a GIS. Paper maps of manipulated sites should be archived.	TNC																	■	
3.1.4	Develop a strategy to obtain funding to help meet ecological research needs as identified in the goals, objectives, actions, and monitoring noted in Chapter 3, Natural Resources Stewardship.	All with leadership from TNC																	■	
4.1.1	Maintain existing Preserve programs that provide educational and volunteer stewardship opportunities at the Preserve.	Sacramento County and GJUESD																	■	
4.1.2	Evaluate the need to institute additional programs that provide educational and volunteer stewardship opportunities at the Preserve (e.g., biological monitoring, Adopt-an-Acre Program, etc.) and institute those programs that are feasible.	Sacramento County and GJUESD																	■	
4.1.3	Develop and distribute outreach materials to educate a diverse public about the importance of the Preserve, its Partners and their missions, and citizen participation in environmental stewardship.	Sacramento County and GJUESD																		■
4.1.4	Utilize Volunteer Naturalists to provide education to the public.	All with leadership from Sacramento County																	■	
4.1.5	Beginning in 2008, host at least two science-related presentations for the general public annually.	All with leadership from Sacramento County																	■	
4.1.6	By 2010, obtain at least one grant to support translation of interpretative signs, brochures, displays, and/or educational/classroom materials into several languages.	All with leadership from Sacramento County			■															
4.1.7	By 2009, update the Preserve's media distribution list to include bilingual media outlets from a variety of geographic areas, including small towns and the larger cities of Stockton and Sacramento.	Sacramento County and GJUESD		■																
4.2.1	By 2009, develop and implement a formalized Cosumnes River Preserve Environmental Education Program based on the institutional model that best fits the Preserve's needs, including a permanent, sustainable funding source for the Education Program.	All	■																	
4.2.2	Prior to 2012, evaluate the feasibility of developing an environmental education center at the Preserve. Implement if feasible.	All					■													
4.2.3	Continue Service Learning activities at the Preserve at least at current levels (e.g., provide opportunity for students in local school districts to visit the Preserve at least three times during K–12).	GJUESD																	■	
4.2.4	Improve quality of the field trip experience by lowering the ratio of students to teacher/volunteer. A ratio of 15 students to 1 teacher/volunteer is ideal.	GJUESD					■													
4.2.5	Update the Preserve's teaching resources as needed to be consistent with state standards and grade-level specific topics and activities.	GJUESD																	■	

Action Implementation Table for Public Use: Recreation, Volunteers, Research, and Education

CHAPTER 5 – ACTIONS		Partners Responsible	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Annually	As Needed
4.2.6	Annually provide at least four on-site teacher training workshops.	GJUESD with assistance from Sacramento County																	■	
4.2.7	Annually provide at least eight off-site teacher trainings.	GJUESD																	■	
4.2.8	Increase the number of teachers participating in each on-site workshop up to a maximum of 25 teachers per workshop.	GJUESD with assistance from Sacramento County								■										
4.2.9	Develop an education program database to accurately track educational activity at the Preserve.	GJUESD				■														
4.2.10	Develop and begin implementation of a plan to upgrade existing facilities and/or provide new facilities (e.g., new drinking fountain, bathrooms) as needed to support the educational program by 2009.	All		■																
4.3.1	Participate in local community events on an ongoing basis by hosting exhibit booths, providing literature, leading tours, and/or making presentations to the public at large.	All with leadership from Sacramento County																		■
4.3.2	Make presentations to City and County leaders (e.g., at public meetings, tours) on an ongoing basis.	All																		■
4.4.1	Develop additional outreach materials that are specific to the Preserve and its mission, as needed, in order to provide additional information to neighboring landowners.	All with leadership from BLM																		■
4.4.2	Attend a minimum of two agriculture-related meetings (e.g., Farm Bureau, Calif. Cattlemen's Assoc., Calif. Rice Growers Assn., RCD) per year.	BLM																	■	

Cosumnes River Preserve Management Plan

Action Implementation Table for Cultural and Visual Resources

	CHAPTER 6 – ACTIONS	Partners Responsible	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Annually	As Needed
1.1.1	Incorporate, as appropriate, information about Native American Indian tribes and early settlers into the Preserve's interpretative programs and materials as they are updated in the future.	Sacramento County																		
1.1.2	Provided that it does not adversely affect the Preserve, continue to permit Native Americans physical access to plants to carry out practices such as pruning, digging, sowing, burning, and selective harvesting to create plant growth characteristics conducive to supplying basket weaving materials.	BLM																		
1.1.3	Establish a productive relationship with persons or organizations interested in cultural resources protection at the Preserve (e.g., California Basket Weavers Association.)	All																		
1.2.1	Assist, as needed and able, in the implementation of the Master Plan for the McFarland Living History Ranch by working with Sacramento County and the Galt Historical Society.	All																		
2.1.1	Manage BLM lands in the Preserve to achieve VRM Class III classification. The other Partners should follow suit to a similar standard, using their own visual classification system.	All																		
2.1.2	Coordinate with the utility companies and other entities to relocate or underground existing and future power lines crossing the Preserve. This will enhance the visual resources as well as reduce collision impacts to sandhill crane and other birds.	All																		
2.1.3	As improvements are made to roads and other infrastructure, ask Project proponents not only to reduce the level of impact but also to take steps to improve the aesthetic quality of the project area.	All																		
2.1.4	As new development projects proposed around the Preserve, either in close proximity or in nearby urban areas, undergo environmental review (CEQA), ensure that project proponents to consider potential effects on visual resources at the Preserve, including the effects of outdoor nighttime lighting.	All																		
2.1.5	When vegetation is removed, altered, or restored, ensure that it is done in a manner consistent or complimentary to the previously existing or historical visual condition (e.g., valley oak trees are replaced with same species or similar, not non-native dissimilar trees).	All																		
2.2.1	Review any new outdoor lighting proposed on the Preserve to ensure it meets the following characteristics: • High quality design that is consistent with natural setting of Preserve. • Controlled and shielded to shine down. • Timed to ensure that there is light is there only when needed. • Minimum amount (intensity) of light (i.e., wattage) is used to accomplish the light's purpose. • Energy efficient. • Installed only where absolutely necessary. •	All																		

CHAPTER 7 – ACTIONS		Partners Responsible	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Annually	As Needed
1.1.1	Update the Preserve's Weed Management Plan (2001) to include the entire Preserve, including, Staten Island and MW Tract.	All																		
1.1.2	Track pesticide use via a variety of mechanisms including the WIMS database, annual reports of pesticide use submitted to the State, etc.	All																		
1.1.3	Ensure that at least one Preserve staff person is licensed with DPR as a Qualified Applicator, and one person is licensed as a Federally certified pesticide applicator.	TNC																		
1.1.4	Ensure that all farm and grazing lease agreements reiterate the policies associated with pesticide use on Preserve-owned lands. This includes ensuring that lessees following all state, federal, and local laws regarding the use of pesticides on Preserve-owned lands.	All																		
1.1.5	Acquire, maintain, and replace, as necessary, the equipment needed to support the Preserve's land-management capacity (*e.g.* , tractors, mowers, graders, etc.).	All																		

Cosumnes River Preserve Management Plan

Action Implementation Table for Operations and Maintenance

CHAPTER 8 – ACTIONS		Partners Responsible	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Annually	As Needed
1.1.1	Identify and secure a variety of funding sources (from grants to other sources) that will provide more financial stability for the Preserve in the future.	All																		
1.1.2	Pursue the establishment of an endowment or foundation to fund the continued maintenance and stewardship of the Preserve in perpetuity.	All																		
1.1.3	Pursue increases in annual and regular funding from state and federal agency Partners.	All																		
1.1.4	Pursue increases in annual funding from private, non-profit conservation organization partners.	All																		
1.1.5	Continue to generate revenue from the Preserve's agricultural and grazing leases, provided that the generation of that revenue is consistent with the overall goals in this Management Plan.	All																		
2.1.1	Plan for and document changes in Preserve leadership, staffing, and Partners' roles via the renewal of the Cooperative Management Agreement, annual work plans, and individual agreements between Partners.	All																		
2.1.2	As applicable, enter into new management agreements with existing and/or new Partners.	All																		
2.1.3	All Partners will work cooperatively to staff and fund the positions necessary to implement the Management Plan.	All																		
2.2.1	Develop and implement activities, presentations, one-on-one conversations, and other outreach actions to recruit new partners and/or support for the Preserve. Consider adding new partners as signatories to the CMA (e.g., local school districts, local land trusts, and/or NRCS).	All																		
2.2.2	Maintain ongoing communicate with neighboring landowners, Partners, and other potential supporters by contacting them on a one-on-one basis, organizing annual gatherings, etc. to share information about ongoing activities and future planned projects at the Preserve.	All																		

Goals, Objectives, Actions, and Monitoring

OVERARCHING GOAL II: COMPATIBLE USES IMPROVE STEWARDSHIP OF THE LANDS IN THE COSUMNES RIVER WATERSHED.

Operations, Management and Monitoring Sub-goal #1: The Preserve will be financially sustainable.

Objectives	Actions	Monitoring Elements
1.1 Recognize that the Preserve is undergoing shifts in management emphasis and Partner roles, which may result in shifts in financial resources.	**1.1.1** Identify and secure a variety of funding sources (from grants to other sources) that will provide more financial stability for the Preserve in the future. **1.1.2** Pursue the establishment of an endowment or foundation to fund the continued maintenance and stewardship of the Preserve in perpetuity. **1.1.3** Pursue increases in annual and regular funding from state and federal agency Partners. **1.1.4** Pursue increases in annual funding from private, non-profit conservation organization partners. **1.1.5** Continue to generate revenue from the Preserve's agricultural and grazing leases, provided that the generation of that revenue is consistent with the overall goals in this Management Plan.	**1.1.1** Number of funding sources explored and number secured each year. **1.1.2** Endowments or foundations established. **1.1.3** Amount of increase in annual "base" funding per year. **1.1.4** Amount of increase in annual budget allocations from non-governmental partners. **1.1.5** Amount of revenue received each year from agricultural and grazing leases.

Operations, Management and Monitoring Sub-goal #2: The Partners will work together to counteract future challenges (*e.g.*, dwindling financial and staffing resources, etc.).

Objectives	Actions	Monitoring Elements
2.1 Transition the Preserve's management emphasis from acquisition and research to more long-term operations and maintenance in a logical and strategic manner.	**2.1.1** Plan for and document changes in Preserve leadership, staffing, and Partners' roles via the renewal of the Cooperative Management Agreement, annual work plans, and individual agreements between Partners.	**2.1.1** Cooperative Management Agreement, Annual Work Plans, Management Plan updates, individual agreements between partners, etc.

Objectives	Actions	Monitoring Elements
	2.1.2 As applicable, enter into new management agreements with existing and/or new Partners. **2.1.3** All Partners will work cooperatively to staff and fund the positions necessary to implement the Management Plan.	**2.1.3** Monitor the result of new agreements. New organization chart, number of positions filled, amount of staff funding provided annually, etc.
2.2 Broaden the base of support for the Preserve among Preserve Partners, Cooperative Partners, Supporters, and neighboring landowners and communities.	**2.2.1** Develop and implement activities, presentations, one-on-one conversations, and other outreach actions to recruit new partners and/or support for the Preserve. Consider adding new partners as signatories to the CMA (*e.g.*, local school districts, local land trusts, and/or NRCS). **2.2.2** Maintain ongoing communication with neighboring landowners, Partners, and other potential supporters by contacting them on a one-on-one basis, organizing annual gatherings, etc. to share information about ongoing activities and future planned projects at the Preserve.	**2.2.1** Number of activities, etc. developed and implemented annually. Types of organizations or entities contacted. **2.2.2** Number of contacts or events annually.

Operations, Maintenance, and Monitoring Sub-goal #3: This Management Plan will be fully implemented and will use an adaptive management approach.

Objectives	Actions	Monitoring Elements
3.1 To be a role model in the use of Adaptive Management.	**3.1.1** Use adaptive management to continually assess environmental and social conditions, analyze and respond directly to specific site conditions, and build upon these efforts to continue to actively manage the Preserve.	**3.1.1** Management actions that are supported by available data. Evaluate management tools used.

	3.1.2 Using adaptive management, this Management Plan may be subject to ongoing minor modifications, subject to consensus of the Partners. Such modifications may include updates to the MS Access database, the geodatabase, and the text of this Plan. **3.1.3** Conduct a major update to this Management Plan within the next 10 years (*i.e.*, 2018), consistent with Action 1.2.11 in Chapter 3.	
3.2 Fully implement this Management Plan by 2023.	**3.2.1** Complete the actions in accordance with the timeline and responsibilities outlined in Table 8.2.	

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Nyberg, J.B. 1998. Statistics and the practice of adaptive management. Pages 1–7 in: Statistical methods for adaptive management studies. Sit, V. and Taylor, B., editors. British Columbia Ministry of Forests, Research Branch, Victoria, BC. Land Management Handbook 42.

9 Summary of Comments Received and Responses to Comments

This section of the Cosumnes River Management Plan addresses oral and written comments received on the Public Review Draft Management Plan. The Draft Management Plan was released to the public on December 10, 2007, for a 30-day public-review comment period. A total of 81 comments were received from a variety of sources, including State agencies, private non-profit conservation organizations, and private landowners and other citizens. During the 30-day public-comment period the Preserve hosted five public meetings to present the Draft Plan to the public and receive oral and written comments. The meetings were held in Elk Grove, Galt, and at the Preserve Visitor Center. The primary method of sharing the Draft Management Plan with the public was by posting it on the Preserve's website, the Bureau of Land Management's (BLM) Folsom Field Office website, and by sending public notices to neighboring landowners and other interested parties. News releases were also published by the BLM and in local newspapers in Galt and Elk Grove.

The BLM prepared an Environmental Assessment that considered potential impacts and alternatives to the Plan, consistent with NEPA. A copy of the Environmental Assessment is available from BLM's Folsom Field Office website and from the Preserve Manager.

Undergoing concurrent public review was the associated CEQA document, prepared by the California Department of Fish & Game. The Initial Study/Negative Declaration (IS/ND) was circulated for public review and comment for a period of 30 days beginning on January 28, 2008. The public comment period closed on February 25, 2008. The Draft Management Plan and the associated IS/ND were made available to the public on the California Department of Fish & Game website. Additionally, hard copies of the documents were provided during normal business hours at the following locations: Cosumnes River Preserve Visitor Center, Department of Fish & Game in Stockton, and the Yolo Bypass Wildlife Area Headquarters in Davis.

The oral and written comments received on the Draft Management Plan are summarized below in Table 9.1 A copy of all the comments received are available for public review upon request during normal business hours at the Preserve's Visitor Center.

Some of the comments received provided clarification of factual information, goals and objectives, and redundancy noted in the document. Other comments provided opinions, alternate views of appropriate goals and objectives, and similar commentary. All comments received were responded to either through the incorporation of clarifying text and/or additional information directly into the Final Cosumnes River Preserve Management Plan. Those comments not requiring revision to the document were addressed via the written responses below in Table 9.1. Because the Plan was prepared in collaboration by the Preserve Partners, comments were addressed by the most qualified Partner.

TABLE 9.1. SUMMARY OF PUBLIC COMMENTS RECEIVED ON DRAFT COSUMNES RIVER PRESERVE MANAGEMENT PLAN.

#	COMMENT	RESPONSE
1.	One commenter stated that the Plan should address the need for fish screens on diversions in the Cosumnes River.	No change made to the Plan. While fish screens have been proven to help out-migrating salmon and other fish species, they are not a focus of the Preserve's efforts to increase salmon populations in the Cosumnes River. The CVPIA Fish Screen Program and other screening programs cover that need for listed fish species.
2.	One commenter stated that the Plan should address the need for more hunting opportunities for the general public, not just special groups.	Additional text was included in Section 5.1.1 to address this comment.
3.	One commenter stated that the Plan should address the need for more leadership to address Delta and sea-level rise over the next 25, 50, and 100 years.	No change made to the Plan. Preserve staff will continue to be involved in policy discussions regarding that issue and we will adapt our management as needed to protect lands within the Preserve.
4.	One commenter stated that the Plan should address the need for more public involvement at the Preserve so that local communities take "ownership."	No change made to the Plan. The Plan currently addresses this point in regards to our desire to have community involvement, our desire to continue our public use program, and our environmental education program. To date, the Preserve has been very successful at working with the local communities and so there is already a great deal of "ownership" by local citizens at the Preserve.
5.	One commenter stated that the Preserve should create a 5–10 page "glossy" version of the Plan that can be handed out to public officials, etc.	Excellent idea; no change made to the Plan. Preserve staff will explore the possibility of creating such a document after the Plan is finalized.
6.	One commenter stated that all the habitat acreage numbers should be double-checked.	Completed as part of finalizing Plan. Document changed if errors were discovered.

#	COMMENT	RESPONSE
7.	One commenter stated that the Plan should include a notation about the impact of flooding on local residents and structures. Past floods have caused damage.	Text revised to include language about past structural damage.
8.	One commenter strongly supported the continuing overt statement about additional acquisitions being from willing sellers on an as-available basis.	No change made to the Plan.
9.	One commenter suggested that an additional action is needed under Objective 2.5: "Work to minimize flooding of residences in the lower Cosumnes River area." Alternatively, Action 2.5.3 could be modified to include this.	Action 2.5.4 was added to Sub-goal 2, Objective 2.5, to include this action.
10.	One commenter strongly supported Action 4.3.1 regarding intentions to breach Mc-Cormack-Williamson Tract levees.	No change made to the Plan.
11.	One commenter strongly supported Action 1.1.4 regarding continued collaboration with adjacent landowners regarding common land-management issues.	No change made to the Plan.
12.	One commenter strongly supported Action 2.2.2 regarding the Preserve's desire to continually communicate with neighboring landowners.	No change made to the Plan.

#	COMMENT	RESPONSE
13.	One commenter stated that overall the Plan does not address what flood control projects are planned for Staten Island; perhaps it should.	No change made to the Plan. Flooding regimes for Staten Island are dictated in part by the easement held by the Department of Water Resources and in part by the land-management strategies employed by Conservation Farms and Ranches to manage the property as a working agricultural landscape that supports wintering waterbirds, such as the threatened greater sandhill crane. Other planning efforts such as the North Delta EIR will address more fully any future plans for flooding issues in the Delta, including Staten Island. The Preserve's plan for Staten Island is to continue its current agricultural operations in a manner that continues to support wintering waterfowl and other waterbirds.
14.	One commenter stated that the Plan should address urban sprawl in Locke and Walnut Grove.	No change made to the Plan. Urban sprawl is identified in the Plan as a major challenge for the Preserve, and staff will remain engaged in that issue as it affects the long-term management of the Preserve. However, it is not the focus of the Management Plan to address urban sprawl in all of the surrounding communities.
15.	What specific actions will we take to increase paddling visitors?	No change made to the Plan. The plan does not specify "new recruiting strategies" specific to paddling since paddling is not the focus of the public use program. The Plan states that we will promote recreational opportunities at the Preserve, including paddling, provided that the recreational use does not adversely affect our ability to achieve the natural resource goals.
16.	What acres are included in the Eco-Reserve designation?	A new map is being included in the plan to identify those parcels.
17.	One neighboring landowner is concerned about trespassers, especially paddlers, crossing his land to launch their watercrafts.	No change made to the Plan. The Plan identifies illegal activities such as trespass as a major challenge. While the Preserve cannot control all trespass, part of the land management strategy is to continue our efforts to combat as much illegal activity as possible, including trespass.

#	COMMENT	RESPONSE
18.	Denier II property plans. What if the levee breaches naturally; will you fix it?	No change made to Plan. We identify the Denier II property as a place where we will restore riparian habitat. If a levee breaches there naturally, we will evaluate the effects of that breach at that time and take the most appropriate action in consultation with neighboring landowners and the appropriate regulatory agencies. There will be substantial time for neighboring landowners to participate in our Denier II project planning process as we develop the appropriate environmental documents to implement the project.
19.	One commenter was under the impression that the Preserve did not oppose a major dam on the Cosumnes River.	No change made to Plan. One action in the Plan clearly states our intentions to remain involved in policy decisions regarding future plans for major hydropower facilities on the Cosumnes River.
20.	One commenter was concerned about any increase in the amount of public use near his property line.	No change made to the Plan. The Plan identifies new and existing activities with respect to public use, but none of those public uses would be implemented in a manner that would affect neighboring landowners without first pursuing their input on the decision.
21.	One commenter was concerned about the proximity of the marijuana gardens to his property line.	No change made to the Plan. The Plan identifies illegal activities such as marijuana cultivation as a major challenge. While the Preserve cannot completely control this activity, the commenter is aware of our previous successes to combat this problem and to coordinate with him and other neighbors that are affected by it. We will continue to coordinate with all neighboring landowners affected by illegal activities that occur on Preserve lands. The Plan specifically states our desire to do so.
22.	One commenter stated that he thought the number of shorebird species was incorrect.	Species number was checked and changed per the commenter's suggestion.
23.	One commenter was concerned that the Preserve provide as much habitat as possible for shorebirds.	The Draft Plan already contained an action that included shorebirds. However, we agree with the commenter on the importance of this issue. Action 4.1.4 has been modified to include management direction for shorebirds.

#	COMMENT	RESPONSE
24.	Will the Preserve offer horseback-riding opportunities?	No change made to the Plan. It is unlikely that the Preserve will offer horseback-riding opportunities due to the impact that horses and their trails have on the habitat. However, horseback riding was not explicitly excluded as a public use option at the Preserve.
25.	One commenter stated that he thought the acres for blue oak woodland were too high.	The acreage numbers were double-checked as part of finalizing the Plan.
26.	One commenter stated that he thought hand-planted acorns grew too slowly and/or they were assessed too early to determine their success. Soil disturbance seemed to be an issue.	This was addressed by inserting additional text in section 3.2.1 regarding adaptive management. We would also like to point out that this issue is adequately addressed in the proposed actions, specifically Action 1.4.2.
27.	One commenter suggested that we add an action to increase the number of cottonwood and willow trees between the Accidental Forest and the Tall Forest for cuckoos, willow flycatchers, and other neotropical migrant songbirds that use that type of habitat.	Action 2.2.7 was added to the Natural Resources Stewardship Sub-goal 2.
28.	Willow Slough Trail and Tall Forest birding survey dates are reversed.	The dates were double-checked and changed as appropriate.
29.	One commenter suggested that the Plan include an action to determine the feasibility of building a causeway on Twin Cities Road to allow the Cosumnes River and Laguna Creek to meander and flood appropriately.	Action 1.2.12 was added to conduct a feasibility study of potential Cosumnes River meander scenarios, and to implement scenarios as appropriate.
30.	One commenter suggested that the Preserve introduce Tule elk.	No change made to the Plan. Reintroducing elk is an issue that is up to the California Department of Fish & Game, not up to the Preserve. However, given the urban-wildland interface issues, it may be a difficult task to accomplish.

#	COMMENT	RESPONSE
31.	One commenter suggested that we should include an action to address long-term management of oak trees (*e.g.*, harvesting oaks when there become too many).	No change made to the Plan. This Plan is a 10-year plan and at the current restoration and reproductive rate of oaks, there is no need for such an action. Future revisions of the Management Plan may address this issue.
32.	How do we plan to help salmon? What about dams to help salmon?	No change made to the Plan. The Plan specifies that salmon are one of our targets and there are a series of actions listed in Chapter 3 that address our plans to help these species. Chapter 3 also addresses our plans to be involved in policy decisions regarding the construction of dams on the Cosumnes River.
33.	Will the Freeport Water Diversions provide any water to the Cosumnes River?	No change made to the Plan. It is possible that upstream urban use will result in some kind of flow back to the Cosumnes River, but the long-term result of those diversions is unknown. The Preserve is not planning on receiving any benefit from the diversions.
34.	One commenter felt that the Plan was well-thought-out and ambitious and that it would result in a diverse landscape that benefits a myriad of wildlife and plant species.	Comment noted. No change made to the Plan.
35.	One commenter was encouraged to see that the Plan had the foresight to address locally breeding ducks as well as wintering species by providing brood habitat and maintaining wood duck boxes.	Comment noted. No change made to the Plan.
36.	One commenter encouraged the Preserve to restore additional seasonal wetlands based on the 2006 Central Valley Joint Venture Implementation Plan goal of 19,000 additional acres.	The acreage figures for the managed wetlands portion in Chapter 3 were double-checked and adjusted if appropriate. Additionally, the Preserve's Wetland Program will continue to look for opportunities to restore additional freshwater managed wetlands on an ongoing basis.

#	COMMENT	RESPONSE
37.	DWR commented that the portions of the project area may encroach within the designated floodway and an encroachment permit may be needed from the Central Valley Flood Protection Board prior to initiating any activities.	No change made to the Plan. Much of the project area is within the floodplain for the Cosumnes River and upper Sacramento/San Joaquin River Delta (see Chapter 7 for property level maps). Prior to initiating any ground-disturbing activity for actions identified in Chapter 8, the Central Valley Flood Protection Board, the Reclamation Board, and the California Department of Fish & Game will be consulted to determine whether a permit is required. Activities will not begin until all required permits are obtained.
38.	Caltrans commented that portions of the project lie within the SR99 and Interstate 5 corridors and requested more detailed and magnified mapping of Preserve areas and waterway features near the freeways.	No change made to the Plan. Please refer to the property-level maps beginning with Figure 7.4 through Figure 7.47.
39.	Caltrans commented that the portions of the project area may encroach within the State right-of-way for SR99 and Interstate 5 corridors. An encroachment permit may be needed from Caltrans prior to initiating any restoration activities within the right-of-ways.	No change made to the Plan. Prior to initiating any ground-disturbing activity for actions identified in Chapter 8, Caltrans will be consulted to determine whether a permit is required. Activities will not begin until all required permits are obtained.
40.	Caltrans stated that drainage projects located within highway rights-of-way can impact State drainage, traffic, and future highway projects; therefore, Caltrans should be notified when the locations of proposed culvert replacement improvements are planned within the right-of-way.	No change made to the Plan. Prior to initiating any ground-disturbing activity for actions identified in Chapter 8, including but not limited to culvert replacement improvements, Caltrans will be notified of the location and provided copies of work plans to determine whether the design criteria is appropriate to meet Caltrans standards, and to determine whether a permit is required. Activities will not begin until all required permits are obtained.
41.	List the known species of concern that are dependent on and/or users of the Preserve (as well as adjacent habitat?). This would provide a quick reference for subsequent planning.	No change made to the Plan. Species of concern are listed in the Lower Cosumnes River Watershed Assessment (RBI 2006) available on the Preserve's website (www.cosumnes.org).

#	COMMENT	RESPONSE
42.	Relative to active-versus-passive restoration of riparian (page 3-6), a map showing the relative proportion and type of habitats to date for each approach would be interesting. The commenter expressed concern that oak regeneration may not be occurring rapidly enough with passive restoration, although it was noted that it may be because of the lack of early successional growth of other species, *e.g.*, willows.	No change made to the Plan. The relative merits of different restoration techniques are discussed in detail in the numerous scientific studies prepared by the Cosumnes Research Group at UC Davis and posted on the website: http://baydelta.ucdavis.edu
43.	Objective 1.2 – "Ecologically functional landscape" does not provide a target; what land-use designations, conditions, or specific conditions would allow the Preserve to achieve this status? This might be addressed by subsequent objectives, but then this objective (1.2) is not needed. This information is important to allow participation in land-use planning, coordination with other land management, and to secure funding for acquisitions.	Changed the wording of this objective to read: "Maintain a landscape that supports the natural processes and habitat for the Preserve's focal conservation targets consisting of natural lands and suitable agriculture at and surrounding the Preserve (100-year floodplain up to Sacramento County's Urban Services Boundary)." Ecologically functional landscape refers to the ability of an area to support ecosystem components. This definition has been added to the Plan glossary. A target refers to one of the six specific species described as target species in Chapter 3.
44.	Objective 1.2 – Is "surrounding" defined as the 100-year floodplain? Does it include only adjacent areas to the Preserve? If other than this, are there specific conditions that are higher priorities? (This kind of relates to previous comment re: the target)	No change made to Plan. "Surrounding" is defined in the wording of the objective. See above response.

#	COMMENT	RESPONSE
45.	Action 1.2.4 – What criteria are used to identify lands for protection? Have needs (linkages and migration corridors) been defined yet, and what are the relative priorities of actions for identified targets? (Adaptive management allows change, so don't avoid starting with something.)	No change made to Plan. We evaluate protection opportunities based on habitat quality and contribution to protection goals for the conservation targets (species and communities) that are set in the Plan. Since we only protect land on an as-available, willing-seller basis, we try to remain open to all available opportunities and evaluate them when they arise.
46.	Action 1.2.5 should be with the associated targeted objectives, and is there some level of identified need?	No change made to Plan. Linkages and corridors are addressed for each target where relevant. It is highlighted here because it is also a general planning principal and something that needs to be considered for many of the species that did not rise to the level of focal targets.
47.	Action 1.2.6 – Is there a current assessment of habitat values of different land uses for evaluation of CRP properties and properties adjacent to CRP? What are the relative priorities of these habitat values? Was this not the purpose of the planning process?	No change made to Plan. The purpose of the planning process is defined in Chapter 1 of the Management Plan to document existing conditions, identify and prioritize needs, and describe future desired conditions for the Cosumnes River Preserve over the next 10 years. It also provides the Preserve Partners with a framework for determining budget and personnel required to implement long-term management of the Preserve over the next 10 years. Habitat values vary depending upon the species being considered, as each species has different needs. Assigning habitat values for each of these species is beyond the scope of this Plan. The Plan does provide maps of land-cover types for use in further analysis. Land cover is a generalization of vegetation types in an area. Habitat values are much more complex than the simplified land-cover maps presented in this Plan.
48.	Action 1.2.8 – What is meant by "promote," other than what has already been mentioned (buying, coordination, participation)?	No change made to Plan. Promote means to encourage other groups (agencies, non-profit organizations, cities, and counties) to build on the existing network of protected lands in an effort to create larger protected areas and strong corridor linkages.

#	COMMENT	RESPONSE
49.	Action 1.2.9 – Is there a weed control plan now? Does it have priorities and criteria for establishing priorities? What and where are the "high threat species" (and why?) How does this relate to 2.3?	No change made to Plan. As stated in Section 7.2.1, the Preserve currently has a Weed Management Plan that will be updated.
50.	Action 1.2.10 – What are the specific outcomes and specific actions of "wildlife-friendly agriculture" that you will be promoting? Or perhaps some criteria to define such? (What does "#10" mean; probably left from early drafts).	No change made to Plan. Wildlife-friendly agriculture includes a set of agricultural practices that provide habitat or foraging value to target wildlife species. Examples include flooding rice fields during the winter for duck habitat and planting certain crops for Swainson's hawk foraging value. Specific actions for various species are refined under the objectives and actions that are relevant to those targets.
51.	Are Actions 1.3.4 and 1.3.2 essentially the same?	They are very similar and have been combined into a single action that reads: "1.3.2: Design and implement next phase of groundwater-surface water studies, in collaboration with research partners, in order to refine understanding of groundwater-surface water status and relationships and to determine groundwater and surface flow requirements of riparian and aquatic species. This includes locating areas favorable for the development of perched aquifers and mounded regional groundwater levels that enhance river baseflow."
52.	Are Actions 1.3.2 and 1.3.3 more participation versus actually doing the study and releases (from CRP perspective)?	No change made to Plan. These studies will be conducted by researchers from UC Davis using funding provided by the Preserve Partners.
53.	Objective 1.4. – Anything to address the lack of new growth/recruitment of blue oak; protection of existing may not be enough.	No change made to Plan. Several studies are available that address recruitment limitation in blue oak woodlands, but much of the management implications are site-specific. Since the Preserve does not currently manage any lands that have blue oak woodland habitat, so there are no immediate plans to study this.

#	COMMENT	RESPONSE
54.	Objective 1.5 is a given for any plan and including this distracts the reader from what this Plan is focusing on.	Comment noted. No change made to Plan.
55.	Are Actions 2.1.2 and 2.1.3 subsets of Action 2.1.1, which is just a repeat of Objective 2.1?	No change made to Plan. No. The separate actions were broken down geographically to delineate the differing habitat protection needs associated with the different types of riparian habitat along these sections of the river.
56.	Objective 2.2 – What is the "mosaic" target (local, regional distribution, etc.) that would then allow mapping to "guide management"? Perhaps a range? What does maintain a mosaic mean, and is Objective 2.4 just a specific of this objective?	No change made to Plan. Mosaic means a mixture of communities as opposed to a single dominant community. A mosaic can be maintained through the introduction of disturbance (fire, flooding, mechanical thinning) to maintain some areas in early-successional stages while allowing others to mature to later successional stages. This is based on the hypothesis that greater habitat diversity begets greater species diversity. Preserve ecologists will work to further define what the mosaic of communities will be for the riparian habitat on the Preserve.
57.	Action 2.2.3 suggests that we don't have a list of actions yet; but some of that is within the other objectives. It was hoped that would come out of this "Plan" subject to adaptive management.	No change made to Plan. Some data is available on a few native species (*e.g.*, migratory songbirds) and this data is used to inform management and restoration actions in riparian areas. As more data becomes available, additional management and restoration actions will be evaluated.
58.	Action 2.2.3 includes to "maintain population levels" Of what species and what are the targets for those species?	No change made to Plan. See answer to above comment
59.	Action 2.2.4 – Is this just a generic monitoring for response or is there some level of criteria for "successful response"?	No change made to Plan. It is important to monitor for both positive and negative responses to restoration and management actions.

#	COMMENT	RESPONSE
60.	Action 2.3.2 - What is the "desired" species composition and population level? (This is too obvious).	No change made to Plan. These would be site-specific and based on baseline conditions.
61.	Actions 2.3.2, 2.3.3, and 2.3.4 – Are we not at the point of presenting a set of "control programs" for defined threats? Can we list what those threats are, and the relative risks? (This kind of gets to criteria if one is afraid of presenting specific actions.)	No change made to Plan. Since many of the threats originate outside of the Preserve (*e.g.*, habitat loss, water quality, air quality, etc.) and are introduced by parties that do not include the Partners, reducing the effect that many of the stressors have on species is beyond the scope of the Preserve and this Management Plan. A list of stressors for many species on the Preserve is currently being developed by DRERIP. As this list (and similar lists) goes through the peer-review process and becomes public information, the Partners may utilize this information (in an adaptive management context) to create future restoration actions.
62.	Should Action 3.6.2 be part of this Sub-goal 2?	Yes. The flooding portion of this action was inappropriately included in the vernal pool section and will be moved to Sub-goal 1 as Action 1.1.3.
63.	Priority is Denier for restoration. But that is really just the objective, not the action. The action appears to be to put a plan together (more planning…) and without specific desired outcomes ("mosaic").	No change made to Plan. The restoration plan for this property will describe the details of this project.
64.	Is Objective 2.5 really to ensure periodic floodplain inundation (as indicated in Action 2.5.3) that would have several sub-objectives to discuss how would one accomplish this? (*e.g.*, working with locals to manage water, periodic levee work, slope control, Action 3.6.2, etc.?)	No change made to Plan. The Preserve does not have the ability to implement flood management on lands outside the Preserve but can encourage others to manage their land in a way that provides benefits for native species and communities.

#	COMMENT	RESPONSE
65.	Action 2.5.2 – Grammatical – delete "should focus"?	Changed to read "Focus water and flood management activities on maintaining the hydrologic connectivity between surface and subsurface waters, while recognizing that periodic connection and disconnection of the floodplain within the river channel is vital to the functioning of the floodplain."
66.	Objective 3.2 –What is the desired "overall native biodiversity and target species"?	No change made to Plan. This will depend on the site and the specific management actions. The details of what will be monitored on various properties will be addressed in the Cosumnes River Preserve Monitoring Plan, which is currently being prepared by Preserve staff.
67.	Action 3.2.3 – Can it be assumed that you are going to continue to allow grazing with various control conditions (which would be identified as an action) that will then be assessed?	No change made to Plan. Yes. See answer to comment 66.
68.	Objective 3.3 –What is the desired "diversity" of native species to be restored? Are there any specific actions yet ("appropriate methods")?	No change made to Plan. See answer to comment 66.
69.	Objective 4.1 –What is the expected/desired beneficial outcome of the 850 acres of wetlands. Wet or more than that? For example, what conditions, specific needs, what populations and/or habitat availability, usage, success criteria (brood rate, growth of fledglings, mortality, etc.).	No change made to Plan. See answer to comment 66.

#	COMMENT	RESPONSE
70.	Objective 4.7 – What invasives are critical threats and why? At least a first shot or some criteria (related to the impact of the to-be-established desired outcome of the wetlands).	No change made to Plan. That information is too detailed to be included in the Preserve Management Plan. However, these details are discussed in the Weed Management Plan.
71.	Objective 4.8 – Would a risk-management plan be appropriate to have *a priori* to an outbreak of avian diseases (*e.g.*, immediate flooding, scaring birds, etc.) ?	No change made to Plan. This is a good suggestion and will be incorporated into our action items for this target.
72.	Objective 5.2 – Restore to what conditions? Is it, or can it be, stated what conditions are important for GGS recovery (as later referenced – an upland need of burrows, what kind of water levels/conditions).	No change made to Plan. The Preserve is currently seeking funding for a study to answer these questions.
73.	Objective 5.5 – Expansion by what year?	No change made to Plan. We don't have a target date for the expansion. This will depend on when conditions in other parts of the system are suitable to support the population expansion.
74.	Objective 5.5 – Somehow over words to delete "(Action 6.2.2)"	Removed (Action 6.2.2) from text.
75.	Objective 5.5.6 is part of plan review in 5 years.	No change made to Plan. Comment noted.
76.	Objective 6.1 – What are the key limiting factors with and threats to restoring the populations, and how do those factors related to actions within CRP's grasp (this gets to priorities).	No change made to Plan. Objective 6.1 addresses one of the largest threats, lack of water in the river during migration.
77.	Is Action 6.1.1 a CRP responsibility or a larger group for which CRP is a participant?	No change made to Plan. Although it is true that this action is not the responsibility of the Preserve alone, it is a critical factor affecting the salmon population that no other group is addressing.

#	COMMENT	RESPONSE
78.	Are Actions 6.1.2 and 6.1.3 the same as Actions 1.3.2 or 1.3.3?	Actions 6.1.2 and 6.1.3 are duplicative and will be deleted.
79.	Objective 6.4 – Is 300 acres what CRP has now or new?	No change made to Plan. This acreage includes current floodplain and potential additional floodplain habitat.
80.	Action 6.4.2 is the same as Actions 3.62 and 3.1.3, so should the focus really be on how the flooding might be benefiting the salmon (growth rate, survival, or other health measures?) or at least changes in conditions within the floodplain and those effects on salmonids.	No change made to Plan. The needs of the target species/ habitat will dictate the details of this action. In other words, flooding for juvenile salmon recruitment in one part of the floodplain may differ from flooding needed to encourage riparian tree regeneration.
81.	Are there any other actions that CRP could consider for salmon – reducing human disturbance of beds, sediment control, toxic runoff, competitive species… ?	No change made to Plan. The Preserve Partners own, manage, and monitor terrestrial landscapes. Because of the relationship between the watershed and the river, the Partners felt it important to include Chinook salmon as a conservation target. Although the Partners do not have direct control over the aquatic portion of the fish habitat, they do collaborate with others to ensure that salmon have sufficient quantity and quality of water in the Lower Cosumnes River. Actions to protect this conservation target are listed in Sub-goal 2. As an anadromous species, Chinook salmon have a fairly complex life cycle and the success of this species is dependent on numerous spatial and temporal factors. To address the complexities associated with this species, DRERIP is currently preparing a conceptual model for Chinook salmon. As this model completes peer review and is released to the public, the Partners may utilize the information contained therein to develop additional restoration actions along the Preserve for this species.

APPENDIX A

ACRONYMS AND ABBREVIATIONS

Acronyms and Abbreviations

ADA	American Disabilities Act
BDAC	Bay-Delta Advisory Council
BLM	Bureau of Land Management
CALTRANS	California Department of Transportation
CARA	California Rivers Assessment
CCC	California Conservation Corps
CDFG	California Department of Fish and Game
CEDR	California Center for Environmental Design Research
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CMA	Cooperative Management Agreement
CNPS	California Native Plant Society
COE	Army Corps of Engineers
CSC	California Species of Special Concern
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
CWA	California Waterfowl Association
DLMSP	Delta Levees Maintenance Subvention Program
DU	Ducks Unlimited
DWR	California Department of Water Resources
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
EQIP	Environmental Quality Incentives Program
ERPP	Ecosystem Restoration Program Plan
ESA	Endangered Species Act
FMMP	Farmland Mapping and Monitoring Program
GIS	Geographic Information Systems
GJUESD	Galt Joint Union Elementary School District
IEP	Interagency Ecological Program

MAF	Million Acre-Feet
NEPA	National Environmental Policy Act
NMF	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
RCD	Resource Conservation District.
SB-34	Delta Flood Protection Act of 1988
SFCP	Special Flood Control Projects
STATE PARKS	California Department of Parks and Recreation
SWP	State Water Project
SWRCB	State Water Resources Control Board
TAF	Thousand Acre-Feet
TDS	Total Dissolved Solids
TNC	The Nature Conservancy
UGB	Urban growth boundary
ULL	Urban limit line
USA	Urban service area
USB	Urban service boundary
USBR	United States Bureau of Reclamation
USFWS	United States Fish and Wildlife Service
YCC	Youth Conservation Corps

APPENDIX B

GLOSSARY

Glossary

ACRE-FOOT	The volume of water that would cover 1 acre to a depth of 1 foot, or 325,851 gallons of water. On average, 1 acre-foot could supply one to two households with water for a year. A flow of 1 cubic foot per second for a day is approximately 2 acre-feet.
ACTIONS	The individual projects, studies, or work elements that implement the objective and can be useful as an aid in staff and budget allocation at the Preserve. Actions are written in a specific format to describe who will do what and when.
ADAPTIVE MANAGEMENT	A systematic process for continually improving management policies and practices by learning from the outcomes of operational programs.
ALTERNATIVES	Different ways to resolve issues, achieve Plan purposes, and meet Preserve goals. Alternatives provide different options to respond to major issues identified during the planning process.
"NO ACTION ALTERNATIVE"	The current management direction. With this alternative, no change from the current management practices would be implemented.
"PREFERRED ALTERNATIVE"	A proposed action in the NEPA document for the Management Plan identifying the alternative that the Partners believes best achieves planning unit purposes, vision, and goals; helps fulfill the Preserve System mission; maintains and, where appropriate, restores the ecological integrity of each Preserve and the Preserve System; addresses the significant issues and mandates; and is consistent with principles of sound management.
ANADROMOUS FISH	Fishes that spend a part of their life cycle in the sea and return to freshwater streams to spawn.
AQUIFER	Underground layer of porous rock, sand, etc. that contains water.
B(2) WATER	Statutory mandate to manage the water dedicated to fish and wildlife purposes pursuant to Section 3406(b)(2) of the CVPIA.
BAY-DELTA	The entire estuary system of the San Francisco Bay, Sacramento-San Joaquin Rivers, and Delta.

BIOLOGICAL DIVERSITY

The variety of life forms and its processes, including the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur.

BIOLOGICAL INTEGRITY

Biotic composition, structure, and functioning at the genetic, organism, and community levels consistent with natural conditions, including the natural biological processes that shape genomes, organisms, and communities (USFWS, 602 FW 1.6).

BIOLOGICAL SUB-GOALS

Measures to sustain, restore, and enhance biological diversity and ecological functionality. A fundamental approach used for setting biological goals was the Conservation Action Plan (CAP) approach. This approach focused on using representative samples of ecosystems or ecological communities (course filter) as well as individual species (fine filter) as an "umbrella" to serve as a shield for many additional species. These representative samples are called conservation targets. See Chapter 3 for details.

CALFED BAY-DELTA PROGRAM

A consortium of 15 State and Federal agencies with management or regulatory responsibilities in the Bay-Delta.

CALIFORNIA ENDANGERED SPECIES ACT (CESA)

California legislation that prohibits the "take" of plant and animal species designated by the CDFG as either endangered or threatened. Take includes hunting, pursuing, catching, capturing, killing, or attempting such activity. CESA provides the CDFG with administrative responsibilities over the plant and wildlife species listed under the State act as threatened or endangered. CESA also provides CDFG with the authority to permit the take of State-listed species under certain circumstances. See Fish and Game Code Section 2050-2116.

CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

California legislation that requires State, regional and local agencies to prepare environmental impact assessments for proposed projects that will have significant environmental effects and to circulate these documents to other agencies and the public for comment before making decisions. CEQA requires that the lead agency make findings for all significant impacts identified in the environmental impact report. The lead agency must propose mitigation to reduce environmental impacts to a less-than-significant level unless the mitigation is infeasible or unavailable and there

are overriding considerations that require the project to be approved. See Public Res. Code Sections 21001.1, 21002, 21080; Guidelines 15002(c).

COMPATIBLE USE A proposed or existing use that, because of its characteristics and manner of operation will promote the Ecological and Cultural Goals listed in this Management Plan. In judging compatibility, defined criteria shall be used as listed in the Management Plan.

CONCEPTUAL MODEL An explicit description of the critical cause-and-effect pathways in ecosystem function. A conceptual model includes a summary of current knowledge and hypotheses about ecosystem structure and function, and highlights key uncertainties where research might be necessary. Alternative or competing conceptual models illustrate areas of uncertainty, paving the way for suitably-scaled experimental manipulations designed both to restore and explore the ecosystem. Conceptual models also help to define monitoring needs, and the basis for quantitative modeling.

CONVERSION Land cover is altered from one type to another. For example: When native vegetation is cleared or scraped to convert the land to agriculture or vice versa. Sometimes referred to as "land use conversion."

CULTURAL RESOURCES Fragile nonrenewable properties, including any district, site, building, structure, or object significant in American history, architecture, archaeology, engineering, or culture. These resources are significant for information they contain or the associations they have with past people, events, or ways of life.

DELTA The Delta lies at the confluence of the Sacramento and San Joaquin Rivers and serves as the major hub for the operations of the SWP and CVP.

ECOSYSTEM A dynamic and interrelated complex of plant and animal communities and their associated non-living environment.

ENVIRONMENTAL ASSESSMENT A concise public document that provides a sufficient analysis for determining whether to prepare an environmental impact statement (EIS) or a finding of no significant impact. It also aids an agency's compliance with NEPA when no EIS is necessary.

ENDANGERED SPECIES	Any species of plant or animal defined through the federal or state Endangered Species Act as being in danger of extinction throughout all or a significant portion of its range. Federal species are published in the *Federal Register*.
EMERGENT	A plant rooted in shallow water that has most of its vegetative growth above water.
ENDEMIC SPECIES	A native species or subspecies confined naturally to a particular, and usually restricted, area or region.
ENVIRONMENTAL IMPACT REPORT	A detailed written report, required by the CEQA, analyzing the environmental impacts of a proposed action, adverse effects that cannot be avoided, alternative courses of action, and cumulative impacts.
ESTUARY	A water body passage where ocean water mixes with river water.
EXTIRPATION	The localized extinction of a species that is no longer found in a locality or country, but still exists elsewhere in the world.
HYDROGRAPH	A chart or graph showing the change in flow over time for a particular stream or river.
INSTREAM FLOWS	Year-round flows in rivers and streams.
MANAGEMENT PLAN	A working document that guides and facilitates all aspects of a preserve's operation, administration, and use. It is a planning tool that serves as a roadmap for the management and use of a preserve's natural resources, and the development of staffing, funding, facilities, equipment, and programs needed to support that management and use.
NATIONAL NATURAL LANDMARKS PROGRAM	The National Natural Landmarks Program is administered by the National Park Service to recognize and encourage the conservation of outstanding examples of our country's natural history. It is the only natural areas program of national scope that identifies and recognizes the best examples of biological and geological features in both public and private ownership. National Natural Landmarks (NNLs) are designated by the Secretary of the Interior, with the owner's concurrence. See www.nature.nps.gov/nnl for details.

NATIVE SPECIES

A species, subspecies, or distinct population that occurs within its natural range or natural zone of potential dispersal (*i.e.*, the geographic area the species occupies naturally or would occupy in the absence of direct or indirect human activity or an environmental catastrophe). This definition recognizes that ecosystems and natural ranges are not static; they can and do evolve over time. Thus a species may naturally extend its range onto (or within) a Preserve and still be considered native.

NAVIGABLE WATERS

Under Federal law, for the purpose of determining ownership of submerged lands beneath inland water bodies not reserved at the date of statehood, navigable waters are waters used or susceptible to being used in their ordinary condition as highways of commerce over which trade and travel are or may be conducted in the customary modes of trade and travel on water. In situations where navigability and the ownership of submerged lands are disputed, the final authority for determining navigability rests with the Federal courts.

NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)

This act, promulgated in 1969, requires all Federal agencies to disclose the environmental effects of their actions, incorporate environmental information, and use public participation in the planning and implementation of all actions. Federal agencies must integrate NEPA with other planning requirements and must prepare appropriate NEPA documents to facilitate better environmental decision-making (from 40 CFR 1500). The law also established the Council on Environmental Quality to implement the law and to monitor compliance with the law.

NON-NATIVE SPECIES

A species, subspecies, or distinct population that has been introduced by humans (intentionally or unintentionally) outside its natural range or natural zone of potential dispersal.

OBJECTIVE

A concise statement of intended results of management actions. Objectives tier off the goals and can be measurable or can be in the form of a policy statement.

ORDINARY HIGH WATER MARK

The line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding area (33 CFR 328.3[e]).

OVERARCHING GOALS

Describe broad and long-term aspirations and form the 2nd tier (after the Vision Statement) in the Plan hierarchy. The Preserve's overarching goals are:

I. Native biological communities and the resident and migratory species dependent on them are restored and maintained to sustainable conditions and population levels.
II. Compatible uses improve stewardship of the lands in the Cosumnes River Watershed.

OVERDRAFT

The condition, over the long-term, when more water is withdrawn from a groundwater basin than is recharged.

PERENNIAL PLANT

A plant that grows for more than one season; it winters in a dormant condition and resumes growth the following season.

PALENTOLOGICAL RESOURCE IMPORTANCE

Reflects the potential productivity of a formation or exposure and the importance of the particular fossils located in the formation or exposure.

PARTNERS

Two types of partnerships are formed at the Preserve. Land-owning partners refers to the land-owning partners that signed the CMA, including U.S. Bureau of Land Management, the California Department of Fish and Game, Ducks Unlimited, the Sacramento County Department of Parks and Recreation, The Nature Conservancy, and the California Department of Water Resources. Program partners are agencies and organizations that work with the Preserve to carry out mutually beneficial programs and includes Galt Unified School District, NRCS, and RCD.

PUBLIC INVOLVEMENT

A process that offers affected and interested individuals and organizations opportunities to become informed about, and to express their opinions on, Partners' actions and policies. In the process, these public views are studied thoroughly and are thoughtfully considered in shaping decisions for Preserve management.

REHABILITATE

Providing nature with a helping hand by returning a physical or ecological process or by replanting native vegetation.

RESTORATION

Sometimes referred to as "ecological restoration." Characteristics of a site are returned to conditions that are similar to pre-1850s and usually includes the addition of native vegetation.

SPECIAL USE PERMIT	A Bureau of Land Management authorization required for certain uses of BLM-owned land within the Preserve. These permits are typically issued from the BLM's Folsom Field Office.
SMOLT	A young salmon that has assumed the silvery color of the adult and is ready to migrate to the sea.
STEWARDSHIP	The careful and responsible management of land, water, air, and biodiversity to ensure we have healthy ecosystems for present and future generations of people to experience.
THREATENED SPECIES	Those plant or animal species likely to become endangered species throughout all of or a significant portion of their range within the foreseeable future. Defined in both state and federal statutes. Federally threatened plant or animal species are identified and defined in accordance with the 1973 Endangered Species Act and published in the Federal Register.
TROPHIC CASCADE	Trophic cascades occur when predators in a food chain suppress the abundance of their prey, thereby releasing the next lower trophic level from predation (or herbivory if the intermediate trophic level is an herbivore). Trophic cascades are associated with the green world hypothesis which is is credited with bringing attention to the role of top-down forces (*e.g.*, predation) and indirect effects in shaping ecological communities.
VEGETATION	Plants in general, or the sum total of the plant life in an area.
VEGETATION TYPE	A category of land based on potential or existing dominant plant species of a particular area.
VERNAL POOL	Seasonally ponded landscape depressions in which water accumulates because of limitations to subsurface drainage and that support a distinct association of plants and animals.
WATERSHED	The entire land area that collects and drains water into a stream or stream system.
WETLAND	Areas such as lakes, marshes, bogs, and streams that are inundated by surface or ground water for a long enough period of time each year to support, and that do support under natural conditions, plants and animals that require saturated or seasonally saturated soils.