

# **Mouth of Cottonwood Creek Wildlife Area Final Land Management Plan**



PREPARED BY SUSTAIN ENVIRONMENTAL INC FOR THE

**California Department of Fish and Game**

North Coast Region

June 2011

State of California  
The Resources Agency  
DEPARTMENT OF FISH AND GAME

**Final Land Management Plan  
for the Mouth of Cottonwood Creek Wildlife Area  
Shasta County, California**

January 2011

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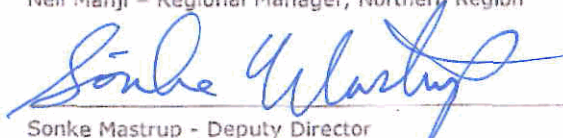
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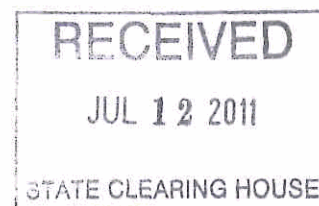
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# Acknowledgements

The California Department of Fish and Game (CDFG) prepared the Mouth of Cottonwood Creek Wildlife Area land management plan (MCCWA LMP) with assistance from Sustain Environmental Inc. (SEI) and its affiliates. CDFG provided overall guidance for the planning process and was responsible for all decisions about the content of the plan.

SEI, under contract to the CDFG, provided technical and scientific expertise and was responsible for most administrative aspects of the plan, including preparation and production of the draft LMP. The Geographical Information Center (GIC) at California State University, Chico, provided geographic information system support, compiled the spatial data and produced the aerial images and preliminary maps. Dr. Roy Buck of EcoSystems West Consulting conducted plant community mapping, compiled the species lists, and prepared the botanical resource report. Cultural resource specialist Scott Baxter of Past Forward Inc. conducted the literature and database review and field surveys to compile the cultural history of the Wildlife Area.

SEI is especially thankful for the assistance of Jim Chakarun, the current manager of the MCCWA, in providing access and critical information regarding management of the Wildlife Area; Karen Kovacs for her unwavering support of this project; and Steve Arrison (CDFG retired) for his visionary commitment towards making the Balls Ferry Wetland Unit a model for environmental education and outreach. We also wish to extend our deep appreciation to the teachers and administrators at the Anderson New Technology High School for their time and assistance in developing the environmental studies curriculum for the Balls Ferry Research and Education Center as well as their ongoing commitment to engaging young people in environmental education and research.

Ron Wolf granted us permission to use his exceptional photographs of many special status species, bringing to life the rich natural heritage of the region. We are also grateful to the many photographers and biologists who contribute their work to the science and creative commons to help expand human knowledge, understanding and appreciation of our world.

Finally, we are indebted to Kate Kane for embedding, reviewing, reactivating and resurrecting the numerous hyperlinks in this land management plan. Our goal was to provide a living document that would retain its usefulness over time for adaptive management purposes. While these hyperlinks were once all alive and well, the dynamic nature of the Web and the vagaries of software programs is likely to “endanger” at least a few. We have included a list of hyperlinks in Appendix K to help preserve as much of the active content as possible.

# I. INTRODUCTION

About the California Department of Fish and Game ..... I-1

About the Mouth of Cottonwood Creek Wildlife Area ..... I-2

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# I. INTRODUCTION

*This land management plan is a living document that describes the dynamic ecological conditions and managerial goals of the Mouth of Cottonwood Creek Wildlife Area. It is designed to be updated by area managers as more information is gathered and management goals are refined. It is written for a wide range of audiences with varying degrees of expertise in ecosystem level and adaptive management techniques as well as varying levels of familiarity with the Wildlife Area itself. Sections are written to stand alone with cross-references so that information can be regrouped as needed to fit planning and outreach needs. We hope it will fit the needs of land managers, policymakers and educators alike.*



Southeast entrance to the Balls Ferry Wetland Unit 1, Mouth of Cottonwood Creek Wildlife Area, July 2005. SEI.

## About the California Department of Fish and Game

The mission of the California Department of Fish and Game is to manage California's diverse fish, wildlife, and plant resources, and the habitats upon which they depend, for their ecological values and for their use and enjoyment by the public.

The California Department of Fish and Game (CDFG) maintains native fish, wildlife, plant species and natural communities for their intrinsic and ecological value and their benefits to people. This includes habitat protection and maintenance in a sufficient amount and quality to ensure the survival of all species and natural communities. The CDFG is also responsible for the diversified use of fish and wildlife including recreational, commercial, scientific and educational uses.

**Purpose of State Wildlife Areas.** The CDFG currently manages more than 100 state wildlife areas. These areas are scattered throughout the state, most located in central and northern California. The state owns about two-thirds of the total acreage while the remainder is managed under agreements with other public agencies. The state acquires these wildlife areas to protect and enhance habitat for wildlife species, and to provide the public with wildlife-related recreational uses. These lands provide habitat for a wide array of plant and animal species, including many listed as threatened or endangered.

**Purpose of CDFG Land Management Plans.** The CDFG develops management plans for all its lands. Its purpose in preparing land management plans (LMPs) is multifold:

- To guide management of habitats, species and programs to achieve the CDFG's mission to protect and enhance wildlife.
- To identify appropriate public uses of the property.
- To serve as a descriptive inventory of the fish, wildlife and native plant habitats that occur on or use the property.
- To provide an overview of the property's operation and maintenance, and personnel requirements to implement management goals. It also serves as a budget planning aid for annual regional budget preparation.
- To provide a description of potential and actual environmental impacts and subsequent mitigation that may occur during management, and to provide environmental documentation to comply with state and federal statutes and regulations.

## About the Mouth of Cottonwood Creek Wildlife Area

The Mouth of Cottonwood Creek Wildlife Area (MCCWA) consists of three units: the original Cottonwood Creek Unit, purchased piecemeal between 1981 and 1993, and the two recently acquired Balls Ferry wetland units. The State of California originally acquired the land to:

1. Protect, restore, enhance and develop riparian and wetland habitats.
2. Protect and enhance salmon and steelhead spawning habitat, an important component of the fragile Sacramento River anadromous fishery.
3. Provide public use with an emphasis on interpretive and educational use.

The Balls Ferry Wetland Unit 1 (BFW1) was acquired with the additional long-term goal of providing outdoor educational opportunities for nearby academic institutions as well as a junior hunt program (S. Arrison, CDFG Area Manager (ret.), personal communication). Balls Ferry Wetland Unit 2 (BFW2) was acquired primarily to protect short-grass foraging habitat for wintering waterfowl (J. Chakarun, CDFG Wildlife Habitat Supervisor II, personal communication).

The CDFG also manages land within the northwest section of the Cottonwood Creek Unit as a wetland mitigation bank on behalf of the U.S. Army Corps of Engineers (USACE). The Cottonwood Creek Mitigation Bank is managed and funded independently of the Wildlife Area and is not specifically addressed in this plan.



**Preparation of the MCCWA Land Management Plan.** The MCCWA LMP demonstrates CDFG's commitment to ecosystem management in accordance with the laws of the United States and the State of California. It incorporates the best available scientific information concerning the natural and cultural resources of the area, and affirms the CDFG's commitment to coordinate and cooperate with other local interests and conservation entities that are active throughout the region. The LMP is an ecosystem-based adaptive management plan that incorporates planning, implementation, monitoring, analysis and adaptation to realize management goals.

The LMP is intended to guide management decisions to create a sustainable system over the long term. Management of the Wildlife Area is intended to benefit both common and sensitive species of wildlife and plants. It may also contribute to the recovery of state and federally listed species.

The LMP has been developed with guidance from the CDFG's "A Guide and Annotated Outline for Writing Land Management Plans, February 2004" (updated in 2007) (California Department of Fish and Game 2004, 2007). The CDFG provided overall guidance to the planning process and was responsible for all decisions about the content of the plan. Sustain Environmental Inc, under contract to the CDFG, provided technical and scientific expertise, and was responsible for most administrative aspects of the plan, including preparation of the draft LMP. A list of document preparers is provided at the end of the LMP (VII).

Information to guide the plan's content came from three primary sources:

1. CDFG policy and federal and state law.
2. Consultation with area land managers as part of an integrated planning program.
3. Information collected about the occurrence of biological and cultural resources (including limited field surveys) and analysis of scientific literature to assess the efficacy of different management strategies.

**Development of Management Goals.** The staff and area land managers from the CDFG's North Coast Region provided the primary source of information on management issues at the MCCWA. Management goals and objectives were crafted based on initial planning interviews with CDFG staff and extensive review of previous meeting notes between CDFG staff and various local area collaborators. Refinement of these goals continued through follow-up interviews and meetings with CDFG North Coast Region land managers and biologists.

To assist with achieving consistency with the California Resources Agency and CDFG partner agencies, state resource planning documents were also considered in the development of management goals. CDFG is an integral part of the California Resources Agency, which oversees the management of the state's natural resources. The CDFG partners with the California Wildlife Conservation Board, which directs public investments in wildlife conservation, and the California Fish and Game Commission, which provides rulemaking decisions. Key planning documents reviewed for the LMP included:

- [California Wildlife Action Plan](#) (UC Davis Wildlife Health Center 2005, 2007)
- [Resource Status Assessment & Trends Methodology](#) and [Legal Mandates Related to the Conservation of Land and Natural Resources](#) (California Resources Agency 2002, 2001)
- [Riparian Bird Conservation Plan](#) (Riparian Habitat Joint Venture 2004)
- [Oak Woodland Bird Conservation Plan](#) (California Partners in Flight 2002)
- [Cottonwood Creek Ecological Management Zone](#) (CALFED Ecosystem Restoration Plan 2000a)
- [Cottonwood Creek Watershed Assessment](#) (CH2MHill 2002)

Goals for the MCCWA are based on adaptive management principles. As such, management goals focus first on establishing baseline conditions of biological diversity, habitat integrity and environmental health within the Wildlife Area. This information will help CDFG staff to determine how effective current management practices are in sustaining the MCCWA, as well as assist in the development of meaningful indicators and performance measures for determining management success in the future.

In accordance with the California Environmental Quality Act (CEQA) an Initial Study (IS) was prepared to evaluate if LMP implementation would adversely impact the environment (Appendix F). A proposed Negative Declaration (ND) finding has been prepared because the Initial Study analysis concluded that this LMP, as proposed, would not have potentially significant adverse environmental impacts.

The MCCWA LMP is programmatic in nature; thus, specific projects that may be developed consistent with the plan are not currently known. Full implementation of the LMP's goals and tasks is also contingent upon having adequate staff and operating budget. Any future projects will need to be evaluated in conjunction with the IS/ND to assess if additional project-specific CEQA analysis is necessary. CEQA Guidelines Sections 15162-15164 will be consulted to determine the extent of additional CEQA review required.

**A General Policy Guide.** The MCCWA LMP is a general policy guide to the management of the Wildlife Area. It does not specifically authorize or make a precommitment to any substantive physical changes to the Wildlife Area. With the exception of ongoing habitat restoration and enhancement, and operations and maintenance activities, any substantive physical changes that are not currently approved will require subsequent authorizations and approvals. Future projects may also require additional permits, consultations or approvals. Examples of such requirements include:

- *California State Lands Commission*: Consultation/permit for possible secondary impacts to surrounding lands underlying rivers and streams
- *CDFG*: Internal consultation regarding California Endangered Species Act (CESA) compliance and streambed alteration agreements (CDFG Code Section 1602)
- *National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS)*: Endangered Species Act (ESA) consultation and take authorizations
- *Regional Water Quality Board*: National Pollutant Discharge Elimination System construction stormwater permit (Notice of Intent to proceed under the statewide General Construction Permit); Clean Water Act (CWA) Section 401 clean water certification if CWA Section 404 permit is required or if isolated wetlands subject to the Porter-Cologne Act will be affected
- *U.S. Army Corps of Engineers (USACE)*: Section 404 CWA permit for discharge or fill of waters of the U.S., Section 10 Rivers and Harbors Act permit for work in navigable waters of the U.S.
- *U.S. Fish and Wildlife Service*: ESA consultation and take authorizations

## II. PROPERTY DESCRIPTION

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## II. PROPERTY DESCRIPTION

*The property description addresses general and site-specific ecological parameters that affect the three-unit Mouth of Cottonwood Creek Wildlife Area. Understanding these parameters is the foundation for adaptively managing the resources at this site.*



PHOTO: The mouth of Cottonwood Creek. Right foreground is the easternmost point in the Wildlife Area. July 2005 SEI, C. Remy

### A. Geographical Setting

The approximately 1,059-acre Mouth of Cottonwood Creek Wildlife Area (MCCWA) is situated in the northernmost portion of the Sacramento Valley in California. The Sacramento Valley is bordered by the Coast Range to the west, the Siskiyou Mountains and Cascade Range to the north, the Sierra Nevada to the east, and the San Joaquin Valley to the south. The dominant landscape feature of the valley is the 384-mile Sacramento River, which has its headwaters in the Cascade Range and flows south to the Sacramento-San Joaquin Delta and San Francisco Bay. Gently sloping to nearly flat in some areas, the valley floor consists of deep alluvial soils formed by floodplains and terraces (Hill 1984).

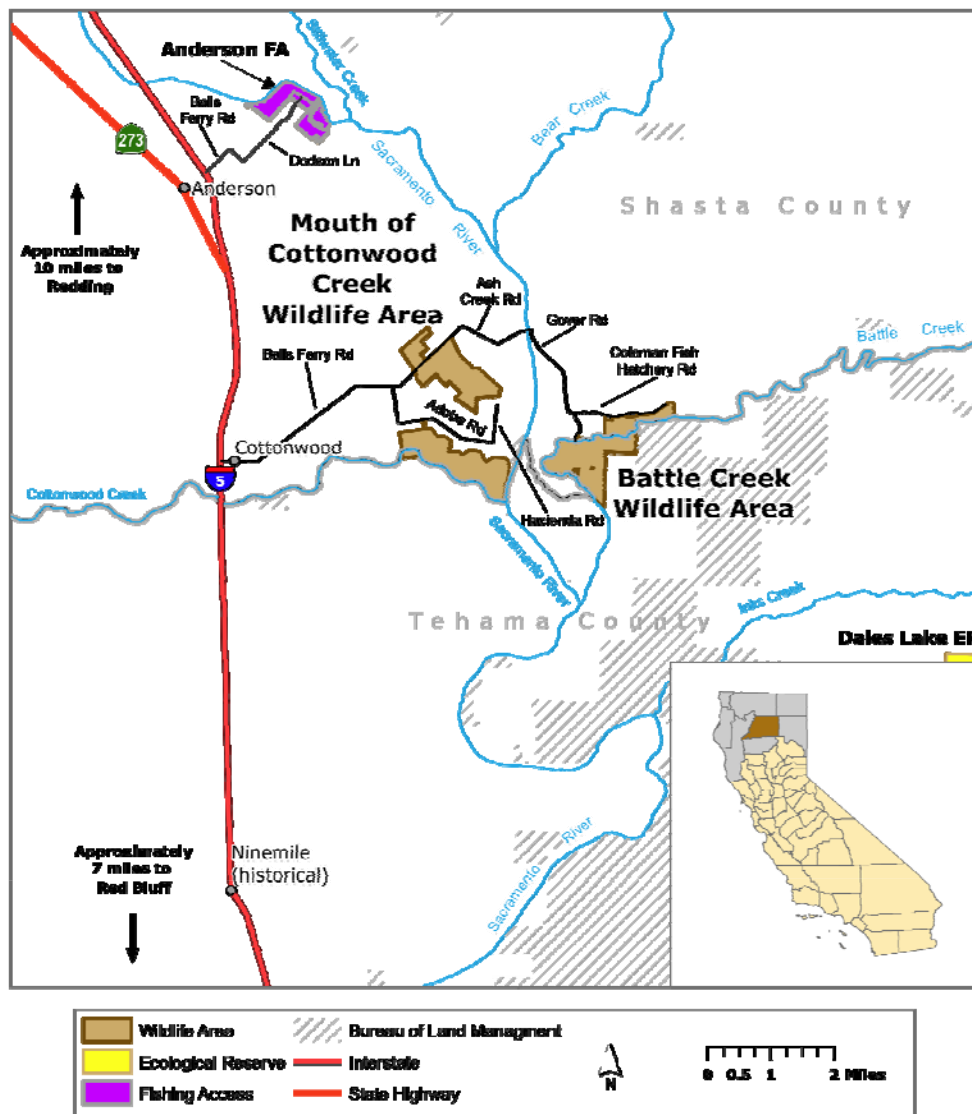
As its name implies, the Mouth of Cottonwood Creek Wildlife Area is located near the confluence of Cottonwood Creek and the Sacramento River. Cottonwood Creek drains a watershed area of 927 square miles and remains the largest undammed westside tributary to the Sacramento River (CH2MHill 2002). The Cottonwood Creek Unit, the original unit of the



Wildlife Area, is situated along the north bank of Cottonwood Creek at its confluence with the Sacramento River. This unit lies entirely within the 100-year floodplain of the creek, Ranging from 350 to 400 feet above sea level, the unit provides a mosaic of riverine, riparian, wetland and upland habitats. Approximately three-quarters of a mile to the north lie the Balls Ferry Wetland Units 1 and 2 (BFW1, BFW2). At 410 to 420 feet above sea level, both these units are flat to gently sloping, and provide freshwater wetlands, annual grasslands, riparian and ruderal habitats.

Cottonwood Creek also forms the southernmost boundary of Shasta County (Figure II-a). Five miles to the west is U.S. Interstate 5 and the small town of Cottonwood, population 2,960 (U.S. Census Bureau 2006). Fifteen miles to the northwest is Redding, the largest city in the northern region of the Sacramento Valley and the government seat of Shasta County. Between 2000 and 2005, Shasta County grew by more than 10% (ibid.); Redding remains one of the fastest growing cities in the nation (ibid.).

**Figure II-a. Regional Location, Mouth of Cottonwood Creek Wildlife Area**



June 2009 - Alberto Tovar, DFG - WB / BDB  
Prepared by BDB for WB

## B. Property Boundaries and Adjacent Land Use

### 1. Cottonwood Creek Unit

The Cottonwood Creek Unit was initially purchased from the Anderson-Cottonwood Irrigation District (ACID) in 1981 and additional holdings were acquired piecemeal until 1993 (Table II-a; Appendix A). The unit is situated in Township 29N, Range 3W, on the U.S. Geological Survey (USGS) 7.5 minute Balls Ferry quadrangle, and includes portions of Sections 4, 5, 8, and 9 (Figure II-b). The northern and western boundaries are adjacent to private land. The easternmost boundary is the Sacramento River and the Reading Island Recreation Site managed by the Bureau of Land Management. The precise location of the southern boundary of the Cottonwood Creek Unit has yet to be determined; therefore, the exact acreage is unknown. On most maps, it is shown as Cottonwood Creek, which is also the boundary between Shasta and Tehama counties. The Cottonwood Creek Unit ownership map, prepared for this plan in 2008, used the Shasta and Tehama county assessor parcel maps to depict the southern boundary (Figure II-c). The meandering channel of Cottonwood Creek shifts up to 400 feet a year in response to winter flooding, as discussed under hydrology later in this section (IIC3; Figure II-j). This changing southern boundary may account for the discrepancy between the listed unit acreage of 571 and the 2008 mapped vegetation community acreage of 509 (IIIA).

The Cottonwood Creek Unit is accessed from Adobe Road. There is one public access point via a walk-in trail parallel to a gated and locked private access road just south of the intersection of Adobe Road and Hacienda Road. A small graded parking lot is provided adjacent to the entrance. A second gated and locked access road is located approximately 0.5 mile west of this parking area and is a shared easement with the ACID.

Land use in the area is predominantly rural agriculture, primarily grazing lands, as can be seen in the aerial parcel map (Figure II-d). Typical residences in this area are homes on large lots, ranchette-style homes with small acreage and ranches with houses and outbuildings.

### 2. Balls Ferry Wetland Units 1 and 2

Approximately three-quarters of a mile north of the Cottonwood Creek Unit between Venzke and Balls Ferry roads lies the 348-acre Balls Ferry Wetland Unit 1 (BFW1), acquired from the Dymesich estate in 2004. The 141-acre Balls Ferry Wetland Unit 2 (BFW2), acquired from the Matthews family in 2008, is adjacent to the northwestern section of BFW1 and includes property north of Balls Ferry Road and east of Webb Road (Table II-a; Appendix A). Both the Balls Ferry wetland units are depicted on the USGS 7.5 minute Balls Ferry quadrangle (Figure II-b).

BFW1 is situated across portions of Township 29N and 30N, Range 3W, and includes portions of Sections 32, 33, and 4. BFW2 is located in Section 32 of Township 30N, Range 3W, as depicted on the topographic parcel map (Figure II-e).

BFW1 can be accessed from either Balls Ferry or Venzke Roads; both are paved two-lane roads maintained by Shasta County. Access to BFW2 is via Balls Ferry Road and Webb Road. Like the Cottonwood Creek Unit, land use around the Balls Ferry wetland units consists of rural residential homes and agriculture, primarily irrigated pasture, as evidenced in the aerial map of the wetland units (Figure II-f).

Table II-a. Acquisition History, Mouth of Cottonwood Creek Wildlife Area

| Year | Acres  | Unit | County | APN           | TwN | Rng | Sec | Funding                          | Prior Owner |
|------|--------|------|--------|---------------|-----|-----|-----|----------------------------------|-------------|
| 1981 | 261.71 | CCU  | Shasta | 089-310-002   | 29N | 03W | 8   | Environmental License Plate Fund | ACID        |
|      |        |      |        | "             | 29N | 03W | 9   |                                  |             |
| 1982 | 54.73  | CCU  | Shasta | 089-190-005   | 29N | 03W | 9   | Energy Resources Fund            | Moore       |
|      |        |      |        | 089-220-004   | 29N | 03W | 9   |                                  |             |
|      |        |      |        | 089-310-005   | 29N | 03W | 9   |                                  |             |
| 1991 | 59.60  | CCU  | Shasta | 089-210-001   | 29N | 03W | 9   | Prop 70 Sec 5907                 | Herrick     |
| 1992 | 166.32 | CCU  | Shasta | 089-230-003   | 29N | 03W | 5   | Prop 70 Sec 5907                 | Chastain    |
|      |        |      |        | 089-230-003   | 29N | 03W | 8   |                                  |             |
|      |        |      |        | 089-0240-0018 | 29N | 03W | 5   |                                  |             |
|      |        |      |        | 089-250-002   | 29N | 03W | 5   |                                  |             |
| 1992 | 16.53  | CCU  | Tehama | 009-030-022-1 | 29N | 03W | 5   | Prop 70 Sec 5907                 | Chastain    |
| 1993 | 12.22  | CCU  | Shasta | 089-020-006   | 29N | 03W | 8   | Prop 70 Sec 5907                 | Moore       |
| 2004 | 346.31 | BFW1 | Shasta | 089-010-001   | 30N | 03W | 32  | Prop 50                          | Dymesich    |
|      |        |      |        | 089-010-001   | 30N | 03W | 33  |                                  |             |
|      |        |      |        | 089-010-003   | 30N | 03W | 32  |                                  |             |
|      |        |      |        | 089-010-003   | 30N | 03W | 33  |                                  |             |
|      |        |      |        | 089-060-001   | 29N | 03W | 04  |                                  |             |
|      |        |      |        | 089-060-001   | 30N | 03W | 32  |                                  |             |
|      |        |      |        | 089-060-001   | 30N | 03W | 33  |                                  |             |
|      |        |      |        | 089-070-009   | 29N | 03W | 04  |                                  |             |
|      |        |      |        | 089-080-001   | 29N | 03W | 04  |                                  |             |
|      |        |      |        | 089-080-001   | 30N | 03W | 33  |                                  |             |
|      |        |      |        | 089-090-008   | 29N | 03W | 04  |                                  |             |
| 2008 | 141.6  | BFW2 | Shasta | 089-020-001   | 30N | 03W | 32  | Prop 40                          | Matthews    |
|      |        |      |        | 091-230-003   |     |     |     |                                  |             |
|      |        |      |        | 091-190-004   |     |     |     |                                  |             |

APN = Assessor Parcel Numbers ACID = Anderson-Cottonwood Irrigation District

CCU = Cottonwood Creek Unit; BFW1 = Balls Ferry Wetland Unit 1; BFW2=Balls Ferry Wetland Unit 2

**Figure II-b. Boundary Map, Mouth of Cottonwood Creek Wildlife Area  
(Townships 29N and 30N, Range 3W)**

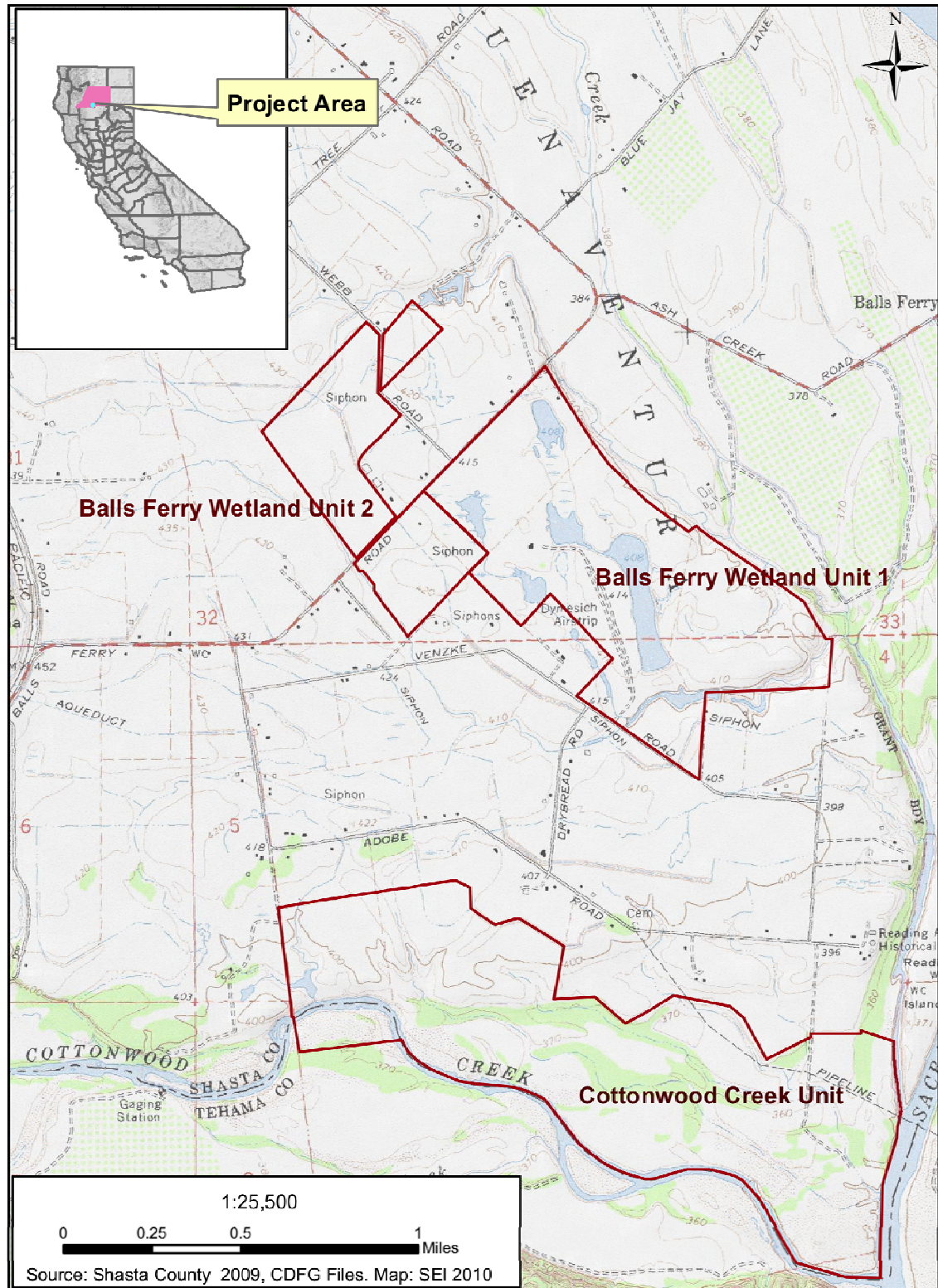




Figure II-c. Parcel Boundaries, Cottonwood Creek Unit (topographic view)

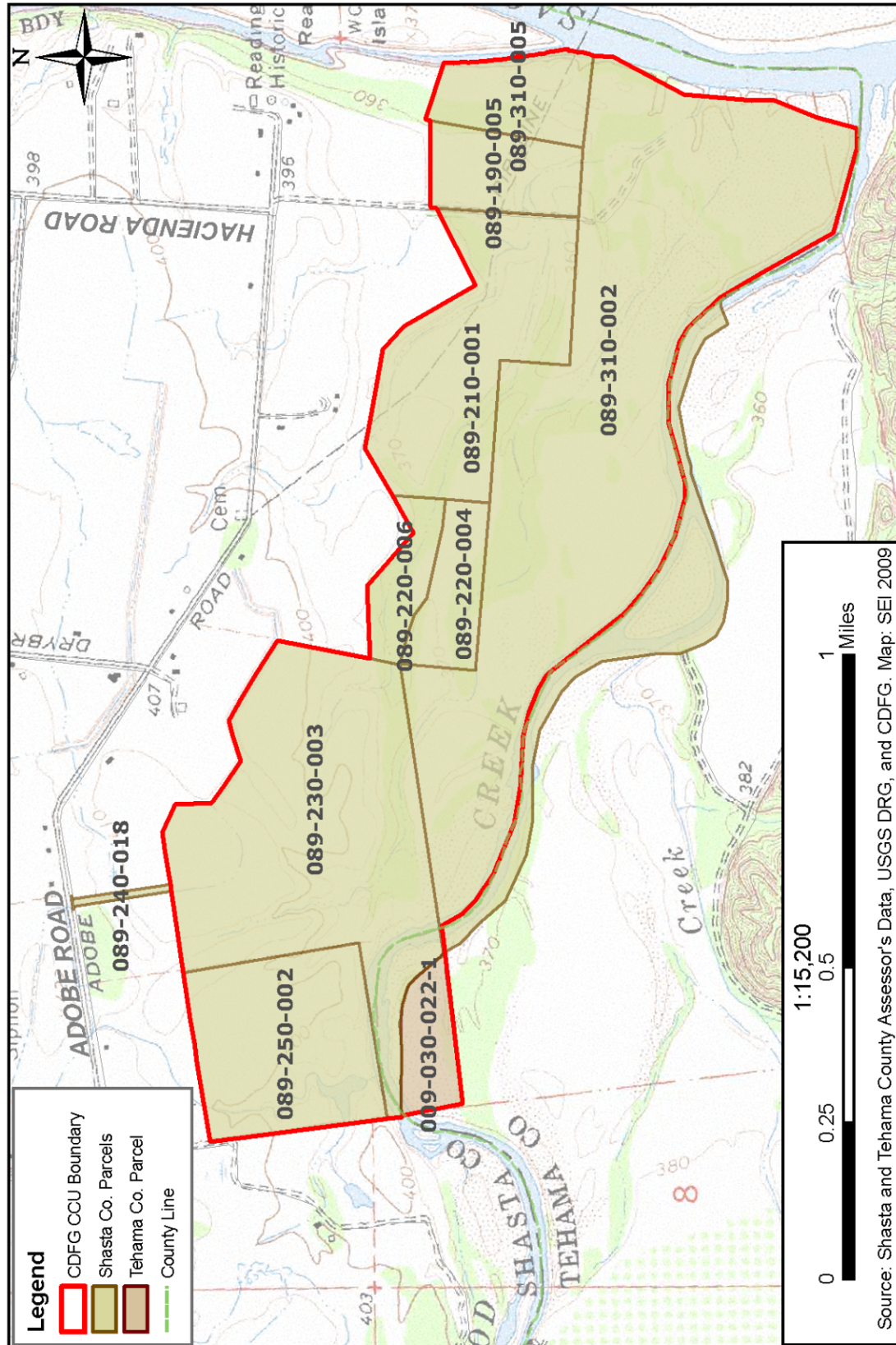




Figure II-d. Parcel Boundaries, Cottonwood Creek Unit (aerial view)

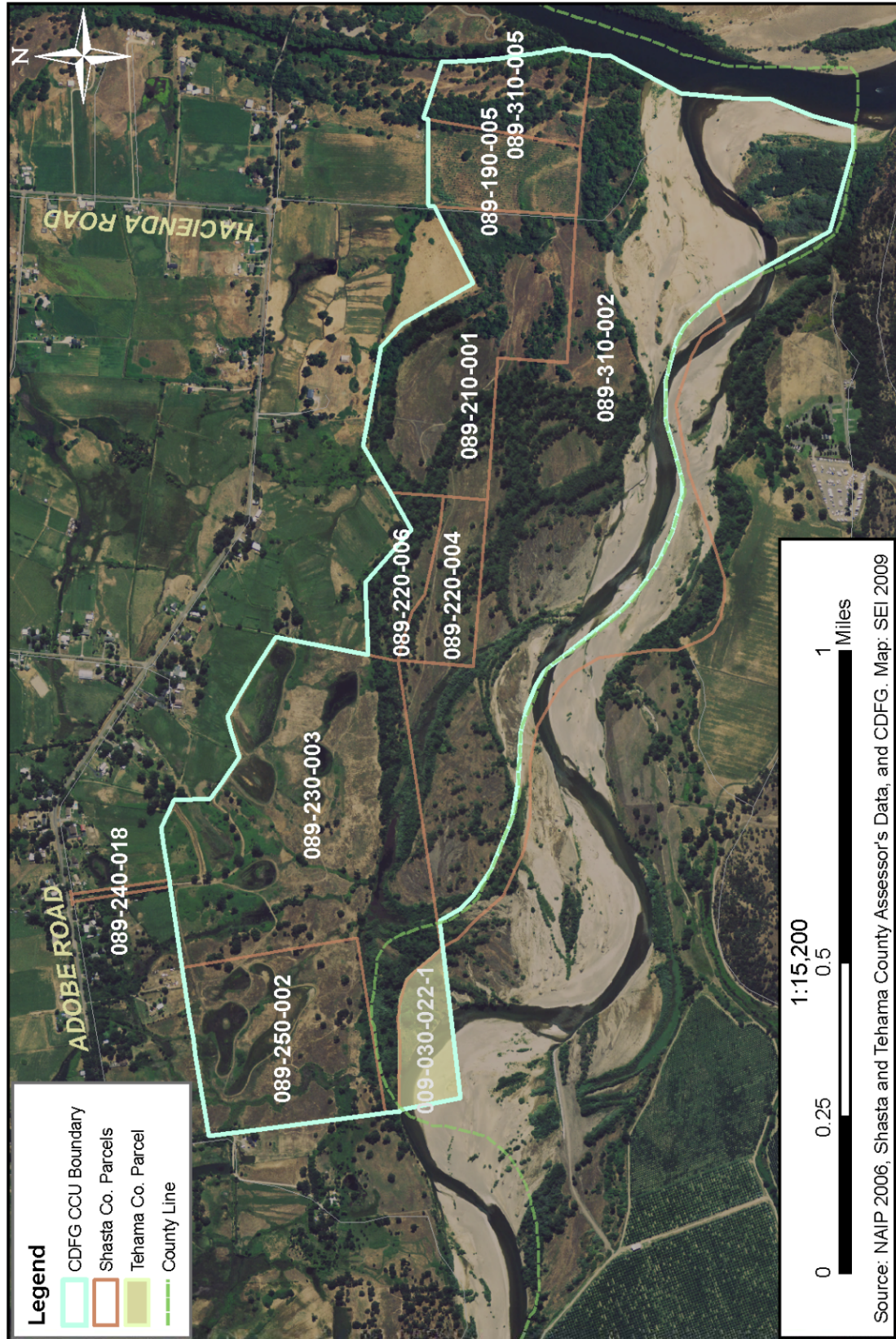




Figure II-e. Parcel Boundaries, Balls Ferry Wetland Units 1 and 2 (topographic view)

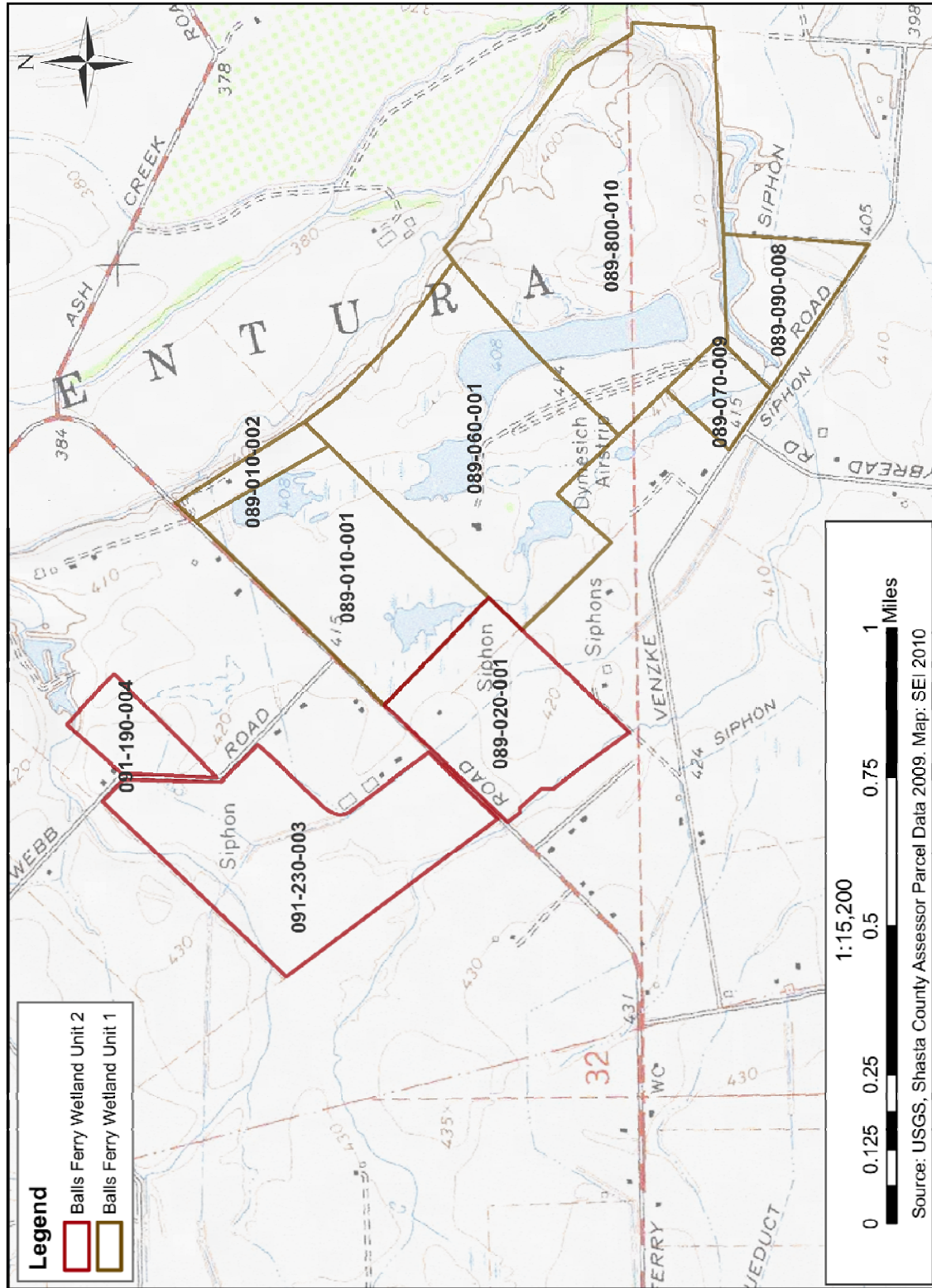
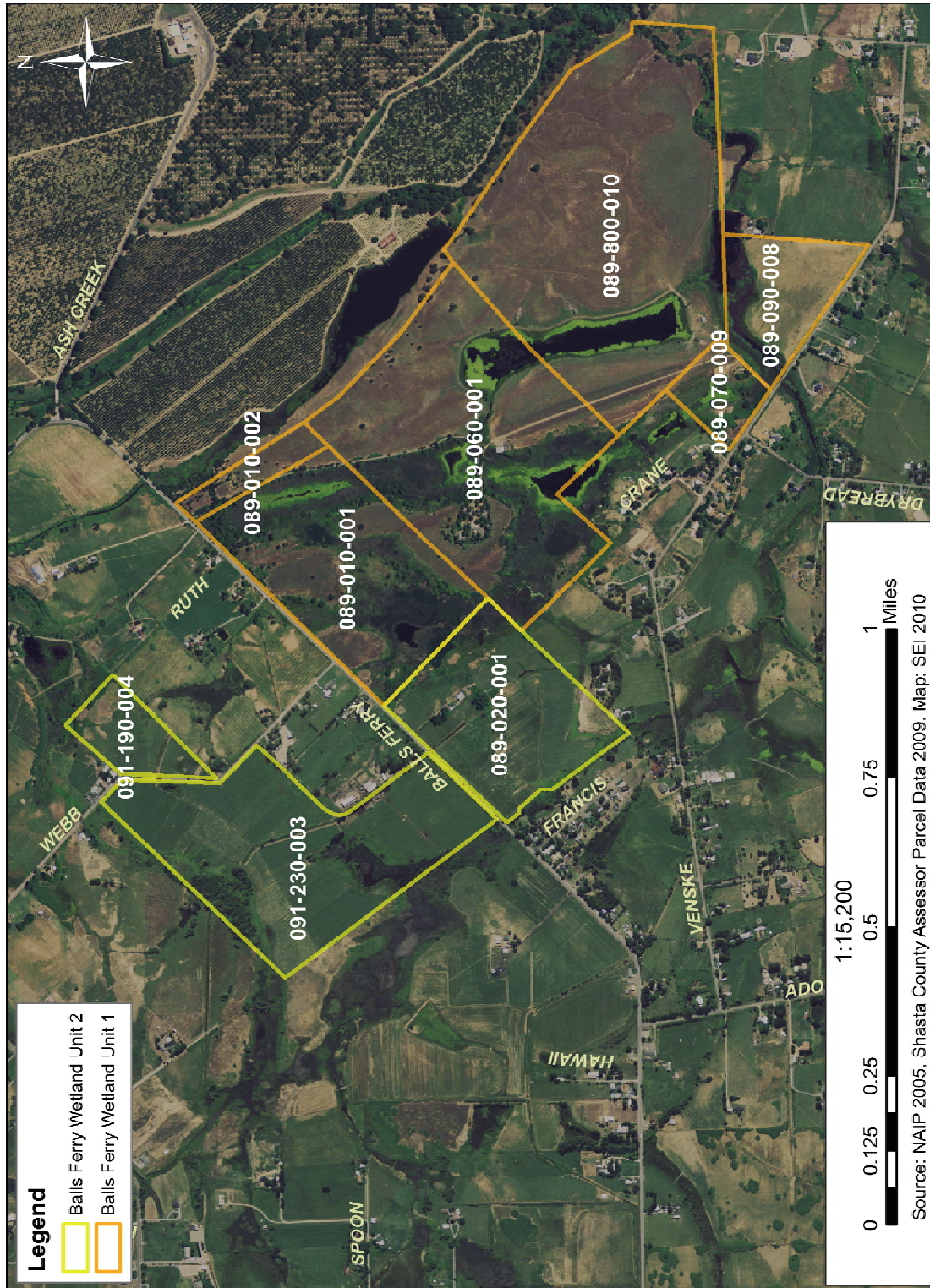




Figure II-f. Parcel Boundaries, Balls Ferry Wetland Units 1 and 2 (aerial view)



### 3. Easements

Easements and rights-of-way are legally recorded documents that run with the deed of the property and are transferred with the property from owner to owner. Easements typically preserve the rights of an entity other than the landowner. The MCCWA has three active easements, one from Anderson-Cottonwood Irrigation District (ACID), one from Pacific Gas and Electric (PG&E), and an easement for maintenance access on the BFW2 parcel retained by the previous owner.

#### *Anderson-Cottonwood Irrigation District*

ACID, the major water supplier in south-central Shasta County, provides irrigation water to the MCCWA. ACID has underground pipelines within the westernmost road access to the Cottonwood Creek Unit and as part of the easement agreement, maintains the roadway (S. Arrison, CDFG retired, personal communication). The ACID Lateral #33 bisects the BFW2 along with three underground irrigation pipelines, and provides water to BFW1. The terms of the easements were not available (S. Wangberg, ACID, personal communication).

#### *Pacific Gas and Electric*

PG&E holds an easement through the southern part of the BFW2 and the southeastern portion of the Cottonwood Creek Unit to allow for placement and necessary maintenance of the electric transmission line through the unit (Appendix A). Per the terms of the easement, management activities in and near the PG&E easements area may not impede the use of the easement or diminish improvements paid for by PG&E.



PHOTO: At left, PG&E easement crosses entry road in the southeastern portion of the Cottonwood Creek Unit. At right, riparian restoration planting in the same area. SEI, July 2005.



## C. Climate and Geology

### 1. Climate

Typical of its location at the northernmost end of the Sacramento Valley, the MCCWA has a Mediterranean climate with hot, dry summers and moist, cool winters. The nearest available climate data is from Redding, California, 15 miles to the north of the Wildlife Area. Redding's average annual temperature is 62°F. The average high temperature in July is 98°F and the average low is 65°F. Extended periods of temperatures above 100°F are not uncommon. In December, the average high temperature is 55°F and the average low is 35°F.

Approximately 90% of the annual precipitation occurs during the period from October through March and consists of rain; however, in the mountainous regions of the upper Sacramento River Basin, much of the seasonal precipitation occurs as snow. It is not uncommon for Redding to receive a dusting of snow during the winter. The average annual precipitation along the Sacramento River in the vicinity of the Wildlife Area is approximately 34 inches. Fog is a common winter element below 1,000 feet where winter humidity often exceeds 50%. Relative humidity in the summer is less than 30% during the day and rises to about 50% at night. Table II-b presents average monthly climatic data from Redding.

**Table II-b. Temperature and Precipitation Averages, Redding, California**

| Month     | Avg High | Avg Low | Avg Precip | Record High         | Record Low         |
|-----------|----------|---------|------------|---------------------|--------------------|
| January   | 55.3° F  | 35.7° F | 6.1 in     | 77° F (01/17/1994)  | 19° F (01/14/1997) |
| February  | 61.3° F  | 40.0° F | 4.5 in     | 83° F (02/25/1992)  | 21° F (02/05/1989) |
| March     | 62.5° F  | 41.7° F | 4.4 in     | 85° F (03/26/1988)  | 28° F (03/05/1997) |
| April     | 69.9° F  | 46.0° F | 2.1 in     | 94° F (04/09/1989)  | 31° F (04/01/1999) |
| May       | 80.5° F  | 52.3° F | 1.3 in     | 104° F (05/06/1987) | 36° F (05/04/1999) |
| June      | 90.4° F  | 61.8° F | 0.6 in     | 111° F (06/26/1987) | 42° F (06/01/1990) |
| July      | 98.3° F  | 64.7° F | 0.2 in     | 118° F (07/20/1988) | 54° F (07/21/1999) |
| August    | 95.7° F  | 63.1° F | 0.5 in     | 115° F (08/06/1990) | 51° F (08/28/1995) |
| September | 89.3° F  | 58.8° F | 0.9 in     | 116° F (09/03/1988) | 46° F (09/24/1993) |
| October   | 77.6° F  | 49.2° F | 2.2 in     | 105° F (10/11/1991) | 33° F (10/31/1989) |
| November  | 62.1° F  | 41.4° F | 5.2 in     | 88° F (11/13/1995)  | 23° F (11/23/1993) |
| December  | 54.7° F  | 35.2° F | 5.5 in     | 78° F (12/16/1998)  | 17° F (12/21/1990) |

Source: [Redding Central 2008](#)

## 2. Soils

The MCCWA is underlain primarily by five loamy soil types: Moda, Perkins, Newtown, Churn and Reiff series. Moda and Perkins loams meet the criteria for farmland of statewide importance (California Department of Conservation 2005). Loam soils are composed of sand, silt, and clay in relatively even concentrations. They are gritty, plastic when moist, and retain water easily, yet they drain well where the topography allows. Loam soils generally contain more nutrients than sandy soils. In Shasta County these soils are typically found along the Sacramento River floodplain and alluvial plains associated with level to gentle slopes ranging from 0 to 9%.

**Moda.** The Moda soils occur on nearly level old terraces under annual grass and forb vegetation. The underlying alluvium is derived from a wide variety of rock formations. Moda soils are well drained, with medium runoff, and very slow permeability below the A horizon. The soil above the hardpan is saturated at times during the rainy season and when it is irrigated. Typically, soils of this type are used for irrigated and dry pasture and for shallow rooted crops. The principal native plants are annual grasses and forbs, such as goldfields, popcornflower, brodiaea, curly dock, and hayfield tarweed (Natural Resources Conservation Service [NRCS] 2006a, b).

**Perkins.** The Perkins series consists of very deep, well drained soils that formed in alluvium derived from sedimentary, granitic and metamorphosed acid igneous rock. Perkins soils are on terraces with slopes ranging from 0 to 30%, but usually have slopes of less than 9%. They are well drained soils with slow to rapid runoff and moderately slow permeability. In some areas, this soil type is subject to rare or occasional flooding. In uncultivated areas, dominate plants are naturalized grasses and forbs. The principal native plants are live oak, California sagebrush, blue oak, valley oak, and shrubs (NRCS 2006a).

**Newtown.** The Newtown soils occur on the gently sloping to very steeply sloping old terraces of the Tuscan-Tehama sediments. They are slowly permeable, well-drained soils with medium to rapid runoff potential. Generally, Newtown soils are used for grazing; where uncultivated, native vegetation is blue oak, live oak, digger pine, manzanita, annual grasses, and forbs (ibid).

**Churn.** The Churn soils are formed in mixed alluvium on low level or gently sloping terraces. They tend to be well drained or moderately well drained; runoff is slow or medium and permeability is moderate to moderately slow. In cultivated areas, Churn soils are used for dry grain crops, irrigated pasture, and small areas of alfalfa, orchard, berries, and truck crops. Native vegetation includes valley oaks, annual grasses, and forbs (ibid).

**Reiff.** The Reiff series consists of very deep, well-drained soils formed in coarse to medium textured alluvium weathered from mixed sources. Reiff soils are located on flood plains and alluvial fans, and are level to gently sloping (slopes range from 0 to 9%). They tend to form in areas subject to occasional periods of flooding from December to April. The soil between the depths of 5 and 22 inches is dry in all parts from June to November and moist in some or all parts the rest of the time. Reiff soils are well drained with very slow to slow runoff and moderately rapid permeability. Thin silt, sand, and gravel lenses are common in the profile. Gravel content in some or all horizons ranges up to 30% but most pedons have little if any gravel. Few faint mottles occur within the profile of some pedons. Organic matter content decreases irregularly with depth. Some pedons have fine stratification below 6 inches. Reiff soils support annual grasses and forbs, such as soft chess, filaree, wild oats, mustard, and valley oak in uncultivated areas (NRCS 2006a).



**Other Soil Types.** Five other soil types are found on the MCCWA include Tehama silty loam (0 to 3% slopes), Anderson gravelly sandy loam, Columbian complex, channeled (0 to 5% slopes), cobbly alluvial soils, and riverwash. Tehama silty loams are found on the upper alluvial terraces and are well-drained soils that rarely flood. They support annual grassland vegetation and are used for pasture and irrigated orchard crops. Anderson loams are found on fans, flood plains and the valley floor, sloped at elevations of 350 to 1,500 feet. They are formed in gravelly and cobbly alluvium derived from a wide variety of rock sources. When vegetated with native plants, Anderson loams support annual grasslands and forbs along with live oak and pines. All three of the remaining soil types represent variations within stream channels and their associated floodplains. Columbian complex are well-drained, silty loams underlain with gravelly sands. They are found in floodplains and are frequently inundated. Riverwash and cobbly alluviums are not specifically defined as soils by NRCS (ibid.), but are generally made up of fine silts, sands and cobbles deposited during flood events. Riverwash areas are subject to regular flooding and support little vegetation.

### *Location and Distribution*

The soil types found on each unit of the MCCWA are summarized in Table II-c. The distribution of soil types at the Cottonwood Creek Unit and at the two Balls Ferry wetland units is depicted in Figure II-g and Figure II-h, respectively.

**Table II-c. Soil Types, Mouth of Cottonwood Creek Wildlife Area**

| Type | Description  | CCU | BFW1 | BFW2 |
|------|--|-----|------|------|
| Ad   | Anderson gravelly sandy loam                           | X   |      |      |
| CeB  | Churn gravelly loam, 3 to 8% slopes                    | X   |      |      |
| CfA  | Churn gravelly loam, deep, 0 to 3% slopes              | X   |      |      |
| CfB  | Churn gravelly loam, deep, 3 to 8% slopes              | X   |      |      |
| Ch   | Cobbly alluvial land                                   | X   |      |      |
| Ck   | Cobbly alluvial land, frequently flooded               | X   |      |      |
| Cu   | Columbian complex, channeled, frequently flooded*      | X   |      |      |
| MhA  | Moda loam, seeped, 0 to 3% slopes                      | X   | X    | X    |
| MkB  | Moda loam, shallow, 0 to 5% slopes                     | X   |      | X    |
| NeC  | Newtown gravelly loam, 8 to 15% slopes                 | X   | X    |      |
| NeD  | Newtown gravelly loam, 15 to 30% slopes                | X   |      |      |
| NeE2 | Newtown gravelly loam, 30 to 50% slopes, eroded        |     | X    |      |
| PIA  | Perkins loam, 0 to 3% slopes                           | X   |      |      |
| PmA  | Perkins gravelly loam, 1 to 3% slopes                  |     | X    | X    |
| PoA  | Perkins gravelly loam, moderately deep, 0 to 3% slopes | X   | X    | X    |
| PoB  | Perkins gravelly loam, moderately deep, 3 to 8% slope  | X   | X    | X    |
| RhA  | Reiff fine sandy loam, deep, 0 to 3% slopes            | X   |      |      |
| RkA  | Reiff gravelly fine sandy loam, deep, 0 to 3% slopes   | X   |      |      |
| RIA  | Reiff loam, 0 to 3% slopes                             | X   |      |      |
| Rw   | Riverwash*   | X   |      |      |
| TbA  | Tehama silt loam, 0 to 3% slope                        |     | X    |      |
| W    | Water  | X   | X    | X    |
| Wa   | Wet alluvial land                                      | X   |      | X    |

\* Similar soil types; identified differently in soil databases from Shasta County and Tehama County.  
 CCU = Cottonwood Creek Unit; BFW1 = Balls Ferry Wetlands Unit 1; BFW2 = Balls Ferry Wetlands Unit 2  
 SOURCE: NRCS 2006a

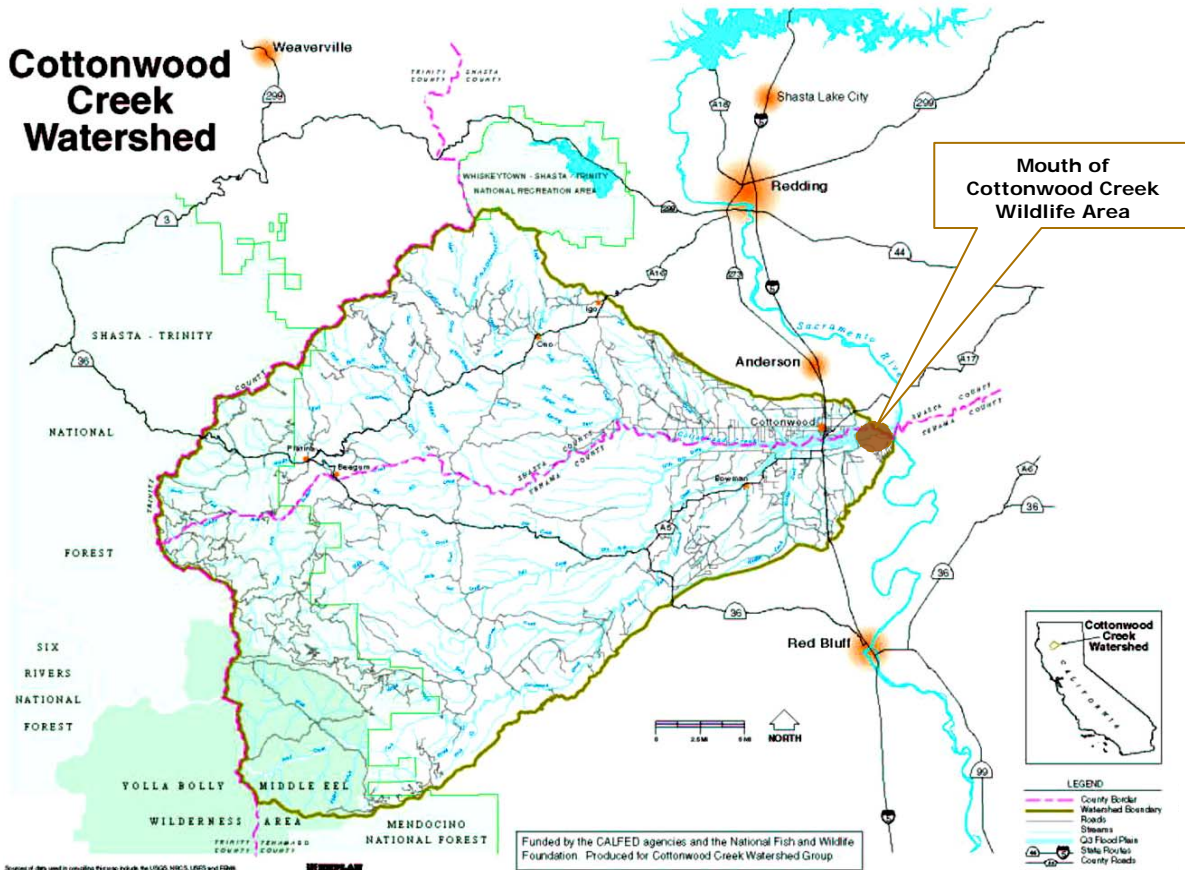






### 3. Hydrology

As discussed previously, the MCCWA lies within the lowermost portion of the Cottonwood Creek watershed. The Cottonwood Creek Unit, situated at the creek's confluence with the Sacramento River, is entirely within the 100-year floodplain. The Balls Ferry wetland units, both located 60 to 70 feet higher than the mouth of Cottonwood Creek and less than a mile north, are unique in the region for their concentration of natural and artificial impoundments and freshwater wetland habitats.



A hydrological assessment of Cottonwood Creek (Graham Matthews & Associates 2003) showed that it drains a basin of about 927 square miles upstream from the USGS gaging station located near Cottonwood at river mile 2.8 (a short distance, and virtually no change in drainage area, above its confluence with the Sacramento River). The watershed rises to over 8,000 feet at the crest of the Coast Ranges, which separates Shasta and Tehama counties from Trinity County. The entire watershed is essentially unregulated, although a small reservoir, Rainbow Lake (4,800 acre feet capacity), is located on the north fork of Cottonwood Creek. As the largest undammed tributary in the northern Central Valley, it provides almost 85% of the gravel introduced between the towns of Redding and Red Bluff and provides the primary gravel source for salmonid spawning habitat along the Sacramento River (CH2MHill 2002).

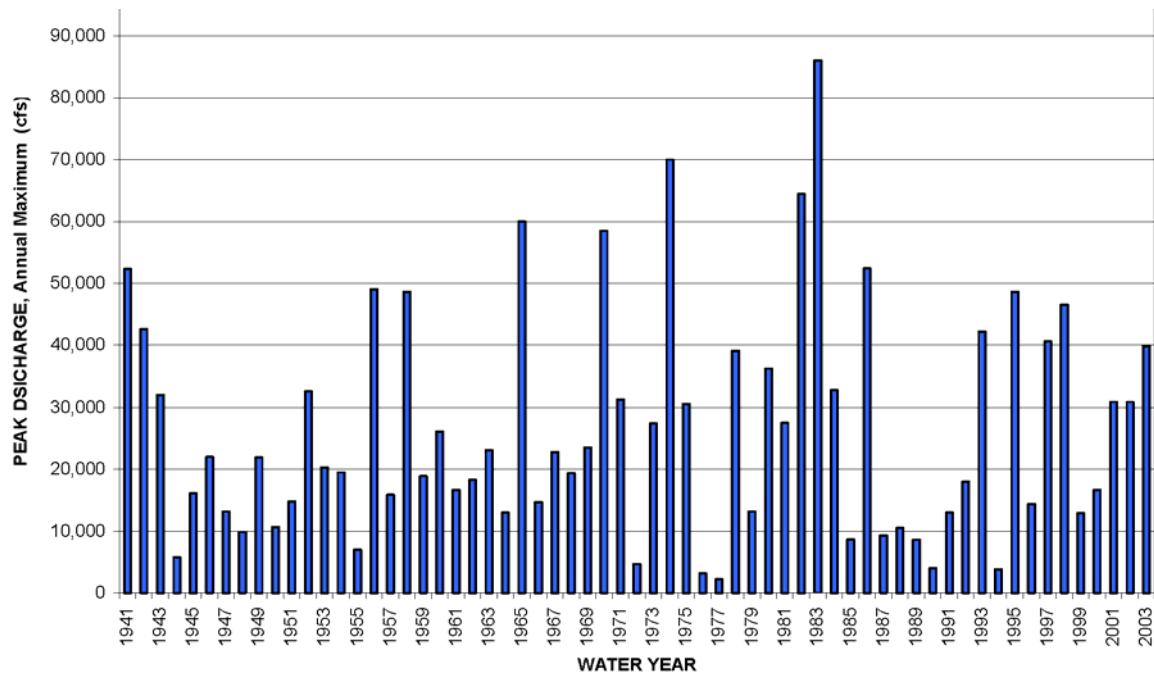
Normal annual precipitation for the entire Cottonwood Creek watershed has been estimated by the U.S. Army Corps of Engineers at 36.3 inches (Graham Matthews & Associates 2003). As is

typical of California, precipitation in the Cottonwood Creek watershed is highly seasonal with about 90% falling between October and April. A small portion of the annual precipitation falls as snow at the higher elevations in the upper watershed; snowmelt runoff is not a major component of the streamflow in the watershed. Occasional rain-on-snow events, however, can contribute significantly to the production of large floods. Annual precipitation rates in the watershed range from about 25 inches at the confluence with the Sacramento River to over 50 inches in the headwaters of the watershed along the crest of the Yolla Bolly Mountains.

Annual runoff has been measured in the Cottonwood Creek watershed at the USGS streamflow gage since October 1940 (ibid.). The mean annual runoff for the 1941-2000 period is 645,000 acre feet for Cottonwood Creek. Flows in Cottonwood Creek are less than 230 cubic feet per second (cfs) 50% of the time, and exceed 2,000 cfs only 10% of the time, or 36 days per year on average. Relatively little sediment transport is likely to occur below 10,000 cfs; thus, all of the geomorphic work accomplished by the creek occurs during less than 5% of the year with most concentrated in the top 1% of the flows.

Peak annual discharges recorded since 1941 are highly variable, ranging from a minimum of 2,210 cfs during the drought of 1976-77 to maximum of 86,000 cfs in 1983 (Figure II-i). When USGS gaging records for the Sacramento River at Bend Bridge near Red Bluff are added along with historical data, the evidence suggests that the largest flood events occurred in 1862, 1890, 1937, 1940, and 1983. A map of the major channel realignments of Cottonwood Creek from 1855 to 1999 shows just how much the channel has shifted, even since CDFG initially acquired the property in 1981 (Figure II-j). Aerial photos of lower Cottonwood Creek taken between 1939 and 1999 further illustrate these channel shifts (Figure II-k).

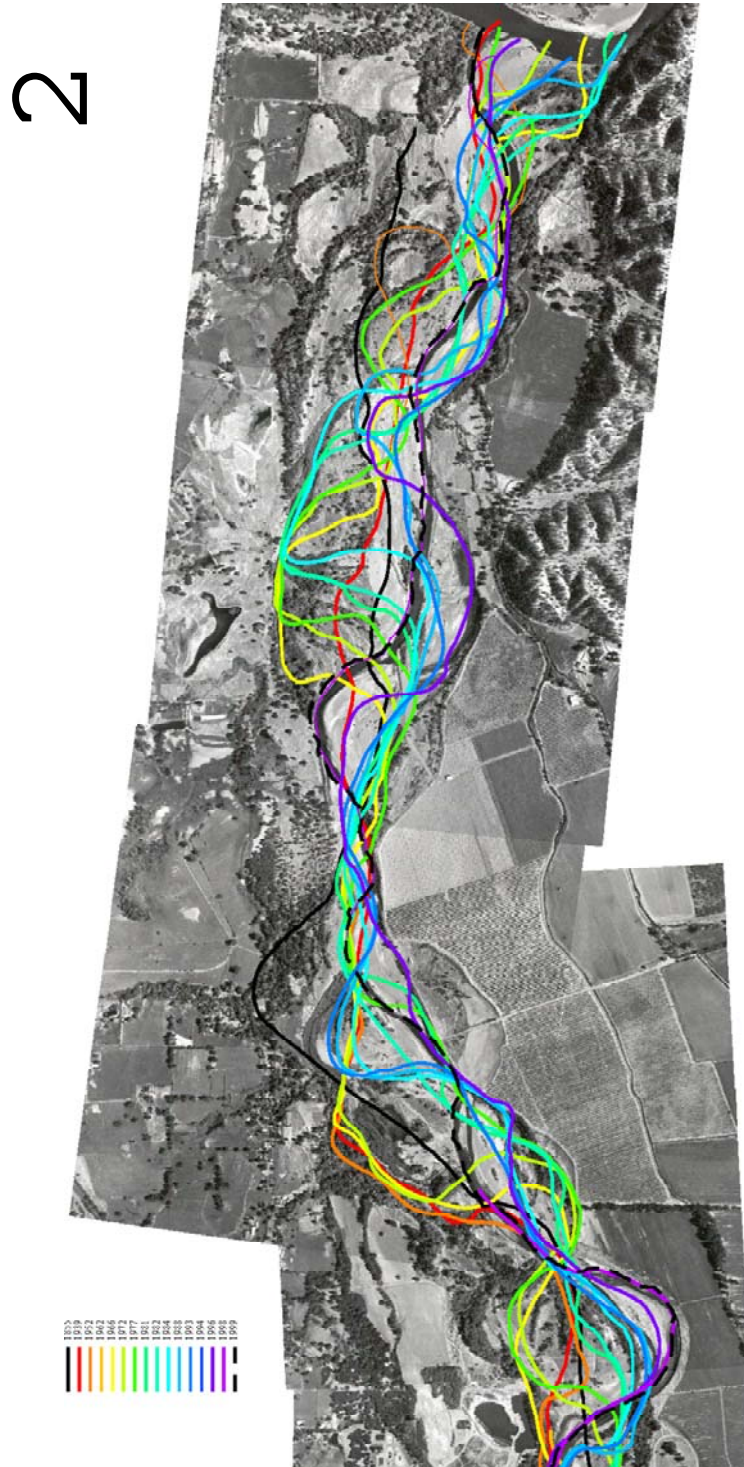
**Figure II-i. Annual Maximum Peak Discharges of Cottonwood Creek near Cottonwood, California (USGS Gage #11376000), 1941-2003**



SOURCE: Cottonwood Creek Geomorphic Study (CalFed Project No. 97-N07), Graham Matthews & Associates, 2003

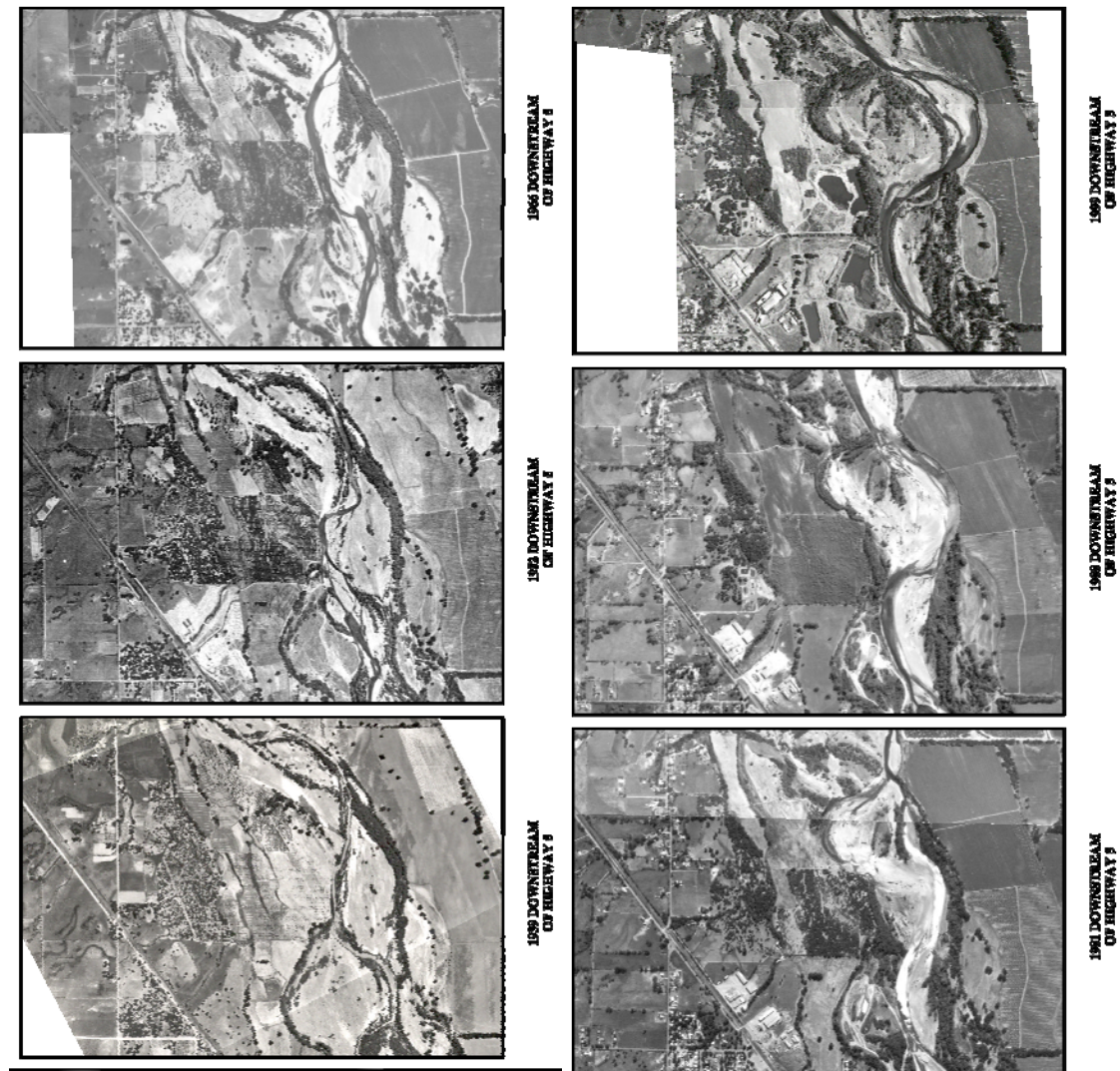


**Figure II-j. Major Channel Alignments, Lower Cottonwood Creek between Interstate 5 and the Sacramento River, 1855-1999**



SOURCE: Cottonwood Creek Geomorphic Study (CalFed Project No. 97-N07), Graham Matthews & Associates, 2003

**Figure II-k. Aerial Photo Comparison of Lower Cottonwood Creek between Interstate 5 and the Sacramento River, 1939–1999**



SOURCE: Cottonwood Creek Geomorphic Study (CalFed Project No. 97-N07), Graham Matthews & Associates, 2003

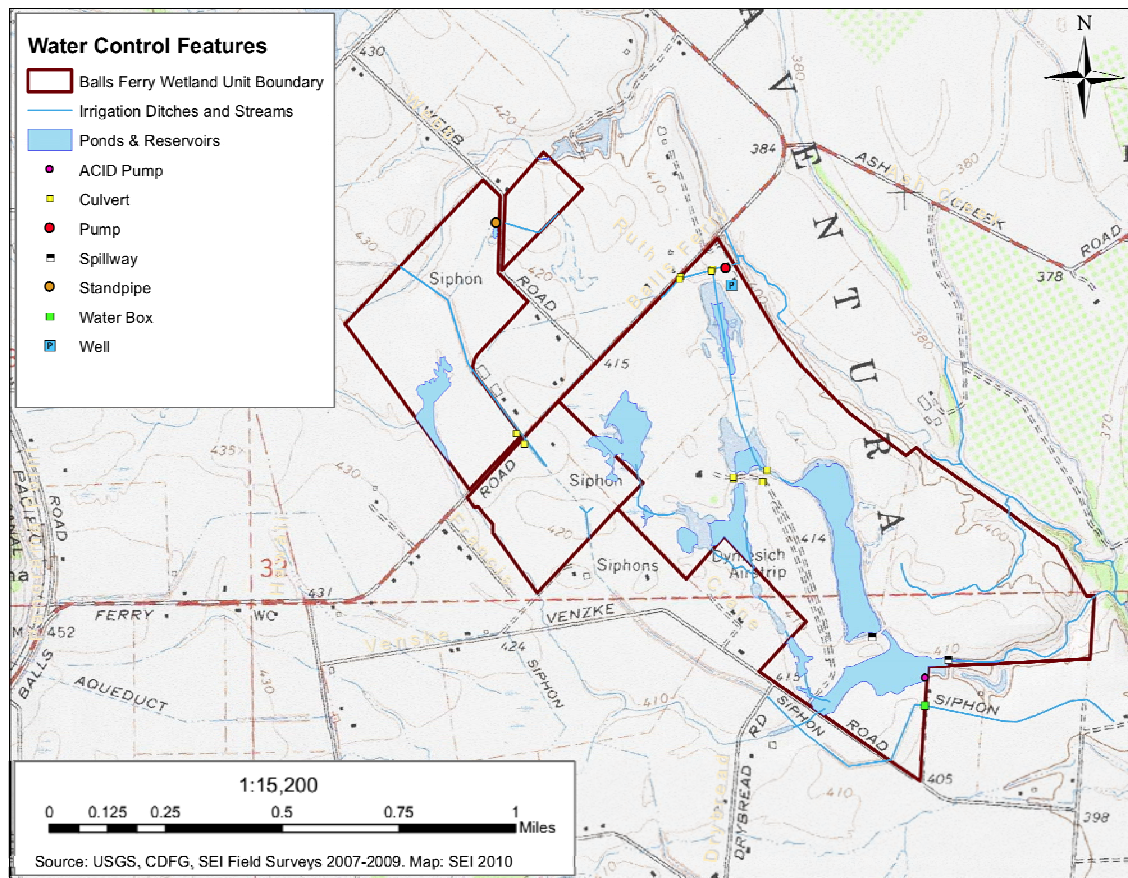


### Water Conveyance

The Anderson-Cottonwood Irrigation District (ACID) provides water to the MCCWA (all three units) through a series of irrigation ditches and pumps. The ACID draws water from the Sacramento River north of Redding and delivers it to southern Shasta County via a system of earthen channels. The Cottonwood Creek Unit is supplied by ACID Lateral #37. In 2006, ACID provided water for 19.5 acres of the Cottonwood Creek Unit, primarily for the Cottonwood Wetland Mitigation Bank which is contained within the unit but is managed separately (Wangberg, personal communication).

BFW1 draws from two water sources, the Dymesich pond pumps and ACID Lateral #33. In 2006, the ACID provided water for 46 acres of the BFW1 (primarily for irrigated pasture and ponds). BFW2 is supplied water through ACID Lateral #33 and three underground irrigation pipes. Figure II-1 shows the location of water conveyance structures on both Balls Ferry wetland units.

**Figure II-1. Water Conveyance, Balls Ferry Wetlands Units 1 and 2**



**Water Deliveries.** ACID water deliveries are billed annually, in advance, by the number of acres irrigated with the assumption that each 5 cfs will irrigate one acre per hour. Users are allotted a specific number of hours during which water is provided based on the flow measured at the delivery point and the number of acres to be irrigated. Each customer receives water in turn approximately every two weeks throughout the irrigation season. For example, if the customer applies for water on 100 acres and the delivery flow is 20 cfs, water will be provided for 25 hours during each two-week rotation (20 cfs = 4 acres per hour) (Wangberg, personal communication).

## D. Cultural History

Previous archaeological work within the MCCWA is limited to two project-specific archaeological surveys within the boundaries of the Cottonwood Creek Unit. In 1993, archaeological surveys were conducted on a portion of the Cottonwood Creek Unit as part of a wetlands mitigation program co-managed by Caltrans (Bennet 1993). The following year Hamusek (1994) conducted a survey of a portion of the property for a parking lot to be developed by CDFG. The acreage covered was not specified. Hamusek identified two isolated prehistoric artifacts: a single “metavolcanic core reduction flake” and an “edge-modified basalt cobble core tool.” She suggested that as isolates the objects were not eligible for the National Register of Historic Places (NRHP) and recommended that the project move forward with no further restrictions. Hamusek reported ground visibility at 90%, indicating that the need to resurvey this area is low (1994). No focused archaeological surveys have been conducted on either of the Balls Ferry Units.

In 2006, archaeologists conducted reconnaissance-level surveys of both the Cottonwood Creek Unit and the BFW1 (S. Baxter, unpublished report for SEI). This effort was repeated in 2009 on the BFW2 (S. Baxter, unpublished report for SEI). The purpose of these investigations was to observe the landscape in the context of known cultural components of the area in preparation of this document. Additional documentation has been compiled through literature reviews and archaeological records searches (Northeast Information Center 2007, 2009).

### 1. Pre-European History

Four distinct phases of human occupation have been defined for the region in which the Mouth of Cottonwood Creek Wildlife Area is located. The earliest known prehistoric occupation dates back to circa 6000 BC.

**Early Archaic Period (6000 BC to 3000 BC)** Villages at this time were small to medium in size, and were situated along streams in the foothill areas. Most cultural resource artifacts recovered that are associated with this period relate to hunting and food gathering. Projectile points were large in size and wide stemmed, probably used with throwing sticks commonly called atlatls, or spears. Manos and metates (tools for grinding grain) were introduced during this time, indicating the use of seeds as food (Hamusek 1994).

**Middle Archaic Period (3000 BC to 500 BC)** Settlement patterns did not change during this time, but the material culture became more elaborate, and projectile points were generally reduced in size (ibid).

**Transitional Period (500 BC to AD 500)** Settlement patterns changed during the transitional period. Villages moved from the foothills to the valley floor and were located along major river systems. Projectile points were characterized by medium-sized side and corner-notched points. Mortars and pestles were introduced during this time, indicating that acorns were used as a food source (ibid).

**Shasta Complex (AD 500 – AD 1800)** Settlement patterns shifted to larger villages with smaller encampments near favored food sources. During this time projectile points became even smaller, indicating the introduction of the bow and arrow. Hopper mortars also came into use. Acorn and salmon were the primary food sources. It has been argued that the Shasta complex is the

archaeological manifestation of the Wintu people, indicating their relatively late arrival to the area (Hamusek 1994).

Moratto (1984) noted the surprising lack of early sites in California's Central Valley when in contrast there are sites known to be 7,500 to 11,500 years old in the nearby coast range. Moratto points out that there has been as much as 10 meters of soil deposition in the valley over the last 6,000 years, an action that would effectively cap earlier sites. It is likely that there are sites older than 6000 BC that have not been located due to their greater depth.

## 2. Pre-European Ethnography

The Mouth of Cottonwood Creek Wildlife Area is situated on land ethnographically occupied by the Wintu. The Wintu were the northernmost of five Penutian-speaking groups that occupied different parts of the Sacramento Valley (Moratto 1984). The Wintu territory covered portions of Shasta, Siskiyou, Trinity and Tehama counties. The Wintu were divided into nine major groups, named by their geographic locations. Nearby neighbors of the Wintu were the Central Yana on the east side of the Sacramento River and the Nomlaki on the south side of Cottonwood Creek.



PHOTO: Bark house, 1924. Phoebe Hearst Museum.

The Wintu lived in conical structures constructed of poles and peeled bark or pine boughs, a house type common throughout the Sacramento Valley and foothills. Villages generally had between four to seven houses, with a typical population of 20 to 150 people. Larger villages (50 or more people) often had a lodge for men's gatherings and spiritual ceremonies. These were 15 to 20 feet in diameter, semi-subterranean, and covered with a roof bark or pine boughs supported by poles. A central opening in the roof served as both an entrance and smoke hole (LaPena 1978).

The main villages were generally situated on low knolls near streams or permanent waterways (Moratto 1984), but three types of settlements were identified ethnographically: winter or main villages, hunting camps, and kill sites. The latter two were small, temporarily occupied camps, situated upcountry and away from the waterways (Hamusek 1994).

Individual families formed basic economic, political and social units, with the village forming the largest political unit. A "chief" was the leader of the village. His position was inherited through patrilineal lines, although the village retained the right of refusal if the heir was deemed unfit for the position. The chief lived off of the contributions of the others in the village. He was expected to mediate disputes within the village and maintain relations with other village leaders. Inter-village disputes were apparently rare, occasioned by formalized warfare in which few casualties were incurred (LaPena 1978).

The Wintu subsisted largely on acorns, fishing, and hunting. They hunted a wide variety of animals. Both individuals and groups hunted deer. Group hunts usually involved a team of people loudly traversing the countryside, driving the deer ahead of them into a canyon or other natural

bottleneck, where the best marksmen waited with bow and arrow to shoot the animal. Black bear were hunted in the fall when they were fat and sluggish. Hunters would smoke the bear out of its



PHOTO: S. W. Indian man holding bow and arrow. CD Id Number: 33. CD Frame Number: 83. Shasta Historical Society Photo Database.

lair and shoot it. Small game, including quail and rabbits, were hunted by driving the animals into nets. Hunters used snares and deadfalls to catch mice, gophers, squirrels, and other rodents. These small animals were eaten by singeing off the hair, gutting them, roasting or boiling them, then drying and pounding them into a meal. Insects such as grasshoppers and salmon flies were also collected and eaten (LaPen a 1978).

In the Cottonwood Creek area, fishing was of the utmost importance. The catch was predominately Chinook salmon, ranging in size from 20 to 70 pounds, with a spring run from mid-May to October and a fall run from mid-October to December. Fishing was often done communally at night. One man would hold a torch and another held a dip net. Fishing was also done individually using harpoons. A pair of poles were lashed together in a cross and set out in deep water. A log was then laid from the shore to the cross, where a small hut was sometimes built. The fisherman then sat in the hut and speared

fish as they swam past. Fall run salmon were sun dried for winter use. Spring run salmon were too oily to dry out, so they were first baked, then de-boned and flaked, dried, and finally pounded into meal. The heads, bones and entrails were dried and pounded into flour. Dried roe and pine nuts were mixed into the flour. Wintu fishermen also caught steelhead and sucker fish although they were only of secondary importance. These fish were speared, poisoned, or caught with hook and line (LaPen a 1978).

The acorn was probably the most important and widely used food source among California Native Americans. Many of the lowland groups moved up into the foothills during the summer or fall to collect acorns (Moratto 1984). Gathering acorns was a family affair. Men climbed the trees and shook the acorns loose, sometimes using hooked sticks to shake the branches. Women collected the acorns in burden baskets. Gatherers worked one tree at a time; one large tree or two small ones comprised a day's work. Women pounded the acorns into a flour or meal in a mortar. This

meal could then be used to make soups or breads. For making bread, the black oak or valley acorn was preferred. After it had been pounded into flour, the meal was leached in a sand pit to remove the tannic acid. A fire was built in a rock lined pit which was kept burning for a day. When hot

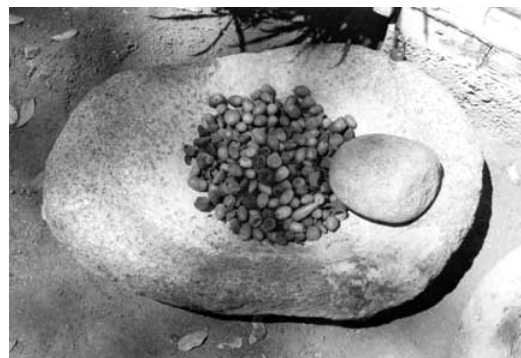


PHOTO: Mano and metate, acorns. Indian Relics



enough, the fire was removed and the dough placed inside. It was then covered with leaves and soil, and another fire built over it for another day. When done, the bread would keep for months, although baking was generally done once a week. Acorns were stored in bark-lined pits or in above-ground granaries that were formed from a shrub. Other important plant foods included buckeye, manzanita, Indian potato, pussy's ear, pine nuts, wild grapes, miners' lettuce, clover, hazel nut, and snakeshead (LaPena 1978).

Technologically, the Wintu were similar to most California tribes in that they lacked ceramics and instead used intricately constructed baskets for cooking, carrying and storage. Plant materials



PHOTO: Intricately constructed baskets were used for cooking, storage and carrying. Phoebe A. Hearst Museum.

gathered to construct baskets included hazel, skunk bush, poison oak, *Xerophyllum* grass, maiden hair, pine root, grapevine, redbud, and willow. Cordage and nets were also widely used. Hunting was accomplished with sinew-backed bows of yew wood and composite-construction, obsidian-tipped arrows. Fishing was done largely with 10- to 20-foot-long wood-tipped harpoons. The Wintu used either mortar and pestle or mano and metate to process plant foods. Hopper mortars were introduced at a late date. Some older bedrock mortar locations were considered to be holy places. Water craft were limited to simple rafts and were used for transporting supplies. Clothing was

minimal. Men were generally naked except for a belt of human hair or porcupine quills, although they sometimes wore a hide breechcloth. Girls were also unclothed until adolescence, after which they wore a shredded maple-bark apron or skirt that hung just below the knees. In colder weather, both sexes wore capes of deer hide or woven rabbit skins. Adornment included a range of feather, fur, or basket head gear, nose and ear piercings, facial tattoos, and beads (LaPena 1978).

Similar to the other Central Valley groups, the malaria epidemic of 1833 devastated the Wintu. An estimated 75% of the indigenous valley people had perished by 1846. The impact of the Gold Rush decimated most of the remaining populations (Moratto 1984).

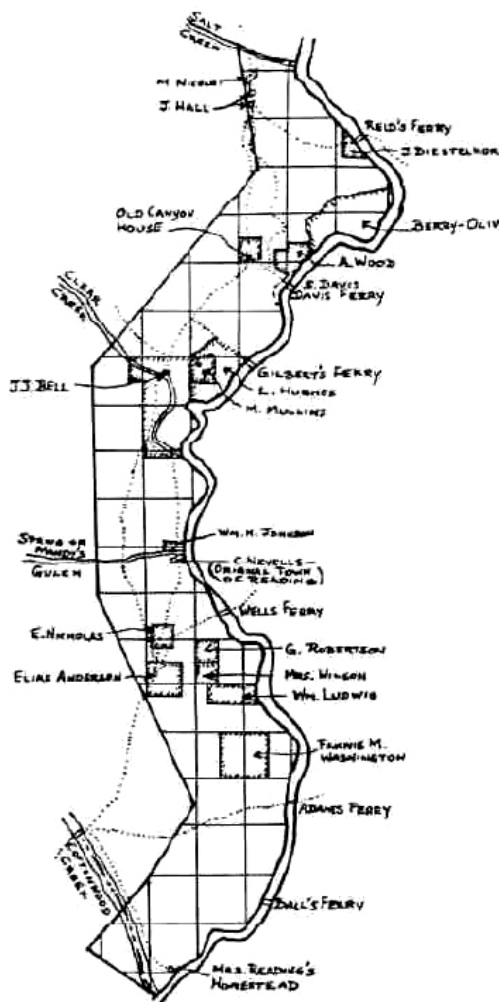
### 3. Post-European History

In the late 1820s and 1830s, a series of trappers moved through the area including parties led by Jedediah Smith, Alexander McLeod, Peter Ogden, and John Work (Shepherd 2002a). They were in search of furs and stayed only long enough to trap what they needed and move on. In the 1840s, the U.S. government sent John C. Fremont on a series of exploratory missions of the western frontier, including the Mexican province of California. The Mexican governor of the province was not entirely comfortable with a U.S. military presence in his territory, and directed Fremont to leave. On his way out of the territory, Fremont passed through the area and gave Cottonwood Creek its name (Shepherd 2002b).

The first permanent settlements by non-native people began with Mexican land grants in the 1840s. All three units of the MCCWA fall within the confines of the Mexican land grant known as Rancho Buena Ventura (Figure II-m). In August 1845, Mexican Governor Micheltoreña granted Rancho Buena Ventura (Rancho San Buenaventura) to Pierson B. Reading. This was northernmost of all of the Mexican period land grants.

A native of New Jersey, Reading came west with the Chiles-Walker party in 1843. He arrived at Sutter's Fort on November 10 and worked for Sutter as clerk and chief of trappers until given the land grant (Robinson 1948, Hamusek 1994). Rancho Buena Ventura included 26,632 acres of land situated on the west side of the Sacramento River. It continued to a point three miles west of the river and from Cottonwood Creek north 19 miles to Salt Creek. Reading built an adobe house for his overseer in the late summer of 1845 and then moved cattle onto the land. Shortly after its completion, Indians attacked and burned the house. Reading was absent at the time as he was working in Sacramento. In 1847, Reading built another adobe house on the rancho near the confluence of Cottonwood Creek and the Sacramento River. It was a four-room structure that later became known as "Reading's Mansion." Reading also planted crops, including cotton, grapes, olives, pears, grain, and vegetables (Hamusek 1994).

**Figure II-m. Map of the Mexican Land Grant to P. B. Reading, Rancho Buena Ventura**



**Map of P. B. Reading's Grant**  
 Rancho Buenaventura 6 Leagues of Land = 26,632.09 acres  
 Amount of sales made by P. B. Reading = 5,061.88 acres  
 Amount of land unsold at his death = 21,570.21 acres  
 Wm. Magee, Surveyor

SOURCE: Cottonwood Community Library (obtained from the California Secretary of State). Accessed online at: <http://www.geocities.com/cott1388/pr-map.jpg>

War came in 1846 and, although Reading (and John Sutter) had remained staunch supporters of Governor Micheltoreña, he was forced out by his Mexican adversaries (Shepherd 2001). Reading eventually sided with the Americans where he fought in Fremont's Battalion. Later, he was a signer of the Capitulation of Cahuenga, the treaty between Mexico and California that ended hostilities and indirectly led to California's statehood (Office of Historic Preservation 1996).

The United States annexed California in 1848 and the holders of most Mexican land grants were soon facing multiple legal battles. Many of the territory's new citizens were not acquainted with the large land holdings and consequently began squatting on what appeared to be open land. Although many grant holders fought to keep their land, the boundaries of the grants were often ill-defined, overlapping, or non-existent. To clarify and finalize holdings, the U.S. government passed the Land Act of 1851 which approved 553 claims, among them Reading's (Beck and Haase 1974; Bureau of Land Management 2006a). By 1862 Reading's ranch was recognized as the best stock farm in the state of California.



PHOTO: Maj. Pierson B. Reading, 1862. CD Id Number: 29. CD Frame Number: 26. Shasta Historical Society



PHOTO: Reading Adobe, Buena Ventura House, 1851, First County Seat of Shasta County, California. View north. CD Id Number: 60. CD Frame Number: 97. Shasta Historical Society

In addition to farming, Reading dabbled in politics, steamships, and gold mining (Shepherd 2001). During the Gold Rush, Reading assembled a group of "his Indians" to try his hand at placer mining, although his success is unknown (Robinson 1948). He apparently remained on good terms with the local Native Americans, and employed them on his ranch. At one point, he fended off an angry mob attempting to attack them. In 1851, Reading helped to negotiate the first treaty with the Native Americans in California (Shepherd 2001). He was appointed the "agent" for the Wintu, who were given 35 square miles of land and \$25,000, to be managed by Reading (LaPena 1978). In 1844, Reading wrote:

These Indians are quite different from any I have seen in the mountains or prairies, being mild and inoffensive in their manner, and easily taught the various duties of the farm. There are on my land two villages, each number 150 persons, men, women, and children. I am confident that by treating them kindly I can easily convert them into useful subjects, and at the same time improve their condition as human beings (Shepherd 2002a).





PHOTO: Group of 4 adults, 1 boy, standing at the boarded end of adobe. Group of Indians at Reading Adobe. CD Id Number: 29 CD Frame Number: 39 Shasta Historical Society



PHOTO: Man seated in ruins of Reading Adobe—interior exposure. “Old Tom at the ancient fireplace” CD Id Number: 29 CD Frame Number: 40 Shasta Historical Society

Reading died in May 1868 at the age of 51. Thereafter, the ranch was sold off piecemeal, and Charles C. Moore claimed the old adobe house (Hamusek 1994). Reportedly this adobe home was still standing in 1948 (Robinson 1948), although now it is reduced to a mound of earth. The Reading Adobe is listed as California Historical Landmark No. 10 (Office of Historic Preservation 1996).

Since the demise of P.B. Reading, the land apparently has been used primarily for agricultural purposes such as horticulture and cattle grazing. The detailed land use of these parcels over the last 100 years is unknown at this time, but cattle ranching and farming continue to be important factors in the local economy.

#### 4. Cultural Resource Sites

Ethnographic villages were concentrated on the bluffs overlooking waterways (Moratto 1984:172), which mirrors the environmental setting of the MCCWA. Given the close proximity of Cottonwood Creek and the Sacramento River, there is a high probability that undocumented prehistoric sites exist within the MCCWA. In 1844, P.B. Reading noted the presence of two such villages on his property (LaPena 1978), which included the land that now makes up the MCCWA. The Reading Adobe is also immediately adjacent to the Cottonwood Creek Unit, and it is likely that there are Mexican and early American period components related to the adobe within the boundaries of the unit. The area experiences massive soil movement during flood season, and archaeological sites along waterways and on flood plains are frequently encountered several meters below the current ground surface. There is a high probability of encountering buried archaeological sites along the waterways adjacent to the Cottonwood Creek Unit.

During the 2006 reconnaissance survey, a new historical site was identified at the far north end of the BFW1 (Baxter, unpublished report). The exact location of this site is confidential. The site appears to be an old residence or homestead and is composed of a series of small concrete foundations, ditches, a water softener, a breaker box and meter on a pole, utility poles, and numerous non-native trees and shrubs (pear, tree of heaven [*Ailanthus altissima*], and other unidentified landscape species). The site was not recorded.

According to the records search by the Northeast Information Center, no previous archaeological surveys have been conducted on the BFW2 parcels. Several archaeological surveys have been conducted on adjacent and nearby properties. None of these surveys identified any archaeological sites (Northeast Information Center 2009).

A reconnaissance survey of the BFW2 property during 2009 identified several historic structures, formerly the Matthews dairy (Baxter, unpublished report). One is a small wood framed bungalow that is abandoned, dilapidated and overgrown with ivy and blackberries. The house probably dates back to the 1920s. The second structure is a large wood-framed hay barn. It is sided with iron sheeting, as is the roof. There are large sliding doors at opposite ends. Along the sides are a series of feed bins open to the outside. The bins are covered with large porch type roofs. It was probably erected about the same time as the house. The third structure is a small milking shed. As is typical of this kind of structure, the lower portions of the walls are made of concrete, and the upper portions are wood framed and sided with T-1-11 siding. The roof is clad in iron sheeting of various types. The interior is divided into three rooms: a milking room, a processing room with a separator, and a room that housed storage tanks. The milking shed was probably built about the same time as the house, although it has been at least partially rebuilt sometime during the 1960s or later.



PHOTO: Matthews Property. 2009 Past Forward Inc., S. Baxter



PHOTO: Hay Barn, Matthews Dairy. 2009 Past Forward Inc., S. Baxter



PHOTO: Milking Shed, Matthews Dairy. 2009 Past Forward Inc., S. Baxter



PHOTO: ACID Lateral #33, north end, BRW2. 2009, Past Forward Inc., S. Baxter

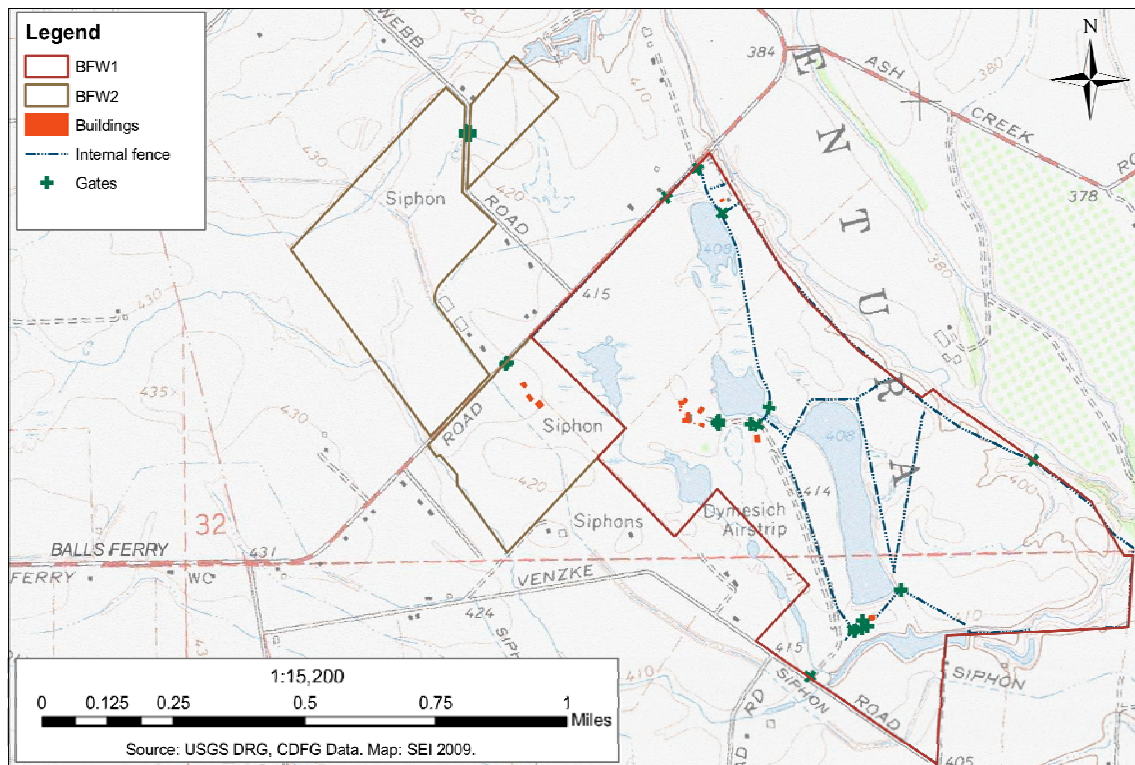
Also present is a historic ditch that runs through the middle of the site. The ditch is part of the Anderson-Cottonwood Irrigation District water control system and is known as Lateral #33. ACID staff had no records regarding the history of the ditch, but believed the Matthews family had built it circa 1920 (H. Lurtsema, ACID, personal communication). Other structures related to the ACID ditch include a concrete culvert that crosses under Balls Ferry Road and sliding gate valves used for flood irrigation of adjacent fields. The ditch is still used and maintained by ACID.

None of these resources were recorded during the course of this project. However, portions of the ACID water control system have been previously recorded. These were given Primary Numbers 91404 and 96818. Site 91404 was noted as an ACID aqueduct, and was not evaluated (DPR code 7L) for the National Register of Historic Places (NRHP). Site 96818 was found ineligible (code 6Y2) for the NRHP (JRP and Caltrans 2000). The locations of these segments of ditches are unknown. Other than these historic features, no unnatural landforms were noted during the archaeological reconnaissance surveys (Baxter, unpublished report).

## 5. Existing Structures

No structures were noted on the Cottonwood Creek Unit. The BFW1 has several standing structures related to the former owner's ranch, including a mobile home, horse shed, pole barn, single family ranch style home, two-story garage, pool house and pool, changing house, and an airplane hanger and landing strip (Figure II-n). None of these structures appear to be over 50 years old, and are not considered historic resources. Aside from the former Matthews dairy structures, there are no buildings on BFW2.

**Figure II-n. Existing Buildings and Fences, Balls Ferry Wetland Units 1 and 2**



### III. HABITAT AND SPECIES DESCRIPTIONS

|   |        |
|---|--------|
| A. Flora.....   | III-2  |
| 1. Plant Community Types, Cottonwood Creek Unit.....      | III-5  |
| 2. Plant Community Types, Balls Ferry Wetland Unit 1..... | III-15 |
| 3. Plant Community Types, Balls Ferry Wetland Unit 2..... | III-23 |
| B. Fauna .....  | III-26 |
| C. Endangered, Threatened and Rare Species.....           | III-29 |
| 1. Special Status Plants .....                            | III-29 |
| 2. Special Status Wildlife.....                           | III-40 |



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### III. HABITAT AND SPECIES DESCRIPTIONS

*The Mouth of Cottonwood Creek Wildlife Area can be grouped into eight basic plant community types consisting of at least 220 plant species, including 117 non-native or naturalized species. The Wildlife Area provides suitable habitat for 25 species of fish, 15 species of reptiles and amphibians, 201 species of birds, and 45 species of mammals. To date, 2 rare plants and 29 special-status animal species have been documented on the site.*



## A. Flora

### Vegetation Communities, Habitat Types and Plant Species

#### METHODOLOGY

Habitat and plant species descriptions are based upon reconnaissance-level field surveys as well as a review of published and unpublished reports covering the Mouth of Cottonwood Creek Wildlife Area (MCCWA). The objectives of the surveys included:

- Compiling an inventory of vascular plant species growing without cultivation in the study area
- Characterizing the habitat types (plant communities) occurring in the study area
- Locating and mapping occurrences of special-status plant species occurring in the study area
- Identifying and mapping sensitive habitats within the study area

**Literature Review.** Botanists reviewed literature and special-status species databases to identify special-status plant species and sensitive habitat types with potential to occur in the study areas (R. Buck, EcoSystems West for SEI, unpublished report). Sources included the California Natural Diversity Data Base (CNDDB) occurrence records for the Balls Ferry U.S. Geological Survey (USGS) 7.5' quadrangle and the eight quadrangles surrounding it (USFWS 2006a, 2008); county and USGS quadrangle occurrence records in the California Native Plant Society (CNPS) Inventory of Rare and Endangered Vascular Plants of California (Tibor 2001, CNPS 2006) for the same nine quadrangles; and regional floras (Munz and Keck 1973, Hickman 1993). They also reviewed the results of a botanical survey of the Cottonwood Creek Unit (excluding the mitigation area) conducted in 1993 and 1994 (Hubbell and Marr 1994).

Scientific nomenclature for plants in this report follows Hickman (1993), Tibor (2001), and CNPS (2006). Common names follow Abrams (1923-1960), Hickman (1993), and the U.S. Department of Agriculture (USDA) PLANTS database (USDA 2006), except for special-status species, which follow Tibor (2001) and CNPS (2006) and *Ludwigia* species, which partially follow California Invasive Plant Council (2006).

Habitat types considered sensitive include those listed on the CNDDB working list of “high priority” habitats for inventory (i.e., those habitats that are rare or endangered within the borders of California) (Holland 1986, CDFG 2003a). Sensitive habitats include riparian corridors, wetlands, habitats for legally protected species and California Department of Fish and Game (CDFG) Species of Special Concern, areas of high biological diversity, areas providing important wildlife habitat, and unusual or regionally restricted habitat types.

**Field Survey and Plant Community Mapping.** A reconnaissance-level botanical survey of the Cottonwood Creek and Balls Ferry Wetland Unit 1 was conducted on 31 May – 2 June 2006. A representative cross-section of all habitat types within each unit was surveyed on foot. Relatively more field time was concentrated on areas providing suitable habitat for special-status plants known to occur in the vicinity. Additional reconnaissance was conducted by vehicle where access was available.

All vascular plant species encountered in identifiable condition were keyed to species or infraspecific taxon were identified using keys and descriptions in Munz and Keck (1973) and Hickman (1993). All habitat types occurring on the units were characterized and data was recorded on physiognomy, dominant



and characteristic species, topographic position, slope, aspect, substrate conditions, hydrologic regime, and evident disturbance for each habitat type. The generalized plant community classification schemes of Holland (1986), Sawyer and Keeler-Wolf (1995), and CDFG (2003a) were consulted in classifying the habitat types. The final classification and characterization of the habitat types of each unit were based on field observations (Buck, unpublished report).

In June 2009, biologists conducted a site visit to characterize and map the general habitat types on the Balls Ferry Wetland Unit 2. The plant community associations were described previously, so no detailed surveys were conducted at that time.

## **FINDINGS**

Based on the preliminary assessments, eight basic plant communities and at least 220 plant species occur at the MCCWA. Of the plant species, 117 (53%) are non-native or naturalized species. A crosswalk of MCCWA plant communities and other common vegetation community classifications is provided in Table III-a. This is followed by a discussion of plant community types and species as they occur on each of the units. A list of all vascular plant species identified during field surveys of the Cottonwood Creek Unit and the Balls Ferry Wetland Unit 1 is presented in Appendix B. Floristic level surveys of Balls Ferry Wetland Unit 2 are a management step-down action (VB1).

Table III-a. Crosswalk of Plant Community Types at the MCCWA

| MCCWA Plant Communities                           | CC Unit <sup>1</sup>    |     | BFW1/2 Units <sup>2</sup> |     | MCCWA Total (as mapped) <sup>3</sup> |     | CALFED MSCS NCCP Habitat Types <sup>4</sup>                        | CDFG, Holland Habitat Types <sup>5</sup>  | Sawyer/Keeler-Wolfe Habitat Series <sup>6</sup>  |
|---|-------------------------|-----|---------------------------|-----|--------------------------------------|-----|--|---|--|
|   | Acres                   | %   | Acres                     | %   | Acres                                | %   |  |   |  |
| California Annual Grassland                       | 113.3                   | 22% | 303.3                     | 62% | 416.6                                | 41% | Grassland  | Non-native grassland (42200)<br>Valley needlegrass grassland (42110)<br>Valley wildrye grassland (42140)  | California annual grassland series<br>Purple needlegrass series<br>Creeping ryegrass series  |
| Valley Oak Savanna                                | 43.1                    | 8%  | 6.8                       | 1%  | 49.9                                 | 5%  | none   | Valley oak woodland (71130)   | Valley oak series  |
| Great Valley Mixed Riparian Forest                | 226.8                   | 45% | 18.5                      | 4%  | 245.3                                | 25% | Valley/ foothill riparian<br>Valley riverine aquatic               | Great Valley willow scrub (63410)<br>Great Valley cottonwood riparian forest (61410)<br>Great Valley mixed riparian forest (61420)<br>Great Valley valley oak riparian forest (61430)<br>Elderberry savanna (63430) | Mixed willow series<br>Black willow series<br>Fremont cottonwood series<br>Mexican elderberry series<br>Narrowleaf willow series<br>Sandbar willow series<br>Valley oak series |
| Floodplain  | 61.3                    | 12% | 0.0                       | 0%  | 61.3                                 | 6%  | Valley riverine aquatic  | Riparian scrub (63000)<br>Mule fat scrub (63310)  | Mule fat series  |
| Freshwater Emergent Wetland and Pond <sup>7</sup> | 39.9                    | 8%  | 123.5                     | 25% | 163.4                                | 16% | Nontidal freshwater permanent emergent<br>Managed seasonal wetland | Vernal marsh (52500)<br>Coastal and valley freshwater marsh (52410)<br>Cismontane alkali marsh (52310)  | Bulrush-cattail series<br>Saltgrass series<br>Sedge series<br>Spikerush series<br>Mosquito fern series   |
| Vernal Pool/Swale/Seasonal Pond                   | 0.0                     | 0%  | 1.9                       | <1% | 1.9                                  | <1% | Natural seasonal wetland   | Northern claypan vernal pool (44120)  | Northern claypan vernal pool series  |
| Seep  | 0.0                     | 0%  | 0.8                       | <1% | 0.8                                  | <1% | none   | Freshwater seep   | none   |
| Ruderal (Himalayan Blackberry) (Developed)        | 24.6<br>(24.6)<br>(0.0) | 5%  | 32.2<br>(26)<br>(6.2)     | 7%  | 56.8<br>(50.6)<br>(6.2)              | 6%  | none   | none  | none   |

<sup>1</sup> Cottonwood Creek Unit

<sup>2</sup> Balls Ferry Wetland Units 1 and 2 combined

<sup>3</sup> The total mapped plant community acreage (1011 acres) is approximately 50 acres less than CDFG acquisition records. This discrepancy is due to the uncertain southern boundary of the Cottonwood Creek Unit.

<sup>4</sup> CALFED Multi-Species Conservation Strategy, Natural Community Conservation Plan (CALFED 2000b)

<sup>5</sup> CDFG 2003a, Holland 1986

<sup>6</sup> Sawyer and Keeler-Wolf 1995 (update to be published 2009)

<sup>7</sup> Freshwater emergent wetland includes natural and created wetlands, ponds, stream channels and ditches

## 1. Plant Community Types, Cottonwood Creek Unit

A total of 166 vascular plant taxa (species, subspecies and varieties) have been documented on the 550-acre Cottonwood Creek Unit. Of these, 74 taxa are native and 88 are non-native. It is not known whether 4 taxa recorded are native or non-native: cleavers (*Galium aparine*) and Kentucky bluegrass (*Poa pratensis*), because standard references disagree on whether or not these taxa are native to California; and horsetweed (*Conyza* sp.) and tobacco (*Nicotiana* sp.), because these species could be identified only to genus, and both native and non-native species could occur in the area. A number of species could not be identified because the survey was conducted before their flowering period and plant parts necessary for identification (flowers and/or fruits) were not present. A lesser number of species, mostly annuals, were already past the stage when identification would have been possible. A list of all vascular plant species identified in the unit is presented in Appendix B.

Of the eight plant community types occurring at the MCCWA (Table III-a above), the following six are present on the Cottonwood Creek Unit:

- California annual grassland
- Valley oak savanna
- Great Valley mixed riparian forest (includes grassland-riparian savanna and riparian restoration)
- Floodplain
- Freshwater emergent wetland and pond (includes created freshwater marsh and pond)
- Ruderal (Himalayan blackberry)

California annual grassland and the closely related habitat types of valley oak savanna and grassland-riparian savanna form a mosaic over most of the lower terrace, except for those areas in closest proximity to Cottonwood Creek. California annual grassland and valley oak savanna occupy most of the upper terrace, except where ponds and freshwater wetlands have been artificially created as part of a mitigation bank. Freshwater wetlands occur locally in areas of suitable hydrology on both terraces. Areas adjacent to Cottonwood Creek (sometimes extending several hundred feet from the channel) where alluvial sediments are frequently reworked by flooding represent the floodplain habitat type. The ruderal habitat type is essentially defined by dominance of an invasive non-native species, Himalayan blackberry (*Rubus discolor*, or *R. armeniacus* according to some references); it occurs in a number of areas on the upper terrace. The distribution of these plant community types on the Cottonwood Creek Unit is shown in Figure III-a (topographic view) and Figure III-b (aerial view).

Figure III-a. Plant Community Types, Cottonwood Creek Unit, MCCWA (topographic view)

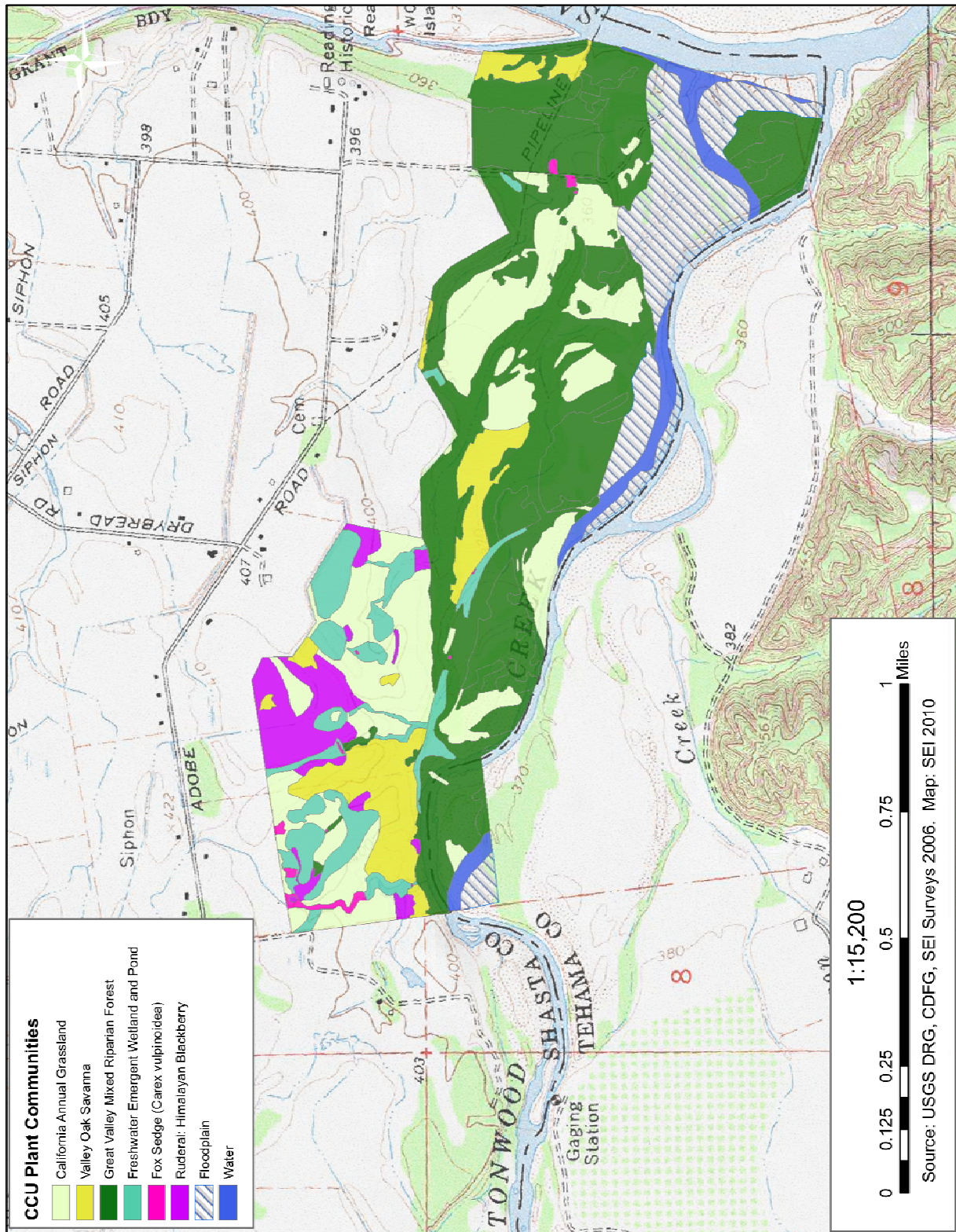
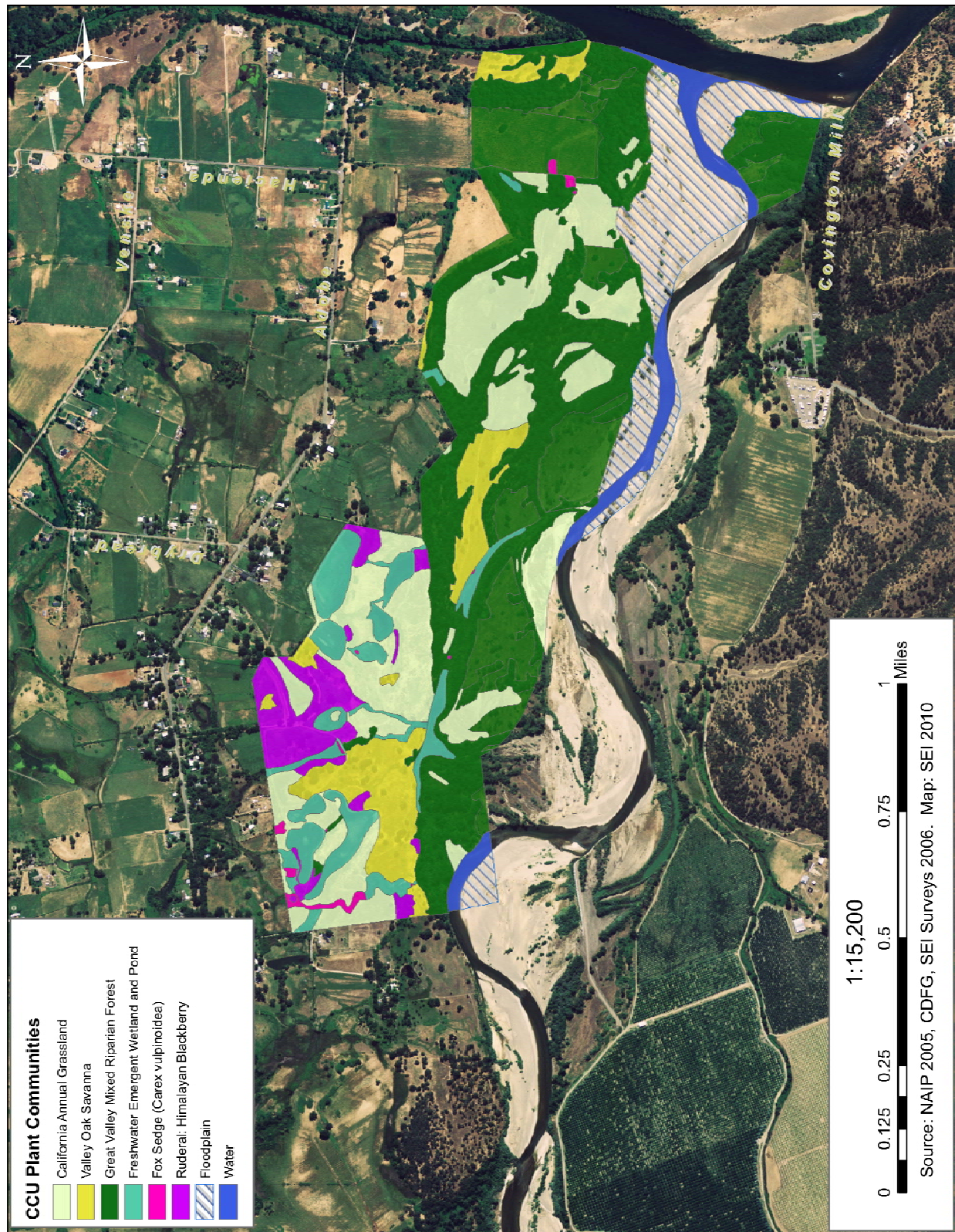




Figure III-b. Plant Community Types, Cottonwood Creek Unit, MCCWA (aerial view)





## CALIFORNIA ANNUAL GRASSLAND

This habitat type is recognized as the California annual grassland alliance by CDFG (2003a) and as the California annual grassland series by Sawyer and Keeler-Wolf (1995). It corresponds to the non-native grassland habitat type of Holland (1986). California annual grassland is one of the most widespread habitat types in this unit, covering approximately 113 acres (22%). California annual grassland, along with the very similar habitat types of valley oak savanna and grassland-riparian savanna, occupy much of the upper terrace. They form a mosaic with Great Valley mixed riparian forest over most of the lower terrace; grassland and grassland-savanna occupy the slightly higher areas that have more well-drained soil, and riparian forest occupies the slightly lower areas that have less well-drained soil.

As would be expected for such a widespread habitat type, the grassland is quite heterogeneous in species composition from place to place. The cover is generally dense, often 100% or nearly so, and the grasses are mostly 2 to 4 feet tall. The dominant grasses are mostly annual and non-native, and at any given location include some combination of the following species: ripgut grass (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), Italian rye grass (*Lolium multiflorum*, sometimes a biennial), slender wild oat (*Avena barbata*), hare barley (*Hordeum murinum* ssp. *leporinum*), dogtail grass (*Cynosurus echinatus*), six-weeks fescue (*Vulpia bromoides*), Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*), and silver hairgrass (*Aira caryophyllaea*). Another non-native annual grass, the highly invasive species Medusa head (*Taeniatherum caput-medusae*), is also locally dominant in sizable patches. Two non-native grasses, velvet grass (*Holcus lanatus*) and tall fescue (*Festuca arundinacea*), are sometimes dominant in relatively moist areas, although they generally do not occur together. Only one native grass, the rhizomatous perennial creeping wild rye (*Leymus triticoides*), is widespread, although not common, in this grassland.



PHOTO: California annual grassland along riparian corridor. July 2005, SEI.

A variety of herb species are associated with the grasses. Non-native species are generally more abundant than native species; they include English plantain (*Plantago lanceolata*), cut-leaved geranium (*Geranium dissectum*), purple vetch (*Vicia benghalensis*), yellow star-thistle (*Centaurea solstitialis*), prickly lettuce (*Lactuca serriola*), rose clover (*Trifolium hirtum*), lesser hawkbit (*Leontodon taraxacoides* ssp. *taraxacoides*), smooth cat's-ear (*Hypochaeris glabra*), hairy cat's-ear (*Hypochaeris radicata*), shamrock clover (*Trifolium dubium*), spreading hedge-parsley (*Torilis arvensis*), yellow salsify (*Tragopogon dubius*), short-fruit stork's bill (*Erodium brachycarpum*), jointed charlock (*Raphanus raphanistrum*), and, in relatively moist places, bird's-foot trefoil (*Lotus corniculatus*).

Some native species do occur in this grassland; characteristic, relatively widespread species include Spanish-clover (*Lotus purshianus*), wine cup clarkia (*Clarkia purpurea* ssp. *quadrivulnera*), wild hyacinth (*Dichelostemma multiflorum*), Hartweg's doll's-lily (*Odontostomum hartwegii*), harvest brodiaea (*Brodiaea elegans* ssp. *elegans*), Fitch's spikeweed (*Hemizonia fitchii*), marigold pincushion plant (*Navarretia tagetina*), dove weed (*Eremocarpus setigerus*), and western ragweed (*Ambrosia psilostachya*) (locally forming patches from rhizomes).

The invasive non-native woody vine Himalayan blackberry is also widespread in the grassland and grassland-savanna habitats on the site, locally forming dense patches. It often, but not always, occurs near the margins of riparian forest or freshwater marsh. Large areas more or less dominated by Himalayan blackberry were mapped as the ruderal/Himalayan blackberry habitat type, but smaller patches of this vine within grassland or valley oak savanna habitats were included with those habitat types.

### VALLEY OAK SAVANNA

This habitat type is recognized as valley oak woodland by Holland (1986) and as the valley oak series by Sawyer and Keeler-Wolf (1995). Sizable areas on both the upper and lower terraces are occupied by annual grassland containing more or less widely scattered, mostly medium-sized to large trees of valley oak (*Quercus lobata*). These areas are mapped as the valley oak savanna habitat type; they cover approximately 43 acres (8%) of the Cottonwood Creek Unit. The grass and herb composition of this habitat type is essentially identical to that of the California annual grassland.

### GREAT VALLEY MIXED RIPARIAN FOREST

This habitat type is recognized as Great Valley mixed riparian forest by Holland (1986) and CDFG (2003a). Depending on the dominant tree species, portions of this riparian forest may also correspond to the following alliances recognized by CDFG (2003a): Fremont cottonwood riparian forests and woodlands; arroyo willow riparian forests and woodlands; black willow riparian forests and woodlands; red willow riparian forests; and mixed willow riparian forests and woodlands. In the classification scheme of Sawyer and Keeler-Wolf (1995), portions of this riparian forest may correspond to the Fremont cottonwood, black willow, mixed willow, or red willow series.

Great Valley mixed riparian forest is considered a CNDDB “high priority” habitat type due to its rarity in California (CDFG 2003a). It is the dominant habitat in the Cottonwood Creek Unit, covering approximately 227 acres (45%). As noted previously, Great Valley mixed riparian forest forms a mosaic with California annual grassland, valley oak savanna and grassland-riparian savanna over most of the unit's lower terrace, where the riparian forest typically occurs in relatively low-lying areas with relatively poorly drained soil. It typically occurs in long linear stands that may represent old channels of

Cottonwood Creek or that follow the courses of upland streams as they traverse the terrace. Some of these stands have watercourses with flowing water running more or less down the center; it is unclear if all of these are tributary streams or if some might be subsidiary flows from Cottonwood Creek. On the upper terrace, riparian forest occurs only as several small, isolated, perhaps early successional stands in the vicinity of some of the artificially created ponds and freshwater marshes.



PHOTO: Great Valley mixed riparian habitat near the mouth of Cottonwood Creek. July 2005, SEI

In general, the tree canopy in the riparian forest is typically closed or nearly so (90–100% cover). The dominant tree species include some combination of Fremont cottonwood (*Populus fremontii*), valley oak, and willows (*Salix* spp.). At least four species of willow were observed on the site: Gooding's black willow (*Salix gooddingii*), arroyo willow (*Salix lasiolepis*), narrow-leaved willow (*Salix exigua*), and red willow (*Salix laevigata*), with the latter species seemingly less abundant than the other three. Gooding's black willow and red willow are often large trees, while arroyo willow and narrow-leaved willow are typically large, often arborescent shrubs. Two other native tree species, Oregon ash (*Fraxinus latifolia*) and box elder (*Acer negundo* ssp. *californicum*), are important constituents of the riparian forest at the eastern end of the site, with the latter species often quite large and among the canopy dominants. Neither species was observed elsewhere on the site.

Northern California black walnut (*Juglans californica* var. *hindsii*), a tree species not believed to be native to Shasta or any adjacent county (Hickman 1993, Tibor 2001, CNPS 2006), and therefore presumed to be naturalized on the site, is also widespread in the riparian forest. It often occurs as small trees in the understory, but large individuals also occur, indicating that it has been present on the site for a long time. Another non-native tree, southern catalpa (*Catalpa bignonioides*), has locally invaded the riparian forest in the southwestern portion of the site. The large native shrub (occasionally a small tree) southwestern elderberry (*Sambucus mexicana*), the host plant for the federally threatened insect valley



elderberry longhorn beetle (*Desmocerus californicus dimorphus*), is occasional but widespread around the margins of the riparian forest.

The understory in the riparian forest is quite variable. It is sometimes relatively open and dominated by herbaceous species such as the weedy non-native grass ripgut grass (*Bromus diandrus*), the native herb Douglas' mugwort (*Artemisia douglasiana*), and cleavers (*Galium aparine*), which may or may not be native. Santa Barbara sedge (*Carex barbara*) forms patches of varying sizes in relatively moist, low-lying areas. In other areas, the riparian forest understory is dense, and often impenetrable, with numerous small trees and/or dense tangles of woody vines. The native vine California wild grape (*Vitis californica*) is widely distributed, sometimes forming large, dense patches. Another native vine, California pipe-vine (*Aristolochia californica*), is also widespread, although somewhat less extensive, in the riparian forest understory. California pipe-vine provides habitat for the pipevine swallowtail butterfly (*Battus philenor*). The invasive, aggressive non-native woody vine Himalayan blackberry is very widespread in the riparian forest understory (more so than either of the native vines), and often forms impenetrable tangles. Another non-native vine, the cultivated grape (*Vitis vinifera*) forms dense colonies at a number of widely scattered locations, but appears to be relatively localized.

Along and in the vicinity of flowing streams within the riparian forest, especially where the riparian forest canopy is relatively open, the riparian forest is transitional to the freshwater emergent wetland habitat type, and contains species characteristic of that plant community.

**Grassland-Riparian Savanna.** Approximately 46 acres (20%) of the Great Valley mixed riparian habitat are mapped as grassland-riparian savanna. These areas occur in the southern portion of the lower terrace in relatively close proximity to Cottonwood Creek where they are mostly surrounded by riparian forest. This habitat type may be regarded as transitional between California annual grassland and Great Valley mixed riparian forest, although periodic disturbance such as major flood events, fires or (past) grazing may be important in maintaining it. It is similar in physiognomy to the valley oak savanna habitat type with widely scattered trees within grassland, but the tree species are those characteristic of the Great Valley mixed riparian forest habitat, including Fremont cottonwood, Gooding's black willow, arroyo willow, valley oak, and Northern California black walnut.

Interestingly, valley oak is the predominant tree species in the patches of grassland-riparian savanna near the eastern boundary of the site in closest proximity to the Sacramento River and Reading Island. These patches of habitat are mapped as valley oak savanna, although they also contain other riparian tree species and are thus transitional to grassland-riparian savanna.



PHOTO: Grassland-riparian savanna along the PGE access road on Cottonwood Creek Unit. July 2005, SEI



PHOTO: Riparian restoration area on Cottonwood Creek Unit. July 2005, SEI

**Riparian Restoration Site.** A 26-acre area in the eastern portion of the Cottonwood Creek Unit on the east side of the eastern entrance road has been planted with scattered individuals of native trees and shrubs following disking or other tilling of the soil (Chico Research Foundation 2004, 2000). Species planted include box elder, mule fat (*Baccharis salicifolius*), narrow-leaved willow, Oregon ash, and Fremont cottonwood. The intervening areas are vegetated largely with non-native grasses and other weedy species.

## FLOODPLAIN

The floodplain habitat type is mapped at approximately 61 acres (12%) and includes the mostly barren areas along Cottonwood Creek that are extensively reworked by scour and flooding and therefore in a constant state of recolonization. Plant species generally include annual grasses, mule fat and arroyo willow. The area of this habitat type varies with flood events.



PHOTO: Cottonwood Creek floodplain. July 2005, SEI.



PHOTO: Cottonwood Creek floodplain. July 2005, SEI.

## FRESHWATER EMERGENT WETLAND AND POND

The freshwater emergent wetland habitat type corresponds to the coastal and valley freshwater marsh habitat type of Holland (1986). Depending on the dominant emergent monocot(s), it may variously correspond to the bulrush, bulrush-cattail or cattail alliance (series) of Sawyer and Keeler-Wolf (1995) and CDFG (2003a), although some areas of freshwater wetlands do not fit in any of these alliances.

Freshwater emergent wetlands are not as large or as widespread on the Cottonwood Creek Unit as on either of the Balls Ferry wetland units, although a number of natural, or apparently natural, freshwater wetlands of various sizes occur on both the lower and upper terraces of the Cottonwood Creek Unit. On the lower terrace, this habitat occurs within or at the margins of riparian forest. Because the habitat signature is difficult to distinguish from that of riparian forest on aerial photos, additional areas besides those mapped may occur within the riparian forest. On the upper terrace, freshwater emergent wetland habitat occurs in association with drainages with at least some flowing water. To maintain consistency with the classification of habitats on the Balls Ferry wetland units, ponds are not recognized as distinct habitats from freshwater emergent wetland. On the Cottonwood Creek Unit, freshwater emergent wetland and pond habitats total approximately 40 acres (8%).

According to the broad-based classification schemes cited above, freshwater emergent wetlands are characterized by dominance, or at least presence, of large, tall emergent monocots such as cattails (*Typha* spp.) and bulrushes (*Scirpus* spp.). All of the freshwater wetlands mapped on the Cottonwood Creek and both Balls Ferry units contain varying amounts of the large emergent monocots broad-leaved cattail (*Typha latifolia*) and/or viscid bulrush or tule (*Scirpus acutus* var. *occidentalis*). These species range from overwhelming dominants to present only in small, isolated colonies, with large intervening areas dominated by other, smaller species that are also highly moisture-dependent. All of the areas mapped as freshwater emergent wetland are characterized by permanent inundation; soils that are inundated or saturated for most of the season; or abundant soil moisture close enough to the surface to support highly moisture-dependent plant species.

Broad-leaved cattail is generally the predominant large emergent monocot in the freshwater wetland habitat of the Cottonwood Creek Unit, with viscid bulrush of more localized occurrence or absent. Other characteristic species of the freshwater marshes on the Cottonwood Creek Unit include: common rush (*Juncus effusus* var. *pacificus*, of which two apparently distinct forms occur); a fairly robust, caespitose grass with light green foliage which could not be identified because it was not in flower or fruit; eggbract sedge (*Carex ovalis*); water smartweed (*Polygonum punctatum*); sharp-fruited rush (*Juncus acuminatus*); and slender rush (*Juncus tenuis*). The special-status species fox sedge (*Carex vulpinoidea*) is widely scattered, but usually localized, in, or near the margins of, freshwater marsh habitats. One area of freshwater wetland, located in the northeast portion of the site, within riparian forest west of the restoration site, contains a considerable amount of the large non-native emergent monocot pale yellow iris (*Iris pseudacorus*). The large native shrub California rose (*Rosa californica*) often forms localized thickets along and near the margins of freshwater wetlands, although it is nowhere extensive. Himalayan blackberry also forms large, dense patches along the margins of freshwater wetlands (occasionally overgrowing California rose), and has invaded the interiors of the wetlands in a few locations.

**Cottonwood Mitigation Bank.** The 29-acre mitigation bank represents nearly three-quarters of the total wetland acreage on the Cottonwood Creek Unit. It consists of nine ponds and associated freshwater wetlands that have been artificially created on the upper terrace by excavation and damming. There tends to be a gradation between the open ponds, with little or no emergent vegetation, and permanently or seasonally inundated wetland areas. Vegetation cover in these marshes is generally lower than is typical for natural freshwater marshes on the site. Broad-leaved cattail occurs, at varying abundance, in all of these ponds and wetlands. Viscid bulrush is infrequent or absent. Sharp-fruited rush and pale spike-rush (*Eleocharis macrostachya*) are often relatively abundant; slender rush is less common, but is sometimes moderately abundant. The apparently native form of floating primrose-willow or creeping water-primrose (*Ludwigia peploides* ssp. *peploides*) occurs in varying abundance in some of these ponds and wetlands, and can form large, dense colonies. In portions of some of these features, the hydrology appears marginal for wetland plants; these areas are sometimes vegetated largely by upland species, especially weedy species. Large patches of Himalayan blackberry are frequent around the margins of these features, and this species sometimes invades drier areas within them.

## RUDERAL

**Himalayan Blackberry.** The invasive non-native woody vine Himalayan blackberry forms large patches in many grassland and valley oak savanna areas and totals approximately 25 acres (5%) of the Cottonwood Creek Unit. In some areas, Himalayan blackberry dominates areas large enough that they are recognized as a separate habitat type. These areas appear to have supported grassland or valley oak savanna prior to invasion by Himalayan blackberry. By far the largest area of this habitat type, covering perhaps 10-15 acres, is located on the upper terrace of the Cottonwood Creek Unit on both sides of the western entrance road to the site. Smaller areas of Himalayan blackberry occur elsewhere on the upper terrace. Himalayan blackberry is abundant in and around the margins of riparian forest and freshwater wetlands on the lower terrace, and it also occurs locally in grassland and valley oak savanna habitats; however, no large areas of it occur on the lower terrace.

Ruderal/Himalayan blackberry habitat has virtually 100% cover over extensive areas, and few other plants grow intermixed. Small openings are vegetated by grassland-like vegetation in which weedy species predominate. Sapling and small tree-sized valley oaks are often relatively abundant in ruderal/Himalaya blackberry areas, indicating that this habitat may be favorable for valley oak reproduction, perhaps because the dense stands of prickly Himalayan blackberry are a deterrent to deer and other herbivores. The yellow-breasted chat, a California Species of Special Concern, is also known to preferentially nest in blackberry thickets (Ricketts and Kus 2000), thus potentially complicating management of this invasive plant.



PHOTO: Access trail ending in a thicket of Himalayan blackberry, Cottonwood Creek Unit. July 2005, SEI



## 2. Plant Community Types, Balls Ferry Wetland Unit 1

A total of 155 vascular plant taxa (species, subspecies, and varieties) have been documented on the 346-acre Balls Ferry Wetland Unit 1 (BFW1). Of these, 65 taxa are native and 89 are non-native. It is not known whether one species recorded, Kentucky bluegrass, is native or non-native (Buck, unpublished report). As with the Cottonwood Creek Unit, a number of species were present on this unit that could not be identified because of the timing of the survey. A list of all vascular plant species identified in the unit is presented in Appendix B.

Of the eight plant community types occurring on the MCCWA (Table III-a above), the following seven are present on BFW1:

- California annual grassland
- Valley oak savanna
- Great Valley mixed riparian forest
- Freshwater emergent wetland and pond
- Vernal pond/swale/seasonal pond
- Seep
- Ruderal (Himalayan blackberry and developed)

California annual grassland, with local areas of valley oak savanna, occupies most of the area east of the main north-south road, and more localized areas west of the road. Much of the area west of the road is occupied by an extensive freshwater emergent wetland complex; two artificial ponds, one with a large associated freshwater wetland, occur elsewhere on the site. Well-developed Great Valley mixed riparian forest is essentially confined to two areas on this unit. The vernal pond/swale, seep, and seasonal pond habitat types are specialized and localized habitat types on this unit. The streamside habitat type occurs along the east-draining creek at the south end of the site. Himalayan blackberry occurs at a number of locations on the site, mostly in the western portion. The ruderal/developed habitat type is essentially artificial and is used for areas occupied by buildings and associated landscaped or heavily disturbed areas. The distribution of these plant community types on the Balls Ferry wetland units is depicted in Figure III-c (topographic view) and Figure III-d (aerial view).

Figure III-c. Plant Community Types, Balls Ferry Wetland Units 1 and 2, MCCWA (topographic view)

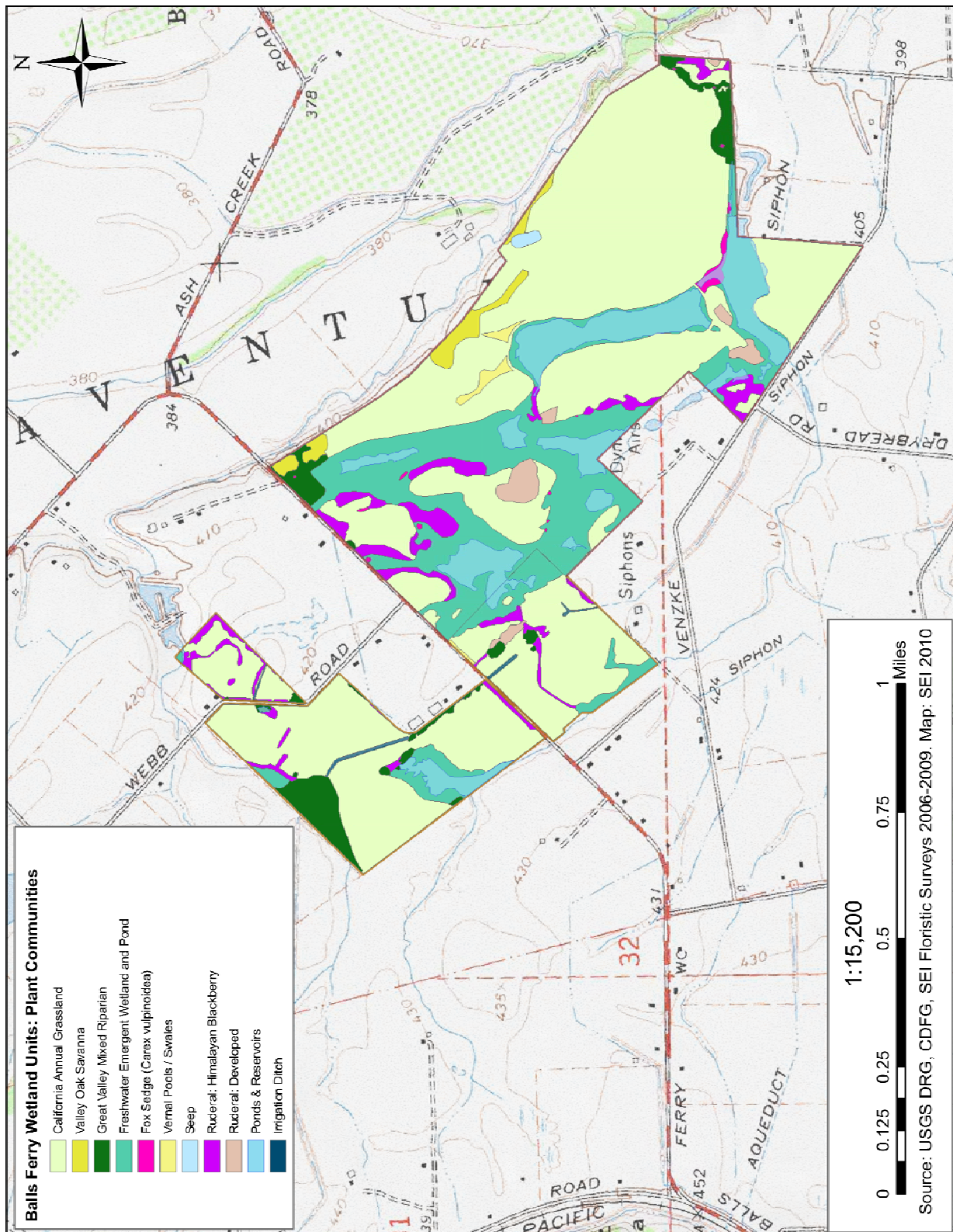
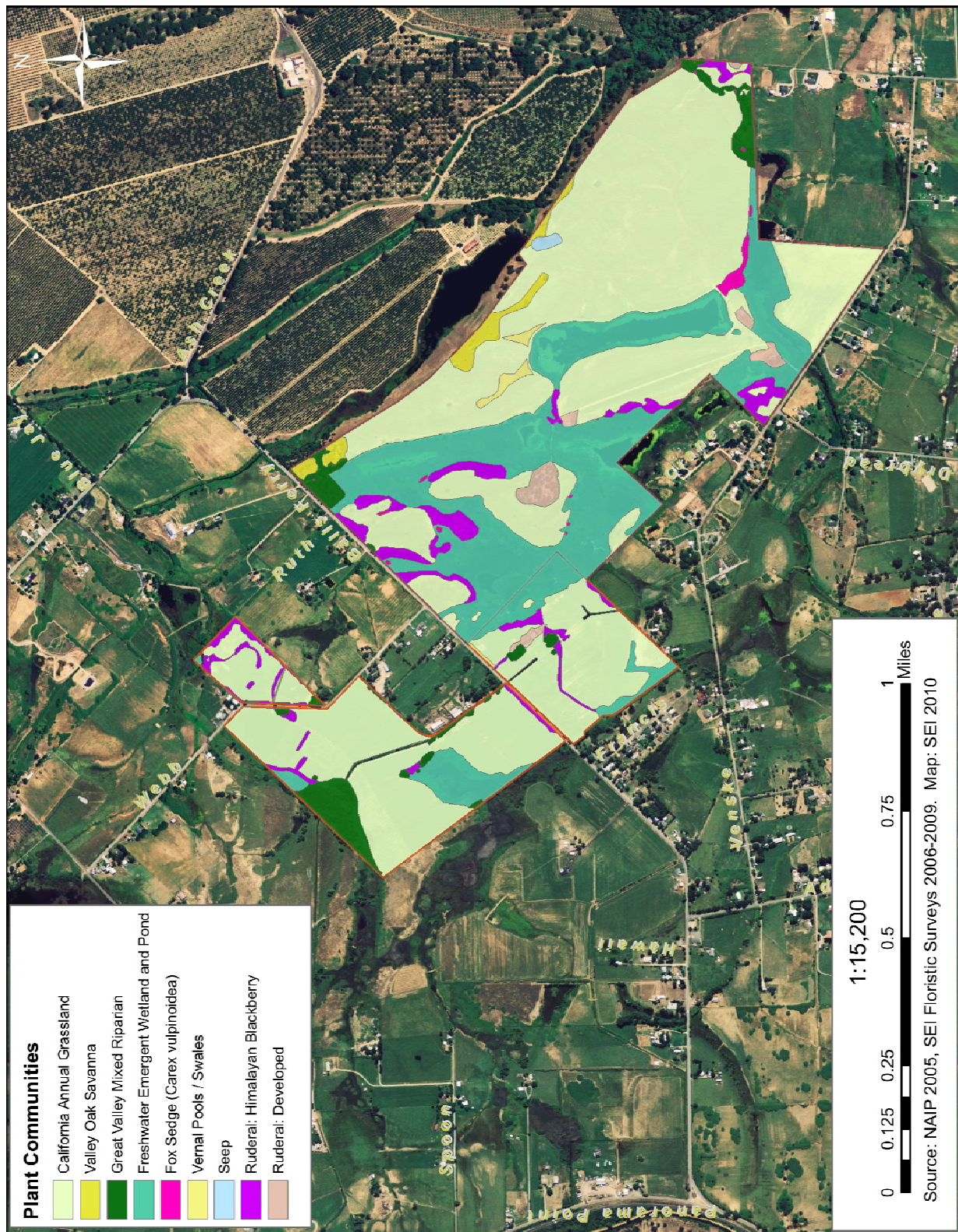




Figure III-d. Plant Community Types, Balls Ferry Wetland Units 1 and 2, MCCWA (aerial view)



## CALIFORNIA ANNUAL GRASSLAND



PHOTO: East side panorama of California annual grassland habitat on BFW1. July 2005, SEI.

California annual grassland occurs on over half of BFW1, covering nearly 200 acres (58%) of the unit. This habitat type occupies most of the unit east of the main north-south road, and also occurs in relatively elevated areas west of the road. The grassland is generally similar to the California annual grassland on the Cottonwood Creek Unit, although the vegetation cover is generally lower (6 inches to 2 feet) and sometimes somewhat sparser where it is actively grazed. A similar suite of non-native grasses dominates the grasslands of this unit, including slender wild oat, soft chess, ripgut grass, six-weeks fescue, Medusahead (typically in dense colonies), Italian rye grass, hare barley, Mediterranean barley, and silver hairgrass. Velvet grass is sometimes a dominant in relatively moist, low-lying areas.

Non-natives tend to predominate among the herb associates; these include purple vetch, smooth cat's-ear, jointed charlock, rose clover, lesser hawkbit, yellow star-thistle, bindweed (*Convolvulus arvensis*), subterranean clover (*Trifolium subterraneum*), hairy pink (*Petrorrhagia dubia*), Queen Anne's lace (*Daucus carota*), and, especially in relatively moist places, bird's-foot trefoil and yellow parentucellia (*Parentucellia viscosa*). Native herbs also occur in this grassland; widespread and characteristic species include Fitch's spikeweed, Spanish-clover, wild hyacinth, crown brodiaea (*Brodiaea coronaria* ssp. *coronaria*), Hartweg's doll's-lily, wine cup clarkia, and marigold pincushion plant. It is noteworthy that crown brodiaea was the only brodiaea species observed on BFW1, while harvest brodiaea was the only brodiaea species observed on the Cottonwood Creek Unit.

## VALLEY OAK SAVANNA

Small areas in the eastern and northern portions of the BFW1, totaling less than 7 acres (2%) of the unit, support widely scattered, mostly large valley oaks and are mapped as valley oak savanna. As on the Cottonwood Creek Unit, the vegetation between the valley oaks is essentially California annual grassland.

## GREAT VALLEY MIXED RIPARIAN FOREST

Riparian tree species frequently occur as solitary individuals or in small stands at the margins of freshwater wetland habitats on BFW1 and some of these, particularly in the northern portion, are extensive enough that they could be mapped as small areas of Great Valley mixed riparian forest. Only two areas of this habitat type, one in the extreme southeastern portion of the unit and one at the extreme northern end, occur in the unit, accounting for less than 8 acres (2%) of the unit in total. Extensive, well-developed areas of riparian forest like those on the Cottonwood Creek Unit do not occur on the BFW1.

The southern stand of riparian forest is developed along and adjacent to the main creek that drains from the site eastward. Gooding's black willow is the principal dominant tree in this stand. Associated tree (or arborescent shrub) species include Fremont cottonwood, arroyo willow, and valley oak. The tree canopy is relatively dense, especially in the eastern portion of this stand, but is locally somewhat open along and near the stream. These areas have relatively dense herb cover, including an unidentified light green caespitose grass (the same species that occurs in freshwater marshes on the Cottonwood Creek Unit; the native species water smartweed and common rush, and the non-native species bird's-foot trefoil, green dock



(*Rumex conglomeratus*), pennyroyal (*Mentha pulegium*), and chain speedwell (*Veronica catenata*). The bordering slopes, which also support riparian forest overstory, are heavily overgrown with Himalayan blackberry. Lesser amounts of another non-native vine, cultivated grape, are also present. This riparian stand is best developed in its eastern portion, where it is continuous with a much larger area of riparian forest located just off the site. Westward, the tree canopy becomes more open and discontinuous, and the proportion of valley oak in the canopy increases.

The northern riparian forest stand is on both sides of the main north-south road at and south of the north entrance to the site. Fremont cottonwood, Gooding's black willow arroyo willow, valley oak, and possibly red willow all occur in the tree canopy in this area. Several non-native trees and large, arborescent shrubs also occur in this riparian forest; these include silk tree (*Albizia* sp.), firethorn (*Pyracantha angustifolia*), plum (*Prunus* sp.), and others. Past disturbance, including construction of the road and irrigation ditch, may have facilitated the invasion of these species. East of the road, the riparian forest is locally dominated by valley oak, and Himalayan blackberry is very abundant in the understory. West of the road, there is considerable standing water and saturated soil; the hydrology in this area has been altered by construction of an irrigation ditch. The understory is nearly impenetrable here, with thickets of California rose and Himalayan blackberry, numerous small trees, and scattered patches of broad-leaved cattail.

### FRESHWATER EMERGENT WETLAND AND POND

Nearly 107 acres (31%) of BFW1 is occupied by freshwater emergent wetland and pond. Freshwater emergent wetlands are among the most productive wildlife habitats in California. They provide food, cover and water for more than 160 species of birds and numerous mammals, reptiles and amphibians (Mayer and Laudenslayer 1988).

No distinction is made here between pond and freshwater wetland habitats because there is a very gradual, continuous transition from open water through permanently inundated areas with increasing density of emergent vegetation to areas that are not permanently inundated, but support large emergent monocots or other highly moisture-dependent species. However, except for marginal areas, most areas of freshwater wetlands on this unit appear to be permanently inundated, or nearly so, to varying depths.

The area west of the unit's main north-south road is a complex of interconnected freshwater marsh areas, including a number of ponds that locally extend west onto BFW2. These wetland areas are interspersed with several elevated areas that support grassland and Himalayan blackberry/ruderal habitats. All or some of the ponds in this area may be natural features. East of the north-south road, approximately in the center of the unit, there is a large north-south oriented artificial pond. This is hydrologically connected to the marsh/pond complex west of the road, receiving inflow from the complex at its northern end. To the south, both this pond and the large marsh/pond complex drain into another east-west oriented artificial pond (with bordering freshwater marsh areas) at the south end of the site, created by a dam on the main east-draining creek.



PHOTO: Panorama of large north-south oriented artificial pond in center of BFW1, looking west.

In contrast to the Cottonwood Creek Unit where broad-leaved cattail is the predominant large emergent monocot in freshwater marshes, on BFW1, both broad-leaved cattail and viscid bulrush are dominants over extensive areas of marsh. Generally, only one species or the other is present but in some localized areas they share dominance. Their cover ranges from sparse to often very dense and more or less impenetrable. Associated species include common rush (as on the Cottonwood Creek Unit, two apparently distinct forms occur); the glabrous (apparently) native form of floating primrose-willow (creeping water-primrose), often forming large colonies; sharp-fruited rush; pale spike-rush; water smartweed; eggbract sedge; slender rush; and fox sedge, at least locally around margins. The small floating fern Pacific mosquito fern (*Azolla filiculoides*) is relatively abundant in the southernmost pond (on the east-west creek).

Around the margins of most of the ponds, and locally in marsh areas with deeper water, there are dense colonies of a species tentatively identified as the non-native, invasive, pubescent form of floating primrose-willow (creeping water-primrose) (*Ludwigia peploides* ssp. *montevidensis*), often intermixed with the native form. This plant sometimes grows more or less erect (in contrast to the native form, which is always more or less prostrate and floating or creeping on drying mud) and has larger flowers than the native form. It could therefore be Uruguay water-primrose (*Ludwigia hexapetala*), a species previously known in California only from coastal counties. Uruguay water-primrose is also non-native and invasive (California Invasive Plant Council 2006).

Individuals or clumps of riparian tree species, including Fremont cottonwood, willows, valley oak, and, in one area, the non-native species white poplar (*Populus alba*) often occur along and near the margins of freshwater marsh areas, most abundantly toward the northern end of the unit. As on the Cottonwood Creek Unit, California rose often forms localized, although generally not extensive, thickets along the margins of freshwater marshes. Himalayan blackberry is also locally abundant in large patches along the margins of the wetlands; in a few locations, it has expanded into the interiors of the wetlands.

The channel of the east-west stream and the immediate bordering area between the artificial pond (the southernmost pond on the site) and the upper end of the riparian forest stand in the southeastern corner of the site share characteristics of freshwater wetland habitat, and so are included in this discussion. The gradient of this stream is relatively high, and well-developed freshwater marsh habitat is not developed along it, but there is a narrow zone dominated by moisture-dependent species. The native species floating primrose-willow (native form) and Pacific mosquito fern occur in the channel, along with the non-native (and potentially invasive) aquatic species parrotfeather (*Myriophyllum aquaticum*). Species occurring along the margins of the stream include the native species common rush, water smartweed, seep monkeyflower, and (in localized patches), narrow-leaved cattail (*Typha angustifolia*); and the non-native species pennyroyal and water speedwell (*Veronica anagallis-aquatica*).

### VERNAL POND / SWALE / SEASONAL POND

In the classification scheme of CDFG (2003a), the habitat type to which the vernal pond/swale habitat type seems to have the closest affinity, northern hardpan vernal pools, is also a CNDDDB “high priority” habitat type, and vernal pools and similar vernal inundated habitats are generally considered sensitive habitats. On BFW1, this plant community is approximately 1.9 acres (0.6%) of the unit. North of the large central pond there are two elongated low-lying areas that are inundated during early season, and then dry out completely in the spring. These areas support a distinctive assemblage of mostly native species characteristic of vernal pools and similar ephemerally wet habitats. They may be considered as vernal ponds or vernal swales. They may be referable to, or have affinities with, the northern hardpan vernal

pool habitat type of Holland (1986), Sawyer and Keeler-Wolf (1995), and CDFG (2003a), although they do not occur on soils typical of that habitat type.

Vegetation cover on the bottoms of these vernal ponds/swales is generally moderate. It consists of mostly native species including: stalked popcorn-flower (*Plagiobothrys stipitatus* var. *micranthus*); Great Valley eryngo (*Eryngium castrense*); dense-flower willow-herb (*Epilobium densiflorum*); dwarf woolly heads (*Psilocarphus brevissimus* var. *brevissimus*); white-flowered navarretia (*Navarretia leucocephala* ssp. *leucocephala*); Carter's buttercup (*Ranunculus bonariensis* var. *trisepalus*); dove weed (germinating after the soil is dry); annual hairgrass (*Deschampsia danthonioides*, mostly around margins); and, sparingly, Sacramento mesa mint (*Pogogyne zizyphoroides*). Most of these species are considered indicator species of vernal pools and similar vernal wet habitats. The non-native species pennyroyal is also moderately abundant in these ponds/swales.

**Seasonal Pond.** Near the southwest corner of the large artificial pond in the center of the unit, west of a barn in this vicinity, there is a small but fairly deep pond that mostly dries out in late season, although the deepest part may contain water permanently. This pond could be of artificial origin, and it is currently heavily disturbed by cattle grazing and trampling. It supports an assemblage of mostly native species, however. The native aquatic herb diverse-leaved pondweed (*Potamogeton diversifolius*) grows in the water. There is considerable pale spike-rush around the margins, and, at the outer margins, considerable pennyroyal. The dry bed is locally almost bare, but also supports native species characteristic of vernal wet habitats, including stalked popcorn-flower, Hoover's downingia (*Downingia bella*), smooth lasthenia (*Lasthenia glaberrima*), and bractless hedge-hyssop (*Gratiola ebracteata*).



PHOTO: Seasonal pond near the southwest corner of the large artificial pond on BFW1.

## SEEP

Two small areas on BFW1 have moist to saturated soil but do not support large emergent monocots. These areas are here recognized as the seep habitat type. This habitat type is referable to the broadly defined freshwater seep habitat type (alliance) of Holland (1986) and CDFG (2003a). There is no comparable type in the classification scheme of Sawyer and Keeler-Wolf (1995). This plant community totals 0.8 acres (0.2%) of the unit.

One seep area is located along a small drainage in the extreme southeast corner of the site, south of the east-west stream. This area supports an assemblage of more or less moisture-dependent native and non-native species. Native species include fox sedge and slender rush; non-native species include green dock, velvet grass, pennyroyal, and meadow fescue (*Festuca pratensis*).

The other, larger seep area is located near the eastern site boundary in the east-central portion of the site. This seep is also vegetated with a combination of native and non-native species, but is more diverse than the southern seep. Native species in this seep area include pale spike-rush, seep monkeyflower (*Mimulus guttatus*), slender rush, water smartweed, Great Valley eryngo, and, in a large, dense patch near the margin, white-tipped clover (*Trifolium variegatum*); non-native species include velvet grass, pennyroyal, waxy manna grass (*Glyceria declinata*), and, around the margins, shamrock clover and yellow parentucellia.

## RUDERAL

**Himalayan Blackberry.** As on the Cottonwood Creek Unit, there are areas more or less dominated by Himalayan blackberry on BFW1 that are large enough to be mapped as Himalayan blackberry/ruderal habitat. Most of these areas are located west of the main north-south road, in between California annual grassland and freshwater marsh habitats. A small area of Himalayan blackberry/ruderal habitat also occurs at the extreme southeast corner of the unit. Approximately 15 acres (4%) of BFW1 are mapped as Himalayan blackberry.

**Developed.** Two areas with residences and associated outbuildings are located on BFW1, one near the south entrance and one in the west-central portion. A barn and associated corral area, heavily trampled by cattle, are located in the southern portion of the area, and another barn (formerly an airplane hangar) is located in the central portion. These areas are recognized as a developed/ruderal habitat type. Where not occupied by buildings, the vicinity of the residences consists primarily of landscaped areas or heavily disturbed areas. Vegetation, other than landscaping species, within the developed/ruderal areas consists mainly of weedy species. Approximately 5.5 acres (1%) of BFW1 has been developed.



### 3. Plant Community Types, Balls Ferry Wetland Unit 2

In June 2009, biologists conducted a site visit of the newly acquired 141-acre Balls Ferry Wetland Unit 2 (BFW2) to assess general habitat conditions and map plant community types. Due to its immediate proximity to BFW1, plant community assemblages were assumed to be similar to those documented on BFW1. A focused survey for special-status plants and the preparation of a formal plant list is recommended under step-down actions in the Operation and Maintenance section (VB1).

Of the eight plant community types that occur on the other two units of the MCCWA, four were documented on BFW2:

- California annual grassland
- Great Valley mixed riparian
- Freshwater emergent wetland and pond
- Ruderal (Himalayan blackberry and disturbed)

The distribution of these plant communities in BFW2 is depicted together with BFW1 in Figure III-c (topographic view) and Figure III-d (aerial view).

#### CALIFORNIA ANNUAL GRASSLAND



PHOTO: California annual grassland on the east side of BFW2. 2009, SEI

California annual grassland is the primary habitat type on BFW2, comprising approximately 106 acres (67%) of the unit. The grasslands of BFW2 are used for hay production and grazing, and are predominately composed of non-native grasses similar to those found on the adjacent BFW1.

## GREAT VALLEY MIXED RIPARIAN FOREST



PHOTO: Dense mixed valley riparian along northern boundary of BFW2. ACID ditch on right.

Individuals or clumps of riparian tree species, including Fremont cottonwood, willows, and valley oaks occur in scattered locations along the property boundary and a fairly well developed mixed riparian woodland is located in the northwestern portion of BFW2 in association with the ACID irrigation system. In this stand, black willow is the principal dominant tree with Fremont cottonwood, arroyo willow, and valley oak. The tree canopy and understory are relatively dense. This habitat type covers approximately 10 acres (7%) of the unit.



## FRESHWATER EMERGENT WETLAND AND POND



PHOTO: Dense tules and freshwater wetland on west side of BFW2, extending beyond parcel boundary. 2009, SEI



PHOTO: Freshwater wetland on east side of BFW2 that is contiguous with large complex of interconnected freshwater marsh areas and ponds on BFW1. 2009, SEI

Freshwater emergent wetland and pond is the second most prevalent habitat type on BFW2, comprising approximately 16.5 acres (12%) of the unit. As discussed previously, no habitat type distinction is made between pond and freshwater wetland habitats because there is a very gradual, continuous transition from open water through permanently inundated areas with increasing density of emergent vegetation to areas that are not permanently inundated, but support large emergent monocots or other highly moisture-dependent species. The larger ponds appear to be natural features, while some smaller ponds seem to be artifacts of the ACID irrigation system. The predominant species include broad-leaved cattail and viscid bulrush around the margins and in shallower areas of the wetlands. Along the northern boundary of BFW2 (west of Webb Road, and in the northeastern corner, east of Webb Road), there are a series of small ponds that support dense colonies of a species tentatively identified as the non-native, invasive, floating primrose-willow (creeping water-primrose). The wetland in the easternmost corner of BFW2 (south of Balls Ferry Road) is contiguous with the large complex of interconnected freshwater marsh areas and ponds that lies west of the main north-south road in BFW1.

## RUDERAL

The remainder of the habitat types on the BFW2 are classified as ruderal, either Himalayan blackberry or developed. Himalayan blackberry grows in large mounds along the property boundaries and is interspersed throughout the three parcels that comprise BFW2. It is distinct enough to warrant classification as a unique habitat and represents approximately 11 acres (8%) of the total acreage of BFW2. Developed lands include those areas previously disturbed by human development. Only 0.77 acres (<1%) of this unit are mapped as developed.

## B. Fauna

### METHODOLOGY

Wildlife species descriptions are based upon review of published and unpublished reports covering the MCCWA as well as reconnaissance-level field surveys. The objectives for this work included:

- Compiling an inventory of common wildlife species found in the study area
- Evaluating habitat quality for wildlife species
- Developing a list of special-status wildlife species potentially occurring in the study area
- Identifying and mapping sensitive wildlife habitats within the study area

**Literature Review.** Wildlife biologists conducted a review of published literature and unpublished materials (including Internet research and CDFG internal documents) concerning the wildlife resources at the MCCWA. They reviewed the results of previous wildlife surveys conducted in and near the MCCWA (Richardson et al. 1979) and other sources, including the CNDDDB occurrence records for the Balls Ferry USGS 7.5' quadrangle and the eight quadrangles surrounding it (CDFG 2006a, b, 2009), Threatened and Endangered Species Records for Shasta and Tehama counties (USFWS 2006b, c, 2008), and the California Wildlife Habitats Relationships System (CDFG 2006b, 2009). They also consulted with local and regional species experts.

**Field Surveys.** Biologists conducted reconnaissance-level field surveys to assess potential habitat for both common and special-status wildlife species in 2005 and 2006 (SEI, unpublished data).

Reconnaissance surveys consisted of pedestrian transects to visually inspect the variety and quality of wildlife habitat as well as “windshield surveys” where access allowed. Biologists noted general habitat conditions and observations of all wildlife species encountered. Wildlife species were identified by sight, sound, tracks and scat.

### FINDINGS

Based upon this preliminary assessment, a total of 25 species of fish, 15 species of reptiles and amphibians, 201 species of birds, and 45 species of mammals may utilize habitats found at the MCCWA (Appendix C). There are no data for invertebrate species occurrences. Of the higher taxa, 29 are considered special-status species by either CDFG or USFWS.

### Invertebrates

Invertebrates include aquatic insects, freshwater crustaceans (e.g., amphipods, crayfish), aquatic annelids (worms), zooplankton, and immature stages of certain terrestrial insects (e.g., *Lepidoptera*) that occur mainly in wetlands. The host plant (valley elderberry) for the federally threatened valley elderberry longhorn beetle is present in scattered locations throughout the MCCWA. Based upon documentation from nearby Reading Island (CDFG 2006a), the beetle is likely to be found on site. The Cottonwood Creek Unit is known for its diversity of dragonflies (*Odonata* spp.) (Bruun 2005) as well as the beautiful pipe-vine swallowtail butterfly (*Battus philenor*) (Cull, unpublished field observation). No focused



invertebrate surveys have been conducted, and there is much to be learned about the diversity of the aquatic and terrestrial invertebrates at this site.

## Fish

Cottonwood Creek provides habitat for a variety of anadromous and resident fish species including fall-run and spring-run Chinook salmon (*Onchorhynchus tshawytscha*), steelhead (*O. mykiss*), California roach (*Hesperoleucus symmetricus*), hardhead (*Mylopharodon conocephalus*), and a wide variety of introduced species, including mosquito fish (*Gambusia affinis*), bass (*Micropterus* spp.), and white catfish (*Ictalurus catus*). CDFG surveys detected over 25 fish species that utilize Cottonwood Creek and its tributaries (Richardson et al. 1979). Sport fishing occurs along the mainstem of Cottonwood Creek and its upper tributaries, primarily for warm water species such as small mouth bass (CH2MHill 2002). The ponds at the BFW1 support a thriving catfish population and are likely to have been stocked with large-mouth bass (S. Arrison, CDFG retired, personal communication). To date, no focused fishery assessment has been conducted at either of the Balls Ferry wetland units.

## Amphibians

This region of the Central Valley and Shasta County provides suitable habitat for 8 species of amphibians, including 3 salamanders and 5 frogs (CalHerps 2006, 2009). The MCCWA is within the historical range of California red-legged frog (*Rana draytonii*), but they are considered to be extirpated from the valley floor (Jennings and Hayes 1994). The Cottonwood Creek watershed has been targeted as a potential recovery site for this species (USFWS 2002 and 2006d). The natural and artificial wetland habitats at both units support large populations of bullfrogs (R. Cull, unpublished field observation).

## Reptiles

No focused inventory of reptiles has been conducted in the area. Based upon a review of ranges in California and the types of habitat types present at the MCCWA, common reptiles are likely to include western fence lizard (*Sceloporus occidentalis*), northern alligator lizard (*Elgaria coerulea*), western skink (*Eumeces skiltonianus*), Pacific rattlesnake (*Crotalus oreganos*), terrestrial garter snake (*Thamnophis sirtalis fitchi*), and Pacific gopher snake (*Pituophis catenifer catenifer*) (CalHerps 2006, 2009).

## Birds

### *Water Birds*

Managed and naturally occurring seasonal wetlands with complex diverse topography provide critical foraging, nesting, and loafing habitat for an abundance of shorebirds, waders and waterfowl bird species. Maintaining existing and restoring additional suitable seasonal and permanent wetland, and riparian communities, and reducing the effect of factors that can suppress breeding success in the Wildlife Area is critical to maintaining healthy shorebird and wading bird populations in the region. Some of the waders

observed at the MCCWA include American bittern (*Botaurus lentiginosus*), green heron (*Butorides virescens*), snowy egret (*Egretta thula*), and great blue heron (*Ardea herodias*).

Waterfowl populations are a highly valued and diversified biological resource. They are of high interest to a variety of recreational users of the Wildlife Area, particularly hunters and bird watchers. Fifteen waterfowl species have been observed on site, including common species such as Canada goose (*Branta canadensis*), wood duck (*Aix sponsa*), and mallard (*Anas platyrhynchos*).

### *Raptors*

A wide variety of wintering and/or breeding raptors utilize the MCCWA, including bald eagle, osprey, red-tailed hawk (*Buteo jamaicensis*), red-shouldered hawk (*Buteo lineatus*), Swainson's hawk (*Buteo swainsoni*), white-tailed kite (*Elanus leucurus*), peregrine falcon (*Falco peregrinus anatum*), kestrel (*Falco sparverius*), Cooper's hawk (*Accipiter cooperii*), sharp-shinned hawk (*Accipiter striatus*), barn owl (*Tyto alba*), great horned owl (*Bubo virginianus*), and northern harrier (*Circus cyaneus*).

### *Terrestrial Birds*

The primary upland game bird species that utilize the Wildlife Area are mourning dove (*Zenaida macroura*), wild turkey (*Meleagris gallopavo*), and ring-neck pheasant (*Phasianus colchicus*).

### *Passerines*

Neotropical migratory birds are species that breed in North America and winter in Central and South America. Representative species that breed and/or migrate through the Wildlife Area include western kingbird (*Tyrannus verticalis*), western wood-pewee (*Contopus sordidulus*), tree swallow (*Tachycineta bicolor*), barn swallow (*Hirundo rustica*), Bullock's oriole (*Icterus bullockii*), Wilson's warbler (*Wilsonia pusilla*), yellow warbler (*Dendroica petechia*), and blue grosbeak (*Guiraca caerulea*).

## **Mammals**

Some of the larger mammals that may inhabit or seasonally use these areas include mule deer (*Odocoileus hemionus*), coyote (*Canis latrans*), bobcat (*Lynx rufus*), northern river otter (*Lutra canadensis*), beaver (*Castor canadensis*), and red fox (*Vulpes vulpes*). Smaller mammals likely to occur include Virginia opossum (*Didelphis virginiana*), striped skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*), Audubon's cottontail (*Sylvilagus audubonii*), Yuma bat (*Myotis yumanensis*), long eared bat (*Myotis evotis*), and several species of rodents.

## C. Endangered, Threatened and Rare Species

Species that are legally protected or otherwise considered sensitive by federal, state, or local resource conservation agencies and organizations are commonly referred to as special-status species. For the purposes of this plan, the designation of “special status” includes all of the following:

- Species identified as rare, threatened or endangered by the California Native Plant Society (CNPS)
- Species listed as threatened or endangered under the federal Endangered Species Act (ESA) or the California ESA
- Species of special concern as identified by the USFWS or CDFG, including Birds of Conservation Concern
- Species fully protected in California under the California Fish and Game Code
- Species identified as priorities for recovery under the CALFED Bay-Delta Program Multi-Species Conservation Strategy (MSCS)
- Species identified as priorities by the Western Bat Working Group

### 1. Special Status Plants

A database search of plant inventories indicates that 12 special-status plant species have the potential to occur on or in the vicinity of the MCCWA (CNPS 2006, CDFG 2006a). Of these, 2 have been confirmed present on the Cottonwood Creek Unit and BFW1. In addition, suitable habitat appears to occur on all the units for several other special-status plant species, primarily marsh species. Suitable habitat for several special-status vernal pool species may occur in the vernal ponds/swales on BFW1, although no special-status vernal pool plants have been observed and these features do not appear to be the deep, well-developed vernal pools generally preferred by such species. More detailed surveys may locate occurrences of these and other special-status plant species on one or more of the units that comprise the MCCWA.

Special-status plants that are known to occur, or that have the potential to occur based on the presence of suitable habitat, are discussed in this section. These species are designated by the CNPS as rare, threatened or endangered in California and elsewhere (List 1B) or rare, threatened or endangered in California but common elsewhere (List 2). Plants on the CNPS List 1 or 2 are legally protected under the provisions of the California Environmental Quality Act (CEQA) and CEQA Guidelines. Of the species described below, only Boggs Lake hedge-hyssop (*Gratiola heterosepala*) is also protected under the California Endangered Species Act (CESA). Information on special-status plants is summarized Table III-b, which follows the species descriptions below.



## SPECIES DESCRIPTIONS: KNOWN TO OCCUR

### Fox sedge (*Carex vulpinoidea*)

Status: California Native Plant Society List 2

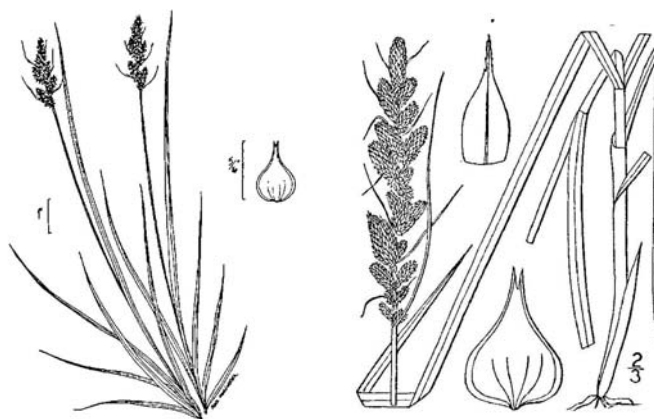


PHOTO: Robert H. Mohlenbrock @ USDA-NRCS PLANTS Database / USDA SCS. 1989. *Midwest wetland flora: Field office illustrated guide to plant species*. Midwest National Technical Center, Lincoln.

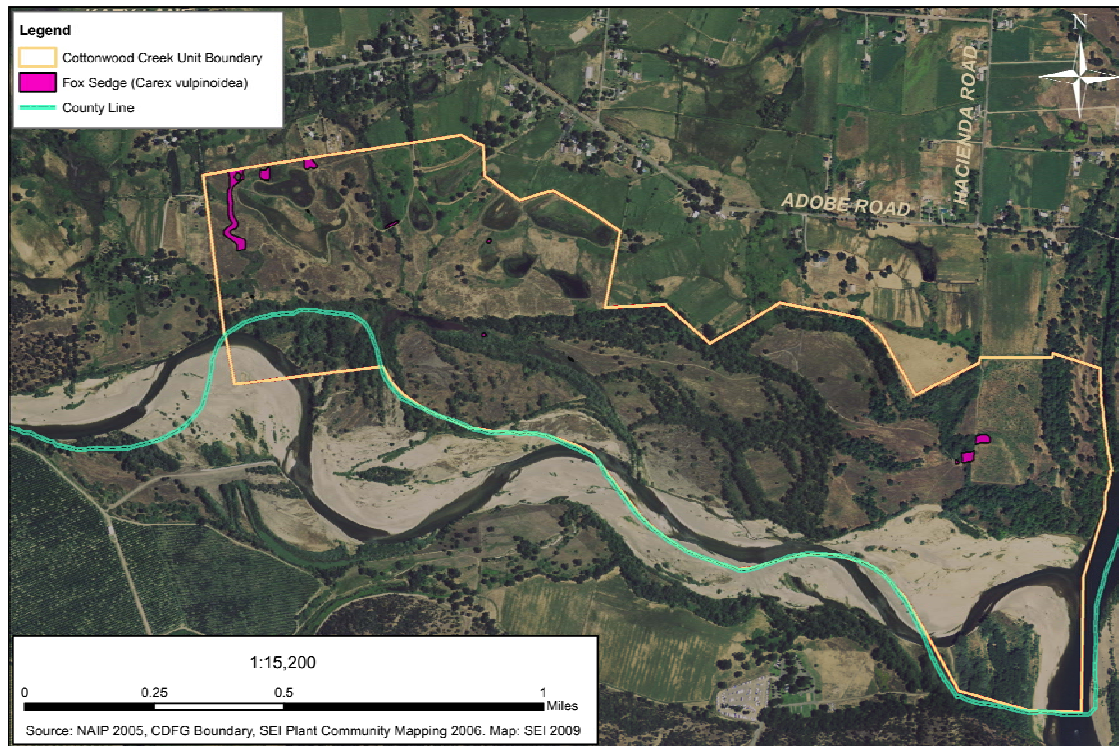
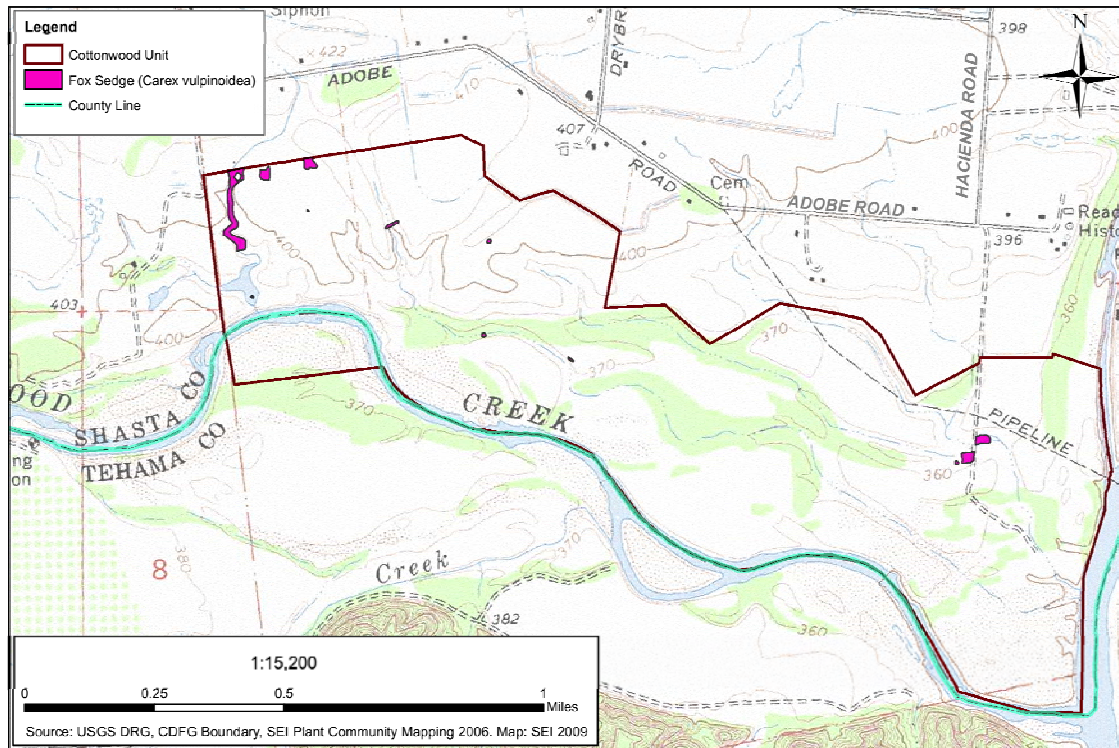
ILLUSTRATION: USDA NRCS PLANTS Database

Fox sedge is a caespitose (tufted), moderately robust sedge with erect or ascending culms 30 to 60 cm (1 to 2 feet) tall and an elongate (5 to 10+ cm [2 to 4+ inches]), narrow inflorescence with, generally, a number of spikelets crowded together at the lower nodes that can be observed under close examination.

Fox sedge occurs in marshes and a variety of other wet places, and ranges widely across the United States and adjacent Canada. According to the USDA (2006), it is known to occur in every state in the continental United States except Utah. In California, however, it is of uncommon and sporadic occurrence, mainly in five north-central counties: Butte, Tehama, Shasta, Trinity, and Siskiyou (Tibor 2001; CNPS 2006; CDFG 2006a; Regents of University of California 2008). Additional collections have been reported from San Joaquin, Kern, and Los Angeles counties. Fox sedge was previously known to occur in the Battle Creek Wildlife Area, east of the Sacramento River approximately two miles east-northeast of the Cottonwood Creek Unit, and also from the vicinity of Anderson, approximately four miles northwest of the Balls Ferry wetland units.

On the Cottonwood Creek Unit, fox sedge occurs at a number of widely scattered localities on both terraces (Figure III-e) in moist to wet places in or at the margins of freshwater marshes and ponds, and at the margins of or in wet places within riparian forest. It also occurs in a disturbed low-lying area within the riparian restoration site in the eastern portion of the unit. It mostly occurs in relatively small, localized colonies, although it is more extensive in the freshwater marshes in the northern and western portions of the upper terrace. It is likely that this species occurs elsewhere in suitable habitat on this unit, in addition to those mapped.

Figure III-e. Fox sedge (*Carex vulpinoidea*), Cottonwood Creek Unit, MCCWA







Fox sedge also occurs at a number of widely scattered locations on BFW1 (Figure III-f above), generally in more or less localized colonies near the margins of freshwater marshes and in other permanently moist to wet places. The most extensive colony of fox sedge on this unit is in freshwater marsh habitat at the northern margin of the southernmost (artificial) pond. As with the Cottonwood Creek Unit, it is likely that this species occurs elsewhere in suitable habitat on this unit in addition to the localities observed during the 2006 reconnaissance-level survey (Buck, unpublished report).

**Silky cryptantha** (*Cryptantha crinita*)

*Status:* California Native Plant Society List 1B



PHOTO: © 1988 Dean Wm. Taylor  
Jepson Herbarium

Silky cryptantha is a small, erect, branched annual herb with white flowers. *Cryptantha* species can be difficult to distinguish, but silky cryptantha is distinct in having dense, long, soft, silky hairs (as opposed to rough or bristly hairs) on the calyx (outermost part of the flower). Silky cryptantha occurs in sandy or gravelly stream beds, creek bottoms, and gravel bars, and is known only from Tehama and Shasta counties.

Hubbell and Marr (1994) reported silky cryptantha from two locations in frequently flooded areas more or less in proximity to Cottonwood Creek. One location was near the mouth of the creek; it is impossible to determine exactly where the second location was, although they report that 18 plants were scattered along approximately one-half mile of the creek. They report that plants were located about 10 to 40 feet from the creek in both areas. The Cottonwood Creek meander channel has changed significantly since 1994, and the plant was not observed during the 2006 survey (Buck, unpublished report).



## POTENTIAL TO OCCUR

### **Boggs Lake hedge-hyssop** (*Gratiola heterosepala*)

*Status:* California Native Plant Society List 1B; State Endangered



PHOTOS (close up): © 2004 Carol W. Witham, Dales Lake ER, Tehama County

PHOTO (mid distance): © 1986 California Native Plant Society, unknown location

Boggs Lake hedge-hyssop is most commonly associated with vernal pool and lakeside habitats. Occupied wetlands are usually found with annual grassland, oak woodland, juniper woodland (*Juniperus spp.*) or coniferous forest habitats (USFWS 2005a). The vernal pool/swale habitat at the BFW1 may provide suitable but marginal habitat. Boggs Lake hedge-hyssop is an erect annual with hollow stems 2 to 10 cm (0.8 to 3.9 inches) tall. The stems are mostly hairless, except for a few glandular hairs in the inflorescence. The leaves are opposite and have entire margins. Leaves near the base of the stem are 1 to 2 cm (0.4 to 0.8 inch) long and lance-shaped, but the leaves become shorter, wider, and blunt-tipped farther up on the stem. The 6 to 8 mm (0.23 to 0.31 inch) long flowers are borne singly in the upper leaf axils. Each corolla has two lips; the tube and upper lip are yellow, whereas the lower II-135 lip is white. However, the flowers appear yellow from a distance. Although limited in distribution, this species is

known to occur in the northeastern and northwestern Sacramento Valley and the Solano-Colusa vernal pool regions (Keeler-Wolf et al. 1998). Additional counties of occurrence are Lassen, Madera, Merced, San Joaquin, Siskiyou, Solano, and Tehama (USFWS 2005a).

**Red Bluff dwarf rush** (*Juncus leiospermus* var. *leiospermus*)

*Status:* California Native Plant Society List 1B



PHOTOS: © 1987 Dean Wm. Taylor, Oat Creek, Shasta County; © 2007 Brad Schafer, North Table Mountain

Red Bluff dwarf rush is found associated with vernal pools, meadows and seeps, vernal moist places in chaparral, cismontane woodland, valley and foothill grassland. Potentially suitable habitat may occur throughout the Wildlife Area.

Red Bluff dwarf rush is an inconspicuous grass-like annual, 2 to 12 cm (0.79 to 4.72 inch) tall, often turning reddish-brown; bracts inconspicuous; leaves basal, less than 3/4 length of stem; flowers usually 2 to 7 inch terminal heads; fruit round to oblong. It is found in the upper Sacramento Valley on floor and lower foothill terraces from northern Butte, Tehama and southern Shasta counties (BLM 2006b).



**Legenera** (*Legenere limosa*)*Status:* California Native Plant Society List 1B

PHOTO: © 1993 Dean Wm. Taylor, Dales Lake

Legenera has been found in a variety of habitats including vernal pools, vernal marshes, artificial ponds, and floodplains of intermittent streams. Occupied vernal pool types include Northern Basalt Flow, Northern Claypan, Northern Hardpan, Northern Volcanic Ashflow, and Northern Volcanic Mudflow (Sawyer and Keeler-Wolf 1995). The surrounding plant community may be grassland, open woodland, or hardwood forest containing oaks species or California buckeye (*Aesculus californica*).

Suitable but marginal habitat for this species may occur on BFW1. This plant is a small, inconspicuous annual.

The main stems are 10 to 30 cm (3.9 to 11.8 inches) long and reclining, although any branches are erect. Extra roots often arise from the lower nodes. The leaves, which are produced underwater, are 1 to 3 cm (0.4 to 1.2 inches) long and narrowly triangular; they fall off the plant before flowers appear. The flower stalks are very slender and elongate as the fruit matures, reaching a final length of as much as 3 cm (1.2 inches).

Since 1984, *Legenere limosa* has been rediscovered at several historical sites and has been found at numerous new locations. During that same time period, the type locality and six other occurrences were extirpated. Among the 52 occurrences presumed to be extant, 20 are in Sacramento County, including 9 in the vicinity of Elk Grove and 6 in the vicinity of the former Mather Air Force Base. Another area of concentration, with 11 extant occurrences, is near Dozier in Solano County. Other counties where this species is presumed to remain are Alameda, Santa Clara, Sonoma, Lake, Napa, Placer, San Joaquin, San Mateo, Shasta, Tehama, and Yuba (USFWS 2005a).

**Red-flowered lotus** (*Lotus rubriflorus*)*Status:* California Native Plant Society 1B

PHOTO: © 1998 John Game

The red-flowered lotus is a small annual herb that is native and endemic to California. This rare plant is known from only four disjunct occurrences in Colusa, Stanislaus, and Tehama Counties. It is associated with cismontane woodlands, and valley and foothill grasslands (CalFlora 2007). Suitable habitat for this species may occur on all three units of the MCCWA.



**Sanford's arrowhead** (*Sagittaria sanfordii*)

*Status:* California Native Plant Society 1B



PHOTOS: © 1991 Robert E. Preston, Ph.D.

Sanford's arrowhead is a freshwater marsh species which occurs in small ponds and sluggish waters of creeks, ditches and canals. A small perennial, this evergreen aquatic plant reaches approximately 13 cm (5.2 inch) tall. A fast grower, this is a summer flowering plant that has white petals with yellow centers. The plant's distribution is found along the North Coast (Del Norte County), the Central Valley (where it is mostly extirpated), and in Ventura County (BLM 2006c). Suitable habitat for this plant exists on all three units of the MCCWA, although none were observed during the 2006 surveys.

## OTHER PLANT SPECIES OF SPECIAL INTEREST

At least two native species occurring on the survey units, common rush and bay forget-me-not (*Myosotis laxa*), are of particular interest for taxonomic or distributional reasons.

### Common rush (*Juncus effusus* var. *pacificus*)



PHOTOS: Left, *Juncus effusus* var. *pacificus* stem and inflorescence, ©2008 Neal Kramer; right, var. *gracilis* stem and inflorescence, © 2004 Steve Matson

Two forms of common rush occur in freshwater wetland habitat on both units. One form has a relatively open inflorescence and perianth segments (petals/sepals) approximately 3 mm long. This form appears to represent *Juncus effusus* var. *pacificus*, according to the key and description in Swab (1993). Another form has a relatively dense, compact inflorescence with perianth segments only about 2 mm long. This form may represent *Juncus effusus* var. *gracilis*; that taxon, however, generally also has a relatively open inflorescence. The two forms often occur intermixed, but no plants observed in the Wildlife Area appeared to be intermediate between them. The status of these two forms may represent an unresolved taxonomic issue.

### Bay forget-me-not (*Myosotis laxa*)

This native forget-me-not occurs in freshwater wetland habitat on both the Cottonwood Creek and BFW1 units, although it is uncommon. Its occurrence in this area appears to represent a range extension.



PHOTO: © 2008 Keir Morse

Although bay forget-me-not is widespread in North America, it is uncommon and sporadic in California. Consortium of California Herbaria accession records indicate that the species has previously been collected in Del Norte and Mendocino counties in northwestern California; at widely scattered locations in the Sierra Nevada in Tehama, Plumas, Butte, El Dorado, and Kern counties; in the lower Sacramento Valley in Sacramento County; and at one location in Siskiyou County (Regents of University of California 2008). It is apparently not previously known from the upper Sacramento Valley or Cascade foothills transition region. The plants observed are clearly identifiable as this species based on the combination of appressed calyx hairs, none of which are hooked, and relatively small flowers (2 to 5 mm diameter) (Joyal 1993).

Table III-b. Special Status Vascular Plant Species with Potential to Occur at the MCCWA

**California Native Plant Society (CNPS) Designations:**

List 1A: Plants presumed extinct in California

List 1B: Plants rare, threatened, or endangered in California and elsewhere

List 2: Plants rare, threatened, or endangered in California, but more common elsewhere

**FT** = Federal Threatened**SE** = State Endangered

| Species<br>Common Name   | Status              | Habitat  | Flowering<br>Period | Potential for Occurrence   |
|--|---------------------|--|---------------------|--|
| <i>Carex scoparia</i><br><b>Pointed broom sedge</b>                              | CNPS 2              | Moist places, Great Basin scrub.   | May                 | Unknown. CNDDDB reports occurrence approximately 1.5 mi. WNW of BFW1; habitat unknown.   |
| <i>Carex vulpinoidea</i><br><b>Fox sedge</b>                                     | CNPS 2              | Freshwater marshes, riparian woodland.   | May-Jun             | Observed in 2006.  |
| <i>Clarkia borealis</i><br>ssp. <i>arida</i><br><b>Shasta clarkia</b>            | CNPS 1B             | Openings in cismontane woodland, lower montane coniferous forest.  | Jun-Aug             | No suitable habitat exists in survey areas.  |
| <i>Cryptantha crinita</i><br><b>Silky cryptantha</b>                             | CNPS 1B             | Sandy or gravelly streambeds in cismontane woodland, lower montane coniferous forest, riparian forest, riparian woodland, valley and foothill grassland. | Apr-May             | Reported from frequently flooded areas on the Cottonwood Creek Unit by Hubbell and Marr (1994). No suitable habitat exists on the Balls Ferry wetland units. |
| <i>Gratiola heterosepala</i><br><b>Boggs Lake<br/>hedge-hyssop</b>               | SE<br>CNPS 1B       | Vernal pools, lake margins.  | Apr-Aug             | Suitable, but marginal, habitat may occur on the Balls Ferry wetland units.  |
| <i>Juncus leiospermus</i> var. <i>leiospermus</i><br><b>Red Bluff dwarf rush</b> | CNPS 1B             | Vernal pools, meadows and seeps, vernal moist places in chaparral, cismontane woodland, valley and foothill grassland.                                   | Mar-May             | Potentially suitable habitat may occur on the Balls Ferry wetland units and possibly the Cottonwood Creek Unit.  |
| <i>Legenere limosa</i><br><b>Legenera</b>  | CNPS 1B             | Vernal pools.  | Apr-Jun             | Suitable, but marginal, habitat may occur on the BFW1.   |
| <i>Lotus rubriflorus</i><br><b>Red-flowered lotus</b>                            | CNPS 1B             | Cismontane woodland, valley and foothill grassland.  | Apr-Jun             | Suitable habitat may occur throughout the Wildlife Area.   |
| <i>Orcuttia tenuis</i><br><b>Slender Orcutt grass</b>                            | FT<br>SE<br>CNPS 1B | Vernal pools.  | May-Sep<br>(Oct)    | No suitable habitat exists in survey areas (requires relatively deep, well-developed vernal pools).  |
| <i>Paronychia ahartii</i><br><b>Ahart's paronychia</b>                           | CNPS 1B             | Seasonally moist places. cismontane woodland, valley and foothill grassland, vernal pools.   | Mar-Jun             | Habitat limited; therefore potential for occurrence low.   |
| <i>Sagittaria sanfordii</i><br><b>Sanford's arrowhead</b>                        | CNPS 1B             | Assorted shallow freshwater marshes and swamps.  | May-Oct             | Suitable habitat may occur throughout the Wildlife Area.   |



## 2. Special Status Wildlife

A review of the California Natural Diversity Database (CNNDDB) and the USFWS online inventory of Threatened and Endangered Species by County indicates there are 39 special-status wildlife species that have potential to occur in the vicinity of the MCCWA (CDFG 2006, 2009; USFWS 2006b, c, 2008). This list includes 3 invertebrates, 3 fish, 1 amphibian, 1 reptile, 29 birds, and 2 mammals. Of these, 18 have been confirmed as occurring in the Wildlife Area either as resident or migrant species and 11 are unlikely to occur based upon existing habitat conditions and known species distribution. Suitable habitat for 10 remaining species has been documented at the MCCWA. Focused surveys will be required to document the occurrence of these additional 10 species.

Special-status wildlife species that are known or have potential to occur in the MCCWA are presented below along with information on each species' regulatory status, habitat requirements, and likelihood of occurrence. Migratory birds described as "winter" visitors may occur in small numbers throughout the year but do not breed in the area and are most common in winter. Information on special-status wildlife is summarized in Table III-c, which follows the species descriptions below. Species on CDFG's Watch List are not included in the discussion.

### SPECIES DESCRIPTIONS: KNOWN OR POTENTIAL TO OCCUR

#### Invertebrates

##### Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)

*Status:* Federal Threatened (1980); recommended for delisting September 2006 (USFWS 2006b, c), CALFED Recovery

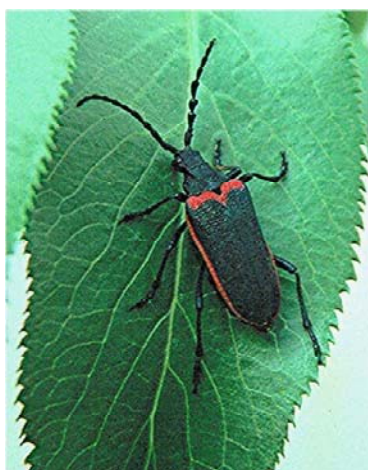


PHOTO: USFWS

The valley elderberry longhorn beetle (VELB) is completely dependent on its host plant, elderberry (*Sambucus* species), which is a common component of the remaining riparian forests and adjacent upland habitats of California's Central Valley. The VELB is a wood borer, and spends most of its life in the larval stage living within the stems of elderberry plants. Frequently, the only exterior evidence of the elderberry's use by the beetle is an exit hole created by the larva just prior to the pupal stage. The VELB life cycle takes one or two years to complete. Adults emerge from the stems from late March through June (about the same time the elderberry produces flowers) to feed on elderberry leaves and flowers and find mates (Barr 1991, USFWS 1984, 1999 and 2006e). The adult stage is short-lived. Further information on the life history, ecology, behavior, and distribution of the beetle can be found in a report by Barr (1991) and the recovery plan for the beetle (USFWS 1984).

The MCCWA is known to support specimens of the valley elderberry shrub, the host plant for the valley elderberry longhorn beetle. No specific surveys for this species have been conducted.

### *Vernal Pool Invertebrates*

#### **Vernal pool fairy shrimp** (*Branchinecta lynchi*)

*Status:* Federal Threatened, CALFED Maintenance

#### **Vernal pool tadpole shrimp** (*Lepidurus packardii*)

*Status:* Federal Endangered, CALFED Maintenance



PHOTO: Adult fairy shrimp, USGS



PHOTO: Adult tadpole shrimp, USGS

Vernal pools are seasonally flooded depressions found on ancient soils with an impermeable layer such as a hardpan, claypan, or volcanic basalt. The impermeable layer allows the pools to retain water much longer than the surrounding uplands; nonetheless, the pools are shallow enough to dry up each season. Vernal pools often fill and empty several times during the rainy season. Vernal pool invertebrates (fairy and tadpole shrimp) are highly adapted to the environmental conditions of their ephemeral habitats. One adaptation is the ability of the fairy shrimp eggs, or cysts, to remain dormant in the soil when their vernal pool habitats are dry. Another important adaptation is that the fairy shrimp has a relatively short life span, allowing it to hatch, mature to adulthood, and reproduce during the short time period when vernal pools contain water (USFWS 2005a).

Vernal pool tadpole shrimp, vernal pool fairy shrimp, and California linderiella may also inhabit vernal swales, provided that water remains ponded in the swales long enough for the shrimp to mature and reproduce (a minimum of 18 days for vernal pool fairy shrimp, 31 days for California linderiella, and 41 days for vernal pool tadpole shrimp). One small vernal swale on BFW1 is known to support vernal pool plant species; however, no focused surveys have been conducted for vernal pool invertebrates. No vernal pool habitat exists on the Cottonwood Creek Unit or on BFW2.

### **Fish**

The Coleman Fish Hatchery, located east of the Sacramento River from the MCCWA, is the largest Chinook salmon hatchery in the United States. Cottonwood Creek itself supports significant fish populations on a seasonal and year-round basis due to a number of environmental factors including hydrology, stream temperature, channel morphology, gravel recruitment and access. With anadromous fish no longer able to return to their historic upstream spawning grounds, second-tier streams like Cottonwood Creek may have significant spawning restoration potential (Western Shasta RCD 2003).

**Chinook salmon** (*Oncorhynchus tshawytscha*)

*Status:* Spring Run: Federal and California Threatened, Critical Habitat Designation, CALFED Recovery

*Status:* Fall and Late-Fall Run: California Species of Concern, CALFED Recovery



PHOTO: USFWS

In the Cottonwood Creek drainage, three races of Chinook salmon have been documented: fall run, late-fall run, and spring run. Due to the differences in the timing of their spawning runs, these three races are considered biologically distinct. Fall-run Chinook salmon ascend Cottonwood Creek and spawn in late October through November (CH2MHill 2002). Juvenile salmon begin migrating following emergence as early as December, and smolts continue to leave the stream through May (Moyle 2002). It is estimated that on average, approximately 1,000 to 1,500 adult fall-run Chinook salmon return to spawn in Cottonwood Creek each year (CH2MHill 2002). The CDFG estimates fewer

than 500 late-fall run and fewer than 500 spring-run Chinook salmon return to spawn in Cottonwood Creek each year (CDFG 1993a).

As their name implies, spring-run Chinook migrate upstream during the spring floods and stay in the higher elevation streams until the fall spawning period. Beegum Creek, a major tributary of Cottonwood Creek, supports a small population of spring-run Chinook (Leidy and Sisco 1999). The creek is the furthest from the ocean of all California salmon spawning streams, and the fish experience some of the highest water temperatures there. Due to high water temperatures that begin in May at the mouth of Cottonwood Creek, the population arrives upstream earlier than most spring-run Chinook; spawning begins in mid- to late October, later than most spring-run Chinook populations (CDFG 2004b).

*The Final Restoration Plan for the Anadromous Fish Restoration Program* (USFWS 2001) established a population target of 5,900 Chinook salmon for the Cottonwood Creek watershed. In 2005, the Cottonwood Creek watershed was designated as critical habitat for the spring-run Chinook (NMFS 2005).

**Central Valley Steelhead** (*O. mykiss*)

*Status:* Federal Threatened, Critical Habitat Designation, California Species of Special Concern, CALFED Recovery



PHOTO: USDA

Steelhead are anadromous rainbow trout, differentiated by their size (steelhead are generally longer than 16 inches) and by their color (the skin turns silvery-grey after spending one or more years in the ocean). In Central Valley streams and rivers, steelhead occurs only during the winter months, when water temperatures are cooler and flows are higher (Moyle 2002). Steelhead enter Cottonwood Creek during November or December and spawn during the winter or spring months. The upper reaches of the Middle Fork, Beegum Creek, and the South Fork provide spawning and nursery habitat for these fish.

Young steelhead spend one to three years in freshwater before migrating to the ocean. Because steelhead migrate during high flows, it is difficult to distinguish juvenile steelhead from resident rainbow trout. In



1989, the population of steelhead spawners in Cottonwood Creek was estimated to be only a few hundred fish (Sacramento River Advisory Council 1989). Cottonwood Creek was identified as one of the three best candidates for steelhead restoration in the Upper Sacramento watershed (McEwan and Jackson 1996) and was designated as critical habitat for winter-run steelhead in 2005 (NMFS 2005).

## Amphibians

### California red-legged frog (*Rana draytonii*)

*Status:* Federal Threatened, California Species of Special Concern, CALFED Maintenance



PHOTO: Chris Brown, USGS

The California red-legged frog (CRLF) requires a variety of habitat elements with aquatic breeding areas embedded within a matrix of riparian and upland dispersal habitats. Breeding sites of CRLF are in aquatic habitats, including pools and backwaters within streams and creeks, ponds, marshes, springs, sag ponds, dune ponds and lagoons. Additionally, CRLF frequently breed in artificial impoundments such as stock ponds.

There are no records of California red-legged frogs from Shasta County in the CNNDDB (CDFG 2006a). Historically, CRLF was found in several counties in this region. In the 1960s, CRLF were found in Glenn County east of Elk Creek and in many drainages in Colusa County. In 1986 and 1987, CRLF were reported in Sunflower Gulch and Cottonwood Creek, west of Red Bluff (Tehama County). However, subsequent surveys have documented only bullfrogs (*Rana catesbeiana*) (Jennings and Hayes 1994). The Cottonwood Creek Core Area, as identified in the California Red-legged Frog Recovery Plan, lies within the Cottonwood Creek and Red Bank Creek watersheds, with the majority of it being within the Cottonwood Creek watershed in Tehama County. This core area is one of the areas identified within the North Coast Range Foothills and Western Sacramento River Valley Recovery Unit and is a potential source for reintroduction of this species to its former range (USFWS 2002).

A Safe Harbor Agreement for private landowners in the Cottonwood Creek watershed to assist with enhancing habitat for the California red-legged frog was finalized with USFWS on 11 December 2006 (USFWS 2006d). The Cottonwood Creek Watershed Group received a grant to conduct focused CRLF surveys in 2007. The data will be provided to CDFG to assist in management of the MCCWA (V. Swearingen, Cottonwood Creek Watershed Group, personal communication).

## Reptiles

### Northern Pacific pond turtle (*Actinemys* [=Clemmys] *marmorata*)

*Status:* U.S. Forest Service Sensitive Species, California Species of Special Concern, CALFED Maintenance



PHOTO: © 1999 California Academy of Sciences

The western pond turtle is California's only native freshwater turtle. The Northern Pacific subspecies is found from San Francisco Bay northward into southern British Columbia. Pond turtles are found near a wide variety of wetlands, including ponds, marshes, lakes, streams, irrigation ditches, and vernal pools. They prefer aquatic habitats with adequate vegetative cover and exposed basking sites. Pond turtles are omnivorous generalists and opportunistic predators, eating small insects, aquatic invertebrates, fish, frogs, snakes, birds and mammals (Jennings and Hayes 1994). Over 90% of the freshwater ponds, marshes and year-round streams where the turtles once lived have been drained, diverted or developed. Where the turtles can still be found, many populations no longer produce offspring, the result of disturbed nesting grounds and the predation of young turtles by non-native bullfrogs and black bass. The turtles spend most of their lives in the water, but need well-drained silty soil to lay their eggs. The female will travel over 400 meters to find suitable nesting sites in upland areas away from the water. In late spring, one to 13 eggs are laid in a shallow hole, which is then

covered with dirt. Nests are highly susceptible to predators as well as to trampling by cattle or people. With a life span of over 40 years, the presence of turtles may be a false indication that populations are healthy (Garrison 1998). During field surveys in 2005 and 2006, Northern Pacific pond turtles were observed in the slough between the Cottonwood Creek Unit and Reading Island (Cull, unpublished field data).

## Birds

### Water Birds

#### **Tule greater white-fronted goose** (*Anser albifrons*)

*Status:* California Species of Special Concern (wintering)



PHOTO: © Terry Spivey, USDA, creative commons

White-fronted geese are winter visitors to California, usually arriving from their arctic breeding grounds in September and leaving by mid-April (Small 1994). Some individuals have remained throughout the summer in northern California, especially in the Klamath Basin and Sacramento Valley. White-fronted geese are found primarily around freshwater lakes and marshes, and open agricultural lands and grain fields, usually in association with other geese species. Comprising four subspecies worldwide, the greater white-fronted goose has a nearly circumpolar Arctic breeding distribution (Deuel and Takekawa 2008). Two subspecies breed in North America: the Pacific

greater white-fronted Goose (*A. a. frontalis*) and the tule greater white-fronted goose (*A. a. elgasi*).

Approximately 200,000 of the Pacific greater white-fronted goose winter in the Central Valley; of the tule subspecies, rarely have more than a few hundred been sighted here. The estimated total population of the tule white-fronted goose is between 5,000 and 10,000 (ibid). White-fronted geese (unknown subspecies) have been observed wintering on BFW2 (J. Chakarun, personal communication).

#### **Common loon** (*Gavia immer*)

*Status:* California Species of Special Concern

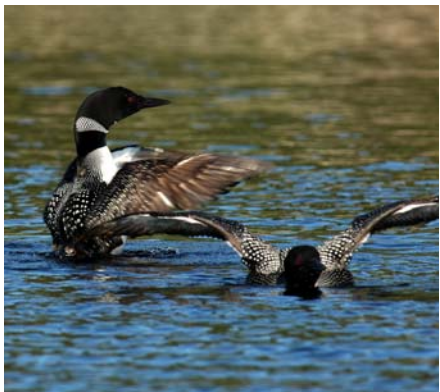


PHOTO: © 2005 Matthews, creative commons

Primarily a migrant and winter visitor to California, common loons are frequently observed during winter months along the entire coast. Common loons are mostly found in bays and harbors along the coast, but may also be found inland on large reservoirs and deep lakes during the spring and fall migration (Small 1994). They are rare during summer. There are historic records of common loons nesting in lakes east of Mt. Lassen in Shasta County (Grinnell and Miller 1944), but no recent nesting records. The Bird List for Shasta County records this species as a winter visitor, with observations during spring and fall (Wintu Audubon Society 1999).



**American white pelican** (*Pelecanus erythrorhynchos*)*Status:* California Species of Special Concern

PHOTO: Roger Dearnaley, creative commons

American white pelicans forage for fish in open water and have been observed at BFW1 (K. Nolte, Shasta College, personal communication; Cull, unpublished field observations). American white pelicans do not nest in the Central Valley (Grinnell and Miller 1944, Small 1994).

**Least bittern** (*Ixobrychus exilis*)*Status:* California Species of Special Concern

PHOTO: © 2005 Mike Baird, creative commons

Least bitterns are rare to uncommon summer residents in California, found in freshwater emergent wetland habitats throughout the state. A highly secretive bird, it nests, roosts, and hides in dense emergent vegetation. The current population status of this species is not well documented. Most of the California population migrates to Mexico for winter, although a small subset in southern California appears resident year-round (Sterling 2008). Suitable habitat for this species consists of freshwater and brackish marshes with tall, dense emergent vegetation and clumps of woody plants over deep water (ibid).

**Raptors\*****White-tailed kite** (*Elanus leucurus*)*Status:* California Fully Protected, CALFED MaintenancePHOTO: © 2004 Tom Greer  
tbphotos@comcast.net

White-tailed kites nest in large and medium-sized trees such as oaks and cottonwood and forage in grasslands, low shrub habitat, and agricultural fields (Zeiner et al. 1990b, Johnsgard 1990). White-tailed kite foraging activity has been observed at the MCCWA.

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\* The MCCWA provides high-quality habitat for five special-status raptors. California Fish and Game Code §3503.5 provides protection for all raptor nests, including those of the species below. Their nests are also protected by the Migratory Bird Treaty Act.

**Bald eagle** (*Haliaeetus leucocephalus*)

*Status:* Federal delisted, Bird of Conservation Concern, California Endangered, Fully Protected, CALFED Maintenance,



PHOTO: Gerald and Buff Corsi  
© 2007 California Academy of Sciences

Bald eagles are known to nest along Cottonwood Creek (CDFG 2006a). They have been observed foraging at the confluence of Cottonwood Creek and the Sacramento River and roosting in cottonwoods along the southern bank of Cottonwood Creek directly across from the Wildlife Area (Cull, unpublished field observations).

**Northern harrier** (*Circus cyaneus*)

*Status:* California Species of Special Concern, CALFED Maintenance



PHOTO: © 2006 Tom Greer tbphotos@comcast.net

Northern harriers nest and forage in a variety of open habitats including marshes, grasslands, low shrublands, and agricultural fields. Harriers are ground nesters and prey on a variety of small animals, particularly rabbits, mice, voles and small birds (Johnsgard 1990).

**Swainson's hawk** (*Buteo swainsoni*)

*Status:* Federal Bird of Conservation Concern, U.S. Forest Service Sensitive Species, California Threatened, CALFED Contribute to Recovery



PHOTO: Creative Commons License

Swainson's hawks breed in the western United States and Canada and winter in South America as far south as Argentina. California has two distinct Swainson's hawk breeding areas: the Central Valley and the Great Basin (including portions of Siskiyou, Modoc and Lassen counties). There are few breeding records from Shasta County, although there is one record from Shasta Valley (CDFG 2006b). Swainson's hawks are adapted to open grassland habitats, and have become increasingly dependent on agriculture as native plant communities are converted to agricultural lands. The California vole (*Microtus californicus*) is a dietary staple; however, a variety of other small

mammals, birds, and insects are also consumed. In the Central Valley, Swainson's hawks often nest peripheral to riparian systems. They will also use lone trees in agricultural fields or pastures and roadside trees when available and adjacent to suitable foraging habitat. Valley oak, Fremont cottonwood, walnut (*Juglans* spp.), and willow (*Salix* sp.), with an average height of 17.6 meters (57.7 feet) and ranging from 12.6 to 25 meters (41.3 to 82.0 feet), are the most commonly used nest-tree species (CDFG 1993a).

**American peregrine falcon** (*Falco peregrinus anatum*)

*Status:* Federal delisted, Bird of Conservation Concern, U.S. Forest Service Sensitive Species, California Endangered, Fully Protected, CALFED Maintenance



PHOTO: Gerald and Buff Corsi  
© 2002 California Academy of Sciences

Historically, the American peregrine falcon was distributed throughout the Sierra Nevada and most of California (Grinnell and Miller 1944). Now, it is uncommon as a breeding resident and uncommon as a migrant (Zeiner et al. 1990b). The American peregrine falcon nests on vertical cliffs with large potholes or ledges that are inaccessible to land predators. Because this species preys primarily on birds, nest sites are usually located near areas that support large avian populations, such as coastal areas or wetlands. Peregrine falcons may travel long distances from their nesting grounds to foraging habitats (Grinnell and Miller 1944, Zeiner et al. 1990b). Breeding activity begins as early as March and ends in August (Zeiner et al. 1990b). In winter 2006, a peregrine falcon was observed hunting waterfowl at BFW1 (Santry, personal communication).



## Cranes

### Greater sandhill crane (*Grus canadensis tabida*)

**Status:** U.S. Forest Service Sensitive Species, California Threatened, Fully Protected, CALFED Contribute to Recovery



PHOTO: © Rebecca Cull

The greater sandhill crane is one of six subspecies of sandhill cranes found in North America (Littlefield 1989). There are five recognized populations of greater sandhill cranes. The Central Valley population winters in California's Central Valley, and nests in northeastern California, eastern Oregon, portions of Nevada and Washington, and British Columbia (Smith 1999). They congregate in large flocks at night roosts and disperse during the day to forage in grasslands and emergent wetlands, as well as moist

croplands with rice or corn stubble. In winter, this species is most densely concentrated in counties south of Yolo County and in agricultural regions and large preserves that support vast fields of suitable habitat. Greater sandhill cranes have been observed in migration over the MCCWA (Santry, personal communication), but are not known to nest in this portion of Shasta County.

## Cuckoos

### Western yellow-billed cuckoo (*Coccyzus americanus occidentalis*)

**Status:** Federal Candidate, Bird of Conservation Concern, U.S. Forest Service Sensitive Species, California Endangered, CALFED Contribute to Recovery



PHOTO: GFDL, Mdf

The current population of the Western yellow-billed cuckoo is about 60 to 100 pairs statewide (RHJV 2004). Western yellow-billed cuckoos are neotropical migrants that breed in riparian habitats dominated by cottonwood and willows. The species was listed by the State of California as threatened in 1971 and was reclassified as endangered in 1987. They have undergone drastic decreases in population in California and most areas throughout the West. The declines have been directly attributed to loss of breeding habitat from clearing and removal of huge areas of riparian forest for agriculture, urban development and flood control (USFWS 2005b). Based on a 1986-87 statewide survey,

only three areas in California support more than about five breeding pairs on a regular basis (ibid.):

- Sacramento River roughly between Colusa and Red Bluff
- South Fork of the Kern River upstream of Lake Isabella
- Lower Colorado River

## Passerines

### Vaux's swift (*Chaetura vauxi*)

Status: California Species of Special Concern (nesting)



PHOTO: © Jerry Oldenettel, creative commons

Although Vaux's swifts have been observed at the MCCWA, there are no nesting records in Shasta County (Santry, personal communication). They are usually observed in the Central Valley only during migration. In California, their breeding range is primarily the forested coastal regions from Del Norte County to Santa Cruz County, with a small breeding population possibly also occurring in Monterey County (Small 1994). Nesting sites are most commonly associated with old growth forest. Breeding populations also occur locally and in low densities throughout northeastern California and south in the Sierra Nevada to Tulare County (Sterling and Paton 1996).

### Willow flycatcher (*Empidonax traillii*)

Status: California Endangered, CALFED Contribute to Recovery



PHOTO: Steve Zack, USFWS

Willow flycatchers historically nested throughout California, preferring riparian deciduous shrubs, particularly willow thickets (Grinnell and Miller 1944). Currently, three subspecies of the willow flycatcher breed in California. Each has been listed as state Endangered and USFS Region 5 Sensitive in California. Willow flycatchers are known to nest in the southeastern portion of Shasta County and in montane riparian habitats in the Cascade-Sierra Range (Sedgwick 2000). They occur in the Central Valley during spring and fall migration and breed in scattered riparian habitats.

**Bank swallow** (*Riparia riparia*)*Status:* California Threatened, CALFED Recovery

PHOTO: © Scott Elowitz

The bank swallow is the smallest North American swallow, with a body length of about 4.75 inches. Bank swallows are distinguished from other swallows by their distinct brown breast band contrasting with white underparts. The upper parts are brown. The species nests in colonies and creates nests by burrowing into vertical banks consisting of fine-textured soils. Bank swallows breed in California from April to August and spend the winter months in South America. Currently, bank swallows are locally common only in restricted portions of California where sandy, vertical bluffs or riverbanks are available for the birds to dig their burrows and nest in colonies. Most of California's remaining populations nest along the upper Sacramento River where it still meanders in a somewhat natural manner. In this alluvial plain, the river system provides suitable soil types and erosion features needed for prime nesting habitat. It is estimated that the range of

bank swallows in California has been reduced by 50% since 1900. Seventy-five percent of the California population is concentrated on the banks of Central Valley streams, including several colonies on the Sacramento River (Garrison et al. 1989).

**Loggerhead shrike** (*Lanius ludovicianus*)*Status:* Bird of Conservation Concern, California Species of Special Concern

PHOTO: © Jerry Oldenettel, creative commons

The loggerhead shrike is the only one of the world's 30 species of true shrikes that occurs exclusively in North America. Like other shrikes, it inhabits ecotones, grasslands, and other open habitats and feeds on a variety of invertebrate and vertebrate prey. Compared to most birds, its head is large in proportion to its body size—hence the name loggerhead, which also means blockhead (Yosef 1996). Also called the 'butcher birds,' loggerhead shrikes impale their prey on thorns or barbed wire. Similar in coloration to mockingbirds, loggerhead shrikes' heads have a distinctive black mask and hooked beak. Males and

females are similar in size. In California, loggerhead shrikes breed mainly in open shrublands or open woodlands with a fair amount of grass cover and areas of bare ground. They require tall structures such as shrubs, trees, fences or power lines for hunting perches and territorial maintenance, as well as impaling sites for prey manipulation and storage (Humple 2008). Loggerhead shrikes have been observed at the MCCWA (Santry, personal communication).



**Purple martin** (*Progne subis*)*Status:* California Species of Special Concern

PHOTO: Dori, creative commons

Purple martins, the largest swallow in North America, are neotropical migrants; they migrate north in the spring to breed in Mexico, the United States, and Canada. In late summer, after their young have left the nest, they migrate south to their non-breeding range in South America. Martins are secondary cavity nesters; this means they nest in a cavity, but do not excavate the cavity themselves. Instead, they use old woodpecker cavities or natural cavities in dead trees, cliff faces, etc. (Purple Martin Conservation Association 2006). Along the west coast of the United States, the purple martin population has substantially

declined in the last 50 to 100 years. This decline is primarily associated with three major causes: habitat loss due to urban development, forest management and fire suppression (reducing the availability of large snags for nesting), and the introduction and proliferation of the European starling and house sparrow (competition for nesting cavities) (Airola and Williams 2008, Western Purple Martin Working Group 2005). Purple martins are a rare to uncommon breeding species in northern and central California with a spotty distribution (Small 1994). They occur in California as summer residents and migrants, primarily from mid-March to late September; nesting is from May (rarely late April) to mid-August (Williams 1998). Purple martins require large trees with numerous cavities for nesting, utilizing western sycamore and cottonwoods in the lower elevations and oaks and conifers at higher elevations. There are records of them using lava tubes for nesting (Airola and Williams 2008). Small numbers nest in holes and cavities under freeway structures in the Central Valley (Williams 1998).

**California yellow warbler** (*Dendroica petechia brewsteri*)*Status:* Bird of Conservation Concern, California Species of Special Concern, CALFED Contribute to Recovery

PHOTO: © 2007 Ron Wolf

Yellow warblers are neotropical migrants that breed in North America and winter from Mexico to northern South America. Yellow warblers nest in a variety of shrubs associated with wetland habitats. Dense growth may be preferred in order to reduce nest predation and brood parasitism. The males are sometimes polygamous. The female builds a neat, compact cup nest in an upright twig fork 2 to 12 feet up, sometimes up to 40 or even 60 feet. The cup is made of wool, plant down, dry weed stem fibers, and fine grass stems, then lined with plant fibers, cotton, plant down, and sometimes feathers. Incubation of the 3

to 6 (usually 4 or 5) whitish spotted eggs is for 11 days. Both parents tend the nestlings until fledging occurs at 9 to 12 days (Lowther et al. 1999).

**Yellow-breasted chat (*Icteria virens*)***Status:* California Species of Special Concern, CALFED Maintenance

PHOTO: Britannica

Yellow-breasted chat numbers are declining throughout the Central and San Joaquin Valleys (Eckerle and Thompson 2001); however, they are still relatively common during the breeding season in Siskiyou and Shasta counties. Yellow-breasted chats have been documented at BFW1 during annual Breeding Bird Surveys (Santry, personal communication). In California, chats require dense riparian thickets of willows, vine tangles, and dense brush associated with streams, swampy ground and the borders of small ponds (Small 1994). In Shasta County, most chat nests are found in Himalayan blackberry (Burnett and

DeStaeble 2003). Other plant species used for nesting include California blackberry, California wild rose, and pipevine. Any management efforts to remove this blackberry from riparian areas (e.g., exotic plant removal programs) should first assess any detrimental effects the removal may have on local breeding chats.

**Tricolored blackbird (*Agelaius tricolor*)***Status:* Bird of Conservation Concern, California Species of Special Concern, CALFED Maintenance

PHOTO: © John Stirling

The tricolored blackbird is largely endemic to California (RHJV2004). The Sacramento and San Joaquin valleys and southwestern California are the heart of the tricolor's historical breeding range – and home to the largest remaining colonies. Adult males are a glossy blue-black with striking red and white shoulder patches, while females are mostly black with grayish streaks, with a small but distinct reddish shoulder patch. The tricolored blackbird is a medium-sized bird (total length ranges from 12 to 24 cm) that breeds in dense colonies. Tricolored blackbirds typically eat insects but will also take grains, snails

and small clams (Center for Biological Diversity 2006). Tricolors will often use exotic plants, such as Himalayan blackberry thickets, as nesting substrates.

**Yellow-headed blackbird** (*Xanthocephalus xanthocephalus*)*Status:* California Species of Special Concern

PHOTO: Phil Norton, USFWS

Primarily wintering in northern and western Mexico, yellow-headed blackbirds occur in California as seasonal migrants and summer residents (Jaramillo 2008). Depending upon the location, their breeding season extends from mid-April to late July.

Yellow-headed blackbirds have a patchy distribution in California, but are locally numerous. This colonial species breeds almost exclusively in marshes with tall emergent vegetation such as tules (*Scirpus* spp.) or cattails (*Typha* spp.), where there is relatively deep water (ibid.); however, they have been documented nesting in low vegetation such as spikerush

(*Eleocharis*). Because of their need to build their nests over deeper water, yellow-headed blackbird breeding sites are often at the edges of large ponds, lakes and reservoirs (ibid.).

**Mammals****Pallid bat** (*Antrozous pallidus*)*Status:* California Species of Special Concern, Western Bat Working Group High Priority

PHOTO: © M. Tuttle

Pallid bats occur throughout California, except in the high Sierra Nevada, from Shasta to Kern counties and the northwestern corner of the state from Del Norte and western Siskiyou counties (Hall 1981). These bats inhabit a variety of habitats, including grasslands, shrublands, woodlands, and forests from sea level up through mixed coniferous forests. They are common in grasslands and desert regions in the southwestern United States and most abundant in the Sonoran life zones; less abundant in evergreen and mixed forests than in vegetation assemblages characteristic of lower elevations (Hermanson and O'Shea

1983). Pallid bats reside yearly in the majority of their range and they have been collected at sites up to 8,000 feet in elevation. In California pallid bats are associated with oak woodlands at lower elevations (CDFG 1995) and may roost in a variety of places including tree cavities, rock crevices and human-made structures.



**Ringtail (*Bassariscus astutus*)**

*Status:* California Fully Protected, CALFED Maintenance



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The ringtail range extends as far north as southwest Oregon, throughout California except the agricultural portion of the Central Valley, east to Colorado, and south into Central America. They are found in a variety of habitats including dense riparian growth, montane evergreen forests, oak woodlands, pinyon juniper, chaparral, and deserts (Kaufmann 1982). Their territory is usually no farther than one-half mile away from a permanent water source and they find reproductive and resting cover in hollow trees, logs, snags, rocks, and abandoned burrows. Nocturnal and secretive, ringtails feed on a variety of small mammals, lizards, invertebrates, and birds (Zeiner et al. 1990a).

**Table III-c. Special-Status Wildlife Known to Occur or With Potential to Occur at MCCWA**
**U.S. Fish & Wildlife Service (USFWS) / National Oceanic & Atmospheric Administrative (NOAA) Fisheries Service**

E = Endangered T = Threatened CH = Critical Habitat Designation C = Candidate D = Delisted  
BCC = Bird of Conservation Concern

**U.S. Forest Service (USFS)**

FSS = Forest Service Sensitive Species

**U.S. Bureau of Land Management (BLM)**

BLMS = BLM Sensitive Species

**California Department of Fish and Game (CDFG)**

E = Endangered T = Threatened FP = Fully Protected SSC = Species of Special Concern WL = Watch List

**CALFED Multi-Species Conservation Strategy (MSCS)**

R = Recovery: CALFED is expected to undertake all actions within the ERP ecological management zones and program scope necessary to recover the species so that its long-term survival in nature is assured.

r = Contribute to recovery: CALFED will make specific contributions to the species' recovery; however, CALFED actions will have a limited effect on the species in a limited portion of its range.

m = Maintain: CALFED will take actions to maintain the species by improving habitat conditions where practicable and by avoiding, minimizing, and compensating for any adverse effects. This designation is less rigorous than "contribute to recovery," and CALFED actions are expected to have minimal effects on the species.

**WBWG** = Western Bat Working Group

High = High Priority

| SPECIES  | STATUS                |      |                        | HABITAT  | POTENTIAL FOR OCCURRENCE  |
|--|-----------------------|------|------------------------|--|---|
|  | USFWS<br>NOAA<br>USFS | CDFG | CALFED<br>MSCS<br>WBWG |  |   |
| INVERTEBRATES  |                       |      |                        |  |   |
| <b>Valley elderberry<br/>longhorn beetle</b><br><i>Desmocerus californicus<br/>dimorphus</i> | T                     |      | R                      | Occurs only in the Central Valley<br>of California in association with<br>blue elderberry ( <i>Sambucus<br/>mexicana</i> ).  | Known to occur. Requisite elderberry<br>habitat is found on the Cottonwood<br>Creek Unit. |
| <b>Vernal pool fairy<br/>shrimp</b><br><i>Branchinecta lynchi</i>                            | T                     |      | m                      | Typically inhabit vernal pools<br>and seasonal wetlands <200 m <sup>2</sup><br>and <5 cm deep; may occur in<br>larger, deeper pools.   | Vernal swale habitat at BFW1 may<br>provide suitable habitat.                             |
| <b>Vernal pool tadpole<br/>shrimp</b><br><i>Lepidurus packardi</i>                           | E                     |      | m                      | Typically inhabit vernal pools<br>and swales in the Sacramento<br>Valley; clear to highly turbid<br>water; commonly found in<br>grass-bottomed swales in<br>unplowed grasslands. | Vernal swale habitat at BFW1 may<br>provide suitable habitat.                             |
| FISH   |                       |      |                        |  |   |
| <b>Spring run Chinook<br/>salmon</b><br><i>Oncorhynchus<br/>tshawytscha</i>                  | T<br>CH               | T    | R                      | Requires cold, freshwater<br>streams with suitable gravel for<br>spawning; rears in seasonally<br>inundated floodplains, rivers,<br>tributaries.                                 | Known to migrate up Cottonwood<br>Creek to spawning grounds at higher<br>elevations.      |
| <b>Fall and late-fall run<br/>Chinook salmon</b><br><i>Oncorhynchus<br/>tshawytscha</i>      | FSS                   | SSC  | R                      | Requires cold, freshwater<br>streams with suitable gravel for<br>spawning; rears in seasonally<br>inundated floodplains, rivers,<br>tributaries.                                 | Known to occur in low numbers in<br>Cottonwood Creek watershed.                           |
| <b>Central Valley<br/>steelhead</b><br><i>Oncorhynchus mykiss</i>                            | T<br>CH               | SSC  | R                      | Requires cold, freshwater<br>streams with suitable gravel for<br>spawning.   | Known to occur in low numbers in<br>Cottonwood Creek watershed.                           |

| SPECIES   | STATUS                |         |                        | HABITAT   | POTENTIAL FOR OCCURRENCE  |
|---|-----------------------|---------|------------------------|---|---|
|   | USFWS<br>NOAA<br>USFS | CDFG    | CALFED<br>MSCS<br>WBWG |   |   |
| AMPHIBIANS  |                       |         |                        |   |   |
| California red-legged frog<br><i>Rana draytonii</i>                   | T                     | SSC     | m                      | Prefers wetlands with extensive vegetation. Requires 11-20 weeks of permanent water for larval development.   | Presumed extirpated in the Central Valley. Low potential due to high populations of predators in natural and artificial wetland habitats. |
| REPTILES  |                       |         |                        |   |   |
| Northern Pacific pond turtle<br><i>Actinemys (=Clemmys) marmorata</i> | FSS                   | SSC     | m                      | Inhabits slow-moving streams, sloughs, ponds, irrigation and drainage ditches, adjacent uplands.  | Observed east of Cottonwood Unit on Reading Island. Known to occur in suitable habitats throughout region.                                |
| BIRDS   |                       |         |                        |   |   |
| Greater white-fronted goose<br><i>Anser albifrons elgasi</i>          |                       | SSC     |                        | Winters in Central Valley; usually associated with extensive marshlands.  | Observed at BFW2.   |
| Redhead<br><i>Aythya americana</i>                                    |                       | SSC     |                        | Occurs year round in California though status varies regionally. Redheads usually nest in freshwater emergent wetlands where dense stands of cattails ( <i>Typha</i> spp.) and tules ( <i>Scirpus</i> spp.) are interspersed with areas of deep, open water.                                | Unlikely to occur.  |
| Common loon<br><i>Gavia immer</i>                                     |                       | SSC     |                        | Primarily known as a winter visitor to California, common loons are fairly common along the entire coast and uncommon on large deep lakes in valleys and foothills throughout the state. There are historic records of common loons nesting near lakes east of Mt. Lassen in Shasta County. | Species observed nearby; however, no suitable nesting habitat.  |
| American white pelican<br><i>Pelecanus erythrorhynchos</i>            |                       | SSC     |                        | Forages in open water. Individuals may be present year-round, but does not breed in the Central Valley.   | Observed foraging at BFW1. No suitable nesting habitat.   |
| Least bittern<br><i>Ixobrychus exilis</i>                             |                       | SSC     |                        | Nests in freshwater and brackish marshes with dense, emergent vegetation.   | Suitable habitat present on site.   |
| White-tailed kite<br><i>Elanus leucurus</i>                           |                       | FP      | m                      | Nests in woodlands and isolated trees; forages in grasslands, shrublands, agricultural fields.  | Known to occur. MCCWA provides suitable foraging and nesting habitat.   |
| Bald eagle<br><i>Haliaeetus leucocephalus</i>                         | D<br>BCC              | E<br>FP | m                      | Forages primarily in fish-bearing waters, but also in open terrestrial habitats.  | Known to occur. Documented nesting territory along Cottonwood Creek.  |
| Northern harrier<br><i>Circus cyanus</i>                              |                       | SSC     | m                      | Nests and forages in open habitats including marshes, grasslands, shrublands, agricultural fields.  | Known to nest and forage in suitable open habitats throughout the site.   |
| Swainson's hawk<br><i>Buteo swainsoni</i>                             | BCC<br>FSS            | T       | r                      | Nests in riparian woodlands and isolated trees; forages in grasslands, shrublands, agricultural fields.   | Potential nesting habitat is available.   |

| SPECIES  | STATUS                |          |                        | HABITAT   | POTENTIAL FOR OCCURRENCE  |
|--|-----------------------|----------|------------------------|---|---|
|  | USFWS<br>NOAA<br>USFS | CDFG     | CALFED<br>MSCS<br>WBWG |   |   |
| BIRDS  |                       |          |                        |   |   |
| <b>Ferruginous hawk</b><br><i>Buteo regalis</i>                                | BCC                   |          |                        | A winter resident of the Central Valley, ferruginous hawks are usually found in open grassland areas. There are no nesting records in Central California.   | Unlikely to occur based upon habitat preferences.   |
| <b>Golden eagle</b><br><i>Aquila chrysaetos</i>                                |                       | FP<br>WL |                        | Habitat typically includes rolling foothills, mountain areas, sage-juniper flats, desert. Nests on cliffs of all heights and in large trees in open areas.  | Unlikely to occur: No suitable nesting habitat nearby.  |
| <b>American peregrine falcon</b><br><i>Falco peregrinus anatum</i>             | D<br>BCC<br>FSS       | E<br>FP  | m                      | Usually nests on cliffs within foraging distance of water. Forages on birds, primarily waterfowl and shorebirds.  | Observed hunting waterfowl on BFW1 in December 2006, but no suitable nesting habitat nearby.                  |
| <b>Greater sandhill crane</b><br><i>Grus canadensis tabida</i>                 | FSS                   | T<br>FP  | r                      | Winter visitor to the Central Valley. Forages primarily in moist croplands with rice or corn stubble; also frequents grasslands, emergent wetlands.   | Observed during migration. Shasta Valley is nearest nesting in Shasta County.                                 |
| <b>Black Tern</b><br><i>Chlidonias niger</i>                                   |                       | SSC      |                        | Flooded rice fields and freshwater marshes including lakes and ponds with emergent vegetation.  | Out of known range of suitable nesting habitat.   |
| <b>Western yellow-billed cuckoo</b><br><i>Coccyzus americanus occidentalis</i> | C<br>BCC<br>FSS       | E        | r                      | Neotropical migrant. In California, tends to nest in dense riparian corridors with cottonwood trees and willows.  | Unlikely due to low population numbers, but potential nesting habitat at Cottonwood Creek Unit.               |
| <b>Long-eared owl</b><br><i>Asio otus</i> (nesting)                            |                       | SSC      |                        | Prefers thickly wooded riparian areas for nesting and roosting with nearby open spaces for hunting.   | Unlikely to occur: Outside of known breeding range.   |
| <b>Short-eared owl</b><br><i>Asio flammeus</i> (nesting)                       |                       | SSC      |                        | Nests and roosts on the ground in open meadows and grasslands.  | Unlikely to occur: No suitable nesting habitat  |
| <b>Black swift</b><br><i>Cypseloides niger</i>                                 | BCC                   | SSC      |                        | Nests behind or beside permanent or semi-permanent waterfalls, on perpendicular cliffs near water (above Sierran rivers or on the sea coast), and in sea caves.   | No suitable nesting habitat near the Wildlife Area  |
| <b>Vaux's swift</b><br><i>Chaetura vauxi</i>                                   |                       | SSC      |                        | Often found foraging over lakes and ponds near the coast. Communal roosts are often in chimneys during migration especially in areas lacking suitable hollow snags. Migrating swifts can be found flying over a range of habitats from grasslands, desert scrub and chaparral to mature coniferous forests. Nests in hollow burned-out tree trunks in large conifers. | Observed during migration in the Wildlife Area. No suitable nesting or roosting habitat in the Wildlife Area. |
| <b>Olive-sided flycatcher</b><br><i>Contopus cooperi</i>                       | BCC                   | SSC      |                        | Summer resident and migrant from April to October. Nests in coniferous forests throughout California.   | Unlikely to occur: No suitable nesting habitat.   |



| SPECIES   | STATUS                |      |                        | HABITAT  | POTENTIAL FOR OCCURRENCE  |
|---|-----------------------|------|------------------------|--|---|
|   | USFWS<br>NOAA<br>USFS | CDFG | CALFED<br>MSCS<br>WBWG |  |   |
| BIRDS   |                       |      |                        |  |   |
| <b>Willow flycatcher</b><br><i>Empidonax traillii</i>                   | FSS<br>BCC            | E    | r                      | Requires dense willow thickets for nesting/roosting. Low, exposed branches are used for singing posts/hunting perches.   | Potential habitat on site, but low likelihood of occurrence.  |
| <b>Loggerhead shrike</b><br><i>Lanius ludovicianus</i>                  | BCC                   | SSC  |                        | Prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches.  | Known to occur. Suitable habitat present.   |
| <b>Purple martin</b><br><i>Progne subis</i>                             |                       | SSC  |                        | Usually occurs in riparian forests, oak woodlands and montane forests. Requires large trees with cavities for nesting.   | Unlikely, but has potential to occur based upon habitat and other cavity nesting species.                     |
| <b>Bank swallow</b><br><i>Riparia riparia</i>                           |                       | T    | r                      | Nests in vertical banks and cliffs with fine textured or sandy soils near streams, rivers, lakes, ocean. Forages primarily over water.                                     | Several known colonies along the Sacramento River corridor; may use Cottonwood Creek for foraging.            |
| <b>California yellow warbler</b><br><i>Dendroica petechia brewsteri</i> | BCC                   | SSC  | r                      | Nests in riparian woodland and riparian scrub habitats. Forages in a variety of wooded and shrub habitats during migration.  | Likely to occur. Suitable habitat is present.   |
| <b>Yellow-breasted chat</b><br><i>Icteria virens</i>                    |                       | SSC  | m                      | Nests in thick shrub habitats, including blackberry thickets. Associated with riparian and wetland habitats.   | Observed at BFW1. Likely to occur throughout area.  |
| <b>Grasshopper sparrow</b><br><i>Ammodramus savannarum</i>              |                       | SSC  |                        | Summer resident in California. Found in open, primarily treeless, grassland habitats.  | Unlikely to occur: No suitable open habitat.  |
| <b>Tricolored blackbird</b><br><i>Agelaius tricolor</i>                 | BCC<br>BLMS           | SSC  | m                      | Nests colonially in tules, cattails, willows, thistles, blackberries, other dense vegetation. Forages in grasslands, agricultural fields.                                  | Known to occur in general vicinity of MCCWA. Both Balls Ferry Wetland Units provide suitable nesting habitat. |
| <b>Yellow-headed blackbird</b><br><i>Xanthocephalus xanthocephalus</i>  |                       | SSC  |                        | Summer resident in California. Closely associated with freshwater emergent marshy areas with tall emergent vegetation.   | Suitable nesting habitat is present.  |
| MAMMALS   |                       |      |                        |  |   |
| <b>Pallid bat</b><br><i>Antrozous pallidus</i>                          | FSS<br>BLMS           | SSC  | WBWG:<br>High          | Particularly associated with oak and coniferous habitats in northern and central California. Day roosts include rock outcrops, mines, hollow trees, buildings and bridges. | Suitable habitat present at MCCWA.  |
| <b>Ringtail</b><br><i>Bassariscus astutus</i>                           |                       | FP   | m                      | Riparian woodlands and corridors throughout California.  | Likely to occur.  |

Taxonomic order and scientific names for invertebrates and fish follow the CNDDDB 2009. For birds, names follow the AOU Check list of North American Birds 1999 (with updates through 2008). Amphibian and reptile taxonomy follows CalHerps (2009). Mammal taxonomy follows the Smithsonian Institution's National Museum of Natural History (2009). Taxonomic order and scientific names are constantly updated; please consult with most recently published lists.

## IV. MANAGEMENT GOALS

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## IV. MANAGEMENT GOALS

The mission of the California Department of Fish and Game is to manage California's diverse fish, wildlife, and plant resources, and the habitats upon which they depend, for their ecological values and for their use and enjoyment by the public.

*In developing management goals for the Mouth of Cottonwood Creek Wildlife Area (MCCWA), the California Department of Fish and Game (CDFG) must adhere to regulations specified in the California Fish and Game Code and the policies set forth by the California Fish and Game Commission. It must also maintain consistency with the goals and objectives of the CALFED Ecosystem Restoration Program (ERP), which is implemented by CDFG (CALFED 2000a). Both the California Fish and Game Commission and the CALFED ERP have policy directives designed to protect and preserve native non-listed species diversity, halt any significant species decline and assist with the recovery of at-risk native species.*

*In general, goals and tasks for the MCCWA are structured to promote best management practices and, where appropriate, are coordinated with larger regional planning goals. Full implementation of the MCCWA goals and tasks is contingent upon having adequate staff and operating budget.*

### **Adaptive Management Approach to Climate Change**

Wildlife area and ecological reserve managers are currently integrating climate change strategies in their proposed goals, operations and maintenance tasks on their sites. These include fuel reduction for habitat diversity or for adjacent residential and urban interface mandates; monitoring and control of exotic weeds and other invasives; water quality and conservation measures, purchase of water rights, and maintaining or enhancing in-stream flows; implementing best management practices for mosquito control in managed wetlands; acquisition and conservation planning to preserve wildlife corridors; creating larger buffer zones around wetlands; and coordinating management goals with other public agencies and non government organizations that have similar missions.

MCCWA management goals and tasks include strategies and best management practices to detect, monitor, evaluate and address climate-change-induced stressors, including weed and invasive species controls, wildfire fuel load prevention and reduction, water, habitat and corridor acquisition, conservation and enhancement measures, and management coordination with public and private agencies that share similar missions.

## A. Definitions of Terms Used in This Plan

*The Mouth of Cottonwood Creek Wildlife Area Land Management Plan has been developed in accordance with the California Department of Fish and Game's A Guide and Annotated Outline for Writing Land Management Plans (CDFG 2004a, 2007). The CDFG guide organizes management information and guidelines into elements, goals and tasks. Elements relate to broad categories of consideration, goals define the purposes within these elements, and tasks establish the specific actions required to attain the management goals. Together, elements, goals and tasks express the policy direction that guides the management of the Wildlife Area.*

### 1. Elements

- **Element:** An element is any biological unit, monitoring and adaptive management strategy, public use activity, program development and planning effort, facility maintenance program, cultural resource protection activity, or resource coordination effort for which goals and objectives have been prepared and presented within this LMP.
- **Biological Element:** Biological elements refer to the habitat types (including their associated plant communities, wildlife and ecological processes) for which specific MCCWA management goals and objectives have been developed.
- **Biological Monitoring Element:** Biological monitoring elements refer to adaptive management strategies for continually improving the diversity, habitat integrity and environmental health of the biological elements identified in this LMP.
- **Public Use Element:** Public use elements include recreational opportunities, educational activities, and management programs appropriate to and compatible with the purposes for which the Wildlife Area was established and land acquired.
- **Balls Ferry Research and Education Center Conceptual Plan Element:** Balls Ferry Research and Education Center (BFREC) Conceptual Plan elements include research and educational activities that are linked to adaptive management strategies or to youth development programs and opportunities appropriate to and compatible with the purposes for which the Wildlife Area was established and land acquired.
- **Facility Maintenance Element:** The facility maintenance element refers to the conservation and maintenance program that supports and protects the multitude of resources and beneficial uses of the Wildlife Area.
- **Cultural Resource Element:** The cultural resource element refers to the protection of significant historical and archaeological resources that may be present on the units and that may yield information important to the prehistory or history of the MCCWA.
- **Resource Coordination Element:** The resource coordination element refers to any management activities that involve coordinating with public and private entities to improve species diversity, habitat integrity or environmental health within the Wildlife Area and region.



## 2. Goals and Objectives

- **Biological Goal:** A biological goal is a statement describing management and intended long-term results for a biological element.
- **Biological Monitoring Goal:** A biological monitoring goal is a statement describing adaptive management and intended implementation results for a phase of a biological monitoring element.
- **Public Use Goal:** A public use goal is a statement describing the type and level of public use that is compatible with the biological element goals specified in this LMP.
- **BFREC Conceptual Plan Goal:** A BFREC conceptual plan goal is a statement describing the type and level of planning and program development that is recommended to achieve the goals specified in the biological, biological monitoring and public use elements of this LMP.
- **Facility Maintenance Goal:** A facility maintenance goal is a statement describing the type and level of grounds and facility maintenance that is needed to attain the goals for the biological and public use elements specified in this LMP.
- **Cultural Resource Goal:** A cultural resource goal is a statement describing the management and intended results for the cultural resources element.
- **Resource Coordination Goal:** A resource coordination goal is a statement describing the type and level of management coordination activities that is needed to achieve the goals specified in this LMP.

## 3. Tasks and Adaptive Management Strategies

- **Tasks:** Tasks are the individual projects or work elements that implement the goals and objectives specified in this LMP. They should be used to develop both immediate and long-term operation and maintenance schedules and budgets for the MCCWA. Generally, tasks are listed in the order required to achieve the goal or objective.
- **Adaptive Management Strategies:**  
Adaptive management is a dynamic strategy in which management efforts are monitored regularly to assess their status and effectiveness. Adaptive management begins with collecting baseline data and testing long-term strategies for monitoring and evaluating changes to the baseline. Information and knowledge gained in this process are used to update management goals and tasks. The goal of adaptive management is continual improvement and long-term sustainability. An adaptive management approach has been applied to all elements within this LMP.



## B. Biological Elements

*The overall biological management goal for California Department of Fish and Game wildlife areas is to optimize ecological and habitat productivity for all species in balance with the needs of the public. To accomplish this, the department strives to protect and maintain the physical processes that contribute to the ecological productivity of its wildlife areas with an emphasis on habitat management programs.*

### HABITAT FOCUS

Biological elements addressed in this management plan focus on priority habitats at the Mouth of Cottonwood Creek Wildlife Area (MCCWA). Each element is introduced in the context of its ecological significance. The MCCWA's eight plant community types, as described in the previous section (IIIA), are grouped here into five biological elements that share common management strategies (Table IV-a).

**Table IV-a. Crosswalk of Biological Elements and Plant Communities at the MCCWA**

| Biological Element                            | MCCWA Plant Communities   |
|---|---|
| Riverine and Riparian Habitat Element         | Great Valley mixed riparian forest<br>Cottonwood Creek floodplain   |
| Freshwater Wetland Habitat Element            | Freshwater emergent wetland and pond<br>(includes natural and created wetlands, ponds, stream channels and ditches)<br>Seep |
| Vernal Pool and Seasonal Pond Habitat Element | Vernal pool / swale / seasonal pond   |
| Annual Grassland Habitat Element              | California annual grassland<br>Grassland-riparian transitional habitat<br>Ruderal (particularly Himalayan blackberry)       |
| Oak Woodland Habitat Element                  | Valley oak savanna<br>Valley oak and mixed riparian forest<br>transitional zones  |

Biological elements are further broken down into goals and tasks that are organized around improving the three major aspects of functionally dynamic ecosystems:

- *Biological Diversity Goals.* These goals aim at improving the composition of species within the habitat type, including rarity, abundance, richness and connectivity.
- *Habitat Integrity Goals.* These goals aim at improving the structural diversity and environmental relationships within the habitat type, including maintenance and restoration of conditions that support biological diversity.
- *Environmental Health Goals.* These goals aim at improving environmental conditions of the habitat, including the water, air and soil quality.

Goals and tasks address conditions both within the MCCWA and within the larger ecological landscape. Many tasks are necessarily broad due to the lack of baseline data. Tasks related to surveys, mapping, monitoring, and regional coordination are discussed with more specificity in the Biological Monitoring Element (IVC). Specific tasks related to controlling invasive non-native species are described in the MCCWA Weed Management Plan (Appendix D) while tasks related to grazing as a vegetation management tool are discussed under MCCWA Grazing Plan and Management Guidelines (Appendix E). A discussion of the environmental impacts and mitigation associated with the proposed management goals and activities as outlined in this document is provided in the California Environmental Quality Act Checklist (Appendix F).

### SPECIAL STATUS SPECIES

Management goals for special-status species are addressed within each habitat type, reflecting the focus of the CDFG on strengthening ecosystem integrity to promote species diversity. Protecting habitat for special-status species is given first priority in recognition of the landscape level needs of rare and endemic species. These goals are based on the stated purpose of the land acquisition by the California Wildlife Conservation Board (WCB), the California Fish and Game Code, the policies of the California Fish and Game Commission, and the CALFED Ecosystem Restoration Program goals and objectives. Internal CDFG coordination for California Endangered Species Act will occur for listed species before any MCCWA activities are undertaken that may potentially impact threatened or endangered species or habitat. Consultation with U.S. Fish and Wildlife Service (USFWS) will also occur when warranted due to a federal nexus via permitting or funding requirements.

#### What is “Critical Habitat”?

“Critical habitat” is a designation under the federal Endangered Species Act (ESA). The federal government is required to designate critical habitat for any species it identifies as threatened or endangered. Specifically, critical habitat is defined as:

- 1) specific areas within the geographical area occupied by the species at the time of listing, if they contain physical or biological features essential to conservation, and those features may require special management considerations or protection; and
- 2) specific areas outside the geographical area occupied by the species if the agency determines that the area itself is essential for conservation.

All federal agencies must ensure that any actions they authorize, fund or carry out are not likely to jeopardize the continued existence of a listed species, or *destroy or adversely modify its designated critical habitat*. These complementary requirements apply only to federal agency actions, and the latter only to habitat that has been designated. A critical habitat designation does not set up a preserve or refuge, and applies only when federal funding, permits or projects are involved. Critical habitat requirements do not apply to citizens engaged in activities on private land that does not involve a federal agency.

## 1. Riverine and Riparian Habitat Element



PHOTO: Cottonwood Creek floodplain and riparian corridor near its confluence with the Sacramento River. July 2005, SEI

Natural floodplain ecosystems are a product of, and adapted to, highly variable hydrologic regimes that are typified by droughts, catastrophic floods and frequent periods of inundation, and are expressed across a variety of temporal scales (seasons, years, decades). This hydrologic variability is an essential ecological process that functions to maintain the complex ecological features within aquatic, riparian, and wetland ecosystems. Historically, winter and springtime flooding created extensive flooded plains. Such flooding is critical to the maintenance of riparian forests, once the predominant floodplain vegetation in the Sacramento Valley.

For most of California's rivers, this natural hydrologic regime has been altered by dams and levees that have altered the timing and magnitude of flows. As one of the few remaining undammed tributaries to the Sacramento River, Cottonwood Creek provides a major source of gravel recruitment and a high quality water supply to the Sacramento River (CALFED 2000). It also provides a critical resource for anadromous and native fish species. The mouth of Cottonwood Creek is a prime example of a natural floodplain with an extensive riparian habitat assemblage.



Riparian habitat in California is one of the most productive and valuable habitats for all forms of wildlife and also one of the most threatened habitats, with only about 5% of the state's original riparian habitat remaining (ibid.). Riparian habitat provides food, nesting habitat, cover and migration corridors. Over 135 species of California birds such as the willow flycatcher, yellow-billed cuckoo and red-shouldered hawk either completely depend upon riparian habitats or use them preferentially at some stage of their life history. Another 90 species of mammals, reptiles, invertebrates and amphibians such as California red-legged frog, valley elderberry longhorn beetle and riparian brush rabbit depend on California's riparian habitats. Riparian habitat also provides riverbank protection, erosion control and improved water quality, as well as numerous recreational and esthetic values (RHJV 2004).

Neotropical migratory birds are those that breed in or migrate through the United States, at least to some extent, and spend the non-breeding season in Mexico, Central America, the Caribbean, and/or South America. Regionally, there have been substantial losses of historic habitat used by neotropical migrants, and information from the annual [Breeding Bird Survey](#)<sup>\*</sup> suggests that the population levels for many of these species are declining (Sauer et al. 2008). Those neotropical migrants that rely upon riparian habitat for nesting have been particularly hard hit. Opportunities to increase the extent and density of riparian vegetation at the Cottonwood Creek and the Balls Ferry units will especially benefit neotropical migrants.

A local watershed group has been spearheading local efforts to restore habitat and improve flow regimes throughout the Cottonwood Creek watershed. Among its endeavors are development and implementation of a watershed management plan, a watershed-level fire management plan, a watershed-level erosion inventory, a historical analysis of the Cottonwood Creek hydrology, and funding for environmental education focused on water quality and watershed health (CCWG 2005). These efforts have resulted in an increase in the historic return of small Chinook salmon spawning runs in the lower creek in recent years. Continued efforts are ongoing to address remaining limiting factors through additional collaborative restoration planning and implementation. The CDFG supports continued restoration efforts in the Cottonwood Creek watershed, especially those opportunities that exist in the lowermost segment of Cottonwood Creek where it runs through the MCCWA.

Riverine and riparian habitats are under stress from a number of factors, including changes in the timing and extent of flooding regimes, conversion to agriculture, gravel mining, grazing, and non-native invasive plant species. There are several invasive non-native plant species that may adversely affect the health and productivity of riparian habitats, including Himalayan blackberry.

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<sup>\*</sup> The dynamic nature of the Internet and changing technology may cause hyperlinks embedded in this document to become inactive. A list of the URLs originally connected to the hyperlinks in this document is on file with CDFG North Coast Region headquarters.

## **BIOLOGICAL DIVERSITY GOALS**

### **GOAL 1.1: Protect essential habitat for special-status species that occur in riverine and riparian habitats within or adjacent to the Wildlife Area.**

TASK 1.1.1: Identify, map and protect essential habitat for the following special-status species *known or highly likely to occur* in riverine and riparian habitats within and adjacent to the Wildlife Area (IIIC):

- Fox sedge
- Valley elderberry longhorn beetle
- Chinook salmon
- Steelhead
- Northern Pacific pond turtle
- Common loon
- Bald eagle
- Ringtail

TASK 1.1.2: Conduct presence/absence surveys for special-status species that have the potential to occur but are not known to occur in riverine and riparian habitats within and adjacent to the Wildlife Area (IVC1.1.3).

TASK 1.1.3: Ensure that actions comply with the federal and state endangered species acts and other regulations aimed at the protection of special-status species.

TASK 1.1.4: Monitor populations of special-status species periodically to assess overall habitat integrity, detect changes in distribution and abundance, and detect positive and adverse effects of management activities, human use, and/or nonnative species (IVC1.2.1).

### **GOAL 1.2: Protect and manage riverine and riparian habitat for species abundance and richness.**

TASK 1.2.1: Complete a wildlife species inventory of riverine and riparian habitats.

TASK 1.2.2: Conduct breeding bird survey in riverine and riparian habitats to establish baseline for species diversity (IVC1.1.6).

TASK 1.2.3: Monitor the distribution and relative abundance of breeding riparian birds on an annual basis as an indicator of diversity within riverine and riparian habitats on and adjacent to the Wildlife Area (IVC1.2.2).

### **GOAL 1.3: Maintain and improve connectivity in riverine and riparian habitats.**

TASK 1.3.1: Assess connectivity within and between riverine and riparian habitats on, adjacent to and nearby the Wildlife Area.

TASK 1.3.2: Explore easements, acquisitions and memoranda of understanding (MOU) with neighboring landowners to manage and restore the riparian corridor.

## **HABITAT INTEGRITY GOALS**

### **GOAL 1.4: Prevent further loss of biological integrity within riverine and riparian habitats in the Wildlife Area.**

TASK 1.4.1: Limit removal of invasive, undesirable non-native species to manual, low intensity methods until presence/absence surveys for special-status species is completed.

TASK 1.4.2: Inventory and map distributions of invasive non-native plant populations and integrate data into the GIS database (IVC1.1.7).

TASK 1.4.3: Implement the MCCWA Weed Management Plan (Appendix D) after conducting presence/absence surveys for special-status species and mapping invasive non-native plant populations.

TASK 1.4.4: Monitor the effectiveness of grazing as a vegetation management tool within the riparian areas (Appendix E) and adapt as needed

TASK 1.4.5: Collaborate with neighboring landowners in implementing habitat management practices that will strengthen the integrity of riverine and riparian habitats in and adjacent to the Wildlife Area.

### **GOAL 1.5: Maintain and manage critical habitat (as defined by the federal ESA) within riverine and riparian habitats in the Wildlife Area.**

TASK 1.5.1: Coordinate with USFWS regarding management of critical habitat for listed species potentially occurring within riverine and riparian habitats of the Wildlife Area, including:

- Valley elderberry longhorn beetle
- Spring run salmon
- Steelhead
- California red-legged frog
- Western yellow-billed cuckoo

TASK 1.5.2: Continue to collaborate with local watershed groups (Appendix H) in their efforts to facilitate watershed restoration and protection to reduce water temperature and sedimentation to improve holding, spawning and rearing habitats for salmonids.

### **GOAL 1.6: Protect and manage riparian forests to promote structural diversity and density of the understory.**

TASK 1.6.1: Set up permanent plots for annual vegetation monitoring (IVC1.1.1).

TASK 1.6.2: Set up permanent monitoring stations for annual photo monitoring of habitat (IVC1.1.2).

TASK 1.6.3: Conduct a detailed, plot-based classification of the riparian forests on the site to identify distinct subtypes based on canopy composition and microhabitat factors.

TASK 1.6.4: Identify target riparian restoration areas based on detailed mapping and community relationships.

TASK 1.6.5: Develop a riparian habitat restoration plan for MCCWA in conjunction with other regional planning efforts (IVC1.3.1; Appendix H).

**GOAL 1.7: Maintain and enhance natural environmental functions of the Cottonwood Creek floodplain.**

TASK 1.7.1: Review historic information on natural processes and conditions within the Cottonwood Creek floodplain and identify areas where natural functions have been lost.

TASK 1.7.2: Assess capacity for restoring or mimicking natural functions to improve habitat integrity.

**ENVIRONMENTAL HEALTH GOALS****GOAL 1.8: Improve environmental health of the riverine and riparian ecosystem.**

TASK 1.8.1: Conduct baseline benthic macro invertebrate (BMI) sampling along Cottonwood Creek (IVC1.1.8).

TASK 1.8.2: Sample and analyze water quality along Cottonwood Creek (IVC2.1.9).

TASK 1.8.3: Establish baseline inventory of riparian bird focal species based on breeding bird surveys (IVC1.1.6).

TASK 1.8.4: Annually monitor focal bird species as an indicator of riparian environmental health surveys (IVC1.2.2).

TASK 1.8.5: Conduct annual surveys to monitor BMIs along Cottonwood Creek (IVC1.2.4).

TASK 1.8.6: Assist neighboring landowners as needed with reducing off-site sources of pollutants in riverine and riparian habitats within the Wildlife Area.

TASK 1.8.7: Continue to work cooperatively with the Western Shasta Resource Conservation District and other agencies and groups to enhance and restore Cottonwood Creek ecological functions (IVH; Appendix H).



## 2. Freshwater Wetland Habitat Element



PHOTO: Freshwater emergent wetland on BFW1. May 2006, SEI

Freshwater emergent wetlands are among the most productive wildlife habitats in California. They provide food, cover and water for more than 225 species of birds (RHJV 2004), and numerous mammals, reptiles and amphibians. The protection of wetland habitats was the impetus for the acquisition of the MCCWA, particularly the Balls Ferry wetlands units. Created and naturally occurring wetland habitats occupy approximately 16% of the MCCWA. This biological element includes freshwater emergent wetland, natural and created ponds, streamside, and seeps.

The MCCWA supports a variety of freshwater emergent wetland types encompassing approximately 163 acres. The two Balls Ferry units provide particularly well developed wetlands, with extensive stands of bulrushes, sedges and cattails. This vegetation type is suitable for rails and bitterns and also important for nesting grebes and some passerine birds. Special-status wildlife that are potentially dependent on freshwater emergent habitat at MCCWA for breeding, foraging or loafing include Northern Pacific pond turtle, bald eagle, American white pelican, least bittern, and tricolored blackbird.

## BIOLOGICAL DIVERSITY GOALS

### **GOAL 2.1: Protect essential habitat for special-status species that occur in freshwater wetlands within or adjacent to the Wildlife Area.**

TASK 2.1.1: Identify, map and protect essential habitat for the following special-status species *known or highly likely to occur* in freshwater wetlands within and adjacent to the Wildlife Area (IIC):

- Fox sedge
- Valley elderberry longhorn beetle
- Northern Pacific pond turtle
- Greater white-fronted goose
- American white pelican
- Least bittern
- Bald eagle
- Greater sandhill crane
- Yellow-breasted chat
- Tricolored blackbird
- Yellow-headed blackbird

TASK 2.1.2: Conduct presence/absence surveys for special-status species that have the potential to occur but are not known to occur in freshwater wetlands within and adjacent to the Wildlife Area (IVC2.1.3).

TASK 2.1.3: Ensure that actions comply with the federal and state endangered species acts and other regulations aimed at the protection of special-status species.

TASK 2.1.4: Monitor populations of special-status species periodically to assess overall habitat integrity, detect changes in distribution and abundance, and detect positive and adverse effects of management activities, human use, and/or nonnative (IVC2.2.1).

### **GOAL 2.2: Protect and manage freshwater wetlands for species abundance and richness.**

TASK 2.2.1: Complete a wildlife species inventory of freshwater wetlands.

TASK 2.2.2: Conduct monthly surveys of wetland-dependent birds to establish a baseline for species diversity for one year (IVC2.1.5).

TASK 2.2.3: Conduct surveys in early spring and summer to document chorusing frogs, egg-masses, tadpoles, and juveniles (IVC2.1.6).

TASK 2.2.4: Monitor the distribution and relative abundance of wetland-dependent birds on an annual basis as an indicator of species diversity within freshwater wetlands on and adjacent to the Wildlife Area (IVC2.2.2).

### **GOAL 2.3: Maintain and improve connectivity for freshwater wetlands.**

TASK 2.3.1: Assess connectivity within and between freshwater habitats on, adjacent to and near the Wildlife Area.

TASK 2.3.2: Explore easements, acquisitions and MOU with neighboring landowners to manage and restore contiguous wetlands.

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## HABITAT INTEGRITY GOALS

### **GOAL 2.4: Prevent further loss of biological integrity within freshwater wetland habitats in the Wildlife Area.**

TASK 2.4.1: Limit removal of invasive, undesirable non-native species to manual, low intensity methods until presence/absence surveys for special-status species is completed.

TASK 2.4.2: Inventory and map distributions of invasive non-native plant populations and integrate data into the GIS database.

TASK 2.4.3: Implement the MCCWA Weed Management Plan (Appendix D) after conducting presence/absence surveys for special-status species and mapping invasive non-native plant populations.

TASK 2.4.4: Monitor the effectiveness of grazing as a vegetation management tool on wetland areas (Appendix E) and adapt as needed.

TASK 2.4.5: Collaborate with neighboring landowners in implementing habitat management practices that will strengthen the integrity of freshwater wetland habitats in and connected to the Wildlife Area.

### **GOAL 2.5: Maintain and manage critical habitat within freshwater wetlands in the Wildlife Area.**

TASK 2.5.1: Coordinate with USFWS regarding management of critical habitat for listed species potentially occurring within freshwater wetland habitats of the Wildlife Area, including

- Valley elderberry longhorn beetle
- California red-legged frog

### **GOAL 2.6: Maintain, protect, enhance and restore freshwater wetland habitat types.**

TASK 2.6.1: Set up permanent plots for annual vegetation monitoring (IVC2.1.1).

TASK 2.6.2: Set up permanent monitoring stations for annual photo monitoring of habitat conditions (IVC2.1.2).

TASK 2.6.3: Refine habitat mapping as physical access allows.

TASK 2.6.4: Identify and prioritize appropriate wetland areas for enhancement and restoration.

TASK 2.6.5: Maintain early successional freshwater emergent wetland habitat types by:

- Implementing a long-term maintenance program for freshwater marsh habitats through the use of mowing, prescriptive fire, disking, grazing, or water level manipulation during the non-nesting season to maintain optimal waterfowl habitat.
- Removing invasive water plants during the non-nesting season (Appendix D).
- Maintain varying amounts of thatch within emergent marsh vegetation to provide habitat for nesting birds.

**GOAL 2.7: Maintain and enhance natural environmental functions of freshwater wetlands within the Wildlife Area.**

TASK 2.7.1: Review historic information on wetland conditions within the Wildlife Area and assess the loss of natural hydrological functions on the integrity of natural habitats, including the impact on valley oaks.

TASK 2.7.2: Maintain, as appropriate, consistent water levels to provide high quality habitat for floating nest builders.

TASK 2.7.3: Identify areas where nesting boxes may contribute to habitat restoration in freshwater wetlands.

TASK 2.7.4: Identify areas where appropriate soil and hydrological conditions exist for creating additional wetlands and, where appropriate, use impounded water and/or water control structures to create additional wetlands.

**ENVIRONMENTAL HEALTH GOALS****GOAL 2.8: Improve environmental health of the freshwater emergent wetlands.**

TASK 2.8.1: Conduct BMI surveys in all freshwater emergent wetlands to establish a baseline data for making decisions about wetland management (IVC2.1.8).

TASK 2.8.2: Establish baseline condition for water quality by sampling and analyzing water in freshwater wetland habitats (IVC2.1.9).

TASK 2.8.3: Conduct monthly surveys of wetland-dependent birds for at least one full year to establish baseline diversity (IVC2.1.5).

TASK 2.8.4: Annually monitor focal species as an indicator of freshwater wetland health (IVC2.2.2)

TASK 2.8.5: Annually monitor BMIs and water quality in freshwater emergent wetlands (IVC2.2.4).

TASK 2.8.6: Assist neighboring landowners with reducing off-site sources of pollutants in freshwater wetlands within the Wildlife Area.

TASK 2.8.4: Continue to work cooperatively with the Western Shasta Resource Conservation District and other agencies and groups to enhance and restore wetland ecological functions (IVH; Appendix H).



### 3. Vernal Pool and Seasonal Pond Habitat Element



PHOTO: Elongated swales north of the large perennial pond on BFW1. July 2005, SEI

Vernal pool habitats are considered a “high priority” habitat type under the California Natural Diversity Database (CDFG 2003a). Vernal pool habitats are endemic to the Central Valley and provide habitat for several threatened and endangered invertebrates, including vernal pool fairy shrimp and vernal pool tadpole shrimp, and sensitive amphibians such as the California tiger salamander (*Ambystoma californiense*) and western spadefoot toad (*Spea hammondi*). An estimated 2.8 million acres of California’s vernal pools have been destroyed (over 66%); most of the remaining intact pools are on higher terraces. Migrating waterfowl are often observed feeding and resting in Central Valley vernal pools. Recent studies suggest that the protein-rich invertebrates and crustaceans, as well as the roots and leaves of vernal pool plants provide an important seasonal food source for waterfowl as well as other non-migratory bird species (San Joaquin County RCD 2002).

Two elongated low-lying areas north of the large pond on the Balls Ferry Wetland Unit 1 (BFW1) are inundated during early season, and then dry out completely in the spring. These areas support a distinctive assemblage of mostly native species characteristic of vernal pools and similar vernal wet habitats. This habitat is approximately 2 acres in extent.

## BIOLOGICAL DIVERSITY GOALS

### **GOAL 3.1: Protect the essential habitat for special-status species associated with vernal pools and other seasonal wetlands on BFW1.**

TASK 3.1.1: Conduct wet season surveys at BFW1 to document habitat conditions and potential presence of vernal pool invertebrate species described in the previous section (IIIC):

- Vernal pool fairy shrimp
- Vernal pool tadpole shrimp

TASK 3.1.2: Conduct presence/absence surveys for special status plant species that may occur in seasonal wetlands (IVC3.1.2).

TASK 3.1.3: Ensure that actions comply with federal and state endangered species acts and other regulations aimed at the protection of vernal pools and any special-status species associated with seasonal wetlands.

TASK 3.1.4: Monitor special-status species populations to periodically assess overall habitat integrity, detect changes in distribution and abundance, and detect positive and adverse effects of management activities, human use, and/or nonnative species (IVC3.2.1).

TASK 3.1.5: Reassess and adapt management practices, such as livestock grazing, limited herbicide application and native grass plantings, to protect and improve essential habitat for special-status species associated with seasonal wetlands.

### **GOAL 3.2: Protect and manage vernal pools and other seasonal wetlands for species abundance and richness.**

TASK 3.2.1: Conduct baseline plant inventories timed to phenology of specific plant species.

TASK 3.2.2: Inventory amphibians and reptiles in seasonal wetlands to establish baseline data. Conduct surveys in early spring and summer to document chorusing frogs, egg-masses, tadpoles and juveniles.

### **GOAL 3.3: Maintain and improve connectivity between vernal pools and other seasonal wetlands.**

TASK 3.3.1: Assess connectivity within and between vernal pool habitats in the general vicinity of the Wildlife Area to improve vernal pool ecosystems at a larger landscape level.

## HABITAT INTEGRITY GOALS

### **GOAL 3.4: Prevent further loss of biological integrity of seasonal wetlands within the Wildlife Area.**

TASK 3.4.1: Limit removal of invasive, undesirable non-native species to hand pulling until presence/absence surveys for special-status species is completed.

TASK 3.4.2: Monitor the effectiveness of grazing as a vegetation management tool on vernal pool/swale and seasonal pond areas (Appendix E) and adapt as needed.

TASK 3.4.3: Collaborate with neighboring landowners in implementing habitat management practices that will strengthen the integrity of vernal pool and seasonal wetland habitats in and near the Wildlife Area.

**GOAL 3.5: Maintain and manage vernal pool/swales and seasonal ponds as critical habitat in the Wildlife Area.**

TASK 3.5.1: Coordinate management planning of seasonal wetlands on BFW1 with the USFWS and its [Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon](#) (Appendix H).

**GOAL 3.6: Protect, manage, and restore vernal pool habitat to promote structural diversity and abundance of native species.**

TASK 3.6.1: Set up permanent plots for annual vegetation monitoring of seasonal wetlands (IVC3.1.5).

TASK 3.6.2: Set up permanent monitoring stations for annual photo monitoring of habitat conditions within seasonal wetlands (IVC3.1.6).

TASK 3.6.3: Complete more detailed mapping of vernal pool/swale habitat where needed.

TASK 3.6.4: Assess restoration projects in coordination with the Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon and other regional planning efforts (IVC3.3.1; Appendix H).

**GOAL 3.7: Protect, restore (or mimic) natural environmental functions within vernal pool ecosystem.**

TASK 3.7.1: Research the historic conditions of vernal pools and seasonal pond habitats on BFW1.

TASK 3.7.2: Assess capacity to restore or mimic lost environmental functions historically provided by seasonal wetlands.

**ENVIRONMENTAL HEALTH GOALS****GOAL 3.8: Improve environmental health of the vernal pool ecosystem.**

TASK: 3.8.1 Implement strategies recommended in the Recovery Plan for Vernal Pool Ecosystems for improving environmental health of seasonal wetlands on BFW1 (IVC3).

TASK 3.8.2: Assist neighboring landowners as needed with reducing off-site sources of pollutants in vernal pools and seasonal ponds within the Wildlife Area.

#### 4. Annual Grassland Habitat Element



PHOTO: Annual grassland spreads across the eastern edge of BFW1. July 2005, SEI

Grasslands are one of the most human-altered terrestrial ecosystems in California. Native perennial grassland types make up less than 1% of state grassland with the balance being dominated by non-native annual grasses. The shift from perennial to annual grasses as the dominant component of the grassland community has modified grassland community structure from a comparatively open and structurally diverse community to one characterized by dense vegetation with fairly homogenous structure. Regardless, grassland provides important habitat for many special-status wildlife and game species. In addition, sensitive elements such as vernal pools are often interspersed in grasslands (CalPIF 2000).

The MCCWA, particularly the Cottonwood Creek Unit, has areas where annual grassland habitats transition to valley oak savannah, with scattered medium to large valley oaks, as well as grassland-riparian transition zones. Oak woodlands and savannahs are another habitat at risk in California, with problems related to low regeneration, habitat fragmentation, disease, and conversion to agricultural and urban use. Non-native annual grasses tend to out-compete native perennials and young oak seedlings for soil moisture, and grazing can damage oak sapling development.

Grasslands and upland habitats are important features within the MCCWA, with the Balls Ferry wetland units having a higher percentage of this habitat than the Cottonwood Creek Unit. Within the MCCWA, there are approximately 417 acres of grassland and pasture of varying grass heights.



Short grass pastures are utilized seasonally by waterfowl, wading birds, shorebirds, and raptors. Tall and medium grass is used by a wide variety of raptors and passerine species. A diverse abundance of species including several special-status species are currently known or have the potential to be using grassland and upland ecosystems at the MCCWA. Comprehensive surveys for these species have not been conducted. If their distribution at MCCWA is more extensive than current documentation indicates, land managers may need to adjust the scope of tasks for this element.

## BIOLOGICAL DIVERSITY GOALS

### **GOAL 4.1: Protect essential habitat for special-status species that occur in annual grassland habitats within or adjacent to the Wildlife Area.**

TASK 4.1.1: Identify, map and protect essential habitat for the following special-status species *known or highly likely to occur* in annual grassland habitats within and adjacent to the Wildlife Area (IIIC)::

- White-tailed kite
- Northern harrier
- Loggerhead shrike
- Tricolored blackbird

TASK 4.1.2: Conduct presence/absence surveys for special-status species that have the potential to occur but are not known to occur in annual grassland habitats within and adjacent to the Wildlife Area (IVC4.1.3).

TASK 4.1.3: Ensure that actions comply with the federal and state endangered species acts and other regulations aimed at the protection of special-status species.

TASK 4.1.4: Monitor populations of special-status species periodically to assess overall habitat integrity, detect changes in distribution and abundance, and detect positive and adverse effects of management activities, human use, and/or nonnative species (IVC4.2.1).

TASK 4.1.5: Reassess and adapt as necessary management practices such as livestock grazing, limited herbicide application, and native grass planting intended to protect and improve essential habitat for special-status species.

### **GOAL 4.2: Protect and manage annual grassland habitat for species abundance and richness.**

TASK 4.2.1: Conduct baseline inventory of vertebrate species diversity for grassland habitats, including reptiles, amphibians, birds and mammals (IVC4.1.5)

TASK 4.2.2: Conduct breeding bird survey of annual grassland habitats to establish baseline for species diversity (IVC4.1.3).

TASK 4.2.3: Monitor the distribution and relative abundance of breeding grassland birds on an annual basis as an indicator of diversity within grassland habitats on and adjacent to the Wildlife Area (IVC4.2.1).

TASK 4.2.4: Avoid mechanical vegetation manipulation (mowing, disking, burning) during breeding season (generally until July 1, but timing can vary depending on the site).

**GOAL 4.3: Maintain and improve connectivity in annual grassland habitats.**

TASK 4.3.1: Assess connectivity between annual grassland habitats in and adjacent to the Wildlife Area.

TASK 4.3.2: Explore easements, acquisitions and MOU with neighboring landowners to manage and restore annual grassland habitats.

**HABITAT INTEGRITY GOALS****GOAL 4.4: Prevent further loss of biological integrity within annual grassland habitats in the Wildlife Area.**

TASK 4.4.1: Limit removal of invasive, undesirable non-native species to manual, low intensity methods until presence/absence surveys for special-status species are completed.

TASK 4.4.2: Inventory and map distributions of invasive non-native plant populations and integrate data into the GIS database (IVC4.1.6).

TASK 4.4.3: Implement the MCCWA Weed Management Plan (Appendix D) for grassland communities after conducting presence/absence surveys for special-status species and mapping invasive non-native plant populations.

TASK 4.4.4: Monitor the effectiveness of grazing as a vegetation management tool on grasslands (Appendix E) and adapt as needed.

TASK 4.4.5: Collaborate with neighboring landowners in implementing habitat management practices that will strengthen the integrity of annual grasslands in and adjacent to the Wildlife Area.

**GOAL 4.5: Maintain and manage critical habitat within annual grassland habitats in the Wildlife Area.**

TASK 4.5.1: Coordinate management planning of critical habitat for any listed species potentially occurring within annual grassland habitats of the Wildlife Area with USFWS.

**GOAL 4.6: Protect, manage, and restore annual grassland habitat to promote structural diversity and abundance of native species.**

TASK 4.6.1: Set up permanent plots for annual vegetation monitoring (IVC4.1.1).

TASK 4.6.2: Set up permanent monitoring stations for annual photo monitoring of habitat conditions (IVC4.1.2).

TASK 4.6.3: Complete more detailed mapping of upland and grassland habitat where needed.

TASK 4.6.4: Identify and promote feasible grassland and upland restoration projects.

TASK 4.6.5: Develop a grasslands habitat restoration plan for MCCWA in conjunction with other regional planning efforts (IVC4.3.1; Appendix H).

**GOAL 4.7: Maintain and enhance natural environmental functions and processes of grassland habitats.**

TASK 4.7.1: Review historic information on prehistoric herbivory and fire occurrence within the upland and grassland habitats of the Wildlife Area, and assess what naturally occurring functions have been lost.

TASK 4.7.2: Conduct a feasibility study for implementing an integrated range management plan that will restore natural functions (Appendix E).

TASK 4.7.3: Evaluate the benefit of prescribed burning as a means of site restoration.

**ENVIRONMENTAL HEALTH GOALS****GOAL 4.8: Improve environmental health of grassland ecosystems.**

TASK 4.8.1: Coordinate with Western Shasta Resource Conservation District to assess upland soil structure.

TASK 4.8.2: Assist neighboring landowners as needed with reducing off-site sources of pollutants in annual grassland habitats within the Wildlife Area.

TASK 4.8.3: Annually monitor focal species as an indicator of annual grassland environmental health (IVC4.2.2).

## 5. Oak Woodland Habitat Element



PHOTO: Oak woodland savannah on northern edge of BFW1. July 2005. SEI

Oak woodlands are among the most aesthetically beautiful and biologically diverse habitats in California, providing nesting habitat, forage, and shelter for a wide variety of wildlife species, as well as substantial human economic value. Over 330 species of birds, mammals, amphibians, and reptiles depend upon them during some stage of their life cycle (CalPIF 2002). Oaks contribute to overall ecosystem health by improving air quality, carbon sequestration, nutrient cycling, soil infiltration rates, maintaining water quality, and reducing sedimentation and erosion (Dalhgren and Singer 1991). As with other high value habitats, oak woodlands and savannahs are at risk in California due to problems related to low regeneration, habitat fragmentation, disease, and conversion to agricultural and urban use. Only about one-third of the 10 to 12 million acres of oak woodlands that once covered California's valleys and hills remain (Tehama RCD 2005).

For planning purposes, this element includes valley oak savanna and the transitional grassland-riparian habitat. Valley oak savanna represents a small but important portion of the MCCWA (50 acres, or approximately 5%), and is distributed mostly on the Cottonwood Creek Unit. The transitional grassland-riparian habitat type includes scattered valley oaks, along with other more typical riparian associates and also comprises about 5% of the total area (46 acres).



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## BIOLOGICAL DIVERSITY GOALS

### **GOAL 5.1: Protect essential habitat for special-status species that occur in oak woodlands within or adjacent to the Wildlife Area.**

TASK 5.1.1: Identify, map and protect essential habitat for the following special-status species *known or highly likely to occur* in valley oak riparian and woodland habitats within and adjacent to the Wildlife Area (IIIC):

- White-tailed kite
- Bald eagle
- Purple martin
- Pallid bat
- Ringtail

TASK 5.1.2: Conduct presence/absence surveys for special-status species that have the potential to occur but are not known to occur in valley oak riparian and woodland habitats within and adjacent to the Wildlife Area (IVC5.1.3).

TASK 5.1.3: Ensure that actions comply with the federal and state endangered species acts and other regulations aimed at the protection of special-status species.

TASK 5.1.4: Monitor populations of special-status species periodically to assess overall habitat integrity, detect changes in distribution and abundance, and detect positive and adverse effects of management activities and human use (IVC5.2.1).

TASK 5.1.5: Reassess and adapt management practices as needed to protect and improve essential habitat for special-status species.

### **GOAL 5.2: Protect and manage oak woodlands for species abundance and richness.**

TASK 5.2.1: Conduct general wildlife surveys in oak woodland habitats to develop an inventory of species known to occur on site (IVC5.1)

TASK 5.2.2: Conduct annual breeding bird surveys to monitor the distribution and relative abundance of breeding birds as an indicator of diversity within oak woodlands in and adjacent to the Wildlife Area (IVC5.2.2).

### **GOAL 5.3: Maintain and improve connectivity of oak woodlands.**

TASK 5.3.1: Assess connectivity within and between oak woodlands in, adjacent to, and near the Wildlife Area.

TASK 5.3.2: Explore easements, acquisitions and MOU with neighboring landowners to manage and restore oak woodland habitats.

## **HABITAT INTEGRITY GOALS**

### **GOAL 5.4: Prevent further loss of biological integrity of oak woodlands within the Wildlife Area.**

TASK 5.4.1: Limit removal of invasive, undesirable non-native species to manual, low intensity methods until presence/absence surveys for special-status species are completed.

TASK 5.4.2: Inventory and map distributions of invasive non-native plant populations and integrate data into the GIS database (IVC5.1.7).

TASK 5.4.3: Implement the MCCWA Weed Management Plan (Appendix D) after conducting presence/absence surveys for special-status species and mapping invasive non-native plant populations.

TASK 5.4.4: Monitor the effectiveness of grazing as a vegetation management tool around valley oaks (Appendix E) and adapt as needed.

TASK 5.4.5: Develop an integrated hardwood management plan for preserving oak woodland habitats in the Wildlife Area.

### **GOAL 5.5: Maintain and manage critical habitat within oak woodlands in the Wildlife Area.**

TASK 5.5.1: Coordinate management planning of critical habitat for any listed species potentially occurring within valley oak riparian forests and valley oak savannas in the Wildlife Area with USFWS.

### **GOAL 5.6: Protect, manage, and promote structural diversity of valley oak riparian forests and valley oak savannas in the Wildlife Area.**

TASK 5.6.1: Set up permanent plots for annual vegetation monitoring within valley oak riparian forest habitats and valley oak savannas (IVC5.1.1).

TASK 5.6.2: Set up permanent monitoring stations for annual photo monitoring of habitat conditions within valley oak habitats (IVC5.1.2).

TASK 5.6.3: Survey and map unique habitat features such as downed wood and snags within valley oak woodlands, and incorporate these features into the GIS database (IVC5.1.6).

TASK 5.6.4: Identify priority valley oak restoration and regeneration sites within the Wildlife Area.

TASK 5.6.5: Improve habitat in the oak woodland ecosystems throughout the Wildlife Area through the adaptive management of livestock grazing, limited herbicide application, native grass plantings, and other management techniques.

TASK 5.6.6: Develop a valley oak preservation and regeneration plan in coordination with regional planning efforts (IVC5.3.1; Appendix H).

**GOAL 5.7: Maintain and enhance natural environmental functions and processes within valley oak habitats.**

TASK 5.7.1: Research information on the natural occurrence of herbivory, fires and wetlands in the Wildlife Area, and assess how these environmental functions contributed to the integrity of valley oak habitats.

TASK 5.7.2: Assess the value of using livestock grazing as a tool to mimic prehistoric herbivory in oak woodland habitats (Appendix E).

TASK 5.7.3: Assess the value of removing Himalayan blackberries from valley oak riparian areas.

TASK 5.7.4: Evaluate the use of prescribed burns to assist in maintaining valley oak habitats.

TASK 5.7.5: Identify areas where nesting boxes may contribute to species abundance and diversity in oak woodlands.

**ENVIRONMENTAL HEALTH GOALS****GOAL 5.8: Improve environmental health of oak woodland ecosystems.**

TASK 5.8.1: Conduct baseline inventory of focal bird species utilizing different attributes of oak woodland habitats (IVC5.2.2).

TASK 5.8.2: Coordinate with Western Shasta Resource Conservation District to conduct soil surveys in valley oak habitats.

TASK 5.8.3: Avoid large-scale changes to water management practices without assessing long-term effects to oak woodlands.

TASK 5.8.4: Assist neighboring landowners as needed with reducing off-site sources of pollutants that threaten oak woodland habitats within the Wildlife Area.

TASK 5.8.5: Annually monitor focal species as an indicator of the environmental health of oak woodland habitats in the Wildlife Area (IVC5.2.2).

## C. Biological Monitoring Elements

*Biological monitoring is a necessary component of the California Department of Fish and Game's mission "to manage California's diverse fish, wildlife, and plant resources, and the habitats upon which they depend" as well as a critical component of implementing an adaptive management program for ecological systems. To date, however, very little data have been collected on baseline conditions at the Mouth of Cottonwood Creek Wildlife Area. The phased approach presented here will enable the department to begin data collection, analysis and assessments in coordination with regional habitat conservation planning efforts. It is also intended to add to the body of knowledge about species, habitats and natural communities in the region as well as provide feedback on the effectiveness of land management practices.*

Biological monitoring elements are focused on the same priority habitat elements for which biological goals were developed in the previous section (IVB):

1. Riverine and Riparian Habitat Monitoring Element
2. Freshwater Wetland Habitat Monitoring Element
3. Vernal Pool and Seasonal Pond Habitat Monitoring Element
4. Annual Grassland Habitat Monitoring Element
5. Oak Woodland Habitat Monitoring Element

Special-status species, including federal and state listed species, species of special concern and species listed by the California Native Plant Society (CNPS), are addressed within the habitat element in which they are found or potentially could occur at the Mouth of Cottonwood Creek Wildlife Area (MCCWA).

### Establishing an Adaptive Management Approach

Land managers are frequently confronted with the quandary of how to manage resources with limited funding and partial information. One approach to this challenge is to simply begin, then adapt practices as knowledge increases. This approach starts by basing the management plan on the broadest ecological level (habitat), then working towards a comprehensive ecological inventory of the site, integrating data as it becomes available, measuring data against indicators of success, and modifying management strategies as new information is learned. This is the backbone of a comprehensive and adaptive land management plan.

Measuring ecosystem condition and responses of the ecosystem to both intentional (e.g., management actions) and natural changes (e.g., flooding) is a critical piece of the adaptive management feedback loop. Over time, monitoring indicates trends in species and habitats (e.g., increasing, decreasing, static) that may be correlated to specific conservation and management activities.

While some management activities are straight forward (trash removal, sign posting), other management activities produce much greater uncertainty (habitat restoration). Due to the complex variables and uncertainty involved in managing and monitoring ecosystems and special-status species, the development of a biological monitoring and implementation program typically proceeds in the three phases (Atkinson et al. 2004).



**Phase 1: Baseline Data Collection**

*Inventorying resources and identifying relationships.*

The main goal of Phase 1 is to determine the baseline condition of the system as a prelude to long-term monitoring program design. This generally involves an inventory of what species, habitats, and other resources are present, their locations and general conditions. Some management can be applied during this phase but generally this should be limited to actions of known impact, such as hand-removal of weeds, or maintaining existing habitat management practices, such as water distribution or grazing, until such practices can be appropriately evaluated.

**Phase 2: Long-Term Monitoring Set Up**

*Pilot testing of long-term monitoring protocols and resolving critical management uncertainties.*

Phase 2 is characterized by testing long-term monitoring protocols and sampling models to select cost-effective designs with sufficient statistical power to detect biologically relevant and management-relevant changes. The pilot phase often progresses through an iterative process, including revisions to protocols and comparisons of multiple methods. In addition, the pilot phase is an opportunity to conduct targeted studies to resolve critical management uncertainties and refine conceptual models based on emerging information.

**Phase 3: Reassessment and Adjustments**

*Implementing long-term monitoring and adaptive management.*

Phase 3 activities include implementation of long-term monitoring protocols and periodic evaluation and refinement of the monitoring program. The program continues to address uncertainties, principally by evaluating responses to management and extreme events. Emerging uncertainties are also addressed and prioritized, such as a new invasive species or pollution source. *Due to the general lack of baseline data on the MCCWA, this document is not able to address Phase 3 since it will depend largely on the findings of Phases 1 and 2.*

**Adaptive Management at the MCCWA**

*Critical Needs*

**Conducting Focused Surveys for Special-Status Species.** A primary concern of the CDFG is the protection of special-status species and their habitats. Since little is known about the presence of special-status species at the MCCWA, this management plan makes conducting focused surveys for both plants and wildlife species a top priority. Monitoring the presence of special-status species within and adjacent to the Wildlife Area will contribute the scientific understanding of regional population trends for these species and will provide valuable information about the overall health of ecosystems at a larger landscape level.

Populations of two special-status plants, silky crypstantha and fox sedge, were documented during reconnaissance-level and focused surveys. Some of the special-status wildlife observed at the MCCWA include Northern Pacific pond turtle, American white pelican, bald eagle, northern

harrier, white-tailed kite, peregrine falcon, yellow-breasted chat, and yellow warbler. Comprehensive surveys assessing the distribution of these species at the Wildlife Area will determine the need for and scope of the other tasks in this section.

Regionally, substantial losses of historic habitat used by neotropical migratory song birds suggest that population levels for many of these species are declining. Continued management of existing habitat, along with restoration of additional suitable wetland, riparian and grassland habitats in the Wildlife Area, is important to maintaining healthy neotropical migrant bird populations. Increasing the structural diversity of riparian vegetation at the MCCWA will benefit these species by improving nesting habitat and reducing nest parasitism and predation.

**Monitoring Focal Species.** Focal species are those whose habitat requirements define different spatial attributes, habitat characteristics and management regimes characteristic of healthy ecosystems. For example, both the Western scrub-jay and, to a lesser degree, the yellow-billed



PHOTO: Western scrub jay in flight with throat and beak engorged with acorns.  
© [Mike Spinak](#). All rights reserved.

magpie cache acorns individually in the ground. Because many of these acorns remain unretrieved and germinate, they are the only species among caching birds to facilitate oak regeneration (CalPIF 2002).

Since birds occupy a wide variety of ecological niches and are relatively easy to monitor in comparison to other taxa, they are often used as focal species for monitoring. Many of the focal bird species identified by California Partners in Flight (CalPIF) have been observed at the MCCWA. Focal species for each habitat type are provided in this element. Monitoring their annual status is key to

understanding trends in the health of ecosystems within the Wildlife Area and the region.

**Collecting Useful Scientific Data.** Data management begins with proper collection and recordkeeping in the field. Inventories and sampling protocols must be established so that different people can gather comparable datasets over time. Protocols should not be overly reliant on technology that is likely to change or become obsolete so that datasets are no longer replicable. Data must also be reported consistently to serve an adaptive management purpose.

CDFG's Species and Natural Communities Monitoring and Assessment Program is working to develop and implement a long-term and strategic program to inventory, monitor, and assess the distribution and abundance of priority species, habitats, and natural communities in California. This strategic program will bring many of the varied data collection, compilation, and dissemination efforts under the "umbrella" of a systematic and more comprehensive effort. The intent of the program is to more effectively address resource assessment priorities and refocus existing efforts in the collection, analysis, and use of data on native fish, wildlife, plants, and communities. A list of data, mapping and assessment resources, both internal and external to CDFG, appears in Appendix G.

**Providing Quality Control.** CDFG should guide the setup and implementation of the biological monitoring program, including development of the quality assurance program and specific protocols for data sampling. MCCWA personnel should also coordinate with larger regional resource planning serves to improve the long-term viability of habitats and species while providing access to additional data and technical expertise.

## 1. Riverine and Riparian Habitat Monitoring Element

### *Adaptive Management Plan*



Riparian corridors are generally more productive and have higher plant species richness than surrounding upland ecosystems. However, because of naturally high rates of hydrological disturbance and high edge-to-area ratios at both the landscape and localized patch scales, riparian habitat systems are susceptible to invasion by non-native plants, which may constitute 25% to 30% of species (Malanson 1993, Planty-Tabacchi et al. 1996). Parameters for monitoring patterns in riparian vegetation include woody and herbaceous plant cover, species richness

or composition (including relative importance of non-native and upland species), size/age structure of dominant riparian trees, and total vegetation volume.

### PHASE 1: BASELINE DATA COLLECTION

#### **GOAL 1.1: Complete a resources inventory of riverine and riparian habitats and identify relationships between biological elements.**

**TASK 1.1.1:** *Set up permanent plots for annual vegetation monitoring.* Permanent vegetation monitoring plots provide consistent reference points from which to measure and monitor changes in species distribution, plant density, and canopy cover within a given habitat (Elzinga et al. 2001). These data are especially valuable when undertaking habitat restoration. Permanent vegetation monitoring plots should be established in each of the habitat types at the MCCWA.

**TASK 1.1.2:** *Set up permanent photo monitoring stations for annual documentation of habitat conditions.* Photographs are by far the easiest monitoring tool available to a manager. They are an inexpensive visual record of the site over time. Establishing permanent photo points in each of the habitats at the MCCWA will provide another method of documenting changes and compliment other monitoring programs.

**TASK 1.1.3:** *Conduct presence/absence surveys for special-status species (flora and fauna) using accepted federal and state protocols, and submit occurrence data to CNDDDB.* Special-status species that have the potential to occur but are not known to occur in riverine and riparian habitats within and adjacent to the Wildlife Area (IIIC):

- Silky cryptantha
- Western yellow-billed cuckoo
- Willow flycatcher
- Purple martin
- Bank swallow
- California yellow warbler
- Yellow-breasted chat
- Pallid bat

Focused surveys for silky cryptantha needed to be conducted along the Cottonwood Creek floodplain. This special-status plant species was noted during 1994 surveys but not during the 2006 botanical resource surveys. It is likely the plant was not rediscovered because the Cottonwood Creek channel has shifted several times during the intervening years. Additional surveys should be conducted to assess the status of this plant at the MCCWA. The extent and location of all special-status plant populations should be documented using GPS and added to the GIS database for the MCCWA.

*TASK 1.1.4: Conduct bat surveys (using Anabat software or similar tool) to determine species utilization of the MCCWA.* The particular combination of habitats at the MCCWA (riparian, freshwater emergent wetland, grasslands, and oak savanna) may support the pallid bat as well as other bat species.

*TASK 1.1.5: Conduct a detailed, plot-based classification of the riparian forests* on the site to identify distinct subtypes based on canopy composition and microhabitat factors using Rapid Assessment Protocol (CNPS 2006).

*TASK 1.1.6: Conduct breeding bird surveys of riverine and riparian habitats.* Use either area searches or point counts to determine species composition and presence/absence of special-status species (Ralph et al. 1993). Birds are sensitive indicators of environmental conditions because of their high metabolic rate, their relatively high position in the food chain and their distribution across a wide variety of habitats (RHJV 2004). A large number of bird species breed in riparian habitat in California; many others use riparian areas during some portion of their life cycle. By managing for a diversity of birds species, CDFG will also protect many other elements of biodiversity and the natural processes that are integral to the riparian ecosystem (e.g., bank swallows depend upon regular high-water events to create exposed riverbank sites that they use for nesting).

*TASK 1.1.7: Inventory and map distributions of invasive non-native plant populations* and integrate data into the GIS database for MCCWA. Mapping invasive plant populations is the first step in prioritizing management activities directed towards controlling their spread (Appendix D).

*TASK 1.1.8: Conduct baseline BMI sampling along Cottonwood Creek* using CDFG's protocol for BMI surveys in low gradient streams (CDFG 2003b). Using aquatic macro invertebrates to monitor water quality is by far the most popular method used throughout the world. Aquatic macro invertebrates are ubiquitous, relatively stationary and their large species diversity provides a spectrum of responses to environmental stresses. BMI monitoring programs have been developed throughout the United States using citizen volunteers and students (USEPA 2000).

## **PHASE 2: LONG-TERM MONITORING SET UP**

### **GOAL 1.2: Test long-term monitoring strategies and resolve critical management uncertainties.**

*TASK 1.2.1: Establish cooperative agreements with local and regional conservation groups and resource agencies to enhance special-status species habitats and monitor regional special-status species populations.* Monitoring populations of special-status species should be conducted periodically to assess overall habitat integrity, detect changes in distribution and abundance, and



detect positive and adverse effects of management activities, human use, and/or nonnative species.

**TASK 1.2.2:** *Monitor the distribution and relative abundance of breeding riparian birds on an annual basis* using area searches or point counts of locally occurring focal species identified in the Riparian Bird Conservation Plan (RHVJ 2004) (Figure a).

**TASK 1.2.3:** *Implement a grazing management and monitoring plan for the MCCWA*, with special emphasis upon assessing grazing effects on riparian habitat. Due to the presence of water and shade, riparian ecosystems are subject to more intense grazing pressure than adjacent uplands. The Sustainable Rangelands Roundtable (2006) has identified 27 core indicators for rangeland monitoring including percentage of bare ground, erosion, changes in the biotic assemblage in wetland habitats (including BMIs), water quality, and plant and animal community composition. Many of these indicators overlap with other biological monitoring tasks identified in this plan (IVF3; Appendix E).

**TASK 1.2.4:** *Annually monitor species diversity and abundance of BMIs along Cottonwood Creek*, coordinating efforts if possible with the activities of the Balls Ferry Research and Education Center (IVE) or local watershed groups (Appendices G and H).

**TASK 1.2.5:** *Establish long-term monitoring protocols for riverine and riparian habitats* after evaluating monitoring strategies and environmental responses to management practices. Phase 3 of adaptive management planning should address any changing conditions and include periodic evaluation and refinement of the monitoring program.

## COORDINATION WITH REGIONAL CONSERVATION PLANNING

**GOAL 1.3: Improve the connectivity, integrity and health of riverine and riparian habitats at the MCCWA and at the larger landscape level.**

**TASK 1.3.1:** Obtain, as necessary, and review regional conservation plans (Appendix H) pertaining to riverine and riparian habitats at the MCCWA, including:

- *CALFED Ecosystem Restoration Program* (CALFED Bay-Delta Authority)
- *California Riparian Habitat Conservation Program* (Wildlife Conservation Board)
- *Cottonwood Creek Watershed Management Plan* (Cottonwood Creek Watershed Group)
- *Neotropical Migratory Bird Conservation Act* (USFWS)
- *Riparian Bird Conservation Plan* (Riparian Habitat Joint Venture)
- *Sacramento River Conservation Area, Management Guidelines* (Sacramento River Advisory Council)
- *Shasta County General Plan, Stream Corridor Protection Plan* (Shasta County)

Collaboration with the agencies and groups responsible for implementing these plans (IVH; Appendix H) will help optimize the value of CDFG land acquisitions, management of critical habitat, and restoration activities.

**Figure a. Riverine and Riparian Focal Species**



**Warbling vireo** © Ted Ardley



**Tree swallow** © Lars Erik Johannesse



**Yellow warbler** © 2007 Ron Wolf



**Common yellowthroat** © 2008 Ron Wolf



**Yellow-breasted chat** © fogle



**Song sparrow** © 2005 Stephen Dowlan

## 2. Freshwater Wetland Habitat Monitoring Element

### *Adaptive Management Plan*



All freshwater wetland habitat types that occur at the MCCWA have been grouped for this discussion since they share similar attributes and challenges. Wetland habitat management requires juggling a challenging set of variables, including water quantity, quality, plant succession, and wildlife use. Aside from the Cottonwood Creek Wetland Mitigation Bank, little is presently known about the status or condition of the wetland habitats at the

MCCWA. It is important to quantify the existing conditions in order to determine appropriate long-term management strategies and actions, and to evaluate the outcome of those activities.

### PHASE 1: BASELINE DATA COLLECTION

#### **GOAL 2.1: Complete a resources inventory of freshwater wetland habitats and identify relationships between biological elements.**

**TASK 2.1.1:** *Set up permanent plots for annual vegetation monitoring.* Permanent vegetation monitoring plots provide consistent reference points from which to measure and monitor changes in species distribution, plant density, and canopy cover within a given habitat (Elzinga et al. 2001). These data are especially valuable when undertaking habitat restoration. Permanent vegetation monitoring plots should be established in each of the habitat types at the MCCWA.

**TASK 2.1.2:** *Set up permanent photo monitoring stations for annual documentation of habitat conditions.* Photographs are by far the easiest monitoring tool available to a manager. They are an inexpensive, visual record of the site over time. Establishing permanent photo points in each of the habitats at the MCCWA will provide another method of documenting changes and complement other monitoring programs.

**TASK 2.1.3:** *Conduct presence/absence surveys for special-status species using accepted federal and state protocols and submit occurrence data to CNDDDB.* Special-status species that have the potential to occur but are not known to occur in freshwater wetland habitat within and adjacent to the Wildlife Area (IIIC):

- Henderson's bent grass
- Pointed broom sedge
- Boggs Lake hedge-hyssop
- Red Bluff dwarf rush
- Sanford's arrowhead
- Northern Pacific pond turtle
- Redhead
- Least bittern
- Tricolored blackbird
- Yellow-headed blackbird
- Pallid bat

**TASK 2.1.4:** *Conduct bat surveys (using Anabat software or similar tool) to determine species utilization of the MCCWA.* The particular combination of habitats at the MCCWA (riparian, freshwater emergent wetland, grasslands, and oak savanna) may support pallid bat as well as other bat species.

**TASK 2.1.5:** *Conduct monthly surveys of wetland dependant birds for at least one full year to establish baseline for species diversity.*

**TASK 2.1.6:** *Inventory amphibian and reptiles in wetland habitats.* Surveys should be conducted in early spring and summer to document chorusing frogs, egg-masses, tadpoles and juveniles. A survey for Western pond turtles and their potential nesting sites also needs to be conducted. All occurrences of special-status species should be documented and mapped.

**TASK 2.1.7:** *Inventory and map distributions of invasive non-native plant populations and integrate data into the GIS database.*

**TASK 2.1.8:** *Conduct BMI surveys in all freshwater emergent wetlands using approved CDFG and Environmental Protection Agency (EPA) protocols.* Wetland invertebrates occur in the entire spectrum of available aquatic wetland habitats and conditions. They are found in the sediment, in the water column, on and amongst the submerged and emergent vegetation. They are found in abundance in large and small, and permanent and seasonal wetlands. Wetland macro invertebrates have a greater tolerance of low dissolved oxygen concentrations than stream macro invertebrates, but they are still sensitive to a variety of physical and chemical factors. Invertebrate community data and Index of Biological Integrity (IBI) can be used for various wetland management needs and decisions, including:

- Condition monitoring (status and trends)
- Problem investigation monitoring
- Wetland mitigation effectiveness monitoring
- Total maximum daily load (TMDL) investigations, including listing, delisting, and effectiveness of implementation.

**TASK 2.1.9:** *Sample and analyze water quality in wetlands at both the Balls Ferry Units and Cottonwood Creek Unit* (dissolved oxygen, temperature, PH, turbidity, total and fecal coliforms, *E. coli*). The general topography of this area of Shasta County slopes south and east toward the Sacramento River; therefore, water used at the MCCWA eventually drains toward the Sacramento River. With the added influence of irrigated pasture and grazing, it is important to monitor water quality as it moves through the wetlands to understand and quantify potential water quality issues related to management of these properties.

## **PHASE 2: LONG-TERM MONITORING SET UP**

**GOAL 2.2: Test long-term monitoring strategies and resolve critical management uncertainties.**

**TASK 2.2.1:** *Establish cooperative agreements with local and regional conservation groups and resource agencies to enhance special-status species habitats and monitor regional special-status species populations.* Monitoring populations of special-status species should be conducted periodically to assess overall habitat integrity, detect changes in distribution and abundance, and



detect positive and adverse effects of management activities, human use, and/or nonnative species.

**TASK 2.2.2:** *Monitor the distribution and relative abundance of wetland-dependent birds on an annual basis* using area searches or point counts of locally occurring focal species identified in the Riparian Bird Conservation Plan (RHJV 2004) (Figure b).

**TASK 2.2.3:** *Implement a grazing management and monitoring plan for the MCCWA.* Land managers should continue to work cooperatively with the Western Shasta Resource Conservation District and grazing lessees to implement a grazing management and monitoring plan for both the Balls Ferry Wetland Units with special emphasis upon assessing grazing effects on grassland and wetland habitats and water quality (IVF3; Appendix E). The University of California Cooperative Extension (UCCE) Services may be available to help oversee this task.

**TASK 2.2.4:** *Annually monitor species diversity and abundance of BMIs and water quality parameters,* coordinating efforts if possible with the activities of the Balls Ferry Research and Education Center (IVE) or local watershed groups (Appendices G and H).

**TASK 2.2.5:** *Establish long-term monitoring protocols for freshwater wetland habitats* after evaluating monitoring strategies and environmental responses to management practices. Phase 3 of adaptive management planning should address any changing conditions and include periodic evaluation and refinement of the monitoring program.

## COORDINATION WITH REGIONAL CONSERVATION PLANNING

**GOAL 2.3: Improve the connectivity, integrity and health of freshwater wetland habitats at the MCCWA and at the larger landscape level.**

**TASK 2.3.1:** Obtain, as necessary, and review regional conservation plans (Appendix H) pertaining to freshwater wetland habitats at the MCCWA, including:

- *California Wetlands Conservation Policy* (California EPA)
- *Central Valley Project Conservation Program Habitat Restoration Program* (U.S. Bureau of Reclamation, USFWS and CDFG)
- *Cottonwood Creek Mitigation Bank* (CDFG)
- *Inland Wetlands Conservation Program* (WCB)
- *North American Waterfowl Management Plan* (Central Valley Joint Venture)

Collaboration with the agencies and groups responsible for implementing these plans (IVH; Appendix H) will help optimize the value of CDFG land acquisitions, management of critical habitat, and restoration activities.

**Figure b. Freshwater Wetland Focal Species**



**Common yellowthroat** © 2008 Ron Wolf



**Yellow-breasted chat** © fuggle



**Song sparrow** © 2005 Stephen Dowlan

### 3. Vernal Pool and Seasonal Pond Habitat Monitoring Element

#### *Adaptive Management Plan*



Two elongated low-lying areas north of the large pond on BFW1 are inundated early in the season, and then dry out completely in the spring. These areas, approximately 2 acres in extent, support a distinctive assemblage of mostly native plant species characteristic of vernal pools and similar vernal wet habitats. To date there have been no protocol level surveys for vernal pool invertebrates.

Near the southwest corner of BFW1 there is a small but fairly deep pond that mostly dries out in late season, although the deepest part may contain water permanently. It supports an assemblage of mostly native species including the native aquatic herb diverse-leaved pondweed. There is considerable pale spike-rush around the margins and, at the outer margins, considerable pennyroyal. The dry bed is almost bare but supports native species characteristic of vernal wet habitats, including stalked popcorn-flower, Hoover's downingia, smooth lasthenia, and bractless hedge-hyssop.

#### PHASE 1: BASELINE DATA COLLECTION

**GOAL 3.1: Complete a resources inventory of vernal pool and seasonal pond habitats and identify relationships among biological elements.**

**TASK 3.1.1:** *Set up permanent plots for annual vegetation monitoring.* Permanent vegetation monitoring plots provide consistent reference points from which to measure and monitor changes in species distribution, plant density, and canopy cover within a given habitat (Elzinga et al. 2001). These data are especially valuable when undertaking habitat restoration. Permanent vegetation monitoring plots should be established in each of the habitat types at the MCCWA.

**TASK 3.1.2:** *Set up permanent photo monitoring stations for annual documentation of habitat conditions.* Photographs are by far the easiest monitoring tool available to a manager. They are an inexpensive, visual record of the site over time. Establishing permanent photo points in each of the habitats at the MCCWA will provide another method of documenting changes and complement other monitoring programs.

**TASK 3.1.3:** *Conduct wet season vernal pool invertebrate surveys at BFW1 to document habitat conditions and potential presence of vernal pool invertebrate species.* A qualified biologist will be required to conduct this assessment.

**TASK 3.1.4:** *Conduct presence/absence surveys for special-status species using accepted federal and state protocols and submit occurrence data to CNDDDB.* Special-status species that have the potential to occur but are not known to occur in vernal pool and seasonal pond habitat within and adjacent to the Wildlife Area (IIC):

- Henderson's bent grass Boggs lake hedge-hyssop
- Red bluff dwarf rush
- Legenere

- Slender Orcutt grass
- Ahart's paronychia
- Sanford's arrowhead

**TASK 3.1.5:** *Inventory amphibians and reptiles in vernal pool/swale habitats to establish baseline data.* Conduct surveys in early spring and summer to document chorusing frogs, egg-masses, tadpoles and juveniles.

**TASK 3.1.6:** *Limit removal of invasive, undesirable non-native species to hand-pulling until presence/absence surveys for special status species are completed.*

## **PHASE 2: LONG-TERM MONITORING SET UP**

**GOAL 3.2: Test long-term monitoring strategies and resolve critical management uncertainties.**

**TASK 3.2.1:** *Establish cooperative agreements with local and regional conservation groups and resource agencies to enhance special-status species habitats and monitor regional special-status species populations.* Monitoring populations of special-status species should be conducted periodically to assess overall habitat integrity, detect changes in distribution and abundance, and detect positive and adverse effects of management activities, human use, and/or nonnative species.

**TASK 3.2.2:** *Monitor vernal pools and seasonal pond habitat during early spring and summer every year* using standard protocol for vertebrate and invertebrate species.

**TASK 3.2.3:** *Monitor the implementation of grazing as a vegetation management tool on the vernal pool/swale and seasonal pond areas* of BFW1 (Appendix E) and adapt as needed.

**TASK 3.2.4:** *Establish long-term monitoring protocols for vernal pools and other seasonal wetlands* after evaluating monitoring strategies and environmental responses to management practices. Phase 3 of adaptive management planning should address any changing conditions and include periodic evaluation and refinement of the monitoring program.

## **COORDINATION WITH REGIONAL CONSERVATION PLANNING**

**GOAL 3.3: Improve the connectivity, integrity and health of vernal pools and seasonal wetland habitats at the MCCWA and at the larger landscape level.**

**TASK 3.3.1:** Obtain, as necessary, and review regional conservation plans (Appendix H) pertaining to vernal pools and seasonal wetland habitats at the MCCWA, including:

- *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (USFWS)
- *North American Waterfowl Management Plan* (Central Valley Joint Venture)

Collaboration with the agencies and groups responsible for implementing these plans (IVH; Appendix H) will help optimize the value of CDFG land acquisitions, management of critical habitat, and restoration activities.



## 4. Annual Grassland Habitat Monitoring Element

### *Adaptive Management Plan*



Annual grasslands represent approximately 41% of the total area of the MCCWA (approximately 417 acres). Grassland habitats at the Wildlife Area are artifacts of previous land use regimes, including cultivated crops and grazing, and have become dominated by nonnative annual grasses and forbs. In the absence of grazing and fire, annual grasslands require active management to maintain their ecological integrity and structural diversity.

Grassland habitat management activities may include prescriptive burning, grazing, mechanical treatments, and/or selective herbicide use. Since there has been no focused grassland management at the Cottonwood Creek Unit since CDFG acquired the property, there is an unusual opportunity to establish ecological baseline conditions, develop management scenarios that address long-term biological goals, and monitor the effectiveness of these strategies.

### PHASE 1: BASELINE DATA COLLECTION

**GOAL 4.1: Complete a resources inventory of annual grassland habitats and identify relationships between biological elements.**

**TASK 4.1.1:** *Set up permanent plots for annual vegetation monitoring.* Permanent vegetation monitoring plots provide consistent reference points from which to measure and monitor changes in species distribution, plant density, and canopy cover within a given habitat (Elzinga et al. 2001). These data are especially valuable when undertaking habitat restoration. Permanent vegetation monitoring plots should be established in each of the habitat types at the MCCWA.

**TASK 4.1.2:** *Set up permanent photo monitoring stations for annual documentation of habitat conditions.* Photographs are by far the easiest monitoring tool available to a manager. They are an inexpensive, visual record of the site over time. Establishing permanent photo points in each of the habitats at the MCCWA will provide another method of documenting changes and complement other monitoring programs.

**TASK 4.1.3:** *Conduct presence/absence surveys for special-status species using accepted federal and state protocols and submit occurrence data to CNDDDB.* Special-status species that have the potential to occur but have not yet been documented in the annual grassland habitats within and adjacent to the Wildlife Area include (IIC):

- Henderson's bent grass
- Pointed broom sedge
- Ahart's paronychia
- Red-flowered lotus
- Swainson's hawk
- Loggerhead shrike

- Yellow-breasted chat
- Pallid bat

*TASK 4.1.4: Conduct bat surveys (using Anabat software or similar tool) to determine species utilization of the MCCWA.* The particular combination of habitats at the MCCWA (riparian, freshwater emergent wetland, grasslands, and oak savanna) may support pallid bat as well as other bat species.

*TASK 4.1.5: Conduct baseline inventory of vertebrate species of grassland habitats, including reptiles, amphibians, birds and mammals.*

*TASK 4.1.6: Survey and map target noxious non-native grasses and forbs in annual grassland habitats (Appendix D).*

## PHASE 2: LONG-TERM MONITORING SET UP

### GOAL 4.2: Test long-term monitoring strategies and resolve critical management uncertainties.

*TASK 4.2.1: Establish cooperative agreements with local and regional conservation groups and resource agencies to enhance special-status species habitats and monitor regional special-status species populations.* Monitoring populations of special-status species should be conducted periodically to assess overall habitat integrity, detect changes in distribution and abundance, and detect positive and adverse effects of management activities, human use, and/or nonnative species.

*TASK 4.2.2: Conduct annual breeding bird surveys* in grassland habitats using standardized protocols, such as point counts (CalPIF 2000) (Figure c)

*TASK 4.2.3: Monitor the response of grassland species to management strategies,* including grazing, prescriptive burning, mechanical treatment or herbicide use.

*TASK 4.2.4: Assess the effectiveness of grazing as a vegetation management tool in annual grassland habitats and adjust as needed (IVF3; Appendix E).*

*TASK 4.2.5: Establish long-term monitoring protocols for annual grassland habitats* after evaluating monitoring strategies and environmental responses to management practices. Phase 3 of adaptive management planning should address any changing conditions and include periodic evaluation and refinement of the monitoring program.

## COORDINATION WITH REGIONAL CONSERVATION PLANNING

### GOAL 4.3: Improve the connectivity, integrity and health of annual grassland habitats at the MCCWA and at the larger landscape level.

*TASK 4.3.1: Obtain, as necessary, and review regional conservation plans (Appendix H) pertaining to annual grassland habitats at the MCCWA, including:*

- *Draft Grassland Bird Conservation Plan* (California Partners in Flight)
- *Habitat Enhancement and Restoration Program* (General) (WCB)
- *Shasta Cooperative Weed Management Area* (California Department of Food and Agriculture)

Collaboration with the agencies and groups responsible for implementing these plans (IVH; Appendix H) will help optimize the value of CDFG land acquisitions, management of critical habitat, and restoration activities.

**Figure c. Annual Grassland Focal Species**



**Northern harrier** © 2006 Tom Greer



**White-tailed kite** © 2004 Tom Greer



**Western meadowlark** © [glcc writer](#)



**Grasshopper sparrow** © [M. J. ...](#)



**Savannah sparrow** © [Clyde Barrett](#)

## 5. Oak Woodland Habitat Monitoring Element

### *Adaptive Management Plan*



Oak woodlands are among the most biologically diverse habitats, providing nesting habitat, forage, and shelter for a wide variety of wildlife species. Oak dominated habitats represent a small, but important portion of the MCCWA (approximately 5%). Many of the focal species identified in the Oak Woodland Bird Conservation Plan (CalPIF 2002) have been observed at the MCCWA. Focal bird species are important because they utilize different attributes of this habitat. For example, Western scrub-jay, and, to a lesser degree, the yellow-billed magpie,

cache acorns individually in the ground, and thus, among caching birds, are the only species to facilitate oak regeneration because many acorns remain unretrieved and germinate (ibid.). Other plans like the “Western Quail Management Plan” (2009) will be important for restoration and monitoring strategies.

### PHASE 1: BASELINE DATA COLLECTION

**GOAL 5.1: Complete a resources inventory of oak woodland habitats and identify relationships between biological elements.**

**TASK 5.1.1:** *Set up permanent plots for annual vegetation monitoring.* Permanent vegetation monitoring plots provide consistent reference points from which to measure and monitor changes in species distribution, plant density, and canopy cover within a given habitat (Elzinga et al. 2001). These data are especially valuable when undertaking habitat restoration. Permanent vegetation monitoring plots should be established in each of the habitat types at the MCCWA.

**TASK 5.1.2:** *Set up permanent photo monitoring stations for annual documentation of habitat conditions.* Photographs are by far the easiest monitoring tool available to a manager. They are an inexpensive, visual record of the site over time. Establishing permanent photo points in each of the habitats at the MCCWA will provide another method of documenting changes and compliment other monitoring programs.

**TASK 5.1.3:** *Conduct presence/absence surveys for special-status species using accepted federal and state protocols and submit occurrence data to CNDDDB.* Special-status species that have the potential to occur but are not known to occur in oak woodland habitats within and adjacent to the Wildlife Area (IIIC):

- Swainson’s hawk
- Loggerhead shrike
- Purple martin
- Pallid bat
- Ringtail

**TASK 5.1.4:** *Conduct bat surveys (using Anabat software or similar tool) to determine species utilization of the MCCWA.* The particular combination of habitats at the MCCWA (riparian, freshwater emergent wetland, grasslands, and oak savanna) may support pallid bat as well as other bat species.



TASK 5.1.5: *Conduct general wildlife surveys in oak woodland habitats to develop baseline inventory of species known to occur on site.*

TASK 5.1.6: *Survey and map unique habitat features such as downed wood and snags within the oak woodland areas, incorporate these features into the GIS database.*

TASK 5.1.7: *Survey and map target noxious non-native invasive species in oak woodland habitats (Appendix D).*

TASK 5.1.8: *Identify possible restoration areas within the oak woodlands habitat.*

## PHASE 2: LONG-TERM MONITORING SET UP

### GOAL 5.2: Test long-term monitoring strategies and resolve critical management uncertainties.

TASK 5.2.1: *Establish cooperative agreements with local and regional conservation groups and resource agencies to enhance special-status species habitats and monitor regional special-status species populations.* Monitoring populations of special-status species should be conducted periodically to assess overall habitat integrity, detect changes in distribution and abundance, and detect positive and adverse effects of management activities, human use, and/or nonnative species.

TASK 5.2.2: *Using point counts or area searches, conduct annual breeding bird surveys in oak habitats concentrating on the focal species identified in the Oak Woodland Bird Conservation Plan (CalPIF 2002) (Figure d).*

TASK 5.2.3: Implement a grazing management and monitoring plan (IVF3; Appendix E).

TASK 5.2.4: *Establish long-term monitoring protocols for oak woodland habitats after evaluating monitoring strategies and environmental responses to management practices.* Phase 3 of adaptive management planning should address any changing conditions and include periodic evaluation and refinement of the monitoring program.

## COORDINATION WITH REGIONAL CONSERVATION PLANNING

### GOAL 5.3: Improve the connectivity, integrity and health of oak woodland habitats at the MCCWA and at the larger landscape level.

TASK 5.3.1: Obtain, as necessary, and review regional conservation plans (Appendix H) pertaining to oak woodland habitats at the MCCWA, including:

- *California Oak Woodlands Conservation Program and Habitat Enhancement and Restoration Program (General) (WCB)*
- *Integrated Hardwood Range Management Program (University of California Cooperative Extension)*
- *Oak Woodland Bird Conservation Plan (California Partners in Flight)*
- *Oak Woodland Management Guidelines (Shasta County)*
- *Oaks 2040: The Status and Future of Oaks in California (California Oak Foundation)*

Collaboration with the agencies and groups responsible for implementing these plans (IVH; Appendix H) will help optimize the value of CDFG land acquisitions, management of critical habitat, and restoration activities.

**Figure d. Oak Woodland Focal Species**



**Wood duck** (*Aix sponsa*)

© [Darhawk](#)



**Wild turkey** (*Meleagris gallopavo*)

© 2007 Kim Cabrera



**California quail** (*Callipepla californica*)

© 2005 Tom Greer



**Red-shouldered hawk** (*Buteo lineatus*)

© 2004 George Hartwell



**Band-tailed pigeon** (*Columba fasciata*) ©

Joyce Gross 2006



**Northern pygmy owl** (*Glaucidium gnoma*)

© 2003 Stephen Dowlan

Figure IV-d (continued). Oak Woodland Focus Species



**Lewis woodpecker** (*Melanerpes lewis*)

© 2007 Ron Wolf



**Acorn woodpecker** (*Melanerpes formicivorus*) © 2007 Don Getty



**Nuttall's woodpecker** (*Picoides nuttallii*)

© 2004 Tom Greer



**Ash-throated flycatcher** (*Myiarchus cinerascens*) © 2007 Tom Greer



Figure IV-d (continued). Oak Woodland Focus Species



**Hutton's vireo** (*Vireo huttoni*)

© 2007 Stephen Dowlan



**Western scrub-jay** (*Aphelocoma californica*)

© 2005 Kim Cabrera



**Yellow-billed magpie** (*Pica nuttalli*)

© 2005 Stephen Dowlan



**Oak titmouse** (*Baeolophus inornatus*)

© 2007 Ron Wolf



**White-breasted nuthatch** (*Sitta carolinensis*) © 2006 Joyce Gross



**Bewick's wren** (*Thryomanes bewickii*)  
© 2007 Ron Wolf



Figure IV-d (continued). Oak Woodland Focus Species



**Blue-gray gnatcatcher** (*Poliophtila caerulea*) © 2007 Ron Wolf



**Western bluebird** (*Sialia mexicana*)  
© 2007 Tom Greer



**California thrasher** (*Toxostoma redivivum*) ©  
2007 Stephen Dowlan



**European starling** (*Sturnus vulgaris*)  
© 2007 John White



**California towhee** (*Pipilo crissalis*)  
© 2007 Ron Wolf



**Lark sparrow** (*Chondestes grammacus*)  
© 2007 Tom Greer

## **Constraints on Biological Monitoring Elements**

### *Internal Constraints*

As with other elements, limited funding for staff and operations is a major constraint on the biological monitoring element. Full realization of the monitoring goals and tasks will require an increase in funding for the Wildlife Area. To fully utilize student and community resources, a qualified biologist must coordinate and supervise research components.

### *External Constraints*

Cooperative agreements with educational institutions and community partners to utilize facilities at the Balls Ferry Research and Education Center (IVE) have not yet been finalized. Biological monitoring tasks may be limited without the assistance of these partnerships.

## Constraints on Biological Elements

The goals of the biological elements are constrained by a range of natural and human-induced factors. Effective management of the Wildlife Area requires that these factors be identified and considered. This plan recognizes that the Wildlife Area exists within the context of conflicting values and needs that are important to neighbors and users of the MCCWA as well as the people of California in general. Factors that affect the ability of the CDFG to attain the biological element goals are presented below.

### *Environmental factors*

Large-scale events such as catastrophic flooding, climate change or wild fires are beyond the control of CDFG. Changes to local zoning ordinances could increase public use pressure upon the MCCWA.

### *Legal, political, or social factors*

Watershed-scale management will be constrained by the willingness or ability of other public land managers and private landowners to cooperate. Private land owners may place values on their land that conflict with the goal of healthy ecosystem function. Other public land management agencies have missions and goals that differ from CDFG (for example, the adjacent Reading Island is owned by the U.S. Bureau of Land Management and offers primitive camping and recreational river access).

### *Financial factors*

Limited funding for staffing and operations is the greatest existing management constraint for the Wildlife Area. This plan proposes management actions that will require an increase in funding and/or creative partnerships with local conservation groups and educational institutions.



## D. Public Use Elements

*Management goals pertaining to public access and use differ greatly between the Cottonwood Creek and the two Balls Ferry wetland units. The Cottonwood Creek Unit remains a primitive area with limited access that is primarily managed for its outstanding riparian habitat. Conversely, the recently acquired Balls Ferry Wetland Unit 1 is a more developed site that includes a house and other structures that make it uniquely suited for youth education programs, and its generally flat terrain makes it more easily accessible to people with disabilities. The entire unit is fenced; access is by permission only. The Balls Ferry Wetland Unit 2 continues to function as a working ranch; it will not be open to the public except by permission from CDFG (J. Chakarun, Area Manager, personal communication).*



PHOTO: Public trail access point, Cottonwood Creek Unit. July 2005, SEI

Public use of all wildlife areas is regulated by the California Department of Fish and Game (CDFG) under California Code of Regulations (CCR), Title 14 (Natural Resources), Division 1, Sections 550 and 551. Division 1 contains regulations that have been formally adopted by the California Fish and Game Commission, reviewed and approved by the Office of Administrative Law, and filed with the Secretary of State. General public use of all wildlife areas is regulated



under Section 550. Activities related to hunting, permitting requirements and site-specific restrictions are regulated under Section 551.

All wildlife areas are classified as Type A, B, or C [§550]. Type A and B areas require specific permits or season passes whereas Type C areas usually do not. The Mouth of Cottonwood Creek Wildlife Area (MCCWA) is currently designated as a Type C area with no required permits or passes and no specified daily hunter capacity. Although regulations can be tailored to specific wildlife areas [§551q], Sections 550 and 551 should be viewed as a framework within which public use is addressed in this plan.

#### Compatible Public Use

It is the policy of the Fish and Game Commission that:

Lands under the administration of the Department be made available to the public for fishing, hunting or other forms of compatible wildlife dependent recreational use, and for scientific studies whenever such use or uses will not unduly interfere with the primary purpose for which such lands were acquired.

For the purposes of this policy, undue interference shall not mean that hunter and angler access to properties that would otherwise be available for access for passive recreational activities (i.e., bird watching, interpretive tours, etc.) is deemed to be necessarily incompatible. Further, hunting and fishing shall not be banned simply because a Department administered land was acquired primarily for the protection of various threatened and endangered species unless it can be clearly demonstrated that such activities would be likely to have a detrimental effect on listed species on the property in question. (California Fish and Game Commission 2002).

In keeping with this policy, the overall public use goal for the MCCWA is to protect biological resources while providing opportunities for recreational activities and scientific studies that do not have significant adverse impacts. Suitable recreational activities are those that are either wildlife-dependent or related, and that have low to moderate potential to negatively impact wildlife and other uses of the Wildlife Area. Using this criteria, compatible recreational activities at the MCCWA include hunting, fishing, day hiking, and nature observation (Table IV-b).

**Table IV-b. Potential Recreational Activities at the MCCWA and Criteria Used to Determine Compatible Uses**

| RECREATIONAL ACTIVITY     | RELATION TO WILDLIFE |         |           | Potential impact on habitat or wildlife | Potential conflict with other uses | Required level of management |
|---------------------------|----------------------|---------|-----------|---|------------------------------------|------------------------------|
|                           | Dependent            | Related | Unrelated |   |                                    |                              |
| Hunting                   | x                    |         |           | Moderate                                | High                               | Moderate                     |
| Fishing                   | x                    |         |           | Low                                     | Low                                | Low                          |
| Day hiking                |                      | x       |           | Low                                     | Low                                | Low                          |
| Nature study, photography | x                    |         |           | Low                                     | Low                                | Low                          |

SOURCE: SEI 2007

Other forms of public recreation, including camping, dog training and field trials, horseback riding, mountain biking and off-highway vehicle use, are prohibited because of the potential negative impacts to wildlife, wildlife habitats, conflicts with other uses, and management demands [§551]. Regulations can be expected to change over time, so [current regulations](#) should be consulted for any determination about lawful use of a wildlife area. These regulations are available at the CDFG Web site and are published annually in a [booklet](#).

## 1. Public Access Information and Education Element

Public entry is allowed from one hour before sunrise to one hour after sunset on the Cottonwood Creek Unit. Both of the Balls Ferry wetland units have been closed to the general public since their acquisition in 2004 and 2008. The future management strategy for the BFW1 is youth-oriented education with the intention of establishing the Balls Ferry Research and Education Center on site (IVE). BFW1 will remain a closed zone with public access by permit only. CDFG will issue permits for outdoor education programs, local birding groups, junior and disabled hunting programs, grazing leases aimed at controlling vegetation, and scientific study. There are no plans for public access for BFW2, which continues to function as a working ranch with grazing management under the oversight of the Western Shasta Resource Conservation District (Appendix E).

**GOAL 1.1: Minimize conflicting public uses and facilitate authorized uses that are compatible with biological resource goals.**

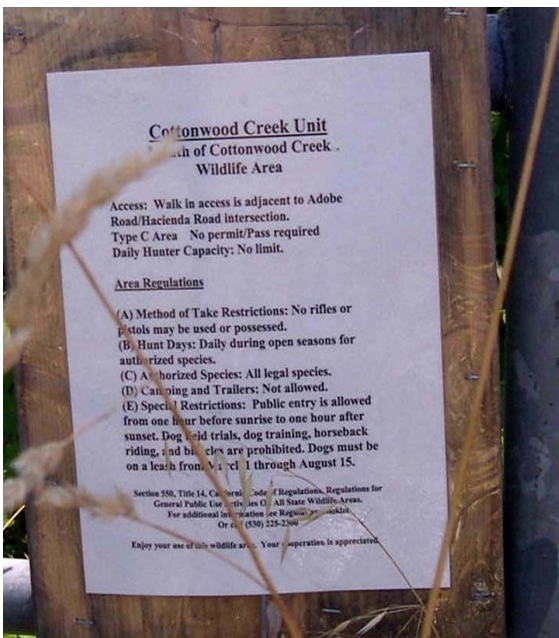


PHOTO: The sign for Cottonwood Creek Unit posts its public access and use regulations. July 2005, SEI,

**TASK 1.1.1:** Inform the public of wildlife area access, use designations, use restrictions and who to contact in an emergency through outreach, signage and CDFG Web site.

**TASK 1.1.2:** Add contact information on signage (including a name, phone number, email and Web site address) for directing questions, comments and suggestions about compatible uses at the MCCWA, and develop a procedure for tracking and following up on these contacts.

**TASK 1.1.3:** Develop pertinent recreation indicators for the MCCWA and use them to evaluate and report use levels and to conduct visitor interest and satisfaction surveys periodically.

**TASK 1.1.4:** Evaluate recreation activities and wildlife area regulations periodically to identify and report changes that are warranted

to maintain consistency with MCCWA goals.

**GOAL 1.2: Support use of the MCCWA by Native Americans for cultural purposes and activities such as gathering native plant materials.**

**TASK 1.2.1:** Develop access plans and permits for Native Americans whose activities are compatible with the MCCWA goals, and ensure that permits include standard liability clauses.

**GOAL 1.3: Facilitate safe use of the MCCWA by informing the public of potential risks and developing an emergency response plan.**

**TASK 1.3.1:** Work with local, regional and state agencies to integrate the MCCWA into emergency communications and response plans (on file at North Coast Region's Redding office).

## 2. Hunting Element

The MCCWA provides hunting opportunities for all legal species, primarily waterfowl, pheasant, mourning dove and turkey. The BFW1 is closed to general public hunting, although special youth-oriented hunts and mobility-impaired hunts may be conducted in the future. The



PHOTO: A [4-H Just for Youth duck hunting event](#) at San Diego Hunter Safety School.

Cottonwood Creek Unit is currently operated as a Type C wildlife area whereby no permit or pass is required [§550 a]. Hunting is permitted on a daily basis during open season with no hunter quota. No rifles or pistols are permitted. No camping or trailers are permitted and public entry is restricted from one hour before sunrise to one hour after sunset. Dog training or field trials are not permitted and dogs must be leashed from March 1 through August 15 [§551q 14]. No hunting is allowed at BFW2.

**GOAL 2.1: Provide a quality wildlife-dependent recreational experience using a renewable natural resource.**

**GOAL 2.2: Promote hunter education and ethics through information and enforcement of hunting regulations and compliance with compatibility determinations.**

TASK 2.2.1: Inform the public of hunting times, locations and any special restrictions at the MCCWA through signage and the CDFG Web site.

TASK 2.2.2: Develop area maps identifying open and closed hunt areas.

TASK 2.2.3: Monitor hunter use by requiring hunters to provide a data count of the species taken.

TASK 2.2.4: Coordinate and conduct a volunteer “clean-up day” in late summer to ready the Wildlife Area for the upcoming hunting season.

TASK 2.2.5: Continue to maintain relationships among CDFG staff, hunters and volunteer organizations.

**GOAL 2.3: Establish youth-oriented hunt programs for waterfowl, pheasant and mourning dove in cooperation with sport groups and volunteers.**

TASK 2.3.1: Promote and support family events where adults participate together with children and youth in hunting experiences, providing encouragement and instruction.

TASK 2.3.2: Provide hunter safety courses on a regular basis at the Balls Ferry Research and Education Center (BFREC) (IVE).

TASK 2.3.3: Develop youth-oriented hunting opportunities at the BFREC (IVE).

**GOAL 2.4: Promote mobility-impaired hunting programs such as waterfowl, pheasant and mourning dove.**

TASK 2.4.1: Promote opportunities for people with mobility impairments to hunt waterfowl and upland game birds on BFW1 where physical barriers are reduced.

TASK 2.4.2: Develop special mobility-impaired hunting opportunities at the BFREC (IVE) through the Game Bird Heritage Special Hunt Program or other programs.

### 3. Fishing Element

Public fishing opportunities on the MCCWA are limited to Cottonwood Creek and the Sacramento River. Sport fishing typically occurs at the confluence of these two river systems for species such as trout, Chinook salmon, steelhead, black bass and catfish. Access is available by



PHOTO: Boys fishing at the [Kids Outdoor Sports Camp](#) in Red Bluff, summer 2007.

foot only and can be difficult due to the dense riparian habitat. Fishing in Cottonwood Creek is dependent on adequate flows and water year type. Regulations concerning these water bodies are covered in the CCR, Title 14, Freshwater Sport Fishing Regulations.

The large pond on the BFW1 could provide angling opportunities for youth-oriented events and mobility impaired anglers in the future. BFW2 is closed to public use.

**GOAL 3.1: Maintain healthy fish populations.**

**GOAL 3.2: Provide safe, compatible fishing opportunities to the public.**

TASK 3.2.1: Post fishing regulations in appropriate locations.

TASK 3.2.2: Develop maps and signs that indicate fishing access points.

TASK 3.2.3: Develop youth-oriented angling opportunities.

TASK 3.2.4: Improve access for mobility-impaired anglers at BFW1, including the development of trails and facilities that meet standards under the Americans with Disabilities Act.



## 4. Day Hiking Element



PHOTO: Hiking down the foot trail to the Cottonwood Creek Unit. July 2005, SEI

Hiking is one of the more common recreational activities at the Cottonwood Creek Unit, although there are no marked or regularly maintained trails. There is one public access trail to the unit off Adobe Road just south of the juncture with Hacienda Road. Public hiking at BFW1 is not allowed at this time without permission from CDFG. There is no public access to BFW2.

**GOAL 4.1: Continue to provide public hiking opportunities that avoid impacts to sensitive habitats.**

**GOAL 4.2: Educate hikers about sensitive habitats through interpretive mapping and, where necessary, signage.**

TASK 4.2.1: Maintain physical separation of closed zones and sensitive habitats through passive barriers and landmarks, such as boulders along access roads and trails.

TASK 4.2.2: Develop a trail map that shows existing trail routes that do not conflict with sensitive areas in the Cottonwood Creek and BFW1 units.

TASK 4.2.3: Identify and develop new trail routes to avoid sensitive resources.

TASK 4.2.4: Conduct biannual inspections to look for signs of human disturbance on unmarked and undesignated trails.

TASK 4.2.5: Coordinate with special interest groups to develop an interpretive map of the Cottonwood Creek and BFW1 units that educates the public about habitat values.

## 5. Nature Observation Element



PHOTO: Young female Pacific Forktail captured by Ray Bruun at the Cottonwood Creek Unit in April 2008. Mr. Bruun visits the MCCWA and other northern California locations at least annually to observe, monitor and photograph dragonflies. ©[Ray Bruun](#)

The MCCWA provides excellent bird watching, photography and nature study opportunities. These types of activities are intimately tied to the quality of the wildlife habitat and the scenic resources of the area. Except for zones that may be closed for management purposes, public safety or resources protection, the Cottonwood Creek Unit is open on a walk-in basis for nature study, bird watching and nature photography. On the BFW1, CDFG will issue permits to local birding groups as well as for outdoor education programs. BFW2 is closed for management purposes.

**GOAL 5.1: Maintain and improve opportunities for nature observation and other passive recreational activities at the MCCWA.**

**GOAL 5.2: Establish a means of capturing and sharing observations made by visitors to the MCCWA.**

TASK 5.2.1: Improve low-impact access and install observation blinds at key points.

TASK 5.2.2: Maintain a current bird list for the MCCWA and provide this information to the general public in informational brochures and on the CDFG Web site.

TASK 5.2.3: Develop interpretive information about the natural history of the MCCWA.

TASK 5.2.4: Explore the possibility of establishing a MCCWA Web site or blog as a way to collect, maintain and share observations and data.

## Constraints on Public Use Elements

The goals of the public use elements are constrained by a range of natural and human factors. Effective management of the Wildlife Area requires that these factors be identified and considered.

### *Environmental factors*

Compatibility of public uses with biological goals depends on the intensity of use and the number of users. Uses that have negligible impacts on biological goals at current levels may have negative impacts at higher levels. Uses that are currently considered compatible may have to be curtailed in the future if they cause degradation of vegetation, erosion, or declines in populations of sensitive species.

While public access is an important component of CDFG's mission, protection of habitat and wildlife is the priority. Public use of the area must be balanced with habitat and wildlife protection.

### *Legal, political, or social factors*

Different public uses have the potential to conflict with one another, especially if overall use of the MCCWA increases in the future. If conflicts develop, uses may need to be limited to specific areas or times of the year, or otherwise restricted.

### *Financial factors*

Limited funding for staff and operations is a major constraint when managing public use. Public use goals and tasks were formulated under the assumption that the CDFG has or will obtain the funding to undertake these tasks.

## E. Balls Ferry Research and Education Center Conceptual Plan Elements

*The long-term vision for the Balls Ferry Wetland Unit 1 is the establishment of a research and education center with a focus on providing outdoor learning opportunities for youth. The site has a house and a variety of outbuildings that could be used for classes, potential group parking areas, and generally accessible topography. Local educational institutions have taken an active role in helping to conceptualize and develop research and outdoor learning programs at the site since the unit's acquisition in 2004.*

### Historical Background

The California Department of Fish and Game acquired BFW1 from the Dymesich estate with the joint understanding that its ranch, wetlands and high wildlife values would provide a unique educational environment for young people. Building on years of discussions with the previous landowner, this vision was captured in the CDFG's Proposed Framework for the Balls Ferry Wetlands (Appendix I) shortly before it was acquired in 2004:



PHOTO: ANTHS student testing water quality at the large pond on BFW1. McConnell Foundation

The Department will designate the Balls Ferry wetlands as a unit of MCCWA. However, the management strategy will be different. The emphasis for Balls Ferry wetlands will be “youth” related with other specific activities. Because this strategy is a departure from “traditional” management of Department wildlife areas, partnerships and collaboration between numerous entities will be required. The departure on Balls Ferry will limit general public use while emphasizing and focusing on youth education, special youth hunts, and other appropriate activities.

The proposed management framework, along with subsequent documents in the administrative record (Appendix I), describes in further detail the CDFG's intention of establishing an outdoor education center on the site:

The current infrastructure of the [BFW1] includes several buildings and outbuildings. Some of these structures could be converted into meeting and overnight facilities to accommodate educational programs and organized youth programs....These programs may range from sponsored field trips with local schools to week long “camps” that emphasize outdoor activities and conservation.

The Balls Ferry facility will also be available for local schools to participate in “outdoor classroom” activities. Outdoor classroom programs generally take time to develop and will require interest and cooperation between local schools and the Department.



Around the time of BFW1 acquisition, the [Anderson New Technology High School](#) (ANTHS) was emerging as a project-based charter school focused on providing integrated curriculum in “real world” community environments. Discussions ensued between CDFG staff, ANTHS faculty and students, and the [McConnell Foundation](#) and resulted in a draft conceptual plan and memorandum of understanding (MOU) regarding shared management responsibilities (Appendix I). The initial agreement was that ANTHS faculty would take the lead on educational components, including the development of curricula specific to collecting baseline data on BFW1, piloting educational formats on behalf of Shasta County schools, providing staff development, and assisting with community outreach. CDFG would take primary responsibility for the development and operation of the area, including the drafting of a management plan to direct these activities, as follows:

Within this plan, background information will include a description of the process which led to the acquisition of the property. A youth hunting program will be implemented. Baseline biological information, used to make informed decisions, will be obtained from ANTHS student researchers. Student research will include an inventory of plant and animal species. Habitats will be mapped using a Geographic Information System. Atmospheric conditions will be monitored. Hydrology and water quality will be assessed. Soils will be sampled and described. The impacts of grazing will be studied. The plan will periodically be reviewed and updated as new information becomes available.

Both CDFG and ANTHS proceeded in this direction in 2005. ANTHS faculty developed a year-long integrated curriculum for mapping resources, collecting baseline data and conducting



PHOTO: Anderson New Technology High School students conducting experiments in the biolab. McConnell Foundation.

historical research on BFW1. CDFG set management objectives that included formalizing partnerships with ANTHS and Shasta College, hiring an outdoor educational coordinator, and assessing facility and equipment needs. However, changes in personnel at both CDFG and ANTHS put the joint project on hold. Recent conversations with ANTHS faculty indicate continued interest in BFW1 (S. Main, ANTHS, personal communication). In May 2008, two ANTHS students who had spent time at BFW1 during their four years at the school developed a [senior project](#) to take a busload of seventh graders from Anderson Middle School to the unit for an environmental education day — an

example of the tiered environmental education, career development and mentoring possibilities possible at the site.

Shasta College has also been involved in educational opportunities at MCCWA through its Natural Resources technician-level degree program, identifying plants and conducting bird surveys (K. Nolte, Shasta College, personal communication). CDFG staff has discussed the possibility of developing a more formal relationship with the college.

Previous land managers at the MCCWA have also explored possibilities of working with California State University, Chico (CSU, Chico). The university's Research Foundation helps manage other ecological areas in partnership with CDFG, and Chico State students have been involved in a previous restoration project on the Cottonwood Creek Unit.

## **BFREC Conceptual Plan**

The Balls Ferry Research and Education Center (BRFEC) Conceptual Plan presented here is based on the existing administrative record (Appendix I) as well as discussions with people involved in the property acquisition and initial visioning efforts. The conceptual plan is intended to achieve the following purposes:

- To protect, enhance and develop riparian, wetland and upland habitats at the MCCWA specifically and in the region generally..
- To provide opportunities for scientific research that will support MCCWA adaptive management goals and provide useful biological information to land managers, regional conservation planners, and researchers in general.
- To provide educational opportunities and programs for the benefit of local youth and for the benefit of the community in general.
- To provide additional access opportunities for disabled youth and adults.

The goals in this section should be understood as general guidelines for developing the various levels of educational and scientific research opportunities envisioned for the BFREC. Tasks are coordinated with the goals and tasks presented in the other management elements of the MCCWA LMP and reflect new information based on research conducted in support of this plan. Following the goals and tasks is specific information on the local and regional groups that have expressed interest in supporting efforts at the site, as well as potential constraints on implementation.

## **1. Sustainability and Strategic Planning Element**

### **GOAL 1.1: Develop a long-term sustainable plan for expanding youth educational opportunities .**

TASK 1.1.1: Assemble a steering committee to guide the development of programs for the BFREC.

TASK 1.1.2: Research and identify funding and in-kind resources to support the BFREC.

TASK 1.1.3: Explore the development of a Web site to share information, resources and opportunities at the BFREC.

TASK 1.1.4: Assess the feasibility of providing week-long youth camps at the site, including use of existing residential buildings for overnight stays and/or developing a camping area.

### **GOAL 1.2: Retain a research and education coordinator to oversee activities and programs at the center.**

TASK 1.2.1: Develop a job description that defines the roles and responsibilities of a research and education coordinator for overseeing research activities and outdoor education at the BFREC.

TASK 1.2.2: Explore grant funding, cooperative management arrangements or job sharing possibilities to fill the research and education coordinator position.

## **2. Research and Monitoring Coordination Element**

**GOAL 2.1: Develop a quality assurance and quality control plan for utilizing student resources for conducting research, monitoring and restoration at MCCWA.**

TASK 2.1.1: Review all elements in the MCCWA Land Management Plan to identify educational/interpretive, research, monitoring and restoration needs.

TASK 2.1.2: Prioritize needs and define expertise levels needed to accomplish work.

TASK 2.1.3: Conduct initial high priority research in house or promote and encourage research projects on these topics.

TASK 2.1.4: Establish protocol guidelines for use by researchers and field technicians, including integration of research into CDFG-preferred databases.

TASK 2.1.5: Incorporate GLOBE program standards (Appendix J) for the scientifically valid atmospheric, hydrologic soils and land cover/phenology measurements.

TASK 2.1.6: Identify and assess experimental design opportunities (including remote sensing) to be incorporated into habitat and species management, restoration, and/or reintroduction projects on the MCCWA.

TASK 2.1.7: Explore the possibility of undertaking long-term studies of the following at MCCWA:

- Ecology of managed wetlands
- Agro-ecology
- Wildlife-friendly agricultural practices
- Vernal pool ecology and management
- Native grassland ecology and management, including management of grazing to enhance native species diversity
- Invasive species management
- Trends in abundance of migrant and/or wintering waterfowl and shorebirds, in support of regional population monitoring throughout the Pacific Flyway
- Trends in abundance, reproduction, survival, and/or habitat use by special-status and game species

**GOAL 2.2: Integrate and coordinate colleges, government and community resources into the research and educational program.**

TASK 2.2.1: Formalize partnerships with ANTHS, Shasta College and CSU, Chico to provide baseline data collection, monitoring and technical assistance at the MCCWA.

TASK 2.2.2: Develop an agreement with Wintu Audubon Society to provide bird counts and offer technical assistance in connection with student monitoring (IVC).

### 3. Youth Educational Programs Development Element

**GOAL 3.1: Establish the BFREC as an “outdoor classroom” available to local schools.**

TASK 3.1.1: Formalize the partnership with ANTHS and Shasta County Office of Education to collaboratively develop and test educational formats for programs at the BFREC that can be expanded to other schools and groups.

- Define roles and responsibilities of agencies
- Address personnel needs
- Assign maintenance and custodial tasks
- Adopt rules for operating area

TASK 3.1.2: Provide copies of the MCCWA LMP to ANTHS faculty to guide the development of educational formats.

TASK 3.1.3: Conduct a safety survey and prepare a safety plan.

TASK 3.1.4: Provide a relatively secure and controlled environment for youth outdoor education.

TASK 3.1.5: Facilitate access to parking and facilities.

TASK 3.1.6: Develop trail system to make resources accessible to students while avoiding impacts to sensitive resources.

TASK 3.1.7: Develop safe access to wetland areas for research and educational activities.

TASK 3.1.8: Assess needs for educational and research tools and supplies, including water quality equipment, binoculars and scopes, GPS units, laptops, field guides, tables and chairs.

TASK 3.1.9: Assess needs for portable bathrooms, including handicap accessibility.

**GOAL 3.2: Develop hunting and fishing programs, as appropriate, aimed at youth, mobility-impaired individuals and other underserved populations.**

TASK 3.2.1: Restrict public access to provide secure, controlled environment for youth outdoor education.

TASK 3.2.2: Assess safety and neighboring landowner issues associated with developing a Junior Hunt program.

TASK 3.2.3: Utilize the resources of the junior hunt coordinator in CDFG’s Game Bird Heritage Special Hunt Division.

TASK 3.2.4: Assess continued interest of Shasta County Sportsmen’s Association and other regional hunting and fishing groups to assist with youth-only waterfowl hunts and fly fishing.

TASK 3.2.5: Consider partnerships with the California Waterfowl Association, Ducks Unlimited, and California 4-H Shooting Sports to develop youth hunting education activities appropriate to the site, including ethical hunter conservation education programs.

**GOAL 3.3: Provide agricultural education opportunities as appropriate.**

TASK 3.3.1: Explore partnership possibilities with UCCE for using existing barns and irrigated fields for 4H and Future Farmers of America (FFA) groups.



TASK 3.3.2: Develop a demonstration grazing regime to control invasive plants and increase native plant composition (IVF3; Appendix E).

## 4. Research and Education Facilities Use Element

**GOAL 4.1: Adapt existing residential buildings and outbuildings for use as educational and research facilities.**

TASK 4.1.1: Conduct a feasibility analysis for continuing conversion of site facilities for the BFREC, including classrooms, a biological chemical laboratory, a computer laboratory, outdoor educational stations, and overnight accommodations.

TASK 4.1.2: Green existing facilities and structures to keep impacts below previous use levels.

TASK 4.1.3: Establish access and capacity levels to keep impacts at or below previous use levels.

TASK 4.1.4: Assess benefits of developing facilities as a model of green conversion under Leadership in Energy and Environmental Design (LEED) or Coalition for High Performance Schools (CHPS) standards.

### **LEED® GREEN BUILDING CONVERSION AT BALLS FERRY WETLAND UNIT 1**

The LEED Green Building Rating System is a voluntary, consensus-based national rating system for developing high-performance, sustainable buildings. LEED addresses all building types, including existing buildings, in five areas: sustainable site development, water savings, energy efficiency, materials and resources selection, and indoor environmental quality. CHPS standards facilitate the modernization of high performance schools, learning environments that are not only efficient but also healthy, comfortable and well-lit.

#### **Environmental benefits:**

- Enhance and protect ecosystems and biodiversity
- Improve air and water quality
- Reduce solid waste
- Conserve natural resources

#### **Economic benefits:**

- Reduce operating costs
- Enhance asset value and profits
- Improve employee productivity and satisfaction
- Optimize life-cycle economic performance

#### **Health and community benefits:**

- Improve air, thermal, and acoustic environments
- Enhance occupant comfort and health
- Minimize strain on local infrastructure
- Contribute to overall quality of life

## Interested Local and Regional Partners

The uniqueness of BFW1 and its facilities, along with its suitability for youth, has inspired the interest of educational, research and recreational groups in the region. Those who have expressed direct interests in a research and education center on the site, or in adapting current curricula or developing new curriculum in conjunction with outdoor learning and research opportunities at MCCWA are discussed below.

### K-12 Schools

- [Anderson New Technology High School](#) (ANTHS) has taken the lead in establishing a formal partnership with CDFG to provide research and monitoring assistance at the Balls Ferry site while providing students with the opportunity to develop career pathways. Faculty developed a comprehensive year-long curriculum specific to the MCCWA for mapping resources, collecting baseline data, conducting research and developing restoration. ANTHS faculty has expressed interest in developing and testing educational formats for Shasta County schools and coordinating work with GLOBE (Appendix I).
- [Shasta County Office of Education](#) currently provides environmental education resources through Camp Latieze in Lassen, the [Schreder Planetarium](#) in Redding, and [Whiskeytown Environmental School](#) on Clear Creek below Whiskeytown Dam. The county office of education also coordinates efforts [CREEC's Northeastern Region](#).

### Community Colleges

- [Shasta College](#) offers an associate degree in Natural Resources and a Watershed Certificate program that are designed to provide technician-level training (Appendix I). It also offers a Forestry degree and participates in CDFG Career Day. In the past, faculty member Ken Nolte has brought wildlife classes to MCCWA to conduct bird surveys and identify plants. He has expressed interest in doing long-term monitoring, perhaps including deer tracking using radio telemetry.
- [Sacramento City College Field Ecology Certificate Program](#) offers another model for providing student training and research assistance that

### Universities

- California State University, Chico secured a grant to plant trees to restore part of the Great Valley riparian habitat on the Cottonwood Creek Unit.
- In 2005, CDFG's North Coast Region explored the possibility of establishing an arrangement with CSU, Chico to cooperatively manage the MCCWA (Appendix I). The [Big Chico Creek Ecological Reserve \(BCCER\)](#), owned by the CSU, Chico Research Foundation, is managed by CSU, Chico's [Institute for Sustainable Development](#). The Research Foundation purchased the land with grant money from the Wildlife Conservation Board, the Packard Foundation, USFWS, the National Fish and Wildlife Foundation, the River Network and Jack Henning. Part of the purchase agreement included a conservation easement held by the Wildlife Conservation Board and a [Memorandum of Understanding](#) with CDFG.

### Regional Conservation Agencies

- [Western Shasta Resource Conservation District](#) offers educational and outreach assistance for all age levels, and could provide its expertise and resources in support of the BFREC. It operates the [Whiskeytown Environmental School](#) as a joint project with the National Park Service. It sponsors the [Clear Creek Student Restoration and Monitoring](#) effort and [Kids in the Creek](#).
- [Shasta County University of California Cooperative Extension](#) has expressed interest in providing an educational program on livestock grazing as a vegetation management tool. The UC Extension office also sponsors youth education and development programs, including [4H](#) and [Future Farmers of America \(FFA\)](#).

### Nonprofit Conservation Education Programs

- The [Cottonwood Creek Watershed Group](#) (CCWG) offers [Kids for Our Creek](#), a science-based educational program for public, private and home school students in grades K-8. Focusing on local watershed issues, it uses a variety of nationally recognized curricula, such as Project WILD Aquatic, Project Learning Tree, and National Wildlife Federation's Access Nature. For the outdoor portion of the program, students visit various sites in the watershed to apply the curriculum to real world situations. The CCWG also plans and implements conservation and restoration projects throughout the watershed with students, teachers and parents directly involved in deciding which projects to undertake, gathering data, and carrying out restoration work.
- [Adopt-A-Watershed \(AAW\)](#) is a non-profit organization that promotes educational enhancement, environmental stewardship, and community development through Place-Based Learning. AAW works with schools, youth education programs, community groups, and environmental organizations throughout California. AAW is actively involved in the Cottonwood Creek Watershed Group and attended early planning meetings that envisioned the BFREC.
- The [California Waterfowl Association](#) sponsors a [Wood Duck Program](#) at the Turtle Bay Museum in Redding. Habitat conditions at the MCCWA and the facilities at BFW1 make this conservation education program for young people a good fit.
- [Shasta-Tehama Shed Heads](#) is a group whose goal is to enhance, restore, conserve and improve the interrelated environmental and economic resources of both Shasta and Tehama counties. Through collaborative efforts, this organization attempts to provide for the social, financial and aesthetic needs of all county residents while at the same time protecting the natural environment which sustains our communities and provides for their needs.

### User Groups

- [Wintu Audubon Society](#) is very active in the region, assisting with conservation science monitoring efforts and regularly offering birding trips for both novice and experienced birders to nearby Reading Island. The chapter has expressed interest in helping CDFG with breeding bird surveys, point counts and monitoring at the MCCWA.

- Shasta County Sportsmen’s Association has expressed interest in sponsoring a youth hunt and a mobility-impaired hunt at BFW1. Since the mid-1990s, Shasta County Sportsmen’s Association has sponsored Youth Pheasant Hunts and Women’s Pheasant Hunts in conjunction with CDFG and the [Bureau of Land Management's \(BLM\) Redding Field Office](#). It offered its first [mobility-impaired pheasant hunt](#) in 2007.

## Constraints on the BFREC Element

The BFREC represents a new management direction for CDFG-managed wildlife areas, making it difficult to fully estimate the effects of such an undertaking.

### *Environmental factors*

While public access is an important component in the CDFG’s mission, protection of habitat and wildlife is the priority. Public use of the area must be balanced with habitat and wildlife protection. BFREC is intended to be fully compatible with and augment the full implementation of the biological goals.

### *Criteria for assessing compatibility of research and education projects*

The following criteria can be used to assess the compatibility of the proposed research projects:

- Research is designed to improve management of the MCCWA units (or other wildlife areas)
- Potential conflicts between the research and compatible public uses
- Potential conflicts between the research and any biological goals stated in this LMP
- Potential for the research to interfere with or preclude certain types of future research at the MCCWA unit(s)
- Use of scientifically valid and CDFG-approved research and monitoring protocol and mapping

### *Legal, political, or social factors*

CDFG staff identified two major constraints unique to this sub-element encountered during previous attempts to implement K-12 programs at BFW1: (1) lack of regular transportation options for youth, and (2) lack of a curriculum for 9-12 grades. Resources available to address the latter of these considerations are discussed in this element.

Different public uses have the potential to conflict with one another, especially if overall use of the Mouth of Cottonwood Creek Wildlife Area increases in the future. If conflicts develop, uses may need to be limited to specific areas or times of the year, or otherwise restricted.

### *Financial factors*

Implementation of the BFREC includes structural upgrades to BFW1, including parking, trails, and conversion of existing buildings for educational uses. Limited funding for staff and operations is a major constraint for implementation of this sub-element. Public use goals and tasks were formulated under the assumption that the CDFG has or will obtain the funding to undertake these tasks.



## F. Facility Maintenance Elements

*Facilities management is a critical component of the Mouth of Cottonwood Creek Wildlife Area. As isolated habitat islands within a rural residential zone, the Wildlife Area will require active management to maintain and restore the structure and species associated with each of the biological elements. This section details the components of facilities management necessary to achieve implementation of the biological goals as well as the unique public use element envisioned at the Balls Ferry Wetland Unit 1.*

The effective management of the Mouth of Cottonwood Creek Wildlife Area (MCCWA) will require establishing a regular facility maintenance program to meet the goals of the public use and biological elements. Existing facilities at the MCCWA that will require regular maintenance include a small network of trails, access roads, a parking area, fencing, gates, and several buildings and structures. Routine maintenance will also be required on water control structures for irrigation purposes. Some existing structures may also require renovation for safety, compliance with the Americans with Disabilities Act (ADA), and to meet the goals of the Balls Ferry Research and Education Center (BFREC) (IVE). Without adequate maintenance, public and employee safety may be jeopardized, wetlands can be degraded or lost, and wildlife habitat may decline in value and quantity.

### 1. Health and Safety Element

#### **GOAL 1.1: Provide a safe environment for wildlife and for public use.**

TASK 1.1.1: Establish an annual monitoring and reporting program of wildlife area facilities (e.g., condition of signs, structures, fences).

TASK 1.1.2: Fix or replace facilities as needed, and develop a facility management approach based on the results of the annual monitoring program.

TASK 1.1.3: Ensure that facilities maintenance actions comply with the ESA, CESA and other regulations aimed at the protection of special-status species and/or sensitive habitats.

TASK 1.1.4: Document facility needs in the CDFG's maintenance and capital outlay database.

#### **GOAL 1.2: Discourage destructive and illegal public use of the Wildlife Area through enforcement of regulations.**

TASK 1.2.1: Monitor the magnitude and type of illegal public use, such as trespass, off-road vehicle use or out of season hunting. Encourage increased CDFG warden presence in the Wildlife Area, as well as increasing the frequency of the assignment of penalties. Request assistance from the county sheriff as necessary to enforce laws.

## 2. Fire Management

The MCCWA is under the jurisdiction of the local Cottonwood Volunteer Fire Department (CVFD). The CVFD is the first responder to any fire outbreaks, backed up by other local agencies, and finally by California Department of Forestry and Fire Protection ([CAL FIRE](#)) crews (R. Armstrong, Chief, Cottonwood Fire Department, personal communication).

The fire history for this area is unknown, but presumed to be rare due to the proximity of the Sacramento River, Cottonwood Creek, and various irrigation ditches and water conveyance structures. Management activities at the MCCWA may include prescriptive burning for vegetation management and creation of firebreaks to provide effective containment. Since the Wildlife Area is essentially an island of wildland habitat surrounded by rural residential development, management coordination with the local first responders is imperative. There is currently no fire management plan for the MCCWA.

Prescriptive burns require a permit from the Shasta County Air Quality Management District (SCAQMD), Department of Resource Management, and must be coordinated with the CVFD (SCAQMD 2005). Guidelines and permit requirements for open burning are posted on the Shasta County AQMD [Web site](#). For prescribed burns that are greater than 10 acres or that would produce more than 1 ton of particulate matter emissions, the SCAQMD requires a smoke management plan to be filed along with payment of burn permit fees (ibid).

### **GOAL 2.1: Manage the Wildlife Area to optimize wildlife habitat conditions while protecting people and property.**

TASK 2.1.1. Develop and implement a wildfire management plan for the MCCWA. The management plan will coordinate with the SCAQMD, CVFD and implement the policies outlined in the [Interim Joint Policy on Pre, During and Post Fire Activities and Wildlife Habitat](#) (California Fish and Game Commission and California State Board of Forestry 1994). The wildlife management plan will include the following:

- Contact information for CDFG managers and local fire response teams.
- Maps that show boundaries, emergency access points and water sources for local fire authorities.
- Maps of sensitive biological resources that require careful consideration during a fire incident.

TASK 2.1.2: Coordinate and meet annually with local fire agencies to develop and update wildfire response procedures including vegetation management, recent fires events, and contact information.

TASK 2.1.3: Design and implement vegetation management strategies, including:

- Establishing firebreaks along existing roads, parking lots, and existing structures.
- Using livestock grazing as appropriate to manage fuel load.
- Maintaining at least 100 feet of defensible space between structures and flammable vegetation.
- Storing woodpiles and other flammable materials away from structures.

TASK 2.1.4: Identify water sources that could be used strictly for emergency purposes that would save lives and property. Install an auxiliary water tank and pump if necessary.

TASK 2.1.5: Install fire extinguishers and smoke alarms in all occupied structures. Equip chimneys with spark arrestors and clean roofs and gutters of leaves.

TASK 2.1.6: Following fire and fire suppression events, implement emergency restoration to sensitive habitat areas and structures as needed.

TASK 2.1.7: Identify all areas that may be candidates for prescribed fire or pre-fire activities and implement policies outlined in the Interim Joint Policy of the California Fish and Game Commission and the California State Board of Forestry (1994).

### 3. Vegetation Management and Grazing

Grazing by native herbivores (deer, elk, bison, or antelope), along with naturally occurring and deliberately set fires, have heavily influenced California's ecological landscape. Many native plants have adapted to and actually benefited from those influences. The introduction of European grasses and forbs by early Spanish and Anglo settlers, traditional cattle grazing practices, loss of native grazing animals, and fire suppression policies have resulted in the virtual replacement of the original grassland vegetation with a predominately alien flora. This nonnative vegetation is more competitive, productive and prolific than the native plants with which it coexists. Nonnative grasses grow rapidly and densely to heights of three feet or more, and present an acute fire safety hazard. In the absence of the native ungulate population, managed domestic livestock grazing is a viable alternative to achieve both fire safety objectives and maintain and restore natural plant communities.

**Grazing Leases.** The Cottonwood Creek Unit is designated primarily for wildlife management and has no active grazing lease. On both Balls Ferry wetland units, grazing is an historical use, and is considered a management strategy to control invasive non-native plants, reduce and manage fuel loads, and provide added management income.

The most recent grazing lease for BFW1 encompassed 240 acres, including 14 acres of irrigated pasture and 18 acres of wetlands. The terms of the lease allowed year-round use, with a maximum of 40 animal units per month (AUM). The grazing lease included maintenance and repair of all fences, cattle guards, gates and other improvements upon the leased lands. Additionally, the grazing lease included repair and maintenance of water delivery equipment and payments for the water delivery from ACID for biweekly flood irrigation. Grazing leases for BFW1 were previously renewed on an annual basis (CDFG internal files). Any future leases at BFW1 will likely be administered by the Western Shasta Resource Conservation District (WSRCD).

The recent lessee at BFW1 operated a cow-calf operation for three consecutive years. Cattle were rotated from annual grassland pastures from April thru July depending on the grass availability. Cows were scheduled to calf from mid-June through July when grass sources were high. During peak growing season, the lessee ran the maximum allotted 40 AUMs. Although the lease allowed up to 40 AUM, this number was adjusted according to the grass availability. During the late summer and fall months when grasses became depleted, some cattle were moved off site to reduce pasture stress. The remaining cattle were then moved to the irrigated pasture for grazing (D. Stroing, grazing lessee, personal communication).

BFW2 grazing lease is managed by the WSRCD on the behalf of CDFG, in accordance with the Balls Ferry Wetlands Unit 2 Grazing Management Plan (WSRCD 2009) (Appendix E). BFW2 includes approximately 106 acres of irrigated pasture and hay fields. The lease agreement includes grazing rights, harvesting hay, irrigation and maintenance of the facilities (all costs borne by lessee). It is the prerogative of the lessee to determine the amount of grazing and/or haying operations that occur in any given season. The WSRCD and the University of California Cooperative Extension (UCCE) Program periodically monitor the site to ensure that plant vigor is maintained and that a vegetation stubble height of 3-4 inch is available by November 1 for migrating waterfowl. The lease terms are five years, with an annual renewal clause. The lessee is additionally responsible for preparing an annual management plan that can be adjusted during the season based on monitoring data and/or site visits, and to manage the site in accordance with good husbandry and ranching practices (WSRCD Lease Agreement #CO-219, on file with CDFG).



PHOTO: Northwest side of BFW2 is grazed and partially hayed. This grazing lease is managed by the Western Shasta Resource Conservation District. 2009, SEI



PHOTO: Northeast hayfield of BFW2. Concrete pipe is part of ACID irrigation system. 2009, SEI



PHOTO: Northwest corner. Posts through center mark underground irrigation pipe. All grazed. 2009, SEI



PHOTO: Close-up of northeast hayfield. Three poles mark the monitoring station for WSRCD. 2009, SEI

**GOAL 3.1: Maintain a livestock grazing regime for invasive plant control, fuel management, and promote native plant restoration.**

**TASK 3.1.1:** Provide additional cross fencing to distribute animal impacts and utilize existing forage.

**TASK 3.1.2:** Introduce perennial grass and legume components to pasture forage mix to increase nutrition and pasture health.



TASK 3.1.3: Time pasture irrigation with animal movement to minimize soil compaction and maximize plant recovery on resting pasture.

TASK 3.1.4: Fence ponds and riparian areas to minimize grazing impacts, and improve wetland health.

TASK 3.1.5: Provide livestock watering troughs away from wetland and riparian habitats.

**GOAL 3.2: Provide opportunities for range management research and education at the Balls Ferry Education and Research Center.**

TASK 3.2.1: Work with WSRCD and grazing lessee(s) to design and implement a grazing management and monitoring plan that meets CDFG habitat management goals with consideration to the economic goals of the livestock owners (Appendix E).

TASK 3.2.2: Consider establishing a MOU with external agencies or non-profit organizations to assume oversight of grazing lease at BFW1.

TASK 3.2.3: Consider establishing a MOU with UCCE for use of facilities for student agriculture projects.

TASK 3.2.4: Evaluate grazing as a vegetation management tool on the Cottonwood Creek Unit.

TASK 3.2.5: Explore opportunities for long-term grazing leases to incorporate habitat monitoring and adaptive management strategies.

## 4. Vector Control

Insects or other arthropods that transmit diseases or discomfort to humans, their pets and livestock are called vectors. Mosquitoes are the most important vectors of human disease worldwide, responsible for about 1.5 million deaths per year from mosquito-borne malaria alone (Center for Disease Control [CDC] 2007). Other important diseases that are transmitted by mosquitoes to humans include West Nile Virus, dengue hemorrhagic fever, yellow fever, and a number of types of encephalitis. Recent attention has been focused on controlling the spread of [West Nile Virus](#), which has killed over 300 species of birds and also infects horses throughout the United States (ibid).

Other important disease vectors include fleas (which can transmit diseases such as bubonic plague) and ticks (which can transmit Lyme disease, human granulocytic ehrlichiosis [HGE] and babesiosis). [Lyme disease](#), the most well known of these tick-borne diseases, is caused by the spirochete bacterium, *Borrelia burgdorferi*. In the western United States, the *Borrelia* bacterium is carried by the Western blacklegged tick, *Ixodes pacificus*. Infected specimens of this species of tick have been found throughout most of California (California Department of Public Health 2009).

[California Fish and Game Code § 1507](#) contains language pertaining to mosquito control in managed wetlands in CDFG's wildlife areas. While there is currently no statewide program for Lyme disease control or prevention, the California Department of Public Health provides a [Web site](#) with important information and links that is available to the public. Public education and protection from tick bites are the primary methods to prevent contracting Lyme disease.

**GOAL 4.1: Maintain or enhance habitat values for waterfowl and other wildlife through proper water management and minimize the use of chemical treatments or other non-biological mosquito control.**

TASK 4.1.1: In consultation with Shasta Mosquito Vector Control District (SMVCD), implement a mosquito control plan that applies best management practices (BMPs) identified in the Technical Guide to Best Management Practices for Mosquito Control in Managed Wetlands (Kwasny et al. 2004).

**GOAL 4.2: Maintain and protect humans, domestic animals and wildlife from vector-borne diseases such as West Nile Virus and Lyme Disease.**

TASK 4.2.1: Post tick identification and Lyme disease prevention signs at public access points to the Wildlife Area.

**GOAL 4.4: Minimize financial costs to CDFG by coordinating with regional mosquito and vector control efforts.**

TASK 4.4.1: Communicate regularly with SMVCD and CDHS.

TASK 4.4.2: Meet annually with mosquito abatement agencies to discuss needed infrastructure improvements, identify areas of high mosquito productivity, schedules of summer irrigations and fall flood up, and scheduling of public use activities.

TASK 4.4.3: Support regional and local academic research regarding vector-borne illnesses.

## **5. Water and Flood Management**

The MCCWA contains a mix of natural and created wetland habitats, connected through a series of irrigation ditches and canals. These wetland habitats provide important habitat for waterfowl and other native species, and provide educational and recreational opportunities important to area managers.

Water flows through the Wildlife Area from offsite hydrological features, and is also provided by a series of irrigation ditches and pumps maintained by the Anderson-Cottonwood Irrigation District (ACID). The irrigation district bills annually, in advance, for its water deliveries based on the number of acres irrigated and the assumption that each 5 cfs will irrigate 1 acre per hour. Thus users are allotted a specific number of hours during which water is provided, based on the flow measured at the delivery point and the number of acres to be irrigated. Each customer receives water approximately every two weeks throughout the irrigation season. For example, if the customer applies for water on 100 acres and the delivery flow is 20 cfs, water will be provided for 25 hours during each two-week rotation (20 cfs = 4 acres per hour). If desired, CDFG could purchase water for 1059 acres per year from ACID for irrigation and maintenance of the wetland habitats (S. Wangberg, ACID manager, personal communication).

The Cottonwood Creek Unit of the MCCWA is located almost entirely within the 100-year floodplain of Cottonwood Creek as well as the Sacramento River (Shasta County General Plan 2004). Cottonwood Creek experiences regular and large flood events and as a result, the creek's channel alignment shifts often, especially along the lower reach between Interstate 5 and the confluence of the Sacramento River (Graham Matthews & Associates 2003). The flood and scour patterns of Cottonwood Creek have created a series of meander channels, oxbows, and cut off ponds, and

have deposited large amounts of sediment at the Creek mouth. This natural disturbance regime has contributed to the variety of habitats of the Cottonwood Creek Unit and is an important contributor to the overall health of the Sacramento River ecosystem (CALFED 2000).

Shasta County regulates development within floodplains through zoning that addresses land use, density and structure siting. The county's general plan includes goals for resource conservation (including restoration and conservation of riparian habitat along the floodplain), preservation of scenic values, and protection of public health and safety (Shasta County General Plan 2004).

CDFG's management of the MCCWA is consistent with the Shasta County General Plan, placing a priority on public safety and resource protection. During flood events, CDFG coordinates with the Division of Flood Management, California Department of Water Resources (DWR), a joint state and federal program designed to prevent loss of life and reduce property damage caused by floods and to assist in recovery efforts following any natural disaster.

**GOAL 5.1: Maintain the variety and diversity of wetland habitats at the MCCWA for optimal wildlife habitat.**

TASK 5.1.1: Ensure that actions comply with the ESA, CESA and other regulations aimed at the protection of special-status species and/or sensitive habitats.

TASK 5.1.2: Coordinate water deliveries to enhance wetland habitat values with ACID.

**GOAL 5.2: Restore and enhance aquatic ecosystems to conditions that provide desired ecological functions.**

TASK 5.2.1: Monitor the condition and use of existing irrigation canals and check gates monthly.

TASK 5.2.2: Take actions as needed to keep desired facilities/structures in good repair.

TASK 5.2.3: Take actions to demolish and remove those structures that are unauthorized or have become unsafe or undesirable.

**GOAL 5.3: Manage and operate the MCCWA in coordination with state, federal and local flood management plans.**

TASK 5.3.1: Maintain accurate records of water deliveries, management and maintenance actions, as well as the associated costs.

TASK 5.3.2: Upon notification of a major flood event, initiate flood response protocol including removal of portable structures onsite, removal of check gates (if necessary) and posting flood closure information onsite and on the CDFG [Web site](#).

## **6. Access Roads, Parking and Trails**

The MCCWA does not have direct public road access and has a limited, unimproved trail network. Access to the Cottonwood Creek Unit is provided by two unimproved gated roads, which are closed to the general public. These roads provide access for ACID, PG&E, and CDFG staff. There is one unpaved public parking area for up to eight vehicles is available at the Cottonwood Creek Unit on the south side of Adobe Road near the junction of Hacienda Road. A marked trail provides pedestrian access from the parking lot to the Cottonwood Creek Unit along the eastern edge of the unit.

The unimproved access roads on BFW1 and BFW2 are also limited to use by CDFG employees, ACID, PG&E and the grazing lessees. Parking for special use at BFW1 is limited to unimproved areas around existing structures and facilities. There is no public access at BFW2 (J. Chakarun, CDFG, personal communication).

**GOAL 6.1: Provide manageable public and private use of existing roads, parking areas, and trails.**

TASK 6.1.1: Prepare public access improvement plan that includes maintenance, and as necessary, improvement of existing roads and trails.

TASK 6.1.2: Maintain existing access roads and trails through herbicide spraying, mowing, graveling, and minor rut repair prior to (or after) the bird-nesting season.

TASK 6.1.3: Maintain and improve existing parking area and trail system at the Cottonwood Creek Unit and BFW1.

**GOAL 6.2: Improve access for people with disabilities.**

TASK 6.2.1: Identify special parking needs on BFW1 and make improvements as required.

TASK 6.2.2: Develop ADA boardwalk and observation blind for BFW1.

## **7. Signage, Fencing and Gates**

Fencing, gates, and signs are used to denote MCCWA boundaries, to restrict public access, and to contain management activities such as livestock grazing. The Cottonwood Creek Unit still has some internal fencing (left from prior ownership) that may present hazards to wildlife and public safety. Fencing at BFW1 is used to divide grazing pastures and limit livestock access to wetlands and existing residential structures. There are no internal fences at BFW2. A map of existing fencing on BFW1 is provided the property description of this plan (IID, Figure 1I-n).

**GOAL 7.1: Protect and improve the wildlife and habitat values on the MCCWA.**

TASK 7.1.1: Survey existing fencing and gates and improve where necessary.

TASK 7.1.2: Identify and remove obsolete internal fencing materials.

TASK 7.1.3: Implement grazing management plan for both Balls Ferry wetland units that includes pasture rotation and exclusionary fencing to protect riparian and wetland resources (IVF3, Appendix E).

**GOAL 7.2: Identify the boundaries of the MCCWA.**

TASK 7.2.1: Survey boundaries and place permanent corner markers on all units of the MCCWA.

TASK 7.2.2: Inventory existing boundary signage, and install new signs where necessary.

**GOAL 7.3: Inform the public of laws and regulations applicable to the Wildlife Area.**

TASK 7.3.1: Install a kiosk or bulletin board with Wildlife Area maps, Title 14 regulations, and public safety information.



**GOAL 7.4: Educate the public about the value of the natural and cultural history of the Wildlife Area.**

TASK 7.4.1: Install and maintain a kiosk or bulletin board with natural and cultural history interpretive material at appropriate public access points.

TASK 7.4.2: Support the use of the BFREC and the MCCWA for environmental education.

**8. Structures**

No physical structures currently exist on the Cottonwood Creek Unit. BFW1 has several structures in various states of repair. Building structures requiring maintenance and/or renovation include a mobile home, horse shed, pole barn, single family home, two story garage, covered pool house, changing house, and airplane hangar. Other facilities include an irrigation system consisting of a small network of ditches that distribute water to the ponds, wetland habitats, and irrigated pasture. BFW2 has no usable structures. A map of existing structures on BFW1 is provided in the property description of this plan (IID, Figure II-n).

**GOAL 8.1: Optimize the use of the existing structures at BFW1 for the Balls Ferry Research and Education Center.**

TASK 8.1.1: Maintain the residences, workshop, storage buildings, sheds, and related structures as needed to optimize the efficient use of the operating budget and to ensure the health, safety, and reasonable accommodation of people using the site.

TASK 8.1.2: Identify and prioritize specific facility needs to carry out research, monitoring and education goals for the MCCWA.

TASK 8.1.3: Prepare a hazardous material assessment for asbestos and other toxins within the existing structures.

TASK 8.1.4: Remove facilities that are unsafe or unusable for the research and educational purposes.

TASK 8.1.5: Modify or construct facilities as needed to meet the requirements of the ADA.

## 9. Equipment

CDFG owns, operates and maintains the following equipment for use at the MCCWA:

- Four-wheel drive, 3/4 ton pickup
- Three point disc
- Three point scraper
- All terrain vehicle (ATV) and trailer
- Riding lawn mower

Land managers have identified the following equipment needs in order to facilitate full implementation of this land management plan:

- 100 horse power wheel tractor
- 12-ft. disc
- 12-ft. mower
- Backhoe
- Broadcast seeder
- Herbicide spray rig
- One-ton dump truck
- Rowboat and life vests

Full details are discussed in the Operations and Maintenance Summary (V).

**GOAL 9.1 Manage the grounds at the MCCWA to protect, maintain and improve the biodiversity, habitat integrity and environmental health.**

TASK 9.1.1: Purchase equipment needed to maintain grounds and facilities at MCCWA.

**GOAL 9.2: Maintain all equipment, vehicles and facilities in optimum working condition to maximize the efficient use of the Wildlife Area's operating budget.**

TASK 9.2.1: Regularly inspect and service all heavy equipment and vehicles.

TASK 9.2.2: Regularly inspect and maintain fuel tanks to comply with state and federal law.

TASK 9.1.3: Establish cooperative agreements with Caltrans, WSRCD, and CAL FIRE to provide and operate equipment needed to maintain the grounds and facilities at MCCWA.

**GOAL 9.3: Maintain facilities and structures as necessary to promote compatible public uses and provide a unique research and education center for the area.**

TASK 9.3.1: Purchase a rowboat and life vests for environmental education and water quality monitoring at the BFREC.

## Facility Maintenance Resources

**CAL FIRE.** CAL FIRE has provided work crews to assist the CDFG with trail maintenance and brush clearing at the MCCWA. This is an economical arrangement benefiting both agencies and should be continued.

**Citizen Volunteers.** The CDFG's Volunteer Coordination Handbook (2003c) provides guidance for enlisting and working with citizen volunteers. This document is available through the North Coast Region office. A volunteer program may include biological monitoring, trail maintenance, plant restoration, weeding, and exotic plant removal. Using volunteers has been effective for the National Park Service ([NPS Volunteers in Parks Program](#)), the Fish and Wildlife Service ([USFWS volunteers](#)), and California State Parks ([State Volunteers in Parks](#)). Successful implementation of such a program must be carefully balanced with the biological goals and monitoring elements and will require a volunteer coordinator. This position could be associated with the Balls Ferry Research and Education Center (IVE).

## Constraints on Facility Maintenance Elements

The goals of the facilities maintenance elements are constrained by a range of natural and human induced factors. Effective management of the Mouth of Cottonwood Creek Wildlife Area requires that these factors be identified and considered.

### *Environmental factors*

Maintenance requirements will depend largely on the severity of winter weather conditions. In years of exceptional rainfall, flooding or erosion may damage roads, fences, and signage. The degree of damage will dictate maintenance priorities.

### *Legal, political, or social factors*

The addition of signing, access improvements, and portable sanitation will result in public expectation for the maintenance of these improvements. Some of the improvements may attract vandalism. The frequency and severity of vandalism may impact the department's ability to maintain the improvements or to continue to provide them over the long term.

### *Financial factors*

As with other elements, limited funding for staff and operations is a major constraint on facilities maintenance. Full realization of the facilities maintenance goals will require an increase in funding for the Wildlife Area.

## G. Cultural Resource Element

*Human activity at the Mouth of Cottonwood Creek Wildlife Area has been continuous since prehistoric occupation. Significant historical or archaeological resources may be present on all units and could potentially be affected by public uses or management actions, particularly ground-disturbing activities in areas not yet surveyed. Some remnants of human activity may need to be removed or disturbed because of safety hazards, aesthetic impacts, or conflicts with other management goals.*



PHOTO: Historical marker of the Rancho Buena Ventura Adobe Site next to the Redding Island information board, just northeast of the Cottonwood Creek Unit.



PHOTO: Artifacts from bygone days on BFW1.

Archaeological and historical resources on the Mouth of Cottonwood Creek Wildlife Area (MCCWA), as elsewhere, are protected under [California Public Resource Code Section 21083.2](#) and [California Code of Regulations, Title 14, Chapter 3, Section 15064.5](#). Whenever an action with potential impacts on cultural resources is contemplated, California Department of Fish and Game (CDFG) staff must follow a standard procedure to evaluate the significance of the resource and to determine whether the potential impact requires mitigation. [California Register of Historic Resources](#) (CRHR) serves as a guide to cultural resources when there is a discretionary action subject to the California Environmental Quality Act; it also serves as a guide for management of the MCCWA. The CRHR lists criteria for evaluating the significance of cultural resources and their eligibility for listing in the Register. Adverse effects to cultural resources eligible for listing must be avoided or the effects mitigated.

**GOAL 1.1: Preserve all cultural resources that have yielded or have the potential to yield information important to the prehistory or history of the MCCWA, or that otherwise would meet significance criteria according to the CRHR.**

**TASK 1.1.1:** Conduct cultural resource surveys before ground-disturbing activities (e.g., any new construction, levee maintenance, road grading, or extensive ecological restoration). If necessary, conduct pre-construction archaeological testing and data recovery if resources are discovered.

**TASK 1.1.2:** Provide an archaeological monitor for all earth moving activities.



TASK 1.1.3: Complete and submit site records to the [State Historic Preservation Officer](#) to establish eligibility, and submit any culturally significant resources that may be eligible for inclusion in the National Register of Historic Places or the CRHR.

TASK 1.1.4: Maintain internal library of cultural resource reports from the vicinity.

TASK 1.1.5: Develop interpretive materials for the Balls Ferry Research and Education Center that will inform and educate users about the historical importance of this region.

TASK 1.1.6: Coordinate an interpretive program with the [Shasta Historical Society](#) and the local Wintu tribal leaders.

**GOAL 2.2: Support use of the MCCWA by Native Americans for traditional activities, such as gathering native plant materials for cultural purposes.**

Gathering of limited quantities of native plant materials can be compatible with the goals of the Wildlife Area. The tasks listed below are intended to ensure that such uses are authorized only when compatible and when they take place in a manner that minimizes conflicts with other uses.

TASK 2.2.1: Work with native peoples who request access to determine the purpose of and need for access and/or collections within the MCCWA.

TASK 2.2.2: Develop access plans, including standard liability clauses, for issuing permits to native peoples whose activities are compatible with the goals of this plan.

TASK 2.2.3: Allow limited gathering of materials for educational and craft purposes by tribal members.

## **Constraints on Cultural Resource Protection**

Effective management of the Mouth of Cottonwood Creek Wildlife Area requires that potential constraints to implementation of the cultural resource element be identified and considered.

### *Environmental factors*

While cultural resource protection is an important component in the department's mission, protection of habitat and wildlife is the priority.

### *Financial factors*

Limited funding for staff and operations could be a major constraint for the implementation of the Cultural Resource Element. Ground-disturbing activities will require additional cultural resource surveys to ensure protection of sensitive artifacts and resources. This work will require the services of a qualified archaeologist. The cultural resource goals and tasks were formulated under the assumption that the CDFG has or will obtain the funding to undertake these tasks.

## H. Resource Coordination Element

*The Mouth of Cottonwood Creek Wildlife Area is located within the jurisdictions of many federal, state and local agencies as well as within regional habitat conservation planning areas that were discussed earlier. Agency activities, as well as those of neighbors and lessees, may influence management needs for the Wildlife Area. Improving communication and coordination with these stakeholders is likely to improve outcomes for everyone.*

It is the policy of the California Fish and Game Commission that CDFG review and comment on proposed projects affecting important range and habitat values, and to recommend and seek the adoption of proposals necessary or appropriate for the protection of fish and wildlife and their habitats. Coordination with local government and planning agencies is an important component of this policy. Entities that have management activities and interests related to the Wildlife Area include, *but are not limited to*, the following:

### **Federal and State Agencies**

Natural Resources Conservation Service  
 U.S. Army Corps of Engineers (Cottonwood Creek Mitigation Bank)  
 U.S. Fish and Wildlife Service (Coleman Fish Hatchery)  
 U.S. Bureau of Land Management (Reading Island Recreation Area)  
 CALFED (Ecosystem Restoration Program, Cottonwood Creek Ecological Management Zone)  
 California Department of Water Resources  
 California State Water Resources Control Board  
 California Highway Patrol

### **Local Governments and Municipalities**

Anderson-Cottonwood Irrigation District (easement)  
 Cottonwood Creek Watershed Fire Safe Council  
 Shasta County  
 Shasta County Office of Education  
 Shasta County Sheriff Department  
 Tehama County  
 Tehama County Office of Education  
 Tehama County Sheriff Department  
 Western Shasta Resource Conservation District

### **Utilities**

Pacific Gas and Electric Company (easement)

### **Private Landowners**

Neighboring landowners

### **Tribal Groups**

Wintu tribe

**GOAL 1.1: Develop regular communication procedures with federal, state and local agencies regarding plans and projects that may affect habitats at MCCWA.**

**GOAL 1.2: Maintain relationships with adjacent landowners.**

TASK 1.2.1: Develop a MCCWA Resource Coordination Plan that identifies key agency stakeholders and establishes a regular communication schedule.

TASK 1.2.2: Establish an online seasonal events calendar and provide generalized reminders to members listed in the contact database.

TASK 1.2.3: Explore the possibility of a MCCWA listserv that includes agency stakeholders as well as regional planning entities (IVC).

TASK 1.2.4: Meet with or send correspondence to adjacent landowners as needed to maintain communication about management needs and activities at the MCCWA.

TASK 1.2.5: Meet with law enforcement staff as appropriate to coordinate activities and explore options for cooperative programs.

TASK 1.2.6: Review, coordinate and provide comments and recommendations on federal, state and local government plans and proposed projects, as appropriate, for the purpose of determining the consistency of such plans with the goals of the Mouth of Cottonwood Creek Wildlife Area Land Management Plan.

### **Constraints on Resource Coordination**

Management coordination involves staff time and resources. Major constraints to the success of this coordination effort include:

- Insufficient staff or funding to identify key outreach entities and individuals, to develop an outreach schedule or strategy, to make contacts, or attend meetings.
- Lack of interest or capacity of outside entities to participate in management.

## **V. OPERATIONS AND MAINTENANCE**

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## V. OPERATIONS AND MAINTENANCE SUMMARY

*The Mouth of Cottonwood Creek Wildlife Area Land Management Plan recommends proactive ecosystem management at a level that is more intensive than in the past. It also includes the development of the Balls Ferry Research and Education Center to utilize the unique residential facilities and outbuildings on this site while filling a regional need for youth education and career development opportunities. Partnerships with local educational institutions, conservation agencies and community groups can help the California Department of Fish and Game meet the biological goals in this plan, provided the department commits additional budgetary resource of its own as a capacity building measure. The advancement of scientific knowledge regarding invasive species control and restoration of native vegetation will likely result in new techniques and opportunities for more effective wildlife management, as will growing understanding of issues specific to the site and region. To respond to changing conditions and increasing knowledge, this plan will need to be reviewed and revised periodically.*

## A. Staff and Equipment

### 1. Personnel Needs

Specific staff time and budget have not been assigned to the Mouth of Cottonwood Creek Wildlife Area (MCCWA). At the time this land management plan (LMP) was prepared, management oversight and maintenance activities were conducted by a Wildlife Habitat Supervisor II (WHS II) and a Fish and Wildlife Scientific Aid (FWSA). Both of these positions are based elsewhere and have additional management responsibilities.

As currently staffed, 0.65 Personnel Years (PY)<sup>1</sup> are allocated to the MCCWA as follows:

|                           |                            |                |
|---------------------------|----------------------------|----------------|
| <i>Program Management</i> | <i>Area Manager/WHS II</i> | <i>0.10 PY</i> |
| <i>Maintenance</i>        | <i>FWSA</i>                | <i>0.55 PY</i> |

To adequately support the MCCWA and to perform the tasks identified in this LMP, a combination of additional program management, site management, maintenance, and interpretive staffing will be required. The staffing program proposed in this LMP incorporates permanent staffing supplemented by seasonal labor. Table V-a summarizes the current as well as estimated new annual labor costs for the MCCWA.

#### PROGRAM MANAGEMENT

##### Area Manager/WHS II position, 0.20 PY

*Currently staffed at 0.10 PY*

The direction of the MCCWA, as well as staffing of CDFG planning and coordination activities with the Balls Ferry Research and Education Center (BFREC), will continue to be supervised by the WHS II position. This person will have the principal responsibility for implementing this LMP. Based upon discussions with CDFG staff, this position will increase to 0.20 PY (an increase of 100%). The WHS II will divide time between the MCCWA and the Battle Creek Wildlife Area, continue to serve as the area manager of the MCCWA, perform technical tasks, and give direction to the maintenance staff. The WHS II serves as CDFG's principal representative at meetings and coordinates with other agencies and interests (J. Chakarun, CDFG Wildlife Habitat Supervisor, personal communication).

#### SITE MANAGEMENT

##### WHS I position, 0.50 PY

*New position*

Increased day-to-day field operations will require a new WHS I position. The individual will act as the field manager for the MCCWA by performing basic communications, monitoring, and support functions. The individual will also assist and direct regular CDFG staff members, seasonal labor and volunteers performing biological monitoring and maintenance tasks as directed by this LMP.

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<sup>1</sup> 1.0 PY = 2080 hours

**Fish and Wildlife Interpreter I, 0.75 PY***New position*

This position will be used primarily for the BFREC and involve volunteer coordination, grant writing, site tours and setting up the interpretive program.

**MAINTENANCE****Wildlife Habitat Assistant, 0.50 PY***New position*

Under the direction of the WHS I, this position and the Fish and Wildlife Technician (below) will provide an estimated 1.00 PY to operate machinery and perform tasks related to maintenance, signage, access improvements, control of invasive non-native species, and other habitat improvement projects.

**Fish and Wildlife Technician, 0.50 PY***Currently staffed at 0.55 PY*

Under the direction of the WHS I, this position and the Wildlife Habitat Assistant (above) will provide an estimated 1.00 PY to operate machinery and perform tasks related to maintenance, signage, access improvements, control of invasive non-native species, and other habitat improvement projects.

**Table V-a. Estimated Annual Labor Cost of MCCWA LMP**

| Title   | Annual Salary* | Current PY | Current Cost | New PY | New Cost  | Annual Increase (or savings) |
|---|----------------|------------|--------------|--------|-----------|------------------------------|
| Wildlife Habitat Supervisor II                            | \$57,306       | 0.10       | \$5,730      | 0.20   | \$11,461  | \$5,730                      |
| Wildlife Habitat Supervisor I                             | \$47,676       | -          | -            | 0.50   | \$23,838  | \$23,838                     |
| Fish and Wildlife Interpreter I (Range B)                 | \$45,960       | -          | -            | 0.75   | \$34,470  | \$34,470                     |
| Wildlife Habitat Assistant                                | \$41,664       | -          | -            | 0.50   | \$20,832  | \$20,832                     |
| Fish and Wildlife Technician, (formerly a Scientific Aid) | \$35,970       | 0.55       | \$19,784     | 0.50   | \$17,985  | (\$1799)                     |
| Estimated Annual Labor Cost                               | -              | 0.6        | \$25,514     | 2.45   | \$108,586 | \$83,071                     |

\* Average annual salary (without benefits) based on 2009 rates, [California State Personnel Board](#).

PY = Personnel Year (1.0 PY = 2,080 hours)

## 2. Capital Equipment Needs

Table V-b presents a summary of additional equipment that will be needed to fulfill the goals and objectives of the MCCWA LMP. Not all of these items will be immediately necessary and equipment purchases can be prioritized and phased in as funding allows.

**Table V-b. Additional Equipment Needs for the MCCWA**

| Description                    | Estimated Cost (New) |
|--------------------------------|----------------------|
| Wheel tractor 100 hp           | \$70,000             |
| Mower 12 ft.                   | \$25,000             |
| Disk 12 ft.                    | \$10,000             |
| Backhoe                        | \$80,000             |
| Broadcaster seed/fertilizer    | \$3,000              |
| Herbicide spray rig            | \$5,000              |
| One-ton dump bed truck         | \$50,000             |
| Estimated Total Equipment Cost | \$243,000            |



## B. “Step Down” Activities

### 1. Biological Resources

The newly acquired BFW2 has not been comprehensively surveyed for biological resources. Additional surveys are needed to augment the plant and wildlife species lists, to map sensitive biological resources, and to identify populations of non-native invasive plant species.

### 2. Cultural Resources

The MCCWA is located in an area rich in historical and pre-historical resources. Ethnographic villages were noted to be concentrated on the bluffs overlooking waterways (Moratto 1984), which is the environmental setting the current project is set in. Given the close proximity of both Cottonwood Creek and the Sacramento River, there is a high probability that undocumented prehistoric sites exist within the property. In 1844, P.B. Reading noted the presence of two such villages on his property, which includes the land that is now known as the Matthews Property. There is a high probability of encountering buried archaeological sites should earth moving activities be conducted on the property.

Given this history, a Cultural Resource Treatment Plan should be prepared by a qualified archaeologist familiar with the resources and issues of this region of California. Such a plan will assist managers and staff in determining appropriate actions and mitigation for cultural resources on sites, as well as appropriate management activities. The plan should include the following actions/mitigation measures:

- Conduct comprehensive archaeological surveys of the Wildlife Area to document resources;
- Record the BFW1 site, Matthews Dairy, Lateral 33, and any newly identified cultural resources;
- Determine the NRHP eligibility for known or newly identified resources. (By determining if a resource is eligible or not, undue constraints on future projects may be eliminated. If resources are determined to be eligible, this information can be used to plan for future projects);
- Incorporate locations of known cultural resources into the GIS database for the MCCWA.

## C. Funding Sources

### 1. Operations and Maintenance

Current funding sources for the operation and maintenance of the MCCWA are through CDFG's operating budget for the North Coast Region. The annual grazing leases at the Balls Ferry wetland units provide a minor budget augmentation that supports maintenance activities. Implementation of the LMP will require additional funding and support.

### 2. Capital Improvements / Restoration and Enhancement

Funding sources for capital improvements, restoration and enhancement include, but are not limited to:

- AB 1982: Funding to implement mosquito best management practices
- California Endangered Species Tax Check-Off Fund
- California Wildlife Conservation Board, Inland Wetlands Conservation Program
- CDFG Comprehensive Wetlands Program
- CDFG Minor/Major Capital Outlay proposals
- Central Valley Project, Wildlife Habitat Augmentation Plan
- Ducks Unlimited, Wetland Restoration Program
- Funding available through the Sacramento River Watershed Program
- Grant programs administered by the California Department of Water Resources (DWR) for water conservation, ground water management, and studies and activities to enhance local water supply reliability, mitigation of water projects and levee maintenance activities
- Grant programs administered by the Environmental Stewardship Council (Environmental Education and Underserved Youth)
- Grant programs administered by the National Fish and Wildlife Foundation
- Grant programs administered by the U.S. Bureau of Reclamation
- Grant programs administered by the U.S. Environmental Protection Agency
- Grant programs administered by the U.S. National Oceanic and Atmospheric Administration
- Grants programs authorized under future bond acts
- Neotropical Migratory Bird Conservation Act Grants Program
- North American Wetlands Conservation Act (NAWCA) funding
- Riparian Habitat Joint Venture
- State Duck Stamp Program
- U.S. Department of Agriculture, Natural Resources Conservation Service, Farm Bill Programs
- U.S. Fish and Wildlife Service, Endangered Species Act, Section 6 provisions for cooperation with the states
- U.S. Fish and Wildlife Service, State Wildlife Grant Program, Federal Aid in Wildlife Restoration Program
- Upland Game Stamp Program
- Western Shasta Resource Conservation District

## D. Operations and Maintenance Tasks

Operations and maintenance tasks are described earlier under the goals for each management element (IV). Tasks are presented according to topical progressions and should not be construed as a prioritized list. Tasks associated with biological goals are largely restated and incorporated under biological monitoring tasks (IVC), BFREC tasks (IVD), and facility maintenance tasks (IVE). CDFG will prioritize implementation of the tasks based upon staffing availability, outside resources and financial constraints.

## E. Future Revisions to this Plan

The MCCWA Land Management Plan (LMP) reflects the best information available at this time; however, the information within will eventually be outdated, and new information and ecological management techniques will be available and standardized. New information may include:

- Documented threats to biotic communities, habitats or wildlife species.
- Feedback generated by monitoring management activities (adaptive management).
- Scientific research that directs improved management techniques.
- New legislative or policy direction.

Implementation of a successful adaptive management plan requires a periodic reassessment of identified tasks and goals to ensure that the overall goals are being met, and integration of new techniques and scientific information. Unfortunately, this aspect of adaptive management is often neglected because it seems too involved, too cumbersome or too expensive. To address this problem, this section presents a hierarchy of revision procedures based upon the magnitude of the change: minor or major.

If the appropriate procedure for a proposed revision is not apparent, the regional manager (in consultation with the Lands and Facilities Branch) will determine which to use. Both Minor and Major revisions to the LMP require appropriate consultation within the North Coast Region and the Land and Facilities Branch, coordination and consultation with other agencies, and an appropriate level of public outreach.

### Minor Revisions

Minor LMP revisions may include the addition of new property to the Wildlife Area, the adoption of limited changes to the goals and tasks as a result of adaptive management, new scientific information, or minor policy or legislative changes. The following revisions qualify as minor:

- The revision(s) does not affect the overall purposes of the LMP.
- The revision(s) does not physically alter the environment beyond what has already been evaluated in the current LMP; therefore, does not require additional CEQA analysis.

Minor revisions to the LMP may be prepared by wildlife area staff or by using other CDFG departmental resources. The regional manager must approve these revisions.

### Major Revisions or a New Comprehensive Management Plan

New policy directions or management plans will require procedures comparable to the initial LMP planning process, and proportionate to the level of policy change that is proposed. The following revisions are categorized as major:

- Revision(s) that could substantially change the LMP.
- Revisions that propose a completely new LMP.
- Revisions that physically alter the environment of the Wildlife Area beyond what was analyzed in the current LMP.
- Management actions that require additional CEQA documentation or environmental permits and approvals.

A major revision or a new plan requires the recommendation of the regional manager, and may be prepared using available departmental resources. The director of the department must approve major revisions.

#### **Recommended Five Year Review**

As part of the adaptive management planning cycle, a complete review of the achievements of the goals of the LMP should be prepared every five years following the date of adoption of the LMP or subsequent revisions. A status report documenting this review should, at minimum, include:

- Evaluation of the achievement of the purposes and goals of this LMP.
- Evaluation of the completion or annual completion, as appropriate, of each task contained in this LMP.
- Fiscal evaluation of the program.
- Evaluation of the effectiveness of CDFG's coordination efforts with CALFED, local governments, and other property management and regulatory agencies involved in the MCCWA.
- Development of important new scientific information that has bearing on the management of the Wildlife Area.
- Recommendations for revisions to incorporate new information into the LMP and improve its effectiveness.

The status report should be prepared or coordinated by the area manager. It should be submitted to the North Coast Region for review and comment, should be approved by the regional manager, and then be submitted to the director of the California Department of Fish and Game. This report should serve as a basis for appropriate adjustments to ongoing management practices and for revisions of the Mouth of Cottonwood Creek Wildlife Area land management plan.



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## VI. REFERENCES

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## **VII. DOCUMENT PREPARATION**

## VII. Document Preparation

*Preparation of an adaptive management plan such as this LMP is an exercise in collaboration and teamwork and would not have been possible without the contributions of the following people and organizations.*

### **California Department of Fish and Game**

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Eric Haney, GIS Analyst, North Coast Region

Jim Charakun, Wildlife Habitat Supervisor, North Coast Region

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Karen R. Fothergill, Coordinator, Game Bird Heritage Program

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Sharon Taylor, Lands and Acquisitions

Steve Arrison, Wildlife Biologist (*retired*) North Coast Region

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Brook Edwards, Senior Restoration Ecologist

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Holly Lurtsema, Anderson Cottonwood Irrigation District

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Randell Armstrong, Fire Chief, Cottonwood Fire Department

Rob Santry, Vice President, Wintu Audubon Society, Redding, CA

Ron Wolfe, Photography

Shasta County Planning Department

Stan Wangburg, Anderson Cottonwood Irrigation District

Steve Main, Anderson New Tech High School

Vieva Swearington, Cottonwood Creek Watershed Group

Shasta County Planning Department

## **APPENDIX A**

# MCCWA Property Records

1. Cottonwood Creek Unit
2. Balls Ferry Wetland Unit 1
3. Balls Ferry Wetland Unit 2





**CDFG REAL PROPERTY INVENTORY**  
**Comprehensive Parcel List (by County)**  
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|  |  |                                    |                                  |                     |                   |                    |   |
|--|--|------------------------------------|----------------------------------|---------------------|-------------------|--------------------|---|
| <b>MOUTH OF COTTONWOOD CREEK WA</b>                      |  | <b>Property No: 00352</b>          | <b>Management</b>                | <b>Ye -</b>         | <b>03/02/198</b>  | <b>County:</b>     | <b>AKA: UPPER SACRAMENTO RIVER RIPARIAN HABITAT</b>                       |
| <b>RIVER</b>   |  |                                    |                                  |                     |                   |                    | <b>45 - SHASTA Location: CONFLUENCE OF COTTONWOOD CREEK AT SACRAMENTO</b> |
| <b>History No: 820478</b>                                | <b>Grantor: ANDERSON-COTTONWOOD IRRIGATION DISTRICT (ACID)</b> | <b>Purpose: RIPARIAN HABITAT -</b> |                                  |                     |                   |                    |   |
| <b>Parcel Name: COTTONWOOD CREEK RIPARIAN HABITAT</b>    | <b>Manner Acq: 0200 - CORPORATION GRANT DEED</b>               | <b>Mitigation Land: No</b>         | <b>Permit Type:</b>              |                     |                   |                    |   |
| <b>Funding: 0140 - Environmental License Plate Fund;</b> |  | <b>Lease Expiration</b>            | <b>Mgt. Agreement Expiration</b> |                     |                   |                    |   |
| <b>State Land Cost: \$130,000.00</b>                     | <b>Federal Cost: \$260,000.00</b>                              | <b>PCA #: \$0.00</b>               | <b>In-Lieu Fees: \$0.00</b>      |                     |                   |                    |   |
| <b>Acq. Admin. Cost: \$3,234.54</b>                      | <b>County/City Cost: \$0.00</b>                                | <b>NCCP: No</b>                    |                                  |                     |                   |                    |   |
| <b>Improvement \$0.00</b>                                | <b>Donation/Mitigation Other Cost:</b>                         | <b>Title Ins: Yes</b>              |                                  |                     |                   |                    |   |
| <b>WCB Cost:</b>   |  | <b>Document Transaction</b>        | <b>10/28/1980</b>                |                     |                   |                    |   |
| <b>Total State \$133,234.54</b>                          |  | <b>Original Acres: 261.71</b>      |                                  |                     |                   |                    |   |
| <b>County: 45 - SHASTA</b>                               |  | <b>Current Acres: 261.71</b>       |                                  |                     |                   |                    |   |
| <b>Recorded Date: 04/02/1981</b>                         | <b>Book: 1801</b>  | <b>Page No: 227</b>                | <b>Document No:</b>              |                     |                   |                    |   |
| <b>Parcel Characteristics: 1000 - FEE</b>                |  |                                    |                                  | <b>Township 28N</b> | <b>Range: 03W</b> | <b>Section: 08</b> |   |
|  |  |                                    |                                  | <b>Township 28N</b> | <b>Range: 03W</b> | <b>Section: 09</b> |   |
| <b>APN: 00089-0310-0002</b>                              |  |                                    |                                  |                     |                   |                    |   |
| <b>APN: 00089-0310-0002</b>                              |  |                                    |                                  |                     |                   |                    |   |
|  |  |                                    |                                  |                     |                   |                    |   |
| <b>History No: 820531</b>                                | <b>Grantor: MOORE, R.M. &amp; DORIS J.</b>                     | <b>Purpose: RIPARIAN HABITAT -</b> |                                  |                     |                   |                    |   |
| <b>Parcel Name: EXPANSION #1</b>                         | <b>Manner Acq: 0100 - GRANT DEED</b>                           | <b>Mitigation Land: No</b>         | <b>Permit Type:</b>              |                     |                   |                    |   |
| <b>Funding: 0188 - Energy Resources Fund;</b>            |  | <b>Lease Expiration</b>            | <b>Mgt. Agreement Expiration</b> |                     |                   |                    |   |
| <b>State Land Cost: \$104,359.50</b>                     | <b>Federal Cost: \$0.00</b>                                    | <b>PCA #: \$0.00</b>               | <b>In-Lieu Fees: \$347.20</b>    |                     |                   |                    |   |
| <b>Acq. Admin. Cost: \$1,146.93</b>                      | <b>County/City Cost: \$0.00</b>                                | <b>NCCP: No</b>                    |                                  |                     |                   |                    |   |
| <b>Improvement \$5,975.00</b>                            | <b>Donation/Mitigation Other Cost:</b>                         | <b>Title Ins: Yes</b>              |                                  |                     |                   |                    |   |
| <b>WCB Cost:</b>   |  | <b>Document Transaction</b>        | <b>07/13/1982</b>                |                     |                   |                    |   |
| <b>Total State \$111,481.43</b>                          |  | <b>Original Acres: 54.73</b>       |                                  |                     |                   |                    |   |
| <b>County: 45 - SHASTA</b>                               |  | <b>Current Acres: 54.73</b>        |                                  |                     |                   |                    |   |
| <b>Recorded Date: 10/11/1982</b>                         | <b>Book: 1918</b>  | <b>Page No: 55</b>                 | <b>Document No: 24728</b>        |                     |                   |                    |   |
| <b>Parcel Characteristics: 1000 - FEE</b>                |  |                                    |                                  | <b>Township 28N</b> | <b>Range: 03W</b> | <b>Section: 08</b> |   |
|  |  |                                    |                                  | <b>Township 28N</b> | <b>Range: 03W</b> | <b>Section: 09</b> |   |
| <b>APN: 00089-0190-0005</b>                              |  |                                    |                                  |                     |                   |                    |   |
| <b>APN: 00089-0220-0004</b>                              |  |                                    |                                  |                     |                   |                    |   |
| <b>APN: 00089-0310-0005</b>                              |  |                                    |                                  |                     |                   |                    |   |

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History No: 821130    Grantor: HERRICK, GEORGE E. & GLORIA  
Parcel Name: EXPANSION #1  
Manner Acq: 0100 - GRANT DEED  
Funding: 0766 - CA, Wildlife, Coastal & Parkland Conservation Act (Prop 70, SEC. 5907) (1988);  
State Land Cost: \$120,000.00    Federal Cost: \$0.00  
Acq. Admin. Cost: \$8,451.50    County/City Cost: \$0.00  
Improvement: \$0.00    Donation/Mitigation: \$0.00  
WCB Cost: \$0.00    Other Cost: \$0.00  
Total State: \$128,451.50  
County: 45 - SHASTA  
Recorded Date: 12/13/1991    Book: 2753    Page No: 680    Document No: 51804  
Parcel Characteristics: 1000 - FEE    APN: 00089-0210-0001    Meridian: MDBM    Township: 29N    Range: 03W    Section: 09

Purpose: RIPARIAN HABITAT -  
Mitigation Land: No    Permit Type:  
Lease Expiration:    Mgt. Agreement Expiration:  
PCA #:    In-Lieu Fees: \$131.80  
NCCP: No  
Title Ins: Yes  
Document Transaction: 08/21/1991  
Original Acres: 59.60  
Current Acres: 59.60

History No: 821165    Grantor: CHASTAIN, ALEX  
Parcel Name: EXPANSION #2  
Manner Acq: 0100 - GRANT DEED  
Funding: 0766 - CA, Wildlife, Coastal & Parkland Conservation Act (Prop 70, SEC. 5907) (1988);  
State Land Cost: \$420,000.00    Federal Cost: \$0.00  
Acq. Admin. Cost: \$6,023.23    County/City Cost: \$0.00  
Improvement: \$0.00    Donation/Mitigation: \$0.00  
WCB Cost: \$0.00    Other Cost: \$0.00  
Total State: \$426,023.23  
County: 45 - SHASTA  
Recorded Date: 04/29/1992    Book: 2853    Page No: 512    Document No: 20368  
Parcel Characteristics: 1000 - FEE    APN: 00089-0230-0003    Meridian: MDBM    Township: 29N    Range: 03W    Section: 05  
APN: 00089-0230-0003    Meridian: MDBM    Township: 29N    Range: 03W    Section: 08  
APN: 00089-0240-0018    Meridian: MDBM    Township: 29N    Range: 03W    Section: 05  
APN: 00089-0250-0002    Meridian: MDBM    Township: 29N    Range: 03W    Section: 05

Purpose: RIPARIAN HABITAT -  
Mitigation Land: No    Permit Type:  
Lease Expiration:    Mgt. Agreement Expiration:  
PCA #:    In-Lieu Fees: \$1,443.42  
NCCP: No  
Title Ins: Yes  
Document Transaction: 11/29/1991  
Original Acres: 186.32  
Current Acres: 166.32

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History No: 821166 Grantor: CHASTAIN, ALEX  
Parcel Name: EXPANSION 2  
Manner Acq: 0100 - GRANT DEED  
Funding: 0786 - CA. Wildlife, Coastal & Parkland Conservation Act (Prop 70, SEC. 5907) (1988);  
State Land Cost: \$40,000.00 Federal Cost: \$0.00  
Acq. Admin. Cost: \$0.00 County/City Cost: \$0.00  
Improvement: \$0.00 Donation/Mitigation: \$0.00  
WCB Cost: Other Cost:  
Total State: \$40,000.00  
County: 52 - TEHAMA  
Recorded Date: 04/29/1992 Book: 1376 Page No: 187 Document No: 5991  
Parcel Characteristics: 1000 - FEE  
APN: 00009-0030-0022 Meridian: MDBM Township 29N Range: 03W Section: 05  
Purpose: RIPARIAN HABITAT -  
Mitigation Land: No Permit Type:  
Lease Expiration: Mgt. Agreement Expiration  
PCA #: In-Lieu Fees: \$37.98  
NCCP: No  
Title Ins: Yes  
Document Transaction: 11/29/1991  
Original Acres: 16.53  
Current Acres: 16.53

History No: 821231 Grantor: MOORE, DORIS J.  
Parcel Name: EXPANSION #3  
Manner Acq: 0100 - GRANT DEED  
Funding: 0786 - CA. Wildlife, Coastal & Parkland Conservation Act (Prop 70, SEC. 5907) (1988);  
State Land Cost: \$36,000.00 Federal Cost: \$0.00  
Acq. Admin. Cost: \$4,932.00 County/City Cost: \$0.00  
Improvement: \$0.00 Donation/Mitigation: \$0.00  
WCB Cost: Other Cost:  
Total State: \$40,932.00  
County: 45 - SHASTA  
Recorded Date: 01/15/1993 Book: 2956 Page No: 363 Document No: 2919  
Parcel Characteristics: 1000 - FEE  
APN: 00089-0220-0006 Meridian: MDBM Township 29N Range: 03W Section: 08  
Purpose: RIPARIAN HABITAT -  
Mitigation Land: No Permit Type:  
Lease Expiration: Mgt. Agreement Expiration  
PCA #: In-Lieu Fees: \$104.10  
NCCP: No  
Title Ins: Yes  
Document Transaction: 08/04/1992  
Original Acres: 12.22  
Current Acres: 12.22

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|   |  |  |
|---|--|--|
| <b>History No:</b> 822093   | <b>Grantor:</b> DYMESICH, GEORGE J. & RONALD | <b>Purpose:</b> INTERIOR WETLANDS - RIPARIAN HABITAT |
| <b>Parcel Name:</b> BALLS FERRY WETLANDS UNIT   |  | <b>Mitigation Land:</b> No                           |
| <b>Water Acq:</b> 0100 - GRANT DEED   |  | <b>Permit Type:</b>                                  |
| <b>Funding:</b> 6031 - Water Security, Clean Drinking Water, Coastal & Beach Protection (2002); |  | <b>Lease Expiration</b>                              |
| <b>State Land Cost:</b>   | <b>Federal Cost:</b>                         | <b>In-Lieu Fees:</b> \$2,848,79                      |
| <b>Acq. Adm'n. Cost:</b>  | <b>County/City Cost:</b>                     |  |
| <b>Improvement:</b>   | <b>Donation/Mitigation:</b>                  |  |
| <b>WCB Cost:</b>  | <b>Other Cost:</b>                           |  |
| <b>Total State:</b>   |  |  |
| <b>County:</b> 45 - SHASTA  |  |  |
| <b>Recorded Date:</b> 08/23/2004  | <b>Book:</b> 2004                            | <b>Document No:</b> 35773                            |
| <b>Parcel Characteristics:</b> 1000 - FEE   |  |  |
|   | <b>APN:</b> 00089-0010-0001                  | <b>Meridian:</b> MDBM                                |
|   | <b>APN:</b> 00089-0010-0001                  | <b>Meridian:</b> MDBM                                |
|   | <b>APN:</b> 00089-0010-0003                  | <b>Meridian:</b> MDBM                                |
|   | <b>APN:</b> 00089-0010-0003                  | <b>Meridian:</b> MDBM                                |
|   | <b>APN:</b> 00089-0060-0001                  | <b>Meridian:</b> MDBM                                |
|   | <b>APN:</b> 00089-0060-0001                  | <b>Meridian:</b> MDBM                                |
|   | <b>APN:</b> 00089-0070-0009                  | <b>Meridian:</b> MDBM                                |
|   | <b>APN:</b> 00089-0080-0001                  | <b>Meridian:</b> MDBM                                |
|   | <b>APN:</b> 00089-0080-0001                  | <b>Meridian:</b> MDBM                                |
|   | <b>APN:</b> 00089-0090-0008                  | <b>Meridian:</b> MDBM                                |
|   |  |  |
|   | <b>Range:</b> 03W                            | <b>Section:</b> 32                                   |
|   | <b>Range:</b> 03W                            | <b>Section:</b> 33                                   |
|   | <b>Range:</b> 03W                            | <b>Section:</b> 32                                   |
|   | <b>Range:</b> 03W                            | <b>Section:</b> 33                                   |
|   | <b>Range:</b> 03W                            | <b>Section:</b> 04                                   |
|   | <b>Range:</b> 03W                            | <b>Section:</b> 32                                   |
|   | <b>Range:</b> 03W                            | <b>Section:</b> 33                                   |
|   | <b>Range:</b> 03W                            | <b>Section:</b> 04                                   |
|   | <b>Range:</b> 03W                            | <b>Section:</b> 04                                   |
|   | <b>Range:</b> 03W                            | <b>Section:</b> 33                                   |
|   | <b>Range:</b> 03W                            | <b>Section:</b> 04                                   |

TOTAL ACREAGE MOUTH OF COTTONWOOD CREEK WA

917.42



## Balls Ferry Unit Property Data

## Location:

The subject property is located on the south side of Balls Ferry Road approximately two miles east of the community of Cottonwood, Shasta County, California.

## Legal Description:

The subject property may be described as all that real property situate in the County of Shasta, State of California, described as follows:

PARCEL 1:

Commencing at a concrete monument marking the Southwest corner of the Southeast one-quarter of Southwest one-quarter of Section 59 of the Reading Grant and running thence South  $31^{\circ}24'45''$  East 41.23 feet; thence South  $44^{\circ}31'15''$  West 250 feet to a point on the Southerly boundary line of the Cottonwood-Balls Ferry Road which is the true point of beginning of this description; beginning at said point and running thence South  $44^{\circ}31'15''$  West 2353.78 feet to a  $3/4$ " iron pipe set on the Southerly boundary of Cottonwood-Balls Ferry Road; thence South  $45^{\circ}28'45''$  East 1320 feet to a  $3/4$ " iron pipe; thence North  $44^{\circ}31'15''$  East 1973.01 feet to a  $3/4$ " iron pipe; thence North  $29^{\circ}23'15''$  West 1348.81 feet; thence continues North  $29^{\circ}23'15''$  West 25 feet to the point of beginning being a portion of Sections 62 and 63 of the Reading Grant and containing 65.54 acres, more or less.

PARCEL 2:

Commencing at an iron pipe witness corner situate 25 feet South of the true section corner common Sections 5, 6, 31, and 32, Township 29-30 North, Range 3 West, Mount Diablo Base and Meridian and running North  $89^{\circ}48'48''$  East on and along the Southerly line of the Cottonwood-Balls Ferry Road 705.61 feet; thence South  $10^{\circ}08'$  East 668.10 feet; thence North  $81^{\circ}33'17''$  East 3909.45 feet; thence South  $55^{\circ}10'43''$  East 1954.40 feet to the true point of beginning of this description. Beginning at said point and running thence South  $55^{\circ}10'43''$  East 1537.74 feet; thence North  $4^{\circ}27'17''$  East 1310.03 feet; thence South  $88^{\circ}18'30''$  West 971.59 feet; thence South  $44^{\circ}31'15''$  West 560.45 feet to the point of beginning. Being a portion of the Reading Grant and containing 24.277 acres more or less.

EXCEPTING THEREFROM that portion deeded to Robert A. Townsend, et ux, by deed recorded January 4, 1951 in Book 340 of Official Records, page 461, Shasta County Records.

PARCEL 3:

Commencing at the witness corner which bears South 25 feet from the Northwest corner of Section 5, Township 29 North, Range 3 West, Mount Diablo Base and Meridian, and running North 89°48'48" East 705.61 feet; thence, South 10°08' East 668.10 feet; thence, North 81°33'17" East 3909.45 feet; thence, South 55°10'43" East 1277.71 feet to the true point of beginning of this description; thence, from said true point of beginning South 55°10'43" East 636.09 feet; thence, North 44°31'15" East 617.98 feet; thence, North 43°29'28" West 635 feet; thence, South 44°31'15" West 754 feet to the true point of beginning, containing 10 acres, more or less.

SUBJECT TO that certain deed of trust in favor of Jessie D. Harris and Mary Ann Harris, his wife, dated June 25, 1956, recorded August 1, 1956 in Book 501 of Official Records at page 142, Shasta County Records, which the grantees have assumed and agreed to pay.

PARCEL 4:

Commencing at a concrete monument marking the Southwest corner of the Southeast one-quarter of Southwest one-quarter of Section 59 of the P.B. Reading Grant, and running thence South 31°24'45" East a distance of 81.23 feet to a 3/4" iron pipe which is the true point of beginning of this description; beginning at said 3/4" iron pipe and running thence North 31°24'45" West, a distance of 40.0 feet to the Southerly line of the Cottonwood-Balls Ferry Road; thence, South 44°31'15" West, on and along the Southerly boundary of said Cottonwood-Balls Ferry Road a distance of 250.00 feet; thence, South 29°23'15" East a distance of 25.0 feet to a 3/4" iron pipe; thence continuing South 29°23'15" East, a distance of 1348.81 feet to a 3/4" iron pipe; thence, North 44°31'15" East a distance of 300.00 feet to a 3/4" iron pipe; thence North 31°24'45" West a distance of 1320.80 feet to the point of beginning. Being a portion of the Northwest one-quarter of Northwest one-quarter of Section 62 of the P.B. Reading Grant and containing 8.584 acres, more or less.

PARCEL 5:

Beginning at a point whence the corner common to Sections 3 and 4, Township 29 North, and Sections 33 and 34, Township 30 North, Range 3 West, M.D.B.&M. bears South 87°46' East 1082.28 feet and running thence North 87°46' West 114.4 feet; thence North 34°19' West 158.93 feet; thence North 34°59' West 399.0 feet; thence North 51°29' West 514.20 feet; thence North 52°29' West 1410.40 feet; thence South 57°00' West 239.0 feet; thence North 48°59' West 162.30 feet; thence South 44°31'15" West 2079.44 feet; thence South 43°29'28" East 1234.73 feet; thence South 44°31'15" West 92.40 feet; thence North 88°19'30" East 2860.11 feet; thence North 04°27'17" East 802.06 feet to the point of beginning. Being a portion of the P. B. Reading Grant and containing 137.041 acres, more or less.

PARCEL 6:

Commencing at a 1 1/2" iron pipe marked "WC" witness corner, situated 25 feet South of the section corner common to Sections 5, 6, 31, and 32 in Township 29 and 30 North, Range 3 West, M.D.B.&M. and running North 89°48'48" East on and along the Southerly line of the Cottonwood-Balls Ferry Road 705.61 feet; thence

South 10°08' East 668.10 feet; thence North 81°33'17" East 1982.25 feet; thence North 44°31'15" East 1980.04 feet to the true point of beginning; thence North 44°31'15" East 2655.90 feet to the Westerly boundary line of the parcel of land conveyed to Virgil Bryant by a deed dated February 1, 1943 and recorded February 18, 1943 in Book 202 Official Records at page 490, Shasta County Records; thence along the line of land so conveyed South 37 1/2° East 359.88 feet; thence South 45 1/2° East 785 feet; thence South 51° East 672.70 feet; thence leaving the line of the property conveyed to Virgil Bryant South 44°31'15" West 2079.44 feet; thence North 43°29'28" West 697.66 feet; thence South 44°31'15" West 605.84 feet; thence North 43°29'28" West 1116.56 feet to the true point of beginning, containing 100.01 acres of land, more or less.

The subject property may also be identified as Assessor's Parcel Numbers 089-010-01, 089-010-02, 089-060-01, 089-070-09, 089-080-01, and 089-090-08 (refer to Assessor's Plat Maps in Addenda section).

#### Physical Description:

##### Land:

The subject site is irregular in shape and, according to public records, includes approximately 347.7 acres. Boundaries of the site include privately owned land to the east, south, and west; as well as Balls Ferry Road to the north and Venzke Road to the southwest. In addition, the site is bisected by several ephemeral creeks, as well as irrigation ditches, and includes six ponds or reservoirs. The ponds are estimated to encompass roughly 15 percent of the overall parcel and have been managed by the property owner for enhancement of wildlife habitat. As a result, the aesthetic characteristics provided by the ponds are unique within the area.

Access to the site is provided by Balls Ferry and Venzke Roads, which are publicly-owned and maintained, paved roadways. Interior access is provided by private dirt roads which were generally in average condition at the time of the property inspection.

Topography of the site is nearly level to gently sloping with an elevation of about 400 feet above mean sea level. Soils of the site consist primarily of moderately deep Perkins gravelly loam and Moda loam. These soils have Storie Indexes ranging from about 24% to 61% and, when used for agricultural purposes, are generally cultivated as irrigated or dry land pasture.

Natural vegetation of the site is characteristic of the Northern Sacramento Valley and includes mostly annual grasses with

scattered oaks. However, it should be noted that a wide variety of riparian vegetation may be found near the numerous ponds and along the creeks of the property and that a variety of ornamental species has been planted around the primary homesite. The ornamental plants, which include species such as redwood, bamboo, and pine, are generally mature and are considered to add considerable aesthetic value to this portion of the parcel.

#### Improvements:

The subject site is improved with two single-family dwellings, a carport with a second story recreation room, a covered swimming pool, a mobile home, an airplane hangar with an attached shop building, a horse barn, and an aviary. In addition, the property includes several miscellaneous sheds, a private airstrip, and other related site improvements.

The primary subject residence is located near the north-central portion of the property and is enclosed within approximately 1,450 linear feet of six-foot-high chain-link fencing. The structure was built about 1950 and consists of a wood frame dwelling with a concrete perimeter foundation, concrete slab floor, wood exterior, and wood shake roof cover. The structure includes a gross living area of about 2,150 square feet plus 674 square feet of covered porches and a 963 square-foot carport. No interior inspection of the residence was performed in conjunction with this appraisal; but, according to the property owner, the structure includes three bedrooms with two bathrooms and has been remodeled, or modernized, several times since the structure was built. Based upon the exterior inspection, the primary residence is estimated to be of average to good quality and in average condition with an effective age of about 25 years.

The second residential structure is located immediately north of the primary residence and adjacent a covered swimming pool. The structure was, apparently, designed for use as a pool house and includes approximately 450 square feet with one bedroom. The residence consists of a wood frame structure with a concrete perimeter slab foundation, wood exterior, and wood shake roof cover. The effective age of the dwelling is estimated at about 20 years and the building is currently in average condition.

The swimming pool includes an inground gunite pool which is enclosed within a wood frame canopy. The canopy has a screen cloth cover with a wood shingle roof cover and is currently in average condition with an effective age of about 15 years.

## Property Data - Cont'd.

The carport is located to the east of the swimming pool and includes a two-story, wood frame building with a concrete perimeter foundation; wood exterior; and wood shake roof cover. This building includes a gross area of about 1,728 square feet and has a two-car garage on the first floor with a recreation room on the second floor. The structure is in average to good condition with an effective age of about 10 years.

The last structure located within the immediate area of the primary residence includes an aviary which consists of a wood frame structure with an unimproved dirt floor, a wood exterior, and a wood shake roof cover. The aviary also is in average condition with an effective age of about 10 years.

The hangar and shop building are located a few hundred yards southeast of the main residence and at the northerly end of a 1,800-foot, private airstrip. The hangar includes a gross area of about 1,764 square feet and consists of a wood frame or pole barn with a sheet metal exterior. The shop is attached to the south side of the hangar but is not directly accessible from the hangar. The shop includes a gross area of about 800 square feet and consists of a wood frame structure with a wood exterior and a sheet metal roof cover. Both the hangar and shop building are in average condition with an effective age of approximately 25 years.

The hay barn includes a gross area of about 1,584 square feet and is located near the southerly portion of the subject property. This structure consists of a modest quality pole barn which is only partially enclosed and has a sheet metal exterior and roof cover. The hay barn is in average condition with an effective age of 20 years.

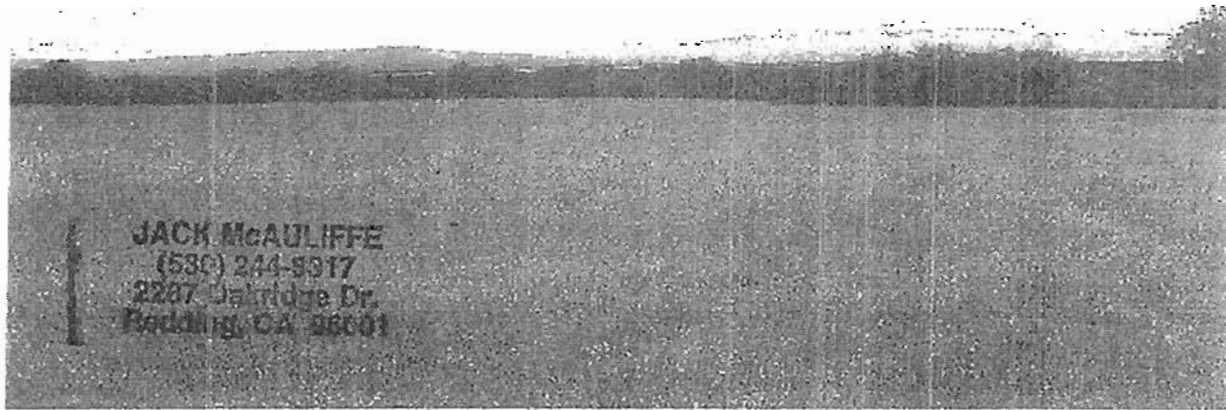
The mobile home is located near the northerly end of the property and includes a 10-foot-by-50-foot single-wide with a 10-foot-by-10-foot addition. The mobile home is in average to good condition with an effective age of 25 years.

In addition to the chain-link fencing around the primary homesite and the private airstrip mentioned previously, site improvements of the subject property include perimeter and interior barbed-wire fencing, a network of ponds with a water distribution system, and a limited interior road system. These improvements are generally in average condition and, with the exception of the airstrip and network of ponds, are considered typical of properties of the subject's type.



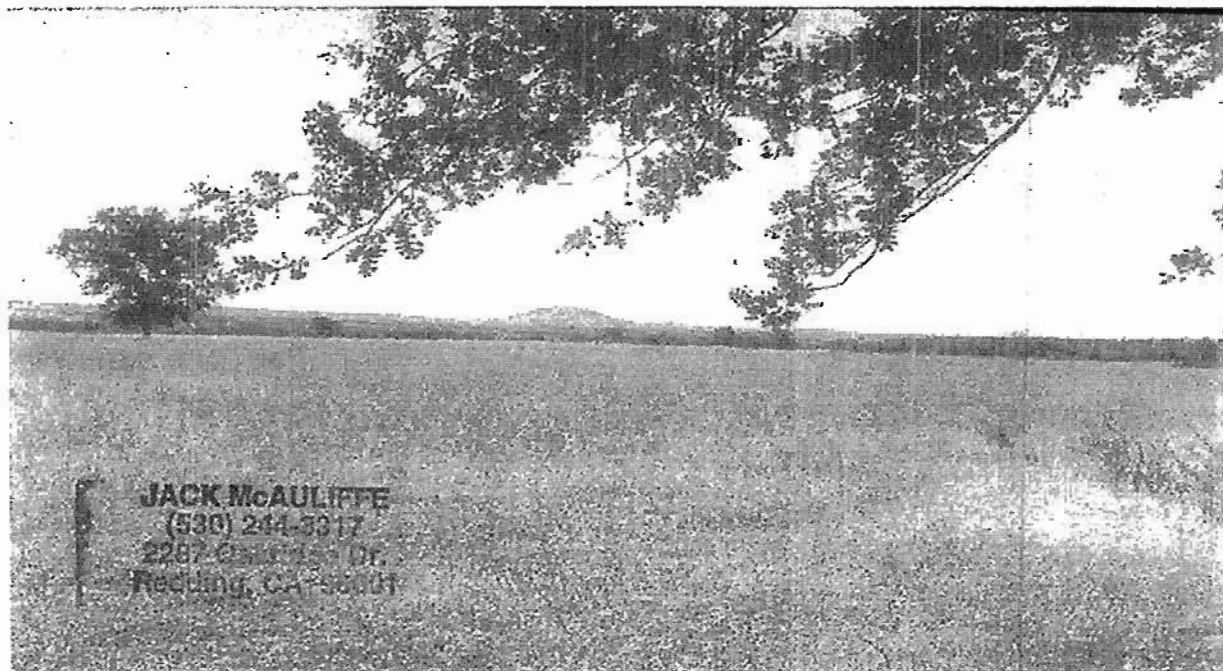
## 347.69 ACRES

| ASSESSOR'S<br>PARCEL NR. | ACRES  | ZONING   | GENERAL PLAN                                    |
|--------------------------|--------|--|---|
| 089-010-001              | 66.09  | UNCLASSIFIED                                     | Agriculture small scale<br>cropland and grazing |
| 089-010-002              | 8.50   | UNCLASSIFIED                                     | Agriculture small scale<br>cropland and grazing |
| 089-060-001              | 100.00 | UNCLASSIFIED                                     | Agriculture small scale<br>cropland and grazing |
| 089-070-009              | 10.00  | Limited Agriculture With<br>mobile homes allowed | Agriculture small scale<br>cropland and grazing |
| 089-080-001              | 138.80 | UNCLASSIFIED                                     | Agriculture small scale<br>cropland and grazing |
| 089-090-008              | 24.30  | Limited Agriculture With<br>mobile homes allowed | Agriculture small scale<br>cropland and grazing |



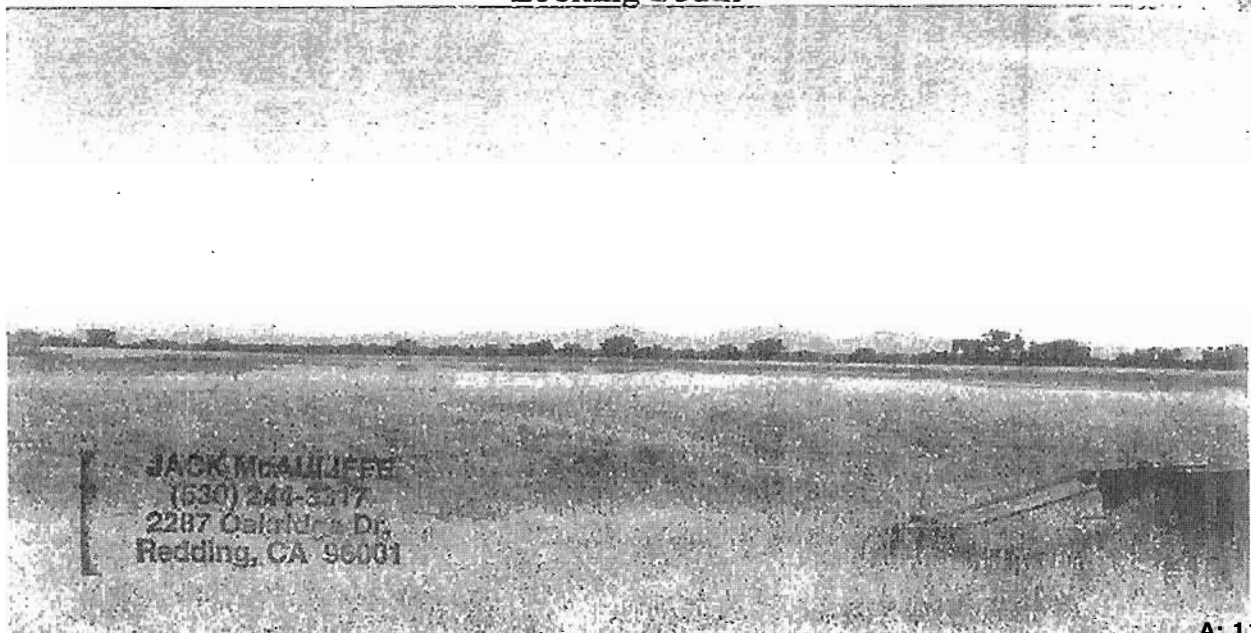
JACK McAULIFFE  
(530) 244-9317  
2287 Oakridge Dr.  
Redding, CA 96001

Looking East towards Lassen



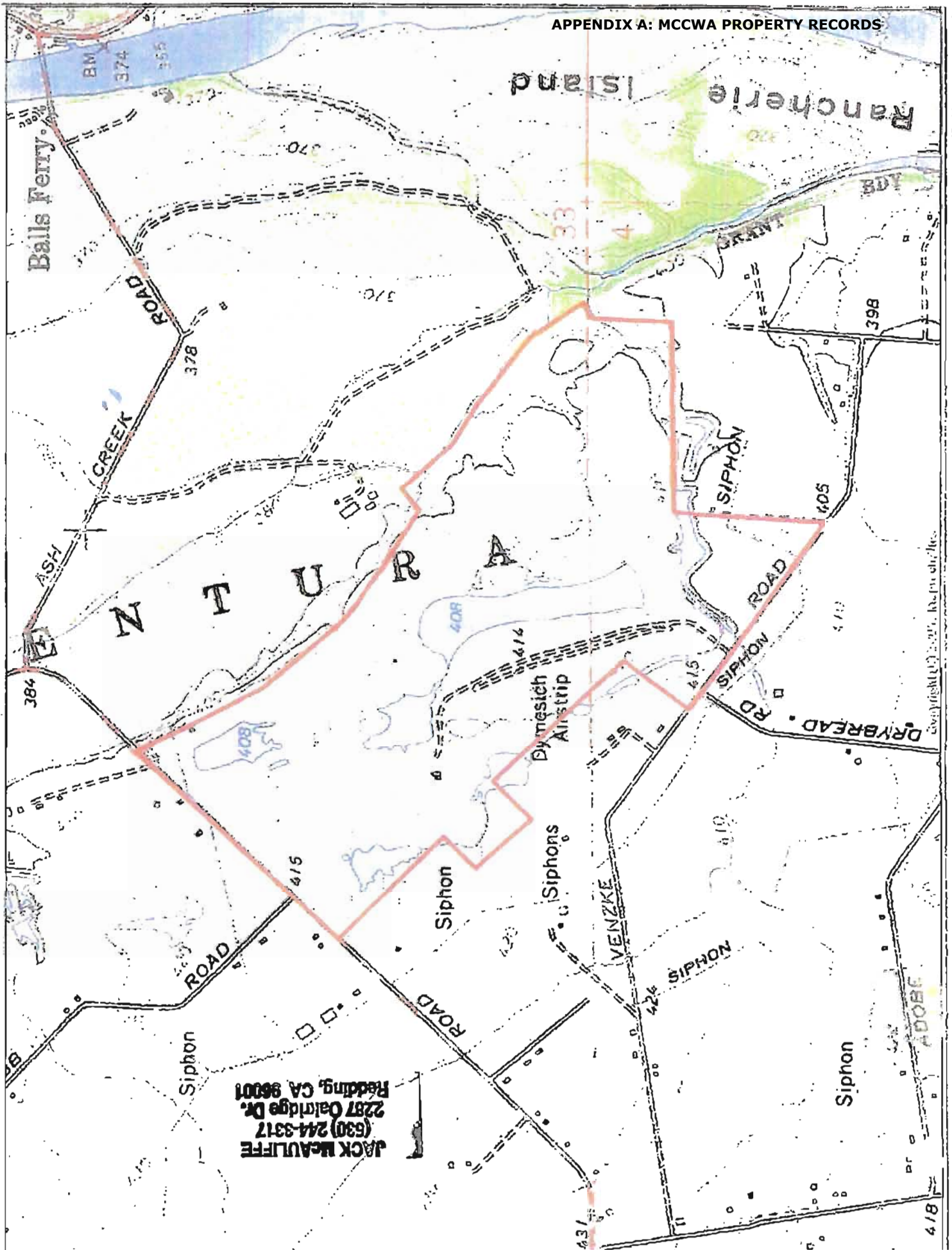
JACK McAULIFFE  
(530) 244-9317  
2287 Oakridge Dr.  
Redding, CA 96001

Looking South

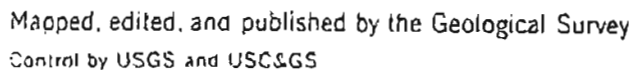


JACK McAULIFFE  
(530) 244-9317  
2287 Oakridge Dr.  
Redding, CA 96001

Looking Northwest



JACK McAULIFFE  
(630) 244-3317  
2287 Oakridge Dr.  
Redding, CA 96001









Project: Mouth of Cottonwood Creek Wildlife Area  
 Balls Ferry Unit, Expansion 2  
 Shasta County

## CERTIFICATE OF ACCEPTANCE

THIS IS TO CERTIFY that the interest in real property conveyed by the correction grant deed dated February 6, 2009 (correcting legal description in grant deed dated July 3, 2008 and recorded August 29, 2008) from Walter E. Matthews to the STATE OF CALIFORNIA, is hereby accepted by the undersigned officer on behalf of the State of California pursuant to authority conferred by authorization of the Wildlife Conservation Board, Department of Fish and Game, Natural Resources Agency, State of California adopted on May 22, 2008, and the grantee consents to the recordation thereof by its duly authorized officer.



STATE OF CALIFORNIA  
 Natural Resources Agency  
 Department of Fish and Game

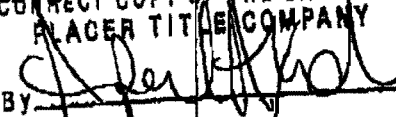
By: *John P. Donnelly*  
 John P. Donnelly  
 Executive Director  
 Wildlife Conservation Board

Date: 2/17/09

RECORDING REQUESTED BY  
PLACER TITLE COMPANY

Escrow Number: 1403-1514-ER

AND WHEN RECORDED MAIL

State of California  
Wildlife Conservation Board  
Attn: Carol Klein  
1807 13th Street, Suite 103  
Sacramento, CA 95811-7137THIS IS A CERTIFIED TRUE AND  
CORRECT COPY OF THE ORIGINAL  
PLACER TITLE COMPANY  
By Recorded  
Official Records,  
County of  
Shasta  
Leslie Morgan  
Assessor-Recorder

2009-0008134

REC FEE 0.00

04:03PM 16-Mar-2009 DS  
Page 1 of 7

SPACE ABOVE THIS LINE FOR RECORDER'S USE

## GRANT DEED

The undersigned grantor(s) declare(s): *Consideration Less Than \$100*  
Documentary transfer tax is \$0.00 - Correction purposes only  
☐ computed on full value of property conveyed, or  
☐ computed on full value less value of liens and encumbrances remaining at time of sale.

FOR A VALUABLE CONSIDERATION, receipt of which is hereby acknowledged, Walter E. Matthews

Hereby GRANT(S) to State of California

THE LAND DESCRIBED HEREIN IS SITUATED IN THE STATE OF CALIFORNIA, COUNTY OF SHASTA,  
UNINCORPORATED AREA, AND IS DESCRIBED AS FOLLOWS:

SEE EXHIBIT "A" ATTACHED HERETO AND MADE A PART HEREOF FOR FULL LEGAL DESCRIPTION

Together with a ten (10) foot wide easement for ingress and egress described in attached Exhibit "B" which by this  
reference is incorporated herein.This easement is for the use of the State of California Department of Fish and Game, its employees, and its agents in  
connection with the management (which shall not include the raising of livestock or crops) of the State of California's  
adjacent wildlife area only and shall in no way be construed to establish a right of access of the general public to such  
property for any reason, including, but not limited to, events held by the State of California on such property in which  
members of the public are invited.THE HEREIN DEED IS BEING RECORDED TO CORRECT THE LEGAL DESCRIPTION AS SHOWN IN THAT  
CERTAIN GRANT DEED DATED JULY 3, 2008 AND RECORDED IN THE OFFICE OF THE SHASTA COUNTY  
RECORDER ON AUGUST 28, 2008 AS INSTRUMENT NO.: 2008-0030009, SHASTA COUNTY RECORDS.

Dated: February 6, 2009



Walter E. Matthews

MAIL TAX STATEMENTS TO PARTY SHOWN ON FOLLOWING LINE; IF NO PARTY SHOWN, MAIL AS  
DIRECTED ABOVE

SAME AS ABOVE

Name

Street Address

City &amp; State

Page 1 - 2/5/2009

OfCandRecd.Am (7/2007)

STATE OF CALIFORNIA  
COUNTY OF SHASTA

On February 6, 2009 before me, Elaine Sanders, Notary Public, personally

appeared WALTER E. MATTHEWS, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct. WITNESS my hand and official seal.

Signature: Elaine Sanders



MAIL TAX STATEMENTS TO PARTY SHOWN ON FOLLOWING LINE; IF NO PARTY SHOWN, MAIL AS DIRECTED ABOVE

SAME AS ABOVE

Names

Street Address

City & State

Page 2 - 2/5/2009

04Consolid.doc (7/2002)

**EXHIBIT "A"**  
**LEGAL DESCRIPTION**

THE LAND DESCRIBED HEREIN IS SITUATED IN THE STATE OF CALIFORNIA, COUNTY OF SHASTA, UNINCORPORATED AREA, AND IS DESCRIBED AS FOLLOWS:

**~PARCEL 1:~**

COMMENCING AT A 6" X 6" CONCRETE MONUMENT MARKING THE SW CORNER OF THE SE 1/4 OF THE SW 1/4 OF SEC. 59 OF THE P. B. READING GRANT AND RUNNING THENCE S. 44 DEGREES 21'15" W. 2692.80 FEET TO A 1" IRON PIPE, THENCE N. 45 DEGREES 38'15" W. 660.0 FEET TO A 1" IRON PIPE WHICH IS THE TRUE POINT OF BEGINNING OF THIS DESCRIPTION; BEGINNING AT SAID IRON PIPE AND RUNNING THENCE N. 45 DEGREES 38'15" W. 330.00 FEET; THENCE S. 44 DEGREES 21'15" W. 660.0 FEET; THENCE S. 45 DEGREES 38'45" E. 330.0 FEET; THENCE N. 44 DEGREES 21'15" E. 660.0 FEET TO THE POINT OF BEGINNING; BEING A PORTION OF THE SE 1/4 OF SEC. 58 OF THE P. B. READING GRANT.

**~PARCEL 2:~**

COMMENCING AT A 6" X 6" CONCRETE MONUMENT MARKING THE SW CORNER OF THE SE 1/4 OF THE SW 1/4 OF SEC. 59 OF THE P.B. READING GRANT AND RUNNING THENCE S. 44 DEGREES 21'15" W. A DISTANCE OF 2692.80 FEET TO A 1" IRON PIPE WHICH IS THE TRUE POINT OF THE BEGINNING OF THIS DESCRIPTION; BEGINNING AT SAID IRON PIPE AND RUNNING THENCE N. 45 DEGREES 38'45" W. A DISTANCE OF 660.0 FEET TO A 1" IRON PIPE, THENCE S. 44 DEGREES 21'15" W. A DISTANCE OF 660.0 FEET TO A 1" IRON PIPE, THENCE S. 45 DEGREES 38'45" E. A DISTANCE OF 660.0 FEET, THENCE N. 44 DEGREES 21'15" E. ON AND ALONG THE NORTHERLY RIGHT OF WAY LINE OF THE COUNTY ROAD A DISTANCE OF 660.0 FEET TO THE POINT OF BEGINNING. BEING A PORTION OF THE SE 1/4 OF SEC. 58 OF THE P.B. READING GRANT.

EXCEPTING FROM PARCELS 1 AND 2 ABOVE, THE FOLLOWING DESCRIBED PARCEL:

COMMENCING AT A 6" X 6" CONCRETE MONUMENT MARKING THE SW CORNER OF THE SE 1/4 OF THE SW 1/4 OF SEC. 59 OF THE P.B. READING GRANT AND RUNNING THENCE S. 44 DEGREES 21'15" W. A DISTANCE OF 2692.80 FEET TO A 1" IRON PIPE WHICH IS THE TRUE POINT OF THE BEGINNING OF THIS DESCRIPTION; BEGINNING AT SAID IRON PIPE AND RUNNING THENCE N. 45 DEGREES 38'45" W. A DISTANCE OF 941.09 FEET TO THE CENTERLINE OF THE ACID IRRIGATION PIPELINE; THENCE S 33 DEGREES 11'18" W ALONG SAID PIPELINE A DISTANCE OF 327.04 FEET TO THE CENTERLINE OF AN ADJOINING ACID IRRIGATION DITCH; THENCE S 35 DEGREES 47'09" E ALONG SAID CENTERLINE A DISTANCE OF 889.04 FEET TO THE NORTHWEST RIGHT OF WAY OF BALLS FERRY ROAD; THENCE N 44 DEGREES 34'45" E ALONG SAID RIGHT-OF-WAY A DISTANCE OF 473.10 FEET TO THE POINT OF BEGINNING.

PORTION OF APN: 091-230-003

**~PARCEL 3:~**

BEGINNING AT AN IRON HARROW TOOTH SET IN THE NORTHERLY LINE OF THE BALLS FERRY-COTTONWOOD ROAD AND MARKING THE QUARTER SECTION CORNER COMMON TO SECTION 58 AND 63 OF THE P.B. READING GRANT AND RUNNING THENCE N. 44 DEGREES 21'15" E. ON AND ALONG THE NORTHERLY LINE OF SAID BALLS FERRY-COTTONWOOD ROAD 660 FEET TO A 3/4" IRON PIPE, THENCE N. 45 DEGREES 38'45" W. 990 FEET TO A 3/4" IRON PIPE, THENCE N. 44 DEGREES 21'15" E. 350 FEET TO A 3/4" IRON PIPE, THENCE N. 18 DEGREES 20' W. 777.1 FEET TO A 3/4" IRON PIPE, THENCE N. 56 DEGREES 20' W. 64.18 FEET TO A 3/4" IRON PIPE, THENCE S. 44 DEGREES 21'15" W. 1064.61 FEET, THENCE S. 36 DEGREES 12'02" E. 1787.5 FEET TO THE POINT OF BEGINNING, BEING A PORTION OF SEC. 58 OF THE P.B. READING GRANT.

PORTION OF APN: 091-230-003

~PARCEL 4:~

COMMENCING AT A WHEEL PIN SET IN THE NORTHERLY BOUNDARY OF THE COTTONWOOD-BALLS FERRY ROAD WHENCE A 6" X 6" CONCRETE MONUMENT MARKING THE SW CORNER OF THE SE 1/4 OF THE SW 1/4 OF SEC. 59 OF THE P. B. READING GRANT BEARS N. 44 DEGREES 21'15" E. 4012.80 FEET, AND RUNNING THENCE N. 38 DEGREES 12'02" W. 1767.50 FEET TO THE TRUE POINT OF BEGINNING OF THIS DESCRIPTION; BEGINNING AT SAID POINT AND RUNNING THENCE N. 44 DEGREES 21'15" E. 1893.85 FEET, THENCE N. 2 DEGREES 18'22" E. 470.18 FEET, THENCE N. 48 DEGREES 54' W. 279.31 FEET, THENCE S. 44 DEGREES 21'15" W. 2237.83 FEET, THENCE S. 38 DEGREES 12'02" E. 802.32 FEET TO THE POINT OF BEGINNING, SAVE AND EXCEPT RIGHT OF WAY FOR ANDERSON-COTTONWOOD IRRIGATION DISTRICT CANAL.

PORTION OF APN: 091-230-003

~PARCEL 5:~

COMMENCING AT A 6" X 6" CONCRETE MONUMENT MARKING THE SW CORNER OF THE SE 1/4 OF THE SW 1/4 OF SEC. 59 OF THE P. B. READING GRANT AND RUNNING THENCE S. 44 DEGREES 21'15" W. 2032.80 FEET, THENCE N. 45 DEGREES 38'45" W. 980.0 FEET TO THE TRUE POINT OF BEGINNING OF THIS DESCRIPTION; BEGINNING AT SAID POINT AND RUNNING THENCE S. 44 DEGREES 21'15" W. 936.24 FEET, THENCE N. 18 DEGREES 20' W. 771.94 FEET, THENCE N. 58 DEGREES 20' W. 68.85 FEET, THENCE N. 44 DEGREES 21'15" E. 898.51 FEET, THENCE S. 2 DEGREES 18'22" W. 409.0 FEET, THENCE S. 45 DEGREES 38'45" E. 479.61 FEET TO THE POINT OF BEGINNING, BEING A PORTION OF THE SE 1/4 OF SEC. 59 OF THE P. B. READING GRANT.

PORTION OF APN: 091-230-003

~PARCEL 6:~

COMMENCING AT A 6" X 6" CONCRETE MONUMENT MARKING THE SW CORNER OF THE SE 1/4 OF THE SW 1/4 OF SECTION 59 OF THE P. B. READING GRANT AND RUNNING THENCE N. 45 DEGREES 31' W. 1442.93 FEET, THENCE S. 44 DEGREES 21'15" W. 683.04 FEET TO THE TRUE POINT OF BEGINNING OF THIS DESCRIPTION; BEGINNING AT SAID POINT AND RUNNING THENCE N. 48 DEGREES 54' W. 603.23 FEET, THENCE S. 43 DEGREES 06' W. 626.49 FEET, THENCE S. 2 DEGREES 18'22" W. 879.97 FEET, THENCE N. 44 DEGREES 21'15" E. 1293.01 FEET TO THE POINT OF BEGINNING, BEING A PORTION OF THE P. B. READING GRANT.

APN: 091-190-004

~PARCEL 7:~

COMMENCING AT A 1 1/2" IRON PIPE WITNESS CORNER SITUATED 25 FEET SOUTH OF THE TRUE SECTION CORNER AND MARKED WC SECTIONS 5, 8, 31 AND 32, TOWNSHIP 29 AND 30 NORTH, RANGE 3 WEST, M.D.M., AND RUNNING THENCE NORTH 89 DEGREES 48'48" EAST ON AND ALONG THE SOUTH LINE OF THE COTTONWOOD-BALLS FERRY ROAD, 1294.81 FEET; THENCE, NORTH 44 DEGREES 31'15" EAST ON AND ALONG THE SOUTHERLY LINE OF SAID ROAD, 980.25 FEET TO THE TRUE POINT OF BEGINNING OF THIS DESCRIPTION; BEGINNING AT SAID POINT AND RUNNING THENCE NORTH 44 DEGREES 31'15" EAST ON AND ALONG THE SOUTHERLY LINE OF SAID ROAD, 2159.0 FEET; THENCE, SOUTH 45 DEGREES 28'45" EAST, 1320.0 FEET; THENCE, SOUTH 44 DEGREES 31'15" WEST, 2159.0 FEET; THENCE, NORTH 45 DEGREES 28'45" WEST, 1320.0 FEET TO THE POINT OF BEGINNING, BEING A PORTION OF THE P. B. READING GRANT.



## EXCEPTING THEREFROM THE FOLLOWING:

COMMENCING AT A 1 1/2 INCH IRON PIPE WITNESS CORNER SITUATED 25 FEET SOUTH OF THE SECTION CORNER AND MARKED W. C. SECTIONS 5, 8, 31 AND 32, TOWNSHIP 29 AND 30 NORTH, RANGE 3 WEST, M.D.M.; THENCE, NORTH 89 DEGREES 48'48" EAST ALONG THE SOUTH LINE OF THE COTTONWOOD-BALLS FERRY ROAD, 1284.91 FEET; THENCE, NORTH 44 DEGREES 31'15" EAST ALONG THE SOUTHERLY LINE OF SAID ROAD, 980.25 FEET TO THE POINT OF BEGINNING OF THIS PARCEL; THENCE, SOUTH 45 DEGREES 28'45" EAST, 1320.00 FEET; THENCE, NORTH 44 DEGREES 31'15" EAST, 425.88 FEET; THENCE, NORTH 35 DEGREES 42'29" WEST, 840.26 FEET; THENCE, NORTH 0 DEGREES 34'15" WEST, 103.38 FEET; THENCE, NORTH 40 DEGREES 07'22" WEST, 260.30 FEET; THENCE, SOUTH 84 DEGREES 47'37" WEST, 45.88 FEET; THENCE NORTH 35 DEGREES 43'45" WEST, 136.85 FEET TO THE SOUTHERLY LINE OF THE COTTONWOOD-BALLS FERRY ROAD; THENCE, ALONG THE SOUTHERLY LINE OF SAID ROAD, SOUTH 44 DEGREES 08'00" WEST, 853.73 FEET TO THE POINT OF BEGINNING.

A.P.N. 089-020-001

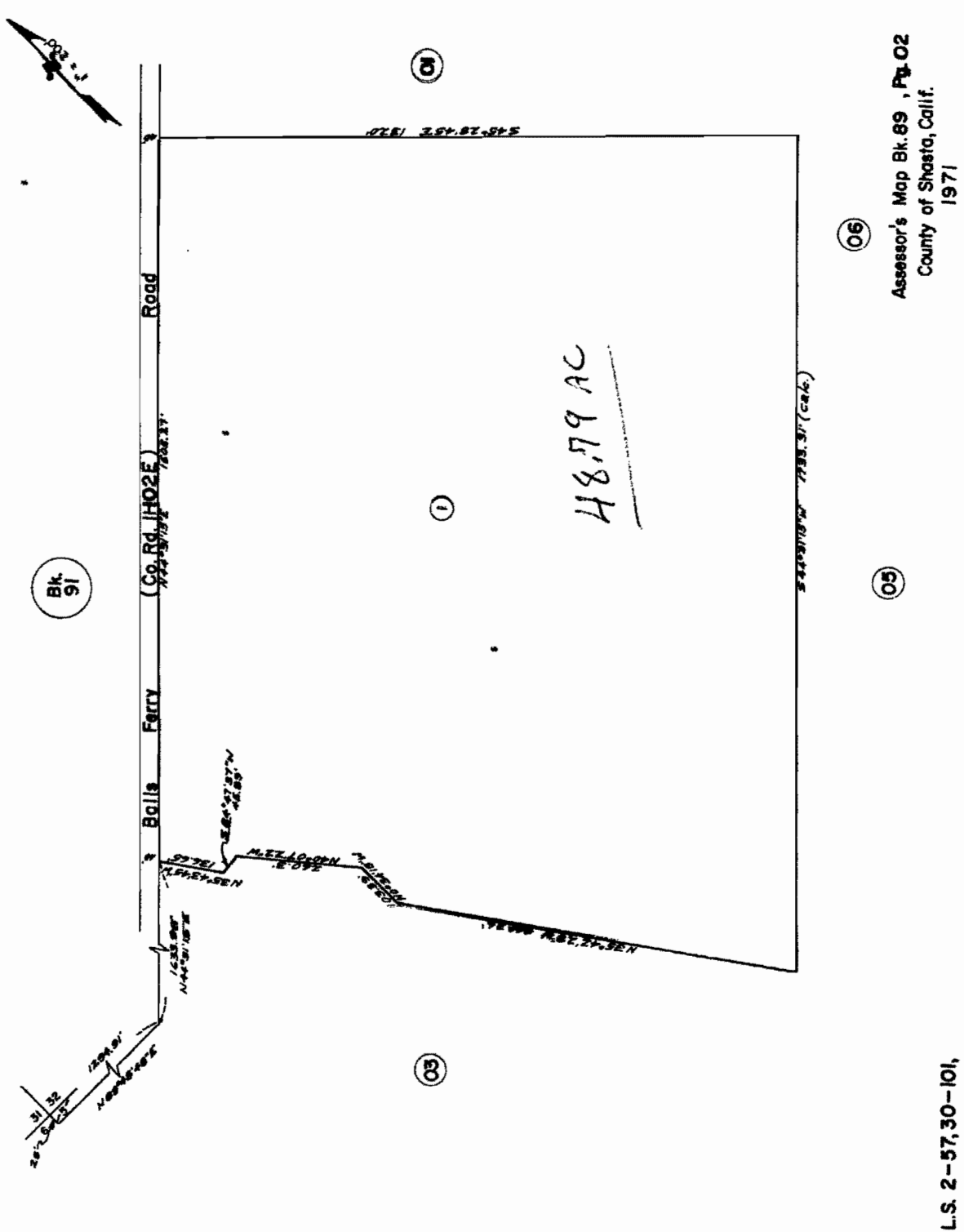
**EXHIBIT B**  
**Legal Description- Access Easement**

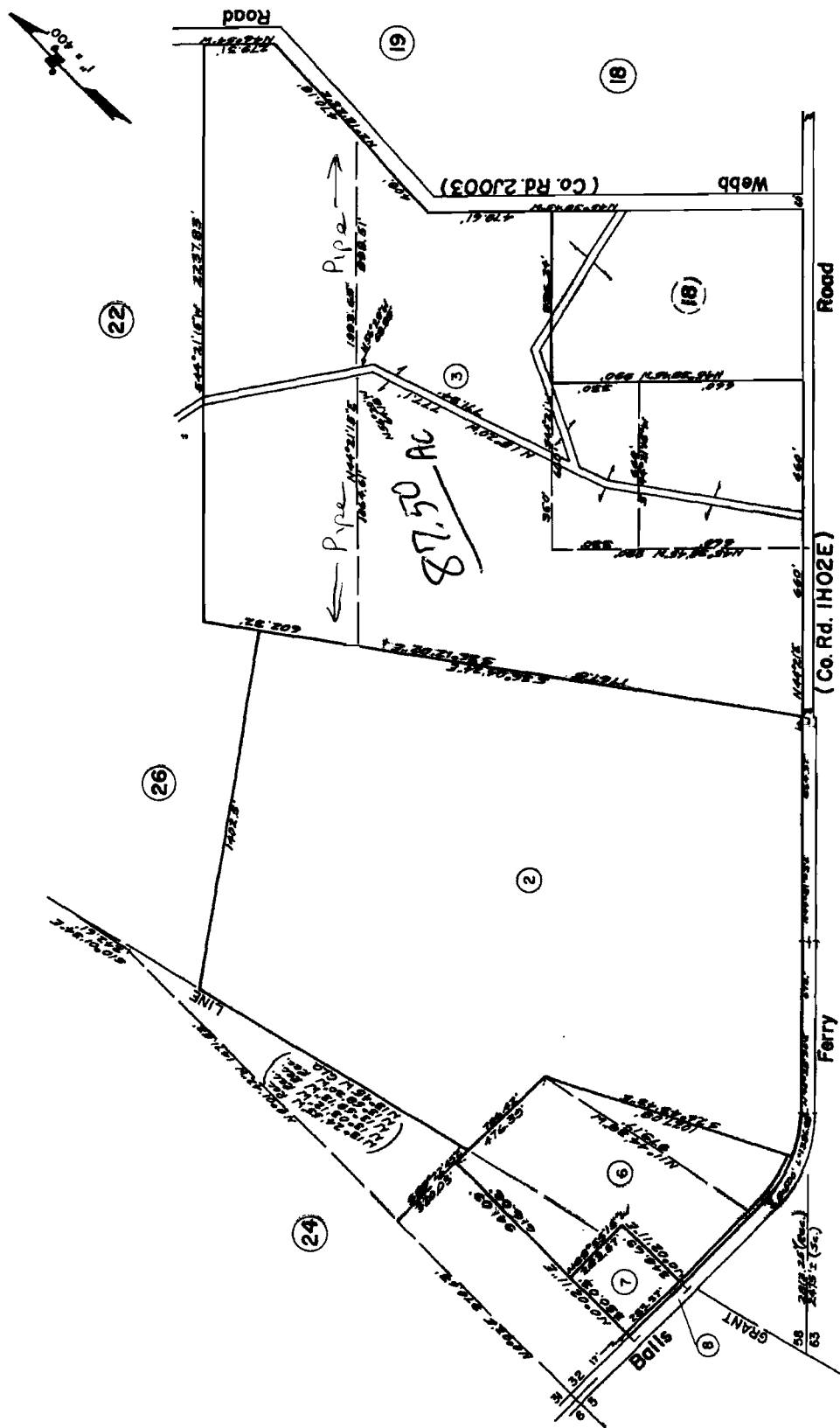
**AN EASEMENT BEING 10 FEET WIDE LYING 5 FEET ON EACH SIDE AND  
 ADJOINING THE FOLLOWING DESCRIBED CENTER LINE;**

Commencing at a 6" x 6" concrete monument marking the SW corner of the SE 1/4 of the SW 1/4 of sec. 39 of the P.B. Reading grant and running thence S. 44 degrees 21'15" W, a distance of 2692.80 feet to a 1" iron pipe; thence, along the northwesterly right of way of Balls Ferry Road, S 44°34'45" W, 448 feet, to a intersection of a line, which is 20 feet, Southeasterly and parallel with the center line of the A.C.L.D. irrigation ditch, being the true point of the beginning of this description; thence, parallel with said A.C.L.D. irrigation ditch, N 35°47'09" W, 660 feet; thence S 34°12'51" W, across an existing bridge, 20 feet to the center line of said ditch.



**POR. SEC. 63, P.B. READING GRANT**



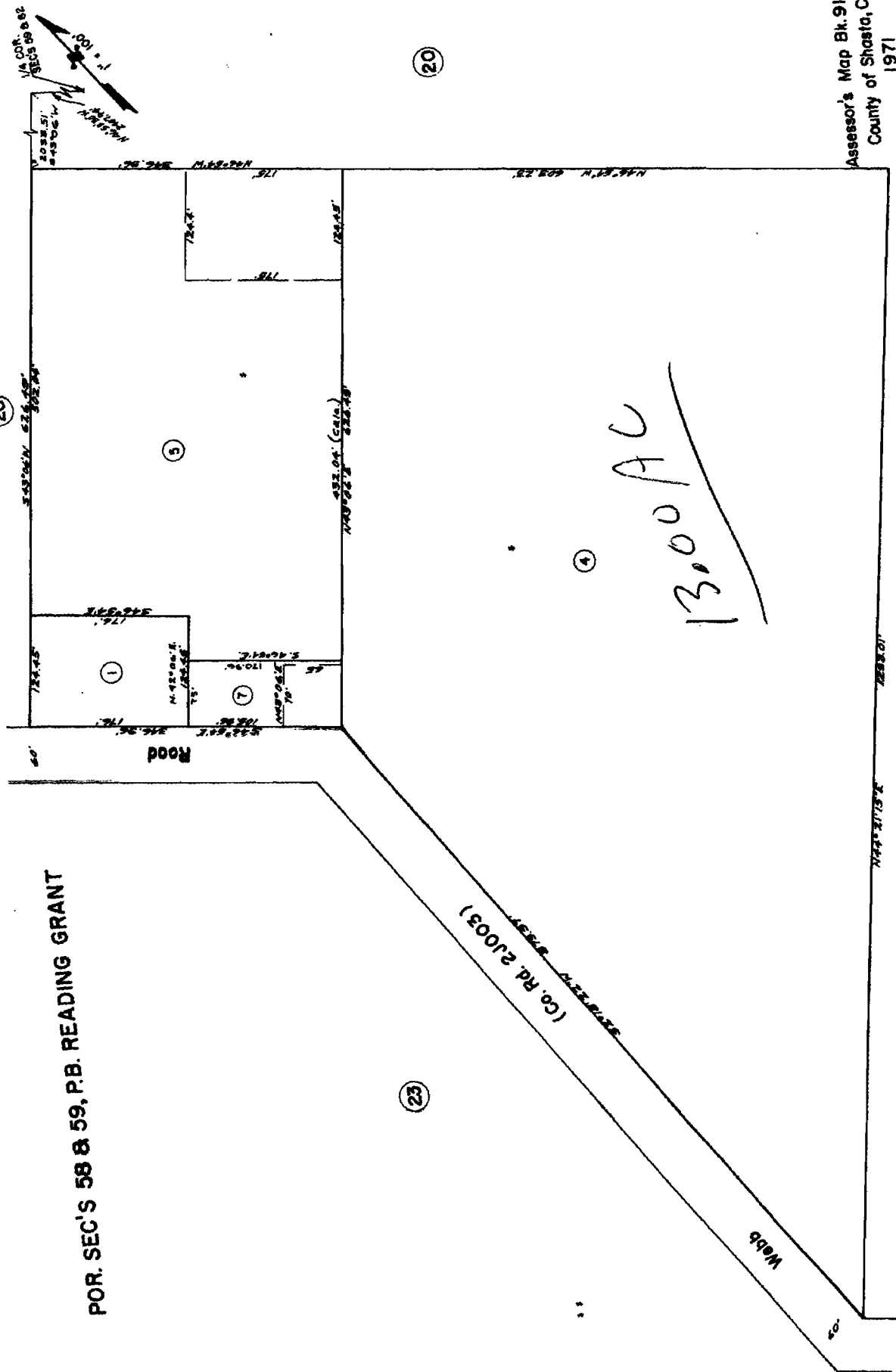


**Bk. 89**

Assessor's Map Bk. 91 , Pg. 23  
County of Shasta, Calif.  
1971

P.M. 7-138,  
L.S. 2-57, 31-48, 33-100, 35-27,

POR. SEC'S 58 & 59, P.B. READING GRANT





# **APPENDIX B**

## **MCCWA Plant Species Inventory**

Cottonwood Creek Unit  
Balls Ferry Wetland Unit 1

A plant species inventory of the recently acquired Balls Ferry Wetland Unit 2 is a recommended step-down action under the Operations and Maintenance section of this LMP (VB1).



## Plant Species Inventory<sup>1, 2</sup>

CCU = Cottonwood Creek Unit BFW1 = Balls Ferry Wetland Unit 1

\* = non-native plant species \*? = probably introduced

| Latin Name   | Common Name                | CCU | BFW1 |
|--|----------------------------|-----|------|
| <b>FERNS AND FERN-ALLIES</b>                           |                            |     |      |
| AZOLLACEAE   |                            |     |      |
| <i>Azolla filiculoides</i>                             | Pacific mosquito fern      |     | x    |
| EQUISETACEAE   |                            |     |      |
| <i>Equisetum laevigatum</i>                            | Smooth horsetail           | x   |      |
| <b>FLOWERING PLANTS(ANGIOSPERMAE - DICOTYLEDONEAE)</b> |                            |     |      |
| ACERACEAE  |                            |     |      |
| <i>Acer negundo</i> ssp. <i>californicum</i>           | California boxelder        | x   |      |
| ANACARDIACEAE  |                            |     |      |
| <i>Toxicodendron diversilobum</i>                      | Poison oak                 | x   |      |
| APIACEAE   |                            |     |      |
| <i>Anthriscus caucalis</i> *                           | Burr chervil               | x   |      |
| <i>Daucus carota</i> *                                 | Queen Anne's lace          | x   | x    |
| <i>Eryngium castrense</i>                              | Great Valley eryngo        |     | x    |
| <i>Torilis arvensis</i> *                              | Spreading hedgeparsley     | x   | x    |
| ARALIACEAE   |                            |     |      |
| <i>Hedera helix</i> *                                  | English ivy                |     | x    |
| ARISTOLOCHIACEAE                                       |                            |     |      |
| <i>Aristolochia californica</i>                        | California dutchman's pipe | x   |      |
| ASCLEPIADACEAE   |                            |     |      |
| <i>Asclepias</i> cf. <i>eriocarpa</i>                  | Woollypod milkweed         |     | x    |
| ASTERACEAE   |                            |     |      |
| <i>Ambrosia psilostachya</i>                           | Cuman ragweed              | x   | x    |
| <i>Anthemis cotula</i> *                               | Stinking chamomile         |     | x    |

<sup>1</sup> SOURCE: Buck 2006. Unpublished Report: Plant Community Characterization and Floristic Inventory for the Mouth of Cottonwood Creek Wildlife Area.

<sup>2</sup> Conducting the Plant Species Inventory for BFW2 is a step-down action recommended under Operations and Maintenance (VB1).

## APPENDIX B: MCCWA Plant Species Inventory

| Latin Name   | Common Name                   | CCU | BFW1 |
|--|-------------------------------|-----|------|
| <i>Artemisia douglasiana</i>                             | Douglas sagewort              | x   |      |
| <i>Baccharis salicifolia</i>                             | Mule fat                      | x   |      |
| <i>Brickellia californica</i>                            | California brickellbush       | x   |      |
| <i>Centaurea solstitialis</i> *                          | Yellow star thistle           | x   | x    |
| <i>Chamomilla suaveolens</i> *                           | Disc mayweed, pineapple weed  | x   | x    |
| <i>Cichorium intybus</i> *                               | Chickory                      | x   | x    |
| <i>Cirsium vulgare</i> *                                 | Bull thistle                  | x   | x    |
| <i>Conyza</i> sp. (*?)                                   | Horseweed                     | x   |      |
| <i>Euthamia occidentalis</i>                             | Western goldentop             | x   |      |
| <i>Filago gallica</i> *                                  | Narrowleaf cottonrose         |     | x    |
| <i>Gnaphalium luteo-album</i> *                          | Cudweed sp.                   | x   | x    |
| <i>Gnaphalium palustre</i>                               | Western marsh cudweed         | x   | x    |
| <i>Hemizonia fitchii</i>                                 | Fitch's tarweed               | x   | x    |
| <i>Holocarpha</i> sp.                                    | Tarweed                       | x   |      |
| <i>Hypochaeris glabra</i> *                              | Smooth catsear                | x   | x    |
| <i>Hypochaeris radicata</i> *                            | Hairy catsear                 | x   | x    |
| <i>Lactuca serriola</i> *                                | Prickly lettuce               | x   | x    |
| <i>Lasthenia californica</i>                             | California goldfields         |     | x    |
| <i>Lasthenia glaberrima</i>                              | Smooth goldfields             |     | x    |
| <i>Leontodon taraxacoides</i> ssp. <i>longirostris</i> * | Lesser hawkbit                | x   | x    |
| <i>Micropus californicus</i> var. <i>californicus</i>    | Cottontop, slender cottonweed |     | x    |
| <i>Psilocarphus brevissimus</i> var. <i>brevissimus</i>  | Short woollyheads             |     | x    |
| <i>Psilocarphus tenellus</i> var. <i>tenellus</i>        | Slender woollyheads           | x   | x    |
| <i>Senecio vulgaris</i> *                                | Old-man-in-the-Spring         | x   |      |
| <i>Silybum marianum</i> *                                | Milk thistle                  | x   |      |
| <i>Sonchus asper</i> *                                   | Spiny sowthistle              | x   | x    |
| <i>Tragopogon dubius</i> *                               | Yellow salsify                | x   | x    |
| <i>Uropappus lindleyi</i>                                | Silver puffs                  | x   |      |
| <i>xanthium strumarium</i>                               | Rough cocklebur               | x   | x    |
| BETULACEAE   |                               |     |      |
| <i>Alnus rhombifolia</i>                                 | White alder                   | x   |      |

## APPENDIX B: MCCWA Plant Species Inventory

| Latin Name   | Common Name                         | CCU | BFW1 |
|--|-------------------------------------|-----|------|
| BIGNONIACEAE   |                                     |     |      |
| <i>Catalpa bignonioides</i> *                          | Southern catalpa                    | x   |      |
| BORAGINACEAE   |                                     |     |      |
| <i>Amsinckia menziesii</i> var. <i>intermedia</i>      | Common fiddleneck                   |     | x    |
| <i>Cryptantha flaccida</i>                             | Weakstem cryptantha                 | x   |      |
| <i>Heliotropium europaeum</i> *                        | European heliotrope                 | x   | x    |
| <i>Myosotis laxa</i>                                   | Bay forget-me-not                   | x   | x    |
| <i>Plagiobothrys bracteatus</i>                        | Bracted popcornflower               |     | x    |
| <i>Plagiobothrys canescens</i>                         | Valley popcornflower                | x   |      |
| <i>Plagiobothrys stipitatus</i> var. <i>micranthus</i> | Stalked popcornflower               |     | x    |
| BRASSICACEAE   |                                     |     |      |
| <i>Brassica nigra</i> *                                | Black mustard                       | x   | x    |
| <i>Lepidium latifolium</i> *                           | Broadleaved pepperweed              | x   |      |
| <i>Lepidium oblongum</i> var. <i>oblongum</i>          | Veiny pepperweed                    |     | x    |
| <i>Raphanus raphanistrum</i> *                         | Wild radish                         | x   | x    |
| <i>Rorippa curvipes</i> var. <i>truncata</i>           | Bluntleaf yellowcress               | x   |      |
| CAMPANULACEAE  |                                     |     |      |
| <i>Downingia bella</i>                                 | Hoovers calicoflower                |     | x    |
| CAPPARACEAE  |                                     |     |      |
| <i>Polanisia dodecandra</i> ssp. <i>trachysperma</i>   | Sandyseed clammyweed                | x   |      |
| CAPRIFOLIACEAE   |                                     |     |      |
| <i>Lonicera japonica</i> *                             | Japanese honeysuckle                |     | x    |
| <i>Sambucus mexicana</i>                               | Blue elderberry, Mexican elderberry | x   |      |
| CARYOPHYLLACEAE  |                                     |     |      |
| <i>Cerastium glomeratum</i> *                          | Sticky chickweed                    |     | x    |
| <i>Herniaria hirsuta</i> ssp. <i>hirsuta</i> *         | Hairy rupturewart                   |     | x    |
| <i>Petrorhagia dubia</i> *                             | Hairypink                           | x   | x    |
| <i>Spergularia rubra</i> *                             | Red sandspurry                      | x   | x    |
| CHENOPODIACEAE   |                                     |     |      |
| <i>Chenopodium ambrosioides</i> *                      | Mexican tea                         | x   |      |
| <i>Chenopodium botrys</i> *                            | Jerusalem oak goosefoot             | x   |      |



## APPENDIX B: MCCWA Plant Species Inventory

| Latin Name   | Common Name             | CCU | BFW1 |
|--|-------------------------|-----|------|
| CONVOLVULACEAE                                     |                         |     |      |
| <i>Convolvulus arvensis</i> *                      | Field bindweed          | x   | x    |
| CUCURBITACEAE                                      |                         |     |      |
| <i>Marah fabaceus</i>                              | California manroot      | x   |      |
| CUSCUTACEAE  |                         |     |      |
| <i>Cuscuta californica</i> var. <i>californica</i> | Chaparral dodder        |     | x    |
| DIPSACACEAE  |                         |     |      |
| <i>Dipsacus fullonum</i> *                         | Fuller's teasel         | x   |      |
| EUPHORBIACEAE                                      |                         |     |      |
| <i>Eremocarpus setigerus</i>                       | Turkey mullein          | x   | x    |
| FABACEAE   |                         |     |      |
| <i>Albizia</i> sp. *                               | Albizia                 |     | x    |
| <i>Lathyrus</i> cf. <i>hirsutus</i> *              | Caley pea               |     | x    |
| <i>Lotus corniculatus</i> *                        | Bird's-foot trefoil     | x   | x    |
| <i>Lotus humistratus</i>                           | Foothill deervetch      |     | x    |
| <i>Lotus purshianus</i>                            | Bird's-foot trefoil sp. | x   | x    |
| <i>Lupinus nanus</i>                               | Lupine sp.              | x   |      |
| <i>Medicago polymorpha</i> *                       | Burr clover             | x   |      |
| <i>Trifolium campestre</i> *                       | Field clover            |     | x    |
| <i>Trifolium dubium</i> *                          | Suckling clover         | x   | x    |
| <i>Trifolium glomeratum</i> *                      | Cluster clover          |     | x    |
| <i>Trifolium hirtum</i> *                          | Rose clover             | x   | x    |
| <i>Trifolium pratense</i> *                        | Red clover              |     | x    |
| <i>Trifolium repens</i> *                          | White clover            | x   | x    |
| <i>Trifolium subterraneum</i> *                    | Subterranean clover     | x   | x    |
| <i>Trifolium variegatum</i>                        | Whitetip clover         |     | x    |
| <i>Vicia benghalensis</i> *                        | Reddish tufted vetch    | x   | x    |
| <i>Vicia sativa</i> ssp. <i>nigra</i> *            | Garden vetch            | x   | x    |
| FAGACEAE   |                         |     |      |
| <i>Quercus douglasii</i>                           | Blue oak                | x   |      |
| <i>Quercus lobata</i>                              | Valley oak              | x   | x    |
| <i>Quercus wislizeni</i>                           | Interior live oak       | x   |      |

## APPENDIX B: MCCWA Plant Species Inventory

| Latin Name  | Common Name                 | CCU | BFW1 |
|---|-----------------------------|-----|------|
| GENTIANACEAE  |                             |     |      |
| <i>Centaurium muehlenbergii</i>                       | Muhlenberg's centaury       | x   | x    |
| <i>Erodium brachycarpum</i> *                         | Shortfruit stork's bill     | x   | x    |
| <i>Erodium cicutarium</i> *                           | Redstem stork's bill        | x   |      |
| <i>Geranium dissectum</i> *                           | Cutleaf geranium            | x   | x    |
| HALORAGACEAE  |                             |     |      |
| <i>Myriophyllum aquaticum</i> *                       | Parrot feather watermilfoil | x   | x    |
| JUGLANDACEAE  |                             |     |      |
| <i>Juglans californica</i> var. <i>hindsii</i> *      | Northern california walnut  | x   | x    |
| LAMIACEAE   |                             |     |      |
| <i>Marrubium vulgare</i> *                            | Horehound                   | x   |      |
| <i>Mentha pulegium</i> *                              | Pennyroyal                  | x   | x    |
| <i>Pogogyne ziziphoroides</i>                         | Sacramento mesamint         |     | x    |
| <i>Stachys stricta</i>                                | Sonoma hedgenettle          | x   |      |
| <i>Trichostema lanceolatum</i>                        | Vinegarweed                 | x   | x    |
| LINACEAE  |                             |     |      |
| <i>Linum bienne</i> *                                 | Pale flax                   | x   | x    |
| LYTHRACEAE  |                             |     |      |
| <i>Lythrum hyssopifolium</i> *                        | Hyssop loosestrife          | x   | x    |
| MORACEAE  |                             |     |      |
| <i>Ficus carica</i> *                                 | Edible fig                  | x   | x    |
| <i>Morus alba</i> *                                   | White mulberry              | x   |      |
| OLEACEAE  |                             |     |      |
| <i>Fraxinus latifolia</i>                             | Oregon ash                  | x   |      |
| ONAGRACEAE  |                             |     |      |
| <i>Clarkia purpurea</i> ssp. <i>quadrivulnera</i>     | Winecup clarkia             | x   | x    |
| <i>Epilobium brachycarpum</i>                         | Tall annual willowherb      | x   | x    |
| <i>Epilobium ciliatum</i> ssp. <i>ciliatum</i>        | Fringed willowherb          | x   | x    |
| <i>Epilobium densiflorum</i>                          | Denseflower willowherb      |     | x    |
| <i>Ludwigia peploides</i> ssp. <i>montevidensis</i> * | Floating primrose-willow    |     | x    |
| <i>Ludwigia peploides</i> ssp. <i>peploides</i>       | Floating primrose-willow    | x   | x    |

## APPENDIX B: MCCWA Plant Species Inventory

| Latin Name  | Common Name              | CCU | BFW1 |
|---|--------------------------|-----|------|
| PAPAVERACEAE  |                          |     |      |
| <i>Eschscholzia lobbii</i>                                | Fryingpans               |     | x    |
| PHYTOLACCACEAE  |                          |     |      |
| <i>Phytolacca americana*</i>                              | American pokeweed        | x   | x    |
| PLANTAGINACEAE  |                          |     |      |
| <i>Plantago lanceolata*</i>                               | Narrowleaf plantain      | x   | x    |
| POLEMONIACEAE   |                          |     |      |
| <i>Navarretia leucocephala</i> ssp. <i>leucocephala</i>   | Whitehead navarretia     |     | x    |
| <i>Navarretia tagetina</i>                                | Marigold pincushionplant | x   | x    |
| <i>Polygonum arenastrum*</i>                              | Oval-leaf knotweed       | x   | x    |
| <i>Polygonum punctatum</i>                                | Dotted smartweed         | x   | x    |
| <i>Rumex acetosella*</i>                                  | Common sheep sorrel      |     | x    |
| <i>Rumex conglomeratus*</i>                               | Clustered dock           |     | x    |
| <i>Rumex crispus*</i>                                     | Curly dock               | x   | x    |
| <i>Rumex cf. kernerii*</i>                                | Kerner's dock            | x   |      |
| <i>Rumex pulcher*</i>                                     | Fiddle dock              | x   | x    |
| PRIMULACEAE   |                          |     |      |
| <i>Anagallis arvensis*</i>                                | Scarlet pimpernel        | x   |      |
| RANUNCULACEAE   |                          |     |      |
| <i>Ranunculus bonariensis</i> var. <i>trisepalus</i>      | Carter's buttercup       |     | x    |
| <i>Ranunculus occidentalis</i>                            | Western buttercup        |     | x    |
| <i>Ranunculus muricatus*</i>                              | Spinyfruit buttercup     |     | x    |
| <i>Ranunculus sceleratus</i>                              | Cursed buttercup         |     | x    |
| ROSACEAE  |                          |     |      |
| <i>Prunus</i> sp. *                                       | Plum sp.                 | x   | x    |
| <i>Pyracantha angustifolia*</i>                           | Narrowleaf firethorn     |     | x    |
| <i>Rosa californica</i>                                   | California rosebush      | x   | x    |
| <i>Rubus discolor*</i>                                    | Himalayan blackberry     | x   | x    |
| <i>Rubus pensilvanicus*</i>                               | Pennsylvania blackberry  |     | x    |
| RUBIACEAE   |                          |     |      |
| <i>Cephalanthus occidentalis</i> var. <i>californicus</i> | Common buttonbrush       | x   |      |
| <i>Galium aparine</i> (*?)                                | Stickywilly              | x   |      |

## APPENDIX B: MCCWA Plant Species Inventory

| Latin Name   | Common Name                | CCU | BFW1 |
|--|----------------------------|-----|------|
| <i>Galium parisiense</i> *                           | Wall bedstraw              | x   | x    |
| <i>Sherardia arvensis</i> *                          | Blue fieldmadder           |     | x    |
| SALICACEAE   |                            |     |      |
| <i>Populus alba</i> *                                | White poplar               | x   |      |
| <i>Populus fremontii</i>                             | Fremont cottonwood         | x   | x    |
| <i>Salix gooddingii</i>                              | Goodding's willow          | x   | x    |
| <i>Salix laevigata</i>                               | Red willow                 | x   | x    |
| <i>Salix lasiolepis</i>                              | Arroyo willow              | x   | x    |
| SCROPHULARIACEAE                                     |                            |     |      |
| <i>Gratiola ebracteata</i>                           | Bractless hedgehyssop      |     | x    |
| <i>Gratiola neglecta</i>                             | Clammy hedgehyssop         | x   |      |
| <i>Lindernia dubia</i> var. <i>dubia</i>             | Yellowseed false pimpernel | x   |      |
| <i>Mimulus guttatus</i>                              | Monkeyflower               | x   | x    |
| <i>Parentucellia viscosa</i> *                       | Yellow glandweed           | x   | x    |
| <i>Triphysaria versicolor</i> ssp. <i>versicolor</i> | Yellowbeak owl's-clover    | x   |      |
| <i>Verbascum blattaria</i> *                         | Moth mullein               | x   | x    |
| <i>Veronica anagallis-aquatica</i> *                 | Water speedwell            | x   |      |
| <i>Veronica catenata</i> *                           |                            |     | x    |
| SIMAROUBACEAE  |                            |     |      |
| <i>Ailanthus altissima</i> *                         | Tree of heaven             | x   | x    |
| SOLANACEAE   |                            |     |      |
| <i>Nicotiana</i> sp. (*?)                            | Tobacco sp.                | x   |      |
| VERBENACEAE  |                            |     |      |
| <i>Vitis californica</i>                             | California wild grape      | x   |      |
| <i>Vitis vinifera</i> *                              | Wine grape                 | x   | x    |
| VITACEAE   |                            |     |      |
| <i>Verbena bonariensis</i> *                         | Purpletop vervain          | x   |      |
| <i>Verbena lasiostachys</i> var. <i>lasiostachys</i> | Western vervain            | x   |      |
| ZYGOPHYLLACEAE                                       |                            |     |      |
| <i>Tribulus terrestris</i> *                         | Puncturevine               | x   |      |

## APPENDIX B: MCCWA Plant Species Inventory

| Latin Name  | Common Name              | CCU | BFW1 |
|---|--------------------------|-----|------|
| <b>FLOWERING PLANTS (ANGIOSPERMAE - MONOCOTYLEDONEAE)</b> |                          |     |      |
| <b>ALISMATACEAE</b>                                       |                          |     |      |
| <i>Alisma lanceolatum</i> *                               | Lanceleaf water plantain |     | x    |
| <b>CYPERACEAE</b>   |                          |     |      |
| <i>Carex barbarae</i>                                     | Santa Barbara sedge      | x   |      |
| <i>Carex ovalis</i>                                       | Eggbract sedge           | x   | x    |
| <i>Carex cf. tumulicola</i>                               | Splitawn sedge           | x   |      |
| <i>Carex vulpinoidea</i>                                  | Fox sedge                | x   | x    |
| <i>Cyperus eragrostis</i>                                 | Tall flatsedge           | x   | x    |
| <i>Eleocharis obtusa</i> var. <i>obtus</i>                | Blunt spikerush          | x   |      |
| <i>Eleocharis macrostachya</i>                            | Pale spikerush           | x   | x    |
| <i>Scirpus acutus</i> var. <i>occidentalis</i>            | Tule                     | x   | x    |
| <b>IRIDACEAE</b>  |                          |     |      |
| <i>Iris pseudacorus</i> *                                 | Pale yellow iris         | x   |      |
| <b>JUNCACEAE</b>  |                          |     |      |
| <i>Juncus acuminatus</i>                                  | Tapertip rush            | x   | x    |
| <i>Juncus bufonius</i> var. <i>bufonius</i>               | Toad rush                | x   | x    |
| <i>Juncus bufonius</i> var. <i>occidentalis</i>           | Toad rush                |     | x    |
| <i>Juncus effusus</i> var. <i>pacificus</i>               | Pacific rush             | x   | x    |
| <i>Juncus tenuis</i>                                      | Poverty rush             | x   | x    |
| <i>Juncus xiphioides</i>                                  | Irisleaf rush            | x   |      |
| <b>LEMNACEAE</b>  |                          |     |      |
| <i>Lemna minuscula</i>                                    | Least duckweed           | x   |      |
| <b>LILIACEAE</b>  |                          |     |      |
| <i>Brodiaea coronaria</i> ssp. <i>coronaria</i>           | Crown brodiaea           |     | x    |
| <i>Brodiaea elegans</i> ssp. <i>elegans</i>               | Harvest brodiaea         | x   |      |
| <i>Chlorogalum angustifolium</i>                          | Narrowleaf soap plant    |     | x    |
| <i>Dichelostemma multiflorum</i>                          | Roundtooth snakerlily    | x   | x    |
| <i>Odontostomum hartwegii</i>                             | Hartweg's doll's-lily    | x   | x    |
| <i>Triteleia hyacinthina</i>                              | White brodiaea           |     | x    |



## APPENDIX B: MCCWA Plant Species Inventory

| Latin Name                                       | Common Name              | CCU | BFW1 |
|--|--------------------------|-----|------|
| POACEAE  |                          |     |      |
| <i>Aira caryophylllea</i> *                      | Silver hairgrass         | x   | x    |
| <i>Arundo donax</i> *                            | Giant reed               | x   | x    |
| <i>Avena barbata</i> *                           | Wild oats                | x   | x    |
| <i>Briza minor</i> *                             | Little quaking grass     | x   | x    |
| <i>Bromus carinatus</i> var. <i>carinatus</i>    | California brome         | x   |      |
| <i>Bromus diandrus</i> *                         | Ripgut brome             | x   | x    |
| <i>Bromus hordeaceus</i> *                       | Soft brome               | x   | x    |
| <i>Bromus madritensis</i> ssp. <i>rubens</i> *   | Red brome                | x   |      |
| <i>Bromus tectorum</i> *                         | Cheatgrass               | x   |      |
| <i>Cynodon dactylon</i> *                        | Bermudagrass             |     | x    |
| <i>Cynosurus echinatus</i> *                     | Bristly dogstail grass   | x   | x    |
| <i>Dactylis glomerata</i> *                      | Orchardgrass             | x   | x    |
| <i>Deschampsia danthonioides</i>                 | Annual hairgrass         | x   | x    |
| <i>Elymus glaucus</i> ssp. <i>glaucus</i>        | Blue wildrye             | x   |      |
| <i>Festuca arundinacea</i> *                     | Tall fescue              | x   | x    |
| <i>Festuca pratensis</i> *                       | Meadow fescue            | x   | x    |
| <i>Glyceria declinata</i> *                      | Waxy mannagrass          | x   | x    |
| <i>Holcus lanatus</i> *                          | Common velvetgrass       | x   | x    |
| <i>Hordeum marinum</i> ssp. <i>gussoneanum</i> * | Mediterranean barley     | x   | x    |
| <i>Hordeum murinum</i> ssp. <i>leporinum</i> *   | Leporinum barley         | x   | x    |
| <i>Leymus triticoides</i>                        | Beardless wildrye        | x   |      |
| <i>Lolium multiflorum</i> *                      | Ryegrass                 | x   | x    |
| <i>Lolium perenne</i> *                          | Perennial ryegrass       | x   | x    |
| <i>Paspalum dilatatum</i> *                      | Dallisgrass              |     | x    |
| <i>Poa annua</i> *                               | Annual bluegrass         |     | x    |
| <i>Poa bulbosa</i> *                             | Bulbous bluegrass        | x   |      |
| <i>Poa pratensis</i> (*?)                        | Kentucky bluegrass       | x   | x    |
| <i>Polypogon monspeliensis</i> *                 | Annual rabbitsfoot grass |     | x    |
| <i>Secale cereale</i> *                          | Cereal rye               | x   |      |
| <i>Sorghum</i> sp. *                             | Sorghum                  | x   |      |
| <i>Taeniatherum caput-medusae</i> *              | Medusahead               | x   | x    |

## APPENDIX B: MCCWA Plant Species Inventory

| Latin Name                                     | Common Name          | CCU | BFW1 |
|--|----------------------|-----|------|
| <i>Vulpia bromoides</i> *                      | Brome fescue         | x   | x    |
| <i>Vulpia microstachys</i> var. <i>ciliata</i> | Eastwood fescue      | x   |      |
| <i>Vulpia myuros</i> var. <i>myuros</i> *      | Rat-tail fescue      | x   | x    |
| POTAMOGETONACEAE                               |                      |     |      |
| <i>Potamogeton diversifolius</i>               | Waterthread pondweed |     | x    |
| TYPHACEAE                                      |                      |     |      |
| <i>Typha angustifolia</i>                      | Narrowleaf cattail   |     | x    |
| <i>Typha latifolia</i>                         | Broadleaf cattail    | x   | x    |

# **APPENDIX C**

## **MCCWA Animal Species Inventory**

Fish

Amphibians and Reptiles

Birds

Mammals



## Fish

### *Documented in Cottonwood Creek<sup>1</sup>*

#### FEDERAL LISTING STATUS

FE = Endangered

FT = Threatened

FP = Petitioned for Threatened or Endangered

#### STATE LISTING STATUS

SE = Endangered

ST = Threatened

SSC = Species of Special Concern

\* = non-native, introduced

| Common Name            | Scientific Name                  | Status                              |
|------------------------|----------------------------------|-------------------------------------|
| Black bullhead         | <i>Ictalurus melas</i> *         |                                     |
| Bluegill               | <i>Lepomis macrochirus</i> *     |                                     |
| Brown bullhead         | <i>Ictalurus nebulosus</i> *     |                                     |
| Brown trout            | <i>Salmo trutta</i> *            |                                     |
| California roach       | <i>Hesperoleucus symmetricus</i> |                                     |
| Carp                   | <i>Cyprinus carpio</i> *         |                                     |
| Chinook salmon         | <i>Oncorhynchus tshawytscha</i>  | Spring run: FT, ST<br>Fall run: SSC |
| Golden shiner          | <i>Notemigonus crysoleucas</i> * |                                     |
| Green sunfish          | <i>Lepomis cyanellus</i> *       |                                     |
| Hardhead               | <i>Mylopharodon conocephalus</i> |                                     |
| Hitch                  | <i>Lavinia exilicauda</i>        |                                     |
| Largemouth bass        | <i>Micropterus salmoides</i> *   |                                     |
| Mosquito fish          | <i>Gambusia affinis</i> *        |                                     |
| Pacific lamprey        | <i>Lampetra tridentata</i>       |                                     |
| Prickly sculpin        | <i>Cottus asper</i>              |                                     |
| Rainbow trout          | <i>Onchorhynchus mykiss</i>      |                                     |
| Riffle sculpin         | <i>Cottus gulosus</i>            |                                     |
| Sacramento pike minnow | <i>Ptychocheilus grandis</i>     |                                     |
| Sacramento sucker      | <i>Catostomus occidentalis</i>   |                                     |
| Smallmouth bass        | <i>Micropterus dolomieu</i> *    |                                     |
| Speckled dace          | <i>Rhinichthys osculus</i>       |                                     |
| Steelhead              | <i>Oncorhynchus mykiss</i>       | FT, SSC                             |
| Threespine stickleback | <i>Gasterosteus aculeatus</i>    |                                     |
| Tule perch             | <i>Hysterocarpus traski</i>      |                                     |
| White catfish          | <i>Ictalurus catus</i> *         |                                     |

SOURCE: <sup>1</sup> Richardson et al. 1979, CDFG 2009



## Amphibians and Reptiles

### *Potential to occur at MCCWA<sup>1</sup>*

#### FEDERAL LISTING STATUS

FE = Endangered

FT = Threatened

FP = Petitioned for Threatened or Endangered

FSS = U.S. Forest Service Sensitive Species

BLMS = Bureau of Land Management Sensitive Species

#### STATE LISTING STATUS

SE = Endangered

ST = Threatened

SSC = Species of Special Concern

| Common Name   | Scientific Name <sup>2</sup>           | Status          |
|---|--|-----------------|
| California newt   | <i>Taricha torosa</i>                  |                 |
| Rough-skinned newt  | <i>Taricha granulosa</i>               |                 |
| California slender salamander   | <i>Batrachoseps attenuatus</i>         |                 |
| Bullfrog <sup>3</sup>   | <i>Lithobates (=Rana) catesbeiana</i>  |                 |
| Western toad  | <i>Anaxyrus (=Bufo) boreas</i>         |                 |
| Tree frog   | <i>Pseudacris (= Hyla) regilla</i>     |                 |
| Foothill yellow-legged frog   | <i>Rana boylei</i>                     | BLM:S; FSS; SSC |
| California red-legged frog  | <i>Rana draytonii</i>                  | FT, SSC         |
| Northern Pacific pond turtle <sup>3</sup><br>(formerly Northwest pond turtle) | <i>Actinemys (= Clemmys) marmorata</i> | FSS, SSC        |
| Western yellow-bellied racer  | <i>Coluber constrictor mormon</i>      |                 |
| California king snake   | <i>Lampropeltis getula californiae</i> |                 |
| Pacific gopher snake  | <i>Pituophis catenifer catenifer</i>   |                 |
| Mountain garter snake   | <i>Thamnophis elegans elegans</i>      |                 |
| Valley garter snake   | <i>Thamnophis sirtalis fitchi</i>      |                 |
| Northern Pacific rattlesnake  | <i>Crotalus oreganus oreganus</i>      |                 |

<sup>1</sup> CalHerps 2009, CDFG 2009

<sup>2</sup> Nomenclature follows lists published by the [Society for the Study of Amphibians and Reptiles, 6<sup>th</sup> edition](#).

<sup>3</sup> Observed on site, SEI, 2005 and 2006.

## Birds

### Potential to occur at MCCWA

#### FEDERAL LISTING STATUS

FE = Endangered

FT = Threatened

FC = Candidate for Threatened or Endangered

FD = Federal delisted

BCC = Bird of Conservation Concern

FSS = U.S. Forest Service Sensitive Species

#### STATE LISTING STATUS

SE = Endangered

ST = Threatened

SSC = Species of Concern

SFP = Fully Protected

WL = Watch List

| Common Name                                | Scientific Name <sup>1</sup>         | Status |
|--|--------------------------------------|--------|
| <b>Geese and Swans</b>                     |                                      |        |
| Greater white-fronted goose <sup>2</sup>   | <i>Anser albifrons (elgasi)</i>      | SSC    |
| Snow goose <sup>2,4</sup>                  | <i>Chen caerulescens</i>             |        |
| Ross' goose                                | <i>Chen rossii</i>                   |        |
| Cackling goose (=Aleutian Canada)          | <i>Branta hutchinsii leucopareia</i> | FD     |
| Canada goose <sup>2,4</sup>                | <i>Branta canadensis</i>             |        |
| Tundra swan <sup>4</sup>                   | <i>Cygnus columbianus</i>            |        |
| <b>Surface Feeding Ducks</b>               |                                      |        |
| Wood duck <sup>2,3,4</sup>                 | <i>Aix sponsa</i>                    |        |
| Gadwall <sup>4</sup>                       | <i>Anas strepera</i>                 |        |
| American wigeon <sup>4</sup>               | <i>Anas americana</i>                |        |
| Mallard <sup>2,4</sup>                     | <i>Anas platyrhynchos</i>            |        |
| Blue-winged teal                           | <i>Anas discors</i>                  |        |
| Cinnamon teal                              | <i>Anas cyanoptera</i>               |        |
| Northern shoveler <sup>4</sup>             | <i>Anas clypeata</i>                 |        |
| Northern pintail                           | <i>Anas acuta</i>                    |        |
| Green-winged teal                          | <i>Anas crecca</i>                   |        |
| <b>Diving Ducks and Stiff-tailed Ducks</b> |                                      |        |
| Canvasback                                 | <i>Aythya valisineria</i>            |        |
| Redhead                                    | <i>Aythya americana</i>              | SSC    |
| Ring-necked duck <sup>4</sup>              | <i>Aythya collaris</i>               |        |
| Greater scaup                              | <i>Aythya marila</i>                 |        |
| Lesser scaup                               | <i>Aythya affinis</i>                |        |
| Bufflehead <sup>4</sup>                    | <i>Bucephala albeola</i>             |        |

## APPENDIX C: MCCWA Animal Species Inventory

| Common Name                             | Scientific Name <sup>1</sup>     | Status |
|---|----------------------------------|--------|
| Common goldeneye <sup>2,4</sup>         | <i>Bucephala clangula</i>        |        |
| Barrow's goldeneye                      | <i>Bucephala islandica</i>       | SSC    |
| Hooded merganser <sup>4</sup>           | <i>Lophodytes cucullatus</i>     |        |
| Common merganser <sup>4</sup>           | <i>Mergus merganser</i>          |        |
| Ruddy duck <sup>4</sup>                 | <i>Oxyura jamaicensis</i>        |        |
| <b>Quail, Pheasants &amp; Turkeys</b>   |                                  |        |
| California quail <sup>2,4</sup>         | <i>Callipepla californica</i>    |        |
| Ring-necked Pheasant <sup>2,4</sup>     | <i>Phasianus colchicus</i>       |        |
| Wild turkey <sup>3</sup>                | <i>Meleagris gallopavo</i>       |        |
| <b>Loons &amp; Grebes</b>               |                                  |        |
| Common loon                             | <i>Gavia immer</i>               | SSC    |
| Pied-billed grebe <sup>2,4</sup>        | <i>Podilymbus podiceps</i>       |        |
| Horned grebe                            | <i>Podiceps auritus</i>          |        |
| Eared grebe                             | <i>Podiceps nigricollis</i>      |        |
| Western grebe                           | <i>Aechmophorus occidentalis</i> |        |
| Clark's grebe                           | <i>Aechmophorus clarkii</i>      |        |
| <b>Pelicans and Cormorants</b>          |                                  |        |
| American white pelican <sup>3,4</sup>   | <i>Pelecanus erythrorhynchos</i> | SSC    |
| Double-crested cormorant <sup>2,4</sup> | <i>Phalacrocorax auritus</i>     | WL     |
| <b>Bitterns and Herons</b>              |                                  |        |
| American bittern <sup>4</sup>           | <i>Botaurus lentiginosus</i>     | BCC    |
| Least bittern                           | <i>Ixobrychus exilis</i>         | SSC    |
| Great blue heron <sup>2,3,4</sup>       | <i>Ardea herodias</i>            |        |
| Great egret <sup>2,4</sup>              | <i>Ardea alba</i>                |        |
| Snowy egret <sup>3</sup>                | <i>Egretta thula</i>             | BCC    |
| Cattle egret                            | <i>Bubulcus ibis</i>             |        |
| Green heron <sup>4</sup>                | <i>Butorides virescens</i>       |        |
| Black-crowned night heron               | <i>Nycticorax nycticorax</i>     |        |
| <b>Ibis</b>                             |                                  |        |
| White-faced ibis                        | <i>Plegadis chihi</i>            | WL     |
| <b>New World Vultures</b>               |                                  |        |
| Turkey vulture <sup>2,3,4</sup>         | <i>Cathartes aura</i>            |        |

# APPENDIX C: MCCWA Animal Species Inventory

| Common Name                            | Scientific Name <sup>1</sup>      | Status                |
|--|-----------------------------------|-----------------------|
| <b>Hawks, Kites and Eagles</b>         |                                   |                       |
| Osprey <sup>2,3,4</sup>                | <i>Pandion haliaetus</i>          | WL                    |
| White-tailed kite <sup>3,4</sup>       | <i>Elanus leucurus</i>            | SFP                   |
| Bald eagle <sup>2,3,4</sup>            | <i>Haliaeetus leucocephalus</i>   | FD, BCC; SE, SFP      |
| Northern harrier <sup>3,4</sup>        | <i>Circus cyaneus</i>             | SSC                   |
| Sharp-shinned hawk                     | <i>Accipiter striatus</i>         | WL                    |
| Cooper's hawk <sup>2,4</sup>           | <i>Accipiter cooperii</i>         | WL                    |
| Red-shouldered hawk <sup>2,3,4</sup>   | <i>Buteo lineatus</i>             |                       |
| Swainson's hawk                        | <i>Buteo swainsoni</i>            | BCC, FSS; ST          |
| Red-tailed hawk <sup>2,3,4</sup>       | <i>Buteo jamaicensis</i>          |                       |
| Ferruginous hawk                       | <i>Buteo regalis</i>              | BCC                   |
| Rough-legged hawk <sup>4</sup>         | <i>Buteo lagopus</i>              |                       |
| Golden eagle                           | <i>Aquila chrysaetos</i>          | SFP, WL               |
| American kestrel <sup>2,3,4</sup>      | <i>Falco sparverius</i>           |                       |
| Merlin <sup>4</sup>                    | <i>Falco columbarius</i>          | WL                    |
| American peregrine falcon <sup>4</sup> | <i>Falco peregrinus anatum</i>    | FD, BCC, FSS; SE, SFP |
| Prairie falcon                         | <i>Falco mexicanus</i>            | BCC, WL               |
| <b>Rails, Gallinules, Coots</b>        |                                   |                       |
| Virginia rail <sup>4</sup>             | <i>Rallus limicola</i>            |                       |
| Sora                                   | <i>Porzana carolina</i>           |                       |
| Common moorhen <sup>3,4</sup>          | <i>Gallinula chloropus</i>        |                       |
| American coot <sup>4</sup>             | <i>Fulica americana</i>           |                       |
| <b>Cranes</b>                          |                                   |                       |
| Greater Sandhill Crane <sup>2,4</sup>  | <i>Grus canadensis tabida</i>     | FSS; ST, SFP          |
| Lesser Sandhill crane                  | <i>Grus canadensis canadensis</i> | SSC                   |
| <b>Shorebirds</b>                      |                                   |                       |
| Killdeer <sup>2,3,4</sup>              | <i>Charadrius vociferus</i>       |                       |
| Black-necked stilt                     | <i>Himantopus mexicanus</i>       |                       |
| American avocet                        | <i>Recurvirostra americana</i>    |                       |
| Spotted sandpiper <sup>4</sup>         | <i>Actitis macularia</i>          |                       |
| Greater yellowlegs                     | <i>Tringa melanoleuca</i>         |                       |

## APPENDIX C: MCCWA Animal Species Inventory

| Common Name                        | Scientific Name <sup>1</sup>       | Status           |
|------------------------------------|------------------------------------|------------------|
| Willet                             | <i>Catoptrophorus semipalmatus</i> |                  |
| Long-billed curlew                 | <i>Numenius americanus</i>         | BCC, WL          |
| Western sandpiper                  | <i>Calidris mauri</i>              |                  |
| Least sandpiper <sup>4</sup>       | <i>Calidris minutilla</i>          |                  |
| Dunlin <sup>4</sup>                | <i>Calidris alpina</i>             |                  |
| Long-billed dowitcher <sup>4</sup> | <i>Limnodromus scolopaceus</i>     |                  |
| Wilson's snipe <sup>4</sup>        | <i>Gallinago delicata</i>          |                  |
| Wilson's phalarope                 | <i>Phalaropus tricolor</i>         |                  |
| <b>Gulls and Terns</b>             |                                    |                  |
| Ring-billed gull <sup>2,4</sup>    | <i>Larus delawarensis</i>          |                  |
| California gull                    | <i>Larus californicus</i>          | WL               |
| Herring gull                       | <i>Larus argentatus</i>            |                  |
| Caspian tern                       | <i>Sterna caspia</i>               |                  |
| Black tern                         | <i>Chlidonias niger</i>            | SSC              |
| Forster's tern                     | <i>Sterna forsteri</i>             |                  |
| <b>Pigeons and Doves</b>           |                                    |                  |
| Rock pigeon (=dove)                | <i>Columba livia</i>               |                  |
| Band-tailed pigeon                 | <i>Patagioenas fasciata</i>        |                  |
| Mourning dove <sup>2,3,4</sup>     | <i>Zenaida macroura</i>            |                  |
| <b>Cuckoos</b>                     |                                    |                  |
| Western yellow-billed cuckoo       | <i>Coccyzus americanus</i>         | FC, BCC, FSS; SE |
| Owls                               |                                    |                  |
| Barn owl <sup>2</sup>              | <i>Tyto alba</i>                   |                  |
| Western screech-owl                | <i>Otus kennicottii</i>            |                  |
| Great horned owl <sup>2,4</sup>    | <i>Bubo virginianus</i>            |                  |
| Northern pygmy-owl                 | <i>Glaucidium gnoma</i>            |                  |
| Long-eared owl                     | <i>Asio otus</i>                   | SSC              |
| Short-eared owl                    | <i>Asio flammeus</i>               | SSC              |
| <b>Nighthawks and Nightjars</b>    |                                    |                  |
| Lesser nighthawk                   | <i>Chordeiles acutipennis</i>      |                  |
| Common nighthawk                   | <i>Chordeiles minor</i>            |                  |



# APPENDIX C: MCCWA Animal Species Inventory

| Common Name                            | Scientific Name <sup>1</sup>   | Status   |
|--|--------------------------------|----------|
| <b>Swifts</b>                          |                                |          |
| Black swift                            | <i>Cypseloides niger</i>       | BCC, SSC |
| Vaux's swift <sup>2</sup>              | <i>Chaetura vauxi</i>          | SSC      |
| <b>Hummingbirds</b>                    |                                |          |
| Anna's hummingbird <sup>2,4</sup>      | <i>Calypte anna</i>            |          |
| Rufous hummingbird                     | <i>Selasphorus rufus</i>       | BCC      |
| <b>Kingfishers</b>                     |                                |          |
| Belted kingfisher <sup>2,3,4</sup>     | <i>Megaceryle alcyon</i>       |          |
| <b>Woodpeckers</b>                     |                                |          |
| Lewis's woodpecker <sup>2,4</sup>      | <i>Melanerpes lewis</i>        | BCC      |
| Acorn woodpecker <sup>2,3,4</sup>      | <i>Melanerpes formicivorus</i> |          |
| Yellow-bellied sapsucker               | <i>Sphyrapicus varius</i>      |          |
| Red-breasted sapsucker <sup>2,4</sup>  | <i>Sphyrapicus ruber</i>       |          |
| Nuttall's woodpecker <sup>2,4</sup>    | <i>Picoides nuttallii</i>      | BCC      |
| Downy woodpecker <sup>2,4</sup>        | <i>Picoides pubescens</i>      |          |
| Hairy woodpecker                       | <i>Picoides villosus</i>       |          |
| Northern flicker <sup>3,4</sup>        | <i>Colaptes auratus</i>        |          |
| <b>Flycatchers</b>                     |                                |          |
| Olive-sided flycatcher                 | <i>Contopus cooperi</i>        | BCC, SSC |
| Western wood-pewee <sup>2,4</sup>      | <i>Contopus sordidulus</i>     |          |
| Willow flycatcher <sup>2</sup>         | <i>Empidonax traillii</i>      | SE       |
| Hammond's flycatcher                   | <i>Empidonax hammondii</i>     |          |
| Dusky flycatcher <sup>2</sup>          | <i>Empidonax oberholseri</i>   |          |
| Pacific-slope flycatcher               | <i>Empidonax difficilis</i>    |          |
| Black phoebe <sup>2,3,4</sup>          | <i>Sayornis nigricans</i>      |          |
| Say's phoebe <sup>4</sup>              | <i>Sayornis saya</i>           |          |
| Ash-throated flycatcher <sup>2,4</sup> | <i>Myiarchus cinerascens</i>   |          |
| Western kingbird <sup>3,4</sup>        | <i>Tyrannus verticalis</i>     |          |
| <b>Shrikes</b>                         |                                |          |
| Loggerhead shrike <sup>4</sup>         | <i>Lanius ludovicianus</i>     | BCC, SSC |
| Northern shrike                        | <i>Lanius excubitor</i>        |          |
| <b>Vireos</b>                          |                                |          |
| Cassin's vireo                         | <i>Vireo cassinii</i>          |          |

# APPENDIX C: MCCWA Animal Species Inventory

| Common Name                                  | Scientific Name <sup>1</sup>      | Status |
|--|-----------------------------------|--------|
| Hutton's vireo                               | <i>Vireo huttoni</i>              |        |
| Warbling vireo <sup>2</sup>                  | <i>Vireo gilvus</i>               |        |
| <b>Jays and Crows</b>                        |                                   |        |
| Western scrub-jay <sup>2,3,4</sup>           | <i>Aphelocoma californica</i>     |        |
| Yellow-billed magpie <sup>2,3,4</sup>        | <i>Pica nuttalli</i>              | BCC    |
| American crow <sup>2,3</sup>                 | <i>Corvus brachyrhynchos</i>      |        |
| Common raven                                 | <i>Corvus corax</i>               |        |
| <b>Larks</b>                                 |                                   |        |
| California horned lark                       | <i>Eremophila alpestris actia</i> | WL     |
| <b>Swallows</b>                              |                                   |        |
| Purple martin                                | <i>Progne subis</i>               | SSC    |
| Tree swallow <sup>2,4</sup>                  | <i>Tachycineta bicolor</i>        |        |
| Violet-green swallow <sup>2</sup>            | <i>Tachycineta thalassina</i>     |        |
| Northern rough-winged swallow <sup>2,3</sup> | <i>Stelgidopteryx semipennis</i>  |        |
| Bank swallow                                 | <i>Riparia riparja</i>            | ST     |
| Cliff swallow <sup>2,3,4</sup>               | <i>Petrochelidon pyrrhonota</i>   |        |
| Barn swallow                                 | <i>Hirundo rustica</i>            |        |
| <b>Chickadees and Titmice</b>                |                                   |        |
| Chestnut-backed chickadee                    | <i>Poecile rufescens</i>          |        |
| Oak titmouse <sup>2,3,4</sup>                | <i>Baeolophus inornatus</i>       | BCC    |
| <b>Bushtits, Nuthatches and Creepers</b>     |                                   |        |
| Bushtit <sup>2,4</sup>                       | <i>Psaltiriparus minimus</i>      |        |
| Red-breasted nuthatch <sup>2</sup>           | <i>Sitta canadensis</i>           |        |
| White-breasted nuthatch <sup>2,4</sup>       | <i>Sitta carolinensis</i>         |        |
| Brown creeper                                | <i>Certhia familiaris</i>         |        |
| <b>Wrens</b>                                 |                                   |        |
| Bewick's wren <sup>2,3,4</sup>               | <i>Thryomanes bewickii</i>        |        |
| House wren <sup>2,4</sup>                    | <i>Troglodytes aedon</i>          |        |
| Winter wren                                  | <i>Troglodytes troglodytes</i>    |        |
| Marsh wren <sup>4</sup>                      | <i>Cistothorus palustris</i>      |        |

# APPENDIX C: MCCWA Animal Species Inventory

| Common Name                                   | Scientific Name <sup>1</sup>        | Status   |
|---|-------------------------------------|----------|
| <b>Kinglets and Gnatcatchers</b>              |                                     |          |
| Golden-crowned kinglet <sup>4</sup>           | <i>Regulus satrapa</i>              |          |
| Ruby-crowned kinglet <sup>2,4</sup>           | <i>Regulus calendula</i>            |          |
| Blue-gray gnatcatcher                         | <i>Poliophtila caerulea</i>         |          |
| <b>Thrushes and Robins</b>                    |                                     |          |
| Western bluebird <sup>2</sup>                 | <i>Sialia mexicana</i>              |          |
| Hermit thrush <sup>2,4</sup>                  | <i>Catharus guttatus</i>            |          |
| American robin <sup>2,4</sup>                 | <i>Turdus migratorius</i>           |          |
| <b>Wrentit</b>                                |                                     |          |
| Wrentit                                       | <i>Chamaea fasciata</i>             |          |
| <b>Mockingbirds and Thrashers</b>             |                                     |          |
| Northern mockingbird <sup>2,4</sup>           | <i>Mimus polyglottos</i>            |          |
| California thrasher <sup>4</sup>              | <i>Toxostoma redivivum</i>          |          |
| <b>Pipits, Waxwings and Silky Flycatchers</b> |                                     |          |
| American pipit <sup>4</sup>                   | <i>Anthus rubescens</i>             |          |
| Cedar waxwing <sup>2</sup>                    | <i>Bombycilla cedrorum</i>          |          |
| Phainopepla <sup>2,4</sup>                    | <i>Phainopepla nitens</i>           |          |
| <b>Starlings</b>                              |                                     |          |
| European starling                             | <i>Sturnus vulgaris</i>             |          |
| <b>Wood Warblers</b>                          |                                     |          |
| Orange-crowned warbler <sup>2,4</sup>         | <i>Vermivora celata</i>             |          |
| California yellow warbler <sup>2,4</sup>      | <i>Dendroica petechia brewsteri</i> | BCC, SSC |
| Yellow-rumped warbler <sup>2,4</sup>          | <i>Dendroica coronata</i>           |          |
| Black-throated gray warbler <sup>2</sup>      | <i>Dendroica nigrescens</i>         |          |
| MacGillivray's warbler                        | <i>Oporornis tolmiei</i>            |          |
| Common yellowthroat <sup>4</sup>              | <i>Geothlypis trichas</i>           | BCC      |
| Wilson's warbler                              | <i>Wilsonia pusilla</i>             |          |
| Yellow-breasted chat <sup>4</sup>             | <i>Icteria virens</i>               | SSC      |
| <b>Tanagers</b>                               |                                     |          |
| Western tanager <sup>4</sup>                  | <i>Piranga ludoviciana</i>          |          |
| <b>Towhees, Sparrows and Juncos</b>           |                                     |          |
| Spotted towhee <sup>3,4</sup>                 | <i>Pipilo maculatus</i>             | BCC      |

## APPENDIX C: MCCWA Animal Species Inventory

| Common Name                           | Scientific Name <sup>1</sup>         | Status   |
|---------------------------------------|--------------------------------------|----------|
| California towhee <sup>4</sup>        | <i>Pipilo crissalis</i>              |          |
| Chipping sparrow                      | <i>Spizella passerina</i>            |          |
| Vesper sparrow                        | <i>Poocetes gramineus</i>            |          |
| Lark sparrow <sup>4</sup>             | <i>Chondestes grammacus</i>          |          |
| Savannah sparrow <sup>4</sup>         | <i>Passerculus sandwichensis</i>     |          |
| Grasshopper sparrow                   | <i>Ammodramus savannarum</i>         | SSC      |
| Fox sparrow <sup>2,4</sup>            | <i>Passerella iliaca</i>             |          |
| Song sparrow <sup>2,4</sup>           | <i>Melospiza melodia</i>             |          |
| Lincoln's sparrow <sup>2,4</sup>      | <i>Melospiza lincolnii</i>           |          |
| White-crowned sparrow <sup>2,4</sup>  | <i>Zonotrichia leucophrys</i>        |          |
| Golden-crowned sparrow <sup>2,4</sup> | <i>Zonotrichia atricapilla</i>       |          |
| Dark-eyed junco <sup>4</sup>          | <i>Junco hyemalis</i>                |          |
| <b>Grosbeaks and Buntings</b>         |                                      |          |
| Black-headed grosbeak                 | <i>Pheucticus melanocephalus</i>     |          |
| Blue grosbeak                         | <i>Guiraca caerulea</i>              |          |
| Lazuli bunting                        | <i>Passerina amoena</i>              |          |
| <b>Blackbirds</b>                     |                                      |          |
| Red-winged blackbird <sup>2,3,4</sup> | <i>Agelaius phoeniceus</i>           |          |
| Tricolored blackbird                  | <i>Agelaius tricolor</i>             | BCC, SSC |
| Western meadowlark <sup>2,4</sup>     | <i>Sturnella neglecta</i>            |          |
| Yellow-headed blackbird               | <i>Xanthocephalus xanthocephalus</i> | SSC      |
| Brewer's blackbird <sup>2,3,4</sup>   | <i>Euphagus cyanocephalus</i>        |          |
| Brown-headed cowbird <sup>4</sup>     | <i>Molothrus ater</i>                |          |
| <b>Orioles</b>                        |                                      |          |
| Bullock's oriole <sup>2</sup>         | <i>Icterus bullockii</i>             |          |
| <b>Finches</b>                        |                                      |          |
| Purple finch                          | <i>Carpodacus purpureus</i>          |          |
| House finch <sup>2,4</sup>            | <i>Carpodacus mexicanus</i>          |          |
| Pine siskin                           | <i>Carduelis pinus</i>               |          |
| Lesser goldfinch <sup>2,4</sup>       | <i>Carduelis psaltria</i>            |          |

## APPENDIX C: MCCWA Animal Species Inventory

| Common Name                         | Scientific Name <sup>1</sup> | Status |
|-------------------------------------|------------------------------|--------|
| American goldfinch <sup>2,3,4</sup> | <i>Carduelis tristis</i>     |        |
| Old World Sparrows                  |                              |        |
| House sparrow <sup>4</sup>          | <i>Passer domesticus</i>     |        |

SOURCE: CDFG 2009, USFWS 2008

<sup>1</sup> Nomenclature follows the [AOU Checklist](#), 7<sup>th</sup> edition (1999) and Supplements through 2008.

<sup>2</sup> B. Oliver, Reading Island Bird List, Wintu Audubon Society, 2004.

<sup>3</sup> R. Cull, Sustain Environmental Inc., reconnaissance surveys, 2005 and 2006.

<sup>4</sup> R. Santry, breeding bird survey coordinator, Shasta County, personal communication.

Note: Nomenclature and listing status designations change frequently. Readers should refer to the most recent CNDDDB or published literature.



## Mammals

### *Likely to occur at MCCWA*

#### FEDERAL LISTING STATUS

FE = Endangered

FT = Threatened

FP = Petitioned for Threatened or Endangered

#### STATE LISTING STATUS

SE = Endangered

ST = Threatened

SSC = Species of Special Concern

#### WESTERN BAT WORKING GROUP

WBWG: H = High Priority

WBWG: M = Medium Priority

WBWG: LM = Low to Medium Priority

| Common Name                | Scientific Name                  | Status       |
|----------------------------|----------------------------------|--------------|
| Virginia opossum           | <i>Didelphis virginiana</i>      |              |
| Vagrant shrew              | <i>Sorex vagrans</i>             |              |
| Ornate shrew               | <i>Sorex omatus</i>              |              |
| Broad-footed mole          | <i>Scapanus latimanus</i>        |              |
| Yuma bat                   | <i>Myotis yumanensis</i>         | WBWG: LM     |
| Long-eared myotis          | <i>Myotis evotis</i>             | WBWG: M      |
| Fringed myotis             | <i>Myotis thysanodes</i>         | WBWG: H      |
| Western red bat            | <i>Lasiurus blossevillii</i>     | SSC, WBWG: H |
| Brazilian free-tailed bat  | <i>Tadarida brasiliensis</i>     |              |
| California bat             | <i>Myotis californicus</i>       |              |
| Western pipistrelle        | <i>Pipistrellus hesperus</i>     |              |
| Big brown bat              | <i>Eptesicus fuscus</i>          |              |
| Hoary bat                  | <i>Lasiurus cinereus</i>         | WBWG: M      |
| Pallid bat                 | <i>Antrozous pallidus</i>        | SSC, WBWG: H |
| Brush rabbit               | <i>Sylvilagus bachmani</i>       |              |
| Desert cottontail          | <i>Sylvilagus audubonii</i>      |              |
| Black-tailed jackrabbit    | <i>Lepus californicus</i>        |              |
| Western grey squirrel      | <i>Sciurus griseus</i>           |              |
| California ground squirrel | <i>Spermophilus beecheyi</i>     |              |
| Botta's pocket gopher      | <i>Thomomys bottae</i>           |              |
| California kangaroo rat    | <i>Dipodomys californicus</i>    |              |
| American beaver            | <i>Castor canadensis</i>         |              |
| Western harvest mouse      | <i>Reithrodontomys megalotus</i> |              |

# APPENDIX C: MCCWA Animal Species Inventory

| Common Name                  | Scientific Name                 | Status |
|------------------------------|---------------------------------|--------|
| Deer mouse                   | <i>Peromyscus maniculatus</i>   |        |
| Brush mouse                  | <i>Peromyscus boylii</i>        |        |
| House mouse                  | <i>Mus musculus</i>             |        |
| Dusky-footed woodrat         | <i>Neotoma fuscipes</i>         |        |
| California vole <sup>2</sup> | <i>Mycrotus californicus</i>    |        |
| Long tailed vole             | <i>Mycrotus longicaudus</i>     |        |
| Common muskrat <sup>2</sup>  | <i>Ondatra zibethicus</i>       |        |
| Black rat                    | <i>Rattus rattus</i>            |        |
| Common porcupine             | <i>Erethizon dorsatum</i>       |        |
| Coyote <sup>2</sup>          | <i>Canis latrans</i>            |        |
| Red fox                      | <i>Vulpes vulpes</i>            |        |
| Grey fox                     | <i>Urocyon cinereoargenteus</i> |        |
| Ringtail                     | <i>Bassariscus astutus</i>      | FP     |
| Raccoon <sup>2</sup>         | <i>Procyon lotor</i>            |        |
| Long tailed weasel           | <i>Mustela frenata</i>          |        |
| American mink                | <i>Mustela vison</i>            |        |
| Western spotted skunk        | <i>Spilogale gracilis</i>       |        |
| Striped skunk                | <i>Mephitis mephitis</i>        |        |
| Northern river otter         | <i>Lontra canadensis</i>        |        |
| Mountain lion                | <i>Puma concolor</i>            |        |
| Bobcat                       | <i>Lynx rufus</i>               |        |
| Mule deer <sup>2</sup>       | <i>Odocoileus hemionus</i>      |        |

<sup>2</sup> Animal or animal sign (e.g., tracks, scat, fur) observed. Sustain Environmental Inc., 2005 and 2006.

SOURCE: CDFG 2009, Hayssen 2009, Jameson and Peeters 2004

## **APPENDIX D**

# MCCWA Weed Management Plan

Draft Invasive Non-Native Plant (Weed) Management Plan  
for the Mouth of Cottonwood Creek Wildlife Area



**INVASIVE NON-NATIVE PLANT  
(WEED) MANAGEMENT PLAN  
FOR THE  
MOUTH OF COTTONWOOD CREEK  
WILDLIFE AREA**

**PREPARED FOR:  
California Department of Fish and Game  
North Cost Region**

**MARCH 2007  
(Updated December 2009)**

**PREPARED BY:  
Barbara Moritsch, MS  
Rebecca Cull  
  
Sustain Environmental Inc.**



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## 1.0 INTRODUCTION

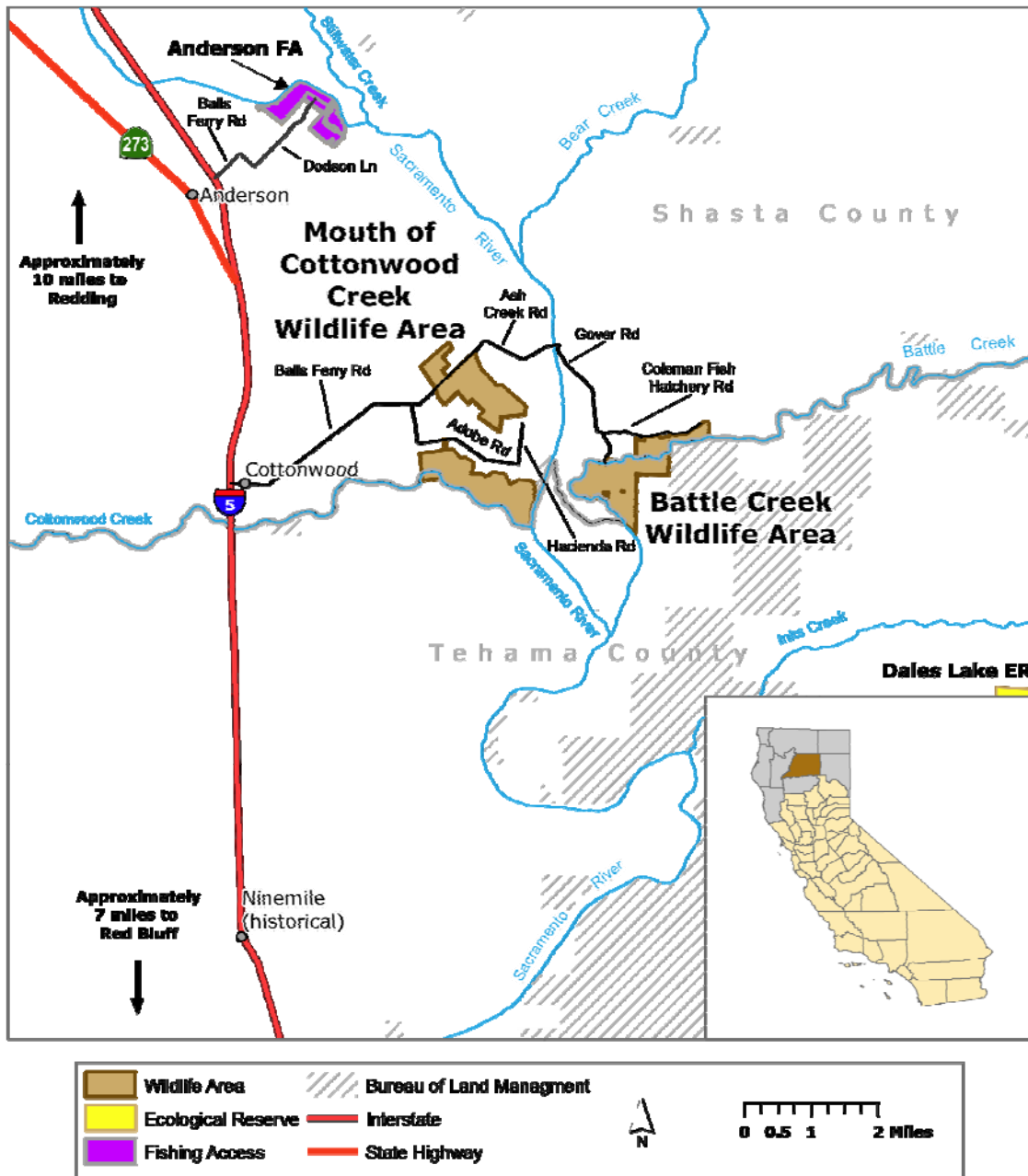
The Mouth of Cottonwood Creek Wildlife Area (MCCWA) is located mostly in south-central Shasta County, west of the Sacramento River, northeast of the town of Cottonwood, and mostly north of Cottonwood Creek. The MCCWA consists of three units: the Cottonwood Creek Unit (CCU), the Balls Ferry Wetland Unit 1 (BFW1) and the Balls Ferry Wetland Unit 2 (BFW2), all of which are located on the Balls Ferry USGS 7.5' quadrangle. The California Department of Fish and Game (CDFG) acquired MCCWA lands to protect, restore, and enhance riparian and wetland habitats.

The CCU (approximately 571 acres) extends north and west from the confluence of Cottonwood Creek and the Sacramento River, along the north side of Cottonwood Creek in Shasta County. The CCU is located between Adobe Road and Cottonwood Creek. The exact southern boundary of this unit is unclear. (The Shasta County Assessor parcel records show the property extending south of Cottonwood Creek; however, the Shasta – Tehama County boundary indicates all of the parcels but one are in Shasta County, north of Cottonwood Creek.) Access to the site is via two gated and locked north-south trending gravel roads extending south from Adobe Road - an eastern and a western entrance. There is a small public parking lot at the eastern entrance, opposite the junction of Adobe and Hacienda Rd., along with a pedestrian access trail.

BFW1 and BFW2 are located approximately  $\frac{3}{4}$  mile to the north, entirely within Shasta County. BFW1 totals 348 acres; Venzke Road borders it on the south and Balls Ferry Road on the north. Access is via a south entrance from Venzke Road or a north entrance from Balls Ferry Road; both points are behind locked gates. This unit is not open to the public without permission from CDFG.

BFW2 consists of three parcels totaling approximately 141 acres. It is located on either side of Balls Ferry Road. South of Balls Ferry Road, it shares the eastern boundary with BFW1. North of Balls Ferry Road, the access is primarily from Webb Road through locked gates. The parcel that lies south of Balls Ferry Road is accessed via a gated dirt road entrance. There are no roads or trails, and the BFW2 is closed to the public due to ongoing management activities (J. Chakarun, personal communication). Figure 1 depicts the general location of the MCCWA.

Figure 1: Location Map



June 2009 - Alberto Tovar, DFG - WB / BDB  
Prepared by BDB for WB

## 1.1 Rationale for Managing Non-Native Invasive Plants

It is widely recognized that non-native invasive plants (weeds) compete with and displace native plants and animals, and other organisms that depend on these native plants. They can alter ecosystem functions and cycles, hybridize with native species, and promote other non-native or undesirable species.

Most natural resource management goals include stopping, slowing or reversing non-native plant invasions to promote native populations and habitats. In certain situations, management goals include restoration of badly infested areas to healthy systems dominated by native species. In most cases, achieving these goals require active management to control and manage the invasive plants.

## 1.2 Overview of this Plan

This plan provides a preliminary strategy for managing the highest priority invasive non-native plants at MCCWA. It includes information on non-native plants identified to date on wildlife area lands, the relative threats posed by those species, and considerations for prioritizing species for management. The plan also includes an initial list of the highest priority species. This is a preliminary list; additional information will be required before CDFG manager's can develop a final priority list. This required information includes, but is not limited to, the following:

- detailed maps of individual occurrences of the species;
- density of the plants within those occurrences;
- potential for the species to spread;
- the proximity of the occurrences to water; and
- proximity of the occurrences to special-status plant or wildlife populations or habitat.

The plan also presents information on approaches, tools, and techniques available for controlling weeds in natural areas, site rehabilitation and restoration, and follow-up monitoring. The strategy presented in this plan is an adaptive strategy. It will require refinement when additional information about the target species, and about the effectiveness of various treatments, becomes available. Designed to be a stand-alone plan, this document repeats some information contained in the Draft MCCWA LMP. CDFG input will be required to finalize this document for use in the field.

## 2.0 INVENTORY AND ASSESSMENT OF INVASIVE NON-NATIVE PLANTS

Baseline reconnaissance level botanical surveys were conducted in late May and early June of 2006 on the CCU and BFW1 (R. Buck, 2006, unpublished report prepared for Sustain Environmental Inc.). Botanists conducted surveys to fulfill the following objectives:

- 1) To map and characterize plant communities;
- 2) To develop a preliminary floristic species list; and
- 3) To locate and map occurrences of special-status plant species and sensitive habitats.

The Draft LMP for the Mouth of Cottonwood Creek Wildlife Area details the methods and results of this survey effort (See Section III, Habitat and Species). The results of the botanical survey are preliminary. Access problems, including inundation, impenetrable emergent marsh vegetation, impenetrable riparian forest understory, and lack of access across Cottonwood Creek precluded a complete survey of the property. BFW2 (acquired in 2008), was not included in the survey effort, and only gross level plant communities have been mapped. There have been no floristic surveys of BFW2 at the time of the preparation of this document. Floristic surveys of BFW2 are considered a “Step Down” action of the LMP.

## 2.1 Summary of Vegetation in the Wildlife Area

Based upon the preliminary botanical resource assessment, the CCU supports 166 vascular plant taxa (species, subspecies, and varieties). Of these, 74 are native and 88 are non-native. It is not known whether four taxa recorded are native or non-native: cleavers (*Galium aparine*) and Kentucky bluegrass (*Poa pratensis*) (because standard references disagree on whether or not these taxa are native to California); and horseweed (*Conyza* sp.) and tobacco (*Nicotiana* sp.). (These later two taxa could only be identified to genus, and both native and non-native species could occur in the area).

On BFW1, botanists identified 155 vascular plant taxa (species, subspecies, and varieties). Of these, 65 are native and 89 are non-native. Kentucky bluegrass also occurs on this unit, and as stated previously, there is some scientific debate whether it is native or non-native in California. A number of observed species could not be identified because surveys were conducted before their flowering period, and plant parts necessary for identification (flowers and/or fruits) were not present. A lesser number of observed species, mostly annuals, were already were past the stage when identification would have been possible.

The MCCWA has eight primary plant communities (ruderal is divided into two subtypes: developed and Himalayan blackberry). Details on the geographic distribution within each unit and the plant species composition of these habitats are in the Draft LMP (See Section III, Habitat and Species). Table I presents the primary habitat types recorded on the properties that make up the MCCWA.

**Table 1. Primary Habitat Types at MCCWA.**

| Habitat Types                        | CCU | BFW1 | BFW2 |
|--------------------------------------|-----|------|------|
| California annual grassland          | X   | X    | X    |
| Valley oak savanna                   | X   | X    |      |
| Great Valley mixed riparian forest   | X   | X    | X    |
| Floodplain                           | X   |      |      |
| Freshwater emergent wetland and pond | X   | X    | X    |
| Vernal pond/swale/seasonal ponds     |     | X    |      |
| Seep                                 |     | X    |      |
| Ruderal: Himalayan blackberry        | X   | X    | X    |
| Ruderal: Developed                   |     | X    | X    |

CCU: Cottonwood Creek Unit; BFW1: Balls Ferry Wetland Unit 1; BFW2: Balls Ferry Wetland Unit 2

## 2.2 Special-status Plants

When managing non-native plant species, it is critical to avoid direct or indirect harm to special-status species, hence the need for precise location mapping. In freshwater marsh and pond-freshwater marsh habitat types, botanists documented the special-status species fox sedge (*Carex vulpinoidea*), which was widely scattered, but usually localized, in, or near the margins of, freshwater marsh habitats. In 1994, Hubbell and Marr documented the special-status species silky cryptantha (*Cryptantha crinita*) at two locations along the Cottonwood Creek floodplain (Hubbell and Marr 1994). It was not located in 2006 (Buck, unpublished report). In addition to conducting focused surveys for special-status plants at BFW2, additional surveys and mapping are recommended (See Section IV, Biological Elements).

## 2.3 Non-native Plant Species

A list of all non-native plant taxa identified to date in the MCCWA is included as Appendix D-1 (see appendices in *this* document). The draft LMP describes the general distributions of these taxa within the various habitat types of the wildlife area (See LMP Section III, Habitat and Species).

Himalayan blackberry (*Rubus discolor*) was the most widespread invasive species on the property, forming extensive patches in or at the margins of several habitat types including California annual grassland, grassland-savanna, Great Valley mixed riparian forest, and freshwater marsh. Some areas dominated by Himalayan blackberry were large enough to map as a distinct habitat type: Himalayan blackberry/ruderal. Especially noteworthy is the widespread degradation of riparian forest understory, especially on the CCU, by extensive infestations of Himalayan blackberry.

Other invasive species with extensive or widespread infestations in dry to moist habitats on one or both units include yellow star-thistle (*Centaurea solstitialis*), medusahead (*Taeniatherum caput-medusae*), velvet grass (*Holcus lanatus*), tall fescue *Festuca arundinacea*), pennyroyal (*Mentha pulegium*), and cultivated grape (*Vitis vinifera*). Floating primrose-willow (creeping water-primrose; possibly Uruguay water-primrose; *Ludwigia peploides* or *L. hexapetala*) is an invasive species that has extensive infestations in ponds and freshwater marshes on both the Balls Ferry Units.

Other invasive species currently of relatively limited occurrence, but that could potentially become more widespread, include, in dry to moist habitats, broadleaved pepperweed (or perennial pepperweed; *Lepidium latifolium*), giant reed (*Arundo donax*), tree-of-heaven (*Ailanthus altissima*), edible fig (*Ficus carica*), and white poplar (*Populus alba*); and, in freshwater marshes, parrot's feather (*Myriophyllum aquaticum*) and pale yellow iris (*Iris psuedacorus*).

Grasslands and savannas supported the greatest concentrations of non-native species. Common taxa included yellow starthistle, medusahead, mustards (*Brassica* spp.), filarees (*Erodium* spp.), ripgut brome (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), wild



oats (*Avena* spp.), ryegrasses (*Lolium* spp.), Mediterranean barleys (*Hordeum* spp.), non-native fescues (*Festuca* spp.), and bur-clover (*Medicago polymorpha*). A few of these species are particularly problematic. Yellow starthistle is of special concern because it degrades forage species, depletes soil moisture and adversely affects the habitat quality of grasslands and savannas (Bossard et al. 2000).

### 3.0 MANAGEMENT APPROACH AND CONSIDERATIONS

It is best to develop a management strategy for non-native invasive plants that is adaptive, and modified over time based on monitoring the effectiveness of treatment, and new information on species presence or the threats they pose, etc. The following list presents a sequence of steps that aid in developing and implementing an adaptive weed management plan:

- a) Establish management goals and objectives for the site.
- b) Determine which plant species or populations block, or have potential to block attainment of the management goals and objectives.
- c) Identify, document, and map those species or populations, and then assign a priority to these species or to individual occurrences, based on level of threat, feasibility of control, etc.
- d) Consider all methods available to eradicate or control targets, or other ways to reduce their adverse impacts; if necessary, re-order priorities.
- e) Develop and implement a management plan designed to move conditions toward management goals and objectives.
- f) Monitor and assess the effectiveness of management actions in terms of moving conditions toward goals and objectives; and
- g) Re-evaluate, modify, and start the cycle again.

Note that control activities do not begin until completion of the first four steps. The initial goals, objectives and plans must be periodically reevaluated so they can be altered or modified as needed. In the end, this will save time and money, and will reduce the chance of making mistakes.

Non-native plant management is a component of an overall comprehensive site management and restoration program for the MCCWA. The focus of management is on the desired native species and communities on site, rather than on simply eliminating the undesirable species. In some cases, removing the targeted non-native species will result in colonization by desirable natives, but in many cases, such colonization does not occur without additional restoration work such as soil treatment, seeding, transplanting, etc.

It is also very important to implement a prevention program to keep the site free of non-native species that are not yet present, but which are known to be invasive elsewhere in the region. Managers must be particularly aware of species that are not yet on their site, but which occur nearby. The ultimate goal should be to preserve native species, communities and functioning ecosystems.

### 3.1 Data and Maps of Target Species Occurrences

Maps of the extent of species occurrences and estimates of density or cover are essential for a successful program. Maps and data on existing conditions provide a baseline (standard) for measuring success of control or removal efforts. Such information also facilitates cooperative efforts with adjacent land owners/managers. If, and when, herbicides are used, maps and density data will facilitate reporting purposes. While the initial cost of mapping can be high, working cooperatively with the regional Weed Management Area (WMA) group may help minimize the expense to CDFG. Integrating the data acquisition needs with the educational objectives of the Balls Ferry Research and Education Center can realize additional cost savings. Mapping is required for the California Environmental Quality Act (CEQA) compliance process.

Mapping and documenting species that are anticipated to be the targeted highest priority species should be conducted first. Section 3.3 presents a preliminary list of such species.

### 3.2 Prioritizing Species for Management

It is critical to set priorities for non-native invasive plant management actions. Managers must identify the highest priority species occurring on their land, and in many cases, the highest priority occurrences within species. For example, Himalayan blackberry poses a much greater threat if it is growing in an area supporting a high percentage of native species or rare species. At the MCCWA, Himalayan blackberry provides nesting habitat for the yellow-breasted chat, a California Species of Special Concern (Santry, personal communication; Burnett and DeStaebler 2003). Managers will need to evaluate those instances where control methods could result in more damage to native species and habitats than by maintaining the status quo. Setting priorities will help to ensure the most efficient and effective use of the resources available for non-native plant management.

There are a number of systems in use for prioritizing removal and management efforts. The first step is to determine the level of threat posed by the invasive non-native species identified. This information can be obtained from lists maintained by the [U.S. Department of Agriculture](#), the [California Department of Food and Agriculture](#) (CDFA), the [California Invasive Plant Council \(Cal-IPC\)](#), and others. The CDFA list initially was prioritized based on threats to agricultural crop lands, but the list now incorporates threats to native habitats in California. The list uses an A-D rating system: A is the highest priority for eradication and D is of lower priority. Cal-IPC provides a list of invasive plant species occurring in California, as well as assessments of potential invasiveness and other basic information. Bossard et al. (2000) provide additional, detailed information about invasive plants in California. See Appendix D-2 (this document) for a list of additional resources on non-native plant management and prioritization.

After assessing the existing information on the species, managers need to evaluate several other site-specific elements before establishing their priorities for treatment. Elements to consider include the following:

- **Extent of Infestations.** Small, incipient occurrences (new populations or outliers of larger infestations) of species posing a high level of threat would usually be high

priority. Species present in large infestations that continue to expand would be a medium priority, and species present in large infestations that are not expanding would generally be lower.

- **Current and Potential Impacts of the Infestations.** For example, if the infestation were immediately threatening rare plants or their habitat, it would likely be high priority.
- **Ecological Value of Habitats or Areas that are Infested or May Become Infested.** The highest priority should be given to infestations that occur in the most highly valued habitats or areas, such as wetlands, areas with rare or highly valued species or communities, and areas that provide vital resources. Infestations in less highly valued portions of the site would be intermediate priorities; and areas already badly infested with other invasive non-natives may be a lower priority, unless the species in question will make the situation significantly worse. Also consider threats to ecosystem parameters such as soil integrity, which can be changed by certain non-native species.
- **Feasibility of Success.** Realistically factoring the cost and difficulty of the control measures must be included in the prioritization of target species. Highest priority would be given, in most cases, to species or occurrences likely to be controlled or eliminated with available technology and resources, and sites that will be re-colonized by desirable native species with little further input. Lower priority would be given to species or occurrences that are likely to be controlled, but where they will not be replaced by desirable natives without an active restoration program. Species that are difficult to control and/or whose control would likely result in substantial damage to desirable species would be low.

### 3.3 Preliminary Prioritization of Species for Control on MCCWA.

The following section is preliminary; it is only the first effort based upon the baseline inventory. Development of a fully prioritized plan is beyond the scope of this effort because additional data collection, mapping, and internal decision-making must occur. The priority list presented is based on Cal-IPC's Invasive Plant Inventory, which categorizes non-native invasive plants that threaten the state's wildlands. Categorization is based on an assessment of the ecological impacts of each plant. The Inventory represents the best available knowledge of invasive plant experts in the state. The following paragraph is from [Cal-IPC's website](#):

The Inventory categorizes plants as High, Moderate, or Limited, reflecting the level of each species' negative ecological impact in California. Other factors, such as economic impact or difficulty of management, are not included in the assessment. It is important to note that even Limited species are invasive and should be of concern to land managers. Although the impact of each plant varies regionally, its rating represents cumulative impacts statewide. Therefore, a plant whose statewide impacts are categorized as Limited may have more severe impacts in a particular region. Conversely, a plant categorized as having a High cumulative impact across California may have very little impact in some regions.

Appendix D-3 (this document) provides a list of non-native invasive plants known to occur at MCCWA that are rated as Moderate or High by Cal-IPC.

Table 2 is a preliminary list of the invasive species present or that have the immediate potential to invade the MCCWA that are likely to be the highest priorities for management. The assessment that preceded development of this table included information from Cal-IPC and our best professional judgment.

**Table 2. Preliminary list of high priority invasive species present or that have the immediate potential to invade the MCCWA.**

| Common Name   | Priority          | CCU | BFW1 |
|---|-------------------|-----|------|
| Tree-of-heaven ( <i>Ailanthus altissima</i> )                                     | high              | x   | x    |
| Giant reed ( <i>Arundo donax</i> )  | very high         | x   | x    |
| Yellow star-thistle ( <i>Centaurea solstitialis</i> )                             | very high         | x   | x    |
| Himalayan blackberry ( <i>Rubus discolor</i> or <i>R. armeniacus</i> )            | high to very high | x   | x    |
| Parrotfeather ( <i>Myriophyllum aquaticum</i> )                                   | very high         | x   | x    |
| Perennial pepperweed ( <i>Lepidium latifolium</i> )                               | very high         | x   |      |
| Water primrose ( <i>Ludwigia hexapetala</i> or <i>L. peploides</i> ) <sup>1</sup> | very high         |     | x    |

BFW1= Balls Ferry Wetland Unit 1, CCU= Cottonwood Creek Unit

<sup>1</sup> Around the margins of most of the ponds, and locally in freshwater marsh areas with deeper water, there are dense colonies of a species tentatively identified as the non-native, invasive, pubescent form of floating primrose-willow (creeping water-primrose; *Ludwigia peploides* ssp. *montevidensis*), often intermixed with the native form. This plant sometimes grows more or less erect (in contrast to the native form, which is always more or less prostrate and floating or creeping on drying mud) and has larger flowers than the native form. It could, therefore, be Uruguay water-primrose (*Ludwigia hexapetala*), a species previously known in California only from coastal counties. Uruguay water-primrose is also non-native and invasive. This plant is a very high priority for removal.

### 3.4 Notes on Other Species

Control of cheatgrass and medusahead can be very difficult and costly. If these grasses are widespread in the region, their control should be a lower priority on MCCWA lands. If they are not widespread, it may be desirable to attempt control or eradication, in coordination with adjacent land owners/managers who also are managing the species.

Velvet grass is sometimes dominant in relatively moist, low-lying areas in grassland habitat types and around seeps. Tall fescue was also documented on the site. These perennial grasses can become monocultures and should be removed.

Bull thistle should be removed, as resources become available, as it also will continue to spread and increase in density.

The following non-native trees and arborescent shrubs should be removed as resources permit as many of them will continue to spread and usurp resources: edible fig, black walnut, southern catalpa, silk tree, firethorn, plum, and white poplar.

#### 4.0 CONSIDERATIONS FOR SPECIES-SPECIFIC MANAGEMENT STRATEGIES

Management strategies for non-native invasive plants must be species-specific, and sometimes specific to individual occurrences. For example, it may be safe to use herbicides on some occurrences, but others may be too close to water or rare species. All pesticide applications made on department-managed lands or for department-managed projects must first be approved by the department's pesticide use coordinator, a pest control adviser licensed by the California Department of Pesticide Regulation (DPR) and assigned to the department's Pesticide Investigations Unit (PIU) (CDPR 2006). CDFG's Pesticide Investigation Unit focuses on five general categories of pesticide work:

- 1) Incident investigations involving fish and wildlife and pesticides;
- 2) Hazard assessments of pesticides to fish and wildlife resources;
- 3) Protection of threatened and endangered species from pesticide use;
- 4) Assessment of pest control and eradication programs on fish and wildlife resource; and
- 5) Coordination and approval of Department pesticide uses and training of CDFG personnel.

PIU staff works closely with Department of Food and Agriculture, Department of Pesticide Regulations, and County Agriculture Commissioner staffs (CDFG 2009). Requests to use pesticides must be submitted to the PIU on the department's pesticide use request form (FG-880) at least 30 days before the intended use date. No pesticide applications can be made to department-managed lands without an approved FG-880 from the PIU. Copies of approved FG-880s must be maintained by department pesticide applicators for at least two years after the pesticide application date. This requirement does not apply to the control of indoor and landscape pests associated with department-managed buildings.

Except as indicated below, all pesticide applications made on department-managed lands or for department-managed projects must be supervised by department personnel who have obtained their qualified applicator certificate from the DPR.

Exceptions to this requirement include the following situations:

- 1) indoor and landscape pest control at department-managed facilities,
- 2) pesticide applications made by DPR-licensed commercial pest control companies, vector control districts, or similar agencies, and
- 3) pesticide applications made by farmers to crops grown under lease agreements with the department.

Herbicides and pesticides are considered hazardous materials and even with the best of care, accidents do occasionally happen. Appendix D-4 of this document contains contact information concerning local medical treatment facilities. This information should be kept up to date by MCCWA area managers.

## 4.1 Basic Treatment Options

This section provides general information on techniques to control or eradicate some of the high priority species listed in Table 2. Prior to finalizing treatment protocols, site managers will need to collect additional information on specific locations of infestations.

The following list presents the basic menu of treatment options available for land managers for removing or slowing spread of non-native plants. These can be used separately or in combination:

- prevention of spread by stopping ongoing soil disturbance
- manual removal (hand pulling)
- mechanical removal (mowing, weed-whacking)
- controlled grazing {cattle, sheep or goats}
- prescribed fire or scorching
- herbicide application

## 4.2 Notes of Treatments for Highest Priority Species

The following sections provide some of the treatment options available for the highest priority species on MCCWA lands as presented in Table 2. Much of this information is derived from the [Cal-IPC website](#).

### 4.2.1 Tree-of-Heaven

- 1) Pull seedlings before taproot is established (roughly 3 months after germination) while soil is moist and loose. If taproot has already formed, dig around base of plant to completely remove root system and prevent resprouts.
- 2) Grubbing out the taproot can kill the plant, but is a slow method best used to control small infestations. The entire root must be removed, as any portion left in the soil can produce a new plant.
- 3) Cut stems of mature trees (up to 12 inches in diameter) early in the spring. Cut a second time at the end of the growing season around June or July. This aims to prevent seed production with the first cut and to exhaust the plant's energy reserves with the second cut.
- 4) Cut the tree with a chainsaw, preferably during the growing season and before it flowers. Immediately treat the cut with herbicide.
- 5) Slash from trees that have not produced seed can be piled for wildlife cover.
- 6) Any seeds present are best collected, bagged, and disposed of.
- 7) Establishing a thick shade over seedlings will slow their growth.
- 8) Follow-up: Return to the site to pull any seedlings that have germinated. New seedlings and root suckers can be pulled or cut and treated with herbicide. Cut resprouts repeatedly for 3–4 years to kill off the plant's root system.



### 4.2.2 Giant Reed

- 1) Completely killing the root system is the only way to remove giant reed, either through physical removal or with herbicide.
- 2) Pulling and cutting can be effective if all rhizomes and aboveground vegetation are removed.
- 3) Apply herbicides as follow-up to pulling or digging. The more thoroughly the rhizomes are removed, the less herbicide will be needed.
- 4) Pull or dig plants, from seedlings to 6 feet tall, ideally after heavy rains loosen the soil. It is important to pull up and remove the roots.
- 5) Cut stems of larger plants with a chainsaw or brush cutter, and dig up roots with a shovel, pickaxe, or Swedish brush axe. Alternatively, use heavy equipment, such as an excavator.
- 6) Cut stems as close to the ground as possible in May, and cover the clump with a very thick tarp or with several tarps for an entire growing season. This should prevent light from reaching the plant (reducing its ability to photosynthesize), and keep resprouts from tearing the tarp. The lack of light will eventually deplete the plant's energy reserves and it will die back.
- 7) Foliar herbicide spraying can be successful after the plant has flowered but before summer dormancy.
- 8) As an alternative to foliar spraying, a stronger concentration of herbicide can be applied to stems immediately after cutting. Make sure that an herbicide product suitable for use near water is used.
- 9) Both treated and non-treated stems can be left on-site to decompose, although they break down very slowly. If left to compost, keep debris well away from water. For stems that have not been chemically treated and in areas where it is feasible, the debris can be burned. Otherwise, chip canes into very small pieces for mulching. The stems are easier to chip when dry. Chipping giant reed requires a heavy-duty chipper to handle the plant's tough fibers.
- 10) Chipped material can be disposed of either in green waste containers, or spread out to dry and possibly sprayed with herbicide if any regrowth occurs from chipped debris. Stem pieces that have no nodes or only one node won't reproduce.
- 11) Follow-up: Return to the site to pull any new seedlings. New seedlings and root suckers can be pulled or cut and treated with herbicide. Cut re-sprouts repeatedly for 3–4 years to kill off the plant's root system.

### 4.2.3 Yellow Star-thistle

There is a wealth of information available on treatment of yellow star-thistle. For example, see the 2006 *Yellow Starthistle Management Guide* by Joseph M. DiTomaso, Guy B. Kyser, and Michael J. Pitcairn <http://www.cal-ipc.org/ip/management/yst.php>

- 1) Pull or dig individual plants by hand in May–June, when plants are bolting or as soon as possible afterwards. (Rosettes often break off from roots, which resprout.) Grasp the plant at the base and pull steadily, straight up.
- 2) Where several plants grow close together, digging or pulling smaller ones often makes it easy to pull others. Cutting lateral roots and loosening soil around the base also make it easier to pull. If the plant cannot be pulled out, cut it or twist it off at the base. Hand pulling is often difficult if plants have stems more than a quarter-inch in diameter.
- 3) Use a narrow spade, soil knife, or other tool to help free or cut the root. Given that this weed is an annual, most of the taproot can be left in the soil, especially if the cut is a quarter- to a half-inch of the root below the root crown.
- 4) Continue to recheck and pull emerging plants through August, preferably even later.
- 5) Hand-pulling can be done in conjunction with mowing: mowing can keep plants from setting seed until you have time to pull.
- 6) Mow (or cut with a hand scythe, brushcutter, or any cutting tool) after the plants have bolted and a small fraction of the buds (about 2 percent) have started to bloom. If mowed, the blades must be close enough to the ground to get the lowest buds. Aim to leave 1–2 inches above ground. The site may need to be mowed a second or even a third time at 4–6 week intervals. Mowing too early can encourage greater seed production, so it's crucial to time the removal carefully. If there are no buds, it's too early, but if the flowers have mostly bloomed and are losing their bright yellow color, it's too late. Occasionally plants bolt sideways with flower heads much closer to the ground, or mowed plants may rebloom very low. These tops can be removed with a shovel, hoe, or mattock, if in small numbers. Cutting is most effective on dry soil, otherwise a repeat treatment is necessary roughly 4 weeks later.
- 7) Graze with cattle, goats, and sheep to help contain plants and reduce seed production. While cattle don't eat mature spiny plants, goats and sheep will. Best results come from intensive grazing by a large number of animals for a short period, preferably from the end of May to June, just after plants have bolted. Research suggests grazing at the rosette stage is counterproductive, leading to an increase in yellow starthistle. This weed is toxic to horses.
- 8) Some practitioners advise leaving clippings from each mowing on-site (as long as they do not contain seeds) to protect reinfestation by other invasive species, and also to discourage yellow starthistle seedlings by providing extra shade. Plants with only buds and young, pale yellow flowers can be left on the ground. Once flowers turn darker yellow, pulled plants should be bagged, as they may produce viable seed. Dispose of the bags off-site where seeds can't disperse elsewhere.
- 9) Mulching may be helpful in shading out seedlings. Some experiments show that a 5-inch layer of wheat straw (or rice straw) stops all regrowth. This level of coverage might be expensive, however, and therefore is only an option for small patches.

- 10) Follow-up: A removal program should last at least 3 years and probably longer, though at lower intensity. Watch for new infestations in nearby areas.

#### 4.2.4 Himalayan Blackberry

- 1) Cut stems with loppers close to the ground.
- 2) Dig out the rootball with a Pulaski or shovel, and remove as much of the root as possible. Interconnecting roots reaching over 30 feet long and 2–3 feet deep make pulling up all roots extremely difficult. Aim to remove the main rootball and large lateral roots.
- 3) Brushcut the canes; use McLeods to clear the vegetation. The best time to do this is when flowers are in bloom but before fruit sets. Cutting encourages new growth, but may be effective if repeated over a number of years.
- 4) Some cut stems to about 1 foot and treat stumps with strong solution (25–50 percent concentration) of herbicide immediately after cutting. Don't use herbicide on or near plants from which people may pick and eat the berries.
- 5) Transfer stems and roots to a site where they can be left to decompose, making sure that to remove all berries. Alternatively, burn the debris or trim it into pieces small enough for bagging and disposal.
- 6) Goats will graze on younger plants.
- 7) There are no viable biological resources for this invasive plant due to its closeness to native *Rubus* species.
- 8) Follow-up: Regardless of the method used, follow-up is essential. Some recommend immediate revegetation with quick-growing shrubs and trees, with periodic visits to the site to remove seedlings and regrowth. After removing canes, one option is to hoe the soil or use a rototiller. This will clear out any roots, but is practical only for small monocultures.

#### 4.2.5 Parrotfeather

The following control methods have been compiled from the [Washington State Noxious Weed Control Board](#) and the [Georesources Institute, the Minnesota State University](#) websites .

- 1) Herbicides are the most common means of controlling parrotfeather.
- 2) Generally, only broadcast herbicide treatments have been applied to parrotfeather and little information is available on subsurface applications. Currently, no herbicide has been shown to be totally effective in controlling parrotfeather without repeated applications over time.

- 3) While parrotfeather is susceptible to herbicides, it is difficult to achieve complete control. The emergent stems and leaves have a thick waxy cuticle and it requires a wetting agent to penetrate this cuticle. Often the weight of the spray will cause the emergent vegetation to collapse into the water where the herbicide is washed off before it can be translocated throughout the plant.
- 4) Because this plant can spread readily through fragmentation of rhizomes, mechanical controls such as cutting, harvesting, and rotoation (underwater rototilling) should be used only when the extent of the infestation is such that all available niches have been filled. Using mechanical controls while the plant is still invading will tend to enhance its rate of spread.
- 5) Parrotfeather populations can be successfully harvested, but the dense tough rhizomes are very heavy and the plant regrows rapidly. In Longview, Washington, a dragline is used to remove parrotfeather plants. A truck-mounted crane with a special attachment plucks weeds out of the ditch. The drag line operation is conducted from August to December each year with control generally lasting for one growing season.
- 6) Parrotfeather has a high tannin content, so most grazers find it unpalatable.
- 7) Biological control agents are not presently available, but research for potential agents (pests and fungal controls) is ongoing and may be available in the near future.
- 8) Hand pulling and harvesting may offer temporary control on small infestations of less than one acre.
- 9) Raking may not be feasible due to the rapid biomass production of parrotfeather, as dense mats are likely heavy and may damage equipment. Care must be taken to remove all plant parts (emergent shoots, submersed shoots, and roots) as well as fragments or re-growth will occur.
- 10) Drawdowns may offer control in some situations, however, all water must be removed to facilitate compete drying of bottom sediments since parrotfeather will root and survive in moist soil.
- 11) Dredging is generally very expensive and not feasible for most management situations.

#### **4.2.6 Perennial Pepperweed**

- 1) Hand pulling is feasible only for seedlings. Established plants have a continuous mass of deep, interconnected roots that frequently break. Each segment can vegetatively reproduce, making it critical to grub out as much of the root system as possible.
- 2) Mechanical removal is not recommended given the plant's ability to spread easily from root fragments, but it will temporarily stop seed from spreading.

- 3) It may be possible to cut this plant back prior to flowering, and then cover the root system with cardboard or landscape fabric for a year to reduce the plant's ability to resprout.
- 4) Some studies suggest that an early season mowing can dramatically shift the total leaf area and the location of the leaf area within the plant canopy. Resprouting stems had 21-59% less leaf area than plants not mowed at the flowerbud stage. In mowed areas, 84-86% of the leaf area was found within the lower third of the canopy. If herbicide applications are made to resprouted shoots, more herbicide will be deposited onto the lower third of the canopy. This may in turn lead to the translocation and accumulation of more herbicide to below-ground perennial organs, enhancing control (Renz 2000).
- 5) The optimal timing for herbicide applications is the flowerbud stage. In riparian or wetland habitat, use a product that is not toxic to aquatic organisms and apply with a wick-type applicator to prevent herbicide drift.
- 6) Sheep and goats will graze on perennial pepperweed if the leaves are still young and there is nothing else to eat.
- 7) Keep roots away from waterways to minimize further infestations downstream. Wash equipment and the tires and undersides of vehicles after leaving the site.
- 8) Bag and dispose of pulled plants as household garbage or take them to a green waste facility. Alternatively, dispose of the plants through hot compost with grinding (but not ordinary compost, as very small fragments will reroor).
- 9) Any revegetation should be carried out as soon as possible. Natives with creeping perennial roots may be best.
- 10) Follow-up: Regular follow-up is essential as roots can lay dormant underground for several years. Return to the site in early spring and late summer for several years to check for regrowth and to remove rosettes. Scrape litter from the soil surface to allow other species to grow. Soil remediation may be required before planting native species.

#### **4.2.7 Water Primrose**

- 1) Water primrose can be cut and the roots can be dug up, but physical control is difficult because it can reestablish from seeds or remaining roots.
- 2) For small populations, hand pulling or raking might be effective. For larger infestations, a mechanical harvester or rotovation might be used.
- 3) Small populations may be tarped; however, covering large populations can cause a drop in dissolved oxygen (DO) that can affect other plants and fish.
- 4) Goats are known to forage on many types of emergent vegetation.
- 5) There is no known biological control for water primrose, although research is ongoing to try to find such an agent.

## 5.0 FOLLOW-UP MONITORING FOR TREATMENT EFFECTIVENESS

Follow-up monitoring to determine the effectiveness of treatments is a critical component of a successful non-native plant management program. Monitoring is valuable for providing information on the following:

- Progress of removal efforts;
- Effectiveness of treatments;
- Degree of re-establishment of target species after removal treatments have been applied (i.e., presence of seedlings or re-sprouts);
- Length of time follow-up visits are necessary;
- Status of natural or imposed re-vegetation on treated sites (e.g., the Proportion of native vs. non-native plants re-colonizing the area); and
- Use of the treated area by native wildlife.

Monitoring and documentation also are valuable for reporting on the use of project funding, as well as for information transfer with other land managers dealing with similar species.

Monitoring can be either qualitative or quantitative. Selection of methods will be contingent on the specific objectives and on available funding, and should be prioritized as removal and control efforts are prioritized. The [Center for Invasive Plant Management](#) offers the following information on examples of low, moderate, and high intensity monitoring and corresponds to the MCCWA LMP Section IV-B, Biological Monitoring Elements.

### 1. Low Intensity (Level I)

*Objective:* To detect new infestations and to assess the success of small scale chemical or mechanical control programs.

- a. Annually survey size and density of weed infestations and vegetation trends.
- b. Assemble data on past and current weed control activities within the weed management area.
- c. Annually update distribution/density map.
- e. Annually examine areas that are determined to be particularly susceptible to weed infestations.

### 2. Moderate Intensity (Level II)

*Objective:* Assess the success of ongoing chemical, biological control, or prevention programs in order to evaluate the need for adjustments.

Include the elements of Level I, plus:



- a. Establish permanent transects to aid visual monitoring.
- b. Establish photo points. Catalog and store photos so they are useful for recording trends.
- c. Collect weather data. This will require access to weather records and Palmer Drought Index.
- d. Evaluate the success of public education programs.
- e. Monitor funding from various sources.
- f. Assess the prevention effort.
- g. Compare the success of application timing, rates, and methods of treatment with that of applications on similar areas.
- h. Make an annual visual inspection for symptoms of damage to desirable plants.
- i. Make post-treatment inspections to determine possible damage and the need for retreatment.

### **3. High Intensity (Level III)**

*Objective:* Assess the success of major, sensitive, or experimental control programs.

Include the elements of Levels I and II, plus:

- a. This level may require the use of statistical and chemical analysis.
- b. Establish a computerized database. Geographical Information Systems (GIS) lend themselves to this level of monitoring.
- c. Automatic weather stations may be used to collect data.
- d. May require more detailed maps.
- e. Collect data on ground water, soils, health effects and impacts on wildlife management.

Also note that weed-free areas also deserve rigorous monitoring. Preventing weeds from becoming established is the most effective, economical, and ecologically sound approach to managing non-native plant infestations at the MCCWA.

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**Appendix D-1: Introduced or Naturalized Vascular Plant Species Observed**  
Mouth of Cottonwood Creek Wildlife Area (Cottonwood Creek and Balls Ferry Wetland Unit 1), Shasta County, California

| Vascular Plant Observed                                 | CCU | BFW1 |
|---|-----|------|
| <b>FLOWERING PLANTS (ANGIOSPERMAE - DICOTYLEDONEAE)</b> |     |      |
| APIACEAE  |     |      |
| <i>Anthriscus caucalis</i>                              | X   |      |
| <i>Daucus carota</i>                                    | X   | X    |
| <i>Torilis arvensis</i>                                 | X   | X    |
| ARALIACEAE  |     |      |
| <i>Hedera helix</i>                                     |     | X    |
| ASTERACEAE  |     |      |
| <i>Anthemis cotula</i>                                  |     | X    |
| <i>Centaurea solstitialis</i>                           | X   | X    |
| <i>Chamomilla suaveolens</i>                            | X   | X    |
| <i>Cichorium intybus</i>                                | X   | X    |
| <i>Cirsium vulgare</i>                                  | X   | X    |
| (?) <i>Conyza</i> sp.                                   | X   |      |
| <i>Filago gallica</i>                                   |     | X    |
| <i>Gnaphalium luteo-album</i>                           | X   | X    |
| <i>Hypochaeris glabra</i>                               | X   | X    |
| <i>Hypochaeris radicata</i>                             | X   | X    |
| <i>Lactuca serriola</i>                                 | X   | X    |
| <i>Leontodon taraxacoides</i> ssp. <i>longirostris</i>  | X   | X    |
| <i>Senecio vulgaris</i>                                 | X   |      |
| <i>Silybum marianum</i>                                 | X   |      |
| <i>Sonchus asper</i>                                    | X   | X    |
| <i>Tragopogon dubius</i>                                | X   | X    |
| BIGNONIACEAE  |     |      |
| <i>Catalpa bignonioides</i>                             | X   |      |
| BORAGINACEAE  |     |      |
| <i>Heliotropium europaeum</i>                           | X   | X    |
| BRASSICACEAE  |     |      |
| <i>Brassica nigra</i>                                   | X   | X    |
| <i>Lepidium latifolium</i>                              | X   |      |
| <i>Raphanus raphanistrum</i>                            | X   | X    |
| CAPRIFOLIACEAE  |     |      |
| <i>Lonicera japonica</i>                                |     | X    |

| Vascular Plant Observed                        | CCU | BFW1 |
|--|-----|------|
| CARYOPHYLLACEAE                                |     |      |
| <i>Cerastium glomeratum</i>                    |     | X    |
| <i>Herniaria hirsuta</i> ssp. <i>hirsuta</i>   |     | X    |
| <i>Petrorhagia dubia</i>                       | X   | X    |
| <i>Spergularia rubra</i>                       | X   | X    |
| CHENOPODIACEAE                                 |     |      |
| <i>Chenopodium ambrosioides</i>                | X   |      |
| <i>Chenopodium botrys</i>                      | X   |      |
| CONVOLVULACEAE                                 |     |      |
| <i>Convolvulus arvensis</i>                    | X   | X    |
| DIPSACACEAE                                    |     |      |
| <i>Dipsacus fullonum</i>                       | X   |      |
| FABACEAE                                       |     |      |
| <i>Albizia</i> sp.                             |     | X    |
| <i>Lathyrus</i> cf. <i>hirsutus</i>            |     | X    |
| <i>Lotus corniculatus</i>                      | X   | X    |
| <i>Medicago polymorpha</i>                     | X   |      |
| <i>Trifolium campestre</i>                     |     | X    |
| <i>Trifolium dubium</i>                        | X   | X    |
| <i>Trifolium glomeratum</i>                    |     | X    |
| <i>Trifolium hirtum</i>                        | X   | X    |
| <i>Trifolium pratense</i>                      |     | X    |
| <i>Trifolium repens</i>                        | X   | X    |
| <i>Trifolium subterraneum</i>                  | X   | X    |
| <i>Vicia benghalensis</i>                      | X   | X    |
| <i>Vicia sativa</i> ssp. <i>nigra</i>          | X   | X    |
| GERANIACEAE                                    |     |      |
| <i>Erodium brachycarpum</i>                    | X   | X    |
| <i>Erodium cicutarium</i>                      | X   |      |
| <i>Geranium dissectum</i>                      | X   | X    |
| HALORAGACEAE                                   |     |      |
| <i>Myriophyllum aquaticum</i>                  | X   | X    |
| JUGLANDACEAE                                   |     |      |
| <i>Juglans californica</i> var. <i>hindsii</i> | X   | X    |
| LAMIACEAE                                      |     |      |

| Vascular Plant Observed                             | CCU | BFW1 |
|---|-----|------|
| <i>Marrubium vulgare</i>                            | X   |      |
| <i>Mentha pulegium</i>                              | X   | X    |
| LINACEAE  |     |      |
| <i>Linum bienne</i>                                 | X   | X    |
| LYTHRACEAE  |     |      |
| <i>Lythrum hyssopifolium</i>                        | X   | X    |
| MORACEAE  |     |      |
| <i>Ficus carica</i>                                 | X   | X    |
| <i>Morus alba</i>                                   | X   |      |
| ONAGRACEAE  |     |      |
| <i>Ludwigia peploides</i> ssp. <i>montevidensis</i> |     | X    |
| PHYTOLACCACEAE                                      |     |      |
| <i>Phytolacca americana</i>                         | X   | X    |
| PLANTAGINACEAE                                      |     |      |
| <i>Plantago lanceolata</i>                          | X   | X    |
| POLYGONACEAE  |     |      |
| <i>Polygonum arenastrum</i>                         | X   | X    |
| <i>Rumex acetosella</i>                             |     | X    |
| <i>Rumex conglomeratus</i>                          |     | X    |
| <i>Rumex crispus</i>                                | X   | X    |
| <i>Rumex cf. kernerii</i>                           | X   |      |
| <i>Rumex pulcher</i>                                | X   | X    |
| PRIMULACEAE   |     |      |
| <i>Anagallis arvensis</i>                           | X   |      |
| RANUNCULACEAE                                       |     |      |
| <i>Ranunculus muricatus</i>                         |     | X    |
| ROSACEAE  |     |      |
| <i>Prunus</i> sp.                                   | X   | X    |
| <i>Pyracantha angustifolia</i>                      |     | X    |
| <i>Rubus discolor</i>                               | X   | X    |
| <i>Rubus pensilvanicus</i>                          |     | X    |
| RUBIACEAE   |     |      |
| (?) <i>Galium aparine</i>                           | X   |      |
| <i>Galium parisiense</i>                            | X   | X    |
| <i>Sherardia arvensis</i>                           |     | X    |
| SALICACEAE  |     |      |



| Vascular Plant Observed                                   | CCU | BFW1 |
|---|-----|------|
| <i>Populus alba</i>                                       | X   |      |
| SCROPHULARIACEAE  |     |      |
| <i>Parentucellia viscosa</i>                              | X   | X    |
| <i>Verbascum blattaria</i>                                | X   | X    |
| <i>Veronica anagallis-aquatica</i>                        | X   |      |
| <i>Veronica catenata</i>                                  |     | X    |
| SIMAROUBACEAE   |     |      |
| <i>Ailanthus altissima</i>                                | X   | X    |
| SOLANACEAE  |     |      |
| (?) <i>Nicotiana</i> sp.                                  | X   |      |
| VERBENACEAE   |     |      |
| <i>Verbena bonariensis</i>                                | X   |      |
| VITACEAE  |     |      |
| <i>Vitis vinifera</i>                                     | X   | X    |
| ZYGOPHYLLACEAE  |     |      |
| <i>Tribulus terrestris</i>                                | X   |      |
| <b>FLOWERING PLANTS (ANGIOSPERMAE - MONOCOTYLEDONEAE)</b> |     |      |
| ALISMATACEAE  |     |      |
| <i>Alisma lanceolata</i>                                  |     | X    |
| IRIDACEAE   |     |      |
| <i>Iris pseudacorus</i>                                   | X   |      |
| POACEAE   |     |      |
| <i>Aira caryophylla</i>                                   | X   | X    |
| <i>Arundo donax</i>                                       | X   | X    |
| <i>Avena barbata</i>                                      | X   | X    |
| <i>Briza minor</i>  | X   | X    |
| <i>Bromus diandrus</i>                                    | X   | X    |
| <i>Bromus hordeaceus</i>                                  | X   | X    |
| <i>Bromus madritensis</i> ssp. <i>rubens</i>              | X   |      |
| <i>Bromus tectorum</i>                                    | X   |      |
| <i>Cynodon dactylon</i>                                   |     | X    |
| <i>Cynosurus echinatus</i>                                | X   | X    |
| <i>Dactylis glomerata</i>                                 | X   | X    |
| <i>Festuca arundinacea</i>                                | X   | X    |
| <i>Festuca pratensis</i>                                  | X   | X    |
| <i>Glyceria declinata</i>                                 | X   | X    |
| <i>Holcus lanatus</i>                                     | X   | X    |

| <b>Vascular Plant Observed</b>                 | <b>CCU</b> | <b>BFW1</b> |
|--|------------|-------------|
| <i>Hordeum marinum</i> ssp. <i>gussoneanum</i> | X          | X           |
| <i>Hordeum murinum</i> ssp. <i>leporinum</i>   | X          | X           |
| <i>Lolium multiflorum</i>                      | X          | X           |
| <i>Lolium perenne</i>                          | X          | X           |
| <i>Paspalum dilatatum</i>                      |            | X           |
| <i>Poa annua</i>                               |            | X           |
| <i>Poa bulbosa</i>                             | X          |             |
| (?) <i>Poa pratensis</i>                       | X          | X           |
| <i>Polypogon monspeliensis</i>                 |            | X           |
| <i>Secale cereale</i>                          | X          |             |
| <i>Sorghum</i> sp.                             | X          |             |
| <i>Taeniatherum caput-medusae</i>              | X          | X           |
| <i>Vulpia bromoides</i>                        | X          | X           |
| <i>Vulpia myuros</i> var. <i>myuros</i>        | X          | X           |

## Appendix D-2: Additional Resources

(From Montana State University's Center for Invasive Plant Management;  
[http://www.weedcenter.org/management/mgmt\\_overview.html](http://www.weedcenter.org/management/mgmt_overview.html))

### Developing a Weed Management Plan

[Adaptive Weed Management Plan Template](#) from [The Nature Conservancy](#). A three-part tool: (1) An introduction to the philosophy of adaptive management. (2) Weed Management Plan Template, including boiler-plate language to ease the planning process and help prioritize weeds. (3) Excel workbook to keep track of your work and costs.

[Weed Information Management System \(WIMS\)](#) from The Nature Conservancy. WIMS keeps track of weed occurrences (GPS point locations), assessments (size and status of the weed infestation to facilitate monitoring over time), and management treatments applied to those weed infestations.

[Creating an Integrated Weed Management Plan](#)—A Handbook for Owners and Managers of Lands with Natural Values. Volume IV in "Caring for the Land Series, from the [Colorado Natural Areas Program](#). Provides the tools and information necessary for public and private landowners to manage noxious weeds successfully in natural areas, wildlands, and rangelands. Free downloads (pdf file) on the website.

[Invasive Exotic Plant Management Tutorial for Natural Lands Managers](#) A "one-stop-shop" for natural resource managers who are interested in organizing on-the-ground efforts to prevent, manage and control IEPs. From Mid-Atlantic Exotic Pest Plant Council, Inc., and PA Dept. of Conservation and Natural Resources.

[Seven Steps to Managing Your Weeds](#): A Guide to Integrated Management in British Columbia (pdf).

### Prioritizing Weed Threats

The [Criteria System](#) for categorizing invasive non-native plants that threaten wildlands. Page 7 in [Cal-IPC 2006 Invasive Plant Inventory](#) (pdf)

[Evaluating Risk to Native Plant Communities from Selected Exotic Plant Species](#) Developed by the Forest Service to help land managers identify the native plant communities most threatened by invasive plants. Land managers in Montana and Northern Idaho can use this program to prioritize and strategize their weed management efforts.

[Invasive Species Assessment Protocol](#): Evaluating Non-Native Plants for Their Impact on Biodiversity (Morse, et. al., [NatureServe](#), 2004). The protocol is designed to make the process of assessing and listing invasive plants objective, systematic, and transparent and will help set priorities focusing scarce management resources.

[Measuring Plant Diversity: Lessons from the Field](#). Because resident native diversity can affect the likelihood of invasion by non-native plants, it is critical that scientists accurately assess the composition of plant communities over large areas. A newly released book by USGS ecologist Tom Stohlgren, *Measuring Plant Diversity: Lessons from the Field* (Oxford University Press, 2006), presents field and analysis methods that can more accurately describe plant biodiversity and help evaluate vulnerability to invasion.

## Inventory and Survey

[California Weed Mapping Handbook](#). Provides information on (1) shared data standards, so that different data sets will be compatible, and (2) “how to” instructional information on mapping techniques. Its aim is to help those working on weed issues to develop mapping systems that will support project goals on both a local and state level. PDF (2 MB) download on website.

[A field manual for surveying and mapping nationally significant weeds \(pdf\)](#). I McNaught, R Thackway, L Brown & M Parsons; published by Australia's [Bureau of Rural Sciences](#), 2006. A 52-page manual explaining standardized, systematic procedures for collecting core weed infestation data for mapping those plants that are Australia's 20 "weeds of national significance."

[Guidelines for Terrestrial Weed Mapping and Inventory in Idaho](#) (pdf).

[Introduction to Mapping Noxious Weeds in Montana](#). Inventory and Survey Methods for Nonindigenous Plant Species. MSU Extension Publications, Sept. 2006. Practical information for sites of any size, staffing level, or budget. Color photos, maps, and diagrams; 80 p. \$20 includes shipping and handling. For discounts on orders of 25 or more, email [dbrokke@montana.edu](mailto:dbrokke@montana.edu). Order Publication EB 0171 from [MSU Extension Publications](#), P.O. Box 172040, Bozeman, MT 59717-2040. Phone: 406-994-3273; email: [orderpubs@montana.edu](mailto:orderpubs@montana.edu)

[Map Important Weeds for A Living Inventory](#), part of the [War on Weeds](#) series from University of Nevada [Extension Publications](#).

[Mapping Standards from NAWMA](#) (the North American Weed Management Association).

[Montana Noxious Weed Survey and Mapping System](#) — Guidelines for a statewide mapping project.

[Non-native Plants of the Kenai Peninsula: Summary of a 2-year Roadside Inventory](#)  
Example of a [baseline inventory](#), conducted across the Kenai Peninsula by the KP-CWMA.

[Remote sensing of invasive plants](#), on the [TNC Invasive Species Initiative](#) website. An introduction intended to help land managers decide if remote sensing could be a useful tool for them.

[Weed Manager's Guide to Remote Sensing and GIS](#) from the USDA Forest Service.  
[Vegetation Mapping Program](#) from NPS.

[YST Mapping Project](#). Detailed methods, forms, and sample maps used in Cooperative Western Sierra Nevada Yellow Starthistle Mapping & Assessment Project.  
Monitoring

[Invasive Species Monitoring Resources](#) from NPS. Guidelines, protocols, assessment, references, and more.

[Measuring and Monitoring Plant Populations \(5.3 MB pdf\)](#). Elzinga, Salzer, and Willoughby. 2001. BLM Technical Reference 1730-1. 492 pp. Order print copies from [BLM Library](#) or email [BLM\\_NCS\\_PMDS@blm.gov](mailto:BLM_NCS_PMDS@blm.gov). Also available from online and retail booksellers.

[Monitoring: How Can I Monitor without Spending a Lot of Time and Money?](#) From USDA Forest Service [A Weed Manager's Guide to Remote Sensing and GIS](#).

[Monitoring Changes in Exotic Vegetation](#), by Robert D. Sutter, TNC. " An overview of the most important monitoring issues, modified to address the management of exotics."

[Monitoring of Non-Indigenous Plant Species](#), by Bruce Maxwell, in [CIPM's Online Invasive Plant Management Textbook](#).

## Other References

Booth, B. D., S. D. Murphy, and C. J. Swanton. 2003. [Weed ecology in natural and agricultural systems](#). CABI Publishing, Wallingford, Oxfordshire, UK.

Explains ecological principles essential to understanding how weeds function in the environment. Emphasizes why weed management strategies within an integrated weed management approach should be based on ecological knowledge. Requires only an understanding of basic biology. Covers population ecology, community ecology, the importance of weed ecology to weed management.

Luken, J. O., and J. W. Thieret. 1997. Assessment and management of plant invasions. Springer-Verlag, New York.

Attempts to cast the issue of non-indigenous plant invasion in a broader ecological context that includes humans acting as managers of natural resources, designers of regulations, and disperses of organisms. Addresses important ecological interactions that emerge prior to plant invasion, as well as post-management interactions.

McPherson, G. R., and S. DeStefano. 2003. Applied ecology and natural resource management. Cambridge University Press, Cambridge, UK.

Practical guidelines for integrating applied ecology with natural resource management; describes how concepts and approaches used by ecologists to study communities and ecosystems can be applied to management.

National Research Council. 1996. [Ecologically based pest management: New solutions for a new century](#). National Academy Press, Washington, DC.

(Scroll down for table of contents.) Ecologically based pest management (EBPM) is recommended as a profitable, safe, and durable approach to controlling pests in managed ecosystems. (Excerpt from [Executive Summary](#))

Radosevich, S., J. Holt, and C. Ghera. 1997. Weed ecology: Implications for management, 2nd ed. John Wiley & Sons, Inc., New York.

By considering weeds foremost as plants and by relying on the concepts of plant ecology, the authors hope to provide a better understanding of weeds that will lead to better crop and weed management.

Sheley, R. L., T. J. Svejcar, and B. D. Maxwell. 1996. A theoretical framework for developing successional weed management strategies on rangeland. *Weed Technology* 10: 766-773.

Provides the mechanistic framework necessary for developing successional weed management systems that shift plant communities to a desired state.



**Appendix D-3: Non-native invasive plants known to occur at MCCWA rated as moderate or high by the California Invasive Plant Council.**

| Scientific Name                                       | Common Name             | Rating    | Alert | Imp. | Inv. | Dis. | Doc. | Regions   | Comments   |
|---|-------------------------|-----------|-------|------|------|------|------|---|--|
| <a href="#"><i>Ailanthus altissima</i></a>            | tree-of-heaven          | 2Moderate | None  | B    | B    | B    | 3    | CA-FP, GV, CaR, CW, GV, NW, SN, SW, MP, SNE         | Riparian areas, grasslands, oak woodland. Impacts highest in riparian areas.                                 |
| <a href="#"><i>Arundo donax</i></a>                   | giant reed              | 1High     | None  | A    | B    | A    | 2.8  | CW, GV, SN, SW, DMoj, DSon                          | Riparian areas, commercially grown for musical instrument reeds, structural material, etc.                   |
| <a href="#"><i>Avena barbata</i></a>                  | slender wild oat        | 2Moderate | None  | B    | B    | A    | 3.5  | D, MP, DMoj, DSon                                   | Coastal scrub, grasslands, oak woodland, forest. Very widespread, but impacts more severe in desert regions. |
| <a href="#"><i>Brassica nigra</i></a>                 | black mustard           | 2Moderate | None  | B    | B    | A    | 2    |   | Widespread. Primarily a weed of disturbed sites, but can be locally a more significant problem in wildlands. |
| <a href="#"><i>Bromus diandrus</i></a>                | ripgut brome            | 2Moderate | None  | B    | B    | A    | 3.3  | CA, CaR, CW, GV, NW, SN, SW, D, DMoj, DSon, MP, SNE | Dunes, scrub, grassland, woodland, forest. Very widespread, but monotypic stands uncommon.                   |
| <a href="#"><i>Bromus madritensis ssp. rubens</i></a> | red brome               | 1High     | None  | A    | B    | A    | 3    | CA, CaR, CW, GV, NW, SN, SW, D, DMoj, DSon, MP, SNE | Scrub, grassland, desert washes, woodlands   |
| <a href="#"><i>Bromus tectorum</i></a>                | downy brome, cheatgrass | 1High     | None  | A    | B    | A    | 3.0  | D, DMoj, DSon                                       | Interior scrub, woodlands, grasslands  |
| <a href="#"><i>Centaurea solstitialis</i></a>         | yellow starthistle      | 1High     | None  | A    | B    | A    | 3    | CA-FP, CaR, CW, GV, NW, SN, SW                      | Grasslands, woodlands, occasionally riparian   |
| <a href="#"><i>Cirsium vulgare</i></a>                | bull thistle            | 2Moderate | None  | B    | B    | B    | 3.3  | CA-FP, GB, CaR, CW, GV, NW, SN, SW, MP, SNE         | Riparian areas, marshes, meadows. Widespread, can be very problematic regionally.                            |

|  |                           |           |      |   |   |   |     |   |   |
|--|---------------------------|-----------|------|---|---|---|-----|---|---|
| <a href="#"><i>Cynodon dactylon</i></a>                    | bermudagrass              | 2Moderate | None | B | B | B | 3.3 | CA-FP, D, CaR, CW, GV, NW, SN, SW, DMoj, DSon     | Riparian scrub in southern CA. Common landscape weed, but can be very invasive in desert washes.  |
| <a href="#"><i>Cynosurus echinatus</i></a>                 | hedgehog dogtailgrass     | 2Moderate | None | B | B | A | 2.5 | CW, GV, NW, SN, SW                                | Oak woodland, grassland. Widespread, impacts vary regionally, but typically not in monotypic stands.  |
| <a href="#"><i>Dipsacus fullonum</i></a>                   | common teasel             | 2Moderate | None | B | B | B | 3.8 | CW, NW, SN  | Grasslands, seep, riparian scrub. Impacts regionally variable, forms dense stands on occasion.  |
| <a href="#"><i>Festuca arundinacea</i></a>                 | tall fescue               | 2Moderate | None | B | B | A | 2.9 | CA-FP, CaR, CW, GV, NW, SN, SW                    | Coastal scrub, grasslands; common forage grass. Widespread, abiotic impacts unknown.  |
| <a href="#"><i>Ficus carica</i></a>                        | edible fig                | 2Moderate | None | B | A | B | 2.6 | CW, GV, CW  | Riparian woodland. Can spread rapidly. Abiotic impacts unknown. Can be locally very problematic.  |
| <a href="#"><i>Geranium dissectum</i></a>                  | cutleaf geranium          | 2Moderate | None | C | B | A | 1.6 | CA-FP, CaR, CW, GV, NW, SN, SW                    | Numerous habitats but impacts appear minor.   |
| <a href="#"><i>Glyceria declinata</i></a>                  | waxy mannagrass           | 2Moderate | None | B | B | B | 1.9 | GV  | Vernal pools, moist grasslands. Often confused with native <i>Glyceria</i> . Impacts largely unknown, but may be significant in vernal pools. |
| <a href="#"><i>Hedera helix</i>, <i>H. canariensis</i></a> | English ivy, Algerian ivy | 1High     | None | A | A | A | 2.6 |   | Coastal forests, riparian areas. Species combined due to genetics questions.  |
| <a href="#"><i>Holcus lanatus</i></a>                      | common velvet grass       | 2Moderate | None | B | B | A | 2.9 | CA-FP, DMoj, GB, CaR, CW, GV, NW, SN, SW, MP, SNE | Coastal grasslands, wetlands. Impacts can be more severe locally, especially in wetland areas.  |
| <a href="#"><i>Hypochaeris</i></a>                         | rough catsear,            | 2Moderate | None | C | B | A | 2.2 | CA-FP, CaR, CW, GV,                               | Coastal dunes, scrub, and prairie;  |

|   |                                     |           |       |   |   |   |     |                                |            |   |
|---|-------------------------------------|-----------|-------|---|---|---|-----|--------------------------------|------------|---|
| <a href="#"><i>radicata</i></a>                       | hairy dandelion                     |           |       |   |   |   |     |                                | NW, SN, SW | woodland, forest. Widespread. Impacts unknown/minor.  |
| <a href="#"><i>Lepidium latifolium</i></a>            | perennial pepperweed, tall whitetop | 1High     | None  | A | A | A | 3.0 | CA-FP, GB                      |            | Coastal and inland marshes, riparian areas, wetlands, grasslands; potential to invade montane wetlands.                                 |
| <a href="#"><i>Lolium multiflorum</i></a>             | Italian ryegrass                    | 2Moderate | None  | A | B | A | 2.6 | CA-FP, CaR, CW, GV, NW, SN, SW |            | Grasslands, oak woodland, pinyon-juniper woodland; widely used for post-fire erosion control. Widespread. Impacts can vary with region. |
| <a href="#"><i>Ludwigia hexapetala</i></a>            | Uruguay water-primrose              | 1High     | Alert | A | B | C | 2.6 | CW, NW, SW                     |            | Freshwater aquatic systems. Clarification needed on taxonomic identification.   |
| <a href="#"><i>Ludwigia peploides</i></a>             | creeping water-primrose             | 1High     | None  | A | B | B | 2.4 | CW, GV, NW, SN, SW, DMoj       |            | Freshwater aquatic systems. Clarification needed on taxonomic identification.   |
| <a href="#"><i>Lythrum hyssopifolium</i></a>          | hyssop loosestrife                  | 2Moderate | None  | C | B | A | 3   | CA-FP, CaR, CW, GV, NW, SN, SW |            | Grasslands, wetlands, vernal pools. Widespread. Impacts unknown, but appear to be minor.  |
| <a href="#"><i>Mentha pulegium</i></a>                | pennyroyal                          | 2Moderate | None  | C | A | A | 2.6 | CW, GV, NW, SW                 |            | Vernal pools, wetlands. Poisonous to livestock. Spreading rapidly. Impacts largely unknown.   |
| <a href="#"><i>Myriophyllum aquaticum</i></a>         | parrotfeather                       | 1High     | Alert | A | B | C | 2.7 | CaR, CW, NW, SW                |            | Freshwater aquatic systems  |
| <a href="#"><i>Nicotiana glauca</i></a>               | tree tobacco                        | 2Moderate | None  | B | B | B | 2.5 | GV, NW, SN, SW, D, DMoj, DSon  |            | Coastal scrub, grasslands, riparian woodland. Abiotic impacts unknown. Impacts vary locally. Rarely in dense stands.                    |
| <a href="#"><i>Rubus armeniacus</i></a><br>(discolor) | Himalaya blackberry                 | 1High     | None  | A | A | A | 3   | CA-FP, CaR, CW, GV, NW, SN, SW |            | Riparian areas, marshes, oak woodlands  |

|   |                          |           |      |   |   |   |     |   |   |
|---|--------------------------|-----------|------|---|---|---|-----|---|---|
| <a href="#"><i>Rumex acetosella</i></a>           | red sorrel, sheep sorrel | 2Moderate | None | B | B | A | 2.3 | CA-FP, CaR, CW, GV, NW, SN, SW                | Many habitats, riparian areas, forest, wetlands. Widespread. Abiotic impacts unknown. Impacts can vary locally. |
| <a href="#"><i>Taeniatherum caput-medusae</i></a> | medusahead               | 1High     | None | A | A | A | 3.3 | CaR, GV, NW, SN, SW                           | Grasslands, scrub, woodland   |
| <a href="#"><i>Torilis arvensis</i></a>           | hedgearsley              | 2Moderate | None | C | B | B | 2.3 |   | Expanding range. Appear to have only moderate ecological impacts.   |
| <a href="#"><i>Trifolium hirtum</i></a>           | rose clover              | 2Moderate | None | C | B | B | 2.7 | CA-FP, CaR, CW, GV, NW, SN, SW                | Grasslands, oak woodland. Widely planted in CA. Impacts relatively minor in most areas.                         |
| <a href="#"><i>Vulpia myuros</i></a>              | rattail fescue           | 2Moderate | None | B | B | A | 3   | CA-FP, D, CaR, CW, GV, NW, SN, SW, DMoj, DSon | Coastal sage scrub, chaparral. Widespread. Rarely forms monotypic stands, but locally problematic               |

### Cal-IPC Inventory Categories

(Note the previous table includes only plants listed as High or Moderate; see <http://www.cal-ipc.org/ip/inventory/> for species with Limited or Evaluated but Not Listed status)

Plants receive an overall rating of High, Moderate or Limited based on evaluation using the criteria system. The meaning of these overall ratings is described below. In addition to the overall ratings, specific combinations of section scores that indicate significant potential for invading new ecosystems triggers an **Alert** designation so that land managers may watch for range expansions. Some plants were categorized as Evaluated but Not Listed because either we lack sufficient information to assign a rating or the available information indicates that the species does not have significant impacts at the present time.

**High** – These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically.

**Moderate** – These species have substantial and apparent—but generally not severe—ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high

rates of dispersal, though establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.

### Geographic Region Codes:

Regions invaded based on Jepson geographic regions. Click on the region code to search for weeds by region.

|         |                               |        |                 |      |              |       |                      |
|---------|-------------------------------|--------|-----------------|------|--------------|-------|----------------------|
| <CA-FP> | California Floristic Province | <D>    | Desert Province | <GV> | Great Valley | <GB>  | Great Basin Province |
| <CaR>   | Cascade Range                 | <DMoj> | Mojave Desert   | <NW> | Northwest    | <MP>  | Modoc Plateau        |
| <CW>    | Central West                  | <DSon> | Sonoran Desert  | <SW> | Southwest    | <SNE> | Sierra Nevada East   |
| <SN>    | Sierra Nevada                 |        |                 |      |              |       |                      |

### Column heading abbreviations:

Imp. = Impact  
 Inv. = Invasiveness  
 Dis = Distribution  
 Doc. = Documentation Level  
 (documentation level averaged)

### Scores:

A = Severe  
 B = Moderate  
 C = Limited  
 D = None  
 U = Unknown

### Nomenclature:

Scientific names are based on The Jepson Manual. For each species, the first common name is based on the Weed Science Society of America's "Composite List of Weeds", followed by other names used in California.

### Citation:

Cal-IPC. 2006. California Invasive Plant Inventory. Cal-IPC Publication 2006-02. California Invasive Plant Council: Berkeley, CA. Available: [www.cal-ipc.org](http://www.cal-ipc.org).

#### **Appendix D-4: Emergency Information**

##### **CDFG to provide additional information**

The nearest hospitals and medical clinics are located in Red Bluff and Redding, California:

St Elizabeth Community Hospital 2550 Sister Mary Columbia Dr, Red Bluff, CA  
(530) 529-8000 (About 15 miles south of Cottonwood)

MERCY MEDICAL CENTER 2175 Rosaline Ave, Redding, 96001 - (530) 225-  
6000 (about 16 miles north of Cottonwood)

**Provide directions and maps to closest hospitals and clinics. Be sure emergency phone numbers and directions are kept current.**



**Appendix D-3: Non-native invasive plants known to occur at MCCWA rated as moderate or high by the California Invasive Plant Council.**

| Scientific Name                                       | Common Name             | Rating    | Alert | Imp. | Inv. | Dis. | Doc. | Regions   | Comments   |
|---|-------------------------|-----------|-------|------|------|------|------|---|--|
| <a href="#"><i>Ailanthus altissima</i></a>            | tree-of-heaven          | 2Moderate | None  | B    | B    | B    | 3    | CA-FP, GV, CaR, CW, GV, NW, SN, SW, MP, SNE         | Riparian areas, grasslands, oak woodland. Impacts highest in riparian areas.                                 |
| <a href="#"><i>Arundo donax</i></a>                   | giant reed              | 1High     | None  | A    | B    | A    | 2.8  | CW, GV, SN, SW, DMoj, DSon                          | Riparian areas, commercially grown for musical instrument reeds, structural material, etc.                   |
| <a href="#"><i>Avena barbata</i></a>                  | slender wild oat        | 2Moderate | None  | B    | B    | A    | 3.5  | D, MP, DMoj, DSon                                   | Coastal scrub, grasslands, oak woodland, forest. Very widespread, but impacts more severe in desert regions. |
| <a href="#"><i>Brassica nigra</i></a>                 | black mustard           | 2Moderate | None  | B    | B    | A    | 2    |   | Widespread. Primarily a weed of disturbed sites, but can be locally a more significant problem in wildlands. |
| <a href="#"><i>Bromus diandrus</i></a>                | ripgut brome            | 2Moderate | None  | B    | B    | A    | 3.3  | CA, CaR, CW, GV, NW, SN, SW, D, DMoj, DSon, MP, SNE | Dunes, scrub, grassland, woodland, forest. Very widespread, but monotypic stands uncommon.                   |
| <a href="#"><i>Bromus madritensis ssp. rubens</i></a> | red brome               | 1High     | None  | A    | B    | A    | 3    | CA, CaR, CW, GV, NW, SN, SW, D, DMoj, DSon, MP, SNE | Scrub, grassland, desert washes, woodlands   |
| <a href="#"><i>Bromus tectorum</i></a>                | downy brome, cheatgrass | 1High     | None  | A    | B    | A    | 3.0  | D, DMoj, DSon                                       | Interior scrub, woodlands, grasslands  |
| <a href="#"><i>Centaurea solstitialis</i></a>         | yellow starthistle      | 1High     | None  | A    | B    | A    | 3    | CA-FP, CaR, CW, GV, NW, SN, SW                      | Grasslands, woodlands, occasionally riparian   |
| <a href="#"><i>Cirsium vulgare</i></a>                | bull thistle            | 2Moderate | None  | B    | B    | B    | 3.3  | CA-FP, GB, CaR, CW, GV, NW, SN, SW, MP, SNE         | Riparian areas, marshes, meadows. Widespread, can be very problematic regionally.                            |
| <a href="#"><i>Cynodon dactylon</i></a>               | bermudagrass            | 2Moderate | None  | B    | B    | B    | 3.3  | CA-FP, D, CaR, CW, GV,                              | Riparian scrub in southern CA.   |

APPENDIX D: MCCWA WEED MANAGEMENT PLAN

|  |                                |           |      |   |   |   |     |   |   |
|--|--------------------------------|-----------|------|---|---|---|-----|---|---|
|  |                                |           |      |   |   |   |     | NW, SN, SW, DMoj, DSon                            | Common landscape weed, but can be very invasive in desert washes.   |
| <a href="#"><i>Cynosurus echinatus</i></a>                 | hedgehog dogtailgrass          | 2Moderate | None | B | B | A | 2.5 | CW, GV, NW, SN, SW                                | Oak woodland, grassland. Widespread, impacts vary regionally, but typically not in monotypic stands.  |
| <a href="#"><i>Dipsacus fullonum</i></a>                   | common teasel                  | 2Moderate | None | B | B | B | 3.8 | CW, NW, SN  | Grasslands, seep, riparian scrub. Impacts regionally variable, forms dense stands on occasion.  |
| <a href="#"><i>Festuca arundinacea</i></a>                 | tall fescue                    | 2Moderate | None | B | B | A | 2.9 | CA-FP, CaR, CW, GV, NW, SN, SW                    | Coastal scrub, grasslands; common forage grass. Widespread, abiotic impacts unknown.  |
| <a href="#"><i>Ficus carica</i></a>                        | edible fig                     | 2Moderate | None | B | A | B | 2.6 | CW, GV, CW  | Riparian woodland. Can spread rapidly. Abiotic impacts unknown. Can be locally very problematic.  |
| <a href="#"><i>Geranium dissectum</i></a>                  | cutleaf geranium               | 2Moderate | None | C | B | A | 1.6 | CA-FP, CaR, CW, GV, NW, SN, SW                    | Numerous habitats but impacts appear minor.   |
| <a href="#"><i>Glyceria declinata</i></a>                  | waxy mannagrass                | 2Moderate | None | B | B | B | 1.9 | GV  | Vernal pools, moist grasslands. Often confused with native <i>Glyceria</i> . Impacts largely unknown, but may be significant in vernal pools. |
| <a href="#"><i>Hedera helix</i>, <i>H. canariensis</i></a> | English ivy, Algerian ivy      | 1High     | None | A | A | A | 2.6 |   | Coastal forests, riparian areas. Species combined due to genetics questions.  |
| <a href="#"><i>Holcus lanatus</i></a>                      | common velvet grass            | 2Moderate | None | B | B | A | 2.9 | CA-FP, DMoj, GB, CaR, CW, GV, NW, SN, SW, MP, SNE | Coastal grasslands, wetlands. Impacts can be more severe locally, especially in wetland areas.  |
| <a href="#"><i>Hypochaeris radicata</i></a>                | rough catsear, hairy dandelion | 2Moderate | None | C | B | A | 2.2 | CA-FP, CaR, CW, GV, NW, SN, SW                    | Coastal dunes, scrub, and prairie; woodland, forest. Widespread. Impacts unknown/minor.   |
| <a href="#"><i>Lepidium</i></a>                            | perennial                      | 1High     | None | A | A | A | 3.0 | CA-FP, GB   | Coastal and inland marshes,   |

APPENDIX D: MCCWA WEED MANAGEMENT PLAN

|  |                           |           |       |   |   |   |     |                                |  |   |
|--|---------------------------|-----------|-------|---|---|---|-----|--------------------------------|--|---|
| <a href="#"><i>latifolium</i></a>                  | pepperweed, tall whitetop |           |       |   |   |   |     |                                |  | riparian areas, wetlands, grasslands; potential to invade montane wetlands.   |
| <a href="#"><i>Lolium multiflorum</i></a>          | Italian ryegrass          | 2Moderate | None  | A | B | A | 2.6 | CA-FP, CaR, CW, GV, NW, SN, SW |  | Grasslands, oak woodland, pinyon-juniper woodland; widely used for post-fire erosion control. Widespread. Impacts can vary with region. |
| <a href="#"><i>Ludwigia hexapetala</i></a>         | Uruguay water-primrose    | 1High     | Alert | A | B | C | 2.6 | CW, NW, SW                     |  | Freshwater aquatic systems. Clarification needed on taxonomic identification.   |
| <a href="#"><i>Ludwigia peploides</i></a>          | creeping water-primrose   | 1High     | None  | A | B | B | 2.4 | CW, GV, NW, SN, SW, DMoj       |  | Freshwater aquatic systems. Clarification needed on taxonomic identification.   |
| <a href="#"><i>Lythrum hyssopifolium</i></a>       | hyssop loosestrife        | 2Moderate | None  | C | B | A | 3   | CA-FP, CaR, CW, GV, NW, SN, SW |  | Grasslands, wetlands, vernal pools. Widespread. Impacts unknown, but appear to be minor.  |
| <a href="#"><i>Mentha pulegium</i></a>             | pennyroyal                | 2Moderate | None  | C | A | A | 2.6 | CW, GV, NW, SW                 |  | Vernal pools, wetlands. Poisonous to livestock. Spreading rapidly. Impacts largely unknown.   |
| <a href="#"><i>Myriophyllum aquaticum</i></a>      | parrotfeather             | 1High     | Alert | A | B | C | 2.7 | CaR, CW, NW, SW                |  | Freshwater aquatic systems  |
| <a href="#"><i>Nicotiana glauca</i></a>            | tree tobacco              | 2Moderate | None  | B | B | B | 2.5 | GV, NW, SN, SW, D, DMoj, DSon  |  | Coastal scrub, grasslands, riparian woodland. Abiotic impacts unknown. Impacts vary locally. Rarely in dense stands.                    |
| <a href="#"><i>Rubus armeniacus</i> (discolor)</a> | Himalaya blackberry       | 1High     | None  | A | A | A | 3   | CA-FP, CaR, CW, GV, NW, SN, SW |  | Riparian areas, marshes, oak woodlands  |
| <a href="#"><i>Rumex acetosella</i></a>            | red sorrel, sheep sorrel  | 2Moderate | None  | B | B | A | 2.3 | CA-FP, CaR, CW, GV, NW, SN, SW |  | Many habitats, riparian areas, forest, wetlands. Widespread. Abiotic impacts unknown. Impacts can vary locally.                         |
| <a href="#"><i>Taeniatherum caput-medusae</i></a>  | medusahead                | 1High     | None  | A | A | A | 3.3 | CaR, GV, NW, SN, SW            |  | Grasslands, scrub, woodland   |

|   |                |           |      |   |   |   |     |   |   |
|---|----------------|-----------|------|---|---|---|-----|---|---|
| <a href="#"><i>Torilis arvensis</i></a> | hedgearsley    | 2Moderate | None | C | B | B | 2.3 |   | Expanding range. Appear to have only moderate ecological impacts.                                 |
| <a href="#"><i>Trifolium hirtum</i></a> | rose clover    | 2Moderate | None | C | B | B | 2.7 | CA-FP, CaR, CW, GV, NW, SN, SW                | Grasslands, oak woodland. Widely planted in CA. Impacts relatively minor in most areas.           |
| <a href="#"><i>Vulpia myuros</i></a>    | rattail fescue | 2Moderate | None | B | B | A | 3   | CA-FP, D, CaR, CW, GV, NW, SN, SW, DMoj, DSon | Coastal sage scrub, chaparral. Widespread. Rarely forms monotypic stands, but locally problematic |

### Cal-IPC Inventory Categories

(Note the previous table includes only plants listed as High or Moderate; see <http://www.cal-ipc.org/ip/inventory/> for species with Limited or Evaluated but Not Listed status)

Plants receive an overall rating of High, Moderate or Limited based on evaluation using the criteria system. The meaning of these overall ratings is described below. In addition to the overall ratings, specific combinations of section scores that indicate significant potential for invading new ecosystems triggers an **Alert** designation so that land managers may watch for range expansions. Some plants were categorized as Evaluated but Not Listed because either we lack sufficient information to assign a rating or the available information indicates that the species does not have significant impacts at the present time.

**High** – These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically.

**Moderate** – These species have substantial and apparent—but generally not severe—ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.

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| <CW>    | Central West                  | <DSon> | Sonoran Desert  | <SW> | Southwest    | <SNE> | Sierra Nevada East   |
| <SN>    | Sierra Nevada                 |        |                 |      |              |       |                      |

#### Column heading abbreviations:

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 Inv. = Invasiveness  
 Dis = Distribution  
 Doc. = Documentation Level  
 (documentation level averaged)

#### Scores:

A = Severe  
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#### Nomenclature:

Scientific names are based on The Jepson Manual. For each species, the first common name is based on the Weed Science Society of America's "Composite List of Weeds", followed by other names used in California.

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## **APPENDIX E**

# Grazing Management Tools

Grazing Management Guidelines for the MCCWA  
(including best management practices and additional resources)

Balls Ferry Wetlands Unit 2 Management Plan  
(Western Shasta Resource Conservation District, January 2009)





## Grazing Management Guidelines for the MCCWA

*Range management is not a static, one-size-fits-all process. To be effective, it is site specific and includes annual planning, monitoring, evaluation, and modification. The Grazing Management Guidelines for the Mouth of Cottonwood Creek Wildlife Area are intended to be used in conjunction with the MCCWA Land Management Plan to provide the wildlife area managers with the tools needed to develop an adaptive range management and monitoring plan. Additional planning will be required to fully develop and implement a grazing management plan for the wildlife area; specifically, a state licensed Certified Rangeland Manager will be required to assist with preparation of the plan.*

### Background

The Land Management Plan (LMP) for the Mouth of Cottonwood Creek Wildlife Area (MCCWA) provides the context for development of a prescriptive grazing management plan for the wildlife area. It describes the management goals for the wildlife area, the geographical and cultural setting, the plant communities and species present or likely to occur, and special management considerations. An ecosystem- based adaptive management plan, the MCCWA LMP includes implementation of a monitoring program to assess whether the various management goals are being met and provisions to modify management strategies over time to changing site conditions. Livestock grazing is an historic use of the wildlife area and CDFG is interested in continuing this practice as long as it is compatible with the mission, purpose and biological goals of the wildlife area (J. Chakarun, CDFG area manager, personal communication). Issues of particular concern include:

- Preservation of wintering waterfowl habitat
- Protection of sensitive wetland resources
- Control of invasive non-native plant species
- Protection for special-status wildlife
- Riparian habitat protection and restoration

### Current Grazing Operations/Lease Agreements

The Cottonwood Creek Unit is designated primarily for wildlife management and has no active grazing lease. On both the Balls Ferry Wetland Units, livestock grazing is an historical use, and is considered a management strategy to control invasive non-native plants, reduce and manage fuel loads, and provide added management income.

The most recent grazing lease for BFW1 encompassed 240 acres, including 14 acres of irrigated pasture and 18 acres of wetlands. The terms of the lease allowed year-round use, with a maximum of 40 animal units per month (AUM). The grazing lease included maintenance and repair of all fences, cattle guards, gates and other improvements upon the leased lands. Additionally, the grazing lease included repair and maintenance of water delivery equipment and payments for the water delivery from ACID for biweekly flood irrigation. Grazing leases for BFW1 were

previously renewed on an annual basis (CDFG internal files). Any future leases at BFW1 will likely be administered by the Western Shasta Resource Conservation District (WSRCD).

The recent lessee at BFW1 operated a cow-calf operation for three consecutive years. Cattle were rotated from annual grassland pastures from April thru July depending on the grass availability. Cows were scheduled to calf from mid-June through July when grass sources were high. During peak growing season, the lessee ran the maximum allotted 40 AUMs. Although the lease allowed up to 40 AUM, this number was adjusted according to the grass availability. During the late summer and fall months when grasses became depleted, some cattle were moved off site to reduce pasture stress. The remaining cattle were then moved to the irrigated pasture for grazing (D. Stroing, grazing lessee, personal communication).

BFW2 grazing lease is managed by the WSRCD on the behalf of CDFG, in accordance with the Balls Ferry Wetlands Unit 2 Grazing Management Plan (WSRCD 2009) (in *this* appendix). BFW2 includes approximately 106 acres of irrigated pasture and hay fields. The lease agreement includes grazing rights, harvesting hay, irrigation and maintenance of the facilities (all costs borne by lessee). It is the prerogative of the lessee to determine the amount of grazing and/or haying operations that occur in any given season. The WSRCD and the University of California Cooperative Extension (UCCE) Program periodically monitor the site to ensure that plant vigor is maintained and that a vegetation stubble height of 3-4 inch is available by November 1 for migrating waterfowl. The lease terms are five years, with an annual renewal clause. The lessee is additionally responsible for preparing an annual management plan that can be adjusted during the season based on monitoring data and/or site visits, and to manage the site in accordance with good husbandry and ranching practices (WSRCD Lease Agreement #CO-219, on file with CDFG).

## Grazing as a Vegetation Management Tool

Grazing can be a practical, readily available, cost-effective and easily regulated resource management tool used to accomplish diverse vegetation management objectives (Table E-1). Livestock grazing can assist land managers with the maintenance of key habitat components, fire suppression and restoration of native grasslands. Grazing animals reduce thatch and litter buildup in grassland and oak savanna habitats, promoting native herbaceous plant growth. Livestock grazing can be used to reduce competition from more aggressive, non-native annual plants and to enhance opportunities for native grass restoration. Conversely, grazing animals defoliate, trample, and deposit manure and urine, which can have a positive or negative ecological impact depending on how they are managed.

**Table E-1. Grazing Strategies Used to Accomplish Habitat Management Objectives**

| HABITAT MANAGEMENT OBJECTIVE  | EXAMPLE OF GRAZING STRATEGY   |
|---|---|
| <ul style="list-style-type: none"> <li>Actively manage invasive and noxious plant populations</li> </ul>    | <ul style="list-style-type: none"> <li>Prescribe heavy grazing during early growth stages for these species</li> </ul>                      |
| <ul style="list-style-type: none"> <li>Increase diversity of native plant populations</li> </ul>            | <ul style="list-style-type: none"> <li>Graze perennials and native plants during the end of growing season and/or fall dormancy.</li> </ul> |
| <ul style="list-style-type: none"> <li>Preserve and protect breeding habitat for aquatic species</li> </ul> | <ul style="list-style-type: none"> <li>Use exclosures to prevent livestock from accessing or limiting access to water sources.</li> </ul>   |

## Integration of Vegetation Management Goals and Grazing Activities

Habitat management strategies that use grazing animals must be monitored and adjusted to accommodate variation among site types co-occurring within a pasture. Phenological differences among different pasture of the same type may change over the course of a season or year. Interannual variation will similarly dictate changes in timing, period of stay, etc. for each pasture each year.

Grazing regimes of different intensity and timing impact plant species uniquely based on their life history characteristics. For this reason, it is important to integrate the weed management plan with any grazing efforts. Early blooming plants may benefit from later-season grazing, while later blooming may reproduce well with the opposite treatment. Taller plants may better succeed under grazing regimes of short duration, while shorter plants may easily endure regimes of longer duration. For non-native grassland with poor forage quality, using abnormally high numbers of livestock per acre for short periods of time (called "animal impact") may act as a restorative disturbance to discourage such exotics. Management prescriptions that encourage a spectrum of grazing disturbance may facilitate conservation of more native species across the landscape (Hayes and Holl 2003).

## Developing a Grazing Management Plan for the MCCWA

California Senate Bill 1094 (1994) requires that a Certified Rangeland Manager (CRM) provide rangeland consulting services on non-federal "forested landscapes" throughout the state. While there is ongoing discussion as to what is meant by forested lands (Bagley 2008, Huff 2008), the currently accepted interpretation is that land that supports at least 10% native tree cover (or that has the potential) constitutes a forested landscape.

The California-Pacific Section of the Society for Range Management oversees CRM testing and certification. CRM licenses are issued by the California Board of Forestry and Fire Protection. Covered range management activities include making management recommendations, developing

conservation plans and management plans, and other activities associated with professional rangeland management when made by professionals working in the private sector, universities, state agencies, and federal agencies when working on non-federal land (California Code of Regulations [CCR], Title 14, Section 1651).

Since MCCWA is on state-owned land and meets the definition of a forested landscape, we recommend that a California licensed CRM take the lead on preparation of a fully integrated range management plan. The recommendations presented here provide the basic information needed to start a range plan that can be integrated with the goals and monitoring strategies of the LMP.

A stand alone grazing management plan for the MCCWA should be based upon the goals and adaptive management objectives of the LMP and include a description of existing grazing practices, discussion of the major resource issues and concerns, and management priorities for the units. All available resource mapping, inventory data, and monitoring information should be used in the development of the plan. Specific measures necessary to solve related problems, minimize conflicts with other uses, and achieve desired management goals and objectives should be identified for implementation.

Completion of a range management plan for the MCCWA requires additional site-specific ecological information that is currently lacking, including focused surveys for special-status species, mapping the locations of protected cultural resources, mapping above and below-ground hydrology, existing infrastructure, erosion hazards and sites, and management problem areas in relation to the planned grazing. Additional information is needed concerning the current livestock operations, especially the number of livestock on each pasture and the frequency that they are moved. The pastures need to be accurately mapped and quantified, and water sources need to be identified.

### *Monitoring and Adapting the Plan*

Range condition should be monitored continually, but objectives and trends should be formally evaluated at least every three years. Despite the inherent limitations of using Residual Dry Matter (RDM) criteria developed for annual grasslands to monitor perennial rangelands (Bartolome et al. 2002), it is recommended, lacking a currently accepted alternative, that annual monitoring of both RDM and established permanent photo points on representative sites be used to evaluate site changes and provide the basis for adaptation of management strategies over time. WSRCDC has installed monitoring points on the BFW2. The Grazing Management Plan must be consistent with the goals and objectives of the MCCWA LMP and should be updated every five years.

Land managers should incorporate best management practices (BMPs), including exclusionary fencing to protect water resources, keeping salt and mineral licks away from wetlands, and defining pasture rotations seasonally. The Bureau of Land Management BMPs, adapted to address considerations at the Mouth of Cottonwood Creek Wildlife Area (MCCWA), are provided below for reference purposes.

## Best Management Practices for Rangeland Health

*Adapted from the Rangeland Health Standards and Guidelines for California and Northwestern Nevada (BLM 1998)*

### PLANNING AND PROCESS

1. Develop and adopt appropriate rangeland management systems and/or prescriptions for each grazing allotment. The factors to be considered in developing appropriate rangeland management systems and/or prescriptions shall include, but are not limited to, the following:

- The kind and class of livestock to be grazed;
- The intensity (stocking level), frequency, season, and duration of grazing;
- Pasture rotation and rest;
- Distribution of grazing pressure away from water bodies, riparian areas, wetlands and other sensitive areas (e.g. by fencing, herding, placement of feed supplements and alternative watering sites, rotation of concentrated use areas);
- Mulch management (residual dry matter (RDM) and/or stubble height) thresholds and/or utilization limits for specific forage species, desirable plants, or types of plant communities;
- Location, design, construction, and maintenance of range improvement structures (e.g., watering, holding, and loading facilities, fences, trails, and roads) to avoid or minimize disruption of water body, riparian and wetland functions and discharges of animal wastes and sediment into water bodies;
- Land treatments to manage vegetation and/or control invasive or noxious species (e.g., prescribed fire, mechanical methods, seeding, planting, pesticides, biological controls);
- Coordination with other land uses and management directives (e.g., recreation, hunting, education, habitat management) to avoid cumulative watershed effects; and
- Rangeland monitoring programs to determine implementation and effectiveness of standards, guidelines, and BMPs.

2. Where needed, more restrictive management practices should be established for water bodies, riparian areas, and wetlands. They should also be established in other special situations such as the following:

- Grazing at the end of the growing season and/or after fall dormancy;
- Presence of critical fisheries and/or special status species;
- Unstable stream bank or channel conditions or unhealthy riparian areas (those not fully meeting standards, or those "functioning at risk"); and
- Water bodies that have been listed as having threatened or impaired beneficial uses or provide habitat for threatened or endangered species.



3. To protect annual grassland soils from erosion, specified end-of-season mulch management thresholds shall be developed and adopted.
4. To protect designated ephemeral (annual and perennial) rangeland, reliable estimates of production should be made, and the level of annual growth, RDM, or desirable plant utilization on site at the end of the grazing season shall be specified and adopted.
5. To protect native perennial rangelands, mulch management and plant utilization thresholds specific to the perennial species shall be developed and adopted.

### **PRESCRIPTIVE BMPS**

1. Continuous, season-long livestock grazing shall be allowed only when it has been demonstrated to be consistent with achieving healthy, properly functioning ecosystems and the integrity and beneficial uses of waters.
2. Development of water sources (including springs and seeps) or other projects affecting water and associated resources shall promote and maintain rangeland health, economic and hydrologic function and processes of watercourses and riparian/wetland areas, and where practicable, year long use by wildlife.
3. Salt blocks, other supplemental feed, and alternate shade and water sources shall be located well away from water bodies and riparian/wetland areas.
4. New livestock management facilities (e.g. (holding corrals for short term use, watering facilities, trails, and roads) shall be located well away from water bodies and riparian/wetland areas and designed to minimize discharges of sediment and animal wastes to water bodies and groundwater.
5. If existing livestock management facilities that are located close to a water body or inside a riparian/wetland area threaten the integrity and beneficial uses of water, the threat shall be eliminated by modification to the design and use of the facility, by eliminating it, or by relocating it as a new facility.
6. Range improvement structures shall be constructed and maintained to function effectively in maintaining, protecting, and/or restoring the integrity and beneficial uses of water.
7. Land treatments to manage vegetation and/or control noxious and invasive plants shall be designed and implemented to avoid or minimize disruption of water body, riparian or wetland functions and/or discharges of sediments, ash, excessive nutrients, or pesticides into water bodies.
8. Livestock trailing, bedding, watering, loading, and other handling efforts, as well as use of roads and other facilities, shall be limited to those areas and times that will not retard or prevent attainment of the integrity and/or beneficial uses of water. Trailing in vernal pools and wetlands shall be avoided whenever possible. Stream bottoms and banks need to be stabilized at frequently used livestock stream crossing locations and watering access locations to streams.
9. Any new permanent and long-term containment facilities for livestock (facilities used for other than temporally holding animals more than a few days) such as corrals, holding pens, feed lots, barns or sheds will adhere to the following guidelines:

(a) The siting and construction of the facilities should be carefully chosen based on the following guidelines and be located, designed, and constructed under the direction of qualified professionals.

- i. Facilities should not be located near a stream or water body.
- ii. Facilities should not be located in areas subject to overland surface flow or flooding from upslope areas.
- iii. Facilities should be located on gently sloping to flat land (5% slope or less).
- iv. Facilities should not be located in areas that have less than four feet from the soil surface to ground water table at any time of the year or areas having a high leaching potential.

(b) Surface runoff and related discharges from livestock containment facilities should be limited by:

- i. Storing both the facility waste water and the runoff from confined animal facilities that is caused by storms up to and including a 25-year, 24 hour frequency storm. Storage structures should have a compacted clay seal or plastic membrane, be constructed with concrete, or be a storage tank. The stored runoff and accumulated solids from the facility need to be managed through an appropriate waste utilization system.
- ii. Surface runoff from these facilities or animal waste stockpile should not be allowed to flow into or near a stream or waterbody.
- iii. Stockpiling of animal waste should be thoroughly investigated for the potential to degrade the soil profile and ground water resources. Any runoff or drainage from animal waste stockpiles or the facility area should be routed to the runoff storage system.
- iv. Manure storage or animal waste piles should be protected from precipitation and surface runoff.
- v. Anaerobic ponds can be used to reduce odors and solids, improve water quality and generate methane gas.
- vi. If the facility is serviced by vehicle, the site should have loading-unloading areas that are not near streams or water bodies.

(c) Inspections should be conducted regularly. A comprehensive inspection and maintenance program should be developed based upon the specifics of the site, particularly after precipitation of storm events, and repair made as required.

10. Approved livestock parasite control practices will be encouraged that reduce the probability of parasites and pathogens contaminating the water.

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# **Mouth of Cottonwood Creek Wildlife Area**

## **Balls Ferry Wetlands Unit 2**

### **Management Plan**



Prepared by the Western Shasta Resource Conservation District  
For the  
California Department of Fish and Game  
January 2009



# **Mouth of Cottonwood Creek Wildlife Area**

## **Balls Ferry Wetlands Unit 2**

### **Management Plan**

#### **A. Background:**

The 141-acre Balls Ferry Wetland Unit 2 (BFW2) is located on Balls Ferry Road and Webb Road southeast of Anderson, Ca. in an area used for hay production and livestock grazing. It includes approximately 130 acres of irrigated pasture and hay fields and 11 acres of riparian area. The surrounding area also includes significant wetlands used for waterfowl staging areas in the spring and fall during migration season.

This property was a dairy operation for several decades and was grazed by dairy cattle on a rotational basis utilizing electric fences. The property was sold to the California Department of Fish & Game (DFG) in August 2008. Since that time, it has been leased for cattle grazing and hay production on an annual basis. The current lease ended December 31, 2008.

#### **B. Objective:**

The objective of this management plan is to maintain the BFW2 in its existing condition providing quality shortgrass habitat.

Cattle grazing or haying will need to be continued to provide the valuable shortgrass pasture habitat currently used by Canada geese, shorebirds, and raptors. If grazing and/or haying were discontinued, the existing pastures would soon become decadent; reducing the wildlife habitat, allowing the encroachment of invasive weed species, and increasing the fire hazard. With very limited personnel and operating funds, the use of a grazing and/or haying program is the best management practice to accomplish wildlife habitat management goals.

The DFG has contracted with the Western Shasta Resource Conservation District (RCD) to prepare this management plan, administer the grazing contract, and oversee certain aspects of the land's management so as to provide winter geese habitat.

#### **C. Current Situation:**

Currently, 48 acres are hayed twice annually on the south side of the Balls Ferry Road and grazing occurs from April through October on the north side of the Balls Ferry Road. Both activities result in short grass and open areas, which are ideal for geese winter foraging habitat.



Anderson-Cottonwood Irrigation District (ACID) water is generally adequate throughout the project area. Lessee is responsible to pay ACID for water directly and to provide labor to irrigate as well. The lessee is responsible for maintenance of water delivery system including pipelines, valves, ditches and field checks.

#### **D. Resource Description:**

1. Topography/Soils/Climate: The topography is relatively flat with slopes from east to west at no more than 2-4% on any area. The soil survey for the property delineates 19 soil types. The soil texture is predominantly loam, but includes silty clay and mucky silts. Wetlands are made up of Pastolla muck or mucky silt and meadows are made up of loams and silty clay. The climate of the north Central Valley is Mediterranean, with cool moist winters and hot, dry summers. Precipitation, mainly in the form of rain, occurs between November and April. Average annual precipitation is 33.5 inches. The temperatures range from 29 to 100+ degrees in summer.

2. Wildlife Habitat: Numerous species of geese and waterfowl utilize this zone for migration from summer to winter habitat. Many other species may use it on a year round basis. The BFW2 and surrounding area potentially provide habitat for migratory bird species, black tail deer, coyote, bobcat, dove, and quail. Various reptiles including rattlesnake, gopher snake, king snake, blue belly lizard and others utilize the BFW2. Raptors including, Red tailed hawk, Burrowing owl, Swainson's hawk, and Rough-legged hawk Golden eagle and bald eagle are observed in the area. Many other species of birds, including neotropical song-birds may occupy on the property.

The California Natural Diversity Database reveals the following species at risk have been known to be within the surrounding area and could periodically utilize the BFW2. These species include: Greater sandhill crane, northwestern pond turtle, and Swainson's hawk. Plants shown on the Database Map include Marsh skullcap, Great Basin downingia, Macoun's buttercup, Howell's thelypodium, Howell's triteleia and Sheldon's sedge. It is unknown if these species exist on the MWPA.

3. Riparian Habitat: The riparian habitat stems from the high groundwater level on the parcel and associated wetlands on adjacent property. Anderson Creek is nearby but does not flow through the property. The riparian areas include a few native willows, but have mostly herbaceous species which include sedges, rushes, native grasses, forbs, and tules. Large trees are nearly absent, but black cottonwood could be established. The riparian zones potentially provide habitat for neotropical songbirds, raptors, quail, western pond turtles, other reptiles, fish, waterfowl and shorebirds.

#### **4. Noxious Weeds:**

There are several species of noxious weeds seen on the property. Himalayan blackberry occurs in large mounds and patches throughout the property and along

the property boundary fence line. Scotch thistle, Canada thistle, bull thistle, knapweed, hoary cress, medusahead, and an occasional yellow star-thistle have been noted in the area.

#### **E. Management Prescription:**

1. Goal: Manage the BFW2 for migratory good winter geese habitat as determined by the DFG.
2. Resource Objectives:
  - a) Provide adequate forage for migratory geese from November 1 to April 1.
  - b) Manage for native plant communities where possible and overall plant vigor through appropriate livestock grazing management and irrigation practices.

**F. Management Guidelines to Meet BFW2 Resource Objectives:** The following guidelines are designed to meet the resource objectives given the current condition and production of the BFW2. It will be at the lessee's discretion to determine what type of operation will be conducted during a particular year. The lessee can choose to hay some, all or none depending upon variables such as the price of hay, access to machinery, value of livestock, etc. The livestock numbers and how they will be grazed to meet the objectives will be at the lessee's discretion.

1. Maintain adequate winter forage for migratory geese.
  - a) The lessee, DFG, UC Cooperative Extension and RCD will meet prior to February 15<sup>th</sup> to discuss lessee's overall operation for the year.
  - b) The season of grazing use is April 1 to November 1.
  - c) Average of 3-4" stubble height in both the grazed and hayed areas by November 1<sup>st</sup> of each year.
  - d) The RCD and UC Cooperative Extension will conduct utilization monitoring during the grazing season to insure adequate forage will be left for migrating geese.
  - e) If utilization monitoring data indicates a problem, the RCD will meet with the lessee to discuss changes necessary to meet the overall objectives for the current year. Cattle may be removed prior to November 1<sup>st</sup> if needed to assure an average 3-4" stubble height remains for winter geese forage.
  - f) The lessee, DFG, UC Cooperative Extension and RCD will meet after the grazing season to evaluate the past year's operation.
2. Manage for native plant communities where possible and maintain overall plant vigor through appropriate management practices.
  - a) Fence the riparian areas. The DFG will provide the materials to construct the riparian area fences. The lessee will be responsible for construction and maintenance of the fences.
  - b) After consultation with the DFG, graze the riparian areas periodically to maintain native plant composition and vigor.
  - c) Manage grazing on the irrigated lands to maintain the plant vigor during and following the grazing season.
  - d) No livestock grazing will be allowed during the winter months to avoid trampling damage to soils and vegetation. If the soils are saturated on April

- 1, grazing will be delayed until the soils have dried adequately in order to protect the fields.
- e) Salt blocks will be placed in tubs in already disturbed areas away from water.
- f) Conduct late season irrigation prior to ACID turning water off to assure adequate soil moisture exists to maintain plant vigor after conclusion of the lessee's operations.
- g) Eradicate noxious plants when possible.

#### **G. Monitoring:**

The monitoring program will be conducted jointly by the RCD and UC Cooperative Extension. The program includes photo points, production cages to capture growth in the absence of grazing, and transects (toe point) to determine stubble height. Noxious weeds will also be monitored and treated when it is needed and feasible.

Monitoring would include a pre-lease meeting, summer meeting, and then a September review to assure the stubble height will be attained by November 1, followed by a post-grazing meeting to determine if the objectives were achieved for the current year.

#### **H. Miscellaneous Administrative Guidelines:**

1. The lease will be for five years with annual renewal options. The RCD and/or DFG may terminate the lease with due cause, following a notice letter to the lessee.
2. The lessee is required to prepare an annual grazing management program and provide copies to the RCD and DFG.
3. The lessee is required to notify the RCD two days prior to beginning operations.
4. The lessee is required to provide the RCD and DFG names and telephone numbers for two contacts responsible for any grazing or hay programs.
5. The lessee is responsible for moving livestock within twelve hours to rectify problems noted through monitoring data or site visits.
6. The lessee is responsible for procurement of fence materials and the construction and maintenance of internal fences needed to support grazing management. The fences will be temporary.
7. The lessee is responsible for maintenance of internal and external fences. The lessee is responsible for maintaining the irrigation infrastructures in the same condition as received when the lease is signed.
8. The lessee is responsible for direct payment of irrigation fees to ACID.
9. The lessee is responsible for proper management of irrigation water to assure adequate soil moisture to maintain plant vigor throughout the BFW2.
10. The lessee will receive a credit on the lease fee if the grazing season is shortened for resource management considerations outside the lessee's

control. It will be the lessee's choice as to when the credit is applied, i.e. the current year's lease fee or the following year's lease fee.

11. Dead livestock will be removed from the property and disposed of as required by law.
12. The lessee is required to be certified for operation of motorcycles or quads on the property and to wear a safety helmet when doing so.

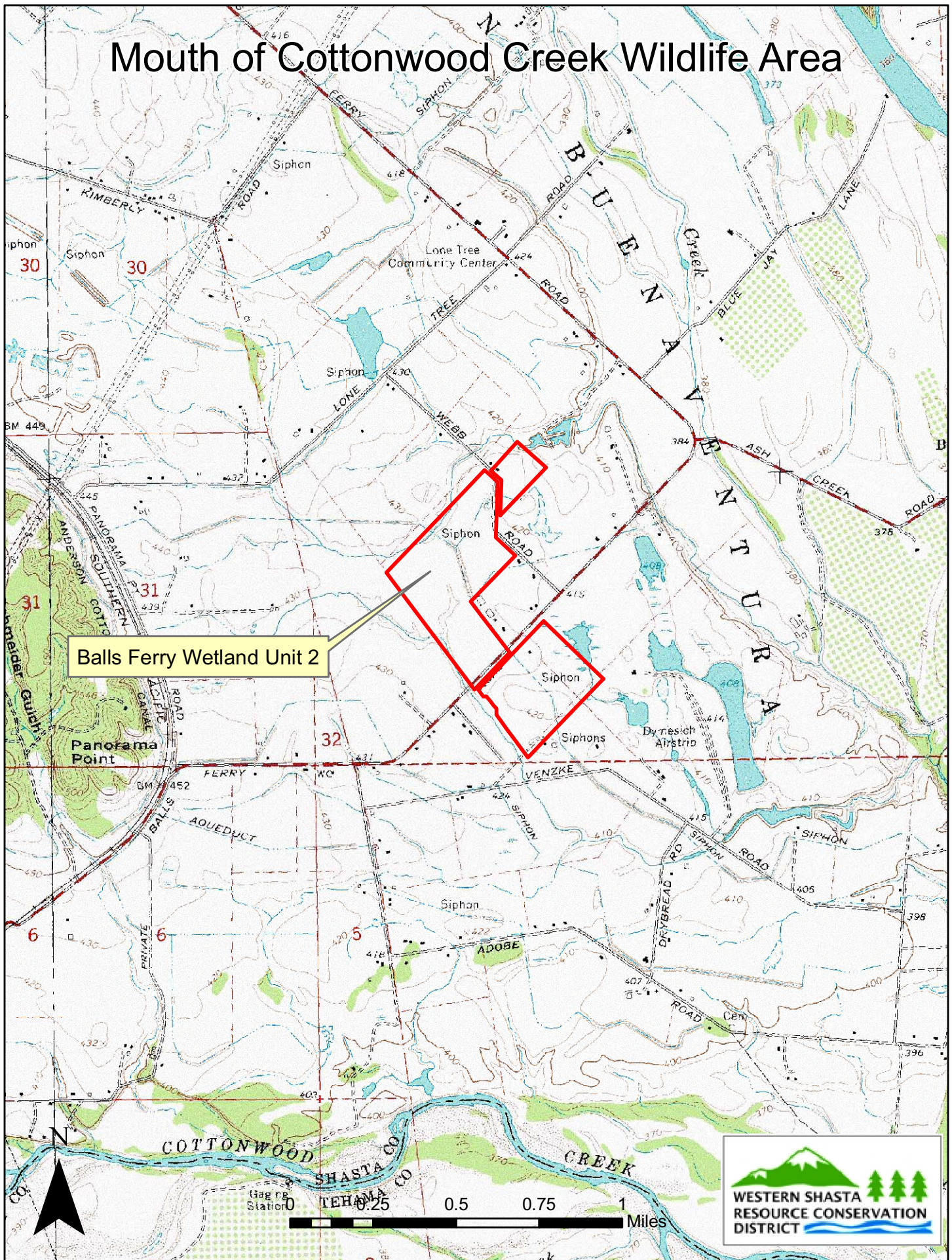
## **I. Summary**

It will be the lessee's yearly prerogative as to what grazing and/or hay operations would be implemented; i.e. combined grazing and hay production operations, an all-grazing operation, or an all hay production operation. All operations will be subject to the goal to leave adequate stubble height to provide winter forage for geese.

Grazing and irrigation will be managed to insure plant vigor is maintained and an average 3-4" stubble height is available for winter forage for migrating geese on November 1.



# Mouth of Cottonwood Creek Wildlife Area





## **APPENDIX F**

# MCCWA Land Management Plan California Environmental Quality Act (CEQA) Checklist





## California Environmental Quality Act (CEQA) Checklist

|    |  |
|----|--|
| 1. | <b>Project title:</b><br><u>Mouth of Cottonwood Creek Wildlife Area Land Management Plan</u>   |
| 2. | <b>Lead agency name and address:</b><br>California Department of Fish and Game, Northern Region<br>601 Locust Street,<br>Redding, California 96001   |
| 3. | <b>Contact person and phone number:</b><br>Jim Chakarun, Wildlife Habitat Supervisor II (530) 527-8917   |
| 4. | <b>Project location:</b><br>The Mouth of Cottonwood Creek Wildlife Area (MCCWA) is located approximately five miles east of the town of Cottonwood, in Shasta County, California. Totalling approximately 1059 acres, the MCCWA has three units: <ul style="list-style-type: none"> <li>• The 571-acre Cottonwood Creek Unit (CCU) is located north of the Shasta Tehama county line at the confluence of Cottonwood Creek and the Sacramento River.</li> <li>• The 348-acre Balls Ferry Wetland Unit 1 (BFW1) is located between Venzke Road and Balls Ferry Road, approximately one half mile north of the Cottonwood Creek Unit.</li> <li>• The 141-acre Balls Ferry Wetland Unit 2 (BFW2) consists of three parcels, one is located adjacent to the northwestern section of BFW1, one is immediately north across Balls Ferry Road, and the third is east of Webb Road.</li> </ul> The three units that comprise the MCCWA are all located in Township 29N, Range 3 W on the Balls Ferry USGS 7.5 minute topographic quadrangle map, in Sections 4, 5, 8, 9, 32, and 33. |
| 5. | <b>Project sponsor's name and address:</b><br>California Department of Fish and Game, Northern Region<br>601 Locust Street,<br>Redding, California 96001   |
| 6. | <b>General plan designation(s):</b><br>Unclassified<br>Agricultural Cropland and Grazing (A-cg)<br>Natural Resource Protection Open Space (NO)<br>Interim Mineral Resource (IMR)   |
| 7. | <b>Zoning:</b><br>Shasta County Parcels: Unclassified, Limited agriculture, Habitat protection-Interim mineral resource, Limited residential.<br>Tehama County (1 parcel): Exclusive agriculture   |

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8.

**Description of project:**

*(Describe the whole action involved, including but not limited to later phases of the project, and any secondary, support, or off-site features necessary for its implementation. Attach additional sheets if necessary.)*

This project is a draft Land Management Plan (LMP) for the MCCWA, an area owned by the State of California Department of Fish and Game. The purpose of Wildlife Areas is to protect, maintain, enhance or restore wildlife habitat, and to provide compatible wildlife-related recreational uses. Fish and Game Code sections (550-551) guide management of wildlife areas. The MCCWA contains three units: the Cottonwood Creek Unit and two Balls Ferry Wetland Units. CDFG acquired the Cottonwood Creek Unit over several years between 1981 and 1989. CDFG acquired the Balls Ferry Wetland Unit 1 in 2004 and Balls Ferry Wetland Unit 2 in 2008.

The LMP is an ecosystem-based adaptive management plan that describes the dynamic ecological conditions and managerial goals of the MCCWA. Written for a wide range of audiences with varying degrees of expertise in ecosystem level and adaptive management techniques, the LMP is a living document. As area managers gather more information and data, they will update the LMP and management goals will be refined and adapted. The LMP consists of 6 chapters and several appendices:

- I. Introduction
- II. Property Description
- III. Habitats and Species
- IV. Management Goals
- V. Operations and Maintenance
- VI. References

The LMP contains a description of the MCCWA and its environment as well as an evaluation of compatible wildlife-related public uses. The LMP also includes a conceptual plan for the Balls Ferry Research and Education Center on the Balls Ferry Wetland Unit 1.

This Initial Study considers the whole of the project, and as such, this project and Negative Declaration include the following components:

- The ongoing operation of the MCCWA, including the public uses incorporated in this LMP;
- Maintenance activities (e.g., habitat management and agriculture) to sustain the biological communities that provide habitat for wildlife and fisheries resources;
- Installation of minor improvements, such as signs and trails that do not involve substantial physical disruption of the Wildlife Area;
- Restoration and enhancement of grasslands and riparian areas;
- Maintenance of the MCCWA improvements;
- Monitoring and educational activities as well as scientific research;
- Ongoing coordination with public agencies and private interests consistent with the goals of this LMP;
- Dissemination of public information regarding the MCCWA that may include hardcopy and online data as well as other media;
- Update to MCCWA regulations; and
- Enforcement of duly adopted laws and regulations.

|     |   |
|-----|---|
|     | <p>This LMP serves as a general policy guide for the management of the MCCWA. It does not specifically authorize or make a precommitment to any substantive physical changes to the Wildlife Area. Because potential physical changes to the MCCWA would be a part of subsequent projects that have yet to be conceived, designed, or funded, it is not possible to reasonably evaluate the impacts of any such projects. Any such subsequent projects will be subject to CEQA review and will be considered in light of the contents of the LMP and this Initial Study. If a subsequent project is not included within the scope of this LMP (i.e., specific goals and tasks), it will require appropriate analysis and documentation pursuant to CEQA when it is conceived and proposed for approval.</p> |
| 9.  | <p><b>Surrounding land uses and setting:</b><br/> <i>(briefly describe the project's surroundings)</i></p> <p>The Cottonwood Creek Unit is surrounded by rural residential housing and small ranches on the north and west, the Bureau of Land Management's Redding Island Recreation Area and the Sacramento River on the east, and by Cottonwood Creek on the south. Access to the Cottonwood Unit is from Adobe Road. Both Balls Ferry wetland units are surrounded by rural residential homes and small ranches. Balls Ferry Road, Venzke Road, and Webb Road provide access to the two Balls Ferry wetland units. Please also see the draft MCCWA LMP Chapters II (Property Description) and III (Habitat and Species Descriptions).</p>   |
| 10. | <p><b>Other public agencies whose approval is required:</b><br/> <i>(e.g., permits, financing approval, or participation agreement)</i></p> <p>None.</p>  |

#### ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:


The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

|  |                               |  |                                    |   |                      |
|--|-------------------------------|--|------------------------------------|---|----------------------|
|  | Aesthetics                    |  | Agriculture Resources              |   | Air Quality          |
|  | Biological Resources          |  | Cultural Resources                 |   | Geology /Soils       |
|  | Hazards & Hazardous Materials |  | Hydrology / Water Quality          |   | Land Use / Planning  |
|  | Green House Gas Emissions     |  | Transportation/Traffic             |   | Population / Housing |
|  | Mineral Resources             |  | Noise                              |   |                      |
|  | Public Services               |  | Recreation                         | X | None                 |
|  | Utilities / Service Systems   |  | Mandatory Findings of Significance |   |                      |

**DETERMINATION:**

On the basis of this initial evaluation:

|          |  |
|----------|--|
| <b>X</b> | I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.  |
|          | I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.   |
|          | I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.   |
|          | I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed. |
|          | I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.                                   |

|   |          |
|---|----------|
|  | 10/29/10 |
| Signature   | Date     |
|   |          |
| Signature   | Date     |

**EVALUATION OF ENVIRONMENTAL IMPACTS:**

| <b>I. AESTHETICS —</b><br><b>Would the project:</b>  | <b>Potentially<br/>Significant<br/>Impact</b> | <b>Less Than<br/>Significant with<br/>Mitigation<br/>Incorporation</b> | <b>Less Than<br/>Significant<br/>Impact</b> | <b>No<br/>Impact</b> |
|--|---|--|---|----------------------|
| a) Have a substantial adverse effect on a scenic vista?  |   |  |   | X                    |
| b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?   |   |  |   | X                    |
| c) Substantially degrade the existing visual character or quality of the site and its surroundings?  |   |  | X   |                      |
| d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?  |   |  |   | X                    |
| <p><b>DISCUSSION:</b></p> <p><b>a), b), d) No Impact.</b></p> <p>The proposed LMP's goals are based upon ecosystem integrity and include optimizing native vegetation, preserving existing agricultural practices and cultural resources, and the protection of natural visual resources. MCCWA is not within a state scenic highway, and the proposed LMP does not involve the construction of any new buildings or outdoor lighting. Therefore LMP adoption would not adversely affect scenic vistas, damage scenic resources or create adverse lighting that affects day or nighttime views in the area.</p> <p><b>c) Less Than Significant Impact.</b></p> <p>Implementation of some proposed LMP management tasks would involve minor modifications to the existing landscape (e.g., restoration or enhancement activities, signage, and access improvements). Designed to prevent unauthorized access, minimize erosion, protect and enhance natural habitats and improve wildlife area management, these activities would provide a net benefit for the MCCWA's aesthetic conditions. Furthermore, prior to implementation of projects consistent with the LMP, CDFG would subject them to CEQA review according to CEQA Guidelines Section 15168, to determine if additional CEQA documentation is necessary. CEQA Guidelines Sections 15162-15164 would guide the type of additional CEQA review to be completed.</p> |   |  |   |                      |
| <p><b>II. AGRICULTURE RESOURCES —</b></p> <p>In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland.</p> <p><b>Would the project:</b></p>   | <b>Potentially<br/>Significant<br/>Impact</b> | <b>Less Than<br/>Significant with<br/>Mitigation<br/>Incorporation</b> | <b>Less Than<br/>Significant<br/>Impact</b> | <b>No<br/>Impact</b> |



|  |  |  |   |   |
|--|--|--|---|---|
| a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use? |  |  | X |   |
| b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?   |  |  | X |   |
| c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?  |  |  |   | X |

**DISCUSSION: a), b), Less Than Significant Impact**

The MCCWA is located in Shasta and Tehama County regions with prime farmland (the valley floor near the Sacramento River and its tributaries). The California Farmland Mapping and Monitoring Project (FMMP) depicts the Cottonwood Creek Unit and the BFW1 as "Other Lands" (California Department of Conservation, FMMP 2006). The FMMP "Other Lands" category includes low density rural developments; brush, timber, wetland, and riparian areas not suitable for livestock grazing; confined livestock, poultry or aquaculture facilities; strip mines, borrow pits; and water bodies smaller than forty acres. It also includes vacant and nonagricultural land surrounded on all sides by urban development and greater than 40 acres. The FMMP depicts BFW2 as Unique Farmland, indicating an area used for agricultural production within 4 years of the mapping project, but has lesser quality soils. Unique Farmland areas are usually irrigated (FMMP 2006). The parcels that make up the MCCWA were in agricultural production (grazing and hay production) prior to CDFG's ownership. Consistent with the Shasta County General Plan (2004), conversion of agricultural lands to wildlife habitat is not a conflicting use. Furthermore, none of the parcels are included in the Williamson Act and the LMP proposes no land use changes to either Units that would remove existing lands from agricultural production or convert farmland to non-agricultural use.

**c) No Impact**

CDFG's current mission is to manage California's diverse fish, wildlife, and plant resources, and the habitats upon which they depend, for their ecological values and for the public's use and enjoyment. LMP tasks do not include the establishment of any facilities, structures, or land uses that would economically or physically preclude returning the land to cultivation in the future, if such a public policy decision were made. LMP implementation would maintain a mix of natural communities and agricultural lands on the property; therefore, it would not be cost prohibitive to return the Wildlife Area to its present condition. Returning the land to cultivation would require removing the native vegetation and implementing some soil preparation, which is similar to the requirements of the original clearing of habitat necessary to create farmed land decades ago. Some infrastructure, such as roads and drainage, is necessary for management and maintenance of agricultural lands as well as for natural communities.

| <b>III. AIR QUALITY –</b><br>Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations.<br><b>Would the project:</b>  | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|--------------------------------|---|------------------------------|-----------|
| a) Conflict with or obstruct implementation of the applicable air quality plan?   |                                |   | X                            |           |
| b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?  |                                |   | X                            |           |
| c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?   |                                |   | X                            |           |
| d) Expose sensitive receptors to substantial pollutant concentrations?  |                                |   | X                            |           |
| e) Create objectionable odors affecting a substantial number of people?   |                                |   | X                            |           |
| <b>DISCUSSION:</b><br><br><b>a), b), c), d), e) Less Than Significant Impact.</b><br><br>The MCCWA is located in the Northern Sacramento Valley Air Basin (NSVAB), which is comprised of seven counties including Shasta and Tehama. The NSVAB's approximate measurements are 200 miles long in a north-south direction with a maximum width of 150 miles, although the valley floor averages only 50 miles. The Shasta and Tehama County Air Pollution Control Districts are responsible for local implementation of state and federal air quality standards within the MCCWA region.<br><br>The MCCWA LMP proposed goals and tasks will not conflict or obstruct implementation of the Districts air quality plans nor contribute significantly to any air quality violations. LMP implementation will not construct any stationary sources of criteria pollutants, nor add to mobile sources, therefore, will not contribute to increasing local levels of green house gas (GHG) emissions. Implementation of the goals and tasks of the LMP will most likely reduce GHG through habitat preservation, restoration and subsequent carbon sequestration. Although some proposed LMP management tasks could involve the use of construction equipment (e.g., continued operations and maintenance, restoration or enhancement activities) thus temporarily increasing equipment emissions, these would be short-term impacts and would not cause a considerable cumulative net increase of air pollutants. None of the proposed LMP's management tasks would create objectionable odors or substantial pollutant concentrations. In addition, prior to implementation of projects consistent with the LMP, CDFG would subject them to CEQA review according to |                                |   |                              |           |

CEQA Guidelines Section 15168, to determine if additional CEQA documentation is necessary. CEQA Guidelines Sections 15162-15164 would guide the type of additional CEQA review to be completed.

| <b>IV. BIOLOGICAL RESOURCES –<br/>Would the project:</b>   | <b>Potentially<br/>Significant<br/>Impact</b> | <b>Less Than<br/>Significant<br/>with<br/>Mitigation<br/>Incorporation</b> | <b>Less Than<br/>Significant<br/>Impact</b> | <b>No<br/>Impact</b> |
|--|---|--|---|----------------------|
| a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service? |   |  | X   |                      |
| b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?   |   |  | X   |                      |
| c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?   |   |  | X   |                      |
| d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?   |   |  | X   |                      |
| e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?  |   |  | X   |                      |
| f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?   |   |  | X   |                      |

#### **DISCUSSION:**

#### **a), b), c), d) e), f) Less Than Significant Impact.**

The MCCWA is located in the Cottonwood Creek watershed and the CALFED Bay-Delta Program (CALFED) Cottonwood Creek Ecological Management Zone. The area is a restoration priority for the CALFED Ecosystem Restoration Program (ERP) Plan (for which CDFG is an implementing agency). The MCCWA provides potential habitat for 22 special-status and priority wildlife and fish species identified in the CALFED Multi-Species Conservation Strategy (MSCS), and the presence of potentially suitable habitat for 6

additional special-status wildlife and fish species. For more information, please see the draft MCCWA LMP Chapter III Habitat and Species Descriptions.

The MCCWA LMP is designed around an adaptive management concept. Baseline data collection, monitoring of key ecosystem functions (or indicators), completing focused research to obtain a better understanding, and staging implementation based on information gained are all central to the LMP's adaptive management process. The LMP compliments the strategic objectives and conservations measures identified in the CALFED ERP and MSCS. Its tasks and goals were developed in coordination with Shasta County's stream and oak conservation policies (Shasta County 2004), the California Wildlife Action Plan (CDFG 2005, 2007), the Riparian and Oak Woodland Bird Conservation Plans (Riparian Habitat Joint Venture (2004) and California Partners In Flight 2002), the Cottonwood Creek Watershed Assessment (CH2M Hill 2002), and the Cottonwood Creek Ecological Management Zone (CALFED Ecosystem Restoration Plan 2000). Such measures and coordination helps ensure that all actions comply with federal and state Endangered Species Acts (ESA and CESA) and other applicable regulations, local policies or ordinances aimed at the protection of special-status species and wildlife.

The LMP's goals and tasks provide guidance to CDFG management of the Wildlife Area for the benefit of the habitats and species found on the sites. Although some proposed LMP management tasks would have the potential for temporary construction impacts, these impacts would not be substantial because habitat preservation and enhancement are the LMP's primary goals. Wetland and riparian habitat resources are especially valued for wildlife and fish habitat and the LMP proposes no actions that will remove, fill or disrupt the hydrological conditions that maintain these resources. The LMP's restoration or enhancement activities will improve habitat connectivity and movement corridors for native species and improve wildlife nursery sites. Additionally, any of these activities would conform to regulatory requirements such as CDFG regulations, U.S. Fish and Wildlife Service (USFWS) regulations, State Water Quality Control Board (SWQCB) regulations, Section 404 of the Clean Water Act (CWA), and any applicable plans or ordinances protecting biological resources.

Furthermore, prior to implementation of projects consistent with the LMP, CDFG would subject them to CEQA review according to CEQA Guidelines Section 15168, to determine if additional CEQA documentation is necessary. CEQA Guidelines Sections 15162-15164 would guide the type of additional CEQA review to be completed.

| <b>V. CULTURAL RESOURCES –<br/>Would the project:</b>   | <b>Potentially<br/>Significant<br/>Impact</b> | <b>Less Than<br/>Significant<br/>with<br/>Mitigation<br/>Incorporation</b> | <b>Less Than<br/>Significant<br/>Impact</b> | <b>No<br/>Impact</b> |
|---|---|--|---|----------------------|
| a) Cause a substantial adverse change in the significance of a historical resource as defined in '15064.5?    |   |  | X   |                      |
| b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to '15064.5? |   |  | X   |                      |
| c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?       |   |  | X   |                      |
| d) Disturb any human remains, including those interred outside of formal cemeteries?                          |   |  | X   |                      |

**DISCUSSION:****a), b), c), d) Less Than Significant Impact.**

Although some proposed LMP management tasks may involve ground disturbance (e.g., ongoing operations and maintenance, and restoration or enhancement activities), the LMP includes requirements for cultural resource surveys prior to major ground disturbance (e.g., excavations below normal plow depths) at undisturbed sites, and consultation with a qualified archaeologist in the case of an inadvertent discovery. The State Historic Preservation Officer consultation required by the plan would identify and protect any historic resources prior to their demolition. Additionally, prior to implementation of projects consistent with the LMP, CDFG would subject them to CEQA review according to CEQA Guidelines Section 15168, to determine if additional CEQA documentation is necessary. CEQA Guidelines Sections 15162-15164 would guide the type of additional CEQA review to be completed.

| <b>VI. GEOLOGY AND SOILS --</b><br><b>Would the project:</b>   | <b>Potentially<br/>Significant<br/>Impact</b> | <b>Less Than<br/>Significant<br/>with<br/>Mitigation<br/>Incorporation</b> | <b>Less Than<br/>Significant<br/>Impact</b> | <b>No<br/>Impact</b> |
|--|---|--|---|----------------------|
| a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:   |   |  |   |                      |
| i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map Issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42. |   |  | X   |                      |
| ii) Strong seismic ground shaking?   |   |  | X   |                      |
| iii) Seismic-related ground failure, including liquefaction?   |   |  | X   |                      |
| iv) Landslides?  |   |  | X   |                      |
| b) Result in substantial soil erosion or the loss of topsoil?  |   |  | X   |                      |
| c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?   |   |  | X   |                      |
| d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?   |   |  | X   |                      |
| e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?   |   |  |   | X                    |

|  |  |  |  |  |
|--|--|--|--|--|
|  |  |  |  |  |
|--|--|--|--|--|

**DISCUSSION:**

Based upon a review of the Alquist-Priolo Earthquake Zoning Maps (California Geological Survey 2002), the project area is not on or near any active earthquake fault zones. Shasta County has a low level of historic seismic activity. In the past 120 years, earthquakes caused no substantial property damage or loss of life within or near Shasta County. According to regional probabilistic ground shaking hazard maps (California Geological Survey 2003), the project area is subject to a 20 to 30% increase in earthquake-induced ground acceleration forces for a 10% probability of being exceeded in 50 years, a low probability relative to other portions of California.

The nearest significant fault is the Quaternary Battle Creek Fault, an east/west-trending normal fault approximately 20 miles east of the site. The Battle Creek Fault is approximately 14 miles long, with an estimated slip rate of 0.5 mm/year. The last known movement of this fault appears to be over 400,000 years ago. The maximum credible earthquake on the Battle Creek Fault was estimated to be a Richter magnitude of 6.0 (California Geological Survey 2002).

**a), b), c), d) Less Than Significant Impact.**

Soil erosion is the process whereby soil materials are worn away and transported to another area by either wind or water. Rates of erosion can vary depending on the soil material and structure, placement and human activity. Some of the proposed LMP management tasks, including restoration and trail maintenance, will involve minimal ground disturbance, but these activities are designed to ultimately reduce or prevent soil erosion, and would be implemented using best management practices designed to minimize erosion and/or topsoil loss. Additionally, all activities would conform to regulatory requirements regarding soil erosion.

The potential for liquefaction depends on the duration and intensity of earthquake shaking, particle size distribution of the soil, density of the soil, and elevation of the groundwater. Areas at risk due to the effects of liquefaction are typified by a high groundwater table and underlying loose to medium-density granular sediments, particularly younger alluvium and artificial fill. MCCWA soil types are considered expansive but due to the area's low potential for seismic activity and relatively flat terrain it is not considered a high-risk area subject to landslides, lateral spreading, subsidence or liquefaction. Moreover, the proposed MCCWA LMP serves as a general policy guide for MCCWA management. It does not specifically authorize or make a precommitment to any substantive physical changes to the Wildlife Area. With the exception of ongoing restoration and enhancement, and operations and maintenance activities, any substantive physical changes that are not currently approved will require subsequent authorizations. Thus, LMP goal and task implementation would not create a substantial risk to lives or property.

In addition, prior to implementation of projects consistent with the LMP, CDFG would subject them to CEQA review according to CEQA Guidelines Section 15168, to determine if additional CEQA documentation is necessary. CEQA Guidelines Sections 15162-15164



would guide the type of additional CEQA review to be completed.

**e) No Impact.**

The MCCWA LMP does not include construction of septic tanks or alternative waste water disposal systems, nor would any be required as a result of LMP goal or task implementation.

| <b>VII. HAZARDS AND HAZARDOUS MATERIALS —<br/>Would the project:</b>   | <b>Potentially<br/>Significant<br/>Impact</b> | <b>Less Than<br/>Significant with<br/>Mitigation<br/>Incorporation</b> | <b>Less Than<br/>Significant<br/>Impact</b> | <b>No<br/>Impact</b> |
|--|---|--|---|----------------------|
| a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?  |   |  | X   |                      |
| b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?  |   |  | X   |                      |
| c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?  |   |  |   | X                    |
| d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?                                   |   |  |   | X                    |
| e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area? |   |  | X   |                      |
| f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?  |   |  | X   |                      |
| g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?  |   |  |   | X                    |
| h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?   |   |  | X   |                      |

**DISCUSSION:****a), b), e), f) h) Less Than Significant Impact.**

Located in rural areas of Shasta and Tehama Counties, the MCCWA is located approximately 1.25 miles north of the Lake California private airstrip. There is an abandoned private airstrip and airplane hanger on the Balls Ferry Wetland Unit 1, but CDFG has no intent to utilize them as such. The MCCWA LMP is designed for the continued maintenance of a Wildlife Area, there are no activities proposed that would expose any airport personnel or nearby residents to a safety hazard. LMP implementation will not require the routine use of hazardous materials, nonetheless, it does contain goals and tasks for hazardous materials safety provisions and best management practices. Additionally, the LMP's fire management goals and tasks will decrease potential risks of loss, injury or death involving wildland fires. For these reasons less than significant impacts are expected for hazardous materials handling or accidental release, including near an airport or the potential losses resulting from wildland fires.

To further minimize the potential for impacts, prior to implementation of projects consistent with the LMP, CDFG would subject them to CEQA review according to CEQA Guidelines Section 15168, to determine if additional CEQA documentation is necessary. CEQA Guidelines Sections 15162-15164 would guide the type of additional CEQA review to be completed.

**c), d), g), No Impact.**

The Wildlife Area is not within a ¼ mile of a school and the MCCWA LMP goals and tasks include designing an emergency response plan consistent with similar plans for the area, therefore no school or emergency response related impacts will occur.

| <b>VIII. HYDROLOGY AND WATER QUALITY –<br/>Would the project:</b>   | <b>Potentially<br/>Significant<br/>Impact</b> | <b>Less Than<br/>Significant with<br/>Mitigation<br/>Incorporation</b> | <b>Less Than<br/>Significant<br/>Impact</b> | <b>No<br/>Impact</b> |
|---|---|--|---|----------------------|
| a) Violate any water quality standards or waste discharge requirements?   |   |  |   | X                    |
| b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)? |   |  |   | X                    |
| c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?  |   |  |   | X                    |

|   |  |  |   |   |
|---|--|--|---|---|
| d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site? |  |  |   | X |
| e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?   |  |  |   | X |
| f) Otherwise substantially degrade water quality?   |  |  |   | X |
| g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?  |  |  |   | X |
| h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?   |  |  |   | X |
| i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?  |  |  | X |   |
| j) Inundation by seiche, tsunami, or mudflow?   |  |  |   | X |

**Discussion:**

Shasta County has classified Cottonwood Creek and the area within 0.5 mi. of the Sacramento River as "Designated Floodway". Designated Floodways are considered special flood hazard zones due to floodwater velocity, potential debris and projectiles and erosion. Land uses within designated floodways need to minimize environmental impacts to riparian and wetland habitats, while protecting life and property (Shasta County 2004).

MCCWA's Cottonwood Creek Unit is bounded by the Sacramento River to the east and Cottonwood Creek to the south. At 350-400 feet above sea level, it is located entirely within the 100-year floodplain of the creek and the river. The precise location of the Unit's southern boundary has yet to be determined due to the meandering channel of Cottonwood Creek (Graham Mathews & Associates 2003). There are no existing structures located on the Cottonwood Creek Unit, therefore nothing that would impede flood flow.

The Balls Ferry Wetland Units 1 and 2 are located three-quarters of a mile to the north, surrounded by residential properties, and sit 410 to 420 feet above sea level. The Balls Ferry Units have several structures related to the former owner's ranches but are not in the designated flood zone for the Sacramento River.

**a), b), c), d), e), f), h), g), j) No Impact.**

The draft LMP serves as a general policy guide for MCCWA management. It does not specifically authorize or make a precommitment to any substantive physical changes to the Wildlife Area. With the exception of ongoing restoration and enhancement, and

operations and maintenance activities, any substantive physical changes not currently approved will require subsequent authorizations. The MCCWA LMP management tasks do not utilize additional surface or groundwater resources, create or contribute to stormwater runoff, construct new buildings or impervious surfaces, nor alter existing risks of seiche, tsunami, or mudflow.

**i) Less Than Significant Impact.**

Unlike the Cottonwood Creek Unit, the BFW Units have existing structures that are not located in a 100-year flood plain. MCCWA LMP management goals and tasks include flood control measures and restoration tasks to minimize potential flooding. These measures would conform with regulatory requirements regarding erosion and sediment control, flooding, and water quality protection, and would be a net improvement to water quality.

Moreover, prior to implementation of projects consistent with the LMP, CDFG would subject them to CEQA review according to CEQA Guidelines Section 15168, to determine if additional CEQA documentation is necessary. CEQA Guidelines Sections 15162-15164 would guide the type of additional CEQA review to be completed.

| <b>IX. LAND USE –<br/>Would the project:</b>  | <b>Potentially<br/>Significant<br/>Impact</b> | <b>Less Than<br/>Significant with<br/>Mitigation<br/>Incorporation</b> | <b>Less Than<br/>Significant<br/>Impact</b> | <b>No<br/>Impact</b> |
|---|---|--|---|----------------------|
| a) Physically divide an established community?  |   |  |   | X                    |
| b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect? |   |  |   | X                    |
| c) Conflict with any applicable habitat conservation plan or natural community conservation plan?   |   |  |   | X                    |

**DISCUSSION:**

**a), b), c) No Impact.**

The draft MCCWA LMP would not require any physical changes to an established community, nor would implementation of any activity following LMP adoption physically divide an established community. The LMP has been developed in conformance with land management plans (e.g., general plans) for adjacent areas. The LMP goals provide for natural resource protection and preservation and require that any projects implemented following adoption of the proposed LMP conform to any habitat conservation plans and natural community conservation plans that may be applicable at that time. The LMP also outlines resource coordination opportunities between agencies and interested parties to facilitate communication and information sharing so that no conflicts will arise in the future. Based upon these provisions no impacts to land use will occur.

| <b>X. MINERAL RESOURCES –</b><br><b>Would the project:</b>   | <b>Potentially<br/>Significant<br/>Impact</b> | <b>Less Than<br/>Significant with<br/>Mitigation<br/>Incorporation</b> | <b>Less Than<br/>Significant<br/>Impact</b> | <b>No<br/>Impact</b> |
|--|---|--|---|----------------------|
| a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?   |   |  | X   |                      |
| b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?  |   |  | X   |                      |
| <p><b>DISCUSSION:</b></p> <p><b>a), b), Less Than Significant Impact.</b></p> <p>The Shasta General Plan does not delineate the MCCWA as an important mineral resource area (Shasta County 2004). The MCCWA is located approximately 5 miles downstream of an existing gravel extraction site. Three parcels within the Cottonwood Unit are zoned for interim mineral resource extraction (Shasta County Planning Department 2007). Presently mineral extraction on the Wildlife Area is prohibited, as it conflicts with CDFG's current mission to manage for ecological values and wildlife-related public uses.</p> <p>The LMP serves as a general policy guide for MCCWA management. It does not specifically authorize or make a precommitment to any substantive physical changes to the Wildlife Area. With the exception of ongoing restoration and enhancement, and operations and maintenance activities, any substantive physical changes that are not currently approved will require subsequent authorizations. Thus, no MCCWA LMP tasks establish facilities, structures, or land uses that would physically or economically preclude mineral extraction in the future, if such a public policy decision were made and any potential mineral resource impacts are less than significant.</p> |   |  |   |                      |
| <b>XI. NOISE –</b><br><b>Would the project result in:</b>  | <b>Potentially<br/>Significant<br/>Impact</b> | <b>Less Than<br/>Significant with<br/>Mitigation<br/>Incorporation</b> | <b>Less Than<br/>Significant<br/>Impact</b> | <b>No<br/>Impact</b> |
| a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?  |   |  | X   |                      |
| b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?  |   |  | X   |                      |
| c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?   |   |  | X   |                      |
| d) A substantial temporary or periodic increase in   |   |  | X   |                      |

|   |  |  |   |  |
|---|--|--|---|--|
| ambient noise levels in the project vicinity above levels existing without the project?   |  |  |   |  |
| e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels? |  |  | X |  |
| f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?  |  |  | X |  |

**DISCUSSION:****a), b), c), d) e), f), Less Than Significant Impact.**

Two waterways and a federal recreation site geographically border the Cottonwood Creek Unit, and the MCCWA is located in an area of low-density rural residential and agricultural use. The Lake California private airpark is located approximately 1.25 miles from the southernmost boundary of the Wildlife area. Although some proposed LMP management tasks could involve the intermittent use of construction equipment (e.g., restoration, enhancement or maintenance activities) thus temporarily increasing ambient noise, these activities would not result in a substantial increase in ambient noise levels above those generated by the Wildlife Area's existing management practices or public uses. Since any increase in ambient noise will be temporary, and due to the isolated nature of the area, people in the vicinity will not be exposed to excessive noise levels or significantly impacted.

Furthermore, prior to implementation of projects consistent with the LMP, CDFG would subject them to CEQA review according to CEQA Guidelines Section 15168, to determine if additional CEQA documentation is necessary. CEQA Guidelines Sections 15162-15164 would guide the type of additional CEQA review to be completed.

| <b>XII. POPULATION AND HOUSING –<br/>Would the project:</b>   | <b>Potentially<br/>Significant<br/>Impact</b> | <b>Less Than<br/>Significant with<br/>Mitigation<br/>Incorporation</b> | <b>Less Than<br/>Significant<br/>Impact</b> | <b>No<br/>Impact</b> |
|---|---|--|---|----------------------|
| a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)? |   |  |   | X                    |
| b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?   |   |  |   | X                    |
| c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?   |   |  |   | X                    |



**DISCUSSION:****a), b), c). No Impact.**

The proposed LMP does not involve any change in housing nor would it induce growth through new infrastructure or by removing of any barriers to growth. Management goal and task implementation may require additional staff hours, but this would not induce population growth that would require additional housing.

| <b>XIII. PUBLIC SERVICES –<br/>Would the project:</b>   | <b>Potentially<br/>Significant<br/>Impact</b> | <b>Less Than<br/>Significant with<br/>Mitigation<br/>Incorporation</b> | <b>Less Than<br/>Significant<br/>Impact</b> | <b>No<br/>Impact</b> |
|---|---|--|---|----------------------|
| a) result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services: |   |  |   |                      |
| Fire protection?  |   |  | X   |                      |
| Police protection?  |   |  | X   |                      |
| Schools?  |   |  | X   |                      |
| Parks?  |   |  | X   |                      |
| Other public facilities?  |   |  | X   |                      |

**DISCUSSION:****a) Less Than Significant Impact.**

Adoption of the proposed LMP would not require substantial changes to existing levels of public service. Implementation of public use, facilities, and fire management goals could require a minimal increase in staff hours per year by the fire department, the County Sheriff's department, and CDFG staff, but these potential minimal increases do not create the need for new or altered facilities.

Additionally, prior to implementation of projects consistent with the LMP, CDFG would subject them to CEQA review according to CEQA Guidelines Section 15168, to determine if additional CEQA documentation is necessary. CEQA Guidelines Sections 15162-15164 would guide the type of additional CEQA review to be completed.

| <b>XIV. RECREATION –<br/>Would the project:</b>  | <b>Potentially<br/>Significant<br/>Impact</b> | <b>Less Than<br/>Significant with<br/>Mitigation<br/>Incorporation</b> | <b>Less Than<br/>Significant<br/>Impact</b> | <b>No<br/>Impact</b> |
|--|---|--|---|----------------------|
| a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated? |   |  | X   |                      |

|   |                                       |  |                                     |                  |
|---|---------------------------------------|--|-------------------------------------|------------------|
| b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?   |                                       |  | X                                   |                  |
| <p><b>DISCUSSION:</b></p> <p><b>a), b) Less Than Significant Impact.</b></p> <p>The MCCWA's overall recreation goal is to provide a variety of public uses to the extent that such uses do not have significant adverse impacts on biological resources. The Cottonwood Creek Unit allows public entry one hour before sunrise to one hour after sunset. Access to the BFW1 is by permit only. BFW2 is currently closed to the public due to management considerations. Suitable recreational activities for the MCCWA are those that are either wildlife dependent or related and have low to moderate potential to negatively affect wildlife or conflict with other uses. Proposed MCCWA LMP adoption and implementation does not expand the Wildlife Area or change existing levels of wildlife-dependent recreational use. The existing use restrictions, coupled with the remoteness of the location and its limited access ensure the number of recreational users will not exceed the carrying capacity of its natural resources or degrade existing natural features or recreational facilities.</p> <p>Moreover, prior to implementation of projects consistent with the LMP, CDFG would subject them to CEQA review according to CEQA Guidelines Section 15168, to determine if additional CEQA documentation is necessary. CEQA Guidelines Sections 15162-15164 would guide the type of additional CEQA review to be completed.</p> |                                       |  |                                     |                  |
| <b>XV. TRANSPORTATION/TRAFFIC</b>   | <b>Potentially Significant Impact</b> | <b>Less Than Significant with Mitigation Incorporation</b> | <b>Less Than Significant Impact</b> | <b>No Impact</b> |
| <b>Would the project:</b>   |                                       |  |                                     |                  |
| a) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?  |                                       |  | X                                   |                  |
| b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?  |                                       |  | X                                   |                  |
| c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?   |                                       |  | X                                   |                  |
| d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?  |                                       |  | X                                   |                  |
| e) Result in inadequate emergency access?   |                                       |  | X                                   |                  |
| f) Result in inadequate parking capacity?   |                                       |  | X                                   |                  |

|  |                                       |  |                                     |                  |
|--|---------------------------------------|--|-------------------------------------|------------------|
| g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)  |                                       |  | X                                   |                  |
| <p><b>DISCUSSION:</b></p> <p><b>a), b), c), d), e), f), g) Less Than Significant Impact.</b></p> <p>There are no predicted increases in MCCWA use levels (including automotive, boat or air traffic levels) following LMP adoption. No design changes are proposed for current road access, nor are any changes anticipated with traffic patterns; therefore, no traffic hazards are anticipated. Since changes to current traffic levels or patterns are not anticipated, no changes to emergency access or parking would result from plan adoption, and the plan would not interfere with alternative transportation.</p> <p>In addition, prior to implementation of projects consistent with the LMP, CDFG would subject them to CEQA review according to CEQA Guidelines Section 15168, to determine if additional CEQA documentation is necessary. CEQA Guidelines Sections 15162-15164 would guide the type of additional CEQA review to be completed.</p> |                                       |  |                                     |                  |
| <b>XVI. UTILITIES AND SERVICE SYSTEMS</b>  | <b>Potentially Significant Impact</b> | <b>Less Than Significant with Mitigation Incorporation</b> | <b>Less Than Significant Impact</b> | <b>No Impact</b> |
| <b>Would the project:</b>  |                                       |  |                                     |                  |
| a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?  |                                       |  | X                                   |                  |
| b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?   |                                       |  | X                                   |                  |
| c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?  |                                       |  | X                                   |                  |
| d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?   |                                       |  | X                                   |                  |
| e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?  |                                       |  | X                                   |                  |
| f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?   |                                       |  | X                                   |                  |
| g) Comply with federal, state, and local statutes and  |                                       |  | X                                   |                  |

|                                     |  |  |  |  |
|-------------------------------------|--|--|--|--|
| regulations related to solid waste? |  |  |  |  |
|-------------------------------------|--|--|--|--|

**DISCUSSION:****a), b), c), d), e), f), g) Less Than Significant Impact.**

Anticipated levels of use at the MCCWA will remain the same following LMP adoption. The LMP does not include a proposal for additional storm drain, water supply, wastewater treatment, or solid waste disposal facilities. Proposed LMP adoption and goal and task implementation would not require the construction of new residences or service-related facilities; and therefore, would not generate a new demand or change existing capacities for storm water, water supply wastewater treatment, or solid waste disposal.

Additionally, prior to implementation of projects consistent with the LMP, CDFG would subject them to CEQA review according to CEQA Guidelines Section 15168, to determine if additional CEQA documentation is necessary. CEQA Guidelines Sections 15162-15164 would guide the type of additional CEQA review to be completed.

| <b>XVII. Greenhouse Gas Emissions –<br/>Would the project:</b>  | <b>Potentially<br/>Significant<br/>Impact</b> | <b>Less Than<br/>Significant with<br/>Mitigation<br/>Incorporation</b> | <b>Less Than<br/>Significant<br/>Impact</b> | <b>No<br/>Impact</b> |
|---|---|--|---|----------------------|
| a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment ?      |   |  | X   |                      |
| b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases ? |   |  | X   |                      |

**DISCUSSION a), b) Less Than Significant Impact**

The MCCWA is located in the Northern Sacramento Valley Air Basin (NSVAB), which is comprised of seven counties including Shasta and Tehama. The NSVAB's approximate measurements are 200 miles long in a north-south direction with a maximum width of 150 miles, although the valley floor averages only 50 miles. The Shasta and Tehama County Air Pollution Control Districts are responsible for local implementation of state and federal air quality standards within the MCCWA region.

The MCCWA LMP proposed goals and tasks will not conflict or obstruct implementation of the Districts air quality plans nor contribute significantly to any air quality violations. LMP implementation will not construct any stationary sources of criteria pollutants, nor add to mobile sources, therefore, will not contribute to increasing local levels of greenhouse gas (GHG) emissions. Implementation of the goals and tasks of the LMP will most likely reduce GHG through habitat preservation, restoration and subsequent carbon

sequestration. Although some proposed LMP management tasks could involve the use of construction equipment (e.g., continued operations and maintenance, restoration or enhancement activities) thus temporarily increasing equipment emissions, these would be short-term impacts and would not cause a considerable cumulative net increase of air pollutants. There are no predicted increases in MCCWA use levels (including automotive, boat or air traffic levels) following LMP adoption. No design changes are proposed for current road access, nor are any changes anticipated with traffic patterns. Hence, it is not expected to have a substantial increase in overall vehicle miles traveled by administrative personnel or the public. The MCCWA LMP management tasks do not utilize additional surface or groundwater resources and integrates many of the actions outlined in an internal policy referenced as "DFG Going Green – Reducing Our Carbon Footprint". Overall, the MCCWA LMP does not conflict with the Department's overall undertaking of reducing GHG emissions as part of its compliance within the Natural Resources Agency's adherence to Assembly Bill 32 and Senate Bill 97.

In addition, prior to implementation of projects consistent with the LMP, CDFG would subject them to CEQA review according to the recent CEQA Guidelines Section 15064.4, to determine if additional CEQA documentation is necessary. CEQA Guidelines Sections 15162-15164 and 15168 would guide the type of additional CEQA review to be completed.

| <b>XVIII. MANDATORY FINDINGS OF SIGNIFICANCE –</b><br><b>Would the project:</b>  | <b>Potentially Significant Impact</b> | <b>Less Than Significant with Mitigation Incorporation</b> | <b>Less Than Significant Impact</b> | <b>No Impact</b> |
|--|---------------------------------------|--|-------------------------------------|------------------|
| a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory? |                                       |  | X                                   |                  |
| b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?   |                                       |  | X                                   |                  |
| c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?  |                                       |  | X                                   |                  |

|  |
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|  |
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**DISCUSSION:****a) Less Than Significant Impact.**

LMP goal and task implementation would help preserve and enhance the natural resources of the MCCWA. As described in Chapter IV and V of the MCCWA LMP, there are some restoration and enhancement activities that could potentially impact biological and cultural resources. However, there are no significant impacts anticipated to these resources because these activities would follow all applicable regulatory requirements and the LMP goals and tasks are designed to have a net benefit to these resources. Additionally, no large scale projects are anticipated which could threaten entire populations or communities.

Moreover, prior to implementation of projects consistent with the LMP, CDFG would subject them to CEQA review according to CEQA Guidelines Section 15168, to determine if additional CEQA documentation is necessary. CEQA Guidelines Sections 15162-15164 would guide the type of additional CEQA review to be completed

**b) Less Than Significant Impact.**

LMP adoption and goal and task implementation would not require any substantial infrastructure improvements or new construction, and any implementation activities conducted would follow all applicable regulatory requirements. In addition, the proposed goals and tasks are designed to provide a net benefit to environmental conditions. Therefore, although there is a potential for some temporary and less than significant impacts to the environment as described above, none of these impacts are cumulatively considerable.

In addition, prior to implementation of projects consistent with the LMP, CDFG would subject them to CEQA review according to CEQA Guidelines Section 15168, to determine if additional CEQA documentation is necessary. CEQA Guidelines Sections 15162-15164 would guide the type of additional CEQA review to be completed.

**c) Less Than Significant Impact.**

CDFG's current mission is to manage California's diverse fish, wildlife, and plant resources, and the habitats upon which they depend, for their ecological values and for the public's use and enjoyment. The proposed project is an LMP that serves as a general policy guide for the management of the MCCWA. It does not specifically authorize or make a precommitment to any substantive physical changes to the Wildlife Area. With no substantive physical changes proposed, LMP implementation will comply with all applicable laws and regulations. As a result, LMP goal and task implementation would not have any direct or indirect environmental effects which would cause substantial adverse effects on human beings.



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- USDA. Natural Resource Conservation Service. 1996. Soil Quality Resource Concerns: Soil Erosion. Online: [http://soils.usda.gov/sqi/publications/files/sq\\_two\\_1.pdf](http://soils.usda.gov/sqi/publications/files/sq_two_1.pdf)

**Notice of Completion & Environmental Document Transmittal**

Mail to: State Clearinghouse, P.O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613

For Hand Delivery/Street Address: 1400 Tenth Street, Sacramento, CA 95814

SCH #

**Project Title:** Mouth of Cottonwood Wildlife Area Land Management Plan**Lead Agency:** Department of Fish and Game - North Coast Region**Contact Person:** Jim Chakarun**Mailing Address:** 601 Locust Street**Phone:** (530) 527- 8917**City:** Redding**Zip:** 96001**County:** Shasta and Tehama**Project Location:** County: Shasta and Tehama

City/Nearest Community: Cottonwood

**Cross Streets:** Balls Ferry Rd**Zip Code:** 96022**Longitude/Latitude (degrees, minutes and seconds):** ° ' " N / ° ' " W **Total Acres:** 1,060**Assessor's Parcel No.:** various, see LMP**Section:** **Twp.:** 29N **Range:** 3W **Base:** MDBM**Within 2 Miles:** **State Hwy #:** 5**Waterways:** Sacramento River / Cottonwood Creek**Airports:****Railways:****Schools:****Document Type:****CEQA:**☐ NOP☐ Draft EIR**NEPA:**☐ NOI**Other:**☐ Joint Document☐ Early Cons☐ Supplement/Subsequent EIR☐ EA☐ Final Document☒ Neg Dec

(Prior SCH No.)

☐ Draft EIS☐ Other:☐ Mit Neg Dec**Other:**☐ FONSI**Local Action Type:**☐ General Plan Update☐ Specific Plan☐ Rezone☐ Annexation☐ General Plan Amendment☐ Master Plan☐ Prezone☐ Redevelopment☐ General Plan Element☐ Planned Unit Development☐ Use Permit☐ Coastal Permit☐ Community Plan☐ Site Plan☐ Land Division (Subdivision, etc.)☒ Other: Mngmt Plan**Development Type:**☐ Residential: Units \_\_\_\_\_ Acres \_\_\_\_\_☐ Office: Sq.ft. \_\_\_\_\_ Acres \_\_\_\_\_ Employees \_\_\_\_\_☐ Commercial: Sq.ft. \_\_\_\_\_ Acres \_\_\_\_\_ Employees \_\_\_\_\_☐ Industrial: Sq.ft. \_\_\_\_\_ Acres \_\_\_\_\_ Employees \_\_\_\_\_☐ Educational:☐ Recreational:☐ Water Facilities: Type \_\_\_\_\_ MGD \_\_\_\_\_☐ Transportation: Type \_\_\_\_\_☐ Mining: Mineral \_\_\_\_\_☐ Power: Type \_\_\_\_\_ MW \_\_\_\_\_☐ Waste Treatment: Type \_\_\_\_\_ MGD \_\_\_\_\_☐ Hazardous Waste: Type \_\_\_\_\_☒ Other: Wildlife Area**Project Issues Discussed in Document:**☒ Aesthetic/Visual☐ Fiscal☐ Recreation/Parks☒ Vegetation☒ Agricultural Land☒ Flood Plain/Flooding☐ Schools/Universities☒ Water Quality☒ Air Quality☒ Forest Land/Fire Hazard☐ Septic Systems☒ Water Supply/Groundwater☒ Archeological/Historical☒ Geologic/Seismic☐ Sewer Capacity☒ Wetland/Riparian☒ Biological Resources☒ Minerals☒ Soil Erosion/Compaction/Grading☐ Growth Inducement☐ Coastal Zone☐ Noise☐ Solid Waste☒ Land Use☐ Drainage/Absorption☐ Population/Housing Balance☒ Toxic/Hazardous☐ Cumulative Effects☐ Economic/Jobs☐ Public Services/Facilities☐ Traffic/Circulation☐ Other:**Present Land Use/Zoning/General Plan Designation:**

Agriculture Cropland and Grazing, Natural Resource Protection Open Space, Interim Mineral Resource

**Project Description:** (please use a separate page if necessary)

This draft LMP describes the ecological conditions and managerial goals of the Mouth of Cottonwood Creek WA. The draft LMP contains a comprehensive description of the MCCWA and its environment as well as an evaluation of compatible wildlife-related public uses. The MCCWA is approximately 1,060 acres and described on the Balls Ferry USGS 7.5 minute topo sections: 4,5,8,9 32-33. It's composed of predominately annual grassland, valley oak savanna and mixed riparian forest.



## Reviewing Agencies Checklist

Lead Agencies may recommend State Clearinghouse distribution by marking agencies below with and "X".  
If you have already sent your document to the agency please denote that with an "S".

|   |  |
|---|--|
| <input type="checkbox"/> Air Resources Board                            | <input type="checkbox"/> Office of Emergency Services                        |
| <input type="checkbox"/> Boating & Waterways, Department of             | <input type="checkbox"/> Office of Historic Preservation                     |
| <input type="checkbox"/> California Highway Patrol                      | <input type="checkbox"/> Office of Public School Construction                |
| <input type="checkbox"/> Caltrans District # _____                      | <input type="checkbox"/> Parks & Recreation, Department of                   |
| <input type="checkbox"/> Caltrans Division of Aeronautics               | <input type="checkbox"/> Pesticide Regulation, Department of                 |
| <input type="checkbox"/> Caltrans Planning                              | <input type="checkbox"/> Public Utilities Commission                         |
| <input type="checkbox"/> Central Valley Flood Protection Board          | <input type="checkbox"/> Regional WQCB # _____                               |
| <input type="checkbox"/> Coachella Valley Mtns. Conservancy             | <input checked="" type="checkbox"/> Resources Agency                         |
| <input type="checkbox"/> Coastal Commission                             | <input type="checkbox"/> S.F. Bay Conservation & Development Comm.           |
| <input type="checkbox"/> Colorado River Board                           | <input type="checkbox"/> San Gabriel & Lower L.A. Rivers & Mtns. Conservancy |
| <input type="checkbox"/> Conservation, Department of                    | <input type="checkbox"/> San Joaquin River Conservancy                       |
| <input type="checkbox"/> Corrections, Department of                     | <input type="checkbox"/> Santa Monica Mtns. Conservancy                      |
| <input type="checkbox"/> Delta Protection Commission                    | <input checked="" type="checkbox"/> State Lands Commission                   |
| <input type="checkbox"/> Education, Department of                       | <input type="checkbox"/> SWRCB: Clean Water Grants                           |
| <input type="checkbox"/> Energy Commission                              | <input checked="" type="checkbox"/> SWRCB: Water Quality                     |
| <input type="checkbox"/> Fish & Game Region # _____                     | <input type="checkbox"/> SWRCB: Water Rights                                 |
| <input type="checkbox"/> Food & Agriculture, Department of              | <input type="checkbox"/> Tahoe Regional Planning Agency                      |
| <input type="checkbox"/> Forestry and Fire Protection, Department of    | <input type="checkbox"/> Toxic Substances Control, Department of             |
| <input type="checkbox"/> General Services, Department of                | <input checked="" type="checkbox"/> Water Resources, Department of           |
| <input type="checkbox"/> Health Services, Department of                 |  |
| <input type="checkbox"/> Housing & Community Development                | Other: _____   |
| <input type="checkbox"/> Integrated Waste Management Board              | Other: _____   |
| <input checked="" type="checkbox"/> Native American Heritage Commission |  |

### Local Public Review Period (to be filled in by lead agency)

Starting Date \_\_\_\_\_ Ending Date \_\_\_\_\_

### Lead Agency (Complete if applicable):

|   |  |
|---|--|
| Consulting Firm: <u>Sustain Environmental Inc</u> | Applicant: <u>CA Department of Fish and Game</u> |
| Address: <u>3104 "O" Street</u>                   | Address: <u>601 Locust Street</u>                |
| City/State/Zip: <u>Oakland, CA 94612</u>          | City/State/Zip: <u>Redding, California 96001</u> |
| Contact: <u>Ms. Rebecca Cull</u>                  | Phone: <u>(530) 527 -8917</u>                    |
| Phone: <u>(916) 457 1856</u>                      |  |

Signature of Lead Agency Representative:  Date: 10/29/10

Authority cited: Section 21083, Public Resources Code. Reference: Section 21161, Public Resources Code.

# Notice of Determination

Appendix D

**To:**

☒ Office of Planning and Research  
 For U.S. Mail: Street Address:  
 P.O. Box 3044 1400 Tenth St.  
 Sacramento, CA 95812-3044 Sacramento, CA 95814

☒ County Clerk

County of: Shasta and Tehama  
 Address: 1450 Court St., Ste. 208A Redding, CA 96001-1667  
633 Washington Street, Room 11 Red Bluff, CA 96080

**From:**

Public Agency: Department of Fish and Game  
 Address: 601 Locust Street  
Redding CA 96001  
 Contact: Steve Burton  
 Phone: (530) 459-1129

Lead Agency (if different from above):

Address: \_\_\_\_\_  
 Contact: \_\_\_\_\_  
 Phone: \_\_\_\_\_

**SUBJECT: Filing of Notice of Determination in compliance with Section 21108 or 21152 of the Public Resources Code.**

State Clearinghouse Number (if submitted to State Clearinghouse): 2010122020

Project Title: Final Land Management Plan for the Mouth of Cottonwood Creek Wildlife Area/Negative Declaration

Project Location (include county): 5 miles east of the town of Cottonwood - Shasta and Tehama Counties

Project Description:

The project being approved is the adoption and implementation of the Land Management Plan (LMP). The LMP will guide the Department's management, planning, and operations of the Mouth of Cottonwood Creek Wildlife Area.

This is to advise that the California Department of Fish and Game has approved the above described project on

☒ Lead Agency or ☐ Responsible Agency

and has made the following determinations regarding the above described project:

(Date)

1. The project [ ☐ will ☒ will not] have a significant effect on the environment.
2. ☐ An Environmental Impact Report was prepared for this project pursuant to the provisions of CEQA.  
☒ A Negative Declaration was prepared for this project pursuant to the provisions of CEQA.
3. Mitigation measures [ ☐ were ☒ were not] made a condition of the approval of the project.
4. A mitigation reporting or monitoring plan [ ☐ was ☒ was not] adopted for this project.
5. A statement of Overriding Considerations [ ☐ was ☒ was not] adopted for this project.
6. Findings [ ☐ were ☒ were not] made pursuant to the provisions of CEQA.

This is to certify that the final EIR with comments and responses and record of project approval, or the negative Declaration, is available to the General Public at: 601 Locust Street Redding CA 96001

Signature (Public Agency)

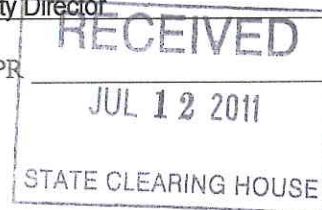
*[Handwritten Signature]*

Title Deputy Director

Date

7/7/11

Date Received for filing at OPR



## **APPENDIX G**

# Data and Monitoring Resources for Adaptive Management of the MCCWA

(hyperlinked)

## Data and Monitoring Resources for Adaptive Management of the MCCWA



### INTERNAL RESOURCES CDFG Data and Maps

[Data Portal](#): Use the data portal to query CDFG's constantly updated databases, and to generate up-to-date lists and reports. Topics covered include angling records, fishing contests, access to the department's complete species list, the [habitat tracking and reporting tool](#), and many resources for authenticated CDFG employees, partners and subscribers.

[Document Library](#): Use the dynamic search features of the document library to quickly and easily locate, view and download important documents held by CDFG. The holdings include species descriptions, monitoring reports and recovery plans, as well as news releases, resources for CDFG employees and much more.

[BIOS](#): Biogeographic Information and Observation System. Online mapping tool designed to enable the visualization, management and analysis of a wide range of biogeographic data collected by CDFG and partner organizations.

[Biogeographic Data Branch \(BDB\)](#): BDB provides a leadership, policy, and standards setting role for biological and geographic data management activities for the entire California Department of Fish and Game, its contractors, and partner organizations. BDB contains biological data development programs that are especially dependent and closely linked with GIS and emerging related technologies.

[California Natural Diversity Database \(CNDDDB\)](#): A natural heritage program providing rare, endangered, and special status species information for use in conservation and resource management.

[RareFind](#): A data query and reporting application with access to all CNDDDB data; regularly updated.

[California Wildlife Habitat Relationships \(CWHR\)](#): CWHR contains life history, geographic range, habitat relationships, and management information on 694 species of amphibians, reptiles, birds, and mammals in California.

[The Vegetation Classification and Mapping Program \(VegCAMP\)](#): VegCAMP's goal is to develop and maintain maps and the classification of all vegetation and habitats in the state to support conservation and management decisions at the local, regional and state levels.

[Geographic Information Systems \(GIS\)](#): The GIS unit assists CDFG's divisions and regions with the collection, documentation, and analysis of spatial data needed to support good conservation decisions. This includes online mapping tools, a GIS data warehouse, software support, and custom tools.



## EXTERNAL RESOURCES

### Other Data and Mapping Resources

Coordination with larger regional resource planning serves to improve the long-term viability of habitats and species while providing access to additional data and technical expertise. Key resources for biological planning and monitoring that share common goals as well as local interest in protecting the ecological integrity of the MCCWA include:

[CALFED Ecosystem Restoration Program Information Network \(ERPIN\)](#)

[CalFish](#)

[California Digital Atlas, Inventory, Monitoring and Assessment Program \(IMAPS\)](#)

[California Environmental Data Exchange Network \(CEDEN\)](#)

[California Environmental Digital Library Network \(CalEDLN\)](#)

[California Environmental Resources Evaluation System \(CERES\)](#)

[California Legacy Project](#)

[California Water Resources Control Board, Surface Water Ambient Monitoring Program \(SWAMP\)](#)

[California Watershed Funding Database](#)

[California Watershed Portal Maps and Tools](#)

[California Wetlands Information System](#)

[Environmental Protection Indicators Program \(EPIC\)](#)

[Natural Resource Projects Inventory \(NRPI\)](#)

[Historical Works of California Native Grasses and Grassland Management](#)

[Sacramento Valley Bioregion](#)

[USFWS, Pacific Region Portals](#)

### Inventory and Monitoring Assistance

**Educational/Academic Programs.** Students and researchers utilizing the Balls Ferry Research and Education Center (BFREC) could provide baseline data collection and monitoring for the MCCWA, focusing initially on Balls Ferry Wetland Unit 1 (BFW1). As this program develops, additional resources may be directed to the Cottonwood Creek Unit. Shasta College and California State University, Chico, have expressed interest in utilizing the Wildlife Area as an extended outdoor classroom, and student monitoring is a viable and inexpensive option for collecting resource data.

**Community Groups.** The local chapter of the Audubon Society (Wintu Audubon) is extremely active in the region, participating in the annual Breeding Bird Survey, managing and conducting the annual Christmas Bird Counts, and assisting the Point Reyes Bird Observatory (PRBO) with point counts at nearby Clear Creek. They regularly offer birding trips for both novice and experienced birders to nearby Reading Island and have indicated a desire to assist CDFG with breeding bird surveys and point counts at the MCCWA. The Wintu Audubon Society has expressed interest in assisting CDFG with bird monitoring at the MCCWA (Santry, personal communication). Additional support for the biological monitoring element may come from USFWS, PRBO Conservation Science, and the Riparian Habitat Joint Venture. The Cottonwood Creek Watershed Group may also be available to assist with benthic macro invertebrate (BMI) monitoring.

**APPENDIX H**

Regional Habitat  
Conservation Planning  
Documents Relevant  
to the MCCWA

(hyperlinked)

## Regional Habitat Conservation Planning Documents Relevant to the MCCWA

*Organized by Planning Entity*

### **California Bay-Delta Authority California Department of Fish and Game**

*CALFED Bay-Delta Program, Ecosystem Restoration Program*

The Cottonwood Creek watershed and the Sacramento River Ecological Management Zone are identified as important ecological management areas in the [Final Programmatic Environmental Impact Statement/Environmental Impact Report](#) (CalFed 2000c). Historically the riparian corridor along the Sacramento River averaged 4 to 5 miles wide; today, only 5% of the riparian forests remain. The MCCWA is situated at the confluence of these two major hydrological systems, and although small in area, contributes to the overall goals enhancing riparian habitats within this region of California. The CDFG is one of the lead implementing agencies for the [Ecosystem Restoration Program](#).

### **California Department of Fish and Game**

*Cottonwood Creek Mitigation Bank Operational Plan*

The CDFG has a no net loss wetland policy and is a partner with the federal resource agencies to establish recommendations for their protection. The department owns the [Cottonwood Creek Wetland Mitigation Bank](#) and manages it on behalf of the U.S. Army Corps of Engineers (USACE), the USFWS, the National Resources Conservation Service (NRCS), the California Central Valley Regional Water Quality Control Board (RWQCB), and U.S. EPA. The Cottonwood Creek Mitigation bank consists of 22.21 acres of created wetlands habitats: 12.25 acres of semi-permanent wetlands, 5.63 acres of moist-soil wetlands, and 4.33 acres of permanent wetlands (CDFG, internal document).

### **California Department of Food and Agriculture**

*Shasta Cooperative Weed Management Area*

Weed Management Areas (WMA) are widely recognized as models for carrying out comprehensive and effective weed management programs on the ground. They are unique because they attempt to address agricultural (regulatory) weeds and “wildland” weeds under one local umbrella of organization. The intent is to bring together landowners and managers from various private, non-profit, county, state, and federal agencies, combining their expertise, energy, and resources to deal with a common problem. The [Shasta County WMA](#) has 21 signatories who are working together to manage weeds in the region. It provides printed weed identification/control brochures, organizes weed education events, writes and obtains grants, coordinates demonstration plots, and initiates joint eradication, mapping, outreach, and other effective weed management projects.

## California Environmental Protection Agency

### *California Wetlands Conservation Policy*

Established in 1993, the [California Wetlands Conservation Policy](#) is the guiding document behind the state's no net loss of wetlands. As the lead agency, the [California Environmental Protection Agency](#) (CalEPA) is responsible for helping state agencies achieve long-term net gains in the quantity, quality and permanence of California wetlands in a manner that fosters creativity, stewardship and respect for private property.

## California Oak Foundation

### *Oaks 2040: The Status and Future of Oaks in California*

Founded in 1988, the [California Oak Foundation](#) (COF) is a 501 (c)(3) non-profit educational organization committed to preserving the state's oak forest ecosystem and its rural landscapes. Its premier planning document and tool is [Oaks 2040: The Status and Future of Oaks in California](#). The Foundation's programs include:

- Working with landowners, ranchers, farmers, developers, conservation organizations, estate planners and others to conserve oak woodlands, mitigate losses of biodiversity, plan responsibly for the urbanization pressures in California, and protect the state's critical watersheds and wildlife habitat.
- Educating children to be responsible stewards of California's oak woodlands by providing curricula to educators; developing the oak component of the "Cal Alive!" CD-ROM series for youth; publishing and distributing a new curriculum entitled "Investigating the Oak Community" aimed at children in grades 4 through 8.
- Enabling community members to work on local oak conservation issues by providing technical assistance, scientific and resource information, press and community outreach guidelines, and testimony.
- Advocating for responsible planning at the state, regional and local levels.
- Conducting ongoing public information programs through symposia, workshops and an extensive schedule of personal appearances and electronic outreach.

## California Partners in Flight

[California Partners in Flight](#) (CalPIF) was formed in 1992 with the full participation of the state's land and wildlife managers, scientists and researchers, and private organizations interested in the conservation of non-game landbirds. Noting that the major cause of population declines in California appeared to be habitat loss, CalPIF began identifying critical habitats important to birds and worked to protect and enhance remaining fragments of those habitats.

### *Draft Grassland Bird Conservation Plan*

The [Draft Grassland Bird Conservation Plan](#) (CalPIF 2000) is a collaborative effort of [CalPIF](#). It was developed to guide conservation policy and action on behalf of grassland habitats and birds. The geographic scope of this plan is the distribution of annual and native perennial grasslands in the state, which are found predominantly along the coast and in California's Great Central Valley.

### *Oak Woodland Bird Conservation Plan*

The [Oak Woodland Bird Conservation Plan](#) (CalPIF 2002) is another collaborative effort of CalPIF, developed to guide conservation policies and actions on behalf of oak woodlands habitats and wildlife. The plan is focused on bird species that are dependent upon oak habitats but the conservation recommendations have broad applicability for all oak woodland habitats and benefit many oak-woodland-dependent wildlife species. The Oak Woodland Conservation Bird Plan is meant to be a source of information for land managers, agencies and non-governmental organizations.

### *Guide to Habitat Enhancement for Birds in the Sacramento Valley*

CalPIF's "Bringing the Birds Back" habitat enhancement guides provide landowners and managers with practical steps they can take to improve bird habitat and overall ecosystem health on their lands. The [Guide to Habitat Enhancement for Birds in the Sacramento Valley](#) focuses on riparian (streamside) habitat throughout the Sacramento Valley. It provides specific recommendations to benefit birds in these habitats, including a list of suggested native plant species to plant, along with exotic species that should be removed. The guide also provide a list of bird species to look for that will help indicate a successful habitat enhancement project. Information about agencies and organizations that can help with technical and financial assistance in habitat enhancement is also provided.

### **Central Valley Joint Venture**

#### *North American Waterfowl Management Plan*

The [Central Valley Joint Venture](#) (CVJV) is one of 17 joint venture partnerships in the United States established under the [North American Waterfowl Management Plan](#) and funded under the annual Department of the Interior Appropriations Act. The CVJV brings together conservation organizations, public agencies, private landowners and other partners interested in the conservation of bird habitat within California's Central Valley. The CVJV mission is to work collaboratively through diverse partnerships to protect, restore, and enhance wetlands and associated habitats for waterfowl, shorebirds, waterbirds and riparian songbirds, in accordance with conservation actions identified in its implementation plan.

### **Cottonwood Creek Watershed Group**

#### *Cottonwood Creek Watershed Management Plan*

The [Cottonwood Creek Watershed Group \(CCWG\)](#) is an organized group of landowners, business owners and other private parties committed to maintaining a healthy and productive watershed. CCWG was formed in 1998 through the volunteer efforts of landowners. Using CalFed grants, the CCWG has completed a watershed assessment (CH2MHill 2002) and a comprehensive hydrological assessment (Graham Matthews Associates 2003). More recently, the CCWG developed a comprehensive environmental education program for all schools in the watershed.

## **Riparian Habitat Joint Venture California Partners in Flight**

### *Riparian Bird Conservation Plan*

The [Riparian Habitat Joint Venture](#) (RHJV) mission is to provide leadership and guidance to promote the effective conservation and restoration of riparian habitats in California through the following goals:

- Identify and develop technical information based on sound science for a strategic approach to conserving and restoring riparian areas in California.
- Promote and support riparian conservation on the ground by providing guidance, technical assistance and a forum for collaboration.
- Develop and influence riparian policies through outreach and education (RHJV 2004).

To date, 18 federal, state and private organizations have signed the landmark cooperative agreement to protect and enhance habitats for native landbirds throughout California. The RHJV, modeled after the successful joint venture projects of the North American Waterfowl Management Plan, reinforces other collaborative efforts currently underway aimed at protecting biodiversity and enhancing natural resources as well as the human element they support. The vision of the RHJV is to restore, enhance and protect a network of functioning riparian habitat across California to support the long-term viability of landbirds and other species.

A major achievement of the RHJV partnership is the development of a statewide [Riparian Bird Conservation Plan](#) (2004) based on current, scientifically valid data and the collective expertise of top ornithologists. This plan is the guidance document for RHJV riparian conservation and action.

## **Sacramento River Advisory Council Riparian Habitat Committee**

### *Sacramento River Conservation Area, Management Guidelines*

The overall goals of the [Sacramento River Conservation Area](#) (SB 1086) are to preserve remaining riparian habitat, reestablish a continuous riparian ecosystem along the Sacramento River between Redding and Chico, and reestablish riparian vegetation along the river from Chico to Verona. This will be accomplished through an incentive-based, voluntary river management plan (Sacramento River Advisory Council 2003). The Riparian Habitat Committee developed a set of management guidelines for the Sacramento River Conservation Area, including Shasta and Tehama counties, within the approximate 100-year designated floodplain. These categories are identified as follows: inner river zone guidelines, site-specific management planning guidelines, restoration priority guidelines, and Sacramento River GIS guidelines.

## **Shasta County**

### *Shasta County General Plan, Stream Corridor Protection Plan*

The Resource Management Section of the [Shasta County General Plan \(2004\)](#) identifies riparian woodland as the most ecologically significant plant community in the south-central portion of the county. To preserve this important resource, the county has adopted a [Stream Corridor Protection Plan](#) that emphasizes protection of riparian habitats from development and from adverse impacts from conflicting resource uses (ibid.). The county has also designated much of Cottonwood Creek as an area where spawning gravels shall be protected and has classified the creek and the area



within 0.5 miles of the Sacramento River as a “designated floodway.” Designated floodways are zones that are considered special flood hazards due to the velocity of the flood waters, debris, potential projectiles and erosion. Land uses within designated floodways need to minimize environmental impacts to riparian and wetland habitats, while protecting life and property (ibid.). The MCCWA is located within this land use area.

#### *Oak Woodland Management Guidelines*

Shasta County enacted voluntary [Oak Woodland Management Guidelines](#) in 1995. These guidelines are designed to encourage the retention of native oaks, brush piles, and snags (Shasta County 2004). The passing of the [Oak Woodlands Conservation Act](#) in 2001 added language to California Public Resources Code (§ 21083.4) related to oak woodland conservation. The act requires the consideration of oak woodland conversion as part of the California Environmental Quality Act (CEQA). Specifically, it requires that a county, in determining whether an environmental impact report, negative declaration, or mitigated negative declaration is prepared, specifically determine whether a project may result in a conversion of oak woodlands that will have a significant effect on the environment. If such a determination of significance is made, the county is required to implement one or more specified alternatives to mitigate the effect of woodland conversion. Mitigation options include the protection of existing oak woodland or the planting of trees.

#### **U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service and California Department of Fish and Game**

##### *Central Valley Project Conservation Program Habitat Restoration Program*

The 1992 [Central Valley Project Improvement Act](#) (CVPIA) specifically provided for anadromous fish and migratory waterfowl habitat improvements and required the U.S. Department of the Interior to address environmental impacts related to the construction and operation of water transfers through the Central Valley Project (CVP). The [Central Valley Project Conservation Program](#) (CVPCP) and [Habitat Restoration Program](#) (HRP) work together to protect endangered species and to protect and restore native fish and wildlife habitats that have experienced the greatest decline since construction of the CVP.

#### **U.S. Fish and Wildlife Service**

##### *Neotropical Migratory Bird Conservation Act*

In 2000, the U.S. Congress passed the Neotropical Migratory Bird Conservation Act (16 USC 6101-6109) to:

1. perpetuate healthy populations of neotropical migratory birds,
2. assist in the conservation of neotropical migrants by supporting conservation initiatives in the United States, Canada, Latin America, and the Caribbean, and
3. provide financial resources and foster international cooperation for these initiatives.

The U.S. Fish and Wildlife Service (USFWS) manages the Neotropical Migratory Bird Conservation Grant Program to implement the terms of this legislation.

### *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon*

In 2005, the USFWS developed the [Recovery Plan for Vernal Pool Ecosystems in California and Southern Oregon](#) specify the actions necessary for recovery and conservation of vernal pool ecosystems and associated species. The plan promotes natural ecosystem processes and functions by protecting and conserving intact vernal pools and vernal pool complexes to achieve self-sustaining, wild populations of listed species so they will no longer require protection under the Endangered Species Act. Although USFWS does not require species of concern to have recovery plans, they are included in this recovery plan because a community-level strategy provides opportunities for pre-listing conservation of species with needs similar to those of listed species.

### **University of California Cooperative Extension**

#### *Integrated Hardwood Range Management Program*

The [Integrated Hardwood Range Management Program \(IHRMP\)](#) was established in 1986 in response to concerns that oaks and oak woodlands in California weren't being managed properly and that the critical ecological values associated with these systems would be irretrievably lost if nothing was done. The IHRMP brings together several state institutions including the University of California Cooperative Extension (UCCE), CAL FIRE, and CDFG to focus on research education related to hardwood management in California. Specific objectives of the IHRMP include:

- Developing methods to sustain hardwood ecosystems and landscapes
- Maintaining wildlife habitat on hardwood rangelands
- Restoring degraded hardwood rangelands
- Ensuring land-use planning utilizes available information to conserve hardwood range ecosystems
- Maintaining economically viable private hardwood rangeland enterprises Maintaining statewide information on trend, condition, and extent of hardwood rangelands
- Helping focus public awareness on the importance of hardwood rangeland habitats

### **Wildlife Conservation Board**

#### *California Riparian Habitat Conservation Program*

The [California Riparian Habitat Conservation Program \(CRHCP\)](#) was created within the Wildlife Conservation Board (WCB) by legislation in 1991. The program has a basic mission to develop coordinated conservation efforts aimed at protecting and restoring the state's riparian ecosystems. The goals of the CRHCP are to protect, preserve, restore and enhance riparian habitat throughout California.

#### *Inland Wetlands Conservation Program*

Administered by the WCB, the [Inland Wetlands Conservation Program \(IWCP\)](#) has a basic mission to create and implement conservation efforts that make economic as well as social and environmental sense. The creation of the IWCP recognized the importance of public and private partnerships in forming coalitions necessary to implement the very specific CVJV objectives. Working in conjunction with other CVJV partners, the program has proven to be highly effective at protecting and restoring wetlands in the Central Valley.

*Habitat Enhancement and Restoration Program (General)*

The [Habitat Enhancement and Restoration Program](#) funds projects outside the WCB's two main restoration programs: the California Riparian Habitat Conservation Program and the Inland Wetlands Conservation Program. Included in the Habitat Enhancement and Restoration Program are restorations of fisheries, wetlands outside the Central Valley, native grasslands and forests. Eligible enhancement and restoration projects must provide for the long-term maintenance of the restored and/or enhanced habitat. Eligible applicants for restoration projects include nonprofit conservation organizations and federal, state or local governmental agencies. Habitat enhancement and restoration projects, like the acquisition and public access projects, are carried out pursuant to recommendations from CDFG. Restoration and public access projects may be located on department-owned or other lands.

*California Oak Woodlands Conservation Program*

In 2001, the California Legislature passed the California Oak Woodland Conservation Act (SB 1334). As a result of the act, the [Oak Woodlands Conservation Program](#) was established. This program, administered by WCB, is designed to provide \$10 million to help local jurisdictions protect and enhance their oak woodland resources. It offers landowners, conservation organizations, and cities and counties an opportunity to obtain funding for projects designed to conserve and restore California's oak woodlands. It authorizes the WCB to purchase oak woodland conservation easements and provide grants for land improvements and oak restoration efforts. It also provides funding for public education and outreach efforts to support the conservation of oak woodlands.

**APPENDIX I**

# **Balls Ferry Research and Education Center (BFREC) Administrative Record**

*In Chronological Order*

Meeting at Dymesich Property  
(March 29, 2004)

Draft Proposed Framework for the Balls Ferry Wetlands  
(April 30, 2004)

INCLUDES:  
Project List for BFW and Freshman Science Course (Anderson New Technology High School)

BFWU/ANTHS Conceptual Plan and MOU  
(Draft, February 24, 2005)  
(Draft 3, March 21, 2005)

Objectives, Balls Ferry Wetland Education Center  
(October 10, 2006)

1082

Meeting at Dymesich property on Friday, 03/19/04

Meeting Notes/Outline

Attendees: Cindy Wallen, Ron Zimmerman, students from ANTHS, Brian and Kelly from the McConnell Foundation, David Walker, Steve Arrison, John Siperek

### **Topics** (first cut: 03/22/04 SJA)

Add timeframe or schedule

Develop grants for repair

Determine vision - what stays and goes

News coverage

GPS/ Property boundary, Infrastructure and plant communities or habitats

Develop GIS map

Inventory of species----animals (fish, reptiles, amphibians, birds, and mammals) and plants

1. Roving Species identification/digital photo record
2. Transects
3. Remote sensusing
4. Remote video
5. Bat identification/by frequency signature

Water quality testing

1. Dissolved oxygen, etc.
2. Demonstrate ability of wetland to filter and improve water quality

Mapping accuracy and resolution needed

Compatibility with DFG protocols

Historical use history of property and surrounding area

1. Land grant

2 of 2

2. Pre Dymesich ownership period
3. Dymesich family ownership period
4. Present surrounding land use
5. Surrounding development history

(Highlighted portions were not meeting topics)



04/30/04

# **DRAFT**

## **Proposed Framework**

### **for the**

## **Balls Ferry Wetlands**

### **Executive Summary**

This "Proposed Management Framework for Balls Ferry Wetlands (BFW) has been developed as a document to provide an overview of the concepts the Department of Fish and Game (Department) proposes to employ when this acquisition is completed. This document includes

BFW Unit area management strategy, goals, background, public use, outdoor education program, Department sponsored youth activities and resource baseline information. BFW would be designated when acquired as a unit of the Mouth of Cottonwood Creek Wildlife area (MCCWA).

### **Goals**

- 1) Protect, enhance and develop riparian wetland and upland habitats.
- 2) Develop "youth" recreational and educational opportunities for fishing, hunting, and natural resource conservation when compatible.

### **Objectives**

- 1) Develop short-term plan (approximately two years) that includes partnerships with Anderson New Technology High School (ANTHS) and other interested youth oriented groups to: identify baseline conditions; identify long-term wildlife compatible activities; and develop and test an outdoor educational plan.
- 2) Develop long-term plan (beyond two years) that is based upon the short-term plan and promotes: the development of infrastructure; and expansion youth educational opportunities.

### **BFW Unit area management strategy**

- Maintain existing water (irrigation and winter runoff) regime to protect and maintain wetland habitats and dependent wildlife species
- Most areas will be closed zone/access by permit only. The Department would issue permits for outdoor education programs, local birding groups, youth and disabled hunts, etc.
- Provide a secure, controlled environment for youth outdoor education
- Provide youth hunts only, no general public hunting
- Provide general public fishing access to big pond from April through August only

- Establish blind for disabled access by permit only
- Maintain cattle grazing régime for invasive plant control and increase native plant composition

### **Background**

The Department will designate BFW as a unit of MCCWA (see Appendix I for MCCWA overview). However, management strategy will be different. The emphasis for BFW will be “youth” related with other specific activities. Because this strategy is a departure from “traditional” management of Department wildlife areas, partnerships and collaboration between numerous entities will be required. This departure on BFW will limit general public use while emphasizing and focusing on youth education, special youth hunts, and other appropriate activities.

### **Public Use**

Public use has always been an important feature of all state wildlife areas. The Department requires public use on state wildlife areas to be “wildlife compatible”. These activities have included birding, hiking, resource education, and research as well as traditional hunting and fishing programs. It is the intent of the Department to allow compatible uses on BFW that supports the Department’s management objectives. Emphasizing and focusing almost exclusively on youth activities will be unique for the Department.

### **Outdoor Education Center**

The current infrastructure of BFW includes several buildings and outbuildings. Some of these structures could be converted into meeting and overnight facilities to accommodate educational programs and organized youth programs. Several organizations may be interested in participating. This list included: Anderson New Technology High School (ANTHS), Ducks Unlimited, and California Waterfowl Association. These groups are education based or have established youth programs and may support and participating in youth programs at BFW. These programs may range from sponsored field trips (lasting a few hours) with local schools to week long “camps” that emphasize outdoor activities and conservation.

The BFW facility will also be available for local schools to participate in “outdoor classroom” activities. Outdoor classroom programs generally take time to develop and will require interest and cooperation between local schools and the Department. An example of potential educational youth projects that benefit DFG (see Appendix II) and ANTHS is a curriculum outline for a Freshman Science Course (see Appendix III).

### **Local Groups**

Because agricultural activities may be an important management component of BFW, opportunities will be present for youth oriented agriculture programs. Facilities such as



barns and irrigated fields may allow 4H and FFA groups to use portions of the facility for their projects. The University of California Cooperative Extension staff might express interest in using these facilities for both 4H projects and an experimental agricultural site.

### **Department Sponsored Youth Activities**

The Department sponsors several youth hunting activities such as the youth dove hunts, youth pheasant hunt and youth waterfowl hunt(s). The land and infrastructure at BFW is suited for youth sponsored hunting and fishing activities. The Shasta Sportsman Club may be interested in participating as a partner.

The Department intends to feature youth only waterfowl hunting on BFW. Waterfowl hunting is typically allowed on Wednesdays, Saturdays and Sundays on state wildlife areas. While the details have not yet been developed, BFW will offer youth only hunting opportunities on a frequent basis. BFW would be the only public hunting area in the State that will emphasize youth hunting opportunities in this manner. However, this activity might be limited because of the limited area available.

### **Other Public Use**

Because of the emphasis on youth activities and availability of general public opportunities on MCCWA, general public access may not be available BFW. For example, waterfowl hunting which is not limited to "youth only" is currently available at other units of the MCCWA. This will help satisfy site security and safety issues.

### **Livestock Grazing Program**

The historic livestock grazing regimen will continue on the eastern and southern portion of the property. Upland grasslands at BFW tend to be dominated by invasive weed species which threaten native plant diversity. For control the Department will continue a cattle grazing regime designed to control invasive plants while increasing native plant composition. The primary grazing area will be the 24 acres of irrigated pasture on the south end of this parcel during the spring and summer irrigation season and on the eastern 100 acre portion for winter grazing. The lessee will do the fence maintenance, manage irrigation and provide rotation of cattle as needed.

### **Baseline Monitoring**

Baseline conditions should be documented to determine if long-term management activities and strategies are beneficial or detrimental for various resources. This should be done as early as possible and prior to any modifications to BFW. An attempt to document all terrestrial wildlife and their habitats should be considered. However, the following items highlight a priority in identifying baseline conditions: habitat and exotic plants; waterfowl; raptor surveys; neotropical migrant songbirds; rare plant survey; and archaeological surveys

## Project List for BFW

1. Map infrastructure—buildings, roads, pumps, gates, structures
  - GPS
  - Aerial photos
2. Map and classify habitat types on property
  - GPS, computer download, Arc view
  - Aerial photos
  - Satellite imagery
  - Wildlife Habitat Relationships (WHR)
  - Permanent digital camera photo stations
  - Monitoring protocols for habitat
3. Develop bird list
  - Bird recorders—build and use
  - Protocol
  - Direct observation
  - Listening stations
  - Four season surveys
  - Remote stations w/ video link
4. Develop mammal list
  - Sherman live traps, ID
  - Protocol
  - Scats-microscopes
  - Tracks-trails, track plates
  - Anabat
  - Trailmaster cameras
  - Photo bait stations
5. History of ecological changes
  - Aerial photographs
  - Interviews
  - Historical reports
6. Wildlife forage plots/habitat development
  - Farming techniques-tractors, irrigation, fencing, seeding
  - Test plots
  - Document wildlife use
  - Marsh improvement-disking, burning, cattle use, nest boxes
7. Infrastructure improvements
  - Signs, blinds, trails



## APPENDIX III

### Freshman Science Course

#### S1 – The Local Community (Biosphere)

- I. **Team Building/Interpersonal Communication**
  - A. Guiding Question – Who are we?
  - B. Primary Activities
    1. Team building
    2. Interpersonal Communication
    3. Use canned program
    4. Field Trip
- II. **Survey and Mapping**
  - A. Guiding Question – Where are we? (sense of place)
  - B. Primary Activities
    1. Multi-sensory exploration of the study area
    2. Community Survey
    3. Park Survey
    4. Map Building
  - C. Primary Products
    1. Baseline habitat maps of Balls Ferry Wetlands Unit
    2. Survey Results
    3. Presentation to stakeholders outside of school
  - D. Assessment
    1. Process
      - a) Qualitative Observation
      - b) Quantitative Observation
      - c) Sampling techniques
      - d) Constructing a Data Table
      - e) Constructing a Graph
      - f) Teamwork/Interviewing Skills- use teamwork rubric to assess
      - g) Use of Tools- assess through map
  - E. Unit Sequence
    1. DFG requests project.
    2. Multisensory exploration of site using GLOBE learning activities
    3. Orientation to unit and assessment prep (Outcomes, assessment)
    4. Presentation of larger task – discovery of a problem, issue, or unusual situation which will become the focus of our study.
    5. Mind mapping about purpose of mapping/survey/biotic communities.
    6. Fun and creative art project to teach the distinction between species, indicator species, population, habitat, biodiversity, adaptation, and community. ( introductory. Remember that they will develop conceptual understanding as they use the terms.)

7. Learn Survey techniques and criteria.
8. Students develop survey tool with partners; DFG, ACID, local community, other schools, see AAW Community Mapping Tools.
9. Students learn interviewing skills
10. Students learn WHR Habitat Mapping Protocol
11. Community and site survey.
12. Survey results (Ron's class)
  - a) Data tables and graphs
  - b) Students begin considering issue of effective communication
13. Community and Wetland's Map created. Visually represent attitudes/culture surrounding site. (Ron's Class)
14. Assessment
15. Student – teacher – partner reflection
- F. Decisions – Tasks – Issues
  1. Design assessment tools
  2. Create multi-sensory exploration of environment
  3. Teacher training on GIS, GPS, and other software
  4. Purchase and set-up GIS server
  5. Select packaged curriculum materials to provide GIS, mapping, and inventory experiences
    - a) Globe
    - b) Nature Mapping
    - c) EcoNet
- III. Data Collection/Inventories
  - A. Guiding Questions
    1. What is here?
    2. What are the community interests/problems?
  - B. Primary Activities
    1. Identify and define primary communities
    2. Do detailed inventory of one community
      - a) Plants
      - b) Indicator species
      - c) Birds
      - d) Insects
      - e) Mammals
      - f) Reptiles/Amphibians
    3. Entries in Field Notebook
  - C. Primary Products
    1. Field Notebook
    2. Species lists
    3. Pictures all observed species
    4. Contributions to ongoing database, new layers added to base maps
    5. Presentation of results to DFG
  - D. Assessment
    1. Process



- a) Qualitative Observation-rubric for field notebook, dissections
- b) Quantitative Observation-rubric for field notebook, dissections
- c) Classification-quizzes, dissections
- d) Sampling-quizzes
- e) Measurement-quizzes, field notebook rubric
- f) Constructing a Data Table and a Graph-field notebook rubric
- g) Acquiring and Processing your own Data-field notebook rubric
- h) Effective Communication-collaboration rubric
- 2. Content
  - a) Populations
  - b) Biodiversity
  - c) Adaptations
  - d) Habitat
  - e) Species
  - f) Indicator species
  - g) Community
  - h) Comparative anatomy and adaptations of different classes of organisms

#### E. Unit Sequence

- 1. Orientation to section and assessment preparation (expected outcomes and assessment tools) ( nature illustration, digital camera use, field collection and inventory techniques, indicator species, observations of biology concepts listed above)
- 2. Learning experiences related to
  - a) Adaptations
  - b) Biodiversity
  - c) Habitat
  - d) Sampling and inventory techniques
  - e) Classification
  - f) Field data collection skills
  - g) Digital camera use
  - h) Nature illustrating
- 3. Select habitat to inventory and gather initial information about that habitat.
- 4. Learning experiences related to inventory techniques needed
  - a) Sampling and inventory techniques (refer to DFG list)
    - 1. Develop bird inventory
    - 2. Develop mammal inventory
    - 3. Develop insect inventory
    - 4. Develop reptiles and amphibian inventory
    - 5. Develop plant inventory
  - b) Instruction in creating a field notebook.

- c) Classification
- d) Field data collection skills
- e) Digital camera use (Greg)
- f) Nature Illustration (Greg)

- 5. Focused investigation of one WHR habitat as selected on the basis of the original survey to create species inventory.
- 6. Organize and analyze data.
- 7. Create Database, including creating layers for GIS map.
- 8. Prepare presentations for DFG.
- 9. Present results to DFG.
- 10. Assessment (integrate process and content outcomes)
- 11. Reflection (integrate process and content outcomes)

**F. Decisions – Tasks – Issues**

- 1. Purchase
  - a) Field journals
  - b) Colored pencils
  - c) Inventory tools
    - (1) Binoculars
    - (2) Measuring tapes
    - (3) Magnifying glasses
  - d) Macroinvertebrate sampling equipment
  - e) Insect sampling equipment
- 2. Identify and get commitment from
  - a) Parent mentors (will accompany students in park for safety and supervision reasons)
  - b) Local scientific mentors
  - c) Local experts
- 3. Select packaged curriculum materials to provide appropriate educational experiences
  - a) Globe
- 4. Create assessment tools
- 5. Database decisions
  - a) Structure
  - b) Filtering data for quality
  - c) Method for inputting student data
- 6. Digital cameras

**IV. Research**

- A. Guiding Question – What used to be here?
- B. Primary Activities
  - 1. Interviews of elders – record stories
  - 2. Historical research
    - a) Old Maps
    - b) Journals

- c) Records
- C. Primary Products
  - 1. Public Display in information gathered including
    - a) Reproductions of old maps and photos
    - b) Elder Stories
    - c) Descriptions of the site in the past
- D. Assessment
  - 1. Process
    - a) Inference
    - b) Acquiring and Processing Your Own Data
    - c) Effective Communication
- E. Unit Sequence
  - 1. Define purpose of interviews
  - 2. Students help make decisions about
    - a) Location for display
    - b) Type of display
    - c) Grading criteria
  - 3. Brainstorm
    - a) Elders to interview
    - b) Tribal connection
      - (1) Tribal interests
      - (2) Tribal assets (Indigenous land use management)
  - 4. Establish
    - a) Interview process
    - b) Interview scheduling
    - c) Documenting interviews
  - 5. Complete Interview
  - 6. Process interview results
  - 7. Define purpose and process for studying old data
  - 8. Study old maps and data
  - 9. Report/share results of old data research
  - 10. Archive results
  - 11. Create and setup display
  - 12. Assessment (integrate process and content outcomes)
  - 13. Reflection (integrate process and content outcomes)
- F. Decisions – Tasks - Issues
  - 1. Develop assessment
  - 2. Locate old and make accessible to students.
    - a) Map resources
    - b) Historic data resources
  - 3. Identify place for display and get permission/scheduled.
  - 4. See if Mark would be interested in collaborating on this section.
  - 5. Local historic society members/experts
    - a) Identify
    - b) Explore partnership possibilities
    - c) Get commitments



6. Locate elders to interview as back up for student process
- V. **Problem Identification – Vision Creation**
- A. Guiding Question – How do we want it to be?
  - B. Primary Activities
    1. Community Visioning Process
    2. Cycles where need-to-knows are discussed and alternate with focused research to develop an understanding of the problem.
    3. Discuss issues with
      - a) Park Managers
      - b) Other experts
    4. Mind Mapping of Vision
  - C. Primary Products
    1. Representations of the vision
      - a) Maps
      - b) Pictures
  - D. Assessment
    1. Process
      - a) Inference
      - b) Critical Thinking
      - c) Effective Communications
  - E. Unit Sequence
    1. Community Visioning Process
      - a) Use public display previously created to provide context
      - b) Outcome is identification of a project/action
    2. Create image of desired outcome
    3. Reflection (integrate process and content outcomes).
  - F. Decisions – Tasks - Issues
    1. ???
- VI. **Problem/Solution Identification**
- A. Guiding Question – What is the best way to do it?
  - B. Primary Activities
  - C. Primary Products
    1. Action Plan
    2. Presentation to Stakeholders
  - D. Assessment
    1. Process
      - a) Variables and the Relationship Between Them
      - b) Predicting
      - c) Experimenting
      - d) Critical Thinking
      - e) Experimenting
  - E. Unit Sequence
    1. Assessment preparation
    2. Community Vision-to Action Process
      - a) Use public display previously created to provide context
      - b) Outcome is identification of project/action

- 3. Mind Mapping of Vision
- 4. Create image of desired outcomes and projects to reach them.
- 5. Develop Plan
- 6. Assessment (integrate process and content outcomes)
- 7. Reflection (integrate process and content outcomes)
- F. Decisions – Tasks - Issues
  - 1. Decide on student groupings
  - 2. Develop assessment tools
- VII. Action/Restoration**
  - A. Guiding Question?
  - B. Primary Activity – Carry out the plan
    - 1. Identify the variables in an experiment.
    - 2. Classify variables as independent (manipulated), dependent (responding), or controlled (constant or randomized during experiment)
  - C. Primary Products
  - D. Assessment
  - E. Unit Sequence
    - 1. Gather resources
    - 2. Take action
    - 3. Develop monitoring/experiment plan
      - a) Identify the variables in an experiment.
      - b) Classify variables as independent (manipulate), dependent (responding), or controlled (constant or randomized during experiment)
    - 4. Evaluate success
    - 5. Define next steps
  - F. Decisions – Tasks - Issues
    - 1.
- VIII. Celebration**
  - A. Guiding Question?
  - B. Primary Activity
    - 1. Plan celebration
    - 2. Invite all individuals who contributed to the project
      - a) Survey respondents
      - b) DFG and other stakeholders
      - c) Other Experts
      - d) Elders
    - 3. Tours to highlight success of project
    - 4. Have fun
  - C. Primary Product
  - D. Assessment
    - 1. Effective Communication
  - E. Unit Sequence
    - 1. Students plan celebration
    - 2. Invite all individuals who contributed to the project

- a) Survey respondents
- b) DFG ET. al
- 3. Gather materials
- 4. Plan tour/presentation of action/restoration for celebrants
- 5. Assessment (integrate outcomes)
- 6. Reflection (integrate outcomes)
- F. Decisions – Tasks - Issues

**IX. Reflection**

- A. Guiding Question
  - 1. What did we accomplish?
  - 2. How did we do?
  - 3. Why?
- B. Primary Activities
- C. Primary Products
- D. Assessment
- E. Unit Sequence
  - 1. ???
- F. Decisions – Tasks - Issues
  - 1. ???



## BFWU/ANTHS CONCEPTUAL PLAN and MOU

draft 2-24-05

Mission: Develop an Educational Center that stimulates developing adults to understand and appreciate the natural world by providing illustrated learning opportunities.

Goal: (From minutes of 11/22/04 meeting) Collaboratively develop educational formats for programs at the Wetland Educational Center (WETTECH), and after testing these programs, ANTHS will become the site mentor for Shasta County.

- I. ANTHS has primary responsibility for the education components.
  - A. Develop an education plan that uses WETTECH as a focal point for ANTHS
  - B. Expand use of the area to include other schools in Shasta County
    1. Develop student docents who can lead other groups of students
  - C. Develop a multi-grade curriculum
    1. The curriculum must meet state standards
    2. Students will provide a history of the area and the project
  - D. Provide opportunities/facilities for staff training and development
  - E. Develop a website for public information
    1. Provide background info on DFG and its programs
    2. Provide video access to the site through remote cameras
    3. Provide links to related sites
  - F. Develop a PowerPoint presentation which displays the educational opportunities of the partnership.
  
- II. The DFG has primary responsibility for operating the area.
  - A. Background information will include a description of the acquisition process.
  - B. A management plan will guide the development and operation of the property.
    1. Baseline biological information will be obtained from ANTHS
      1. Student researchers will gather most of the data.
      2. An inventory of plant and animal species will be done.
      3. Habitat mapping will be accomplished using a GIS
      4. Atmospheric conditions will be recorded
      5. Hydrology and water quality will be monitored
      6. Soils will be sampled
      7. Impacts of grazing will be studied
    2. Youth hunting programs will be implemented

III. Some topics will need to be addressed jointly by ANTHS and DFG.

- A. Diversified educational opportunities will be provided to the community.
  - 1. Astronomy classes or viewing opportunities will be offered
  - 2. Fly fishing classes will be conducted
  - 3. Bird watching tours will be allowed
  - 4. Special needs students will be accommodated
- B. Needed facilities must be identified.
  - 1. A safety survey will be conducted
  - 2. The need for student housing will be assessed
  - 3. Classroom needs must be assessed
  - 4. A camping area would add to the outdoor experience
  - 5. Restrooms will need to be added and enlarged
  - 6. Potable water will be needed throughout the infrastructure
  - 7. Inside and outside chairs, tables and other hardware is needed
- C. Additional sources of funding, including grants, will be needed.
  - 1. Hire a grant writer
    - a. California Wildlife Foundation
    - b. Coordinate with High School District grant writer
- D. Develop a Memorandum of Understanding
  - 1. Define the roles and responsibilities of the cooperators
    - a. Personnel needs will be addressed
    - b. Maintenance and custodial tasks will be assigned
    - c. Rules for operating the area and programs will be adopted
- E. Develop a safety plan for the protection of students, and other facility users
- F. Site development plans will be adopted
  - 1. Infrastructure will be surveyed
  - 2. Needed facilities will be considered for developed
  - 3. A trail system will be planned to make the area more accessible
  - 4. Habitat rehabilitation projects will be planned
  - 3. Facilities will be prepared for use by students and others
- G. A steering committee will be assembled to guide the programs.
  - 1. Members will be selected from a wide range of interests, including ANTHS, District, DFG, local landowners, students and other interested groups.
  - 2. The committee will act as a "sounding board"
  - 3. The committee assist were it can with the site development



Draft 3 3-21-05 dw

## THE BALLS FERRY WETLAND UNIT: A CONCEPTUAL PLAN FOR THE PARTNERSHIP BETWEEN THE DEPARTMENT OF FISH AND GAME AND ANDERSON NEW TECHNOLOGY HIGH SCHOOL

The mission of the partnership is to develop a Wetland Educational Center (WEC) that stimulates developing adults to understand and appreciate the natural world by providing learning opportunities that reflect life. In a meeting on November 22, 2004, a committee of Department of Fish and Game (DFG) and Anderson New Technology High School (ANTHS) representatives decided that the goal of the partnership would be to collaboratively develop educational formats for programs at the WEC, and after testing these programs ANTHS will become the site mentor for Shasta County.

In the partnership, ANTHS has primary responsibility for the education components. ANTHS will develop an education plan that uses the site as a focal point for their activities. They will develop a multi-grade curriculum which will meet State standards. Students will participate in the gathering of information and will provide reports which contribute to the understanding of the natural resources and history of the area. Once the curriculum is tested, student docents will be trained to lead groups, including students from other schools in Shasta County.

In addition to the academic aspects, the WEC will provide other site-related opportunities. The facility will be used for training and development of staff and faculty. ANTHS students and faculty will develop a website which conveys information to the public. The website will include background information on the DFG and its programs, provide video access to the site through the use of remote cameras, and provide links to other related sites. A PowerPoint presentation will be developed which displays the educational opportunities of the partnership.

The DFG will have primary responsibility for the development and operation of the area. A Management Plan will be drafted which will direct these development and operation activities. Within the plan, background information will include a description of the process which led to the acquisition of the property. A youth hunting program will be implemented. Baseline biological information, used to make informed decisions, will be obtained from ANTHS student researchers. Student research will include an inventory of plant and animal species. Habitats will be mapped using a Geographic Information System. Atmospheric conditions will be monitored. Hydrology and water quality will be assessed. Soils will be sampled and described. The impacts of grazing will be studied. The plan will periodically be reviewed and updated as new information becomes available.

Some issues impact both ANTHS and DFG and will need to be addressed jointly. A Memorandum of Understanding will be written which defines the roles and responsibilities of the partners. Staffing needs will be addressed. Maintenance and custodial tasks will be assigned. Rules for operating the area and the programs will be adopted.

2 of 2

Needed facilities and improvements will be identified. A safety survey of the existing facilities will be conducted. Student housing and classroom needs will be assessed. The locations of restrooms and potable water will be identified and their adequacy will be determined. The need for chairs, tables and other hardware, both inside and outside, will be investigated. The feasibility of an outdoor camping area will be explored.

After identification of the needs, plans will be developed which will address those needs. A safety plan will provide protection for students and other facility users. A site development plan will address identified infrastructure deficiencies. A trail system will be designed which will make the area more accessible. Habitat rehabilitation and development projects will be planned and the facilities will be prepared for use by students and others.

Diversified educational opportunities will be provided to the community. These could include classes such as astronomy and fly fishing. Bird watching tours will be conducted. Accommodations for special needs students will be provided.

In order to meet these identified needs and take advantage of the opportunities, additional funding, including grants, will be required. The services of a grant writer will be obtained to apply for this funding.

A steering committee will be assembled to provide guidance for the programs. Members of the committee will be selected from a wide range of interests, including ANTHS, DFG, the Anderson High School District, local landowners, students and other interested groups.



Michelle Rodebaugh  
October 10, 2005

## OBJECTIVES

The goal of the Balls Ferry Wetland Education Center (BFWEC) is to provide learning opportunities for the community, especially developing adults, by designing educational projects that teach wetland conservation through "hands-on" experiences.

By the end of the first year, BFWEC will:

- Establish partnership with Anderson New Technology High School and Shasta College.
- Hire an Outdoor Educational Coordinator.
- Purchase:
  - A six-man rowboat and six life jackets.
  - Water quality equipment (oxygen, conductivity, and pH meter).
  - Five binoculars (7 X 35)
  - A GPS unit.
  - Five sets of field guides (mammals, birds, and plants).
- Rent three portable bathrooms.
- Build boardwalks for access to observation points.
- Implement weekly visits by groups of 30-50 students (2 classes).
- Collect baseline biological data using current DFG protocols.
  - Inventory plant and animal species.
  - Map habitat.
  - Monitor water quality.
- Develop and test educational formats that will be used by next year's students.

By the end of the second year, BFWEC will

- Establish five student docents who can lead other groups of students and teach them the wetland monitoring techniques.
- Develop a website for public information.
- Finish analyzing student's first year data and write a report.

## **APPENDIX J**

# **Environmental Literacy Resources Relevant to the Balls Ferry Research and Education Center**

(hyperlinked)



## Environmental Literacy Resources Relevant to the Balls Ferry Research and Education Center

For the past 40 years, as modern society has grown increasingly removed from the natural world, an effort has been underway to improve “environmental literacy.” Environmental literacy is a term used to describe a person’s capacity to perceive and interpret the relative health of environmental systems and to take appropriate action to maintain, restore or improve the health of those systems. In 1968, Charles Roth began work to define and develop a continuum of environmental literacy. The [North American Association for Environmental Education \(NAAEE\)](#) was established shortly thereafter to bring together people were giving serious thought to how people become literate concerning environmental issues. NAAEE now operates [EE-Link](#), a searchable database that organizes 5,400 links to environmental education resources in 300 categories. In 2000, NAAEE identified four aspects of advancing environmental literacy:

1. Developing inquiry, investigative, and analysis skills.
2. Acquiring knowledge of environmental process and human systems.
3. Developing skills for understanding and addressing environmental issues.
4. Practicing personal and civic responsibility for environmental decisions.

This continuum forms the basis of most environmental literacy efforts around the world.

### California’s Education and Environment Initiative

In 2003 and 2005, California passed landmark legislation promoting environmental literacy statewide.<sup>1</sup> The [Education and Environment Initiative \(EEI\)](#) mandates the development of a unified education strategy to bring education about the environment into California’s primary and secondary schools.

The California Environmental Protection Agency and the California Integrated Waste Management Board are actively engaged in implementing the legislation. Other key partners include the State Board of Education, the Office of the Secretary for Education, the Curriculum and Supplemental Materials Commission, the State Department of Education, and the California Resources Agency (including CDFG). These entities have now adopted [Environmental Principles and Concepts](#) and are in the process of integrating environmental concepts into all aspects of K-12 education.

The EEI Curriculum:

- Is an environment-based curriculum rather than an environmental education curriculum.
- Is designed to teach students about their relationship with the environment and how humans interact with natural systems.
- Is designed to teach mastery of select California academic standards.
- Is aligned with instructional materials adopted by the California Department of Education (the 2005 History/Social Science adoption and the 2006 Science adoption).
- Gives teachers “Extension Ideas” for linking their lessons with local resources, including environmental education providers, industry, and/or agencies in their area.

<sup>1</sup> AB 1548 (Pavley, Chapter 665, Statutes of 2003-PDF) and AB 1721 (Pavley, Chapter 581, Statutes of 2005-PDF).



## INTERNAL RESOURCES

### *CDFG-Linked Environmental Literacy Programs*

#### **CDFG Staff Resources**

[CDFG Education and Outreach Staff](#) are available to assist with environmental and outdoor education. In addition, other regions have established special programs for involving [volunteers](#). CDFG also published a [quick guide for working with volunteers](#) in its 2005 newsletter. The CDFG Volunteer Coordination Handbook is available on the CDFG Intranet (CDFG 2003c).

#### **Project WILD**

Founded in 1983, [Project WILD](#) is administered by the [Council for Environmental Education](#), cosponsored by the Western Association of Fish and Wildlife Agencies and the U.S. Fish and Wildlife Service (USFWS). Project WILD materials assist youth educators, formal and non-formal, in guiding young people to develop critical thinking skills — skills that help them evaluate behavior and actions that may benefit or harm the wildlife and environment.

In California, Project WILD is sponsored by CDFG and activity guides are available without charge through workshop attendance. Workshops provide hands-on training and curricula specially designed for educators of kindergarten through high school youth. Project WILD is [correlated](#) with the Environmental Principles and Concepts of the EEI Model Curriculum as well as with California Content Standards for Science, English Language Arts, and Social Science. General K-12 activity guides focus on understanding wildlife and habitats while the WILD Aquatic helps students understand watersheds and water quality monitoring. Sustain Wildlife addresses investigations and decision making and is correlated with science and civics curricula for grades 9-12.

#### **Project WET**

Established in 1990, [Project WET \(Water Education for Teachers\)](#) facilitates and promotes awareness, appreciation, knowledge, and stewardship of water resources through the dissemination of classroom-ready teaching aids and the establishment of internationally sponsored Project WET programs. In addition to publishing materials and lesson plans for teachers and for children, Project WET provides leadership training and capacity building courses, seminars, and workshops.

#### **Project Learning Tree**

One of the first curricula of its kind, [Project Learning Tree® \(PLT\)](#) is a multi-disciplinary environmental education program for educators and students in pre-kindergarten through grade 12. Established in 1976 by the Council for Environmental Education and the American Forest Foundation, its network consists of 3,000 grassroots volunteers and more than 120 state coordinators that work with formal and informal educators, school staff, state agencies, foresters, businesses, civic organizations, museums, nature centers, and youth groups to provide professional development programs. PLT meets state and national education standards. Its curriculum materials provide tools to bring the environment into the classroom and students into

the environment. Topics range from forests, wildlife, and water, to community planning, waste management and energy.

### **Classroom Aquarium Education Project**

CDFG established the [Classroom Aquarium Education Project](#) (known variously as Salmonids/Trout/Steelhead in the Classroom and the Salmon and Trout Education Program) to provide a hands-on project for hatching fish in a classroom aquarium. Instructors and their students set up an aquarium in the classroom, receive fish eggs under a special CDFG permit, and observe the fish as they hatch and develop. The experience may culminate in a field trip to a local stream or river where the fish are released.

### **Hunting Education and Outreach**

[California Hunter Education Program](#). In a continued effort to reduce firearm accidents, the State of California requires all first time resident hunters, regardless of age, to complete hunter education training or pass a comprehensive equivalency test before purchasing a hunting license. CDFG conducts training throughout the state. Each year approximately 30,000 students complete the state's ten-hour minimum hunter education course.

[Game Bird Heritage Special Hunts Program](#). Special Hunts are education and outreach programs jointly sponsored by CDFG and other public or private entities. These hunts focus on youth, women, people that are mobility impaired, and other underserved populations.

### **Youth in the Outdoors**

[Youth in the Outdoors](#). YO is a partnership to facilitate the conservation, enhancement, and restoration of our fish and wildlife and habitats through the education and participation of youth in California's outdoor heritage.

### **Other CDFG Education and Outreach**

[California Fishing Passport book](#)

[California Finfish and Shellfish Identification book](#)

[Online Fishing Guide](#)

[TripTracks Fishing Logbook](#)

[California Fishing Passport Awards](#)

[My First Fish Award](#)

[National Archery in the Schools Program](#)

## EXTERNAL RESOURCES

### *California Environmental Literacy Networks and Clearinghouses*

#### **California Environmental Education Interagency Network**

Formed in 1993, the [California Environmental Education Interagency Network \(CEEIN\)](#) is a consortium of government departments and agencies committed to develop, enhance, and promote environmental education efforts throughout California. CEEIN operates through an MOU between the California Department of Education, California Environmental Protection Agency, the California Resources Agency (including CDFG), and the Department of Food and Agriculture. It was restructured in 2004 to provide greater leadership with respect to the EEI and to strengthen its ability to assist member agencies in sharing resources, programs and materials to improve environmental literacy. Among its recent accomplishments are providing assistance with the [Curricula and Compendia Project](#) (topical compilations containing descriptive evaluations of high quality, supplemental, environmental education curricula for kindergarten through grade twelve) and support for the California Regional Environmental Educators Community (CREEC) Network.

#### **California Regional Environmental Educators Community Network**

The [California Regional Environmental Educators Community \(CREEC\) Network](#) is an educational project supported by the California Department of Education in collaboration with state, regional and local partners. Its [online, searchable resource directory](#) includes over 1,000 environmental education providers and over 2,000 programs/resources available to educators in California. There are 20 CREEC coordinators in 13 regional offices throughout California that provide environmental education activities and exhibits, funding opportunities, and teacher professional development opportunities.

#### **California Department of Education, Environmental Education Program**

Funded through the Environmental License Plate Program, the California Department of Education's [Environmental Education Program](#) provides online information regarding current environmental education resources, special events, grant opportunities, and a state plan for environment-based education through its professional development services.

## The GLOBE Program

*World Wide Science Projects And Monitoring Of Earth Systems*

[Global Learning and Observations to Benefit the Environment \(GLOBE\)](#) is a hands-on, primary and secondary school-based science and education program operated around the world. GLOBE's vision promotes and supports students, teachers and scientists to collaborate on inquiry-based investigations of the environment and earth systems working in close partnership with NASA and the National Science Foundation's Earth System Science Projects in study and research about the dynamics of earth's environment.

For students, GLOBE provides the opportunity to learn by:

- Taking scientifically valid measurements in the fields of atmosphere, hydrology, soils, and land cover/phenology, depending upon their local curricula
- Reporting their data through the Internet
- Publishing their research projects based on GLOBE data and protocols
- Creating maps and graphs on the free interactive Web site to analyze data sets
- Collaborating with scientists and other GLOBE students around the world

For educators, GLOBE provides assistance through:

- Training at professional development workshops
- Teacher's Guide, "how-to" videos, and other materials
- Continuing support from a help desk, scientists, and partners
- Contact with other teachers, students, and scientists worldwide



**APPENDIX K**

# Acronyms and Hyperlinks

(hyperlinked)



## Acronyms and Hyperlinks

| Acronym | Definition   Hyperlink  | URL   |
|---------|---|---|
|         | <u>4-H</u> , Shasta County  | <a href="http://ceshasta.ucdavis.edu/4-H_Program/">http://ceshasta.ucdavis.edu/4-H_Program/</a>   |
|         | <u>Breeding Bird Survey</u>   | <a href="http://www.pwrc.usgs.gov/birds/bbc.html">http://www.pwrc.usgs.gov/birds/bbc.html</a>   |
|         | <u>California Code of Regulations, Title 14, Chapter 3, Section 15064.5</u> | <a href="http://ohp.parks.ca.gov/pages/1054/files/california%20code%20of%20regulations.pdf">http://ohp.parks.ca.gov/pages/1054/files/california%20code%20of%20regulations.pdf</a>   |
|         | <u>California Finfish and Shellfish Identification book</u> , CDFG          | <a href="http://www.dfg.ca.gov/fishingpassport/idbook.asp">http://www.dfg.ca.gov/fishingpassport/idbook.asp</a>   |
|         | <u>California Fishing Passport</u>  | <a href="http://www.dfg.ca.gov/fishingpassport/book.asp">http://www.dfg.ca.gov/fishingpassport/book.asp</a>   |
|         | <u>California Fishing Passport Awards</u>                                   | <a href="http://www.dfg.ca.gov/fishingpassport/awards.asp">http://www.dfg.ca.gov/fishingpassport/awards.asp</a>   |
|         | <u>California Hunter Education Program</u> , CDFG                           | <a href="http://www.dfg.ca.gov/huntered/index.aspx">http://www.dfg.ca.gov/huntered/index.aspx</a>   |
|         | <u>California Legacy Project</u>  | <a href="http://legacy.ca.gov/">http://legacy.ca.gov/</a>   |
|         | <u>California Public Resource Code, Section 21083.2</u>                     | <a href="http://ohp.parks.ca.gov/pages/1054/files/public%20resources%20code.pdf">http://ohp.parks.ca.gov/pages/1054/files/public%20resources%20code.pdf</a>   |
|         | <u>California Public Resources Code</u>                                     | <a href="http://www.leginfo.ca.gov/cgi-bin/calawquery?codesection=prc&amp;codebody=California+Public+Resources+Code&amp;hits=20">http://www.leginfo.ca.gov/cgi-bin/calawquery?codesection=prc&amp;codebody=California+Public+Resources+Code&amp;hits=20</a> |
|         | <u>California State Lands Commission</u>                                    | <a href="http://www.slc.ca.gov/">http://www.slc.ca.gov/</a>   |
|         | California Waterfowl Association  | <a href="http://www.calwaterfowl.org/web2/departments/education/default.htm">http://www.calwaterfowl.org/web2/departments/education/default.htm</a>   |
|         | <u>California Watershed Funding Database Program</u>                        | <a href="http://cwfd.casil.ucdavis.edu/">http://cwfd.casil.ucdavis.edu/</a>   |
|         | <u>California Watershed Portal Maps and Tools</u>                           | <a href="http://cwp.resources.ca.gov/map_tools.php">http://cwp.resources.ca.gov/map_tools.php</a>   |
|         | <u>California Wetlands</u>  | <a href="http://ceres.ca.gov/wetlands/policies/governor.html">http://ceres.ca.gov/wetlands/policies/governor.html</a>   |

| Acronym | Definition   Hyperlink  | URL   |
|---------|---|---|
|         | <u>Conservation Policy</u>  |   |
|         | <u>California Wildlife Action Plan</u>  | <a href="http://www.dfg.ca.gov/wildlife/wap/report.html">http://www.dfg.ca.gov/wildlife/wap/report.html</a>   |
|         | <u>Cottonwood Creek Ecological Management Zone</u>                              | <a href="http://www.delta.dfg.ca.gov/erp/docs/reports_docs/ERP_Vol_2.pdf">http://www.delta.dfg.ca.gov/erp/docs/reports_docs/ERP_Vol_2.pdf</a>   |
|         | <u>Cottonwood Creek Watershed Assessment</u>                                    | <a href="http://www.cottonwoodcreekwatershed.org/nodes/aboutwatershed/reports/documents/ccwa_full.pdf">http://www.cottonwoodcreekwatershed.org/nodes/aboutwatershed/reports/documents/ccwa_full.pdf</a> |
|         | Cottonwood Creek Watershed Fire Safe Council                                    | <a href="http://www.firesafecouncil.org/find/view_council.cfm?c=14">http://www.firesafecouncil.org/find/view_council.cfm?c=14</a>   |
|         | <u>Cottonwood Creek Wetland Mitigation Bank</u>                                 | <a href="http://www.dfg.ca.gov/habcon/conplan/mitbank/catalogue/catalogue.html">http://www.dfg.ca.gov/habcon/conplan/mitbank/catalogue/catalogue.html</a>   |
|         | <u>Data Portal, CDFG</u>  | <a href="http://nrm.dfg.ca.gov/">http://nrm.dfg.ca.gov/</a>   |
|         | Document Library, CDFG  | <a href="http://nrm.dfg.ca.gov/documents/">http://nrm.dfg.ca.gov/documents/</a>   |
|         | <u>Environmental Education Program, California Department of Education</u>      | <a href="http://www.cde.ca.gov/pd/ca/sc/oeintrod.asp">http://www.cde.ca.gov/pd/ca/sc/oeintrod.asp</a>   |
|         | Environmental Principles and Concepts, CALEPA                                   | <a href="http://www.calepa.ca.gov/Education/Principles/">http://www.calepa.ca.gov/Education/Principles/</a>   |
|         | <u>Final Programmatic Environmental Impact Report, CALFED Bay-Delta Program</u> | <a href="http://www.calwater.ca.gov/calfed/library/Archive_EIS.html">http://www.calwater.ca.gov/calfed/library/Archive_EIS.html</a>   |
|         | <u>First Fish Award, CDFG</u>   | <a href="http://www.dfg.ca.gov/fishingpassport/firstfish.asp">http://www.dfg.ca.gov/fishingpassport/firstfish.asp</a>   |
|         | <u>Game Bird Heritage Special Hunts Program, CDFG</u>                           | <a href="http://www.dfg.ca.gov/wildlife/hunting/uplandgame/gamebird/index.html">http://www.dfg.ca.gov/wildlife/hunting/uplandgame/gamebird/index.html</a>   |
|         | Habitat Enhancement and Restoration Program (General), WCB                      | <a href="http://www.wcb.ca.gov/Pages/habitat_enhancement_and_restoration_program.asp">http://www.wcb.ca.gov/Pages/habitat_enhancement_and_restoration_program.asp</a>                                   |
|         | <u>Institute for Sustainable</u>  | <a href="http://www.csuchico.edu/sustainablefuture/">http://www.csuchico.edu/sustainablefuture/</a>   |

| Acronym | Definition   Hyperlink  | URL   |
|---------|---|---|
|         | <u>Development</u> , CSU, Chico   |   |
|         | Interim Joint Policy on Pre, During and Post Fire Activities and Wildlife Habitat | <a href="http://www.fgc.ca.gov/policy/p5policy.asp#INTERIM">http://www.fgc.ca.gov/policy/p5policy.asp#INTERIM</a>                                   |
|         | <u>Kids for Our Creek</u> , CCWG  | <a href="http://www.cottonwoodcreekwatershed.org/nodes/resources/education/">http://www.cottonwoodcreekwatershed.org/nodes/resources/education/</a> |
|         | <u>Kids in the Creek</u>  | <a href="http://www.kidsinthecreek.org/">http://www.kidsinthecreek.org/</a>   |
|         | <u>Legal Mandates Related to the Conservation of Land and Natural Resources</u>   | <a href="http://legacy.ca.gov/pub_docs/CCRISP_LegalMandates_V8.1.pdf">http://legacy.ca.gov/pub_docs/CCRISP_LegalMandates_V8.1.pdf</a>               |
|         | <u>Lyme Disease</u> , California Department of Public Health                      | <a href="http://www.cdph.ca.gov/HealthInfo/discond/Pages/LymeDisease.aspx">http://www.cdph.ca.gov/HealthInfo/discond/Pages/LymeDisease.aspx</a>     |
|         | <u>Lyme Disease</u> , Learn about, CDC  | <a href="http://www.cdc.gov/ncidod/dvbid/Lyme/">http://www.cdc.gov/ncidod/dvbid/Lyme/</a>   |
|         | <u>McConnell Foundation</u>   | <a href="http://www.mcconnellfoundation.org/programs/anths">http://www.mcconnellfoundation.org/programs/anths</a>                                   |
|         | <u>Mobility-impaired pheasant hunt</u>  | <a href="http://www.redding.com/news/2007/nov/15/outdoors-briefs/">http://www.redding.com/news/2007/nov/15/outdoors-briefs/</a>                     |
|         | <u>no net loss wetland policy</u>   | <a href="http://ceres.ca.gov/wetlands/policies/governor.html">http://ceres.ca.gov/wetlands/policies/governor.html</a>                               |
|         | <u>Northern Region</u> , CDFG   | <a href="http://www.dfg.ca.gov/regions/1/">http://www.dfg.ca.gov/regions/1/</a>   |
|         | <u>Oak Woodland Bird Conservation Plan</u>  | <a href="http://www.prbo.org/calpif/pdfs/oak.v-2.0.pdf">http://www.prbo.org/calpif/pdfs/oak.v-2.0.pdf</a>   |
|         | <u>Oak Woodlands Conservation Program</u>   | <a href="http://www.wcb.ca.gov/Pages/oak_woodlands_Act.asp">http://www.wcb.ca.gov/Pages/oak_woodlands_Act.asp</a>                                   |
|         | <u>Online Fishing Guide</u> , CDFG  | <a href="http://www.dfg.ca.gov/fishingpassport/guide.asp">http://www.dfg.ca.gov/fishingpassport/guide.asp</a>                                       |
|         | <u>Porter-Cologne Act</u> , 2009  | <a href="http://www.swrcb.ca.gov/laws_regulations/docs/porter_cologne.pdf">http://www.swrcb.ca.gov/laws_regulations/docs/porter_cologne.pdf</a>     |
|         | <u>Project WET (Water</u>   | <a href="http://www.projectwet.org/index.html">http://www.projectwet.org/index.html</a>   |

| Acronym | Definition   Hyperlink  | URL   |
|---------|---|---|
|         | <u>Education for Teachers)</u>  |   |
|         | <u>Project WILD</u>   | <a href="http://www.dfg.ca.gov/projectwild/">http://www.dfg.ca.gov/projectwild/</a>   |
|         | <u>RareFind 3, CDFG</u>   | <a href="http://www.dfg.ca.gov/biogeodata/cnddb/rarefind.asp">http://www.dfg.ca.gov/biogeodata/cnddb/rarefind.asp</a>   |
|         | <u>Recovery Plan for Vernal Pool Ecosystems in California and Southern Oregon</u> | <a href="http://www.fws.gov/sacramento/es/recovery_plans/vp_recovery_plan_links.htm">http://www.fws.gov/sacramento/es/recovery_plans/vp_recovery_plan_links.htm</a>   |
|         | <u>Redding Central 2006</u>   | <a href="http://www.reddingcentral.com/weather-reddingcalifornia.htm">http://www.reddingcentral.com/weather-reddingcalifornia.htm</a>   |
|         | <u>Resource Status Assessment and Trends Methodology</u>                          | <a href="http://legacy.ca.gov/pub_docs/Natural_Resource_Health_and_Condition_Methodology_Report_FINAL.pdf">http://legacy.ca.gov/pub_docs/Natural_Resource_Health_and_Condition_Methodology_Report_FINAL.pdf</a> |
|         | <u>Riparian Bird Conservation Plan</u>  | <a href="http://www.prbo.org/calpif/html/docs/riparian.html">http://www.prbo.org/calpif/html/docs/riparian.html</a>   |
|         | <u>Shasta College</u>   | <a href="http://www.shastacollege.edu/">http://www.shastacollege.edu/</a>   |
|         | <u>Shasta County</u>  | <a href="http://www.co.shasta.ca.us/">http://www.co.shasta.ca.us/</a>   |
|         | <u>Shasta County General Plan</u>   | <a href="http://www.co.shasta.ca.us/Departments/Resourcemgmt/drm/general_plan.htm">http://www.co.shasta.ca.us/Departments/Resourcemgmt/drm/general_plan.htm</a>   |
|         | <u>Shasta County Office of Education</u>  | <a href="http://www.shastacoe.org/">http://www.shastacoe.org/</a>   |
|         | <u>Shasta County Sheriff Department</u>   | <a href="http://www.co.shasta.ca.us/html/Sheriff/sh_index.htm">http://www.co.shasta.ca.us/html/Sheriff/sh_index.htm</a>   |
|         | <u>Shasta County Weed Management Area</u>   | <a href="http://www.cal-ipc.org/WMAs/Shasta_WMA.php">http://www.cal-ipc.org/WMAs/Shasta_WMA.php</a>   |
|         | <u>Shasta County, Oak Woodland Management Guidelines</u>                          | <a href="http://danr.ucop.edu/ihrmp/county/ShastaOaksGuidelines.pdf">http://danr.ucop.edu/ihrmp/county/ShastaOaksGuidelines.pdf</a>   |
|         | <u>Shasta Historical Society</u>  | <a href="http://www.shastahistorical.org/">http://www.shastahistorical.org/</a>   |
|         | <u>Shasta-Tehama Shed Heads</u>   | <a href="http://www.battle-creek.net/shedheads.html">http://www.battle-creek.net/shedheads.html</a>   |

| Acronym    | Definition   Hyperlink                                | URL   |
|------------|---|---|
|            | <u>State Historic Preservation Officer</u>            | <a href="http://www.achp.gov/shpo.html">http://www.achp.gov/shpo.html</a>   |
|            | <u>Stream Corridor Protection Plan, Shasta County</u> | <a href="http://www.co.shasta.ca.us/departments/Resourcemgmt/drm/pdf/67fish.pdf">http://www.co.shasta.ca.us/departments/Resourcemgmt/drm/pdf/67fish.pdf</a> |
|            | <u>Tehama County</u>                                  | <a href="http://www.co.tehama.ca.us/">http://www.co.tehama.ca.us/</a>   |
|            | <u>Tehama County Office of Education</u>              | <a href="http://www.cde.ca.gov/re/sd/details.asp?cds=5210520000000&amp;Public=Y">http://www.cde.ca.gov/re/sd/details.asp?cds=5210520000000&amp;Public=Y</a> |
|            | <u>Tehama County Sheriff Department</u>               | <a href="http://www.tehamaso.org/">http://www.tehamaso.org/</a>   |
|            | <u>TripTracks Fishing Logbook</u>                     | <a href="http://www.dfg.ca.gov/fishingpassport/triptracks.asp">http://www.dfg.ca.gov/fishingpassport/triptracks.asp</a>                                     |
|            | <u>Wintu Audubon Society</u>                          | <a href="http://www.wintuaudubon.org/">http://www.wintuaudubon.org/</a>   |
|            | <u>Youth in the Outdoors, CDFG</u>                    | <a href="http://www.dfg.ca.gov/yo/">http://www.dfg.ca.gov/yo/</a>   |
| AAW        | <u>Adopt-A-Watershed</u>                              | <a href="http://www.adopt-a-watershed.org/">http://www.adopt-a-watershed.org/</a>   |
| ACID       | <u>Anderson- Cottonwood Irrigation District</u>       | <a href="http://acidwater.org/acid.php?ACID=agenda">http://acidwater.org/acid.php?ACID=agenda</a>   |
| ADA        | <u>Americans With Disabilities Act</u>                | <a href="http://www.ada.gov/">http://www.ada.gov/</a>   |
| ANTHS      | Anderson New Technology High School                   | <a href="http://www.anths.org/about_us.php">http://www.anths.org/about_us.php</a>   |
| AQMD       | Air Quality Management District                       |   |
| ATV        | All terrain vehicle                                   |   |
| AUM        | Animal units per month                                |   |
| BCCER      | <u>Big Chico Creek Ecological Reserve</u>             | <a href="http://www.csuchico.edu/bccer/">http://www.csuchico.edu/bccer/</a>   |
| BCCER, MOU | BCCER MOU with CDFG                                   | <a href="http://www.csuchico.edu/bccer/Management/MOU.htm">http://www.csuchico.edu/bccer/Management/MOU.htm</a>   |

| Acronym        | Definition   Hyperlink   | URL   |
|----------------|--|---|
| BDB            | <u>Biogeographic Data Branch</u> , CDFG                            | <a href="http://www.dfg.ca.gov/biogeodata/">http://www.dfg.ca.gov/biogeodata/</a>                   |
| BFREC          | Balls Ferry Research and Education Center                          |   |
| BFW1           | Balls Ferry Wetland Unit 1   |   |
| BFW2           | Balls Ferry Wetland Unit 2   |   |
| BIOS           | <u>Biogeographic Information and Observation System</u> , CDFG     | <a href="http://bios.dfg.ca.gov/">http://bios.dfg.ca.gov/</a>                                       |
| BLM            | <u>Bureau of Land Management</u> , U.S. Department of the Interior | <a href="http://www.blm.gov/wo/st/en.html">http://www.blm.gov/wo/st/en.html</a>                     |
| BMI            | benthic macro invertebrate   |   |
| BMP            | best management practices  |   |
| CAEP           | <u>Classroom Aquarium Education Project</u> , CDFG                 | <a href="http://www.dfg.ca.gov/caep/index.html">http://www.dfg.ca.gov/caep/index.html</a>           |
| CAL FIRE       | <u>California Department of Forestry and Fire Protection</u>       | <a href="http://www.fire.ca.gov/">http://www.fire.ca.gov/</a>                                       |
| CalEDLN        | <u>California Environmental Digital Library Network</u>            | <a href="http://caledln.casil.ucdavis.edu/">http://caledln.casil.ucdavis.edu/</a>                   |
| CalEPA         | <u>California Environmental Protection Agency</u>                  | <a href="http://www.calepa.ca.gov/">http://www.calepa.ca.gov/</a>                                   |
| CALFED         | CALFED Bay-Delta Program   | <a href="http://calwater.ca.gov/index.aspx">http://calwater.ca.gov/index.aspx</a>                   |
| <u>CalFish</u> | Cooperative Andromous Fish and Habitat Data Program                | <a href="http://www.calfish.org/DesktopDefault.aspx">http://www.calfish.org/DesktopDefault.aspx</a> |
| Cal-IPC        | <u>California Invasive Plant Council</u>                           | <a href="http://www.cal-ipc.org/">http://www.cal-ipc.org/</a>                                       |
| CalPIF         | <u>California Partners In Flight</u>                               | <a href="http://www.prbo.org/calpif/">http://www.prbo.org/calpif/</a>                               |



| Acronym                 | Definition   Hyperlink  | URL   |
|-------------------------|---|---|
| CCRISP                  | California Continuing Resources Investment Strategy Project   |   |
| CCU                     | Cottonwood Creek Unit   |   |
| CCWG                    | <u>Cottonwood Creek Watershed Group</u>                       | <a href="http://www.cottonwoodcreekwatershed.org/">http://www.cottonwoodcreekwatershed.org/</a>   |
| <del>CDF</del>          | DNU. Use CAL FIRE   |   |
| CDFA                    | <u>California Department of Food and Agriculture</u>          | <a href="http://www.cdfa.ca.gov/">http://www.cdfa.ca.gov/</a>   |
| CDFG                    | <u>California Department of Fish and Game</u>                 | <a href="http://www.dfg.ca.gov/">http://www.dfg.ca.gov/</a>   |
| CDFG, code              | <u>California Fish and Game Code §1507</u>                    | <a href="http://law.justia.com/california/codes/fgc/1500-1507.html">http://law.justia.com/california/codes/fgc/1500-1507.html</a>           |
| CDFG, code              | <u>California Fish and Game Code §1602</u>                    | <a href="http://law.justia.com/california/codes/fgc.html">http://law.justia.com/california/codes/fgc.html</a>                               |
| CDFG, code              | <u>California Fish and Game Code §3503.5</u>                  | <a href="http://law.onecle.com/california/fish/3503.5.html">http://law.onecle.com/california/fish/3503.5.html</a>                           |
| CDFG, education staff   | <u>CDFG Education and Outreach Staff</u>                      | <a href="http://www.dfg.ca.gov/education/staff.html">http://www.dfg.ca.gov/education/staff.html</a>   |
| CDFG, volunteer program | <u>Developing a Volunteer Program</u> , CDFG                  | <a href="http://www.dfg.ca.gov/education/newsletter/2005/volunteer.html">http://www.dfg.ca.gov/education/newsletter/2005/volunteer.html</a> |
| CDFG, volunteers        | <u>Volunteer Opportunities</u> , CDFG                         | <a href="http://www.dfg.ca.gov/volunteer/index.html">http://www.dfg.ca.gov/volunteer/index.html</a>   |
| CEDEN                   | <u>California Environmental Data Exchange Network</u>         | <a href="http://ceden.org/">http://ceden.org/</a>   |
| CEEIN                   | <u>California Environmental Education Interagency Network</u> | <a href="http://www.calepa.ca.gov/Education/CEEIN/">http://www.calepa.ca.gov/Education/CEEIN/</a>   |

| Acronym           | Definition   Hyperlink  | URL   |
|-------------------|---|---|
| CEQA, guidelines  | <u>CEQA Guidelines</u> , California Environmental Quality Act                 | <a href="http://ceres.ca.gov/ceqa/guidelines/">http://ceres.ca.gov/ceqa/guidelines/</a>   |
| CERES             | <u>California Environmental Resources Evaluation System</u>                   | <a href="http://www.ceres.ca.gov/">http://www.ceres.ca.gov/</a>   |
| CERES, Sacramento | <u>Sacramento Valley Bioregion</u> , CERES                                    | <a href="http://www.ceres.ca.gov/geo_area/bioregions/Sacramento_Valley/about.html">http://www.ceres.ca.gov/geo_area/bioregions/Sacramento_Valley/about.html</a> |
| CERES, wetlands   | <u>California Wetlands Information System</u> , CERES                         | <a href="http://ceres.ca.gov/wetlands/">http://ceres.ca.gov/wetlands/</a>   |
| CESA              | <u>California Endangered Species Act</u>                                      | <a href="http://www.dfg.ca.gov/habcon/cesa/">http://www.dfg.ca.gov/habcon/cesa/</a>   |
| Cfs               | Cubic feet/second   |   |
| CHP               | California Highway Patrol   |   |
| CHPS              | <u>Coalition for High Performance Schools</u>                                 | <a href="http://www.chps.net/">http://www.chps.net/</a>   |
| CNDDDB            | <u>California Natural Diversity Database</u> , CDFG                           | <a href="http://www.dfg.ca.gov/biogeodata/cnddb/">http://www.dfg.ca.gov/biogeodata/cnddb/</a>   |
| CNGA              | <u>California Native Grasslands Association</u>                               | <a href="http://www.cnga.org/">http://www.cnga.org/</a>   |
| CNGA, archives    | <u>Historical Works of California Native Grasses and Grassland Management</u> | <a href="http://www.cnga.org/historical.html">http://www.cnga.org/historical.html</a>   |
| CNPS              | <u>California Native Plant Society</u>  | <a href="http://www.cnps.org/">http://www.cnps.org/</a>   |
| COF               | <u>California Oak Foundation</u>  | <a href="http://www.californiaoaks.org/">http://www.californiaoaks.org/</a>   |
| CREEC             | <u>California Regional Environmental Educators Community Network</u>          | <a href="http://www.creec.org/">http://www.creec.org/</a>   |
| CREEC, directory  | <u>CREEC Resource Directory</u>   | <a href="http://creec.edgateway.net/cs/creecp/search/creec_res">http://creec.edgateway.net/cs/creecp/search/creec_res</a>                                       |

| Acronym         | Definition   Hyperlink                                     | URL   |
|-----------------|--|---|
| CRHCP           | <u>California Riparian Habitat Conservation Program</u>    | <a href="http://www.wcb.ca.gov/Pages/california_riparian_habitat_at_conservation_program.asp">http://www.wcb.ca.gov/Pages/california_riparian_habitat_at_conservation_program.asp</a> |
| CRHJV           | California Riparian Habitat Joint Venture                  |   |
| CRHR            | <u>California Register of Historic Resources</u>           | <a href="http://ohp.parks.ca.gov/?page_id=21238">http://ohp.parks.ca.gov/?page_id=21238</a>   |
| CRLF            | California red-legged frog                                 |   |
| CSP, volunteers | <u>California State Parks, Volunteers in Parks</u>         | <a href="http://www.parks.ca.gov/?page_id=886">http://www.parks.ca.gov/?page_id=886</a>   |
| CSU, Chico      | <u>California State University, Chico</u>                  | <a href="http://www.csuchico.edu/">http://www.csuchico.edu/</a>   |
| CVFD            | Cottonwood Volunteer Fire Department                       |   |
| CVJV            | Central Valley Joint Venture                               |   |
| CVP             | Central Valley Project                                     |   |
| CVPCP           | <u>Central Valley Project Conservation Program</u>         | <a href="http://www.usbr.gov/mp/cvpcp/program_cvp/index.html">http://www.usbr.gov/mp/cvpcp/program_cvp/index.html</a>   |
| CVPIA           | <u>Central Valley Project Improvement Act</u>              | <a href="http://www.usbr.gov/mp/cvpia/">http://www.usbr.gov/mp/cvpia/</a>   |
| CVRWQCB         | <u>Central Valley Regional Water Quality Control Board</u> | <a href="http://www.swrcb.ca.gov/rwqcb5/">http://www.swrcb.ca.gov/rwqcb5/</a>   |
| CWA             | Clean Water Act  |   |
| CWA, 401        | <u>Section §401, Clean Water Act</u>                       | <a href="http://www.epa.gov/OWOW/wetlands/regs/sec401.html">http://www.epa.gov/OWOW/wetlands/regs/sec401.html</a>   |
| CWA, 404        | <u>Section §404, Clean Water Act</u>                       | <a href="http://www.epa.gov/OWOW/wetlands/regs/sec404.html">http://www.epa.gov/OWOW/wetlands/regs/sec404.html</a>   |
| CWHR            | <u>California Wildlife Habitat Relationships</u>           | <a href="http://www.dfg.ca.gov/biogeodata/cwahr/">http://www.dfg.ca.gov/biogeodata/cwahr/</a>   |

| Acronym   | Definition   Hyperlink   | URL   |
|-----------|--|---|
| DWR       | <u>California Department of Water Resources</u>                          | <a href="http://www.water.ca.gov/">http://www.water.ca.gov/</a>   |
| EEI       | <u>Education and Environment Initiative</u>                              | <a href="http://www.calepa.ca.gov/Education/EEI/">http://www.calepa.ca.gov/Education/EEI/</a>   |
| EE-Link   | <u>Environmental Education on the Internet</u>                           | <a href="http://www.naaee.org/ee-link">http://www.naaee.org/ee-link</a>   |
| EIR       | Environmental Impact Report  |   |
| EPA       | <u>U.S. Environmental Protection Agency</u>                              | <a href="http://www.epa.gov/">http://www.epa.gov/</a>   |
| EPIC      | <u>Environmental Protection Indicators Program</u>                       | <a href="http://www.oehha.ca.gov/multimedia/epic/index.html">http://www.oehha.ca.gov/multimedia/epic/index.html</a>   |
| ERPIN     | <u>Ecosystem Restoration Program Information Network</u> , CALFED        | <a href="http://www.delta.dfg.ca.gov/erpin/default.asp">http://www.delta.dfg.ca.gov/erpin/default.asp</a>   |
| ESA       | <u>Endangered Species Act</u>  | <a href="http://www.epa.gov/lawsregs/laws/esa.html">http://www.epa.gov/lawsregs/laws/esa.html</a>   |
| FFA       | <u>Future Farmers of America, California</u>                             | <a href="http://californiaffa.org/">http://californiaffa.org/</a>   |
| FWSA      | Fish and Wildlife Scientific Aide  |   |
| GIC       | <u>Geographic Information Center, California State University, Chico</u> | <a href="http://www.gic.csuchico.edu/">http://www.gic.csuchico.edu/</a>   |
| GIS       | Geographic Information System  |   |
| GIS, CDFG | <u>Geographic Information Systems, CDFG</u>                              | <a href="http://www.dfg.ca.gov/biogeodata/gis/">http://www.dfg.ca.gov/biogeodata/gis/</a>   |
| GLOBE     | <u>Global Learning and Observations to Benefit the Environment</u>       | <a href="http://www.globe.gov/fsl/html/aboutglobe.cgi?intro&amp;lang=en&amp;nav=1">http://www.globe.gov/fsl/html/aboutglobe.cgi?intro&amp;lang=en&amp;nav=1</a> |

| Acronym | Definition   Hyperlink   | URL   |
|---------|--|---|
| HCP     | Habitat Conservation Plan  |   |
| HGE     | human granulocytic ehrlichiosis  |   |
| HRP     | Habitat Restoration Program  |   |
| IBI     | Index of Biological Integrity  |   |
| IHRMP   | <u>Integrated Hardwood Range Management Plan</u>                               | <a href="http://danr.ucop.edu/ihrmp/">http://danr.ucop.edu/ihrmp/</a>   |
| IMAPS   | <u>Inventory, Monitoring and Assessment Program</u> , California Digital Atlas | <a href="http://atlas01.resources.ca.gov/mx/">http://atlas01.resources.ca.gov/mx/</a>   |
| IS      | Initial Study  |   |
| IWCP    | <u>Inland Wetlands Conservation Program</u>                                    | <a href="http://ceres.ca.gov/wetlands/introduction/inland_ease ment.html">http://ceres.ca.gov/wetlands/introduction/inland_ease ment.html</a> |
| LEED    | <u>Leadership in Energy and Environmental Design</u>                           | <a href="http://www.usgbc.org/DisplayPage.aspx?CategoryID=19">http://www.usgbc.org/DisplayPage.aspx?CategoryID=19</a>                         |
| LMP     | Land management plan   |   |
| MCCWA   | <u>Mouth of Cottonwood Creek Wildlife Area</u> , CDFG                          | <a href="http://www.dfg.ca.gov/lands/wa/region1/mouthofcottonwood.html">http://www.dfg.ca.gov/lands/wa/region1/mouthofcottonwood.html</a>     |
| MOU     | Memorandum of Understanding  |   |
| MSCS    | Multi-Species Conservation Strategy  |   |
| NAAEE   | <u>North American Association for Environmental Education</u>                  | <a href="http://www.naaee.org/">http://www.naaee.org/</a>   |
| NASP    | National Archery in the Schools Program  | <a href="http://www.dfg.ca.gov/nasp/index.html">http://www.dfg.ca.gov/nasp/index.html</a>   |
| NAWMP   | <u>North American Waterfowl</u>  | <a href="http://www.fws.gov/birdhabitat/NAWMP/index.shtm">http://www.fws.gov/birdhabitat/NAWMP/index.shtm</a>                                 |

| Acronym         | Definition   Hyperlink   | URL   |
|-----------------|--|---|
|                 | <u>Management Plan</u>   |   |
| ND              | Negative Declaration   |   |
| NMBCA           | <u>Neotropical Migratory Bird Conservation Act</u>                       | <a href="http://www.fws.gov/birdhabitat/Grants/NMBCA/index.shtm">http://www.fws.gov/birdhabitat/Grants/NMBCA/index.shtm</a> |
| NMBCA, grants   | <u>Neotropical Migratory Bird Conservation Act Grant Program</u> , USFWS | <a href="http://www.fws.gov/birdhabitat/Grants/NMBCA/index.shtm">http://www.fws.gov/birdhabitat/Grants/NMBCA/index.shtm</a> |
| NMFS            | <u>National Marine Fisheries Service</u>                                 | <a href="http://www.nmfs.noaa.gov/">http://www.nmfs.noaa.gov/</a>   |
| NOAA            | <u>National Oceanic and Atmospheric Administration</u>                   | <a href="http://www.noaa.gov/">http://www.noaa.gov/</a>   |
| NPS             | <u>National Park Service</u>   | <a href="http://www.nps.gov/">http://www.nps.gov/</a>   |
| NPS, volunteers | <u>Volunteers in-Parks, NPS</u>  | <a href="http://www.nps.gov/volunteer/">http://www.nps.gov/volunteer/</a>   |
| NRCS            | <u>Natural Resources Conservation Service</u>                            | <a href="http://www.nrcs.usda.gov/">http://www.nrcs.usda.gov/</a>   |
| NRHP            | <u>National Register of Historic Places</u>                              | <a href="http://www.nps.gov/nr/">http://www.nps.gov/nr/</a>   |
| PH              |  |   |
| PIF             | <u>Partners in Flight</u>  | <a href="http://www.partnersinflight.org/">http://www.partnersinflight.org/</a>   |
| PLT             | <u>Project Learning Tree® (PLT)</u>                                      | <a href="http://www.plt.org/cms/pages/21_21_9.html">http://www.plt.org/cms/pages/21_21_9.html</a>                           |
| PRBO            | <u>Point Reyes Bird Observatory</u>                                      | <a href="http://www.prbo.org/cms/index.php">http://www.prbo.org/cms/index.php</a>   |
| RAP             | <u>Resource Assessment Program</u>                                       | <a href="http://www.dfg.ca.gov/rap/">http://www.dfg.ca.gov/rap/</a>   |
| RAPnet          | RAPnet   | 6/2009: dead link <a href="http://www.cdfg-rap.net/">http://www.cdfg-rap.net/</a> -   |
| RDM             | Residual dry matter  |   |



| Acronym             | Definition   Hyperlink  | URL   |
|---------------------|---|---|
| Region 1            | Use <u>Northern Region</u> , CDFG                                     |   |
| RHJV                | <u>Riparian Habitat Joint Venture</u>                                 | <a href="http://www.rhvjv.org/">http://www.rhvjv.org/</a>   |
| RWQCB               | Regional Water Quality Control Board                                  |   |
| SCAQMD              | <u>Shasta County Air Quality Management District</u>                  | <a href="http://www.co.shasta.ca.us/departments/resourcemgmt/drm/aqmain.htm">http://www.co.shasta.ca.us/departments/resourcemgmt/drm/aqmain.htm</a> |
| SJRDC               | San Joaquin County Resource Conservation District                     |   |
| SMVCD               | <u>Shasta Mosquito Vector Control District</u>                        | <a href="http://www.shastamosquito.org/">http://www.shastamosquito.org/</a>   |
| SWAMP               | <u>Surface Water Ambient Monitoring Program</u> , SWRBC               | <a href="http://www.waterboards.ca.gov/water_issues/programs/swamp/">http://www.waterboards.ca.gov/water_issues/programs/swamp/</a>                 |
| SWRBC               | <u>State Water Resources Control Board</u>                            | <a href="http://www.swrcb.ca.gov/">http://www.swrcb.ca.gov/</a>   |
| the Corps           | See <u>USACE</u>  |   |
| the department      | See CDFG  | <a href="http://www.dfg.ca.gov/">http://www.dfg.ca.gov/</a>   |
| TMDL                | Total maximum daily load  |   |
| UCCE, Shasta County | <u>University of California Cooperative Extension</u> , Shasta County | <a href="http://ceshasta.ucdavis.edu/index.cfm">http://ceshasta.ucdavis.edu/index.cfm</a>   |
| USACE               | <u>U.S. Army Corps of Engineers</u>                                   | <a href="http://www.usace.army.mil/Pages/Default.aspx">http://www.usace.army.mil/Pages/Default.aspx</a>   |
| USBR                | <u>Bureau of Reclamation</u> , U.S. Department of the Interior        | <a href="http://www.usbr.gov/">http://www.usbr.gov/</a>   |
| USDA                | <u>U.S. Department of</u>   | <a href="http://www.usda.gov/wps/portal/usdahome">http://www.usda.gov/wps/portal/usdahome</a>   |

| Acronym              | Definition   Hyperlink  | URL   |
|----------------------|---|---|
|                      | <u>Agriculture</u>  |   |
| USFS                 | <u>U.S. Forest Service</u>  | <a href="http://www.fs.fed.us/">http://www.fs.fed.us/</a>   |
| USFWS                | <u>U.S. Fish and Wildlife Service</u>   | <a href="http://www.fws.gov/">http://www.fws.gov/</a>   |
| USFWS, portals       | Pacific Region Portals, USFWS   | <a href="http://www.fws.gov/pacific/">http://www.fws.gov/pacific/</a>   |
| USFWS, Recovery Plan | Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon, USFWS | <a href="http://www.fws.gov/sacramento/es/recovery_plans/vp_final_recovery_plan/VP%20Recovery.pdf">http://www.fws.gov/sacramento/es/recovery_plans/vp_final_recovery_plan/VP%20Recovery.pdf</a> |
| USFWS, volunteers    | <u>USFWS</u> volunteers   | <a href="http://www.fws.gov/volunteers/">http://www.fws.gov/volunteers/</a>   |
| USGS                 | <u>U.S. Geological Service</u>  | <a href="http://www.usgs.gov/">http://www.usgs.gov/</a>   |
| VegCAMP              | <u>Vegetation Classification and Mapping Program</u> , CDFG                       | <a href="http://www.dfg.ca.gov/biogeodata/vegcamp/">http://www.dfg.ca.gov/biogeodata/vegcamp/</a>   |
| VELB                 | Valley elderberry longhorn beetle   |   |
| WCB                  | <u>Wildlife Conservation Board</u> , State of California                          | <a href="http://www.wcb.ca.gov">http://www.wcb.ca.gov</a>   |
| WHS                  | Wildlife Habitat Supervisor   |   |
| WMA                  | Weed Management Area  |   |
| WSRCD                | <u>Western Shasta Resource Conservation District</u>                              | <a href="http://www.westernshastarcd.org/">http://www.westernshastarcd.org/</a>   |

# **APPENDIX L**

## **DFG Response to Public Comments**

Mouth of Cottonwood Creek Wildlife Area  
Land Management Plan

## **Public Comments**

Sent by email 1/30/2011:

Dear Mr. Burton-

Just spent a lovely hour walking the Reserve with my small dog this beautiful afternoon. What a great place this is and so happy to have it close by. I am pleased there are people who donate their land and there are agencies to manage it. I hope this good place can be preserved for the future of Cottonwood. I hope people will respect the land and the rules that are set up.

Ethel Hicks

## **DFG Response to Public Comments**

Sent by email 1/30/2011:

Ms. Hicks:

Thank you for your kind assessment of the Mouth of Cottonwood Creek Wildlife Area. It is always nice to hear when someone has an enjoyable experience on one of our wildlife areas. It is the intention of the Department of Fish and Game to manage this property for wildlife and compatible human use for generations to come. Thank you again for taking the time to express your interest in MCCWA.

Steve Burton  
Senior Environmental Scientist  
California Department of Fish and Game  
Northern California North Coast Region