

**PROJECT DESCRIPTION****RIO ALTO WATER DISTRICT WASTEWATER TREATMENT PLANT IMPROVEMENTS & CONSTRUCTED WETLANDS PROJECT****Table 4 – 2014 IRWM Drought Solicitation Project Summary Table**

<b>Drought Project Element</b>		<b>Rio Alto Water District Wastewater Treatment Plant Improvements &amp; Constructed Wetland Project</b>
D.1	Provide immediate regional drought preparedness	
D.2	Increase local water supply reliability and the delivery of safe drinking water	1
D.3	Assist water suppliers and regions to implement conservation programs and measures that are not locally cost-effective	
D.4	Reduce water quality conflicts or ecosystem conflicts created by the drought	1
<b>IRWM Project Element</b>		
IR.1	Water supply reliability, water conservation, and water use efficiency	
IR.2	Stormwater capture, storage, clean-up, treatment, and management	
IR.3	Removal of invasive non-native species, the creation and enhancement of wetlands, and the acquisition, protection, and restoration of open space and watershed lands	1
IR.4	Non-point source pollution reduction, management, and monitoring	
IR.5	Groundwater recharge and management projects	1
IR.6	Contaminant and salt removal through reclamation, desalting, and other treatment technologies and conveyance of reclaimed water for distribution to users	
IR.7	Water banking, exchange, reclamation, and improvement of water quality	1
IR.8	Planning and implementation of multipurpose flood management programs	
IR.9	Watershed protection and management	1
IR.10	Drinking water treatment and distribution	
IR.11	Ecosystem and fisheries restoration and protection	1

Project Description

The RAWD WWTP Improvements & Constructed Wetlands project includes infrastructure improvements to the WWTP, construction of a 2 mile pipe line and creation of a wetland.

Additional Project Description Discussion

These improvements are driven by new effluent limits for zinc, dichlorobromomethane and chlorodibromomethane as a result of the California Toxics Rule and National Toxics Rule. Based on current

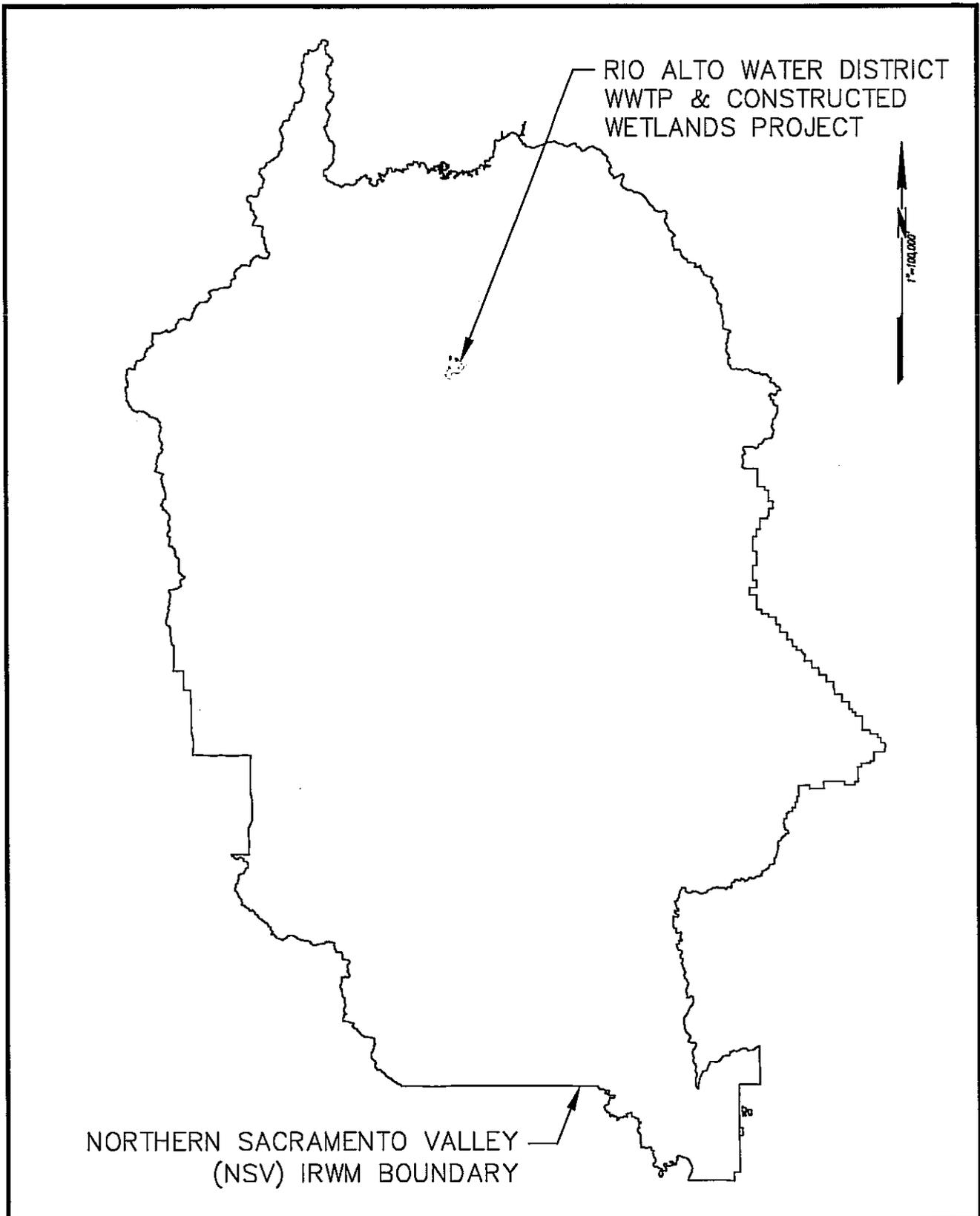
treatment capabilities, the existing facility will not be able to meet the final effluent limits for these constituents. Therefore, Cease and Desist Order (CDO) No. R5-2010-01014 was adopted by the California Regional Quality Control Board on Sept. 23, 2010. The District evaluated several alternatives, and after careful consideration, determined that the best long range alternative was to do infrastructure improvements at the Wastewater Treatment Plant and eliminate our river discharge by replacing it with land discharge in the form of creation of wetlands. The Rio Alto Water District Wastewater Treatment Plant Improvements & Constructed Wetlands will eliminate direct discharge of secondary effluent containing water quality contaminants to the Sacramento River, thereby improving water quality, improving, protecting, and enhancing riparian habitat and special status wildlife and fish species.

Improvements to the wastewater treatment plant include construction of a secondary clarifier, RAS pump station, new effluent pumping system, installation of a generator for emergency operation of the sewage treatment plant during power outages, update the electrical and installing a 10" forcemain to transport the effluent to the wetlands. All of these improvements will ensure better and more reliable treatment of effluent prior to the discharge to land. Creation of a wetland will also assist in cleaner recharge to ground water.

The recycled effluent will be used to create a wetland that will be maintained in perpetuity by the District. This wetland will not be dependent on the Central Valley Project water deliveries for sustenance and therefore not subject to current and future reduction in allotments due to drought conditions. This will assist the health of wetlands in the Pacific Flyway, the migration corridor for birds and waterfowl moving from as far north as Alaska, south to Mexico and beyond.

By removing our effluent discharge to the Sacramento River we will be assisting in improvement in water quality standards for the delivery of safe drinking water for the downstream surface water users who are already experiencing water quality issues magnified by low flows and lack of major flushing events due to the drought.

This project can be considered for three of the four eligible drought project types. It will provide immediate regional drought preparedness by the reuse of effluent water to support a wetland that is not dependent on Central Valley Water Allocations. It will increase local water supply reliability and delivery of safe drinking water by removing contaminants introduced by our discharge in to the Sacramento River for cleaner water delivery for downstream users. Removal of our discharge will also reduce water quality conflicts and ecosystem conflicts created by the drought by decreasing pollutants discharged into the Sacramento River during low flows, improving water quality for fish species and creating a wetland that is not subject to drought allocations which would affect the health of the wetland.



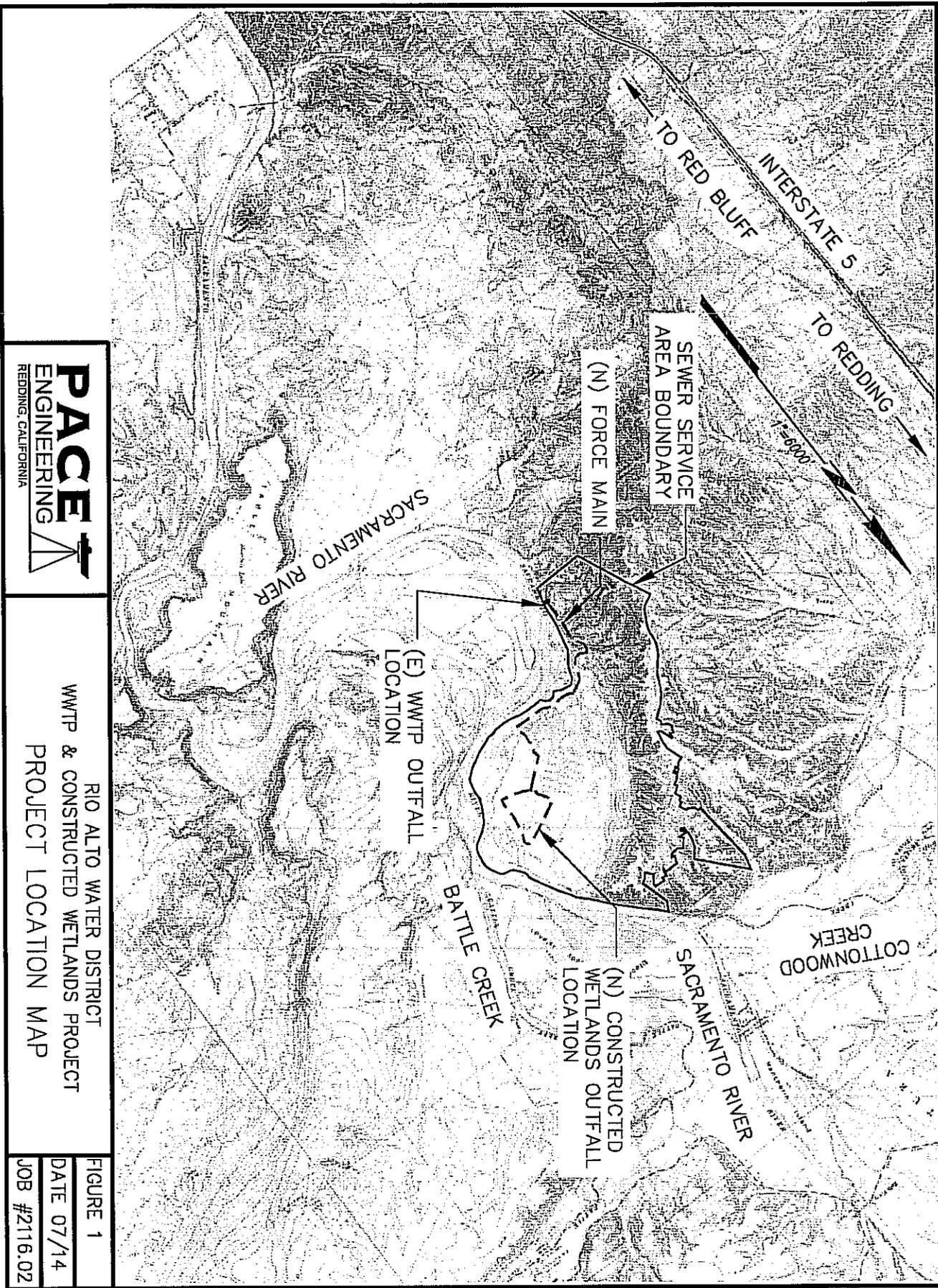
DATE  
7/2/14



NSV IRWMP REGIONAL  
MAP

FIGURE 1  
JOB #2116.02





**PACE**  
ENGINEERING  
REDDING, CALIFORNIA

RIO ALTO WATER DISTRICT  
WWTP & CONSTRUCTED WETLANDS PROJECT  
PROJECT LOCATION MAP

FIGURE 1  
DATE 07/14  
JOB #2116.02

Project Physical Benefits

**Table 5 – Annual Project Physical Benefits**

**Project Name:** Rio Alto Water District Wastewater Treatment Plant Improvements & Constructed Wetlands

**Type of Benefit Claimed:** Increased wetlands acreage and riparian habitat

**Units of the Benefit Claimed :** wetted acres

**Additional Information About this Benefit:** The creation of the wetlands for land disposal of our effluent will increase permanent wetlands adjacent to the Sacramento River not dependent on Central Valley Water During drought periods.

(a)	(b)	(c)	(d)
Physical Benefits			
Year	Without Project	With Project	Change Resulting from Project (b) – (c)
2014	0	0	0
2015-2035	0	39	39
2035- perpetuity	0	78	78

**Comments:** The project is estimated to be completed by March 2015. As such, no benefits will be seen until that time. The acreage purchased for the wetlands is a total of 78 acres which allows for future build out of the community and increased wetted acreage as it is needed with District development, anticipated no sooner than the next 20 years.

**Table 5 – Annual Project Physical Benefits**

**Project Name:** Rio Alto Water District Wastewater Treatment Plant Improvements & Constructed Wetlands

**Type of Benefit Claimed:** Recycled Water Use- Use of wastewater effluent to create a wetlands

**Units of the Benefit Claimed :** Million gallons per day

**Additional Information About this Benefit:** Reusing wastewater effluent to establish a wetlands for further polishing through the wetlands before recharge to groundwater.

(a)	(b)	(c)	(d)
Physical Benefits			
Year	Without Project	With Project	Change Resulting from Project (b) – (c)
2014	0	0	0
2015- perpetuity	0	1 MGD	1 MGD

**Comments:** The project will be completed by March 2015. As such, no benefits will be seen until that time. Potential for the use of a maximum of 1 million gallons per day for creation of a wetlands with riparian habitat located adjacent to the Sacramento River and within the Pacific Flyway. The District will maintain the wetlands in perpetuity.

**Table 5 – Annual Project Physical Benefits**

**Project Name:** Rio Alto Water District Wastewater Treatment Plant Improvements & Constructed Wetlands

**Type of Benefit Claimed:** Removal of contaminants to improve water quality on the Sacramento River.

**Units of the Benefit Claimed :** Million gallons per day

**Additional Information About this Benefit:** Improve water quality will protect the ecosystem habitat and water for downstream beneficial uses.

(a)	(b)	(c)	(d)
	<b>Physical Benefits</b>		
Year	Without Project	With Project	Change Resulting from Project (b) – (c)
<b>2014</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>2015- perpetuity</b>	<b>0</b>	<b>1 MGD</b>	<b>1 MGD</b>

**Comments:** The project will be completed by March 2015. As such, no benefits will be seen until that time. The removal of our wastewater effluent from the Sacramento River will increase the water quality for downstream surface water users and increase water quality for fish and aquatic life.

**Table 5 – Annual Project Physical Benefits**

**Project Name:** Rio Alto Water District Wastewater Treatment Plant Improvements & Constructed Wetlands

**Type of Benefit Claimed:** Increase priority and other species by providing food, water and breeding habitat within the Pacific Flyway for migrating birds.

**Units of the Benefit Claimed :** The number of priority birds increased from the BCR 32 list as listed on the California Waterbird Conservation Plan, Species of Concern.

**Additional Information About this Benefit:** Creation of the wetlands will improve the habitat for migratory birds that will be effected by current and future drought reduction of water allotments to the managed wetlands from the Central Valley Project.

(a)	(b)	(c)	(d)
	<b>Physical Benefits</b>		
Year	Without Project	With Project	Change Resulting from Project (b) – (c)
<b>2014</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>2015- perpetuity</b>	<b>0</b>	<b>526</b>	<b>526</b>

**Comments:** The project will be completed by March 2015. As such, no benefits will be seen until that time. The created wetlands will provide habitat for food, water and breeding for waterfowl and bird migration which is desperately needed in the Pacific Flyway because most of the wetlands are contingent on Central Valley Water allotments and the drought has decreased those allotments.

## TECHNICAL ANALYSIS OF PHYSICAL BENEFITS

The primary expected physical benefit of the Rio Alto Water District Wastewater Treatment Plant Improvements & Constructed Wetlands Project is that of increased wetlands acreage and riparian habitat. Environmental groups are very concerned that this year's drought threatens to do even more damage to the Sacramento Valley's chain of ecosystems. The constructed wetlands will return approximately 78 acres of star thistle covered pasture acres into 39 wetted acres consisting of 4 ponds with riparian habitat adjacent to the Sacramento River located within the Pacific Flyway. The total acreage purchased will allow for future build out of the community and increased wetted storage from two additional ponds as they are needed with District development anticipated no sooner than the next 20 years. The wetlands will be owned, operated, and managed by the District in perpetuity. The millions of birds that migrate annually will need the riparian habitat provided by wetlands for their journey. The loss of wetlands in the Central Valley since the 1850s has been well documented by a variety of publications and reports. Over 90% of the Central Valley's historic wetlands have been destroyed and those that remain depend on water from the Central Valley Project.

Creation of wetlands will also enhance the community by increasing natural habitat for waterfowl and wildlife, while offering educational and recreational opportunities for local schools and community residents through the development of walking trails and informational kiosks. A wildlife corridor already exists in the immediate vicinity of the proposed project as it is adjacent to the Sacramento River. The river provides a natural corridor for numerous birds, mammals, and other wildlife to utilize. Designated Sacramento River Wildlife Areas exist all along the river, and although a named designated area does not exist in the immediate, the project will enhance the natural wildlife corridor that currently exists.

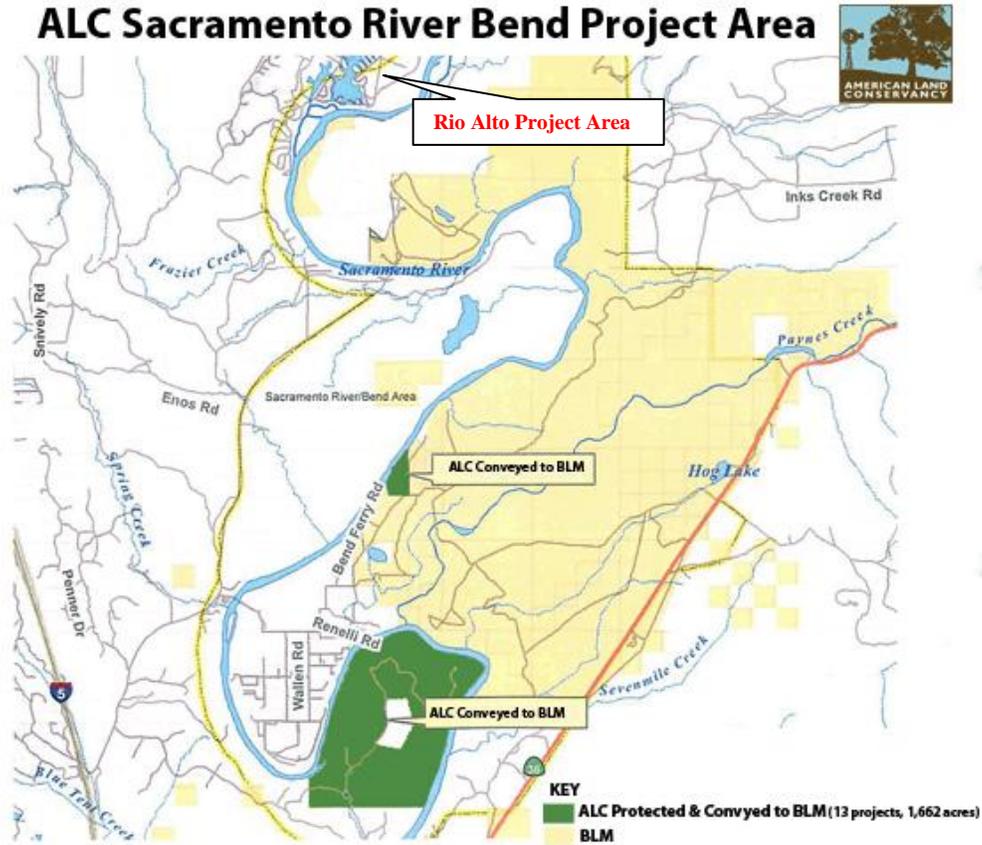
Additionally, The Battle Creek Watershed Conservancy has been monitoring the progress of proposed designation by U.S. Senators Barbara Boxer and Dianne Feinstein on legislation introduced for the proposed Sacramento River Bend National Recreation Area Act. The legislation would designate 17,000 acres of BLM public land adjacent to the Sacramento River Bend as a National Recreation Area.

As detailed at American Land Conservancy (ALC) website on the Sacramento River Bend site ([www.alcnet.org/projects/overview/california/](http://www.alcnet.org/projects/overview/california/)), ALC has been partnering BLM in the Sacramento River Bend Outstanding Natural Area (ONA) since 1992, working piece by piece to fill in a mosaic of protected lands that include high priority riparian and oak woodland habitat and outstanding outdoor recreation opportunities. As of January, 2011, ALC has protected 1,662 acres within the Sacramento River Bend ONA.

Conservation in the Sacramento River Bend ONA is a priority, as it is surrounded by some of the fastest population growth in the state. ALC and BLM are protecting parcels that were imminently threatened by development and subdivision in order to prevent further fragmentation of riparian habitat. The area has been designated as an Area of Critical Environmental Concern by the BLM and is under consideration to become a National Recreation Area.

ALC has made steady progress in conserving this important ecological resource: In 1972 the area included just 4,000 acres of public land and less than a mile of river frontage. Today it includes nearly 18,000 public acres and 16 miles of river frontage managed by the BLM. ALC has completed 13 projects in the Sacramento River Bend since 1996. The proposed EEMP project is located approximately 15 miles upstream of the ALC Sacramento River Bend Project area as shown below:

## ALC Sacramento River Bend Project Area

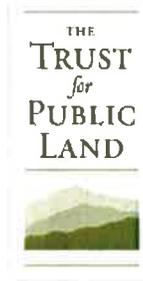


A secondary benefit of this project is that recycled water will be used to maintain the wetlands. Current flows at the Rio Alto Water District wastewater treatment plant (WWTP) can be as high as a peak wet weather flow of 1 million gallons per day (MGD). As such, this secondarily treated wastewater effluent will be utilized to keep the wetlands wet for use by riparian habitat. Due to the drought, deliveries to these managed wetlands may be reduced by as much as 25% of their normal year of level 2 water derived primarily from CVP yield. No level 4 water is anticipated to be provided from willing sellers or other sources outside the CVP. This water is the optimal amount of water supply for refuges and wetlands. In addition, the Nature Conservancy is paying farmers to keep their fields wet longer, but with agribusiness interest dependent on publicly subsidized water, this will further reduce habitat for the Pacific Flyway. The wetlands created by this project will provide wetlands and riparian habitat maintained in perpetuity not reliant on surface water or subject to curtailment during drought years.

Another secondary benefit of this project is the improvement of water quality that will result in the Sacramento River. This project will eliminate the current direct discharge of up to 1 MGD of secondary effluent containing water quality contaminants to the Sacramento River thereby improving, protecting, and enhancing riparian habitat and special status wildlife and fish species. As reported in the Tehama West Watershed Assessment for the Tehama County Resource Conservation District (RCD), the Sacramento River comprises the largest and most important riverine ecosystem in California. It provides passage, spawning, and rearing capabilities for all species of anadromous fish found in the Central Valley. The California Rivers Assessment at the University of California, Davis identified 18 native fish species in the Sacramento River including the Chinook salmon, Green sturgeon, and steelhead which are threatened or endangered, or special concern species in decline. As such, improving the water quality in this reach of the river will improve the habitat of these species, as well as for all downstream beneficial uses.

Yet another benefit of this project is the number of priority birds that are anticipated to increase in the area due to the creation of a wetland. As described by the Wintu Audubon Society, the location of the proposed wetlands is especially critical for birds as it is adjacent to the Sacramento River in an important flyway for migrating birds. The Audubon Society highlighted 29 species of birds that will likely be attracted to the proposed wetlands in this location. Furthermore, up to 10 priority bird species as indicated in the California Waterbird Conservation Plan, Species of Concern (BCR 32) are anticipated to benefit from this project due to the habitat that will be provided. Of these species, it is anticipated that 526 birds or more will utilize these wetlands, none of which are currently in the area according to documented bird sightings including that from an expert bird watcher. Due to its location and proposed habitat, this project will improve the number of bird species listed as priorities in national priority wetland areas and regionally important wetland areas as discussed in the following plans: page 6 of the 2004 North American Waterfowl Implementation Framework, 2004 Partners in Flight-North American Landbird Conservation Plan, page 1 of the US Shorebird Conservation Plan, page 45 of the North American Waterbird Conservation Plan, and pages 147 and 250 of the 2006 Central Valley Joint Venture Plan as attached.

<b>Table 6 – Cost Effective Analysis</b>	
<b>Project name: Rio Alto Water District Wastewater Treatment Plant Improvements &amp; Constructed Wetlands</b>	
Question 1	Types of benefits provided as shown in Table 5 include increasing wetlands acreage and riparian habitat by 78 acres, recycling 1 MGD of water for wetland establishment and maintenance, removing 1 MGD of water containing quality contaminants from the Sacramento River, and increasing the number of priority bird species anticipated in the area by 526.
Question 2	Have alternative methods been considered to achieve the same types and amounts of physical benefits as the proposed project been identified? Yes.
	If no, why? N/A
	If yes, list the methods (including the proposed project) and estimated costs. While the following considered alternatives to this project would have the same benefit of improving water quality in the Sacramento River, they would not create wetlands and all the benefits that come with these. This fact, together with the increased costs of the considered alternatives, is why the constructed wetlands project was selected as the preferred alternative. As detailed in pages 25-43 of the Preliminary Engineering Report (PER) completed by PACE Engineering January 2011, the following alternatives were considered and found to be infeasible: pasture irrigation with subsurface disposal, regional treatment and disposal, and Lake California Discharge meeting end-of-pipe limits. Also as detailed therein, two additional alternatives were found to be feasible, but were eliminated due to increased costs above that associated with the constructed wetlands alternative. Both of these alternatives included the following at two different locations as shown in the PER: 130 acres of pasture irrigation, a 365 acre-foot effluent storage pond, and effluent and tailwater pump stations for project costs of \$7.7 million and \$8.1 million. As described in the PER, the total project cost of the entire constructed wetlands project including improvements at the wastewater treatment plant was cheaper than this at approximately \$6 million.
Question 3	If the proposed project is not the least cost alternative, why is it the preferred alternative? Provide an explanation of any accomplishments of the proposed project that are different from the alternative project or methods. The proposed project was the least cost alternative considered that would give the same benefits as described in Table 5.
Comments:	



March 5, 2014

Felicia Marcus, Chair  
State Water Resources Control Board  
1001 I Street, Sacramento, CA 95814

**RE: Comments on Drought Actions and Potential Impacts to Refuges and Central Valley Wetlands**

Dear Chair Marcus and Members of State Water Resources Control Board:

Our groups are writing to provide the Board and related agencies information about the continuing stress and adverse consequences that the drought is causing to critical ecosystem values that are at stake along the Pacific Flyway. Recognizing the complex interests the Board must balance and weigh in this critical—and now compounded—third dry year, we recommend priorities and actions to protect basic habitat for waterfowl and migratory birds, especially in the Central Valley refuge areas.

In sum, our concerns are that the ongoing drought this year will compound impacts to wetland wildlife, already stressed by declining water supplies to our state and federal refuges and other managed wetland habitats over the last 2 dry years. This year, Central Valley refuges anticipate receiving little more than one-quarter of their legally-mandated water supplies. Furthermore, post-harvest flooding of wildlife-friendly farmland—a collaborative success story for agriculture and the environment that has provided a vital component of or the flyway habitat mosaic necessary to support birds by supplementing public and private managed wetland habitat—could decline severely this year because of potential water supply curtailments.

**The loss of flooded agricultural habitat places overwhelming pressure on our public and private refuges, and cuts to refuge water deliveries make refuges less able to provide food**

**resources and nesting habitat for millions of birds and other species.** Collectively, available habitat may be reduced to levels not seen since the early 1980s. We must consider these collective and compounding effects on birds and other wetland-dependent wildlife and safeguard against so much habitat loss in the Central Valley.

We appreciate and recognize the challenge confronting the Board to balance all interests in response to the drought and increasingly scarce water resources. We understand through the proposed revisions to the Board's Emergency Order (February 28, 2014) that the Board staff continues to seek an overall water management strategy that addresses multiple public interests, including contractual obligations for both urban and agricultural water users, water quality considerations, and conservation of fish and wildlife. We also recognize the important objective of maintaining salinity control in the Delta throughout 2014. We continue to support the Board's efforts to anticipate and plan for continued drought conditions, and to ensure enough water is stored for the health and safety of all Californians, while also recognizing north-of-Delta, in-Delta, and south-of-Delta environmental protections. However, we discourage the Board from being too hasty. Take action only after directly engaging with agencies and organizations, considering all information provided by the state and federal water projects and creative solutions proposed by water users.

**Protecting Central Valley wetlands is critically important – especially during drought.**

California's public refuges, private wetlands, and some agricultural land provide indispensable habitat along the Pacific Flyway—together piecing together less than one-tenth of the four million wetland acres that once supported migrating birds and other wildlife before human development over a century ago. Millions of birds depend on these wetlands to rest and feed between long flights of hundreds or even thousands of miles. Their over-winter survival and breeding success from one season to the next is critically linked to the quality, abundance, and distribution of wetlands in the Central Valley. These relatively few remaining wetland areas are not incidental; their existence depends on dedicated water supplies and active management.

During the last severe California drought in the late 1970s, curtailments to refuge water deliveries resulted in significant impacts to wetland habitat and waterbird populations, especially wintering waterfowl. Further declines in the 1980s ultimately led to federal legislation and international agreements to mitigate for and reverse the damage.

Since the 1980s, thousands of acres of wetland habitat have been restored, and thousands more have been supplemented through compatible agricultural practices such as post-harvest flooding of rice and corn. Central Valley rice fields and wetlands collectively have been designated one of the largest internationally significant shorebird ecological sites in North America. Populations of many once-listed or declining species, such as the Aleutian Canada goose and White-faced ibis, have improved significantly. Recreation opportunities such as hunting and birdwatching have benefitted local communities and economies.

This drought—now entering a third consecutive dry year—threatens to dramatically impact the value of these long-term public investments. In particular, the cumulative impacts of habitat lost on both refuges and agricultural land presents an unprecedented challenge to birds and other wetland-dependent wildlife, and it may take many years for populations to recover.

Unquestionably, our farms and communities are suffering during this drought. So, too, are migratory birds, resident waterfowl, and other wetland wildlife. These species have no insurance policy to recover from the significant loss of habitat they could suffer this year if no action is taken. To protect our public investments and international commitments, we must provide a backstop to so much habitat loss in the Central Valley by prioritizing and augmenting water supplies to the remaining 5 percent of California wetlands.

**It is our hope that the Board's actions will help provide a backstop to severe cutbacks in agricultural wetland habitat by prioritizing water supplies to public and private wetlands, especially in dry years.**

In consideration of substantial public investments in Pacific Flyway habitat over many years as well as international commitments to recover migratory bird species in the Central Valley, the Board's considerations and actions should:

- Recognize that the remaining wetlands are a fraction of historical wetlands in the Central Valley, and thus require adequate water to be optimally managed to support the millions of migratory birds that depend on them in wet and dry years. With dwindling agricultural habitat, these wetlands face overwhelming pressure to provide for birds.
- Maintain water deliveries to managed wetlands. Legal commitments to refuge water contracts should not be compromised, especially in drought years. This is exactly the moment when larger ecological values in the flyway are most at risk.
- Provide funding for refuge infrastructure improvements and operations, such as groundwater wells for critical-year supplies, wherever feasible and appropriate.
- Allow refuges to manage forecasted water supplies optimally and efficiently by providing assurances that conserved water will be kept available for delivery in fall, when needed most by refuges to flood up wintering habitat for millions of arriving birds.
- Duly consider our obligations under international commitments as a signatory to the North American Waterfowl Management Plan, an international treaty recognizing the importance of recovering and maintaining waterfowl and other wetland wildlife through wetland restoration throughout North America, by providing water to wetlands in all years.

**To minimize wetland habitat losses this year and protect flyway habitat values, we recommend that the Board consider measures to help ensure some wildlife benefits from water transfers, improve infrastructure, and fund emergency water supply operations.**

Such measures should include:

- Maximize opportunities to build environmental benefits into these activities that enhance habitat for resident and migratory waterbirds. Water transfers that take water away from habitat-providing rice and other seasonal crops will likely impact birds and other listed terrestrial species.
- Enhance fallowed farmland resulting from water transfers through landowner incentives to provide habitat for resident nesting birds and other wildlife. For example, cover crops can provide critically important waterfowl nesting habitat with minimal precipitation and little to no supplemental irrigation.
- Seek out collaborative measures between state and federal efforts to make additional funding available to refuges so that existing water supply wells and pumps can operate as necessary to support habitat units, without funding restrictions.
- Where appropriate, rehabilitate existing wells and construct new wells at refuges and easement lands to provide supplemental or alternative water supplies in critical years to safeguard the longevity of established managed wetlands.
- Install new and rehabilitate existing infrastructure to improve water use efficiency of public and private wetland units. For example, functional lift pumps and pipelines can provide wetland managers the ability to reuse water flowing through the wetland units to provide spring irrigations to augment food resources to support migratory waterbirds. Grading ponds can also allow more efficient flooding targeted to foraging waterfowl and shorebirds.

**We urge you to begin monitoring conditions on the ground to adaptively build and manage a better systemic response to emergency drought circumstances, now and in the future.**

- Investments are needed immediately to gauge stress and impacts during this drought year so wetland managers can best optimize conditions for birds across the valley and provide habitat more precisely when and where it is in greatest demand. Disease outbreaks can signal overcrowding on too little available habitat. Supplemental funding is needed for disease detection, diagnosis, and control so that federal and state refuge managers can manage changing conditions and coordinate water and habitat management across the Valley to minimize disease outbreaks.
- Additionally, long-term monitoring programs should be established or existing programs given renewed support to assess habitat conditions for waterfowl and shorebird populations. Impacts of the drought are complex and long-lasting, and current bird population surveys may not adequately reflect drought impacts.

We, the undersigned parties and organizations, very much appreciate your consideration of these measures, and we urge the Board to fully consider the cumulative effects that comprehensive “dewatering” of the Flyway may cause. It is within the Board’s authority to prioritize multi-benefit actions that can help sustain habitat values in the Central Valley for the benefit of migratory birds and wildlife.

We appreciate your attention to these matters, and look forward to continued dialogue to address the myriad challenges of this drought for the benefit of people, farms, cities, and wildlife.

Sincerely,



Jay Ziegler  
Director of External Affairs and  
Policy  
The Nature Conservancy



Rico Mastrodonato  
Senior Government Relations Manager  
The Trust For Public Land



Meghan Hertel  
Working Lands Program Director  
Audubon California



Kim Delfino  
California Program Director  
Defenders of Wildlife



Mark Hennelly  
V.P. Legislative Affairs & Public Policy  
California Waterfowl Association



Mark Biddlecomb  
Director of Operations, Western Region  
Ducks Unlimited, Inc.

CC: State Water Quality Control Board:

- Member Francis Spivy-Weber, Vice Chair
- Member Tam Doduc
- Member Steven Moore
- Member **Dorene D'Adamo**

Karen Ross, Secretary, Department of Food and Agriculture  
John Laird, Secretary, California Natural Resources Agency  
Matt Rodriguez, Secretary, California Environmental Protection Agency  
Chuck Bonham, Director, Department of Fish and Wildlife  
Mark Cowin, Director, Department of Water Resources  
Nancy McFadden, Executive Secretary, Office of the Governor  
Thomas Howard, Executive Director, State Water Resources Control Board  
Caren Trgovcich, Chief Deputy Director, State Water Resources Control Board  
Sandra Schubert, Undersecretary, Department of Food and Agriculture  
Martha Guzman-Aceves, Deputy Legislative Director, Office of the Governor  
Debbie Davis, Community & Rule Affairs Advisor, **Governor's Office of Planning and Research**  
Cliff Rechtschaffen, Senior Advisor, Office of the Governor

# TEHAMA WEST WATERSHED ASSESSMENT

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## *EXECUTIVE SUMMARY*

*Prepared for*  
**TEHAMA COUNTY  
RESOURCE CONSERVATION DISTRICT**

**APRIL 2006**

**VESTRA**



# TEHAMA WEST WATERSHED ASSESSMENT

## *EXECUTIVE SUMMARY*

*Prepared for*

**Tehama County Resource Conservation District**

*Prepared by*



**VESTRA Resources, Inc.  
962 Maraglia St.  
Redding, California 96002**

**APRIL 2006**

## Section 10 FISHERIES AND AQUATIC RESOURCES

### SOURCES OF DATA

All information on the biology, distribution, and abundance of fishery resources and their habitats was obtained from various studies and reports. No field surveys were conducted for this assessment. Several documents served as the primary sources of information on fishery resources. Dr. Peter Moyle's book, *Inland Fishes of California*, provided most of the biological background information on native and non-native fish life history characteristics. Information on the Sacramento River was primarily extracted from state and federal agency documents pertaining to restoration of anadromous salmonid fishery resources and ecosystem restoration. These included:

- California Department of Fish and Game's (CDFG) *Restoring Central Valley Streams: A Plan for Action*
- U.S. Fish and Wildlife Service's (USFWS) *Anadromous Fish Restoration Program (AFRP)*;
- California Resources Agency's *Upper Sacramento River Fisheries and Riparian Habitat Management*
- The CALFED *Ecosystem Restoration Plan*

Because extensive information on fishery resources and their habitats in the Sacramento River are provided in these and other documents, and because of large-scale, ongoing state and federal programs on the Sacramento River, the main stem Sacramento River is only briefly discussed in this section of the watershed assessment.

Information on fish and associated habitats in the small intermittent streams of western Tehama County is limited. The primary documents used to provide recent information on fishery resources within these streams included several reports from California State University, Chico by Dr. Paul Maslin and his students. These reports focused on non-natal rearing of anadromous salmonids in the lower-most reaches of western Tehama County streams, but included data relevant to other native and non-native fish species in those areas. Additionally, information regarding Thomes and Elder Creeks was gleaned from CDFG files, while CALFED studies of offstream storage sites provided data for portions of Thomes and Upper Red Bank Creeks.

### HISTORICAL CONTEXT

The historical abundance and distribution of Sacramento River salmon and steelhead populations within the main stem and anadromous salmonid-producing tributaries are described within numerous documents (e.g., CALFED Ecosystem Restoration Program, CDFG's Central Valley and fishery restoration plans, USFWS Anadromous Fish Restoration Program). In the CDFG Fish Bulletin No. 179, Yoshiyama et al. (2001) state:

Chinook salmon (*Oncorhynchus tshawytscha*) formerly were highly abundant and widely distributed in virtually all the major streams of California's Central Valley drainage –

encompassing the Sacramento River basin in the north and San Joaquin River basin in the south.

In the Sacramento River basin, constituting the northern half of the Central Valley system (covering about 24,000 square miles), most Coast Range streams historically supported regular salmon runs; however, those ‘westside’ streams generally had streamflows limited in volume and seasonal availability due to the lesser amount of snowfall west of the valley, and their salmon runs were correspondingly limited by the duration of the rainy season.

Riparian forests near the Sacramento River have declined to just 2 to 3 percent of the original area (McGill 1979 and 1987, as cited by CALFED, 1999). Large-scale agricultural clearing and fuel harvest for riverboats from about 1850 to the turn of the century initiated this reduction. During the early to mid 1900s, reservoir and levee projects to assist with flood control resulted in additional reductions in floodplain riparian stands. Loss of riparian habitats likely affected the associated streams and the quality of their fishery habitat. At the same time, large multipurpose reservoirs and diversion dams impounded the Sacramento River. These structures stopped the upstream migration of anadromous fish into tributaries where spawning and rearing historically occurred.

## **HABITAT TYPES**

### **Sacramento River**

The Sacramento River is a major river of the western United States and comprises the largest and most important riverine ecosystem in California. It yields 35 percent of the state’s water supply, while providing passage, spawning and rearing capabilities for all species of anadromous fish found in the Central Valley.

The Sacramento River in Tehama County provides habitat attributes to support cold and warm water fish species year round. While the upper reach above Red Bluff Diversion Dam (RBDD) flows through confined canyons, the southern reach meanders over a broad alluvial floodplain. The RBDD, located in central Tehama County, is a portion of the federal Central Valley Project (CVP). According to CALFED (1999), the CVP is one project that contributed to the alteration of the Sacramento River’s natural flow regime, sediment transport capabilities, and riparian and riverine habitats. Fish habitat characteristics of the main stem Sacramento River are described in state and federal salmon and ecosystem restoration plans.

### **Tehama West Tributary Streams**

Relatively little is known about the fishery resources of the Tehama West Watershed. However, it appears that the fisheries are affected by the “flashy” nature of their water flow. These streams often have high flows during winter storms, frequently dry out in summer in Sacramento Valley reaches, experience high summertime water temperatures prior to drying, and lack habitat heterogeneity (e.g., pools). These conditions result in an unusual situation where the streams exhibit three fishery zones. The first zone, for the larger West Tehama tributaries, is in the Coast Range canyons. Here the streams are perennial and support a variety of native and introduced fish species. Fish have the

As in the case of Thomes and Elder Creeks, Red Bank Creek has intermittent flow through the Sacramento Valley until near its confluence with the Sacramento River at Red Bluff. A variety of fish species use its lower-most portions, as will be described later in this section.

Appendix 10-2 summarizes those native fish species observed in lower reaches of the tributaries of the Sacramento River by Maslin et al. (1995-1999), Moore (1997), and Villa (1985).

## DESCRIPTION OF FISH SPECIES

### Native Fish Species

The California Rivers Assessment (CARA 1997) at the University of California, Davis identified 18 native fish species in the Sacramento River and other waters of Tehama County. These taxa are listed in Table 10-2. Other sources of information regarding the fish found in the watershed area include: CALFED (2000), which provides information regarding fish presence at proposed dam sites on Thomes Creek (near Paskenta) and Upper Red Bank Creek; NOAA (2006) and CDFG files (CDFG Various), which offer survey information for Upper Elder Creek and the portions of Thomes Creek between Paskenta and the “Slab” (see Figure 10-1). The biology, distribution, and abundance of these native fish species in the watershed is described below in order of taxonomic family.

#### Lampreys: Family Petromyzontidae

##### *Pacific Lamprey (Lampetra tridentate)*

Pacific lamprey spend most of their adult life phase in the ocean where they prey on a wide variety of fish species. Spawning migration into the river is usually between early March and June (Moyle 2002). Large numbers have been seen in the Sacramento River clinging to the Red Bluff Diversion Dam gate piers during the spring (USFWS unpublished observations). Male and female lamprey construct nests and spawn in gravelly, swift areas of the river and both sexes usually die shortly thereafter. Lamprey embryos hatch in about 19 days at 59°F, and the resulting larvae (ammocoetes) spend a short time in the gravels before moving with the current to downstream areas of soft sand and mud where they rear for several years. Upon reaching about 6–7 inches in length, the ammocoetes transform (metamorphose) into adults, migrating downstream during high-flow events in winter and spring (Moyle 2002). Although the species is commonly found in the Sacramento River, it has also been recorded in mid-reaches of Thomes and Red Bank Creeks (CALFED 2000). Presumably, the fish could not successfully propagate in lower reaches of those streams because of intermittent flow conditions, but would move from the Sacramento River to the tributaries mid-reaches when stream flows are moderate.

During trapping operations at RBDD from July 1994 through June 2000, the U.S. Fish and Wildlife Service captured 5,199 of these fish (Appendix 10-1). It ranked as the fifth most abundant of all species captured.

##### *River Lamprey (Lampetra ayresii)*

River lamprey life history characteristics are not as well known as Pacific lamprey because the species has not been studied in California (Moyle 2002). Most observations have been made in the lower Sacramento-San Joaquin River systems. The timing of spawning migrations is not well known.

The species reproduces in a similar riverine environment as Pacific lamprey and adults die after spawning. The ammocoete metamorphosis into the adult life phase is the longest among lamprey species (9–10 months) (Moyle 2002). The population status of river lamprey is largely unknown, which may be attributable to a small population or lack of research on the species. A total of only 79 river lampreys were captured by the USFWS during trapping operations at RBDD from July 1994 to June 2000 (Appendix 10-1). Presumably, the fish could not successfully propagate in lower reaches of the small streams in western Tehama County because of their flow regimes.

**Table 10-2  
NATIVE FISH SPECIES IN THE SACRAMENTO RIVER IN  
TEHAMA COUNTY AND POPULATION STATUS**

Common Name	Scientific Name	Status (see below)
California roach	<i>Lavinia symmetricus</i>	4
Chinook salmon <sup>a</sup>	<i>Oncorhynchus tshawytscha</i>	1
Green sturgeon <sup>b</sup>	<i>Acipenser medirostris</i>	2
Hardhead	<i>Mylopharodon conocephalus</i>	3
Hitch	<i>Lavinia exilicauda</i>	4
Pacific lamprey	<i>Lampetra tridentata</i>	0
Prickly sculpin	<i>Cottus asper</i>	5
Rainbow trout/Steelhead <sup>c</sup>	<i>Oncorhynchus mykiss</i>	5/1
Riffle sculpin	<i>Cottus gulosus</i>	5
River lamprey	<i>Lampetra ayresi</i>	2
Sacramento blackfish	<i>Orthodon microlepidotus</i>	5
Sacramento pikeminnow	<i>Ptychocheilus grandis</i>	5
Sacramento splittail	<i>Pogonichthys macrolepidotus</i>	3
Sacramento sucker	<i>Catostomus occidentalis</i>	5
Speckled dace	<i>Rhinichthys osculus</i>	4
Threespine stickleback	<i>Gasterosteus aculeatus</i>	4
Tule perch	<i>Hysterocarpus traski</i>	4
Western brook lamprey	<i>Lampetra richardsoni</i>	3
White sturgeon	<i>Acipenser transmontanus</i>	5

**Fish Status Ratings (defined by Dr. Peter Moyle, U.C. Davis)**

Status	Meaning
0	Not specified
1	Threatened or endangered-usually formally listed but not always
2	Special concern species is in decline or has very limited distribution
3	Watch list species in decline but not yet in serious trouble. Monitoring needed
4	Species overall not in decline or in danger of extinction but has subspecies or distinctive populations that are
5	Species widespread and abundant

Notes, based upon more recent Federal actions:  
<sup>a</sup> Spring-run has Threatened status; winter-run has Endangered status; fall and late-fall runs are candidates for listing.  
<sup>b</sup> Proposed for Federal Threatened status in 2005.  
<sup>c</sup> Rainbow exist in the headwaters; steelhead only exist below the Horse Trough Creek barrier of Thomas Creek. Steelhead are federally-listed.

Source: CARA 1997; NOAA 2006

***Western Brook Lamprey (Lampetra richardsoni)***

Western brook lamprey is a small non-predaceous species with major inland distributions in the Sacramento River drainage. Neither the adults nor larvae enter salt water. Spawning in river gravels begins when water temperatures exceed 50°F and is similar to Pacific lamprey (Moyle 2002). The CARA (1997) project identified the species in the watershed tributary streams, where perennial



# Wintu Audubon Society

CHAPTER OF THE NATIONAL AUDUBON SOCIETY

P. O. Box 994533, Redding, California 96099

REC'D MAR 11 2011

Martha Slack, General Manager  
Rio Alto Water District  
22099 River View Drive  
Cottonwood, California 96022

Dear Ms. Slack:

Thank you for inviting us to your board meeting on January 19, 2011 to learn of your wetland alternative to the upgrade of waste water treatment. We found this alternative very exciting. And the Wintu Audubon Society enthusiastically supports its creation. Wetlands support a rich assortment of all living things not just birds. Most of it has been degraded or destroyed in northern California. Any additional habitat that can be created is most valuable. The location of your proposed wetlands will be especially critical for birds because it is adjacent to the Sacramento River an important flyway for migrating birds.

The Wintu Audubon Society is a local organization dependent upon nominal membership dues for our operational income. As such, we cannot offer any significant financial support. However, we could offer assistance in interpretive signing and in field trips for local schools and other groups. Please keep us informed of your progress on this valuable project and call on us for other support.

We are attaching a list of local and migratory birds that could be attracted to the wetland habitat.

Sincerely,

George Horn, President

attachment: 1

## **Birds That Might be attracted to the Proposed Rio Alto Water District Waste Water Wetlands**

Greater white-fronted goose  
Canada goose  
Wood duck  
Gadwall  
American wigeon  
Mallard  
Cinnamon teal  
Green-winged teal  
Ring-necked duck  
Bufflehead  
Pied-billed grebe  
American bittern  
Great blue heron  
Great egret  
Snowy egret  
Green heron  
Virginia rail  
Sora  
Common moorhen  
American coot  
Killdeer  
Greater yellowlegs  
Wilson's snipe  
Black phoebe  
Tree swallow  
Violet-green swallow  
Marsh wren  
Song sparrow  
Red-winged blackbird

NORTH AMERICAN  
WATERFOWL  
MANAGEMENT PLAN



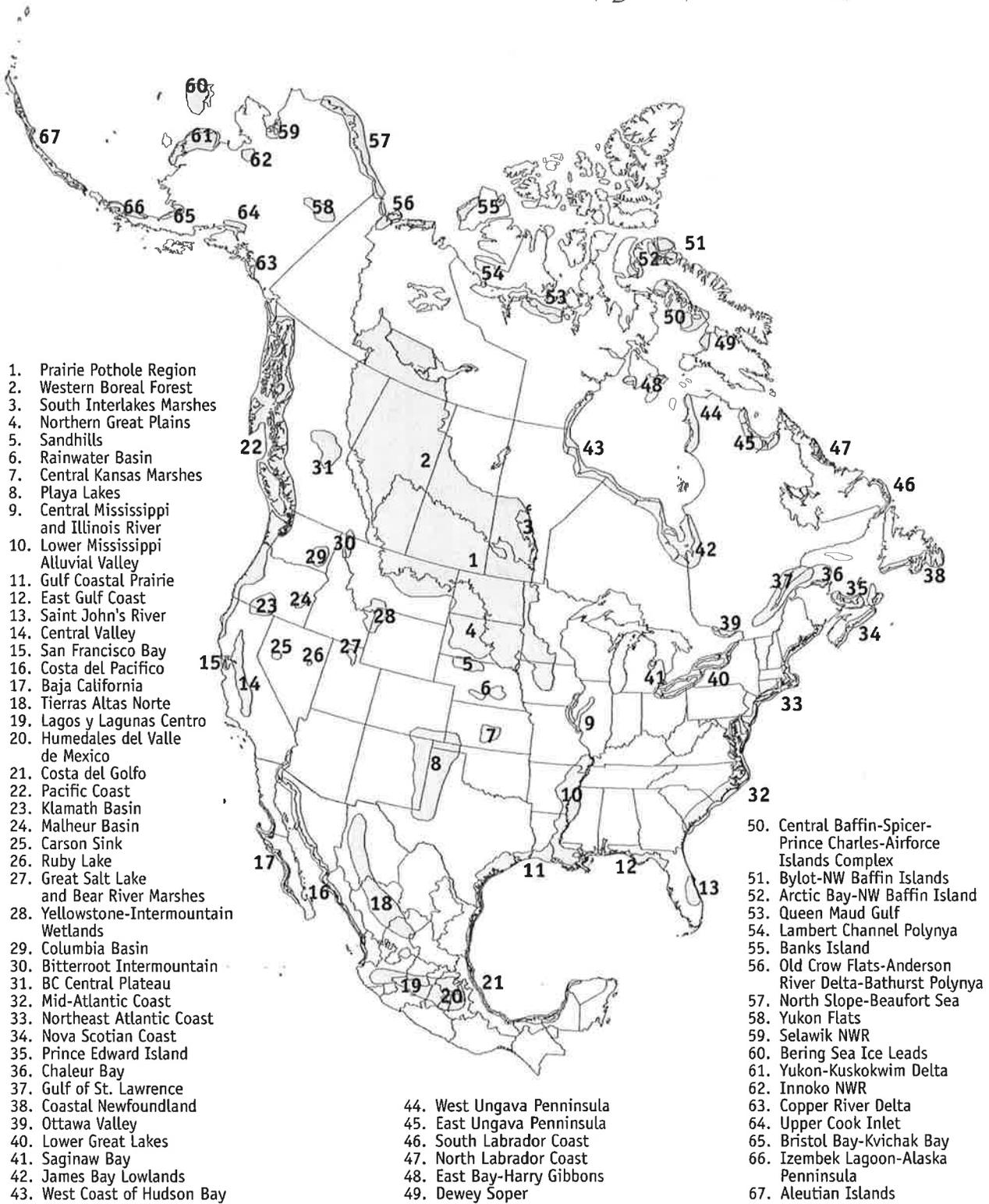
STRENGTHENING the BIOLOGICAL FOUNDATION

# 2004 Implementation Framework



*North American Waterfowl  
Management Plan  
Plan nord-américain de  
gestion de la sauvagine  
Plan de Manejo de Aves  
Acúaticas de Norteamérica*

Figure 1. Areas of continental significance to North American ducks, geese, and swans.

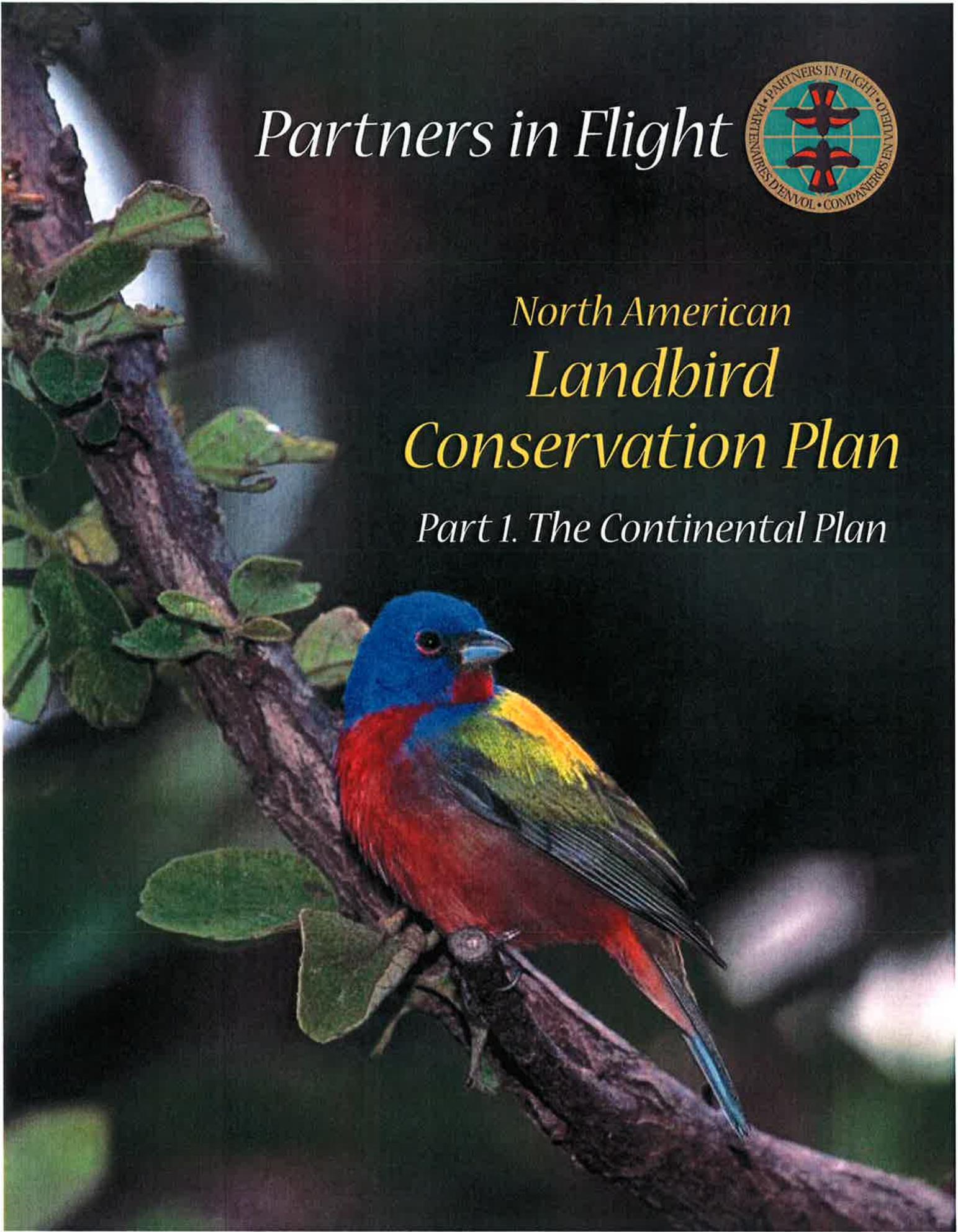


# *Partners in Flight*



## *North American Landbird Conservation Plan*

*Part 1. The Continental Plan*



## PACIFIC AVIFAUNAL BIOME



The Pacific Avifaunal Biome is made up of three BCRs (Fig. 9) that extend from south-coastal Alaska south to northern Baja California in Mexico. This region en-

compasses the Pacific coastline of Canada and the U.S., including coastal archipelagos. Dominating the northern portion of the landscape are the magnificent coniferous rainforests, including Sitka and other spruces, western hemlock, red cedar, Douglas fir, coastal redwood, and giant sequoia. These forests have been greatly altered in recent decades. In the southern half of the region, dry pine forests, oak woodlands, chaparral, and coastal scrub support a large number of endemic species. These habitats have been extensively altered and lost due to human encroachment. Important riparian habitats occur throughout the biome, particularly in the southern portion and in montane wet meadows throughout.

The Pacific Avifaunal Biome has a distinct group of species that is concentrated along the coast, both in the breeding and wintering seasons (Fig. 18a, b). Many are resident year round, while others breed here and winter in western Mexico (Fig. 18b). This biome also is very important for northern breeding species that winter in the moderate climate along the Pacific coast. Large populations of raptors such as Red-tailed Hawk, American Kestrel, and Northern Harrier winter in the interior valleys where agriculture dominates. The majority of the wintering populations of Fox Sparrow (western races) and Golden-crowned Sparrow occur in this biome.

Overall, the species in this region have relatively high breeding season threats (Fig. 5), and a high proportion of Watch List Species occur here (Fig. 10a). The main conservation issues for birds in the region are related to effects of forest management (e.g., timber harvest, fire suppression), loss of wetlands and riparian woodlands, and urban/residential/agricultural encroachment into oak, chaparral, and coastal scrub habitats. Lowland and coastal habitats are heavily encroached upon by urban development and agriculture, as are the former grasslands of the Central Valley of California.

There are Watch List and Stewardship Species representative of all the major terrestrial habitats in the Pacific Biome, but the greatest number of these species can be placed in two major groups: those associated with moist coniferous forests and those associated with drier oak

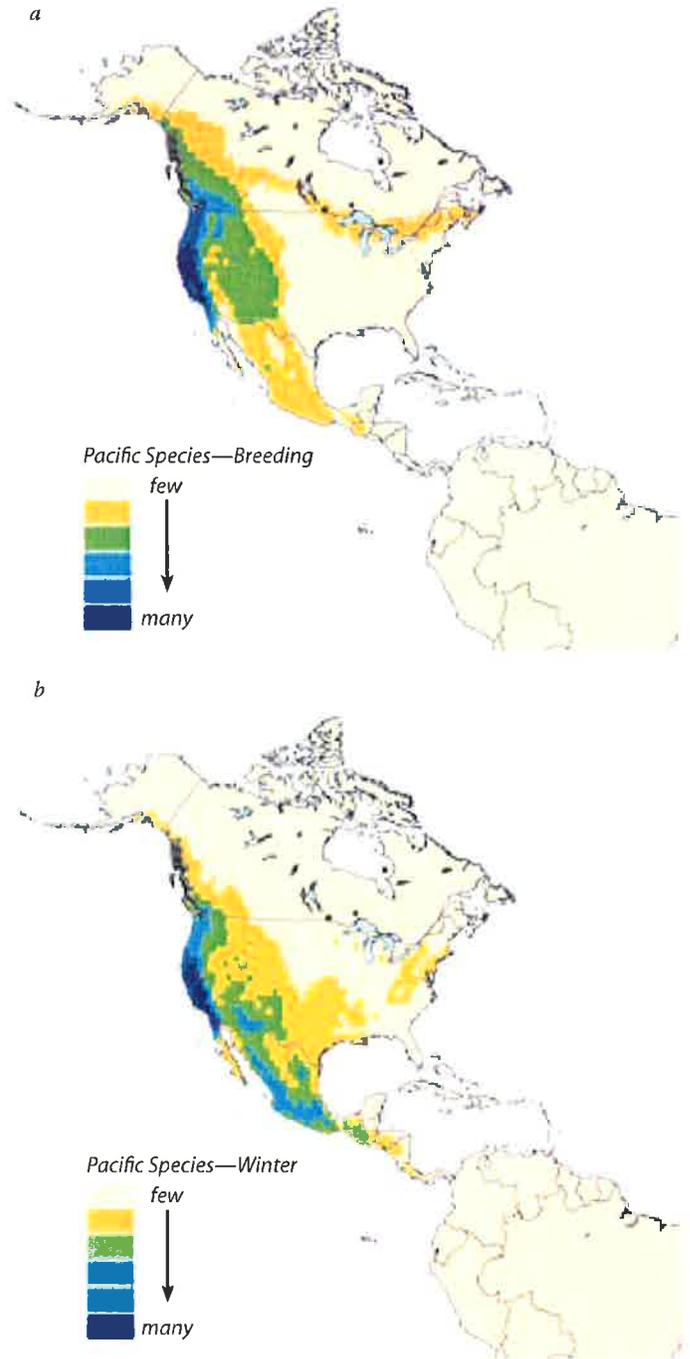


Figure 18. Number of species (a) during the breeding season and (b) during winter in each lat-long block, weighted by the percent of total population of each species breeding within the Pacific Avifaunal Biome.

woodland, chaparral, and/or other scrub habitats. More specifically, mature coniferous forest and oak habitats stand out as supporting the most Species of Continental Importance.

Two other habitats are noteworthy because they support a diverse assemblage of birds and/or significant regional

**Table 4. Species of Continental Importance in the Pacific Avifaunal Biome: BCRs 5, 15, 32**

Species <sup>1</sup>	% Breeding Population	% Winter Population	Primary Habitat	Continental Population Objective	Monitoring Need <sup>2</sup>
<b>Immediate Action</b>					
Island Scrub-Jay	100%	100%	Western shrublands	Maintain/Increase	Mo1
Tricolored Blackbird	91%	65%	Wetland	Increase 100%	Mo2
California Condor	59%	59%	Various	Recovery Plan	**
Spotted Owl	40%	40%	Coniferous forest	Recovery Plans	**
<b>Management</b>					
Oak Titmouse	99%	99%	Woodland	Increase 50%	**
Wrentit	97%	97%	Western shrublands	Increase 50%	**
Nuttall's Woodpecker	96%	96%	Woodland	Maintain/Increase	**
California Thrasher	95%	95%	Western shrublands	Increase 50%	Mo2
Hermit Warbler	94%	0%	Coniferous forest	Maintain/Increase	**
Blue Grouse	75%	75%	Coniferous forest	Increase 100%	Mo2
Rufous Hummingbird	61%	0%	Western shrublands	Increase 100%	**
Black-chinned Sparrow	44%	<1%	Western shrublands	Increase 50%	Mo2
Black Swift	29%	0%	Various	Increase 50%	Mo2
Lewis's Woodpecker	4%	25%	Riparian	Maintain/Increase	Mo2
Willow Flycatcher	24%	0%	Riparian	Increase 50%	**
Band-tailed Pigeon	22%	18%	Mixed forest	Increase 100%	Mo2
Olive-sided Flycatcher	15%	0%	Coniferous forest	Increase 100%	Mo3
White-throated Swift	10%	4%	Various	Increase 100%	Mo2
<b>Long-term Planning &amp; Responsibility</b>					
Yellow-billed Magpie	100%	100%	Woodland	Maintain/Increase	**
Allen's Hummingbird	98%	4%	Western shrublands	Maintain/Increase	Mo2
Mountain Quail	96%	96%	Western shrublands	Maintain/Increase	**
Pacific-slope Flycatcher	91%	0%	Mixed forest	Maintain	**
Chestnut-backed Chickadee	90%	90%	Coniferous forest	Maintain	**
Golden-crowned Sparrow	12%	85%	Western shrublands	Maintain	Mo3
Lawrence's Goldfinch	84%	29%	Woodland	Maintain/Increase	Mo2
Red-breasted Sapsucker	78%	77%	Mixed forest	Maintain	Mo3
White-headed Woodpecker	73%	73%	Coniferous forest	Maintain	Mo2
Varied Thrush	33%	72%	Coniferous forest	Maintain	Mo3
Black-throated Gray Warbler	69%	0%	Mixed forest	Maintain	**
Bald Eagle	60%	39%	Wetland	Maintain	Mo3
California Towhee	55%	55%	Western shrublands	Maintain	**
Steller's Jay	54%	54%	Coniferous forest	Maintain	**
Western Scrub-Jay	53%	53%	Western shrublands	Maintain	**
Fox Sparrow	8%	52%	Western shrublands	Maintain	Mo3
Flammulated Owl	25%	0%	Mixed forest	Maintain/Increase	Mo1
Winter Wren*	26%	50%	Coniferous forest	Maintain	Mo3
California Gnatcatcher	17%	17%	Western shrublands	Recovery Plan	Mo1
Costa's Hummingbird	15%	6%	Western shrublands	Maintain/Increase	Mo2

<sup>1</sup> Species are sorted by Action Category (Immediate Action, Management, Planning & Responsibility), then by decreasing % of global population that occurs in the biome (by greater of breeding or winter population). Species highlighted in yellow are Watch List species, with at least 10% of their global population in this biome. Species in green (in species or % population columns) are Stewardship Species, with ≥50% of their population in this biome.

<sup>2</sup> Monitoring Need (this assessment addresses only the adequacy of long-term population trend monitoring at the continental scale): Mo1=no trend data, Mo2=imprecise trends, Mo3=inadequate northern coverage.

\*For this species, % of Population is for Western Hemisphere. All others are % of Global Population.

\*\*Long-term population trend monitoring is generally considered adequate but some issues, such as bias, may not have been accounted for.

Revised March 20, 2000



# **U.S. Shorebird Conservation Plan**

## **Northern Pacific Coast Regional Shorebird Management Plan**

by

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MARCH 2000

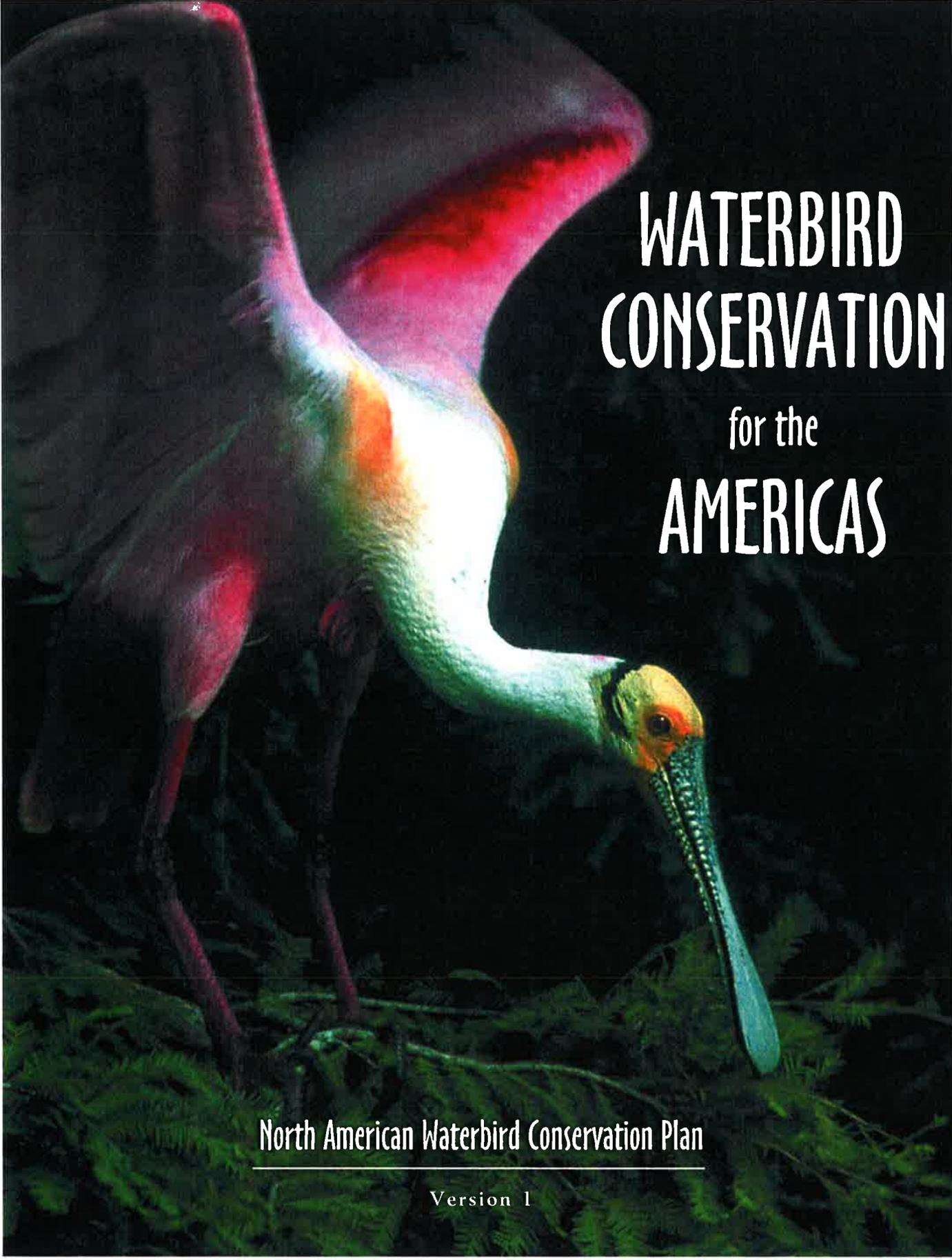
## **EXECUTIVE SUMMARY**

Shorebirds (Order Charadriiformes; plovers, oystercatchers, stilts and avocets, sandpipers and allies) represent a group of species which has long been of interest to scientists and the general public. These birds use a variety of habitats during annual spring and fall migrations to and from breeding grounds. Many of the most critical habitats used by shorebirds are associated with wetlands or other limited habitats. Thus, shorebirds may be important indicators of ecosystem status. Because shorebirds aggregate in limited areas in large numbers during critical periods of their life cycles, habitat loss and degradation is a major threat. Addressing these threats and other issues in a coordinated fashion is key to effectively conserving shorebird populations at the national and international scale. To meet this challenge, Manomet Center for Conservation Sciences, under contract with the U. S. Fish and Wildlife Service, is developing the United States Shorebird Conservation Plan. This national Plan includes 11 regional plans reflecting major shorebird flyways and habitats within the United States. The Northern Pacific Regional Working Group was formed under the auspices of the National Plan to formulate shorebird management goals for the Northern Pacific Region (NPR), which represents western Washington and Oregon. The purpose of this management plan is to address shorebird management needs on a regional basis while considering Pacific Flyway and National levels of need.

Within the NPR, the important shorebird habitats are coastal estuaries, beaches, rocky shorelines, pelagic, and freshwater systems (natural and managed wetlands, flooded agricultural areas, and riverine systems). We identified numerous sites across these habitat types within the region that supported at least 1,000 birds in one or more season. Many of the coastal estuaries within the region, such as Grays Harbor, Willapa Bay, and the Columbia River estuary, support large numbers (i.e. >f shorebirds . Other locations, such as the Willamette Valley, contain both wetlands and agricultural lands which overall support a wide diversity of species and large numbers of individuals.

Of the 50 shorebird species recognized by the National Plan as occurring within the United States, 40 occur regularly within the NPR, although several species occur in very low abundance (e.g., rare migrants). All species were given National and Regional prioritization scores based on abundance (i.e., regional importance) and potential threats. Only one species, the Snowy Plover, was considered to be highly imperiled at the national and regional scales. Nineteen species (including species such as Black Oystercatcher, Common Snipe, Dunlin, Greater Yellowlegs, and Sanderling) were identified regionally as species of high concern due to their regional importance, and the remaining species were considered to be of less concern.

Regional goals were established during the development of this plan. The primary goals are to: 1) measurably increase populations, over the next 10 years, of species impacted by current or recent declines at population or flyway levels, and 2) stabilize and maintain current levels of breeding, wintering, and migrating populations of other shorebird species within the region/flyway. In support of these broad population goals, specific goals were also developed for research and monitoring, management, habitat protection, and outreach. Specific strategies to meet each of these goals were developed.



# WATERBIRD CONSERVATION

for the  
AMERICAS

North American Waterbird Conservation Plan

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Version 1

# **WATERBIRD CONSERVATION for the AMERICAS**

**North American Waterbird Conservation Plan**

**Version 1**



### ***Pacific Coast***

The Pacific Coast region stretches from the Kenai Peninsula in Alaska through British Columbia and California coasts to include the northern portion of Baja California. Its diverse habitats include the coastlines and highly productive offshore marine areas, the largely coniferous coastal rainforests of its northern half, low coastal mountains of mixed chaparral vegetation towards the south, and the wetlands and lowlands of the expansive Central Valley of California. Each of these habitats hosts an array of waterbird species subject to varying threats. The northern coastlines include large proportions of the global breeding populations of a number waterbirds including Ancient Murrelet, Cassin's Auklet, Rhinoceros Auklet, Glaucous-winged Gull, and Leach's Storm-Petrel, while rocky islands off the southern coast support many or most of the world's

breeding Ashy Storm-Petrel, Brandt's Cormorant, Western Gull and Xantus's Murrelet. The region's pelagic waters provide habitat for large numbers of shearwaters, storm-petrels, alcids, and albatrosses. The major threats to these coastal and pelagic species include introduced mammalian predators, bycatch in fisheries operations, contaminants, oiling, climate change, and lack of formal protection for several key breeding colonies and their associated marine foraging areas. The threats to Marbled Murrelets from timber harvest in the coastal rainforests are well known but this activity also impacts the waterbirds utilizing the associated river deltas and pockets of wetlands. Much of the depressional wetland and riparian habitats of the Central Valley, lying between the coastal and Sierra Nevada mountain ranges, have been lost to agriculture and other development, but large populations of waterbirds breed and winter here. The southern marshes and beaches of the region provide critical habitat for endangered populations of Clapper Rail and Least Tern. These habitats are threatened by development, as are all habitats in this rapidly developing region. Because of the tremendous diversity of populations, habitats, and threats, planning in the Pacific Coast region will be multi-faceted, including on-going scientific study, monitoring, management, education and outreach.

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**Green Heron**

### ***Mexico-Southwest U.S.***

The Mexico region includes all of Mexico's lands, ocean waters and islands, as well as dry, often mountainous portions of southern California, Nevada, Arizona, New Mexico and Texas. From its northern edge, the region makes a transition from a temperate to tropical climate, and mountain ranges running almost the length of the region define the interior regions that separate the Pacific and Atlantic coastal plains. The region's complex topography results in a diverse array of aquatic habitats and waterbird species, and often localized bird distributions. The Mexican islands in the Pacific, Gulf of Mexico, and Caribbean (the Campeche Bank) support important seabird and coastal waterbird breeding colonies. Pacific offshore waters host non-breeding pelagic species, notably those ranging from their nesting islands in central and south Pacific, and the Gulf of Mexico provides foraging habitat for both locally nesting seabirds and wintering migrants. On the mainland, shallow bays, mangroves, coastal lagoons, and marshes frequented by wading birds are scattered along the

*Christmas Shearwater* ➤ *Manx Shearwater* ➤ *Newell's Shearwater* ➤ *Townsend's Shearwater* ➤



JOINT VENTURE  
CONSERVING BIRD HABITAT

# 2006 IMPLEMENTATION PLAN



## Planning Regions

Where possible, conservation objectives for bird groups included in the 2006 Plan were established at the basin scale. However, several basins were combined into two planning regions: (1) Sacramento Valley (SV) consisting of Colusa, Butte, American, and Sutter Basins; and (2) Delta, consisting of Yolo and Delta Basins. The Suisun Marsh was not included, as counts do not exist for this region. However, the Suisun Marsh does provide valuable habitat for wintering shorebirds, and the following conservation actions identified in the *Southern Pacific Shorebird Conservation Plan* may benefit this bird group: (1) incorporate shorebird habitat components in tidal marsh restorations; (2) increase tidal circulation and water quality in marshes to enhance invertebrate productivity and shorebird foraging areas; (3) manage vegetation in some ponds to provide expanses of open habitat; and (4) create one to six inch water depths in some ponds. (Hickey et al. 2003). The San Joaquin and Tulare Basins were maintained as separate planning regions (Figure 6-2). These planning regions reflect the scale at which shorebird population information is available.



**Figure 6-2.** Planning regions for wintering shorebirds in the Central Valley.

# Summary of Integrated Conservation Objectives

## Integrated Wetland Objectives

Integrated bird conservation objectives for wetland habitats in the Central Valley are presented in Table 11-16.

**Table 11-16.** Integrated bird conservation objectives for wetland habitats in the Central Valley.

Basin	Seasonal Wetland Restoration (acres)	Seasonal Wetland Enhancement (acres/year)	Semi-Permanent Wetland Restoration (acres)	Riparian Restoration (acres)
AMERICAN	20,396	1,957	425	675
BUTTE	17,396	3,381	425	1,125
COLUSA	2,396	2,057	425	1,350
SUTTER	4,396	527	425	675
YOLO	3,170	973	508	675
DELTA	19,170	2,118	1,208	1,500
SUISUN	0	2,675	333	0
SAN JOAQUIN	20,340	6,752	2,815	2,500
TULARE	21,263	3,442	5,935	1,500
TOTAL	108,527	23,884	12,500	10,000

## Integrated Agricultural Objectives

Integrated bird conservation objectives for agricultural habitats in the Central Valley are presented in Table 11-17.

**Table 11-17.** Integrated bird conservation objectives for agricultural habitats in the Central Valley

Basin	Winter-Flooded Rice (acres) <sup>a</sup>	Waterfowl-friendly Agriculture <sup>b</sup>	Type I Agricultural Easements <sup>c</sup>	Type II Agricultural Easements <sup>d</sup>
AMERICAN	50,000	69,000	NEEDED	NEEDED
BUTTE	62,000	104,000	NEEDED	NEEDED
COLUSA	45,000	85,000		
SUTTER	10,000	18,000	NEEDED	NEEDED
YOLO	3,000	8,000		
DELTA	0	23,000		NEEDED
SUISUN	0	0		
SAN JOAQUIN	0	0		NEEDED
TULARE	0	0		
TOTAL	170,000	307,000		

<sup>a</sup>The amount of harvested rice that must be flooded to meet wintering duck and wintering shorebird needs when wetland restoration objectives are met for the Central Valley.

<sup>b</sup>Waterfowl-friendly agriculture is defined as the amount of winter flooded rice plus rice and corn acres that are not flooded and are not deep plowed following harvest.

<sup>c</sup>Agricultural easements that maintain waterfowl food resources on agricultural lands.

<sup>d</sup>Agricultural easements that buffer existing wetlands from urban and residential development.