INLAND WETLANDS CONSERVATION PROGRAM

1990 to 2010

State of California
Natural Resources Agency
Department of Fish and Game
WILDLIFE CONSERVATION BOARD
1807 13th Street, Suite 103
Sacramento, California 95811

December 2010

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Wildlife Conservation Board
Inland Wetlands Conservation Program
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EXECUTIVE SUMMARY

Pursuant to the requirements of Chapter 1645, Statutes of 1990, this report describes the activities of the Wildlife Conservation Board's (WCB) Inland Wetlands Conservation Program (IWCP). As defined in the enabling legislation, the sole purpose of the IWCP is to assist the Central Valley Joint Venture (CVJV) in its activities and programs, all designed with a goal to protect, restore and enhance wetlands and associated habitats to increase bird populations in the Central Valley.

The Central Valley of California, which runs from Red Bluff in the north to Bakersfield in the south, is the single most important waterfowl wintering area in the Pacific Flyway. Every fall, millions of ducks, geese, and swans, as well as many other birds such as sandhill cranes and shorebirds from areas as far away as Siberia, the Arctic tundra and the Canadian prairies find their way to the wetlands and agricultural fields of the Central Valley of California. Historically, the valley contained more than 4,000,000 acres of wetlands. By 1980, fewer than 300,000 acres remained.

In response to the dramatic decline of wetland habitat in the Central Valley and across the continent, coupled with prolonged droughts of the 1980's that decimated continental waterfowl populations, Canada and the United States signed an international agreement in 1986, with Mexico joining in 1994. Called the North American Waterfowl Management Plan (NAWMP), this plan provides a biological blueprint or framework for wetland and waterfowl conservation across North America. Within the NAWMP, thirty two high priority areas were identified that are critical to the long term needs of North American waterfowl. The Central Valley of California is one of those critical areas.

As part of the NAWMP, the CVJV, a coalition of twenty-two federal, State and conservation organizations (see Figure 1), was formed in 1988. The purpose of the CVJV is to protect, restore, and enhance wetlands and associated habitats for waterfowl, shorebirds, waterbirds, and riparian songbirds, in accordance with conservation actions identified in the CVJV's Implementation Plan. The goal is to provide the local habitats that will increase all bird populations to levels identified in the NAWMP.

It is becoming increasingly clear that global climate change will make the attainment of these goals more difficult. Every year there is more evidence suggesting that some impacts of warming are inevitable, including higher air and water temperatures, accelerating sea level rise, increasing coastal storm surges, and more frequent extreme events, such as heat waves, floods, drought, and wildfires. The Association of State Wetland Managers, in their publication "Recommendations for a National Wetlands and Climate Change Initiative", state that "there is ample scientific evidence to suggest that climate change is now having and will have significant impacts on millions of coastal, estuarine, and freshwater wetlands throughout the Nation." The NAWMP Committee, a

group of wetland biologists that are in the process of updating the NAWMP, are also concerned, stating, “Global climate change should be given more consideration in JV regional targeting, program emphasis, and project design.” Fortunately, many managed wetlands in the Central Valley are somewhat more resistant to global climate change than other, less managed, habitats. However, worsening drought and flooding will adversely affect the way these wetlands can be managed. In addition, the Sacramento-San Joaquin River Delta and Suisun Marsh are extremely susceptible to sea level rise. The WCB staff is working with other CVJV partners to identify the climate change issues specific to the Central Valley and to develop goals and objectives to counteract those impacts. In the interim, the WCB has been implementing projects that are sustainable in the long-term and provide wetland managers with efficient water delivery.

To date, working in partnership with members of the CVJV and consistent with the objectives of the CVJV, the WCB has authorized the expenditure of more than $80,000,000 to protect, restore and/or enhance more than 185,000 acres of wetlands, uplands and agricultural lands critical to migrating waterfowl. This includes the acquisition of more than 23,600 acres in fee and 10,700 acres of conservation easements, and the restoration and enhancement of more than 150,000 acres of wetlands and associated grasslands and riparian habitat (See Appendix A).

Background

Each year as they have for thousands of years, millions of waterfowl make their annual fall migration from their breeding grounds in Canada, Alaska and northern tier of the continental United States (U.S.) to wintering areas farther south. Following traditional flight patterns, by mid winter more than five million ducks and geese have found their way to their destination in the Central Valley (Valley) of California, the most important wintering waterfowl area in the Pacific Flyway. This is a remarkable number of birds, but from an historical standpoint, a tremendous decrease, perhaps by a factor of ten, in the total numbers of birds that once "darkened the skies" of the Valley.

During the twentieth century, this trend was seen throughout North America. By 1985, waterfowl populations had plummeted to record lows, in the Valley and throughout the North American continent. More than half of the original 221 million wetland acres found in the contiguous U.S. had been destroyed, and habitat that waterfowl depend on for survival was disappearing at a rate of 60 acres per hour. The picture was just as bleak across Canada, nesting grounds for a large percentage of the waterfowl that winter in the U.S.

Recognizing the importance of waterfowl and wetlands to North Americans and the need for international cooperation to help in the recovery of a shared resource, the Canadian and U.S. governments developed a strategy to restore waterfowl populations through habitat protection, restoration and enhancement. The strategy was documented in the North American Waterfowl Management Plan (NAWMP) signed in 1986 by the Canadian Minister of the Environment and the U.S. Secretary of the Interior, the foundation partnership upon which hundreds of others would later be built. With an update in 1994, Mexico became a signatory to the NAWMP.

The Plan is international in scope, but its implementation functions at the regional level. Its success is dependent upon the strength of partnerships, called joint ventures, involving federal, state, provincial, tribal and local governments, businesses, and conservation organizations. Each joint venture has developed implementation plans focusing on local areas of concern, with the goal of providing habitats locally that will provide the basis for recovering the continental bird populations identified in the Plan. From the long-established joint ventures to those in various stages of development, there are now nearly two dozen such partnerships at work across the continental landscape. In addition, three species-specific joint ventures are addressing the needs of the black duck, Arctic geese, and sea ducks throughout their international ranges.

Established in 1988, the Central Valley Joint Venture (CVJV) was one of the first joint ventures to be formed. Belying its small size, the importance of the Valley to the continent's waterfowl populations cannot be overstated. Simply put, the Valley is the most important wintering waterfowl area in the Pacific Flyway, providing habitat to more than 60 percent of the total Flyway waterfowl population. To put this into perspective, this represents between 25 and 30 percent of the total waterfowl population of North America. Sixty-five percent of all pintails in the U.S. spend all or part of each winter in the Valley. In an average year, the Valley supports 100 percent of the world's population of Aleutian Canada geese (a species formerly listed as threatened but recently taken off the list, in part because of habitat improvements in California). Additionally, the Valley is winter home to 100 percent of the world's population of tule geese; 80 percent of North America's Ross's geese and cackling geese; and 65 percent of North America's tundra swans and Pacific greater white-fronted geese. Wintering waterfowl, while the most visible of the bird life in the Valley, are not alone. The Valley also supports nearly a half million breeding ducks, hundreds of thousands of wintering shorebirds, tens of thousands of breeding shorebirds, large breeding colonies of herons, egrets and white-faced ibis, and more than sixty species of breeding riparian-dependent birds.

All of these birds are squeezed into a small remnant of the once extensive native habitats of the Valley. While the rest of the country was losing more than half its wetland acreage, the Valley's vast marshes, riparian forests and upland grasslands were reduced by more than 95% (see Figure 1). The largest of these, Tulare Basin, was the single largest freshwater wetland complex west of the Mississippi River, and is now reduced to a few thousand acres of wetlands scattered across the landscape. Other areas in the Valley may have fared a little better, but all wetlands have been greatly reduced and altered. As a result, few places on earth have greater concentrations of wintering waterfowl and other bird species than the Valley.

The jurisdiction of the CVJV has recently been expanded to include the surrounding foothills and mountains. Still, the habitats that support the vast majority of the birds described above lie on the valley floor, an area that averages perhaps 30 miles wide and extending 400 miles from Red Bluff in the north, to Bakersfield in the south. The Valley encompasses the following nine hydrologic basins: Butte, Colusa, Sutter, Yolo, American, Suisun Marsh, Delta, San Joaquin and Tulare (See Figure 2).

CVJV PARTNERS

Audubon California

California Association of Resource Conservation Districts

California Waterfowl Association

Defenders of Wildlife

Ducks Unlimited, Inc.

The Nature Conservancy

PRBO Conservation Science

River Partners

The Trust for Public Land

California Department of Fish and Game

California Department of Water Resources

California Natural Resources Agency

California State Parks

California Wildlife Conservation Board

PG&E

U.S. Army Corps of Engineers

U.S. Bureau of Land Management

U.S. Bureau of Reclamation

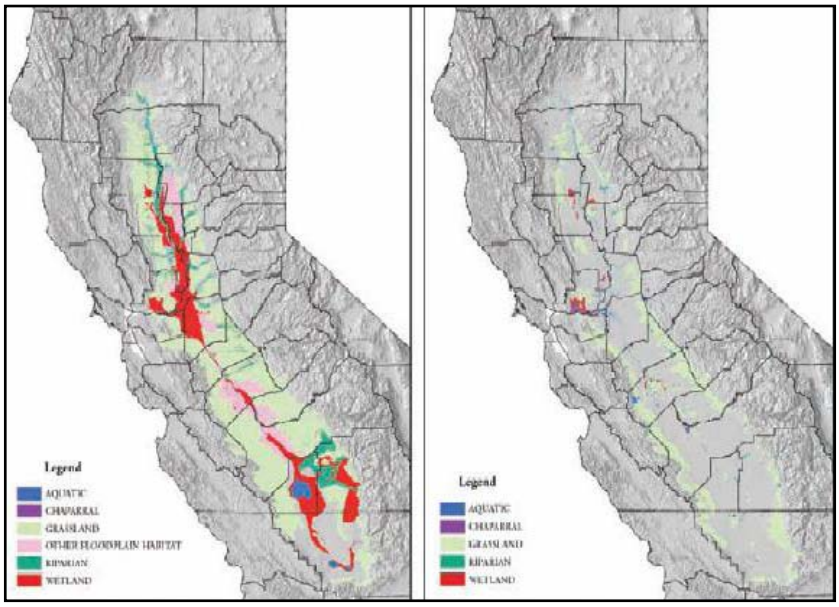
U.S. Environmental Protection Agency

U.S. Fish and Wildlife Service

U.S. Geological Survey

U.S. Natural Resources Conservation Service

Figure 1. Central Valley wetland losses from the 1850's to now.



To achieve the goal of maintaining a diverse, abundant and healthy distribution of migratory bird populations in the Central Valley, the CVJV Implementation Plan (CVJV Plan), developed in 1990 and updated in 2006, established local habitat protection, restoration and enhancement objectives pursuant to the larger goals of the NAWMP. The CVJV Plan emphasizes the needs of waterfowl and focuses on wetland complexes, but also recognize that the Central Valley provides tremendous benefits to many other bird groups. The CVJV Plan now includes goals for six bird groups: 1) wintering/migrating waterfowl, 2) breeding waterfowl, 3) wintering/migrating shorebirds, 4) breeding shorebirds, 5) riparian and grassland associated passerines and 6) waterbirds (mainly herons, egrets, ibis, cranes and cormorants). These goals have been used to generate objectives for wetland restoration, wetland protection, wetland enhancement, and agricultural enhancement (See Figure3). The Plan also identifies the water needed to accomplish these goals, and each goal has been further refined for each of the nine hydrological basins.

The Inland Wetlands Conservation Program

Chapter 1645, Statutes of 1990, authorized the creation of the Inland Wetlands Conservation Program (IWCP) within the Wildlife Conservation Board. The enabling legislation defines the purpose of the program, ". . . to carry out the programs of the Central Valley Habitat Joint Venture" (since renamed the Central Valley Joint Venture). In conjunction with other CVJV partners and many others, the program works to protect, restore and enhance wetlands and waterfowl habitat in the Central Valley.

The public and private partnerships that have been developed over the years are key to the WCB's ability to implement waterfowl and wetland protection projects. The program's legislative authority provides great flexibility, allowing the WCB to authorize grants and loans to nonprofit organizations, local

Figure 2. Central Valley Basins

governmental agencies and state departments; a procedure that has proved highly effective in restoring and enhancing wetlands and wildlife friendly agriculture. In addition, the WCB is authorized to acquire, lease, rent, sell or exchange any land or options acquired, with any proceeds going directly to the Inland Wetlands Conservation Fund to further support the efforts of the CVJV and the wetland program. This menu of "programmatic options or authority," provides the ability to create and respond to opportunities designed to address all of the CVJV objectives.

CVJV Objectives

As mentioned above, the CVJV goals for wintering waterfowl have been developed by stepping down from the continental goals identified in the NAWMP. We know, in general, what percentage of the continental populations of waterfowl rely on the Valley for all or part of their fall, winter and spring needs. Studies have been conducted to determine food requirements for various species of waterfowl, and how many acres and what types of habitat are needed to supply those needs. Then, with an understanding of existing landscape conditions in the Valley, habitats that are lacking can be quantified, and locations where additional habitat can be restored identified. Recognizing the need to integrate habitat objectives for waterfowl with those of other wetland dependent bird groups, as identified in the NAWMP, similar approaches were undertaken for other bird groups. Once the needs for all bird groups were identified, to the extent allowed by existing information, total habitat objectives for the Valley, in acres restored and protected, were determined. These objectives were further stepped down to each of the nine hydrologic basins in the Valley.

Figure 3. Objectives for Each of the Hydrological Basins in the Central Valley.

Basin	Seasonal Wetlands Restored (acres)	Seasonal Wetlands Enhanced[a] (acres/year)	Semi-Permanent Wetlands Restored (acres)	Riparian Habitat Restored (acres)	Winter-flooded Rice[b] (acres)	Waterfowl-friendly Agriculture[c] (acres)	Type I Agriculture Easements[d]	Type II Agriculture Easements[e]
American	20,396	1,957	425	675	50,000	69,000	Needed	Needed
Butte	17,396	3,381	425	1,125	62,000	104,000	Needed	Needed
Colusa	2,396	2,057	425	1,350	45,000	85,000		
Sutter	4,396	527	425	675	10,000	18,000	Needed	Needed
Yolo	3,170	973	508	675	3,000	8,000		
Delta	19,170	2,118	1,208	1,500	0	23,000		Needed
Suisun	0	2,675	333	0	0	0		
San Joaquin	20,340	6,752	2,815	2,500	0	0		Needed
Tulare	21,263	3,442	5,935	1,500	0	0		
Total	**108,527**	**23,882**	**12,499**	**10,000**	**170,000**	**307,000**		

[a] *Annual seasonal wetland enhancement objectives assume that all seasonal wetlands need some form of enhancement on average every twelve years.*

[b] *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.*

[c] *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.*

[d] *Agricultural easements that protect and maintain waterfowl food resources on agricultural lands.*

[e] *Agricultural easements that protect ag land to buffer existing wetlands from urban and residential development.*

The CVJV Plan also considered non-biological factors when establishing conservation objectives. Human population growth, changing land use, and competition for limited water supplies all present real challenges to bird conservation efforts in the Central Valley. By taking into consideration biological factors, socio-economic forecasts, potential changes in agricultural practices, and an increasingly competitive water market, habitat programs can identify where restored habitat would most likely to be successful, and to anticipate and to some degree mitigate for landscape changes that are otherwise detrimental to birds.

Inland Wetland Conservation Program Projects

The following sample of six projects, all implemented in the last three years, help illustrate how the Inland Wetland Conservation Program at the WCB has helped further the goals of the CVJV. These projects were chosen to demonstrate the breadth and flexibility of the IWCP, with its ability to protect land through fee acquisition or easements, and to restore or enhance habitats, including wetlands, riparian habitat, uplands or wildlife friendly agricultural lands, on public or private lands.

Wetland Conservation Easement Program, Bird Haven Ranch

This acquisition of a conservation easement over 259± acres of privately-owned land located in Glenn County was a cooperative project with the California Waterfowl Association (CWA) and the private property owner. The property, located adjacent to the Department of Fish and Game's (DFG) Howard Slough Unit of the Upper Butte Basin Wildlife Area, is now protected in perpetuity and contains seasonal and semi-permanent wetlands, grasslands, and forested wetlands

This 259± acre easement area is part of a larger 2,446± acre privately-owned property, most of which is dedicated to the preservation of waterfowl and wildlife habitat. The easement parcel is retired rice fields, with a strip of riparian habitat bordering Howard Slough. The DFG holds the conservation easement, which provides for the continuation of agricultural use through grazing and the continuation of recreational uses such as hunting and fishing. The landowner has restored the property under the direction of the CWA and DFG and has established a youth hunter education program on the property to encourage this heritage in the next generation. DFG biologists visit the site each year to provide oversight and assistance to the landowner and to develop an annual work plan for the management of the wetlands on the property.

Figure 4. Wetlands at Bird Haven Ranch, three months after restoration was completed.

Big Water Wetland Enhancement

Responding to an application from Ducks Unlimited, Inc., (DU), the WCB agreed to fund a project to enhance 316± acres of seasonal wetlands and 84± acres of semi-permanent wetlands on privately owned land protected with a permanent U.S. Fish and Wildlife (FWS) wetland easement in the Grasslands, an area of managed wetlands between the Cities of Merced and Los Banos in Merced County. The Grasslands is one of the most important wetland areas in California, containing nearly one third of all managed wetlands in the State. It has been recognized by the Ramsar Convention, as a Wetland of International Importance, one of only 22 sites so recognized in the United States. Most of the 180,000± acres of wildlife habitat are privately owned, but there are also nearly 50,000 acres of wetlands and uplands on the USFWS' National Wildlife Refuges and nearly 19,000 acres of wildlife habitat on the DFG's Los Banos, North Grasslands and Volta Wildlife Areas. The CVJV considers this area to be of critical importance and the implementation plan calls for the protection and enhancement of an additional 20,000± acres of restorable lands within the San Joaquin Basin, which includes the Grasslands, and the enhancement of more than 6,700 acres of existing wetland habitats each year.

The property lies immediately adjacent to, and upstream of, the DFG's Los Banos Wildlife Area Gadwall Unit, which was restored with assistance from the WCB in 2001. The property is located in a narrow wetland corridor between the North Grasslands and the South Grasslands, and has many different habitat types, from uplands and native shrubs to seasonal and semi-permanent wetlands. An 80-acre semi-permanent wetland, the "Big Water" for which the property is named, provides deep-water habitat, which is uncommon in the Grasslands, for such birds as canvasbacks and grebes. The many seasonal wetlands on site provide ideal habitat for a number of wetland dependent species such as mallards, northern pintails, green-winged teal and shorebirds. A host of other species, from swallows and garter snakes to river otters and beavers, will also benefit.

Wetlands choked with tules show loss of habitat value.

Unfortunately, over the years habitat quality had declined, a normal occurrence in all managed wetlands as structures fail, levees erode and ponds silt in. The WCB was asked to assist with the renovation of the entire property since no significant upgrades or repairs had occurred on the site for a number of decades. DU, DFG and FWS biologists designed a project that replaced all structures that were close to failure, excavated swales through seasonal wetland units to facilitate drainage and supply, and strengthened existing levees to provide long-term management capabilities. Most of the property is managed as seasonal wetlands, which are flooded in winter and irrigated in summer. The large semi-permanent wetland in the center was left as one large lake, now with an upgraded water supply system.

Gray Lodge Wildlife Area Wells

The DFG's Gray Lodge Wildlife Area, located approximately twelve miles southwest of the City of Gridley in Butte County, is well known for its spectacular flocks of waterfowl on its more than 9,000 acres of seasonal and permanent wetlands, riparian habitat, oak woodlands and upland grasslands. Gray Lodge Wildlife Area is unsurpassed in the Sacramento Valley of California for its diversity and numbers of wildlife present, with more than 200 species of birds, 30 mammal species and 25 species of reptiles and amphibians. More than a million waterfowl visit the area each winter. These tremendous numbers of wildlife provide recreational enjoyment to thousands of visitors every year.

To maintain those habitats, the DFG relies on surface delivery of water from water districts, just as the surrounding farms and cities do, but also drain water from nearby farms, the occasional major flood event, and deep water wells. Over the past eight years, the WCB assisted in a six-phase plan for upgrading the entire water delivery and drainage system, with the sixth and final phase nearly complete. With the completion of the water delivery and drainage system, the Wildlife Area finally has the ability to efficiently move water throughout the area.

Even with this diversity of water sources and a new efficient water deliver system, an adequate supply was still a problem. Surface water is available only part of the year, floods are controlled, and existing wells, installed many decades ago prior to State ownership for the purpose of flooding the agricultural fields, are inadequate for flooding or maintaining wetlands. As a result, DU requested that the WCB provide funds for additional high capacity wells to assure that the DFG can continue to provide the wetland habitat it is famous for. The plan was to install as many wells as possible with the limited funding available and to discontinue use of older inefficient and failing groundwater wells as these new wells come on line. DU, WCB and DFG approached the U.S. Bureau of Reclamation (USBR) to get funding for additional wells and to agree to assist in paying for power for the pumps. WCB funds were sufficient for only one well, but this well was located to make the most efficient use of the existing water distribution system. USBR currently reimburses DFG for pumping groundwater and is evaluating the proposal for additional wells and pumps.

Grizzly Island Wildlife Area Uplands and Wetlands Enhancement

In 2008, the WCB approved a grant to the California Waterfowl Association for a cooperative project with the U.S. Geological Survey (USGS) and the DFG to enhance 475± acres of uplands and 150± acres of wetlands on the DFG's Grizzly Island Wildlife Area, located in the Suisun Marsh, south of the City of Fairfield in Solano County.

The Suisun Marsh is one of the most productive and diverse places in California and supports vast numbers wildlife species: as many as 250 bird species, 45 species of mammals, 26 fish species and 15 reptile and amphibian species. These biological riches now depend on the abilities of the landowners to manage the various habitats

to maximize species diversity. The DFG is the largest of these landowners, with responsibility for nearly 15,000 acres of managed wetlands and uplands. In the heart of DFG's Grizzly Island lie 1,500± acres of uplands, making up ten percent of the entire Wildlife Area. This vast area provides much needed nesting habitat for a number of waterfowl and other bird species, confirmed by nesting studies that have been underway in this area for nearly thirty years. By the mid 1990s, however, breeding success began to decline, at least in part due to invasion of weeds and a water delivery system that had deteriorated to the point where DFG staff could not manage the uplands as intensively as was possible twenty years ago. The project is currently underway and will renovate the uplands through weed control and replanting, and all water delivery canals, ditches and structures will be upgraded or replaced as necessary. The USGS and CWA conducted baseline nesting studies, and over the next ten years will conduct nest surveys on all the fields to determine nesting and breeding success. These monitoring efforts will help guide the DFG in its long-term management of these important upland areas.

On the far western edge of the Marsh, adjacent to Highway 680, lies the West Family Unit. This unit was an active duck club when acquired by in 1994 and has since been managed by the DFG as seasonal wetland. The area, one of the most popular hunting sites on the wildlife area, can no longer be properly managed, because of poor drainage and water circulation. This project created a new swale and island complex that will improve water circulation, drainage, and habitat diversity and replaced two exterior water control structures to improve water management efficiency.

The project is located on some of the highest land in the Marsh to provide long-term benefits even in the case of sea level rise. The project will benefit a wide range of upland and wetland dependent wildlife. As mentioned above, the uplands on Grizzly Island have the potential to support good numbers of breeding waterfowl, from mallards to cinnamon teal and gadwalls. In addition, other species known to benefit from uplands in the Marsh include such species as northern harriers, meadowlarks and savannah sparrows. Mammals in the upland areas of the Marsh range from the tiny Suisun ornate shrew, a federal and state species of special concern, which weighs less than a quarter of an ounce, to the tule elk, which can weigh as much as half a ton. Wintering waterbirds flock to the wetland areas, including such species as northern pintails and western sandpipers, so improvements to the seasonal wetlands on the West Family Unit will benefit these species and many others. Perhaps equally importantly, the improvements outlined above on Grizzly Island and the West Family Unit will be designed to allow the DFG to better manage the area with their existing staff and budget while providing a maximum of recreational benefit to the public at large.

Grassland Conservation Area, Expansion 1

In 2008, the WCB acquired a conservation easement over 1,876± acres of land for the purposes of protecting critical riparian and wetland habitat and maintaining wildlife-friendly agriculture. This easement, when added to an earlier WCB acquisition from 2004, protects more than ten miles of the San Joaquin River and more than a mile of the Merced River, in perpetuity. The property lies adjacent to DFG's North Grasslands Wildlife Area, the Great Valley Grasslands State Park and the Kesterson National Wildlife Refuge and is a part of the Grasslands Ecological Area (GEA), a contiguous block of 160,000 acres of National Wildlife Refuges, State Wildlife Areas and privately-owned wetland and wildlife habitat.

The subject property contains riparian, wetland and upland habitats, but also includes fields currently in agricultural production. Protecting these lands from future development and maintaining them in "wildlife friendly" agricultural production provides two benefits identified in the CVJV Implementation Plan. First, the easement limits agricultural activities to wildlife compatible farming and grazing, which provides important wintering habitat for various waterbirds plus nesting cover for ground nesting birds such as mallards, short-eared owls and American bitterns. Second, an open space buffer will be established between existing publicly owned wildlife habitat and ever expanding human encroachment in the area.


Sandhill crane

Specific species benefiting from the protection of these lands includes migrating willow flycatchers, Swainson's hawk, greater and lesser sandhill cranes and wintering Arctic-nesting geese. Portions of the property contain habitat suitable for the giant garter snake, western pond turtle, tri-colored blackbird, white-faced ibis, long-billed curlew and American white pelican.

Global Climate Change

Every year, the wetland community faces ever more difficult challenges including such issues as a critical need for water in a world where water increasingly is at a premium, the potential for wetlands to methylate mercury and their ability to produce mosquitos, the fragmentation of wetlands by roads, canals and powerlines, and the encroachment of urban development, all in an area of the State where the human population is expected to triple by 2040. Global climate change is likely to make many of the problems facing wetland managers even more challenging. The following is a short list of issues that may become more intractable in a warming climate.

- Storms are expected to be more intense, which likely will result in more severe winter flooding. While floods and wetlands in general are compatible, managed wetlands contain structures – levees, roads and water control structures, etc. – that can be damaged by high water and increase maintenance costs.

- The snowpack is likely to be shallower, resulting in drier summers and less water

for delivery to these wetland areas. Less water will mean additional competition between wetland managers and all other water users.

- Climate change will change the nature of wildlife habitats, including wetlands. Specialist species, including most threatened and endangered species, being more restricted in their habitat needs than more common, generalist species, will be more adversely affected by any changes to their habitat.

- Invasive species, short-lived generalists generally, have the ability to adapt and will likely become even more common.

- Increased temperatures will increase evapo-transpiration, which will mean that seasonal wetlands, including vernal pools, will dry earlier in the year thereby reducing wildlife habitat values.

- With warmer temperatures, mosquito abatement will be required longer into the fall and will start earlier in spring.

- The thousands of acres of managed wetlands in the Suisun Marsh and the Delta that have been managed for waterfowl, shorebirds and other wildlife for many decades are at great risk to sea level rise. Should the protecting levees breach, and the wetlands behind become tidal, the wildlife values associated with these lands would change from habitats that support birds and terrestrial animals to purely aquatic habitats.

Of all of these, ensuring an affordable and reliable water supply for wetland management may be the State's biggest challenge in the future. While a very few wetlands in the Central Valley still flood naturally, most now rely on managed water supplies for seasonal flooding. These water sources are exactly the same as for everything else in California; the water is captured in dams and delivered by canal or through stream channels to provide water for everything from agriculture and urban uses, to wetlands and instream flow for fish. Demand for this water increases every year. And while some wetland managers have relatively reliable surface water rights, many must rely on irrigation drain water, wastewater discharges, low priority water contracts, non-binding agreements with water districts, and groundwater pumping to flood their properties. But no matter the source, water gets more expensive every year. And finally, even if funds are found for acquisition, water delivery capacity in many areas is limiting.

The WCB, working with many partners, is helping develop strategies to address these issues in the Valley. The following list of potential strategies, while incomplete and in transit, indicates the directions that the WCB and many of its partners are headed:

- Continue to work toward providing a secure, reliable and affordable water supply for wetland habitat. This will include all of the following: purchase long-term water rights, upgrade delivery systems to make sure that any water acquired can be delivered, restore and enhance wetlands with an eye toward efficient water use, and work toward developing a conjunctive use program where urban and agricultural water supplies could be used for wetland flooding. All wetland water

purchases should be coordinated with other environmental programs, such as the purchase/management of in-stream flows for anadromous fish, so that these programs are not in direct competition with each other…water should be purchased for ecosystem purposes.

- Continue restoring wetlands. The NAWMP goals have not been met, and wetland habitats for migratory birds and other species is in short supply. But in addition, wetland restoration, creation and enhancement, properly located and constructed, also help reduce the impact of climate change by protecting existing carbon stores, sequestering additional carbon, reducing flood risk and restoring groundwater stores.

- Assure long-term viability for new wetlands. Fragmentation of wetlands should be prevented and corridors established to permit migration of plant and animal species. Acquisition and restoration work in tidally influenced areas should be focused in the highest elevations. Existing wetland habitats that have demonstrated long-term stability should be expanded, providing corridors and allowing for efficient management. Restoration projects should be constructed with infrastructure sufficiently robust to withstand flooding and should be designed for resilience and management efficiency. If invasive species move in as a result of climate change, agencies and organizations should be prepared to act quickly and aggressively to control populations before they have had a chance to spread.

- Design restoration projects for flexibility and cost effectiveness. Often, once a managed wetland is constructed, the same infrastructure can be used to provide seasonal wetlands, semi-permanent or permanent wetlands, riparian habitat, or uplands. As new information arises or water availability changes, management can change to accommodate. In addition, efforts should be made to develop methods to control mosquitoes that limit the use of pesticides – the cost of mosquito abatement discourages landowners from restoring habitat and high pesticide use reduces the quality of current habitat.

- Protect and develop projects that provide multiple benefits, e.g., wildlife habitat, flood control, wildlife-friendly agricultural production, and recreation. Acquire agricultural conservation areas to buffer wetlands from incompatible uses.

- Monitor and apply adaptive management techniques. Both success and failure should be identified, and strategies developed to continue to implement those practices that work and to change those that don't. Continue to work to identify trends associated with global climate change that affect the long-term success of wetland protection and restoration activities. Make both successes and failures broadly available to the public.

Conclusion

Over the years, the WCB, through the IWCP, has proven adept at developing coalitions and partnerships that benefited not only migrating waterfowl but agricultural operations, water interests and local economies. Every year, however, more challenges arise, making partnerships even more critical and testing the WCB's abilities to respond to the changing landscape. The WCB will continue to utilize the same techniques that have proven successful in the past; that is, work with many partners, continue to leverage dollars from federal and private sources, and protect and restore wetlands in ways that allow for efficient water use that will provide wetland benefits for decades to come. In addition, again working with many partners, the WCB will work toward fine tuning the acquisition and restoration techniques and processes to assure that wetland values and functions continue well into the future.

The Central Valley is critically important to a wide range of wildlife species, and increasingly important to the people of California not only for food production and places to live and work, but for outdoor recreation. The IWCP has the goal of providing wildlife habitat, pursuant to the goals of the CVJV, and to do so in ways that benefit the people of California. Wetlands habitats support millions of waterfowl and many other species, which are enjoyed by thousands of people every year, from hunters and anglers to bird watchers. In addition, wetlands can be a part of the solution to the some of the issues that face all Californians, from flood control to groundwater supply. The legislation that created the IWCP clearly provided the tools to allow the WCB to address these myriad issues on many fronts.

The sample projects described above in this report, all accomplished in the last three years, clearly demonstrate the breadth and flexibility of the IWCP, but they are only the most recent of many years of habitat protection and restoration. Since the inception in 1990 of the IWCP, the WCB, in partnership with members of the CVJV, has authorized the expenditure of more than $80,000,000 to protect, restore and/or enhance more than 185,000 acres of wetlands, uplands and agricultural lands critical to migrating waterfowl. This includes the acquisition of 23,604 acres in fee and 10,773 acres of conservation easements, and the restoration and enhancement of 151,221 acres of wetlands and associated grasslands and riparian habitat.

To better illustrate the WCB's IWCP contributions toward fulfilling the CVJV objectives, Appendix A provides a complete list of all IWCP projects funded by the WCB.

INLAND WETLAND CONSERVATION PROGRAM
1990 - 2010

PROJECT NAME	BOARD DATE	COUNTY	EXPENDED	ACRES EASEMENT	ACRES FEE	ACRES RESTORED/ ENHANCED	CVHJV Basin
Protect Existing Wetlands							
Upper Butte Basin WLA, Exp. 3	13-Feb-91	Butte	$2,580,151.00		1,325		Butte
Cosumnes River WLA	05-Nov-91	Sacramento	$500,000.00		483		Delta
Los Banos WLA, Exp. 4	12-May-92	Merced	$265,068.00		171		San Joaquin
Mud Slough Wildlife Area	10-Nov-94	Merced	$1,187,193.00		395		San Joaquin
Mud Slough Wildlife Area, Exp. 1	04-May-95	Merced	$648,281.00		258		San Joaquin
Cosumnes River WLA, Exp. 2	10-Aug-95	Sacramento	$2,257,146.00		1,020		Delta
Mud Slough Wildlife Area, Exp. 2	20-May-99	Merced	$1,300,000.00		724		San Joaquin
Los Banos WLA, Mud Slough #3	30-Aug-01	Merced	$330,000.00		67		San Joaquin
Volta Wildlife Area, Expansion 1	11-Feb-03	Merced	$10,000.00		780		San Joaquin
Volta Wildlife Area, Expansion 2	13-May-04	Merced	$220,000.00		120		San Joaquin
Upper Butte Basin Wildlife Area, Expansion 6	18-Nov-10	Butte	$1,120,000.00		222		Butte
Protection Sub-Total			**$10,417,839.00**		**5,565**		
Restore and Protect Wetlands							
Yolo Bypass Wildlife Area	13-Feb-91	Yolo	$4,589,848.00		3,100		Yolo
Conservation Easement, Joe Lares (Hidden Mallard)	12-May-92	Glenn	$154,000.00	123			San Joaquin
Conservation Easement, Klamath Land and Cattle	12-May-92	Merced	$372,000.00	252			San Joaquin
Conservation Easement, San Joaq. Wetland Fms, Exp. 1	12-May-92	Stanislaus	$282,277.00	481			San Joaquin
Conservation Easement, San Joaquin Wetland Farms	12-May-92	Stanislaus	$167,400.00	93			Colusa
Gilsizer Slough Wetlands	25-Aug-92	Sutter	$623,002.00		267		Sutter
Mud Slough Wetlands	25-Aug-92	Merced	$553,562.00			780	San Joaquin
Gilsizer Slough Wetlands	09-Mar-93	Sutter	$176,111.00			267	Sutter
Conservation Easement, Senator Outing Duck Club	06-May-93	Yolo	$319,334.00	400			Yolo
Conservation Easement, Yolo Basin Farms, Inc.	06-May-93	Yolo	$113,500.00	158			Yolo
Mud Slough Wetlands Restoration	06-May-93	Merced	$29,904.00			779	San Joaquin
Upper Butte Basin WLA, Exp. 4	06-May-93	Butte	$353,532.00		21		Butte
Upper Butte Basin WLA, Exp. 5	06-May-93	Butte	$1,809,336.00		716		Butte
Yolo Bypass Wildlife Area, Exp. 1	10-Feb-94	Yolo	$474.00		390		Yolo
Conservation Easement, Victor Ranch (Honcut Creek)	05-May-94	Butte	$155,793.00	106			American
Conservation Easement, Rancho Rio Chico	11-Aug-94	Butte	$249,030.00	230			Butte
Yolo Bypass Wildlife Area, Exp. 2	11-Aug-94	Yolo	$556,221.00		195		Yolo
Conservation Easement,, Holmestead #2	10-Nov-94	Yuba	$169,699.00	124			American
Conservation Easement, Rancho Rio Oso	04-May-95	Yuba	$259,874.00	133			American
Conservation Easement, Mom's Farm	10-Aug-95	Butte	$518,297.00	228			Butte
Conservation Easement, Skyraker Duck Club	10-Aug-95	Yolo	$243,026.00	335			Yolo
Conservation Easement, CWC Ranch (Empire Tract)	08-Feb-96	San Joaquin	$401,198.00	261			Delta
Grassland Environmental Education Center - Wetland Restoration	05-Nov-96	Merced	$27,000.00				San Joaquin
Conservation Easement, Ranch Rio Oso, Exp. 1	14-Aug-97	Yuba	$215,992.00	83			American
Conservation Easement, River Islands Farms	24-Feb-98	Sacramento	$444,334.00	800			Delta
Owens Creek Habitat Restoration	21-May-98	Merced	$150,000.00			340	San Joaquin
Conservation Easement, Holmestead Farms #3	03-Nov-98	Yuba	$47,000.00	40			American
Conservation Easement, McCorkle Ranch	03-Nov-98	Butte	$543,670.00	296			American
Conservation Easement, Shively Ranch	20-May-99	Butte	$61,000.00	37			Butte
WHR (Lakeview Farms)	18-Nov-99	Placer	$190,150.00			460	American
WHR (Butte Basin and Colusa Basin)	17-Feb-00	Butte, Colusa, Glenn, Sutter	$983,780.00			4,686	But./Col.
WHR (Bluebird Farms)	10-Aug-00	Yuba	$40,000.00			147	American
Conservation Easement, Orme and Hughes	02-Nov-00	Butte	$1,375,000.00	629		629	American
Conservation Easement, Cherokee Farms	18-May-01	Butte	$1,447,000.00	254			Butte
Sacramento Valley Refuge	18-May-01	Glenn	$736.00		36		Colusa
WHR, North Grasslands WLA, Gadwall Unit	18-May-01	Merced	$242,000.00			305	San Joaquin
Yolo Bypass WA # 3 and 4	30-Aug-01	Yolo	$16,630,000.00		12,808		Yolo

INLAND WETLAND CONSERVATION PROGRAM
1990 - 2010

PROJECT NAME	BOARD DATE	COUNTY	EXPENDED	ACRES EASEMENT	ACRES FEE	ACRES RESTORED/ ENHANCED	CVHJV Basin
Restore and Protect Wetlands (continued)							
Wetland CE and Restoration Program, CREP (Traynham Ranch)†	27-Feb-02	Colusa	$561,500.00	235		235	Colusa
WHR (Wallace Ranch)	27-Feb-02	Yolo	$50,000.00			366	Colusa
Yolo Bypass WA #5	23-May-02	Yolo	$207,000.00		100		Yolo
WHR (Butte Creek Ranch)	22-Aug-02	Colusa	$58,000.00			185	Butte
WHR (Provo)	22-Aug-02	Yuba	$50,000.00			265	American
WHR (Rancho Caleta)	22-Nov-02	Colusa	$200,000.00			427	Butte
Yolo Bypass Wildlife Area, Expansion 6	19-Feb-04	Yolo	$180,000.00		119		Yolo
Wetland Habitat Restoration, Holmestead	13-May-04	Yuba	$34,000.00			119	American
Miller Lake Wetland Restoration	18-Nov-04	Stanislaus	$110,000.00			82	San Joaquin
Wheatville Farms Wetland Restoration	24-Feb-05	Fresno	$485,000.00			1,617	Tulare
Liberty Farms Wetland Restoration	26-May-05	Solano	$135,000.00			1,634	Delta
Wetland Easement Conservation Program, Rudd Farms	26-May-05	Butte, Sutter	$1,190,000.00	437			Butte
McAravy Ranch Wetland Restoration	17-Nov-05	Yolo	$55,000.00			160	Colusa
Tule Basin Farms Wetland Restoration	17-Aug-06	Sutter	$124,000.00			320	Sutter
Ingomar Ranch Wetland Restoration	24-May-07	Merced	$70,000.00			250	San Joaquin
Yolo Bypass Wildlife Area Wetland Restoration	24-May-07	Yolo	$240,000.00			350	Yolo
Montna Farms Wetland Restoration	23-Aug-07	Sutter	$150,000.00			800	Sutter
Conservation Easement, Bird Haven Ranch	20-Feb-08	Glenn	$440,000.00	259			Butte
Los Banos Wildlife Area, Gadwall Unit	28-Aug-08	Merced	$922,375.00		154		San Joaquin
North Grasslands Wildlife Area, Gadwall Unit	28-May-09	Merced	$560,000.00		133		San Joaquin
Conservation Easement, Holmestead Farms #4	25-Feb-10	Yuba	$640,000.00	260			American
Restoration Sub-Total			**$40,956,955.00**	**6,254**	**18,039**	**15,203**	
Enhance Exsiting Wetlands							
Mendota Wildlife Area Wetland Development	13-Feb-91	Fresno	$245,484.00			1,373	Tulare
Upper Butte Sink WLA Wetland Development	13-Feb-91	Butte	$239,813.00			3,736	Butte
Cosumnes River Wildlife Area Wetland Restoration	5-Nov-91	Sacramento	$500,000.00			492	Delta
Stillbow Water Delivery System	06-May-93	Merced	$7,767.00			2,000	San Joaquin
Los Banos WLA, Wetland Restoration	05-May-94	Merced	$308,257.00			302	San Joaquin
Suisun Marsh Restoration and Enhancement	05-May-94	Solano	$299,793.00			22,634	Suisun
No. Grasslands WLA, Wetland Restoration (China Island Unit)	16-Feb-95	Merced	$290,651.00			535	San Joaquin
San Joaquin Valley Wetland Rest (Greenhouse Ranch and Bardin Ranch)	04-May-95	Merced	$43,400.00			285	San Joaquin
Mud Slough North Drainage Project	10-Aug-95	Merced	$34,000.00			2,800	San Joaquin
Thermalito Afterbay Habitat Restoration	10-Aug-95	Butte	$61,300.00			400	Butte
Tulare Basin (El Cinco and Los Alamos)	10-Aug-95	Kern	$26,042.00			320	Tulare
Tulare Basin Wetland Restoration, Phase 2 (Santura)	14-May-96	Kern	$31,430.00			160	Tulare
WHR (BEE-ESS Properties)	14-May-96	Merced	$20,100.00			700	San Joaquin
WHR (Modesto Properties)	14-May-96	Merced	$64,265.00			1,283	San Joaquin
WHR (Elworthy Brothers)	01-May-97	Merced	$39,386.00			280	San Joaquin
WHR (Wilmarth)	01-May-97	Colusa	$179,479.00			80	Colusa
East Grasslands Wetland Enh/Rest (Castle Land and Cattle)	24-Feb-98	Merced	$62,250.00			720	San Joaquin
Suisun Marsh Waterfowl Production and Enhancement	21-May-98	Solano	$120,000.00			11,340	Suisun
Woodbridge Ecological Reserve Habitat Enhancement	21-May-98	San Joaquin	$184,000.00			352	Delta
WHR (Santa Cruz Land and Cattle)	13-Aug-98	Merced	$65,000.00			1,440	San Joaquin
WHR (North Pintail Slough)	03-Nov-98	Kern	$800,000.00			1,000	Tulare
East Grasslands Wetland Enh/Rest (Castle Land and Cattle)	20-May-99	Merced	$15,000.00			70	San Joaquin
WHR (American Basin Farms)	19-Aug-99	Butte	$292,000.00			600	American
WHR (Four Mile Ranch)	19-Aug-99	Colusa	$190,314.00			320	Colusa
WHR (North Pintail Slough)	10-Aug-00	Kern	$110,000.00				Tulare
WHR (Richens)	10-Aug-00	Butte	$45,000.00			200	American
Gray Lodge WLA, Water Dist. System II	02-Nov-00	Butte	$500,000.00			9,000	Butte

INLAND WETLAND CONSERVATION PROGRAM
1990 - 2010

PROJECT NAME	BOARD DATE	COUNTY	EXPENDED	ACRES EASEMENT	ACRES FEE	ACRES RESTORED/ ENHANCED	CVHJV Basin
Enhance Exsiting Wetlands (continued)							
WHR, East Grasslands (Castle Land and Cattle)	23-Feb-01	Merced	$178,500.00			720	San Joaquin
WHR, Upper Butte Basin WA (Little Dry Creek)	23-Feb-01	Butte	$35,500.00			540	Butte
Suisun Marsh Waterfowl Production 2	18-May-01	Solano	$160,000.00			6,285	Suisun
WHR (2017)	18-May-01	Colusa	$198,000.00			608	Colusa
WHR, East Grasslands (Duck Slough)	18-May-01	Merced	$324,000.00			2,000	San Joaquin
WHR, South Grasslands (Britto, ETN, Riverfield)	18-May-01	Merced	$19,100.00			637	San Joaquin
WHR (Coast Cattle)	30-Aug-01	Merced	$23,900.00			286	San Joaquin
WHR (Wingsetter Ranch)	30-Aug-01	Stanislaus	$49,000.00			143	San Joaquin
WHR, East Grasslands (San Felipe)	30-Aug-01	Merced	$110,000.00			920	San Joaquin
WHR, Joice Island WA	30-Aug-01	Solano	$134,600.00			1,800	Suisun
WHR, North Grasslands (Featherston)	28-Nov-01	Merced	$83,000.00			530	San Joaquin
WHR, North Grasslands (Lone Tree Ranch)	27-Feb-02	Merced	$40,000.00			215	San Joaquin
WHR, Suisun Marsh	23-May-02	Solano	$445,000.00			13,734	Suisun
WHR (Lincoln High School)	22-Aug-02	Placer	$25,000.00			57	American
WHR (San Joaquin Wetland Farms)	22-Aug-02	Stanislaus	$196,000.00			610	San Joaquin
WHR, South Grasslands (Britto Land and Investment)	22-Aug-02	Merced	$26,000.00			70	San Joaquin
HR & PA, Sun River Unit, Stone Lakes NWR	11-Feb-03	Sacramento	$500,000.00			369	Delta
HR, Sacramento Valley Grasslands	11-Feb-03	Colusa, Glenn, Yolo	$287,000.00			1,600	Colusa/Yolo
WHR, South Grasslands (Redfern Ranch)	11-Feb-03	Merced	$26,000.00			200	San Joaquin
WHR, South Grasslands (Rooney Ranch)	11-Feb-03	Merced	$100,000.00			255	San Joaquin
Gray Lodge WLA, Water Dist. System, Phases IV and V	14-May-03	Butte	$1,490,000.00			2,700	Butte
WHR (Little Dry Creek Farms)	14-May-03	Butte	$83,000.00			585	Butte
WHR, Los Banos Wildlife Area	14-May-03	Merced	$110,000.00			475	San Joaquin
WHR, Volta Wildlfe Area	14-May-03	Merced	$67,000.00			2,930	San Joaquin
WHR, Duck Slough, Flynn Ranch	18-Nov-03	Merced	$150,000.00			900	San Joaquin
Wetland Habitat Restoration, Frog Pond	13-May-04	Merced	$85,000.00			190	San Joaquin
Gray Lodge WLA, Water Dist. System, Phases IV and V, Augmentation	25-Aug-04	Butte	$595,000.00				Butte
Tulare Basin Wetland Enhancement, Phase III	24-Feb-05	Kern	$123,000.00			803	Tulare
Live Oak Wetland Restoration	26-May-05	Sutter	$100,000.00			668	Butte
River Island Farms Wetland Restoration	26-May-05	Sacramento	$129,000.00			497	Delta
Grizzly Island Wildlife Area Wetland Enhancement	25-Aug-05	Solano	$305,000.00			1,740	Suisun
Roberts Ranch Wetland Enhancement	25-Aug-05	Merced	$88,000.00			348	San Joaquin
Accornero Wetland Restoration	17-Nov-05	Merced	$48,000.00			321	San Joaquin
Newman Land company Wetland Restoration	25-May-06	Merced	$52,000.00			332	San Joaquin
Volta Wildlife Area Wetland Enhancement	25-May-06	Merced	$126,000.00			N/A	San Joaquin
Rudd Ranch Wetland Restoration	17-Aug-06	Butte	$85,000.00			319	Butte
Gray Lodge Wildlife Area, Water Distribution System, Phase VI	15-Feb-07	Butte	$560,000.00			1,601	Butte
North Sutter Bypass Ranch Wetland Enhancement	24-May-07	Sutter	$45,000.00			177	Sutter
Gray Lodge Wildlife Area Wells, Butte County	23-Aug-07	Butte	$300,000.00			9,000	Butte
McAravy Ranch Wetland Restoration, Phase II	23-Aug-07	Yolo	$97,000.00			160	Colusa
DFG Minor Capital Projects, Gray Lodge Field 93	20-Feb-08	Butte	$270,000.00			640	Butte
DFG Minor Capital Projects, Volta Water Control Installation	20-Feb-08	Merced	$120,000.00			2,500	San Joaquin
Grizzly Island Wildlife Area Uplands and Wetlands Enhancement	22-May-08	Solano	$750,000.00			625	Suisun
Rancho Rio Chico Wetland Enhancement	22-May-08	Butte	$218,000.00			160	Butte
Yolo Bypass Wildlife Area Fireman's Unit Wetland Enhancement	22-May-08	Yolo	$163,000.00			380	Yolo
Big Water Wetland Enhancement	28-Aug-08	Merced	$91,000.00			400	San Joaquin
DFG Wildlife Area Wetland Enhancement Projects	28-May-09	Butte, Glenn, San Joaquin, Merced	$978,000.00			1,493	San Joaquin
Tulare Basin Wetland Enhancement	28-May-09	Kern	$451,000.00			1,244	Tulare
Los Banos Lift Pumps	27-May-10	Merced	$250,000.00			2,414	San Joaquin
Enhancement Sub-Total			**$15,664,331.00**			**127,603**	

INLAND WETLAND CONSERVATION PROGRAM
1990 - 2010

PROJECT NAME	BOARD DATE	COUNTY	EXPENDED	ACRES EASEMENT	ACRES FEE	ACRES RESTORED/ ENHANCED	CVHJV Basin
Enhance Agricultural Land for Wildlife							
Brood Water and Wetland Enhancement	09-Mar-93	Glenn	$200,000.00			104	Butte
Sacramento Valley Rice Roller Project	09-Mar-93	Colusa, Glenn, Butte, Yolo, Sutter	$93,118.00				Sac Valley
Honcut Creek Wildlife Conservation Area	05-May-94	Butte	$225,509.00	295			American
Honcut Creek Wildlife Conservation Area, Exp. 1	16-Feb-95	Butte	$128,861.00	254			American
Honcut Creek Wildlife Conservation Area, Exp. 2	08-Feb-96	Butte	$95,000.00	384			American
WHR (Brood Water and Wetland Enhancement, Phase II)	18-Nov-99	Glenn	$26,000.00				Butte
WHR, Honcut Creek (McCorkle)	18-May-01	Butte	$110,000.00			311	American
Grasslands Conservation Area	18-Nov-04	Merced, Stanislaus	$3,920,000.00	1,710			San Joaquin
Grassland Conservation Area, Expansion 1	15-Feb-07	Merced	$8,000,000.00	1,876			San Joaquin
Agricultural Sub-Total			**$12,798,488.00**	**4,519**		**415**	
Multiple Objectives							
Wetland and Riparian Habitat GIS	09-Nov-93	Statewide	$70,000.00				Sac Valley
West Yolo County Water Management and Wildlife Habitat Plan	10-Feb-94	Yolo	$69,875.00				Yolo
M&T/Parrott Pumping Station and Fish Screen	08-Feb-96	Butte	$500,000.00			8,000	Butte
GIS Model for Wetland Protection and Restoration	17-Feb-00	Colusa, Yolo, Butte, Glenn, Sutter, Yuba	$150,000.00				Sac Valley
Multiple Objectives Sub-Total			**$789,875.00**			**8,000**	
		GRAND TOTALS	**$80,627,488.00**	**10,773**	**23,604**	**151,221**	

† Traynham includes $500,000 for easement acquisition and $61,500 for restoration