# Project Information

2005 Proposal Number: 0044

Proposal Title: **Rice−Cover Crop Rotation Pilot Program**

Applicant Organization Name: **California Waterfowl Association**

Total Amount Requested: $**1,649,051**

ERP Region: Sacramento Region

## Short Description

This project seeks to implement a 3−year pilot project to benefit ground nesting birds, giant garter snakes, and other wetland dependent species through altered crop rotations and semi−permanent wetlands.

## Executive Summary

**The California Waterfowl Association (CWA), in partnership with the CALFED Ecosystem Restoration Program, Wildlife Conservation Board, California Department of Fish and Game, US Fish and Wildlife Service, farmers, wetland managers, and local water agencies, is proposing a 3−year pilot project to benefit ground nesting birds, giant garter snakes, and other wetland−dependant species through a combination of altered crop rotations to produce upland nesting cover and increased semi−permanent wetlands for waterfowl and snake refugia, rearing and foraging areas. The Project area includes rice fields and managed wetlands in Butte County served by the Western Canal Water District and Richvale Irrigation District (RID). The approach to implementation is through use of locally−based organizations; the RID will solicit and sign up growers; CWA will design and implement the habitat restoration plans in cooperation with the wetland managers and US Fish and Wildlife Service. Monitoring for garter snake and waterfowl use will be completed by USGS Dixon Field Station and CWA biologists. Expected outcomes include measurable increases in waterfowl nesting densities and brood survival over existing**

**conditions in rice fields and seasonal marshes; no significant loss of GGS foraging habitat; and an increase in GGS refugia habitat. The results of this pilot program and lessons learned will help shape the approach several participating agencies take toward planning expected water transfers and the 2008 USDA Farm Bill Conservation Programs.**

**Relationship to ERP goals: Goal 1: Endangered and other at−risk species and native biotic communities • Objective 2: Contribute to the recovery of the following at−risk native species in the Bay Delta Estuary and its watershed:…giant garter snake… . • Objective 3: Enhance and/or conserve native biotic communities in the Bay−Delta estuary and its watershed including the following assemblages and communities:…wading birds, shore birds , waterfowl…and terrestrial biotic assemblages associated with a aquatic and wetland habitats. Goal 2: Ecological Processes • Objective 1: Establish and maintain hydrologic and hydrodynamic regimes for the Bay and Delta that support the recovery and restoration of native s species…support the restoration and maintenance of functional natural habitats, and maintain harvested species Goal 3: Harvested Species • Objective 3: Enhance, to the extent consistent with ERP goals, populations of waterfowl and upland game for harvest by hunting and non−consumptive recreation. Goal 4: Habitats • Objective 2: Restore large expanses of all major aquatic, wetland and riparian habitats…to support recovery and restoration of native species… • Objective 4: minimize the conversion of agricultural land to urban and suburban uses …and manage agricultural lands in ways that are favorable to birds and other wildlife**

# Rice-Cover Crop Rotation Pilot Program

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## PROJECT DESCRIPTION

### 1. Problem

Approximately two thirds of California's 30 million people live south of the Tehachapi Mountains, yet two thirds of the rainfall and snowmelt in the state comes from the northern third of the state, primarily north of the Sacramento-San Joaquin Delta. As restrictions on the use of Colorado River water continue to increase, southern California water districts are looking for sources of water to purchase and transport through the delta for metropolitan users in southern California. Small-scale transfers have taken place within the last 15 years, and it is anticipated that future demand will require larger scale transfers, primarily from the rice-growing region of the Sacramento Valley supplied by the State Water Project through Lake Oroville. Potential effects of large-scale transfers could include reduction of aquatic habitat, both in agriculture and managed wetlands, and an increase in uplands with crop idling or crop-shifting to non-irrigated crops. This pilot-scale project will assess the potential and impacts to wildlife for developing cover-crops on idled rice lands, and the potential for additional semi-permanent wetlands to provide habitat for wetland-dependent species such as locally breeding birds and giant garter snake.

**The Central Valley**

California's Central Valley, situated in the heart of the Pacific Flyway, supports 3-4 million wintering waterfowl and approximately 350,000 breeding ducks (CVHJV 1990). The Central Valley also supports many other wetland dependent bird species, including more shorebirds than any other inland site in North America during winter and spring (Shuford et al. 1998). The wildlife values of the Central Valley remain impressive, despite the loss of over 90 percent of the original wetlands as a result of state and Federal reclamation projects. The projects were developed to control seasonal water flows to provide flood protection, and allow the expansion of agriculture, and commercial and residential development. As natural habitats were reduced or altered, birds and other wildlife species that inhabit the Central Valley have become increasingly dependent on agricultural habitats for food, cover and water (Heitmeyer 1989). Many wildlife species now depend on a mix of agricultural and wild lands for key elements of their life cycle such as feeding, resting, breeding and raising their young. This is especially evident in the northern Central Valley (know as the Sacramento Valley), where rice is the predominant crop (Jones and Stokes 2005).

**The Sacramento Valley - Wildlife and Rice Agriculture**

Rice has been cultivated in the north Central Valley since the early 1900s and the region supports about 500,000 acres annually, primarily in Colusa, Sutter, Butte and Glenn Counties . Rice is a crop that provides year round benefits to a wide range of

wildlife species (Jones and Stokes 2005). During the fall and winter, waste rice grain is an important food source for millions of waterfowl when flooded after harvest (Miller et al. 1989). Because of their importance to waterfowl, the rice-growing basins of the Sacramento Valley have been identified as high priority areas for conservation by the North American Waterfowl Management Plan (CVHJV 1990). Fall and winter flooded rice fields also provide foraging habitat for numerous migratory shorebirds, resulting in the Sacramento Valley's recent recognition as a site of international significance by the Western Hemisphere Shorebird Reserve Network.

During the spring and summer, rice fields, associated uplands and the network of irrigation canals and ditches provide habitat for breeding ducks and other birds. In fact, past studies indicate that idle rice land adjacent to active rice fields can support densities of breeding mallards comparable to or greater than more natural habitat in California and elsewhere (Yarris and Loughman 1990, Loughman et al 1991, Loughman et al. 2004, McLandress et al. 1996). Nest success measured in these artificial habitats were consistently greater than 15%, determined to be the minimum necessary for population stability in the Prairies of the Midwestern US and Canada. Thus, because of high nest densities and success, the potential for measurable wildlife population increases can be achieved with much less land devoted to upland nesting cover than other breeding areas.

Other bird species found nesting in the cover of idle rice lands included ring-necked pheasant, American bittern, northern harrier, short-eared owl and several passerines (Yarris and Loughman 1990, Loughman et al. 1991, Loughman et al. 2004). Pheasants are an economically important species in the Sacramento Valley because of their popularity as a game bird. Northern harriers and short-eared owls are both listed as species of special concern by the California Department of Fish and Game. Many other wildlife species, including some of special concern, also use ricefields for habitat.

**A Landscape in Transition: Increasing Rice, Decreasing Uplands**

During the past decade, the landscape of the Sacramento Valley rice-growing region has changed noticeably, with mixed consequences for wildlife. Favorable market conditions and current farm policies have resulted in increased amount of rice grown in California (Figure 1). In 2004, 618,000 acres of rice was planted in California, the most ever planted in one growing season. In addition, air quality concerns resulted in legislation (AB 1378 1991) that greatly reduced the amount of rice stubble that could be burned, the traditional method of disposing of excess straw. The favored alternative method for disposing of rice straw is to incorporate it into the soil during fall followed by winter flooding (Bird et al. 2000). As a result, the amount of rice planted in spring and the amount of rice flooded after harvest have both increased (Fleskes et al. 2005) thereby benefiting the numerous avian species that use these habitats during winter (Elphick and Oring 1998).

Although the landscape has improved for wintering species, wildlife that rely on upland habitats during the spring and summer have not benefited from recent rice growing patterns in California (Yarris 1997). While the amount of rice has increased in recent years, it has been at the expense of alternative crops such as wheat and idle or fallow "set-aside" land (Figure 2 ). Under the USDA Acreage Conservation Reserve (ACR) program of earlier farm bills, growers were required to set-aside a portion (typically 5-45%, determined annually) of their rice ground and not plant it with a rice crop. This idled acreage was frequently vegetated and provided suitable, although not

always optimal, nesting habitat. The freedom to farm provision of the 1996 Farm Bill eliminated the ACR and allowed growers to plant as many acres of rice as the market would support.

This recent trend has not benefited upland nesting birds and other wetland dependent wildlife requiring uplands, because the most productive nesting habitats in the rice-growing region have been eliminated (Figure3). Actively farmed rice fields do not provide good nesting habitat for most species, because they are disced and planted during March to June, which typically coincides with nesting season of many bird species (including ducks and pheasants). Typical management of rice fields during production years requires they be drained throughout the spring period to facilitate planting. During this period the fields are repeatedly disked to prepare a seedbed for rice and they provide no habitat value for waterfowl or other wildlife prior to flooding. Flooding and aerial seeding typically occur sometime in May, and plant growth is not typically tall enough to provide cover for duck broods until late June and July.

And because rice fields are flooded during the growing season and not drained until fall harvest, they are too wet to be used as nesting areas for most bird species. In areas of intense rice cultivation, very little undisturbed cover is available, and birds must nest in sub-optimal habitat strips such as field borders, roads, and rice check dams. These linear habitats are much less productive than larger blocks of nesting cover because they can't support as many birds and nest success is usually lower due to increased predator efficiency.

Limited expanses of upland habitat currently now exists mainly on refuges, wildlife areas, and privately owned wetland complexes, but most of acreage and management of these areas is focused on providing habitat for winter migrants. Production of mallards, ring-necked pheasants, and other ground nesting birds is limited by the current lack of available nesting cover and associated semi-permanent wetlands for brood rearing habitat. Yarris (1995) found that less than 15% of early-hatched ducklings survived to fledge, and attributed the poor success to lack of wetland habitat prior to rice flooding. After June, when ricefield habitat became suitable, duckling survival increased to almost 60%. Thus, it appears increasing upland habitat as well as increased spring seasonal or semi-permanent wetlands, would benefit locally nesting ducks.

**The Conservation Reserve Enhancement Program – a Solution With Shortcomings-**

In response to overwhelming evidence that declining set-aside was resulting in lost nesting habitat, the Conservation Reserve Enhancement Program (CREP) was initiated in the Central Valley. The CREP is a joint effort by private landowners, the USDA, CDFG, the Wildlife Conservation Board, and CWA to enroll marginal cropland in 10- year conservation contracts to benefit wildlife. These contracts provide landowners with annual rental payments, technical assistance, and restoration cost-sharing to establish and maintain upland cover for grassland dependent birds. The CREP is a national program that focuses on soil, air, water, or wildlife concerns within individual states and requires that measurable objectives be established and assessed.

California's CREP was the first in the nation to be established with wildlife objectives; specifically for mallards, ring-necked pheasants, and other grassland nesting

birds. Recent biological evaluations by CWA and CDFG indicate wildlife are benefiting from the program (Loughman et al. 2004). Although the program is popular with many farmers, only 4,500 of the proposed 12,000 acres targeted have been enrolled . For most rice farmers, the annual rental payments received from the CREP are not sufficient to compensate them for deferring when market conditions are favorable (as they are now). In addition, CREP requires a 10-year commitment and many landowners are hesitant to suspend farming operations for such a long time period.

**Short Term Crop Rotation: A Proposed Alternative**

During the development of the CREP, numerous landowners expressed interest in participating based on their previous positive experiences in the earlier USDA "set-aside" programs, but had reservations about idling their land for more than a few seasons at a time. However, recent changes in California's water usage and distribution have on occasion (i.e., during drought years) presented rice growers with the option of selling a portion of their irrigation water and forgoing planting rice on some of their land. By carefully considering the prescribed use and management practices on lands temporarily removed from production, there is an opportunity to transfer water to those who need it, while simultaneously benefiting wildlife populations and improving future crop production.

Periodically rotating rice ground out of production and into cover crops, as previously practiced under earlier Farm Bill legislation, can have multiple benefits. Planting a winter cover crop has been shown to improve soil (tilth/porosity, N content) and can affect the costs and yields of subsequent rice crops. In addition, planting a cover crop improves water and air quality by deterring soil erosion caused wind and water runoff. Finally, establishing suitable cover crops will provide habitat for numerous species of wildlife. It would provide needed nesting habitat for locally breeding ducks and other upland birds. It would provide nesting, brood, winter cover for pheasants, and year round habitat for numerous mammal species.

The second part of the proposed alternative program involves establishing 1,000 acres of wetlands for waterbirds and other wildlife. Considerable wetland habitat and flooded rice is available during the fall and winter, but this disappears beginning in February when farmers drain water from fields of decomposing stubble to prepare rice for planting. Rice is not planted until April or May, and rice plants don't become tall enough to provide cover for wildlife until mid-June. Mallards begin nesting as early as March, so many broods hatch when wetland habitat is unavailable. Supplemental wetlands in spring would provide habitat for hens and their broods, as well as other wetland wildlife, during this critical period. Strategically positioned wetlands may also improve rice yields if used to warm water prior to circulating it through planted rice fields.

## 2. Goals and Objectives

The California Waterfowl Association (CWA), in partnership with the Wildlife Conservation Board, California Department of Fish and Game, US Fish and Wildlife Service, farmers, wetland managers, and local water agencies, is proposing a 3-year pilot project to benefit ground nesting birds, giant garter snakes, and other wetland-dependant species through a combination of altered crop rotations to produce upland nesting cover and semi-permanent wetlands for waterfowl and snake refugia, rearing and foraging

areas. The project area (Figure 4) includes rice fields and managed wetlands in Butte County served by the Western Canal Water District and Richvale Irrigation District (RID) that also lie within the core areas for GGS (Figure 5). The approach to implementation is through use of locally-based organizations: The RID will solicit and sign up growers; CWA will design and implement the habitat restoration plans in cooperation with the wetland managers and US Fish and Wildlife Service. Monitoring of breeding waterfowl will be conducted by CWA biological staff, and giant garter snake monitoring will be completed by USGS Staff at the Western Ecological Research Center (WERC) in Dixon. Expected outcomes include measurable increases in waterfowl nesting densities and success compared to existing conditions in rice fields and seasonal marshes; no significant loss of GGS foraging habitat; and an increase in GGS refugia habitat. The results of this pilot program will help determine the approach several participating agencies take toward planning the 2008 USDA Farm Bill Conservation Programs.

For the program to be successful, it must result in suitable habitat for wildlife and provide enough incentive for farmers to participate. Past research in the Sacramento Valley has demonstrated that nesting ducks will use a wide variety of cover crops for nesting. The structure of the vegetation, rather than the plant species, appears to be the most important factor for attracting nesting ducks. Research results also indicate that certain cover types attain the desired structure and are used more readily than others, and this will serve as a starting point for a pilot program. The highest duck nest densities are typically found in vetch, vetch/grass mixes, annual grasses (e.g. ryegrass, canary grass) and winter wheat(Figures 6 and 7) (Yarris and Loughman 1990, Loughman et al. 1991, Loughman et al 2004).

The focus of this program will be vetch and winter wheat or oats, because they are also desirable from a farming standpoint. Vetch can improve soil by suppressing weeds, fixing nitrogen, and if desired it can be harvested for seed after the nesting season. Volunteer stands of vetch can be incorporated into the soil as green manure after the required set-aside period has ended, reducing the need for supplemental fertilizer. Winter wheat is a commodity, although the market value of wheat grown under the restrictions of this program will be lower than a typical commercial crop (due to no irrigation, and sub-optimal harvest timing). Planting of cover crop should occur in the fall before the first rains so vegetation attains suitable height by spring for nesting birds.

Soils of the rice-growing region are variable, and not all areas can profitably support alternative crops. Even in areas with soils that can support other crops, current or future market conditions may dictate that rice is the most profitable use of the land. As such, financial incentives will be required to encourage growers to participate in planting cover crops. An analysis provided by the Department of Water Resources economists estimated that a total revenue of at least $164 per acre per year will be required to make this pilot program economically attractive to farmers. This assumes that growers either nave no “rice-base” for the acres being enrolled or they will continue to receive their FSA subsidy during the set-aside rotation year (assumed to be approximately $180/acre on average).

Planting costs are derived from the following estimate:

| | |
|---|---|
| Chopping of rice straw | $15.00/acre |
| Discings (2) at $15/acre | $30.00/acre |
| Vetch and wheat seed blend @ 40 lbs/acre | $20.00/acre |
| Furrowing beds | $12.00/acre |
| Application of seed | $8.00/acre |
| Pulling of drains | $3.00/acre |
| Total cost to grower of planting | $88.00/acre |

**Duration of Rotation**

Fields temporarily removed from rice production will remain undisturbed after fall planting until at least July 15 the following year. At this time, the grower can either take whatever steps necessary to prepare the field for the next rice crop, or plant the field again to a cover crop. Growers are encouraged to plant the same field (or another field in the same vicinity) in cover crop for at least two consecutive years, although this will not be required. Nesting ducks are traditional and will return to the same area to nest year after year, often the same field.

**Improving Wetland Wildlife Habitat with Semi-Permanent Wetlands and Shallow Water Areas for Wildlife**

A vast majority of the 350,000 acres of managed wetlands in the Central Valley are managed as seasonal marshes. Seasonal marshes are typically flooded from early October through March and are managed to provide high-value waterfowl food plants for migrating populations of ducks and geese. Although the spring drawdown provides concentrated sources of invertebrates for waterfowl and shorebirds, locally-breeding waterfowl continue to need breeding pair water for territory establishment and brood water for the survival of ducklings and hens.

Flooding of 1,000 acres of seasonal marsh from March through September 30 will provide aquatic habitat during this critical time in the life cycles of GGS and locally breeding waterfowl. This component of the proposal includes partnership funding from WCB to modify the earthworks of existing seasonal marshes to withstand the longer flooding period and for an incentive payment to help cover the costs cover management required by having water on the wetlands during the longer growing season.

**Data Collection and Reporting**

Field work for the evaluation program will begin in spring and continue through September of each year. Evaluations will be conducted for 3 consecutive years beginning in 2007 and finishing in 2009. An annual report summarizing each season will be produced in December of 2006 through 2008. A final project report including all 3 years of data will be completed in July of 2009.

**Project-Specific Goals and Objectives**

For rice-cover crop rotation fields

1. Establish 1,000 acres of new cover crops surrounded flooded ditches on a rotating basis for 3 consecutive years within the Richvale Irrigation District

2. Increase use of these areas by grassland-dependent species, including ground-nesting birds and giant garter snakes
3. Document use of fields and surrounding network of irrigation ditches by grassland-dependent species and wetland-dependent species requiring uplands

For semi-permanent wetlands:

1. Establish 1,000 acres of semi-permanent marsh
2. Increase use of these areas by wetland-dependent species including waterfowl, wading birds, and giant garter snakes
3. Document use of restored wetlands by wetland-dependent species including waterfowl, wading birds, and giant garter snakes

## 3. Conceptual Model

The short term idling of rice fields presents a unique opportunity to study and improve the health of grassland dependent birds. We can improve our understanding about wildlife responses to blocks of upland cover in the rice landscape: how their size, proximity to other habitat types, and plant composition affects wildlife use and farm management. Additionally, one of the primary findings of California's Grassland Bird Conservation Plan was the limited amount of data on grassland bird species and the need to collect basic biological data on species distribution, habitat use, and survival. Other potential research includes the movements of females between nesting fields, how predators limit nesting success and recruitment, and how young birds use available habitats.

In addition to studying basic ecological principles, evaluation of land use changes on waterfowl (and other bird) populations and nesting effort and success will be assessed. Annual evaluation is essential to this pilot program because it measures progress towards management goals. The primary wildlife goal is to provide nesting habitat for ducks and other birds. CWA is conducting very similar habitat evaluations for the California CREP and has extensive experience conducting biological evaluations on private and public lands throughout the rice- growing region. We will incorporate standardized methods to evaluate population parameters such as breeding pair and nest density, nest success, and causes of nest loss.

Predictions:

1. Bird nesting densities on lands planted to cover crops are significantly higher than those for lands otherwise left idle or are disked or laser-leveled during the period of April through July 15.

2. Giant garter gnake densities and use are not significantly different in habitat associated with rice fields planted in cover crops when compared to habitat associated with planted rice fields during the period of June through October.

3. Numbers and diversity of adult and juvenile birds and adult and juvenile giant garter snakes are significantly higher in newly created semi-permanent wetlands when compared with seasonal wetlands for the period of March through October.

**4. Approach and Scope of Work**
Note: See Figure 8 for a complete calendar of tasks and subtasks

*Task 1. Administration*
Administration includes all aspects of contract and project management by CWA staff. Tasks include developing contracts with administering agencies, developing subcontract with USGS for GGS monitoring, providing budget monitoring, quarterly reports, outreach and information for magazine articles, coordination with other CWA field and professional staff members. Administration also includes communication with partner agencies and landowners including Richvale Irrigation District, Western Canal Water District, Central Valley Habitat Joint Venture, growers and wetland managers.

Deliverables: Periodic budget and project reports to administering agencies documenting progress and milestones for all tasks below.

*Task 2: Planting*
Rice-Rotation Fields
*Selection*

- Proposed field(s) must have a history of rice to be eligible.
- The area(s) planted to cover crop must be adjacent to water on two sides the following spring (either rice fields or irrigation canals or other waterway).
- Area(s) to be planted in a cover crop can be all in one field, or distributed over several fields within a farm.
- The amount planted in a contiguous area must be at least 40 acres, but not more than 160 acres.
- Seeds of vetch (and other legumes) shall be inoculated prior to planting,
- Participating fields may not be purposely flooded during winter, except for periods of less than one week for irrigation during dry years.
- Irrigation must be withheld from participating fields during the period of March 1 to October 31 if rice water consumptive use is to be made available for transfer.
- Disturbance shall be limited during the nesting season, from March 15 until July 15.
- Harvest of grain, vetch seed, haying, or disking may not occur until July 15.
- Livestock grazing will not be permitted prior to July 15.
- Access must be provided for GPS verification of acreage, as well as for evaluation and monitoring personnel during the term of the contract. Personnel may include CWA, WCB, DFG, DWR, USBR, USFWS, USGS, and others.
- Provisions of the United States Fish and Wildlife Service's biological opinion regarding giant garter snakes in the Environmental Water Account's short term EIS/EIR will be followed.
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Subtasks:

1. CWA and RID send out solicitation letter to growers in May of 2007
2. Sign-ups will occur at the RID office beginning in June of 2007
3. Fields must be identified at the time of sign-ups and will be evaluated by CWA for eligibility
4. Participating fields will be planted with a wheat/vetch mixture at a rate of at least 50 lbs/acre.

5. Field borders will be mapped using GPS by CWA after planting is completed by growers
6. Payments for planting costs will be made to the growers from CWA after funds are received by CWA from the ERP program.

Deliverables:

1. Signed agreements from each grower detailing areas to be planted, terms of the planting and cover-crop incentive program, and provisions for access to their property for verification and monitoring.. Due by October 1 of 2006, 2007, 2008.
2. Map of Richvale Irrigation District and electronic copy of shapefiles showing boundaries of planted cover crop fields. Due on December 31 of 2006, 2007, 2008

*Task 3: Monitoring Fields for GGS and Grassland Dependent species*

*Bird Monitoring*

Waterfowl Breeding Pair Surveys – Observers will count waterfowl pairs at weekly intervals along four pre-determined routes within the pilot project boundary in spring. Routes will be selected to ensure the mix of habitat types encountered along the survey is representative of the project area. All habitat types along the route will be mapped and seasonal changes in habitat composition documented (e.g., rice field flood-up). Waterfowl counts will be conducted from April through mid-June in the early morning beginning one hour after sunrise. All pairs, lone drakes, and drakes in groups of four or less will be counted as "indicated breeding pairs" (USFWS-CWS 1987). Mallard breeding pair density for each region surveyed will be obtained by averaging the weekly estimates made during the central span (i.e., the period between the $10^{th}$ and $90^{th}$ percentiles of initiation dates) of nest initiations.

Nest Searching – Nest searches will be conducted at designated field plots located throughout the project area. The goal of the pilot program is to idle approximately 1000 acres of rice land and plant it with a cover crop. We will attempt to systematically search 500 acres (50%) of randomly selected plots within the project area. Waterfowl nest search procedures were designed following Klett et al. (1986) as modified by McLandress et al. (1996) for California habitats. Nest searches will be initiated in early April and continued until July to ensure finding both early-nesting and late-nesting ducks (McLandress et al. 1996). Each field will be searched at three-week intervals until no new nests are found (about four or five complete searches). Nest searches will begin at least two hours after sunrise and will be finished by 1400 hours to avoid missing nests due to morning an afternoon nest breaks by hens (Caldwell and Cornwell 1975, Gloutney et al. 1993). Nest searches will be conducted using a 50-m nylon rope strung between two slow-moving all-terrain vehicles (ATV). An observer will watch the drag line to determine nest location after a hen flushes. Tin cans containing stones will be attached to the drag rope approximately every 1.5 meters in order to generate noise and flush nesting hens. Hand dragging will be conducted in sensitive crops if they are to be harvested (e.g., wheat). Each nest will be marked with a 2-m bamboo stake placed 4 m north of the nest bowl and a shorter stake placed just south of the nest bowl level with the vegetation height. Each nest will be revisited on foot once every seven days, the stage of embryo development will bw determined by candling (Weller 1956), and clutch size and nest fate (hatched, destroyed, or abandoned) will be recorded. A nest will be considered successful if at least one egg hatched (as determined from shell remains; Klett et al.

1986). Nest success will be determined for each field using Mayfield (1961, 1975) techniques modified for waterfowl (Johnson 1979, Klett et al. 1986). Total duck nest success will be calculated using an average clutch age at hatching of 35 days.

We will use Mayfield nest-success rates to estimate nesting densities (Miller and Johnson 1978). To elaborate, we will divide the number of hatched nests by the Mayfield nest-success rate to estimate the total number of nests initiated in each field. We will then divide the number of nests initiated by the field's area (h) to determine the density of initiated nests. The Mayfield estimate takes into account the limitations of the nest searching methodology; specifically, nests depredated early in incubation are often not found, causing apparent nesting densities (number of nests found divided by area) to be underestimated.

Nest-site vegetation will be measured using a Robel pole (Robel et al. 1970) when each duck nest is initially found; measurements will include the vegetation's visual obstruction height (dm), lateral density, and canopy density. Lateral and canopy density is a subjective estimate of the nest-site's vegetation density from a ground or aerial predator's view, respectively. Vegetation density will be ranked from partial (vegetation only partially covered the nest site, a rank of 1) to complete (vegetation completely covered the nest site, a rank of 6). For each year, we will use principle components analysis to extract the first principle component (PC1) for the three vegetation measurements. Vegetation data at nest-sites will be analyzed by pooling data for each field. By doing so, we will be able to determine the relationship between nest success and vegetation among fields.

When a nest is located, eggs will be candled to determine stage of incubation (Weller 1956). Date of nest initiation and hatch will be estimated based on embryo development (Weller 1956). Eggs will be counted, their status noted, and nest site vegetation characteristics recorded. Height, density, and composition of nest site vegetation will be recorded by measuring visual obstruction (Robel et al. 1970) and by estimating the percent cover of the three dominant plant species for each nest. Only nests found in the laying period and surviving into the incubation period, and nests discovered in the first week of incubation, will be used to calculate full clutch size. Nests will be marked with garden stakes and revisited at 7 to 10 day intervals to determine their fate. Nests are considered successful when at least one egg hatches (as determined from shell and egg membrane remains). When possible, incubating hens will be captured with a long-handled net and fitted with a standard U.S. Fish and Wildlife Service metal leg band and released. Mallard hens will be aged using wing feather characteristics described by Krapu et al. (1979). Nest success will be calculated using Mayfield's Method modified for use with waterfowl (Johnson 1979).

*Giant Garter Snake Monitoring*

Giant garter snake monitoring will take place in the ditches and drains adjoining cover-crop fields. Methods are those that have been developed for standard sampling, and include floating traps, radio-monitors, and tagging.

Subtasks:

1. Waterfowl breeding pair surveys will be conducted between April and June of each year

2. Nest Searching will be conducted between April and the end of June of each year
3. Giant garter snake monitoring will occur during the months of June through October

Deliverables:

1. Annual monitoring reports will be completed prior to December 31st of 2007, 2008, 2009
2. One Final monitoring report will be completed prior to June 30, 2009

*Task 4: Incentive Payment for Cover* Crops

In addition to covering the costs of planting fall-seeded cover crops, we anticipate growers will require an incentive payment to stimulate the enrollment of otherwise fallow ground. This is required to overcome grower's reluctance to make a decision regarding spring planting for rice at such an early fall date. Market prices for rice vary widely throughout the winter and spring and most growers make their planting decisions based on their potential return when they must begin working the ground. Payment to growers is delayed until the cover crop is grown and remains in place until the July 15 deadline.

Subtasks:

1. Borders of grown cover crop fields will be mapped using GPS by CWA after July 15
2. Payments will be made to the growers from CWA after funds are received by CWA from the ERP program.

Deliverables:

1. Map of Richvale Irrigation District and electronic copy of shapefiles showing boundaries of grown cover crop fields. Due on August 1 of 2007, 2008, 2009

*Task 5: Wetland Restoration (Matching Contribution)*

**Semi permanent Wetlands**

Necessary modifications to existing water control infrastructure within wetlands will include widening levees creating islands within the wetlands with soil excavated from channels. These islands will be built up above the high-water flood level to avoid drowning waterfowl nests during occasional spring flood events. These islands will also provide high-water refugia for any GGS living within the wetlands. Soil for these islands and levees will come from excavation of deeper channels and potholes within the flooded wetlands. These areas will be at least three feet deep and will tend to resist colonization by emergent cover.

*Selection*

- Wetlands must be currently managed as seasonal or irrigated wetlands (only flooded from October through March, and irrigated periodically during summer)
- Wetlands must have at least 25% emergent cover (cattails and/or round stem bulrush)
- Wetlands must have access to district or independent water supply during the period of March through September

- Wetlands must already be protected by a conservation easement or fee title ownership by conservation agencies.
- Access must be provided to evaluation and monitoring personnel during the term of the contract. Personnel may include CWA, DWR, USBR, USFWS, US Geological Survey, and others.

Subtasks

1. CWA will conduct elevation surveys and provide wetland enhancement plans by July 1 of the first year of the project (2007)
2. CWA will supervise construction of wetland projects during the first year of the project.
3. Private landowners will be reimbursed for 50% of the enhancement and costs for enhancement on federal or state lands will be paid in full by WCB.

Deliverables:

1. Location map showing relationship between cover-crop fields and restored wetlands. Due on March 1 of 2007, 2008, 2009

*Task 6: Wetland Management*

Maintenance of summer water in wetlands significantly increases habitat values for wetland-dependent species over management of these same lands as seasonal wetlands. Management costs also significantly increase, primarily due to the increase in water use and increased cover management required by having wetlands flooded during the hottest periods of the year. Water use for the period of March through October is estimated at 6 acre-feet per acre. An increase in labor to maintain constant water levels is required to minimize emergent growth and mosquito production. Increased costs for labor are added to the costs to control undesirable vegetation that are produced by flooding for such long periods during the growing season.

Subtasks:

1. Water must be maintained at least through the period of March 1 through September 30 of each year of the project
2. Pond borders will be GPS mapped by CWA after March 1 and again after September 30 of each year of the project
3. Cover management by disking, mowing, or burning must be conducted by the landowners after September 30 if emergent cover exceeds 75% of wetland area.
4. CWA will request payment from CALFED for costs of water and cover management.
5. CWA will pay landowners for water and cover management after payment by CALFED

Deliverables:

1. Map and shapefiles describing pond borders mapped in March and September of 2007, 2008, 2009.

*Task 7: Wetland Monitoring*

Early morning avian surveys will be conducted within one hour following sunrise bi-weekly from April through July at each semi-permanent wetland. Individual observation stations will be marked with flagging in areas that provide maximum concealment of the observer and to maintain a consistent survey location. We will establish one observation station per 10 acre wetland area to ensure complete coverage. Scan ampling (Altmann

1974) will be used to record all bird species seen during 10 minute counting periods. After each scan there will be a 10-minute rest period until the next 10-minute counting period. A total of 5 complete scans will be conducted during each pond visit. Callback tapes will be used during rest periods to elicit calls from secretive species difficult to detect using normal scanning techniques. All species heard during the play of callback tapes will also be recorded and included in species richness and frequency of occurrence determination for each pond. Avian species richness will be defined as total number of species either seen or heard during bi-weekly surveys (Vandruff et al. 1996). Social status of all waterfowl observed will be recorded according to standard operating procedures used in waterfowl breeding population surveys in North America (USFWS 1987). Swim-in bait traps (Lincoln 1922, Wainwright 1957) will be placed in semi-permanent wetlands in late June to facilitate waterfowl banding operations through August, before flights of migrant waterfowl species arrive from northern breeding grounds.

Subtasks

1. Waterfowl breeding pair surveys will be conducted between April and June of each year
2. Brood counts and bait trapping will be conducted by CWA between April and the end of August of each year
3. Giant garter snake monitoring will occur during the months of such and such

Deliverables:

1. Annual Monitoring reports will be completed by CWA and USGS prior to December 31st of each year of the three year program
2. One Final monitoring report will be completed prior to June 30, 2009.

## 5. Performance Evaluations

(see descriptions under Tasks 3 and 7 under section 4. above)

## 6. Feasibility

California Waterfowl Association has been completing wetland and upland restoration and monitoring projects in California since 1980 and is a respected leader in these efforts. CWA has been the past recipient of two CALFED grants totaling over $1,000,000 and regularly has an annual budget for habitat-associated work in the order of 3-5 million dollars a year. This project has the support of numerous rice growers, Richvale Irrigation District, Metropolitan Water District, Wildlife Conservation Board, and the Department of Fish and Game.

All of the methods proposed in this project are feasible and the PI's have experience implementing these techniques in California. The California Waterfowl Association (CWA) has conducted extensive studies of the nesting biology of waterfowl throughout California and field methods are well established (McLandress et al. 1996). CWA, in partnership with the California Department of Fish and Game began evaluating the reproductive success of ground-nesting birds within Sacramento Valley agricultural habitats in 1990 (Yarris and Loughman 1990, Loughman et al. 1991). Currently, CWA is coordinating, and evaluating the U.S. Department of Agriculture's (USDA) Conservation Reserve Enhancement Program in California's North Central Valley Conservation Priority Area. During the period 2001 – 2005, CWA's Wetland Biology staff has

restored approximately 50,000 acres of wetland habitat through the implementation of grants garnered from the State's Wildlife Conservation Board, USDA Wetlands Reserve Program, North American Wetland Conservation Act funds, and various privately funded projects.

## 7. Data Handling and Storage

Data for field and wetland boundaries will be collected by GPS unit and downloaded into CWA's GIS computer in Sacramento. Backup copies of this data will be archived in CWA's secure facility every 6 months. Similarly, bird and GGS monitoring and survey data will be computerized from field collection materials (both electronic and hard copies) and archived every 6 months.

## 8. Information Value

The results of this pilot program and study will assist agencies such as the USDA, Department of Water Resources, US Fish and Wildlife Service, and Department of Fish and Game assess the potential benefits of larger scale cover-crop programs and the potential impacts to GGS and other wetland-dependant species of large-scale water transfers from the rice-growing regions of the Central Valley.

## 9. Public Involvement and Outreach

Public involvement and outreach will be accomplished through numerous tours and publications that CWA regularly holds each year. CWA's Mallard Tour, typically held in late may or early june typically attracts private landowners, growers, and representatives from partnering agencies such as USDA, USFWS, DFG, and others. Articles describing projects typically appear on a semi-annual basis in CWA's bi-monthly magazine. CWA also is represented at the Wildlife Society meetings and at various Pacific Flyway Council meetings each year where the results of the studies conducted under this project may be shared. CWA also intends on developing press releases and news articles with local media outlets to publicize the project.

# B. Applicability to CALFED Bay-Delta Program and ERP Goals and priorities for this solicitation

### 1. ERP Priorities for this 2005 solicitation

This project is a pilot-scale implementation and research project that has its goal to conserve giant garter snakes and other wetland dependent species. *Altered cropping patterns* in the Butte Basin, including establishment of fall-planted *cover crops* in rice fields, will be assessed for their benefits and impacts to wetland-dependent species requiring upland cover. Additionally. *semi-permanent wetlands* will be restored and managed to provide aquatic habitat during critical summer months. These wetlands will be assessed for their benefits to GGS and wetland dependent wildlife. Results from these studies will assess the impacts of crop idling/shifting resulting from potential water transfers.

This pilot project will contribute to the following ERP goals and objectives:

Goal 1: Endangered and other at-risk species and native biotic communities

- Objective 2: Contribute to the recovery of the following at-risk native species in the Bay Delta Estuary and its watershed:…giant garter snake… .
- Objective 3: Enhance and/or conserve native biotic communities in the Bay-Delta estuary and its watershed including the following assemblages and communities:…wading birds, shore birds , waterfowl…and terrestrial biotic assemblages associated with a aquatic and wetland habitats.

Goal 2: Ecological Processes

- Objective 1: Establish and maintain hydrologic and hydrodynamic regimes for the Bay and Delta that support the recovery and restoration of native species…support the restoration and maintenance of functional natural habitats, and maintain harvested species

Goal 3: Harvested Species

- Objective 3: Enhance, to the extent consistent with ERP goals, populations of waterfowl and upland game for harvest by hunting and non-consumptive recreation.

Goal 4: Habitats

- Objective 2: Restore large expanses of all major aquatic, wetland and riparian habitats…to support recovery and restoration of native species…
- Objective 4: minimize the conversion of agricultural land to urban and suburban uses …and manage agricultural lands in ways that are favorable to birds and other wildlife

Relationship to Other Ecosystem Restoration Actions or Program Investments

## C. Qualifications and Organization

The team assembled under this proposal is comprised of individuals, when taken together encompass the breadth of skills necessary to implement this pilot project. Within CWA, Senior Biologists Rob Capriola (Project Director) and Dan Loughman have a combined 30 years experience in integrating agricultural and environmental sciences in the California landscape. Associate Biologist Jim Laughlin has seven years of experience in implementing wetland and set-aside programs, and works under the direction of Dan Loughman. All three staff members work within CWA's Waterfowl and Wetland Department. Mr. Capriola's completed projects include CALFED grants for the Butte Creek/Sanborn Slough Bifurcation Upgrade Project ($2,000,000) North Central Valley Wetland NAWCA ($868,000), California North Coast Wetland Habitat Project NAWCA ($1,369,000), and numerous individual wetland and upland habitat projects completed in partnership with the USDA Wetland Reserve Program, California Wildlife Conservation Board, Central Valley Project Improvement Act, and the USFWS (Partners For Fish and Wildlife). His resume is included as Attachment B.

CWA's expertise lies in wetland and upland habitat implementation and monitoring for bird use, and therefore we have chosen to add Glenn Wylie and his team from the USGS Western Ecological Research Center to complete the monitoring of the giant garter snake under a subcontract. Mr.Wylie is recognized as the foremost expert in this field and will be able to apply satisfactory scientific rigor to monitoring and reporting under this proposal. His resume is included as Attachment B.

CWA will provide overall project management and administration, including coordinating sign-ups for growers through Richvale Irrigation District, planning and implementing required wetland restoration of semi-permanent wetlands with the Wildlife Conservation Board, and conducting cover-crop and wetland monitoring for bird and GGS use with USGS. CWA will provide results and information to agencies such as the USDA that are implementing similar programs under the Wetland Reserve Program and Conservation Security Program.

## D. Cost

*Budget*

**Budget Narrative**

*Personnel:* Budget projections for CWA personnel are based on actual wages expected to be paid to current employees and anticipated hiring of seasonal employees for field work and data collection. Benefits of 33.57 % of wages cover additional actual costs of payroll expenses, health insurance, vacation, holiday, sick leave.

*Operating Expenses:* include office and field supplies and equipment such as printers, stakes, wire and bait for trapping, flagging, software, and hand-held GPS units. Payment for seeding of cover-crops is also included with these more routine operating expenses in this line item for Task 2. This cost is based on as estimated reimbursement of $88/acre for 1,000 acres per year over 3 years. Payment of water costs and wetland management costs to landowners is included under this line item for Task 6. This cost is estimated at $56/acre per year for 1,000 acres ($20 per acre for wetland management, and $36 per acre for water)..

*Travel and Per Diem:* These costs will be reimbursed according to current State of California guidelines at the time of request for reimbursement. Travel is primarily accomplished by CWA vehicle from field offices and the Sacramento Headquarters to the widely disbursed field sites. Additional travel within the state will be required to coordinate all tasks and to provide outreach and information on the progress of the project. Some meals and incidental lodging may be required under Task 1 for this purpose.

*Equipment*: The equipment budget includes the purchase of one four-wheel drive all-terrain vehicle to be used by the CWA GPS/Mapping technician to outline planted fields under tasks two and six. Two additional four-wheel drive all-terrain vehicles plus a trailer to carry them will be required under tasks three and seven to support the CWA monitoring field crews as they conduct field samples of uplands and wetlands in the project area.

*Sub-Contractor:* Subcontractor costs include payment to USGS Dixon Field station for completion of GGS monitoring and report writing under Tasks 3 and 7. Personnel include Glenn Wylie, PhD., Mike Casazza, and seasonal USGS field crews. Costs for benefits, operating expenses, and overhead are included in the totals for these line items.

*Overhead Percentage:* The overhead percentage of 21.5% on all operating expenses, travel and per diem, equipment, and subcontractors is derived in accordance with

generally accepted accounting principles and includes such items as those direct and indirect CWA expenses listed under the following table:

| | |
|---|---|
| Allocated Gross Salaries of Acctng & Admin staff | |
| Benefits/Cost of Payroll | |
| Outside Labor | |
| Professional Fees (attorney, accountants) | |
| Profess-Single Audit Portion | |
| Depreciation on PP&E | |
| Dues & Subscriptions | |
| Equipment Maint. & Rental | |
| Insurance-Prop, Liab & D&O | |
| Ins-Profess. Liab Portion | |
| Meetings and Travel | |
| Miscellaneous | |
| Office Expense | |
| Telephone | |
| Postage | |
| Building Lease | |
| Building Janitorial | |
| Utilities | |
| Advertising | |
| Interest | |
| Misc. Fees | |
| | |
| | |

**Task 1 –Administration**
These costs are for CWA personnel time, benefits, printer (in year one), miscellaneous office supplies such as paper, printer cartridges, promotional materials, and travel within the state conducted in CWA vehicles.

**Task 2 – Planting**
These costs are for CWA personnel time, benefits, miscellaneous office and field supplies to promote and sign up growers, determine field eligibility, and to certify that planting has taken place. Payment for planting ( $88/acre for 1,000 acres per year) is included under the category of Operating expenses. First year equipment expense of one four-wheel drive all-terrain vehicle is required for GPS documentation of field boundaries. Task #4 is linked to this task but takes place after the growing season for the cover-crop (August). The Wildlife Conservation Board will pay for the 1996 planting and personnel costs ( $88,000 and $14,586 respectively) due to the fact that a contract between CWA and the CALFED administering agency will not be in place by June of 2006. These funds are included as matching funds within the budget summary and in the section below.

**Task 3 - Monitoring of Fields**
These costs are for CWA personnel time, benefits, miscellaneous office and field supplies to monitor fields for bird use. A field crew of four members plus supervisor (Jim Laughlin) and two vehicles are required. Equipment purchase is for two four-wheel drive all-terrain vehicles and a trailer. Subcontractor expenses are for USGS field crews and

supervision and total $35,000 per year plus 21.5% overhead . Tasks include writing of annual and final reports.

**Task 4 – Incentive Payment (Linked to Task 2)**
These costs are for CWA personnel time, benefits miscellaneous office and field supplies to verify cover-crop at the end of the growing season (July) and to process payments to growers. The payment to growers is $100 per acre per year ($100,000 per year total). Travel expense is for GPS tech. to verify field boundaries. Equipment purchased under Task 2 will be used for this task.

**Task 5 – Wetland Restoration**
CWA will apply for cost-share funds from the California Wildlife Conservation Board to convert existing seasonal wetlands into semi-permanent wetlands for this proposal. The Wildlife Conservation Board has also indicated that they will pay for a portion of capital costs needed to make wetlands capable of providing semi-permanent water and wildife islands. Capital costs on private lands will be split with the landowners on a 50-50 basis. These costs are included under cost-share funds on the Budget Summary. WCB costs also include CWA personnel, travel, and miscellaneous costs to survey, design and supervise construction of up to $25,000.

**Task 6 – Wetland Management**
CWA costs are for personnel to verify wetland acreages, and habitat requirements on an annual basis, benefits, miscellaneous office and field supplies and travel costs. Payments to the Richvale Irrigation District for water used during the March through October period ($6/acre-foot for 6 acre-feet/acre for 1,000 acres/year) and incentive payments for wetland management ($20/acre/year for1,000 acres/year) total $56,000 per year and are listed under Operating Expenses for this task. This item can be eliminated, but will affectively eliminate the incentives for Task 5 and will eliminate the need to fund Task 7 Monitoring of Semi-Permanent Wetlands.

**Task 7 – Wetland Monitoring**
These costs are for CWA personnel time, benefits, miscellaneous office and field supplies to monitor fields for bird use. A field crew of four members plus supervisor (Jim Laughlin) and two vehicles are required. Equipment purchase is for two four-wheel drive all-terrain vehicles and a trailer. Subcontractor expenses are for USGS field crews and supervision and total $35,000 per year plus 21.5% overhead Tasks include writing of annual and final reports.

*Cost-Share Funds*
Cost-share funds are anticipated to come from the Wildlife Conservation Board for fall-planting of the cover crop in 2006 and for wetland enhancement and restoration, also anticipated for 2006. Capital expenses in 2006 will also be contributed by private landowners participating with Wildlife Conservation Board in these restorations. It is estimated that a total of $327,586 in matching contributions will directly affect this project.

*Long-term funding strategy*
Since the project is a pilot project and does not involve fee-title or easement acquisition, no long-term monitoring or funding is required.

## E. Compliance with Standard Terms and Conditions

CWA has carefully reviewed the Sample ERP grant agreement template and understands the grant agreement terms. CWA has been able to comply with all similar terms and conditions under two previous ERP Recipient Agreements and anticipates no problems complying with the standard terms and conditions.

## F. LITERATURE CITED


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## G. Non-Profit Verification ( see Attachment C)

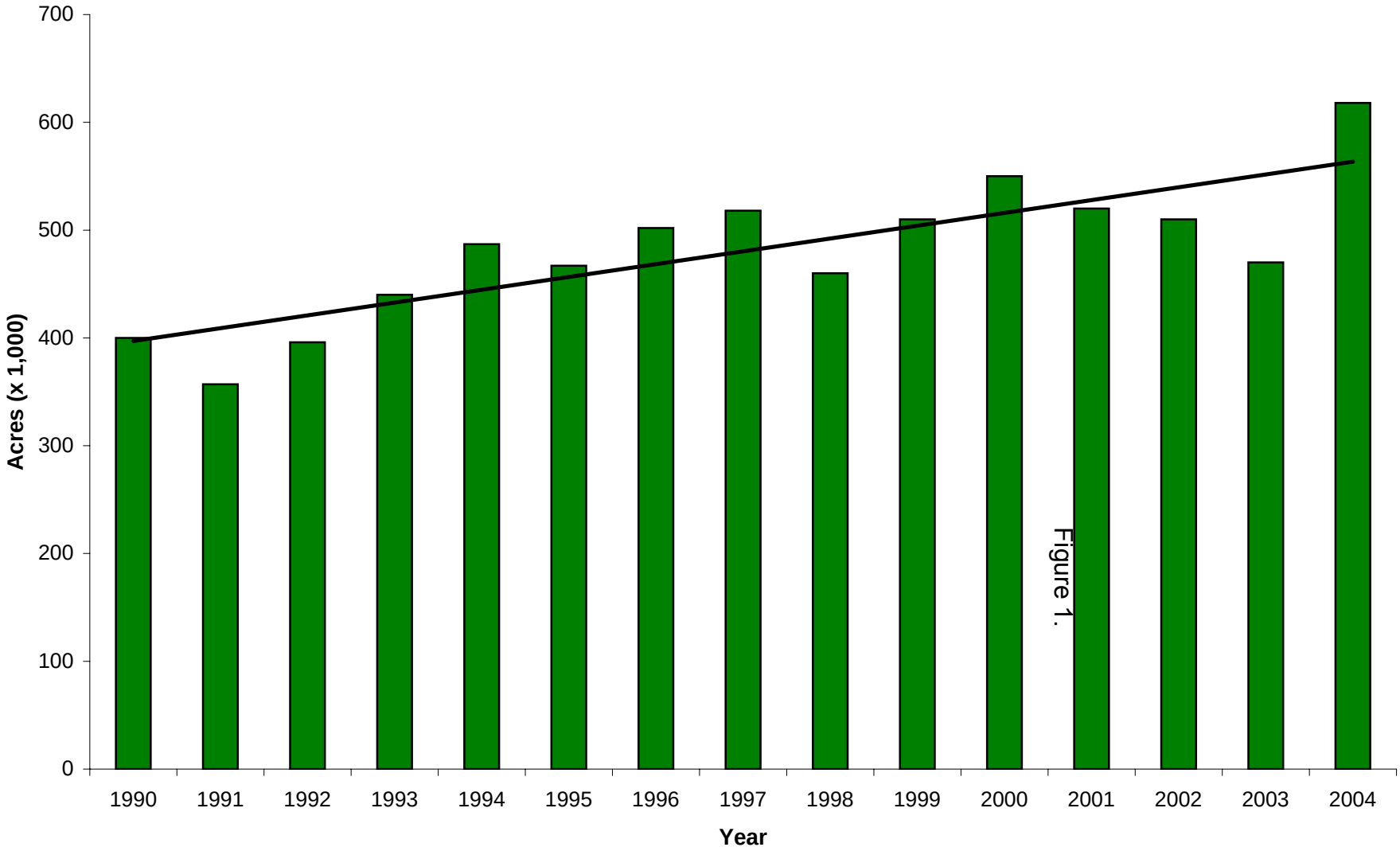

California Rice Production, 1990-2004
Acres (x 1,000)
700
600
500
400
300
200
100
0
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
Year

Figure 1.

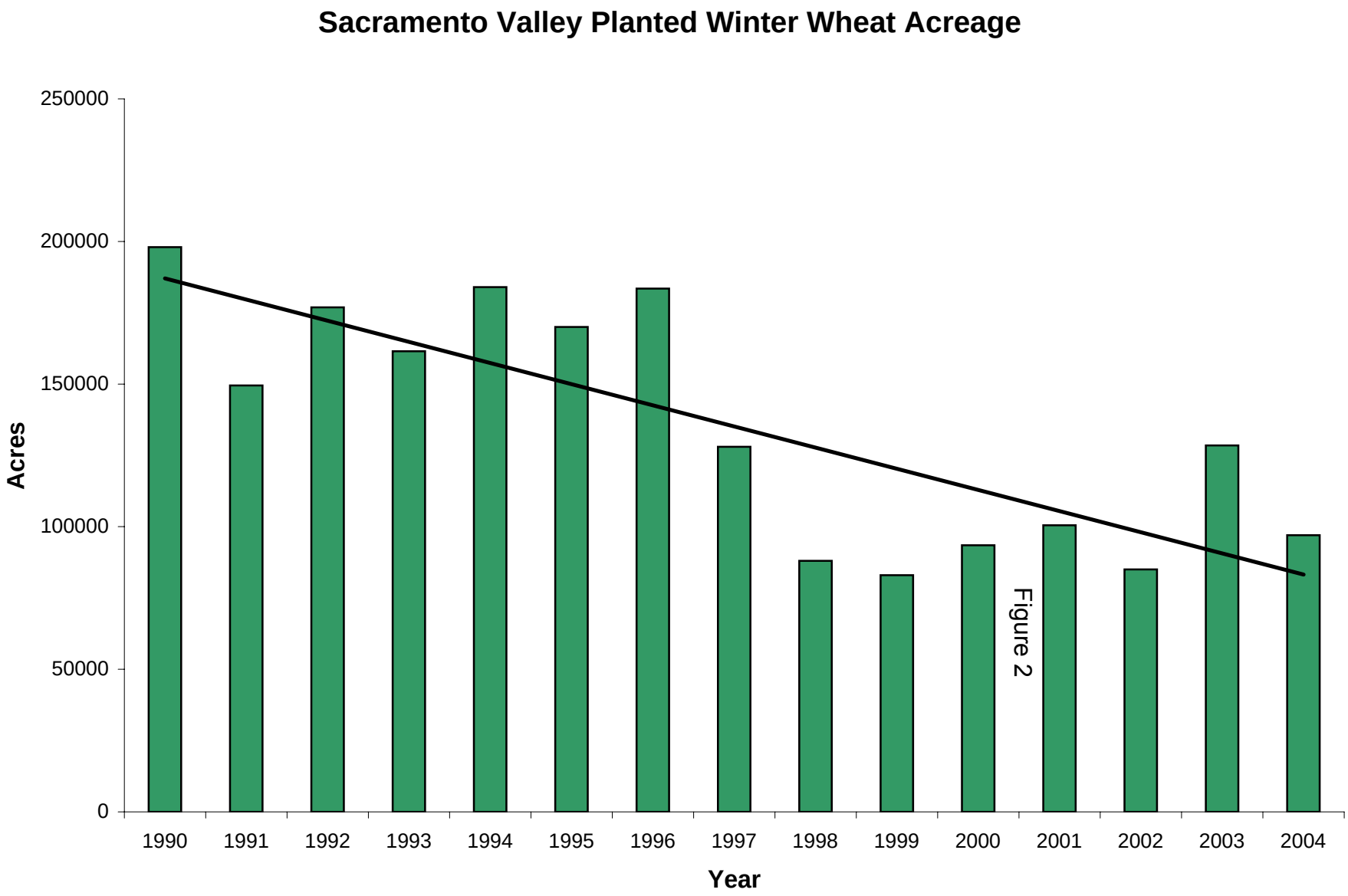
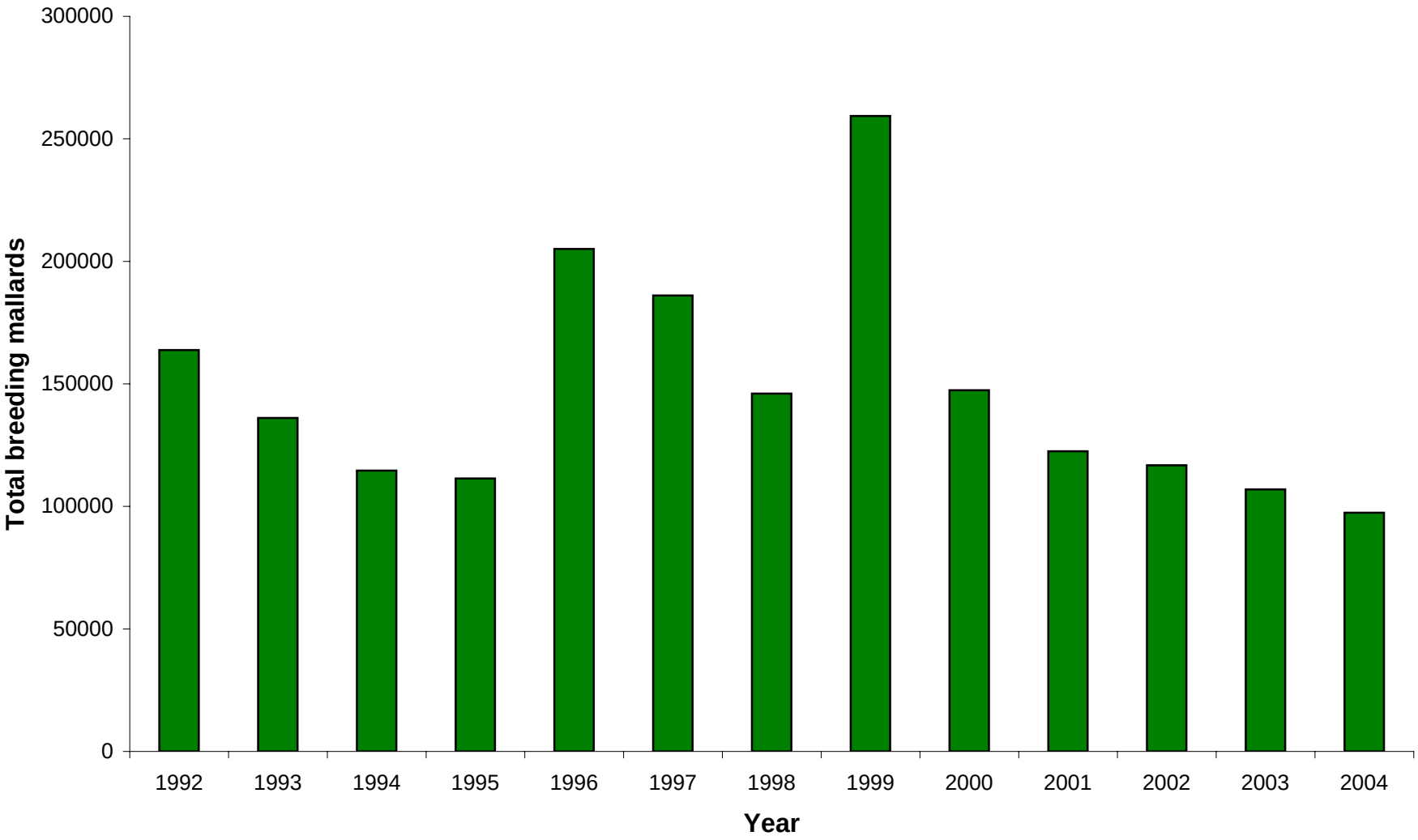

Sacramento Valley Planted Winter Wheat Acreage
250000
200000
150000
100000
50000
0
Acres
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
Year

Figure 2

## Sacramento Valley Breeding Mallard Population Estimate, 1992-2004



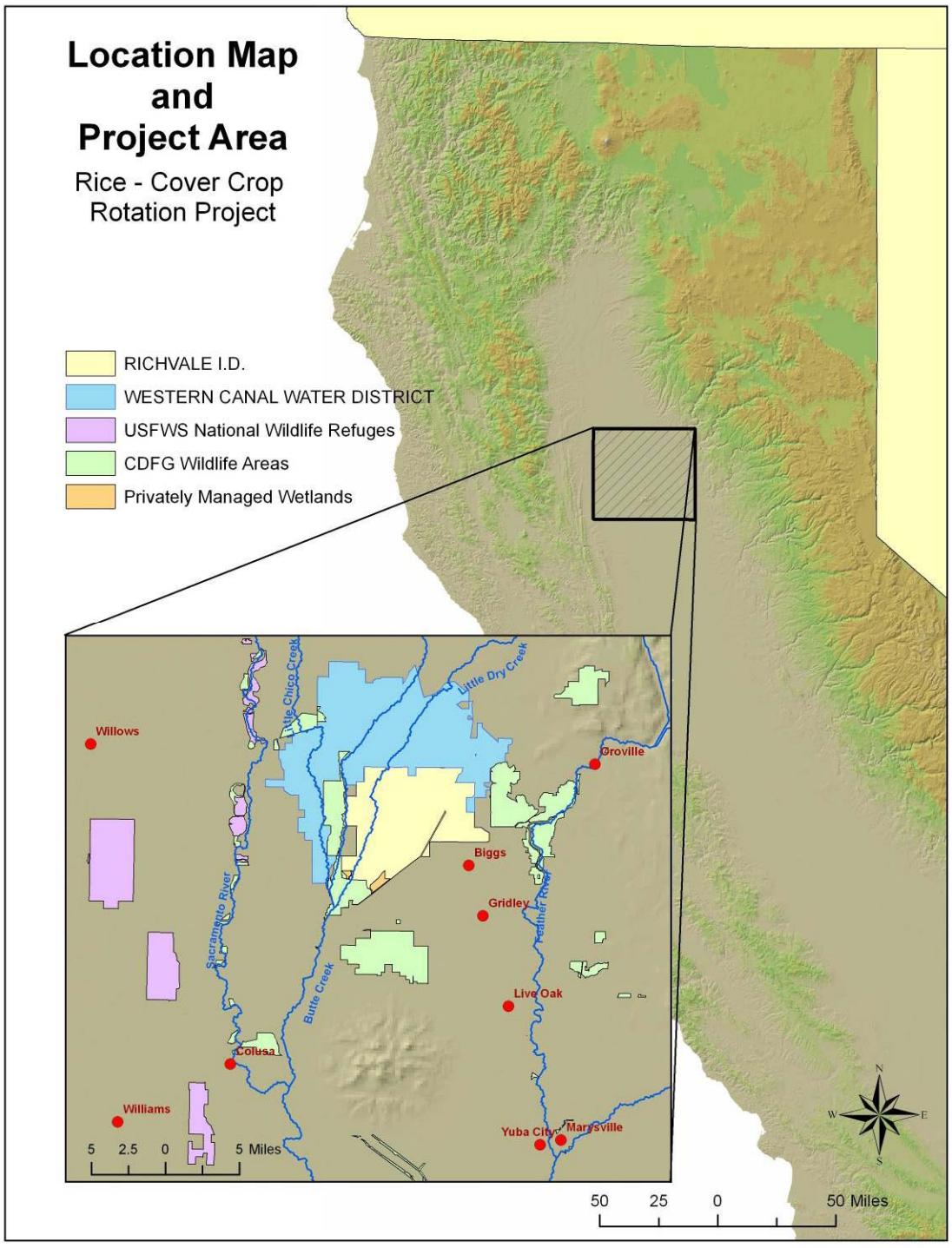
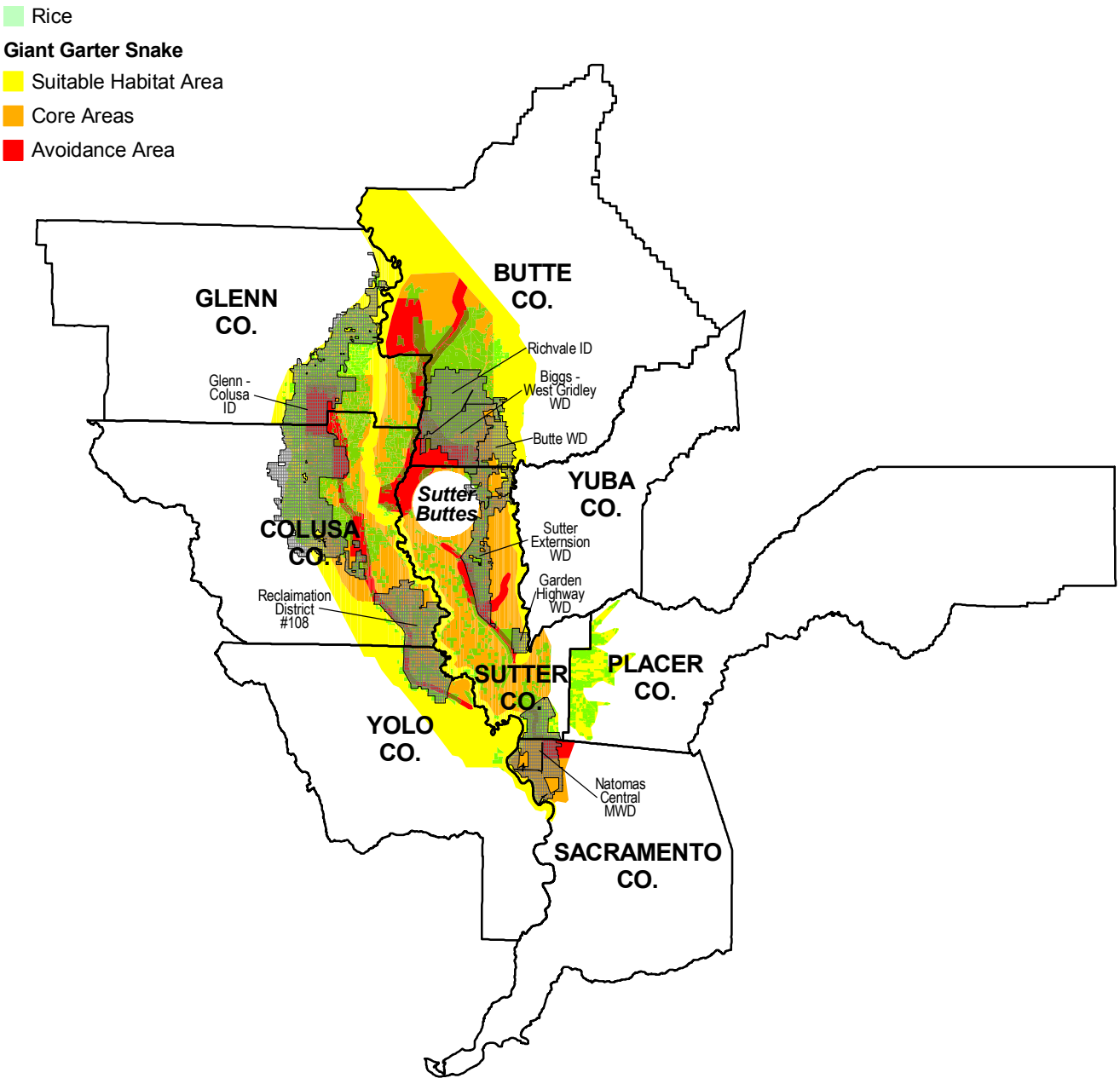

Location Map and Project Area
Rice - Cover Crop Rotation Project
RICHVALE I.D.
WESTERN CANAL WATER DISTRICT
USFWS National Wildlife Refuges
CDFG Wildlife Areas
Privately Managed Wetlands
Willows
Little Chico Creek
Little Dry Creek
Oroville
Biggs
Gridley
Feather River
Sacramento River
Butte Creek
Live Oak
Colusa
Williams
Yuba City
Marysville
5 2.5 0 5 Miles
50 25 0 50 Miles
N
W
E
S

FIGURE 4.

# Distribution of Giant Garter Snake




No Scale

Figure 5

Distribution of Giant Garter Snake


Figure 6.

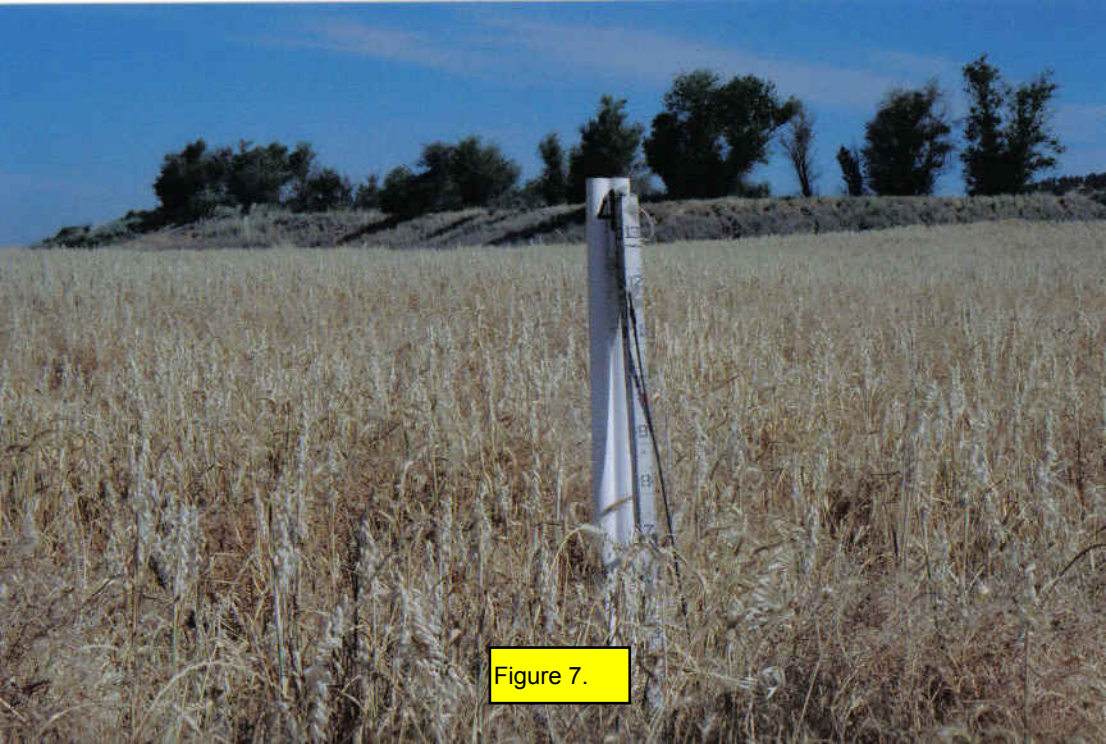


Figure 7.

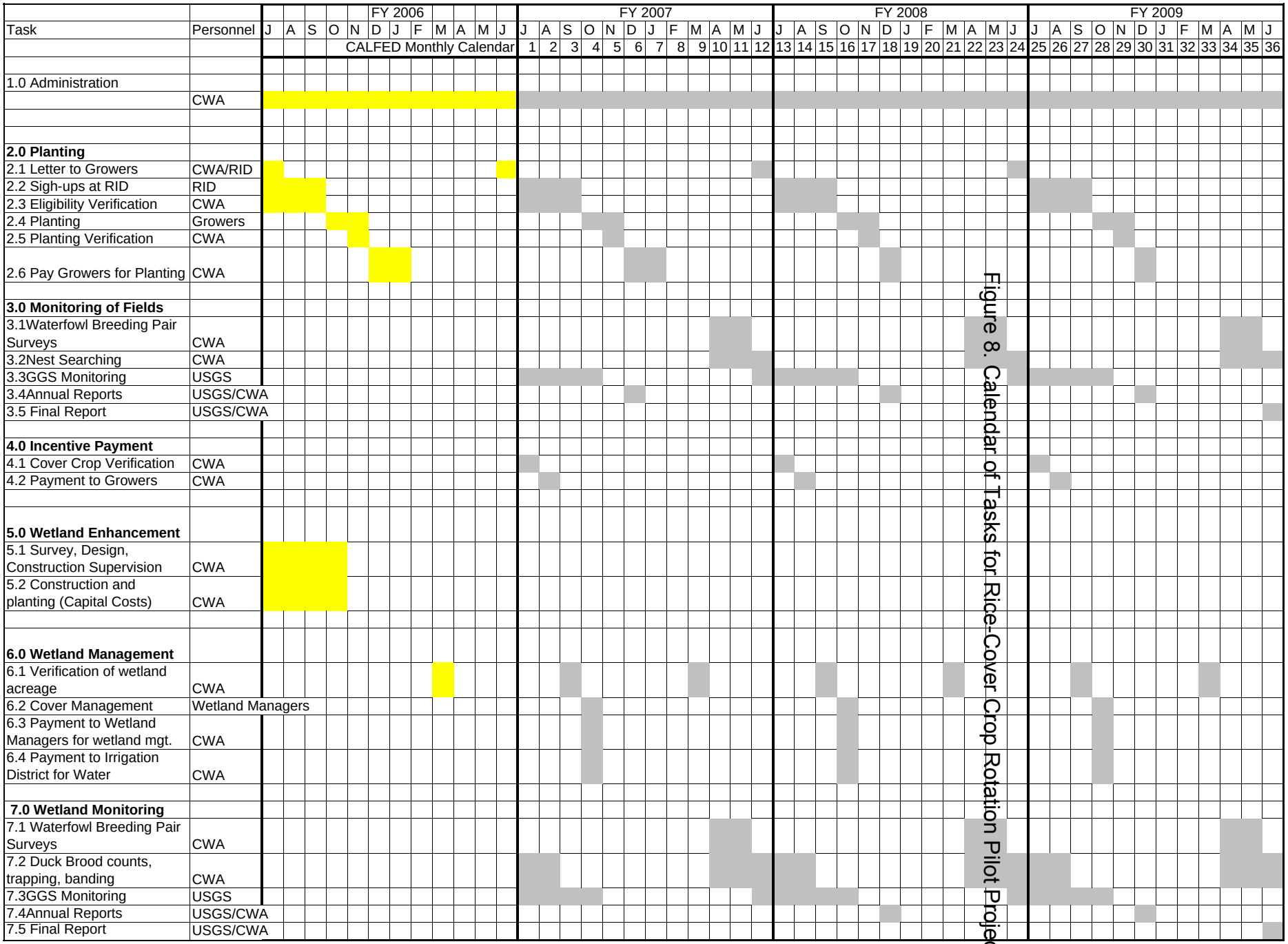



Figure 8. Calendar of Tasks for Rice-Cover Crop Rotation Pilot Project

**Attachment A**
Resume

ROBERT BRINK CAPRIOLA
128 Zinnia Way
Chico, CA 95926
(530) 892-9908 (home)
brink-capriola@sbcglobal.net

## KNOWLEDGE AND SKILLS

Versatile manager of natural resource restoration and enhancement projects with expertise in:

- Proposal writing and contract management (over $6,000,000 in grant funds)
- Wetlands project survey, design, construction and habitat management supervision (over 40 completed projects in California)
- Fish Passage improvement projects (CALFED, CVPIA Butte Creek)
- Permitting requirements including CEQA, NEPA, State Historic Preservation Act, ACOE, RWQCB, ES Consultation (FWS, NOAA), CDFG 1600, Reclamation Board
- Supervisory skills including budgeting, performance reviews, and training of employees
- Computer skills: MS Word, Excel, Project Manager, ArcView, PowerPoint
- Public speaking, fundraising, and major donor cultivation activities

## EDUCATION

**M.S. Natural Resources** Humboldt State University Arcata, California, 1996

- Thesis: Levels of Copper, Cadmium and Lead in Waterfowl Food Items at the Arcata Marsh and Wildlife Sanctuary Arcata, California.
- Concentrations: Wetlands structure and function; Construction of wetlands for water quality improvement; Wetland project development and implementation

**B.A. Cultural Anthropology** Humboldt State University Arcata, California, 1985
*Pi Gamma Mu,* Social Science Honors Society

- Concentration: Cultural and Institutional Factors Affecting International Agricultural Development.

**U.S. Navy ROTC** University of Colorado Boulder, Colorado, 1977-1978

- Concentration: Mechanical engineering

## WORK EXPERIENCE

**California Waterfowl Association**
*Senior Biologist* December 2001 - present
Current duties and responsibilities:

- Provides assistance to the department director in planning CWA's annual and long-term program objectives
- Supervises the job functions and performance of Wetland Programs staff
- Identifies potential government grant programs and pursue appropriate opportunities.
- Supervises the preparation of grant proposals in partnership with landowners and partner agencies and organizations
- Supervises the preparation, negotiation and management of contracts and grant requirements

- Completes elevational surveys, design, and construction supervision of wetland restoration and enhancement projects
- Provides progress and final reports in a timely manner to meet required grant and project deadlines
- Attends appropriate technical and partnership meetings, interagency coordination meetings, policy planning committees, and public exhibitions
- Provides technical assistance on wetland restoration, enhancement, or regulation issues to members, landowners, and agencies
- Provides detailed management plans and recording systems to landowners
- Assists department director with the preparation of the Waterfowl & Wetland Programs annual budget
- Assists department director with the preparation of reports to the Executive Committee and Board of Directors
- Makes presentations at Executive Board and committee meetings, appropriate public and professional meetings and training sessions
- Assists with presentations at fundraising events and with major donor cultivation in coordination with Fundraising and Executive staff.

*Regional Biologist-North Sacramento Valley, North Coastal Regions* 1998-2001

- Trained and supervised four wetland biologists conducting habitat restoration and enhancement projects
- Supervised the survey, design, and construction of over 15 wetland restoration and enhancement projects
- Coordinated the Lower Butte Creek Project fish passage improvement planning effort for the Butte Sink
- Managed construction of the $2,000,000 fish ladder and control structure at the Butte Creek/Sanborn Slough Bifurcation (Partners: USFWS, CALFED, DWR)
- Prepared grant proposals in partnership with landowners and other agencies and organizations (NAWCA, WCB, NRCS, CALFED, DU)
- Prepared, negotiated and managed contracts and subcontracts
- Prepared progress and final reports to meet required grant and project deadlines

*Wetland Biologist North Sacramento Valley 1997-1998*

- Conducted the survey, design, and construction of over 20 wetland restoration and enhancement projects
- Prepared progress and final reports to meet required grant and project deadlines

**President and Cofounder,** 1991 - 1996
Pacific Coast Fish, Wildlife, and Wetlands Restoration Association Arcata, California
Responsibilities:

- Identified partnership opportunities for natural resource management and restoration
- Wrote successful grant proposals for riparian and wetland restoration projects.
- Planned and permitted construction and planting activities

**Biological Technician,** GS-5 June 1996 - April 1997

U.S. Fish and Wildlife Service Humboldt Bay National Wildlife Refuge Loleta, California and Arcata Fish and Wildlife Office Arcata, California

- Conducted biological surveys and recorded data on habitat conditions
- Assisted in the construction and maintenance of managed wetlands and riparian areas
- Established and maintained riparian and wetland plants in newly restored areas
- Reviewed Biological Assessments for special-status fish species
- Conducted sampling and habitat assessment of special status fish species on the Klamath River

**Seasonal aid,** 1979 - 1981.
U.S. Forest Service, Boulder, Colorado; Sitka, Alaska; Idaho Springs, Colorado; Juneau, Alaska.

- Conducted forest management by thinning and controlled burns
- Acted as *Crew Chief* for wilderness trail construction and maintenance
- Supervised inner-city youths conducting conservation work from isolated field camps

**Humboldt Bay Decoys,** 1981 - present

- Owner and operator of decoy and waterfowl art business

## VOLUNTEER ACTIVITIES

**California Waterfowl Association** Northcoast Chapter 1982 - 1996

- Reviewed CEQA and NEPA environmental documents of proposed development projects for wetland impacts
- Reviewed and commented on management plans for state and federal wildlife areas.
- Provided testimony at public hearings on issues relating to wetland resources in Humboldt and Del Norte County.

**Chairman,** Pacific Flyway Wildfowl Festival, Sacramento, CA. 1985-1988.

- Planned and organized an annual arts exhibition and competition with a budget of approximately $50,000/year.
- Supervised approximately 25 volunteer committee heads.
- Reported to the board of directors on a quarterly basis.

## HOBBIES AND INTERESTS

- Clay shooting, waterfowl, upland, and big game hunting, fresh and saltwater fishing
- Carving of working decoys
- Evolutionary biology and natural history of humans and hunting
- Hunting ethics, fair chase, and the role of sportsmen in conservation
- Trends and opportunities in philanthropy

**References available on request.**

## Attachment B

### Glenn Wylie Resume

**Glenn D. Wylie** is a research wildlife biologist for the USGS-BRD Western Ecological Research Center at the Dixon Field Station. He has broad training and experience in wetland ecology and has been the project leader for the Giant Garter Snake Initiative since 1995 when the Initiative was begun by the National Biological Service. This project has identified giant garter snake population centers in the Sacramento Valley and has generated new information on their biology and ecology, including demography and seasonal habitat use and movements. Current projects include monitoring giant garter snakes and evaluating their response to a wetland restoration at Colusa NWR, funded by the CVPIA, evaluating the response of giant garter snakes to levee maintenance methods funded by the U.S. Army Corps of Engineers, and assessing the distribution and abundance of giant garter snakes in Solano County funded by the Solano County Water Agency.

**Address**:
Western Ecological Research Center
U.S. Geological Survey, Biological Resources Division
Dixon Field Station
6924 Tremont Road
Dixon, California 95620
(707) 678-0682
(707) 678-5039 fax
email: glenn_wylie@usgs.gov

**Experience**:

Principal investigator in a study of the biology and habitat use study of giant garter snakes (*Thamnophis sirtalis*) in the Sacramento Valley (1994 to present).
Principal investigator in a study of migratory bird use of harvested rice fields in relation to post-harvest agricultural treatments (1993 to 1997).
Co-principal investigator in a study of wetland restoration in San Pablo Bay using GIS (1993 to present).
Co-principal investigator in a study of the population viability of the San Pablo song sparrow (1994 to 1995).

**Selected Publications**:

Paquin, M.M., **G.D. Wylie,** and E. Routman. (in press). Population structure of giant garter snakes (*Thamnophis gigas*). Conservation Genetics.

**Wylie, G.D.,** and M.L. Casazza. (in press). *Thamnophis gigas* (giant garter snake). Catfish Mortality. Herpetological Review.

**Wylie, G.D.**, M.L. Casazza, and M. Carpenter. 2003. Diet of bullfrogs in relation to predation on giant garter snakes at Colusa National Wildlife Refuge. California Fish and Game 89(3): 139-145.

Casazza, M.L., **G.D. Wylie**, and C.J. Gregory. 2000. A funnel trap modification for surface collection of aquatic amphibians and reptiles. Herpetological Review 31(2), 91-92.

Miller, M.R., and **G.D. Wylie**. 1996. Preliminary estimate of rice present in strip-harvested fields in the Sacramento Valley, California. California Fish and Game 82(4): 187-191.

**Selected Reports:**

Wylie, G.D., and L.L. Martin. 2004. Surveys for giant garter snakes on USFWS Partners for Fish and Wildlife project sites: final report. USGS-BRD, Western Ecological Research Center, Dixon Field Station, 31 pp.

Wylie, G.D., and L.L. Martin. 2004. Results of 2004 monitoring for giant garter snakes (*Thamnophis gigas*) for the bank protection project on the left bank of the Colusa Basin Drainage Canal in Reclamation District 108, Sacramento River Bank Protection Project, Phase II. USGS-BRD, Western Ecological Research Center, Dixon Field Station, 22 pp.

Wylie, G.D., and L.L. Martin. 2004. Surveys for giant garter snakes in Solano County: 2004 report. USGS-BRD, Western Ecological Research Center, Dixon Field Station, 25 pp.

Wylie, G.D., and L.L. Martin. 2003. Results of 2003 monitoring for giant garter snakes (*Thamnophis gigas*) for the bank protection project on the left bank of the Colusa Basin Drainage Canal in Reclamation District 108, Sacramento River Bank Protection Project, Phase II. USGS-BRD, Western Ecological Research Center, Dixon Field Station, 18 pp.

Wylie, G.D., M.L. Cazazza, L.L. Martin, and M. Carpenter. 2004. Monitoring giant garter snakes at Colusa National Wildlife Refuge: 2004 progress report. USGS-BRD, Western Ecological Research Center, Dixon Field Station, 18 pp.

Wylie, G.D., M.L. Cazazza, L.L. Martin, and M. Carpenter. 2003. Monitoring giant garter snakes at Colusa National Wildlife Refuge: 2003 progress report. USGS-BRD, Western Ecological Research Center, Dixon Field Station, 16 pp.

Wylie, G.D., M.L. Cazazza, and M. Carpenter. 2002. Monitoring giant garter snakes at Colusa National Wildlife Refuge: 2000 progress report. USGS-BRD, Western Ecological Research Center, Dixon Field Station, 15 pp.

Wylie, G.D., M.L. Cazazza, and M. Carpenter. 2001. Monitoring giant garter snakes at Colusa National Wildlife Refuge: 2000 progress report. USGS-BRD, Western Ecological Research Center, Dixon Field Station, 15 pp.

Wylie, G.D., and M.L. Casazza. 2001. Investigations of giant garter snakes in the Natomas Basin: 2000 field season progress report. USGS-BRD, Western Ecological Research Center, Dixon Field Station, 13 pp.

Wylie, G.D., and M.L. Casazza. 2000. Investigations of giant garter snakes in the Natomas Basin: 2000 field season progress report. USGS-BRD, Western Ecological Research Center, Dixon Field Station, 13 pp.

Wylie, G.D., M.L. Casazza, and N.M. Carpenter. 2000. Monitoring giant garter snakes at Colusa National Wildlife Refuge: 2000 progress report. USGS-BRD, Western Ecological Research Center, Dixon Field Station, 14 pp.

Wylie, G.D., M.L. Casazza. 2000. Investigations of giant garter snakes in the Natomas Basin: 1998-1999. Final report. USGS-BRD, Western Ecological Research Center, Dixon Field Station, 18 pp.

Wylie, G.D., M.L. Casazza, E. Burns, M. Paquin, J. Daugherty. 1997. Surveys for giant garter snakes (*Thamnophis gigas*) at Stone Lakes National Wildlife Refuge. Final report. USGS-BRD, Western Ecological Research Center, Dixon Field Station, 6 pp.

**Selected Presentations**:

Wylie, G.D., and L.L. Martin 2005. Habitat use and movements of giant garter snakes in the Colusa Basin Drain. Annual meeting of The Wildlife Society, Madison, WI.

Wylie, G.D., M.L. Casazza, and M. Carpenter. 2004. Bullfrog predation of giant garter snakes at Colusa National Wildlife Refuge. Annual meeting of The Wildlife Society, Calgary, AB.

Wylie, G.D., and M.L. Casazza. 2003. Habitat preferences of giant garter snakes in the Sacramento Valley. Annual meeting of The Wildlife Society, Burlington, VT.

Wylie, G.D., and M.L. Casazza. 2001. Response of giant garter snakes to wetland restoration at Colusa National Wildlife Refuge. Annual meeting of The Wildlife Society, Reno, NV.

Wylie, G.D., and T. Graham. 1997. Habitat use and movements of giant garter snakes in the Sacramento Valley. Fourth Annual Conference of The Wildlife Society, Snowmass Village, CO.

# Tasks And Deliverables

| Task ID | Task Name | Start Month | End Month | Personnel Involved | Deliverables |
|---|---|---|---|---|---|
| 1 | Administraton | 1 | 36 | Capriola, Robert<br>Loughman, Dan | 1. Periodic budget and project reports to administering agencies documenting progress and milestones for all tasks below. |
| 2 | Planting | 1 | 30 | Capriola, Robert<br>Loughman, Dan<br>GPS/GIS mapping technician, CWA | 1. Signed agreements from each grower detailing areas to be planted, terms of the planting and cover-crop incentive program, and provisions for access to their property for verification and monitoring.. Due by October 1 of 2007, 2008, 2009. 2. Map of Richvale Irrigation |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | District and electronic copy of shapefiles showing boundaries of planted cover crop fields. Due on December 31 of 2007, 2008, 2009 |
| 3 | Monitoring Fields for GGS and Grassland Dependent species | 6 | 36 | Loughman, Dan Wylie, Glenn D. Casazza, Michael CWA Field Crew, Monitoring USGS Field Crew (Subcontractor), Monitoring Laughlin, Jim | 1. Annual Monitoring reports will be completed prior to December 31st of 2008, 2009, 2010. GGS reports by subcontractor Wylie, Casazza 2. One Final monitoring report will be completed prior to December 31st of 2010 |
| 4 | Incentive Payment for Cover Crops | 13 | 36 | Capriola, Robert GPS/GIS mapping technician, CWA | 1. Map of Richvale Irrigation District and electronic copy of shapefiles showing boundaries of grown cover crop fields. |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | Due on August 1 of 2008, 2009, 2010 |
| 5 | Wetland Restoration (Matching Contribution) | 1 | 2 | Capriola, Robert Loughman, Dan GPS/GIS mapping technician, CWA | 1. Location map showing relationship between cover−crop fields and restored wetlands. Due on March 1 of 2008, 2009, 2010 |
| 6 | Wetland Management | 1 | 36 | Capriola, Robert GPS/GIS mapping technician, CWA | 1. Map and shapefiles describing pond borders mapped in March and September of 2008, 2009, 2010. |
| 7 | Wetland Monitoring | 1 | 36 | Loughman, Dan Wylie, Glenn D. Casazza, Michael CWA Field Crew, Monitoring USGS Field Crew (Subcontractor), Monitoring Laughlin, Jim | 1. Annual Monitoring reports will be completed by CWA and USGS prior to December 31st of each year of the three year program 2. One Final monitoring report will be completed prior to December 31st GGS reports by Subcontractos |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | **Wylie, Casazza** |

# Total Project Budget Summary by Task and by Fiscal Year



Note: This budget summary **automatically links** to the costs and totals on the **"Budget Detail"** worksheet.
**DO NOT CHANGE FORMULAS OR ENTER NUMBERS INTO ANY CELLS EXCEPT THE SHADED CELLS** for "Cost Share" and "Other Matching Funds"

| BUDGET SUMMARY | Total Amount for Year 1 | Total Amount for Year 2 | Total Amount for Year 3 | Total Amount for All Years |
|---|---|---|---|---|
| **Total Costs for Task One** | $ 19,346.10 | $ 14,073.05 | $ 14,073.05 | $ 47,492.21 |
| **Total Costs for Task Two** | $ 133,754.30 | $ 127,632.77 | $ 110,949.61 | $ 372,336.68 |
| **Total Costs for Task Three** | $ 117,301.02 | $ 101,184.68 | $ 102,685.84 | $ 321,171.55 |
| **Total Costs for Task Four** | $ 132,698.41 | $ 133,152.81 | $ 133,542.30 | $ 399,393.52 |
| **Total Costs for Task Five** | $ - | $ - | $ - | $ - |
| **Total Costs for Task Six** | $ 74,374.09 | $ 74,666.21 | $ 74,893.41 | $ 223,933.72 |
| **Total Costs for Task Seven** | $ 95,312.85 | $ 94,705.35 | $ 94,705.35 | $ 284,723.55 |
| **Total Costs for Task Eight** | $ - | $ - | $ - | $ - |
| **Total Costs for Task Nine** | $ - | $ - | $ - | $ - |
| **Total Costs for Task Ten** | $ - | $ - | $ - | $ - |
| **Total Costs for Task Eleven** | $ - | $ - | $ - | $ - |
| **Total Costs for Task Twelve** | $ - | $ - | $ - | $ - |
| **Total Costs for Task Thirteen** | $ - | $ - | $ - | $ - |
| **Total Costs for Task Fourteen** | $ - | $ - | $ - | $ - |
| **Total Costs for Task Fifteen** | $ - | $ - | $ - | $ - |
| | | | | |
| **Total Costs for Project Tasks** | $ 572,786.78 | $ 545,414.88 | $ 530,849.57 | $ 1,649,051.23 |
| | | | | |
| **1/Cost Share** | $ 327,586.00 | $ - | $ - | $ 327,586.00 |
| **2/ Other Matching Funds** | $ - | $ - | $ - | $ - |

1/ *Cost share funds* are specifically dedicated to your project and can include private and other State and Federal grants. Any funds listed in this line must be further described in the text of your proposal (see Chapter 3, Section D, of the PSP document)

2/ *Other matching funds* include other funds invested consistent with your project in your project area for which the ERP grant applicant is not eligible. Any funds listed in this line must be further described in the text of your proposal (see Chapter 3, Section D, of the PSP document)

# Environmental Compliance

## CEQA Compliance

Which type of CEQA documentation do you anticipate?
− none *Skip the remaining questions in this section.*
− negative declaration or mitigated negative declaration
− EIR
**X** categorical exemption *A categorical exemption may not be used for a project which may which may cause a substantial adverse change in the significance of a historical resource or result in damage to scenic resources within an officially designated state scenic highway.*

If you are using a categorical exemption, choose all of the applicable classes below.

**X** Class 1. Operation, repair, maintenance, permitting, leasing, licensing, or minor alteration of existing public or private structures, facilities, mechanical equipment, or topographical features, involving negligible or no expansion of use beyond that existing at the time of the lead agency's determination. The types of "existing facilities" itemized above are not intended to be all−inclusive of the types of projects which might fall within Class 1. The key consideration is whether the project involves negligible or no expansion of an existing use.

− Class 2. Replacement or reconstruction of existing structures and facilities where the new structure will be located on the same site as the structure replaced and will have substantially the same purpose and capacity as the structure replaced.

− Class 3. Construction and location of limited numbers of new, small facilities or structures; installation of small new equipment and facilities in small structures; and the conversion of existing small structures from one use to another where only minor modifications are made in the exterior of the structure. The numbers of structures described in this section are the maximum allowable on any legal parcel, except where the project may impact on an environmental resource of hazardous or critical concern where designated, precisely mapped, and officially adopted pursuant to law by federal, state, or local agencies.

**X** Class 4. Minor public or private alterations in the condition of land, water, and/or vegetation which do not involve removal of healthy, mature, scenic trees except for forestry or agricultural purposes, except where the project may impact on an environmental resource of hazardous or critical concern where designated, precisely mapped, and officially adopted pursuant to law by federal, state, or local agencies.

**X** Class 6. Basic data collection, research, experimental management, and resource evaluation activities which do not result in a serious or major disturbance to an environmental resource, except where the project may impact on an environmental resource of hazardous or critical concern where designated, precisely mapped, and officially adopted pursuant to law by federal, state, or local agencies. These may be strictly for information gathering purposes, or as part of a study leading to an action which a public agency has not yet approved, adopted, or funded.

– Class 11. Construction, or placement of minor structures accessory to (appurtenant to) existing commercial, industrial, or institutional facilities, except where the project may impact on an environmental resource of hazardous or critical concern where designated, precisely mapped, and officially adopted pursuant to law by federal, state, or local agencies.

Identify the lead agency.
**CA Department of Fish and Game**
*Please write out all words in the agency title other than United States (Use the abbreviation "US".) and California (Use the abbreviation "CA".).*

Is the CEQA environmental impact assessment complete?
**No.**

If the CEQA environmental impact assessment process is complete, provide the following information about the resulting document.

**Document Name**

**State Clearinghouse Number**

If the CEQA environmental impact assessment process is not complete, describe the plan for completing draft and/or final CEQA documents.

**CEQA EA will be completed by DFG once the project is funded and prior to begining work on the ground requiring compliance (restoration and data collection)**

# NEPA Compliance

Which type of NEPA documentation do you anticipate?
– none *Skip the remaining questions in this section.*
– environmental assessment/FONSI
– EIS

**X** categorical exclusion

Identify the lead agency or agencies.

**US Fish and Wildife Service**

*Please write out all words in the agency title other than United States (Use the abbreviation "US".) and California (Use the abbreviation "CA".).*

If the NEPA environmental impact assessment process is complete, provide the name of the resulting document.

If the NEPA environmental impact assessment process is not complete, describe the plan for completing draft and/or final NEPA documents.

**The NEPA process will be completed by USFWS once funding is received and prior to begining work requiring compliance.**

Successful applicants must tier their project's permitting from the CALFED Record of Decision and attachments providing programmatic guidance on complying with the state and federal endangered species acts, the Coastal Zone Management Act, and sections 404 and 401 of the Clean Water Act.

Please indicate what permits or other approvals may be required for the activities contained in your proposal and also which have already been obtained. Please check all that apply. If a permit is *not* required, leave both Required? and Obtained? check boxes blank.

| Local Permits And Approvals | Required? | Obtained? | Permit Number (If Applicable) |
|---|---|---|---|
| conditional Use Permit | – | – | |
| variance | – | – | |
| Subdivision Map Act | – | – | |
| grading Permit | – | – | |
| general Plan Amendment | – | – | |
| specific Plan Approval | – | – | |

| | | | |
|---|---|---|---|
| rezone | – | – | |
| Williamson Act Contract Cancellation | – | – | |
| other | – | – | |

| State Permits And Approvals | Required? | Obtained? | Permit Number (If Applicable) |
|---|---|---|---|
| scientific Collecting Permit | X | – | |
| CESA Compliance: 2081 | X | – | |
| CESA Complance: NCCP | – | – | |
| Lake Or Streambed Alteration Agreement | – | – | |
| CWA 401 Certification | – | – | |
| Bay Conservation And Development Commission Permit | – | – | |
| reclamation Board Approval | – | – | |
| Delta Protection Commission Notification | – | – | |
| state Lands Commission Lease Or Permit | – | – | |
| action Specific Implementation Plan | – | – | |
| SWRCB Water Transfer Approval | – | – | |
| other | – | – | |

| Federal Permits And Approvals | Required? | Obtained? | Permit Number (If Applicable) |
|---|---|---|---|
| ESA Compliance Section 7 Consultation | – | – | |
| ESA Compliance Section 10 Permit | – | – | |
| Rivers And Harbors Act | – | – | |
| CWA 404 | – | – | |
| other | – | – | |

| Permission To Access Property | Required? | Obtained? | Permit Number (If Applicable) |
|---|---|---|---|
| | – | – | |

| | | | |
|---|---|---|---|
| **permission To Access City, County Or Other Local Agency Land Agency Name** | | | |
| **permission To Access State Land Agency Name**<br><br>**California Department Of Fish And Game** | **X** | **–** | |
| **permission To Access Federal Land Agency Name** | **–** | **–** | |
| **permission To Access Private Land Landowner Name**<br><br>**Various Private Landowners** | **X** | **–** | |

If you have comments about any of these questions, enter them here.

**Different landowners may participate on a year to year basis. All landowners have not been identified at the time of submittal. Access agreements will be secured prior to begining work on each property.**

# Land Use

Does the project involve land acquisition, either in fee or through easements?
**X** No. *Skip to the next set of questions.*
**–** Yes. *Answer the following questions.*

How many acres will be acquired by fee?

How many acres will be acquired by easement?

Describe the entity or organization that will manage the property and project activities, including operation and maintenance.

Is there an existing plan describing how the land and water will be managed?
**–** No.
**–** Yes. *Cite the title and author or describe briefly.*

Will the applicant require access across to or through public or private property that the applicant does not own to accomplish the activities in the proposal?
**–** No. *Skip to the next set of questions.*
**X** Yes. *Answer the following question.*

Describe briefly the provisions made to secure this access.

**Letters granting access from landowners will be acquired by CWA after funding, prior to begining the implementation of the project.**

Do the actions in the proposal involve physical changes in the current land use?
**X** No. *Skip to the next set of questions.*
**–** Yes. *Answer the following questions.*

Describe the current zoning, including the zoning designation and the principal permitted uses permitted in the zone.

Describe the general plan land use element designation, including the purpose and uses allowed in the designation.

Describe relevant provisions in other general plan elements affecting the site, if any.

Is the land mapped as Prime Farmland, Farmland of Statewide Importance, Unique Farmland, or Farmland of Local Importance under the California Department of Conservation's Farmland Mapping and Monitoring Program?
**–** No. *Skip to the next set of questions.*
**X** Yes. *Answer the following questions.*

| Land Designation | Acres | Currently In Production? |
|---|---|---|
| **Prime Farmland** | **1000** | **X** |
| **Farmland Of Statewide Importance** | | **–** |
| **Unique Farmland** | | **–** |
| **Farmland Of Local Importance** | | **–** |

Is the land affected by the project currently in an agricultural preserve established under the Williamson Act?
**–** No. *Skip to the next set of questions.*
**X** Yes. *Answer the following question.*

Is the land affected by the project currently under a Williamson Act contract?
**–** No. *Skip to the next set of questions.*
**X** Yes. *Answer the following question.*

Why is the land use proposed consistent with the contract's terms?

**agricultural crops will continue to be grown on the properties**

Describe any additional comments you have about the projects land use.

**rice will be grown in rotation with a cover-crop, thus increasing the agricultural and resource benefits of the land**