Summary Information

California State Coastal Conservancy

Near−field and Far−field Effects of Tidal Wetland Restoration in the Lower Napa River

Amount sought: $2,731,376

Duration: 36 months

Lead investigator: Mr. John Takekawa, USGS

Short Description

This project will monitor the effects of a large (3,900 ha) NSMR Project, and determine its effects on a relatively small (28 km long) Napa River Estuary. This ecosystem provides a unique opportunity to assess the effect of restoration actions on an undammed river, including the ability to contribute to recovery of at−risk fish species and other populations. This project wil use a BACI (before−after, control−impact) sampling framework to determine changes in restored ponds in the Restoration Project, as well as to examine near−field and far−field effects in wetlands in the Napa River Estuary. This project will also measure changes in physical processes and biological responses.

Executive Summary

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The primary goal of the CALFED Ecosystem Restoration Program (ERP) is to improve ecological functions of the San Francisco Bay (SFB) estuary. Many of the projects supported by the ERP have included restoration of diked baylands, including the Calfed construction grant provided for the Napa River Salt Marsh Restoration (NSMR) Project (#31). Most current wetland restoration monitoring is focused on individual projects rather than larger scale ecosystems. Exceptions include the Calfed Breaches and Integrated Regional Wetland Monitoring (IRWM) studies that are conducted across the Bay−Delta ecosystem. However, our proposed study is unique, because we plan to monitor the effects of a large (3,900 ha) NSMR Project, but also determine its effects on a relatively small (28 km long) Napa River Estuary. The Napa River supports critical populations including Sacramento splittail, steelhead, and Delta smelt as well as numerous migratory birds. However unlike the Delta, this ecosystem provides a unique opportunity to assess the effect of restoration actions on an undammed river, including the ability to contribute to recovery of at−risk fish species and other populations. We will use a BACI (before−after, control−impact) sampling framework to determine changes in restored ponds in the Restoration Project, as well as to examine near−field and far−field effects in wetlands in the Napa River Estuary. We will measure changes in physical processes and biological responses. If we want to predict restoration changes at the Bay−Delta level created by the Calfed ERP, we have an ideal situation to undertake that investigation and to observe changes as this large restoration project is initiated. Thus, our primary hypotheses are: Do perturbations in physical processes caused by a large tidal marsh restoration result in detectable physical and biological responses in a small river estuary? And if so, do near−field and far−field effects vary from downstream to upstream of the project site?

Near-Field and Far-Field Effects of Tidal Wetland Restoration in the Lower Napa River

A. PROJECT DESCRIPTION: PROJECT GOALS AND SCOPE OF WORK

The CALFED Ecosystem Restoration Program has provided a grant to the California Coastal Conservancy (Conservancy) for the design, monitoring, and construction of approximately 3,000 acres (1,200 ha) of tidal marsh restoration at the Napa Salt Marsh Restoration (NSMR) Project (Fig. 1). This tidal marsh restoration provides a unique opportunity to monitor the effects of a large restoration project on the ecology of a small undammed estuary, the lower Napa River. Our study will focus on monitoring near-field and far-field effects of early project restoration on tidal marshes upstream and downstream along the river corridor. It provides an opportunity to understand physical processes on the regional or estuary scale, as well as examining biological responses to those physical changes. Those changes may be apparent in vagile species such as fishes and birds that can respond quickly to habitat changes created by alteration of the tidal prism, salinity, and circulation of the estuary.

The Conservancy and DFG, in association with the U.S. Geological Survey (USGS), the University of California at Davis (UCD), the Watershed Information Center and Conservancy of Napa County (WICC), Napa Resource Conservation District, Philip Williams and Associates (PWA), Jones & Stokes Associates (JSA) and Stillwater Sciences, Inc. (SSI) are proposing to implement a comprehensive regional monitoring program that will assess ecosystem-wide restoration effects and responses. The monitoring program will build on existing project-specific monitoring for the NSMR and other restoration projects along Napa River, expand monitoring to ecologically significant areas along the river corridor, and be closely coordinated with the CALFED-funded Integrated Regional Wetlands Monitoring (IRWM) Pilot Program currently underway.

A.1 Problem, Goals, and Objectives

This section first discusses the status of the previously funded restoration actions that will be addressed by the proposed study, and then describes the problem that this proposal addresses, and then provides the goals and objectives for the restoration actions proposed for monitoring.

A.1.1 Status of the Previously Funded Restoration Actions Proposed for Monitoring and Evaluation

This study area includes several restoration projects funded by CALFED and others. A description and the status of the primary restoration project follows and related restoration projects are in Attachment 1.

Napa Sonoma Marsh Restoration (NSMR) Project (ERP-02-P04-D)

The NSMR property was purchased from Cargill, Inc. in 1994 by the State of California. Restoration planning was completed in 2003, and the USACOE is currently preparing a Chief's Report. The Conservancy and USCOE prepared a Chief's report for Nov 2004. The

Conservancy and California Department of Fish and Game (DFG) have obtained a Waste Discharge Requirements Order (WDR) and Water Quality Certification from the Regional Water Quality Control Board, San Francisco Bay Region (RWQCB). The Napa Sonoma Marsh Restoration Project (Restoration Project) (ERP-02-P04-D) funded partial construction and baseline planning information for the Lower Ponds (Ponds 1, 1A, 2, and 3-5), with 75% of construction costs for Ponds 3-5 projected to come from the Wildlife Conservation Board. Bay Conservation and Development Commission (BCDC) and USACOE permits are in review and design completion is scheduled for 12/2004. In this grant, we will conduct pre- and post-construction restoration monitoring, while including sites downstream, adjacent, and upstream of the NSMR Project (Fig. 1: hereafter Restoration Project) to examine near-field and far-field effects.

A.1.2 Problem

The primary goal of the CALFED Ecosystem Restoration Program (ERP) is to improve ecological functions of the San Francisco Bay (SFB) estuary. Many of the projects supported by the ERP have included restoration of diked baylands, including the CALFED construction grant provided for the Restoration Project (#31). Most current wetland restoration monitoring is focused on individual projects rather than larger scale ecosystems. Exceptions include the CALFED Breaches and Integrated Regional Wetland Monitoring (IRWM) studies that are conducted across the Bay-Delta ecosystem. However, our proposed study is unique, because we plan to not only monitor the effects of a large restoration project, but also determine its effects an entire Napa River Estuary (Estuary) Napa River Estuary (Estuary). Unlike the Delta, this ecosystem provides a unique opportunity to assess the effect of restoration actions on an undammed river, including the ability of such actions to contribute to recovery of at-risk fish species. Relevant studies that document the problem are shown in Table A.1.2-1.

The Napa River watershed (1103 km^2) is fed by 47 tributaries and extends 89 km from Mt. St. Helena to San Pablo Bay at the Carquinez Strait (Fig. 2). The lower section of the river corridor below the City of Napa (Trancas Street) is an estuarine system with seasonally and tidally varying salinity. Boundaries for the study are from San Pablo Bay in the south to Napa (Trancas Street -- extent of saltwater) in the north, and the watershed boundary from the baylands east of the river to Napa Slough in the west (Fig. 3). The Restoration Project site is managed by the DFG, and 3 former salt evaporation ponds (Ponds 3, 4, and 5) will be opened to tidal flow along the river and in adjacent sloughs.

Monitoring will occur in the Restoration Project, as well as in wetlands along the Estuary (Fig. 4). We will take advantage of existing datasets from several monitoring efforts and sample a gradient of tidal marshes along the Estuary, including four tidal marshes downstream (Mare Island Causeway), adjacent (White Slough, American Canyon), and upstream (Coon Island – coordinated with IRWM, Fagan Marsh, Bull Island – coordinated with IRWM, South Wetlands Opportunity Area) of the Restoration Project to examine pre- (prior to 2006) and post-construction changes (2007-2008). We will use a BACI (before-after, control-impact) sampling framework to determine changes in restored ponds in the Restoration Project (Fig. 1), as well as to examine near-field and far-field effects in wetlands in the Estuary (Fig. 1). CALFED funding is needed to support the monitoring integration from the Restoration Project level to the Estuary scale.

A.1.3 Goals and Objectives

Our goal is to examine the linkage between changes in physical processes and the biological responses created by a tidal marsh restoration project at the larger ecosystem scale. This proposal directly addresses a major question of the CALFED ERP program – what is the larger scale effect of several tidal marsh restoration projects? We suggest that the Napa River ecosystem provides one of the best opportunities to answer this question since we will be monitoring one of the largest (3,900 ha) restoration projects in the Bay-Delta that is located within a small (28 km long) Estuary (Fig 1, 4) which is comparatively unaltered. Thus, our objectives are to:

1. Monitor changes in physical processes and biological responses for adaptive management when diked salt ponds are opened to tidal action in the Napa Sonoma Marsh Restoration Project.
2. Study near-field and far-field effects of tidal marsh restoration in the lower Napa River Estuary.

Monitoring within the Restoration Project will include examining Physical Processes, as well as Biological Responses. In Ponds 3-5 (that will be breached), we will examine changes in Physical Processes of water quality (salinity, temperature, pH, DO, nutrients), hydrology (water level, tidal circulation), and habitat evolution (slough morphology, bathymetry, vegetation). We will relate those physical changes to Biological Responses in primary productivity (chl*a*), macroinvertebrates, vegetation (composition, cover), fishes (assemblages, biological characteristics), birds (community, behavior), and special status species (salt marsh harvest mouse, rails, song sparrows). Selected variables will be studied in unrestored ponds as "control" sites within the Restoration Project.

Monitoring within the Estuary will include early restoration variables that we feel may show changes in response to the Restoration Project actions. For example, since the 3-year study is a constraint and we expect little change in plants or sessile invertebrates, we will concentrate on potential changes in use by highly mobile fishes and birds. We will examine changes in Physical Processes of water quality (salinity, nutrients) and hydrology (water level, suspended sediment, flows). We will examine Biological Responses in vegetation (composition, cover), macroinvertebrates (density, mass), fishes (composition, characteristics) including surveys for special status species, and birds (composition, behavior).

Our sample framework will be unified under a Before-After Control-Impact statistical framework (Fig. 5: Stewart-Oaten et al. 1986, Stewart-Oaten et al. 1992, Underwood 1992, Stewart-Oaten 2003). BACI sampling measures the differences in signals of "control" and "impact" sites, both "before" and "after" changes to the system in question. Following such a statistical approach, a subtle change at the Estuary scale may be more readily detectable than use of standard inferential statistics.

A.2 Justification

The Napa River watershed provides a unique opportunity for ecosystem-level study of restoration projects in a system that has been comparatively unaltered from its pre-1850s condition. Although most historic tidal marshes have been diked, there are no dams or large-scale diversions. The wide range of restoration projects in the Estuary provide the means to assess the effectiveness of tidal marsh restoration in benefiting water quality, physical processes, and fish and wildlife populations. It allows us to evaluate how multiple projects interact at the regional scale, and how an ecosystem may be changed through restoration. We are most likely to observe ecosystem level effects in this system, where a relatively large Restoration Project is being undertaken in a relatively small Estuary. In addition, it provides a valuable learning tool for other proposed restoration efforts in the North Bay area (e.g. Napa Crystallizer Ponds, Cullinan Ranch Project; see Fig. 3), and for regional restoration efforts in South Bay and the Delta.

A.2.1 Conceptual Model

Statement of Problem
An estimated 85% of the historic tidal marshes in the Bay have been filled or significantly altered. The loss of tidal marsh has had negative effects on the physical, chemical, and biological health of the Bay, including decline in fish and wildlife populations, reduced sport and commercial hunting and fishing, listing of numerous species, loss of tidal prism creating reduced capacity tidal channels and increasing flooding hazards, decreased water quality and increased turbidity; and accumulation of sediments at stream mouths (Goals Report 1999). Tidal marsh wetland restoration projects have been promoted as a means to restore ecosystem health both within the project, and in the greater ecosystem. Although monitoring studies of individual restoration projects have been conducted, few studies have been conducted at a regional scale. Will changes in tidal prism, salinity, and suspended sediments result in successful Restoration Project trajectories? Do such Restoration Project changes have any effect on the entire Estuary?

Conceptual Model
We can describe linkages between **physical input and processes** (tidal inundation, sediment deposition, erosion or scour, wind wave action, river flows, evaporation and precipitation), **habitat evolution** (channel network formation, subtidal and upland transition zones, vegetation along an elevation gradient, daily and seasonal tidal variation, daily and seasonal salinity changes), and **biological responses** (sustainable populations of resident and migratory native species, complex food webs). We can describe these processes at the project-scale and at the regional-ecosystem scale; however, linkages between projects can only be recognized at the regional-ecosystem scale, where effects maybe be observed that are not predictable by monitoring at the project level (Fig. 6).

The Restoration Project design is intended to initiate physical processes that will lead towards valuable tidal wetland habitat. We expect most changes to occur through levee breaching and the re-introduction of tidal flows (Fig. 7), although the design includes elements to encourage estuarine sedimentation and vegetation colonization. Scouring is expected to shape and maintain interior pond channels and surrounding tidal sloughs, which in turn affect the tidal regime of the breached ponds. Initially, areas will consist of unvegetated intertidal mudflat. We expect mudflat habitat to convert to vegetated salt marsh in areas favoring sedimentation (Fig. 8). Once established, tidal marshes should expand laterally and vertically in response to organic contributions to the sedimentary process, damping of local wave action, and plant colonization of the adjacent tidal flat.

Diking of historic marshes for agricultural and later salt production has reduced the tidal prism in outboard sloughs, leading to shallow, narrow channels and tidal marsh along the fringes. Historic interior channels have filled with soft sediment. Both interior and outboard sloughs are expected to scour once tidal flows are restored. Tidal sloughs should enlarge through deepening along the channel thalweg, followed by slumping along the vegetated channel banks. We expect natural processes to reoccupy the historic drainage networks as tidal scour progresses headward along relict pond channels. However, given the pond sizes and rate of nick point migration at other restoration sites, we expect that the drainage network will not be fully established for a decade following levee breaching. Friction losses over the shallow mudflats are expected to mute the tide range and inhibit drainage at low tide, delaying vegetation establishment in some areas.

Ground surface elevations will gradually increase as sediment-laden water floods the site and sediment deposits during low wind-wave exposure. Distribution of mudflat and marsh habitats will represent dynamic equilibrium between sediment supply and erosive energy of wind waves. Therefore, large fetches and wave action are expected to hinder deposition of fine estuarine sediments and retard the evolution towards a vegetated marshplain. In areas with sufficient sediment supply and less wave exposure, pioneering vegetation is expected to appear once the suitable tidal regime is established. Vegetation will contribute organic material to the sedimentary process and keep pace with slow increases in sea level. Continued estuarine sedimentation will gradually reduce the tidal prism across the Restoration project site, leading to reduced tidal scour in the slough and smaller channel dimensions. We expect mature tidal marshes to contain well-organized drainage networks and broad plains of low relief that contain shallow ponds or pannes along a portion of the drainage divides. The amount of vascular vegetation influences site values through effects on physical structure of wetland habitats and functions as food resource. Tidal restoration has the potential to affect estuarine exchange in the sloughs and Estuary. Enlarged channel sizes along the slough network are expected to increase conveyance and circulation, potentially affecting the barotropic convergence zone to the west.

Restoration projects in the Estuary are creating natural tidal habitats along a gradient from subtidal habitat to midmarsh with limited upland habitat, primarily from natural sedimentation. These projects create large patches of heterogeneous wetlands with complex tidal hydrology extending to much of the historic wetlands area. The numerous projects may create greater habitat benefits than single, spatially segregated projects to benefit native at-risk species, including the California clapper rail, salt marsh harvest mouse, Sacramento splittail, Chinook salmon, Central Coast steelhead trout, and potentially delta smelt, along with other resources. Daily tidal fluctuations, seasonal salinity variations, and winter floods may favor native species over exotic predators or invasive aquatic vegetation. Daily and seasonal cycles of wetting and drying with the spatial complexity of dendritic tidal marsh provides habitat for native fish and wildlife.

Projects range from 4 - 4,000 ha and present a unique opportunity for scientific understanding of system dynamics. Efforts range from passive restoration to active management involving design features to enhance tidal marsh development. Projects are located along a gradient of suspended sediment concentrations and salinities. The diversity of projects along a range of measurement scales will allow evaluation of interactions on a regional scale, but also directional changes from near-field to far-field areas from downstream to upstream of the project breaches (Fig. 9).

The Restoration Project will greatly alter the tidal prism in surrounding sloughs, and therefore, the salinity, turbidity, and transport. Four regions (see monitoring sites: Fig. 10) are known to affect the hydrology of the area. First, the Napa River is the dominant regional freshwater source with flows that seasonally vary. Second, because of a tidal lag with Carquinez Strait, the Mare Island Strait at the lower end of the Napa River behaves as a baroclinic convergence zone with a salinity minimum and a high rate of sediment deposition (Fig. 11: Warner et al. 2002). Third, tidal asymmetries between the east and west sides of the interconnected slough system create a barotropic convergence zone during a part of the spring-neap tidal cycle (Fig. 11: Warner et al. 2003). This region can collect and concentrate salts (as seen with discharge from Pond 3, Swanson et al. 2003, Shellenbarger et al. submitted) and sediment. Fourth, a tidally oscillating sediment mass is associated with Sonoma Creek in which suspended sediment concentration is an order of magnitude greater than surrounding waters (Ganju et al. 2004). This oscillating mass is likely a result of the loss of tidal prism when the area was diked. Deposition associated with the mass appears to have created a sill at the mouth of Sonoma Creek (Jaffe et al. 1998), which affects the hydrodynamics in the sloughs (Warner et al. 2003).

A.2.2 Hypotheses

While monitoring of most restoration sites has focused on individual projects, this study will evaluate effects at both the Restoration Project and at the Estuary level. The study will also contribute to determining the relationships or causal links between wetland habitat restoration and recovery of at-risk species. The broad hypothesis being tested is: does tidal habitat restoration contribute to the recovery of biological resources in the Restoration Project, and in the greater Estuary? Our specific hypotheses to test include:

1. Design features accelerate or enhance habitat formation in the Restoration Project.
   a. Historic channel networks will re-establish through scour of soft sediments along relict channels, although headcutting and large drainage areas may require a decade until the channel network is fully established;
   b. Borrow ditch blocks will promote reestablishment of historic channels by inhibiting existing borrow ditches from capturing the tidal supply;
   c. Tidal sloughs will enlarge through deepening along the thalweg, followed by slumping along the channel banks;
   d. Tidal slough channels will first enlarge in response to the initially large tidal prism, and then slowly reduce to an equilibrium reflecting a mature mosaic of tidal habitats;
   e. Fetch breaks may reduce wind wave agitation and accelerate estuarine sedimentation and affect long-term morphology of large breached ponds;
   f. Levee lowering to high marsh elevations will compensate for loss of tidal marsh as slough channels widen, will reduce iceplant and other non-native vegetation, and encourage replacement by pickleweed; and
   g. Breach locations and phasing will minimize impacts to adjacent levees, properties, and utilities, and will reduce predator pathways.
2. The increase in tidal habitat area and wetland diversity in the Restoration Project will benefit targeted species.
   a. Increased and diversified habitat will increase primary productivity and volume and diversity of aquatic and benthic invertebrates, creating more complex food webs and benefiting a wide range of native fish and wildlife species;
   b. Increase in subtidal, intertidal and tidal marsh habitats will benefit special-status anadromous native fish (Fig. 12), specifically Central Coast steelhead trout and Chinook

salmon during their upriver migration or in the smoltification process by providing more places to take refuge and more food sources;

c. Increased and diversified marsh habitat will benefit special-status resident fish, specifically delta smelt and Sacramento splittail by providing more places to take refuge and more food sources (Fig. 13);
d. Increased and diversified marsh habitat will benefit listed species that depend upon tidal wetlands, specifically California clapper rail, salt marsh harvest mouse, San Pablo song sparrow, and black rail, by providing foraging and nesting habitat; and
e. Increases in subtidal and intertidal habitat will benefit migratory shorebirds and dabbling ducks by providing feeding and resting areas in early restoration.

3. Restoring some of the former salt ponds to tidal action will increase the tidal prism in the Estuary and affect existing tidal and salinity regimes in the study area.
   a. Increasing tidal prism in the Estuary will increase salinity upstream;
   b. Increasing tidal prism in the Estuary will increase the salinity downstream;
   c. Increasing slough tidal prism will increase salinity in the barotropic convergence zone, and changing salt and pressure fields will change its location; and
   d. Increasing tidal prism in Sonoma Creek will increase salinity at its mouth and reduce the mass of tidal oscillating sediment.
4. Increased salinity both upstream and downstream due to increased tidal prism in the Estuary will change use of affected areas by some fish and wildlife species.
   a. Shorebirds will shift areas as increased tidal prism shifts habitat availability;
   b. Estuarine fishes will move to stay within optimal salinity range;
   c. Macroinvertebrate composition (but not necessarily richness) may shift if salinity increases past optimal ranges for some species; and
   d. Avian response will change if salinity increases effect changes in prey (macroinvertebrate) composition.
5. Restoration of Estuary tidal wetlands are important to recovery of sustainable populations of native fish (Fig. 14), wildlife, and plants, including at-risk species.
   a. Response of species is related to spatial characteristics of tidal habitats (size, shape, and connectivity) and habitat diversity;
   b. Species respond to tidal habitat location along hydrodynamic and salinity gradients;
   c. Sediment supply is a limiting factor in tidal habitat restoration projects.
6. Conditions in the Estuary favor the establishment of native vegetation rather than introduced species after restoration is undertaken.
   a. Tidal restoration projects in the Estuary are less susceptible to invasions of introduced *Spartina* species due to salinity regimes and initial introductions in the South Bay;
   b. Salt and brackish marsh restoration projects in the Bay are less susceptible to invasions of introduced freshwater vegetation than the Delta or riparian habitats.
7. Maintenance of tidal marsh and managed ponds is essential to ensure a fully functioning Estuary system consistent with historic wetlands and past patterns of use.
   a. As diked seasonal wetlands are converted to tidal marsh, bird populations will redistribute to alternate sites;
   b. Improving management of areas retained as ponds will result in greater numbers of waterfowl and shorebirds using the ponds for feeding and resting;
   c. Food (invertebrates) in ponds will increase with improved management; and
   d. A variety of tidal habitats, including tidal lagoons, will provide a greater habitat range for

shorebirds and waterfowl, leading to increased populations (Fig. 15).

A.3 Previously Funded Monitoring

Extensive studies have been conducted pertaining to restoration projects in the study area. Baseline, pre-construction, and post-construction monitoring have been conducted at various project locations within the study area. Table A.3-1 provides a summary of the monitoring efforts conducted to date and Attachment 2 provides additional information on those projects. All work proposed as part of this study has been designed to complement the existing body of data, and planned project-specific monitoring. Fieldwork will be coordinated to the degree feasible to minimize mobilization costs, and reduce impacts on the environment.

A.4 Approach and Scope of Work

Our study includes monitoring a large Restoration Project, as well as examining near-field and far-field effects in the Estuary (Fig. 9). It provides an opportunity to examine Physical Processes driving Biological Responses on a regional scale (Fig. 6). The SCC and DFG, in association with the USGS, UCD, Watershed Information Center and Conservancy of Napa County (WICC), Napa Resource Conservation District (RCD), PWA, JSA, and SSI will work as a team to implement this comprehensive Napa River monitoring study (Fig. 16). We will use a BACI (before-after, control-impact) sampling framework to determine how a restoration project may affect the lower Napa River watershed. In this section, we discuss the Analytical Approach, Project Management, Data Management, and monitoring tasks within the Restoration Project and Estuary objectives, grouped by Physical Processes and Biological Responses.

A.4.1 Analytical Approach

We will continue sampling in the salt pond system at ponds selected from a salinity gradient in 1998 (Miles et al. 2000, Takekawa et al. 2000, Takekawa *in press*). We will compare baseline data on selected ponds (Ponds 1, 2, 3, 4, 7) from intake Bay water (Pond 1; 10-30 psu) to saturation (Pond 7; >300 psu) to examine trends among-pond. To examine within-pond variation, we use a 250 m x 250 m (6.25 ha) grid (Matveev 1995; Posey et al. 1995). Accessible gridcells (three to ten) are sampled for water quality, nutrients, primary productivity, invertebrates, fishes, and birds. We also will sample other ponds to examine water quality and bird community response.

We will apply a BACI framework (Stewart-Oaten et al. 1986, Stewart-Oaten et al. 1992, Underwood 1992, Stewart-Oaten 2003) in analyses. To implement BACI, we will use baseline data and pre-breach data to determine “Before” restoration conditions, comparing signal differences in the Restoration Project ponds and the tidal wetlands of the Estuary (Fig. 3). In the 2 years following breaching, we will look for “After” effects from near-field to far-field Estuary tidal marshes, downstream to upstream of the Restoration Project. We will use unbreached ponds (Ponds 1, 2, 6, 7, 8) and wetlands in the Estuary as the best available “Control” sites. Breached ponds will be treated as “Impact” sites, although Pond 3 has two initial breaches (Fig. 4).

A.4.1.1 Task 1: Project Management and Coordination

The Project Manager (PM: Amy Hutzel, SCC) will coordinate administrative and fiscal activities, possibly with a consultant, and work with Lead Investigator (LI: John Takekawa, USGS-WERC) to ensure that the project meets its objectives (Fig. 16). USGS will support a Technical Coordinator (TC: Nicole Athearn, USGS-WERC) to handle regular fieldwork coordination, data management, dissemination, and editing of quarterly progress reports. The LI and TC will oversee the technical fieldwork, ensure peer review is conducted, and coordinate the final report. The LI will also ensure effective coordination with other area studies such as IRWM. The PM and TC will track project performance measures from which the PM will submit semi-annual summaries. All will ensure that investigators work together as a team to maximize their efforts. The team will coordinate through a Town Hall webpage hosted by WICC, quarterly conference calls, and semiannual meetings. Public outreach will be done via WICC webpages, other webpages, the Napa-Sonoma Marsh Restoration Group (NSMRG), and public and scientific talks. WICC will host and showcase project information through its WebCenter; virtual web mapping; and, an accessible online library.

A.4.1.2 Task 2: Data Management and Storage

Data handling and storage will follow Federal Geographic Data Committee (FGDC) metadata standards.

Field and Laboratory Data Management

Data handling and storage will follow FGDC metadata standards. All data will be compiled, QA/QC checked, and archived on a USGS-WERC data server with mirrored drives, tape backup, and redundant copies at a WICC. Field data will be referenced in GIS coverages, data projected in UTM in NAD83 horizontal and NAVD88 vertical datum.

Data Storage and Dissemination

Datasets will be stored by USGS with backup at WICC. WICC will provide online web hosting, and an interface the public. WICC will provide technical support. Monitoring reports will be made available at WICC (http://www.napawatersheds.org), Napa Marsh Restoration Group (http://www.Napa-Sonoma-Marsh.org), and Wetland Tracker Database (http://www.wrmp.org/projectsintro.html).

Compilation of Existing Studies

The study team members will obtain existing data from past and present studies in the Restoration Project and Estuary, and compile it for use by the study team. The dataset will, to the extent feasible, be made accessible with data generated by the study. The data will be categorized to identify available baseline (pre-project) data, and all data will be integrated into a database (Microsoft Access). Selected specialists will peer-review the data before summaries with metadata will be made publicly available.

Objective 1. Monitor changes in physical processes and biological responses for adaptive management when diked salt ponds are opened to tidal action in the Napa Sonoma Marsh Restoration Project.

A.4.2 Physical Process In The Restoration Project

A.4.2.1 Task 3: Restoration Project Water Quality

Temperature, pH, dissolved oxygen, and turbidity will be determined with water quality meters (Hach Hydrolab), and salinity measured with meters or hydrometers. Monthly samples will be taken at 2-5 locations to account for spatial variation inside restored Ponds (3-5) and in other Ponds (1, 2, 6, 6A, 7, 7A). Measurements will build on existing USGS data for the former salt ponds. Three samples will be collected for nutrient analysis per pond, and nitrogen (NH_4-N and NO_3-N), total and soluble phosphorus, and sulfur concentrations will be analyzed (Natural Resources Lab, Univ. of Calif., Davis).

A.4.2.2 Task 4: Restoration Project Hydrology

Water levels will be monitored to document tidal action in restored ponds and muting or damping of the tidal signal in the ponds or sloughs, and as a helpful guide for remedial actions. Water levels will be continuously monitored at the following locations:

- Within Napa River and Sonoma Creek to provide the driving water level signal
- Within the adjacent outboard slough channels (one each in four adjacent slough channels) to determine if they are limiting tidal circulation or are affected
- Inside the ponds, near select breaches to determine if the breaches are limiting tidal circulation (three breaches for Pond 3 and one each for Ponds 4 and 5)
- Inside the ponds at a point furthest from the breaches to determine if the interior slough channel network is limiting tidal circulation (one per pond)

Water level data will be collected the first winter (2006-2007) and summer (2007) following breaching to establish a baseline, provide insight into seasonal variations, and ascertain changes in tide propagation in the first 6 months. Monitoring will be repeated in Year 3 (summer 2008) at eight locations within the ponds and adjacent outboard slough channels to document changes in tidal circulation and identify factors limiting tidal circulation. Tide ranges will be measured to determine if breaches or interior slough channels are limiting circulation. We will compare tide range inside ponds and adjacent sloughs to determine if undersized sloughs contribute to tidal muting inside the ponds.

A.4.2.3 Task 5: Restoration Project Habitat Evolution

Habitat evolution monitoring (changes in slough channel morphology, bathymetry and vegetation) will be used to assess rates of tidal habitat development. If habitat evolution is slower than anticipated, the data will be used to review model simulations, determine if there is a sediment deficit or if re-suspension is causing slow accretion. In addition, we will assess whether reduced habitat formation combined with fringe marsh and mudflat erosion leads to unacceptably high interim losses of regional tidal habitats. Slough channel morphology will be monitored to determine if channels inside and outside the ponds are scouring to prevent tidal muting within ponds.

Marshplain Accretion. As breaches and slough channels scour, sediment will accrete. Pond 3 is expected to aggrade to elevations suitable for marsh vegetation (Fig. 8), while parts of Ponds 4-5 are expected to persist at mudflat elevations. Monitoring will measure sedimentation rates and patterns, determine elevations at which vegetation species establish, and see if the marsh is developing along the anticipated trajectory. We propose bathymetric mapping to monitor sedimentation. A pre-construction survey of the bathymetry of each pond exists (USACOE 2003), and a Pond 3 bathymetry survey will be completed in 2005. We will conduct one post-construction bathymetry survey in Ponds 3-5 in 2008 with an echosounder system (Fig. 17:

Takekawa et al. 2003) comparing pre- and post-restoration surfaces in ArcGIS. Sediment plates will be installed at 2 to 4 locations in each pond during construction, and sediment deposition will be measured during the Year 2 topographic surveys.

Slough Channel Development. Breaches and interior and outboard slough channels will be monitored to document tidal scour and determine when breaches and channels reach equilibrium. Slough surveys will identify impediments to tidal channel evolution. Monitoring of interior and outboard slough channel networks includes:

- Ortho-rectified aerial photos of Ponds 3-5 and sloughs at extreme low tides
- Oblique digital photos of breaches, slough channels, interior berms and mudflats
- Ground and bathymetric surveys of outboard slough channels, levee breaches, and interior slough channels including adjacent berms and mudflats or marsh plains.

We anticipate that a detailed as-built survey with all constructed features will be performed to confirm design compliance.

After a post-construction baseline is established, interior slough channel monitoring would include annual aerial and oblique digital photos. In the first two years, we will measure breach width quarterly to estimate breach widening. Detailed surveys would be performed in areas identified as potential problems. At Year 2, interior channels and half of the breaches would have detailed topographic surveys to compare with the baseline to detect channel evolution, and hard points (obstructions) inhibiting channel scour. In addition, exterior slough channels and adjacent fringe marsh would be resurveyed with topographic and bathymetric (fathometer ADP) at Year 2 for sediment scour calculation, and impact of increased tidal prism on slough channel size. We will monitor erosion pins (2-cm PVC pipe) placed in levees along Dutchman Slough semiannually.

A.4.3 Biological Responses in the Restoration Project

A.4.3.1 Task 6: Restoration Project Primary Productivity

Primary productivity will be sampled quarterly at Ponds 1-5. Chl*a* will be measured with a SCUFA (Self-Contained Underwater Fluorescence Apparatus) submersible fluorometer. Three samples will be collected quarterly for chl*a* analysis in Ponds 3-5.

A.4.3.2 Task 7: Restoration Project Vegetation

We will use annual aerial photos to assess vegetation colonization and growth rates in the tidal ponds and erosion rates in the neighboring sloughs. Ground surveys will include point-intercept transects at accessible areas in restored ponds (Takekawa et al. 2002). Species frequency will be calculated (Bonham 1989). A 0.25 m^2 quadrat at each 5-m will be used to estimate density of rooted plants and percent cover (Elzinga et al. 1998).

A.4.3.3 Task 8: Restoration Project Macroinvertebrates

Benthic macroinvertebrates will be sampled twice yearly with Ekman grab or core samplers. Samples will be taken at four locations in ponds 1-5 within quadrants dividing each pond equally. Four samples will be taken at each site (16 per pond per event; 160 total per year), sieved through 0.5-1.0 mm screens, preserved in ethanol and rose Bengal, and stored.

Invertebrates will be sorted and identified, dried and weighed for biomass.

A.4.3.4 Task 9: Restoration Project Fish

We will inventory fishes in selected ponds and sloughs to assess seasonal and annual variation during pre-construction (baseline) and construction phases. Our surveys will detect distinct species assemblages, and whether composition and characteristics (population structure, body condition) vary pre- and post-construction, and with environmental variables. Bimonthly fish surveys will occur in Ponds 1-3 from Jan 2006 to Nov 2007, continuing ongoing surveys under Phase I. An extra sample will be taken in Mar 2006 and 2007 to cover the time period when native fishes are spawning or rearing. Bimonthly fish surveys will be conducted in March in Ponds 4-5 and two sloughs. Selected water quality variables and habitat characteristics will be measured in conjunction with surveys.

Juvenile and adult fish will be collected from three fixed sampling sites in each pond and slough (33 sites total) with two monofilament gill nets (38 m x 1.8 m) of variable mesh (12.7 mm, 15.4 mm, 38.1 mm, 50.8 mm, and 63. 5 mm panels) and five baited rectangular-shaped minnow traps (25.4-cm X 25.4-cm X 43.2-cm with 3.2-mm nylon mesh) fished for 2 h. Other gear types (e.g., seines, throw nets, dip nets) may be used to supplement the catch. Captured fish will be identified to species (Miller and Lea 1972, Moyle 2002, Eschmeyer et al. 1983, McGinnis 1984) or, if needed, voucher specimens submitted to taxonomic specialists. Captured fish will be counted, measured for total length, and the first 25 of each species weighed and preserved (archived) in alcohol.

Larval fish will be collected from each sampling site with plankton nets, light traps, or other appropriate gear (*see* Kelso and Rutherford 1996). Larval fish will be preserved (archived) in 10% buffered formalin (preferred) or 99% isopropyl alcohol for possible analysis at a later date if funding is available. Water temperature, dissolved oxygen, pH, salinity, and turbidity will be measured. Habitat characteristics (water depth, channel width, current velocity, bottom substrate— (modified Wentworth scale; McMahon et al. 1996), and percent cover of submerged vegetation will be measured. Species assemblages will be identified and related to environmental variables with multivariate analyses including cluster and discriminant analysis (Green and Vascotto 1978, Ludwig and Reynolds 1988). We will compare pre- and post-construction length frequencies and body condition (computed as relative condition factors; Anderson and Neumann 1996).

A.4.3.5 Task 10: Restoration Project Birds

Bird surveys will be conducted monthly on all ponds in the Restoration Project to document change in distribution. USGS has monthly to bimonthly bird population pond survey data since 1999 (*see* Takekawa et al. 2000, Takekawa et al. 2001*b*, Warnock et al. 2002). Ponds divided into 250 m x 250 m grids (6.25 ha) are mapped into coverages. Birds are counted within 3 h of high tide, identified, enumerated, and recorded. Data will be entered, appended as point coverages, and grouped into abundance classes. Birds will be analyzed by month, grid, foraging guild, and behavior. Water temperature, salinity, and water depths are recorded at staff gages during each survey.

A.4.3.6 Task 11: Restoration Project Special Status Species

At 3 locations with established or colonizing marsh vegetation, live trapping of small mammals will be conducted once to determine presence or absence of salt marsh harvest mice and other small mammals under FWS protocols. Trap grids (5x5: *see* Takekawa et al. 2002) or point samples (4 per point: *see* Padget-Flohr 2003) will be flagged and trapped for three nights. Captured animals will be identified recording standard variables (Fisler 1965). We will clip small patches of fur to identify recaptures, reporting new animals captured per trap night.

Variable circular plots will be conducted to determine relative abundance of tidal marsh passerines such as the San Pablo song sparrow (*Melospiza melodia samuelis*). In addition, we will conduct passive surveys or playbacks of recorded species-specific rail vocalizations following agency protocols to detect their presence in fringing areas. These surveys will be conducted one time during the study period.

At three project area sites with established marsh vegetation, or where marsh vegetation begins establishing, we will conduct variable circular plots to determine relative abundance and densities of tidal marsh passerines such as the San Pablo song sparrow (*Melospiza melodia samuelis*). In addition, we will conduct passive surveys or playbacks of recorded species-specific rail vocalizations to detect the presence of rails in the fringing areas of marsh surrounding the Restoration Project following standard agency protocols. These surveys will be conducted one time during the study period.

A.4.4 Physical Process in the Napa River Estuary

A.4.4.1 Task 12: Napa River Estuary Water Quality

We will deploy conductivity, temperature and depth-measuring sondes with turbidity sensors (CTD-T). The CTD-Ts will be used to determine if regional increases in salinity result from increased tidal prism or pond discharge. Continuous monitoring will be performed for three 90 day periods (summers 2006, 2007 and 2008) at four locations to ascertain the fate of the water (which may be elevated in salinity) that leaves the salt ponds and enters the surrounding slough system.

- Napa River downstream (Mare Island Causeway in the baroclinic convergence zone: Buchanan 2003, Buchanan and Ganju 2004, Warner et al. 2004)
- Napa River upstream (Channel Marker 14) reoccupied to determine if increased tidal prism drives an increase in upstream salinity
- South Slough, Can Duck Club (CAN) to track salinity and sediment in the barotropic convergence zone
- Sonoma Creek mouth where a sediment mass tidally oscillates between the Estuary and San Pablo Bay (Ganju et al. 2004)

We will examine the barotropic convergence zone near the Can Duck Club on South Slough (Warner et al. 2004), where tidal asymmetries across the interconnected slough system collect and concentrate dissolved salts during parts of the spring-neap tidal cycle. Salinity, turbidity and velocity will be measured in the surrounding sloughs and Napa River to measure changes to the convergence zone caused by pond breaching. These data will also be used to determine if there are regional increases in salinity resulting from increased tidal prism or pond discharge, and to track transport of suspended sediments. All sondes will collect data each 15-min, and stations will be serviced once each four weeks, instruments cleaned and calibrated following methods in Wagner et al. (2000).

In addition, 3 quarterly water samples for nutrients (see Task 3 methods) and chlorophyll (see Task 6 methods) will be collected upstream, at, and downstream of the breaches. Samples will help to detect changes in nutrients from pond releases. In tidal marshes, we will use sondes to record temperature, pH, salinity, and DO (see Task 17).

A.4.4.2 Task 13: Napa River Estuary Hydrology

Hydrology data can be used to adaptively manage pond restoration by 1) providing early warning of hypersalinity problems and geomorphic change, 2) provide additional data on the barotropic convergence zone, and 3) provide data to test and refine numerical models that can be used to improve future restoration actions. The CTD-Ts will be used to measure water level for the calibration of future numerical modeling. Conductivity, temperature and turbidity are currently measured at two depths from Mare Island Causeway (MIC) in a baroclinic convergence zone downstream of the site (Buchanan 2003, Buchanan and Ganju 2004). A water level sensor will be added to this site.

At each of the CTD-T sampling locations (see Task 12), Acoustic Doppler Profilers (ADP) will be deployed for one 90-day period in summer 2007 to measure velocity to assess transport and convergence of salinity and sediment. The Napa River upstream site (Channel Marker 14) will show changes in tidal prism. The Sonoma Creek mouth site will determine if increased deposition or erosion occurs based on changes to the oscillating sediment mass at the western boundary of the project area (Ganju et al. 2004). When deployed, ADPs will collect velocity data concurrently with CTD-Ts.

Water level data will be collected during summer 2006, 2007 and 2008. The water level monitoring will be important to document changes in tidal circulation and to help identify factors that may be limiting tidal circulation. The summer season is preferred because of the largest tides and greatest tidal influence in the Napa River, Sonoma Creek and sloughs.

A.4.5 Biological Responses in the Napa River Estuary

A.4.5.1 Task 14: Napa River Estuary Plants

Point-intercept transects will be used to document wetland plant species composition in conjunction with bird surveys (*see* Takekawa et al. 2002). A combination of point intercept and 0.25-m^2 quadrats will be used to monitor vegetation changes. We use 15-m, random direction, point-intercept transects is used to determine species and canopy cover (see Task 7 methods). Although we expect little change in short-term community structure, vegetation growth may be affected. Three 0.25-m^2 spaced quadrats will be used for species, cover, maximum height, and density (stems/m^2).

A.4.5.2 Task 15: Napa River Estuary Macroinvertebrates

Benthic macroinvertebrates will be sampled twice yearly (see Task 4) with Ekman grab or core samplers (10cm x 10cm). Four samples will be collected per wetland quadrat (32 samples per site per year up to 96 total samples per year). Biomass (dry weight) and diversity of invertebrates will be measured. Samples will be sieved through 1.0 or 0.5 mm mesh screens, preserved in ethanol and rose Bengal, and stored. Invertebrates from these samples will be sorted and identified, and then a sub-sample dried and weighed to estimate total biomass.

A.4.5.3 Task 16: Napa River Estuary Fish

Sampling in the lower Napa River will (1) document presence and relative abundance of fish species (particularly delta smelt, Sacramento splittail, Chinook salmon, and steelhead) in open water habitat, (2) determine if native and non-native fish captured in the open water habitat are using restored habitats, (3) examine if correlations exist between sampled fish species and environmental conditions, and (4) determine whether there are significant changes in fish species composition in the vicinity of the breach because of water quality changes. Five sampling sites will be monitored: two sites located upstream, one adjacent, and two downstream of the Restoration Project. Four years of fish data will be available for comparison at the farthest upstream area (Fig. 1) under the current Napa River Fisheries Monitoring Program. This past data will assist in explaining annual and seasonal fish population trends.

Sampling in the open water will occur concurrent with sampling inside ponds (see Task 9) to allow for comparisons of fish species between areas. Sampling will be conducted in 2006 (pre-breach) and in 2007–2008 (post breach) monthly in Mar, Apr, and May to document presence of Sacramento splittail, delta smelt, and salmonids, and once bimonthly (Jul, Sep, Nov, and Jan) to obtain seasonal data. Fish measurements and environmental parameters are consistent with pond sampling methods. Depending on sites selected, otter trawl, purse seine, gill nets, and beach seine will be used to sample fish. Two gear types will be used to sample each location. These gear types will sample fish during the rising, high, or ebbing tide. To capture larval fish, light traps will be deployed Mar–May at three locations near the breach and one in the restored pond. Ten percent of larval species will be identified from samples if additional funding is obtained.

Analyses will identify relationships between relative abundance (Catch Per Unit Effort) and environmental variables, and to determine if these relationships vary by site. Potential explanatory variables include: (a) categorical variables – gear type, year, season (i.e., winter, spring, and summer), habitat type; and (b) numerical variables – temperature, salinity, and turbidity.

A.4.5.4 Task 17: Napa River Estuary Birds

Bird surveys will be conducted monthly on four Estuary wetlands (Fig. 1) to document changes in the bird community. Bird surveys will be conducted following existing protocols (Napa County RCD 2003, Miles et al. 2000, Takekawa et al. 2001*a*). Two methods will be used to survey birds. Strip transects or area surveys will be used for visual sightings of birds. The observer observes an area and records all species along with habitat (mud flat, open water, marsh plain) and behavior (roosting, foraging). All birds will be counted within 3 hours of high tide. Data will be entered in spreadsheets, appended as point coverages, and grouped into abundance classes. Variable circular plot surveys (point counts) will be conducted quarterly (DeSante 1981). Variable line-transects (Burnham et al. 1980) adjusted for circular plots (Roeder et al. 1987) may be used to calculate densities from program DISTANCE (Buckland et al. 1993).

A.4.6 Performance Measures

The primary products for this monitoring study will be in datasets, reports, presentations, and publications (Table A.4.6-1). Data collection will follow standardized protocols (Task 2). All products will have peer-review within the team and external review by specialists. Public outreach will include the project webpage (see Tasks 1-2) and presentations.

A.5 Feasibility

The proposed study is feasible from a physical, economic, legal, environmental, regulatory, and scientific standpoint. All monitoring sites are located on public lands (State Lands, DFG, American Canyon, Vallejo) and the landowners will provide access. The study has support among the public, environmental and scientific communities, and regulators (see Endorsement Letters in Attachment 3). A list of required permits is included in the Environmental Compliance form.

A.6 Expected Products/Outcomes

The end result of the CALFED-funded regional monitoring study will be a Final Report documenting the significant findings from the study. A list of the deliverable is included on the Task and Deliverables form. Reports will include peer-reviewed journal articles, semi-annual progress reports, presentations, and WebCenter outreach (see Task 2).

A.7 Data Handling, Storage, and Dissemination

See description under Task 2.

A.8 Public Involvement and Outreach

See description under Task 1-2, A.6.

A.9 Work Schedule

We are assuming that contracts will be in place effective January 2006 and a work schedule is provided in Table A.9-1. Work in Year 1 of the study will focus on baseline information for Estuary sites and later post-construction monitoring of the Restoration Project. Periodic project milestones are semi-annual progress reports, annual data reports, and biannual CALFED Science Conferences (see Task 1).

B. APPLICABILITY TO CALFED ERP AND SCIENCE GOALS, IMPLEMENTATION PLAN, AND CVPIA PRIORITIES

B.1 ERP and CVPIA Priorities

The study is consistent with the ERP Draft Stage 1 Implementation Plan Strategic Goals for At Risk Species (#1), Ecological Processes (#2), Habitats (#4), and Water and Sediment Quality (#6). It will further understanding of anadromous fish restoration and habitat restoration goals under the CVPIA. ERP Draft Stage 1 Multi-regional area priorities will be addressed including water quality (#5) and recovery of at-risk species (#6). Under the ERP Draft Stage 1 Bay Region implementation plan, the study is one of the first efforts to directly support #4 -- performance of restoration on a local and regional scale. It also will assess restoration for at-risk species (#5) and improve linkages between tidal marshes and adjacent habitats, inflows, and support for management strategies (#6- 8). The CALFED Science Program Goals to develop performance measures, conduct adaptive management experiments, establish integrated science programs, advance scientific basis of regulatory activities, and coordinate and extend existing monitoring.

B.2 Relationship to Other Ecosystem Actions, Monitoring Programs, and System-wide Ecosystem Benefits

B.2.1 Monitoring Programs

Table A.3-1 lists past, on-going, and planned monitoring efforts in the study area. The proposed study will integrate with the existing efforts, to generate supplemental information that will enable scientists to understand the ecosystem-level linkages between separate projects, and to understand species dynamics at the regional level.

B.2.2 System-Wide Ecosystem Benefits

This Napa River Estuary study will result in a comprehensive understanding of system-wide ecosystem dynamics, leading to improved implementation and integration of restoration projects throughout the Bay-Delta system. The study will enable scientists to better understand interactions between restoration projects. This improved understanding of restoration processes will enable project planners to better design projects to provide habitats that support a wide variety of fish, wildlife and plants, including special status species.

C. QUALIFICATIONS

The Conservancy has developed an interdisciplinary study team with an exemplary level of knowledge regarding restoration science, and restoration science in the lower Napa River drainage in particular. We present the proposed project management organization (Task 1) and organizational chart (Figure 16) for the study, and individual qualification are presented below (see selected publications in Literature Cited).

Amy Hutzel. California State Coastal Conservancy. Amy Hutzel has been a project manager with the California State Coastal Conservancy since 2001. She has managed numerous restoration projects, and is currently managing the day-to-day planning process for the South Bay Salt Pond Restoration Project. Prior to her work at the Conservancy, Ms. Hutzel worked for Save the Bay and the US Fish and Wildlife Service.

John Y. Takekawa, PhD. USGS. Dr. Takekawa has been a federal research biologist in California for 18 years. His research specialty is the ecology of migratory waterbirds, with a technical specialty in application of radio telemetry. His studies have focused on the Pacific Rim, California, and San Francisco Bay. He established the San Francisco Bay Estuary Field Station of the USGS located on San Pablo Bay in 1995.

Nicole Athearn, MS. USGS. Ms. Athearn is a permanent wildlife biologist with the USGS

Western Ecological Research Center at the Vallejo field station. She coordinates the USGS Napa-Sonoma salt pond studies and the USGS Short Term Needs studies in support of the South Bay Salt Pond Restoration Program. Her studies have focused on avian response to biophysical changes of salt pond habitats.

A. Keith Miles, PhD. USGS. Dr. Miles' primary focus of research is on the effects of contaminants on estuarine and marine habitats. The emphasis of his research is on determining the consequences of accumulation of contaminants, discriminating effects caused by contaminants from naturally occurring changes in wildlife populations, effects of contaminants on the structure of invertebrate and vegetative assemblages, and the potential for accumulation of these contaminants among specific prey guilds of migratory waterbirds and marine mammals. His research has examined the habitats at Chesapeake Bay and the San Francisco Bay.

Michael K. Saiki, PhD. USGS. Dr. Saiki federal research biologist in California for 26 years and adjunct professor at Humboldt State University for 5 years; research specialties in aquatic ecotoxicology (especially selenium and other trace elements), water quality requirements of fish, and life history and ecological interactions of native and nonnative fishes.

David H. Schoellhamer, PhD. USGS. Dr. Schoellhamer has led USGS studies of suspended sediment transport in the San Francisco Estuary since 1993, resulting in numerous presentations and publications. He served as Program Co-chair for the 2004 CALFED Science Conference and assisted with the CALFED Science Program publication *Management Cues: Physical Processes and Tidal Restoration*. He has served on technical panels involving sediment and restoration in the estuary including the Hydro-geomorphic Advisory Team of the Ecosystem Goals Project, Napa-Sonoma Marsh Restoration Group, and the South Bay Salt Pond Restoration Project Science Team. He is also an Associate Adjunct Professor of Civil and Environmental Engineering Department at UC Davis.

Stephanie Theis, MS. JSA. Ms. Theis is a fisheries biologist with an expertise focuses in Endangered Species Act listed species, conducting monitoring programs, fisheries impact assessments, and preparing fisheries technical sections for environmental reports. She has extensive experience with the study of anadromous salmonids and other native and non-native fish species. She has a M.S. from Frostburg State University, Maryland (*Fisheries 1995*) and a B.S. from HSU (*Fisheries 1990*).

Sharon Hendrix Kramer, PhD. Stillwater. Dr. Kramer has over 25 years of experience in aquatic ecology and fisheries biology. Since 1994 her primary focus has been on Pacific salmon and the ESA. She was involved in technical teams with academics, resource agencies and environmental groups under the Interagency Ecological Program of CALFED. She provided expertise in modeling, assessment of restoration actions and impacts of water supply operations in the delta.

Jonathan Koehler, MS. Napa County Resource Conservation District. Mr. Koehler is monitoring the South Wetland Opportunity Area, which is currently a site under the Wetland Monitoring Program funded by the USEPA through 2006. Mr. Koehler has researched fish populations within tidal marshes of San Francisco Bay, stream assessments in Napa County, studies of macroinvertebrate, avian and fish in the Napa River estuary. Mr. Koehler has a MS degree in Biology with emphasis in fisheries ecology from CSU Hayward.

S. Geoffrey Schladow, PhD. UC-Davis. Dr Schladow is a Professor of Water Resources and Environmental Engineering at UC Davis and Director of the UC Davis Tahoe Environmental

Research Center. He was the P.I on the two previous multi-disciplinary studies of the Napa-Sonoma Marsh region, and has been a P.I. or co-P.I. on several restoration projects throughout the Delta (including the North Delta, Cosumnes Floodplain and the Stockton Deep Water Ship Channel). Dr Schladow has extensive experience in measurement of fundamental fluid transport properties, and their interactions with water quality and ecological parameters.

Ann Borgonovo, PE. PWA. Ms. Borgonovo is the Director of Design Engineering and has over 15 years experience in restoration implementation. She specialized in restoration concepts based on hydrologic and geomorphic studies into construction documents. Ms. Borgonovo is currently the project manager overseeing the engineering design for the first phase of restoration for the NSMR.

Stephen Crooks, PhD. PWA. Dr. Crooks is a coastal geomorphologist with specialized knowledge of estuarine and tidal wetland systems. He contributed to several interdisciplinary teams to assess wetlands functioning involving physical scientists, ecologists, economists and social scientists. He is author of over 30 peer-review papers, book chapters and reports on wetland restoration, estuarine geomorphology and sustainable management of coastal resources under conditions of climate change and urban development.

Jeff Sharp. RCD. Mr. Sharp is the Watershed Coordinator for the Napa County Office of Conservation, Development, and Planning. He has extensive experience in the management of scientific related information and public outreach through the WICC. The WICC is a result of recommendations by the Napa River Watershed Task Force Phase II Report.

D. COST

D.1 Budget

See PSP Budget form

D.2 Long-term Funding Strategy

See PSP Budget Justification form.

D.3 Overlap With Other Funding

A monitoring program, scheduled to be completed in November 2006, is currently underway at the Restoration Project. The proposed monitoring for the Restoration Project under this study has been carefully designed to dovetail with the existing monitoring program for that area. Both the scope of the existing monitoring and the schedule for the existing monitoring have been taken into consideration. Funding from this grant is designed solely to extend and enhance existing monitoring. The existing monitoring helps reduce the amount of baseline monitoring required for the Restoration Project (a lesser effort in Year 1).

E. COMPLIANCE WITH STANDARD TERMS AND CONDITIONS

The Coastal Conservancy is agreeable to, and able to comply with, the terms and conditions included in Exhibit D, Special Terms and Conditions for ERP Grant Agreements. The Coastal Conservancy, as a State agency, would like to substitute GIA 101 in place of Exhibit C, General Terms and Conditions for ERP Grant, as provided for in the language of Exhibit C.

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See also Relevant Studies in Table A.1.2-1.

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TABLES

TABLE A.1.2-1 Relevant Studies

Study Name	Study Date	Study Author	Type of Study	Study Area
Final Feasibility Study and Environmental Impact Statement, Napa River Salt Marsh Restoration	Jul 2004	U.S. Army Corps of Engineers	Engineering/ Environmental	Former Salt Ponds
Draft Cost Estimate of Napa Salt Marsh Salinity Reduction and Restoration Alternatives	May 2002	Brown and Caldwell	Engineering	Former Salt Ponds
Final Environmental Impact Report, Napa River Salt Marsh Restoration,	Apr 2004	California Department of Fish and Game	Environmental	Former Salt Ponds
Napa River Salt Marsh Restoration, Habitat Restoration Preliminary Design, Phase 2 Stage 2 of the Hydrology and Geomorphology Assessment in Support of the Feasibility Study	Nov 2002	Philip Williams and Associates (PWA)	Hydrology and Geomorphology	Former Salt Ponds
Historical Napa Marsh Channels, Napa-Sonoma Marsh Color Photography (Mosaic)	1999	San Francisco Estuary Institute	Hydrology and Geomorphology	Former Salt Ponds
Napa Sonoma Marsh Restoration Feasibility Study: Hydrodynamic Modeling Analyses of Existing Conditions-Phase I	Mar 2002	PWA	Hydrodynamic Modeling	Former Salt Ponds
Napa Sonoma Marsh Restoration Feasibility Study Hydrodynamic Modeling Study: Preliminary Salinity Reduction, Habitat Evolution, and Sediment Budget, Phase 2 Stage I	Mar 2002	PWA	Hydrodynamic Modeling	Former Salt Ponds
Baylands Ecosystem Habitat Goals [the Goals Report]	Mar 1999	San Francisco Bay Area Wetland Ecosystem Goals Project	Planning	
Reconnaissance Report, Napa River Salt Marsh Restoration	Aug 1997	U.S. Army Corps of Engineers	Planning	Former Salt Ponds

TABLE A.3-1. PAST AND CURRENT MONITORING EFFORTS IN THE STUDY AREA

Study Name and Area	Monitoring Period	Study Author(s)	Study Status	Analytical and Statistical Methods	Information Generated	Findings
A.3.1 Napa River Salt Marsh Restoration Project, Water Quality and Sediment Characterization – Former Salt Ponds	October 2001 and October 2002	Hydroscience Engineers	Complete		Samples were analyzed for volatile and semi-volatile organics, pesticides, PCBs, heavy metals, dioxins, and general water quality parameters, including nutrients, TDS, TSS, pH, temperature, salinity, and DO.	
A.3.2 USGS Priority Ecosystem Science Program – Former Salt Ponds	October 1998	USGS-WRD, USGS-BRD, UC-Davis	Ongoing	Time series analysis of continuous data, numerical box model of a salt pond	Buchanan (2003), Buchanan and Ganju (2004), Ganju et al. (2004), Lionberger et al. (2004), Miles et al. (2000), Miles et al. (2004), Shellenbarger et al. submitted, Swanson et al. (2003), Takekawa et al. (2001*a*), Takekawa et al. (*in press*), Warner et al. (2002), Warner et al. (2003)	Water and salt budgets for the ponds 1999-2001.
A.3.3 Baseline Monitoring of the Pond 2A Tidal Restoration Project, Final Report, July 1996 – July 2000, prepared for California Department of Fish and Game – Pond 2A	July 1996 – July 2000	PWA and MEC Analytical Systems	Pond 2A		Surveys of levee breach and natural slough channel width equilibrium, sediment chemistry and grain size, sedimentation rates, tidal range and response, fish usage, avian usage, and plant	

Study Name and Area	Monitoring Period	Study Author(s)	Study Status	Analytical and Statistical Methods	Information Generated	Findings
					colonization.	
A.3.4 Ground Control and Hydrographic Survey Report, Napa River Salt Marsh Restoration Project Phase II-Topographic and Hydrographic Surveys – Former Salt Ponds	2001	Towill, Inc.	Complete		Included in the Feasibility Study with the U.S. Army Corps of Engineers (USACE, 2003c)	The survey included a very accurate primary control level loop through the site, which was connected to high confidence benchmarks outside the site. This survey was used in the development of the hydrodynamic model by PWA and will be useful for before and after comparisons of elevations.
A.3.5 Desalinization, Erosion, and Tidal and Ecological Changes Following the Breaching of a Levee between a Salt Pond and a Tidal Slough -- Pond 3	August 2002 – September 2003	USGS-WRD, USGS-BRD	Complete, Final paper submitted	Repeated spatial breach measurements (laser level rod), use of continuous CTD data, ADCP transects for pond discharge, repeated measurements for near-breach erosion using ADCP data and GIS, repeated bird (visual counts), fish (bag seine), and invertebrate (Ekman grab) surveys	Shellenbarger et al. submitted, Swanson et al. (2003), Takekawa et al. (2004)	Physical processes need to be considered when timing a breaching event and locating a breach; near-breach erosion is significant; decreasing pond salinity drove change in pond invertebrates and fish; changing pond water levels and prey drove change in bird use
A.3.6 Napa/Sonoma Marsh Hydrodynamics and Sediment Transport – Napa-Sonoma Marsh slough system	1997-1998	USGS-WRD, UC-Davis	Complete	Time series analysis of continuous data (salinity, suspended-sediment concentration, water surface, velocity)	Warner et al. (2003)	The Napa River is the dominant regional freshwater source. Mare Island Strait behaves as a baroclinic convergence zone with a salinity

Study Name and Area	Monitoring Period	Study Author(s)	Study Status	Analytical and Statistical Methods	Information Generated	Findings
						minimum and a high rate of sediment deposition. There is a barotropic convergence zone in the center of the slough system.
A.3.7USEPA CISNet Program – Napa-Sonoma Marsh Sloughs and San Pablo Bay	1999-2001	UC-Davis, USGS, PRBO, SFEI		Time series analysis of continuous data. Chemical analysis for a variety of organic and inorganic constituents (based on RMP methodologies); bird and egg chemical analyses and statistical analysis; chemical analysis of fish tissue; statistical analysis of benthic assemblages	Ganju et al. (2004) Schladow (Ed.) 2004	A tidally oscillating sediment mass is in Sonoma Creek. Established linkages between hydrodynamics, contaminant fluxes, indicator species, and contaminant levels in fish and birds under pre-restoration conditions
A.3.8 Napa River Fisheries Monitoring Program	2001-2005	U.S. Army Corps of Engineers, Stillwater Sciences, Jones & Stokes	In process	Analytical methods Comparison of fish species and life stages (emphasis on Sacramento splittail and delta smelt) between created/restored to surrounding habitats. Gear: otter trawl, fyke net, beach seine, and purse seine. Identification of larval fish. Environmental variables: dissolved oxygen, temperature, salinity, turbidity, and tide height. Statistical methods Multivariate linear regression to identify possible relationships	Four years of data collected to determine annual and seasonal trends of native and non-native fish species. Reports include: USACE 2001a, USACE 2001b, USACE 2002, USACE 2003a, USACE 2003b, and USACE 2004 (in progress)	1) Juvenile Sacramento splittail are positively correlated with salinity in created/restored habitat 2) Juvenile Sacramento splittail were more abundant in shallow created/restored habitat than surrounding deep habitat. 3) Striped bass appear to have a seasonal distribution and are positively

Study Name and Area	Monitoring Period	Study Author(s)	Study Status	Analytical and Statistical Methods	Information Generated	Findings
				between relative abundance and environmental variables. Generalized linear model.		correlated with salinity. 4) CPUE of Pacific herring was significantly greater in 2002 than in 2003 or 2004. No clear relationship between abundance and environmental parameters is apparent yet.
A.3.9 BREACH II	2001-2004	University of Washington, PWA, Romberg Tiburon Center, University of New Orleans, PRBO Conservation Science	Completed Napa Pond 2A, White Slough, Centennial marsh Petaluma Petaluma Ancient, Carl's Marsh, Green Point Restored, Greenpoint Centennial, Suisun Ryer, Ryer restored	An interdisciplinary assessment of tidal wetland restoration action in the North Bay and Delta. Analysis involved geomorphic analysis of channel development and sedimentation, and ecological assessment of invertebrate, fish and bird utilization across a spectrum of natural and restoring marshes.	Orr, Crooks and Williams (2003) Dedicated special edition of Restoration Ecology (2005) in prep. 3 MSc Thesis Presentations to CALFED and other Scientific conferences BREACH report in prep (Dec 2004)	(1) systematically addressed the present status, rates, and patterns of tidal ecosystem restoration in discrete ecosystems; (2) determined factors that promote rapid restoration of shallow-water habitat *versus* factors that potentially inhibit natural rates and patterns of functional development; (3) assessed the contribution of shallow water habitats to food webs supporting tidal marsh ecosystems; and (4) evaluated the overall outcome of breached-levee

TABLE A.4.6-1 OVERALL PROJECT PERFORMANCE MEASURES

No.	Performance Measure	Metric
1	Refine and approve annual sampling programs through peer review	1. Annual peer review conducted 2. Peer review comments addressed
2	Collect all data specified in sampling programs	Percent of proposed measurements/samples actually collected
3	Meet data quality objectives (DQOs)	1. Define DQOs for chemical and numerical data 2. All data QA/QCed within 4 weeks of receipt/collection 3. All data meet DQOs 4. Identify corrective measures if data do not meet DOQs
4	Complete laboratory analyses and QA/data reports within 5 months of sampling	1. All data has been QA/QCed, and laboratory analyses and QA/data reports completed within 5 months
5	Complete peer-reviewed annual project findings and progress reports for CALFED	1. Annual project findings and progress report prepared 2. Peer review conducted 3. Peer review comments addressed
6	Present findings from each task at CALFED Science Conference and at least one 1 other review meeting	1. Findings presented at CALFED Science Conference 2. Findings presented at other scientific meetings
7	Produce peer-reviewed final report	1. Final report prepared 2. Peer review conducted 3. Peer review comments addressed
8	Present findings and raw data on the web	1. QA/QC data quarterly to Lead Investigator for dissemination 2. Raw data posted to WICC and SFBJV website each quarter 3. All peer-reviewed progress reports and the final report are posted to the WICC website, SFBJV website, South Bay Salt Pond Restoration Project website, and Napa Salt Marsh Restoration Project website within 30 days of completion. 4. Announcements of published journal articles are posted to the same websites on a quarterly basis. Links to articles are provided where feasible.
9	Publish results in peer-reviewed journals	Each task generates at least one peer-reviewed journal article.

A.9-1 Work Schedule

TASK		2006												2007												2008											
NO.	**NAME**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
1	***Project Management***																																				
	Set up agreements with researchers and consultants	X	X																																		
	Coordination with other projects and coordination of field work and other activities	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Semi-Annual Report for Preceeding 6 months							X						X						X						X						X					
	Annual Report for Preceeding Year														X												X										
	NSMRG Presentation							X											X												X						
	Conference Presentations										X			X									X												X		
	Final Report																																				X
2	***Data Management & Storage***																																				
	Compile Existing Data	X	X	X																																	
	Set-up and WICC Test Database	X	X																																		
	Transfer Existing Information Into WICC and USGS Databases		X	X																																	
	Train Researchers and Field Staff on WICC Webportal Capabilities			X																																	
	Release WICC Database for Public Access				X																																
	Update WICC Database with New Data				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Backup USGS Main Database	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3	***Restoration Project Water Quality***																																				
	Pre-Construction Monitoring Under Existing Grant/Other Funding																																				
	Purchase Equipment	X												X												X											
	Install/Set-up Equipment	X																																			
	Monitoring Period	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Service Equipment/Download Data																																				
	Sample Collection		X			X			X			X			X			X			X			X			X			X			X				
	Laboratory Sample Analysis			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
	Laboratory Data QA/QC			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
	Report Preparation													X												X									X	X	X

A.9-1 Work Schedule

TASK		2006												2007												2008											
NO.	**NAME**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
4	***Restoration Project Hydrology***																																				
	Pre-Construction Monitoring Under Existing Grant/Other Funding																																				
	Purchase Equipment			X	X																																
	Install/Set-up Equipment												X																								
	Monitoring Period												X	X				X	X												X	X					
	Service Equipment/Download Data													X					X													X					
	Data QA/QC																																				
	Report Preparation																		X							X						X				X	X
5	***Restoration Project Habitat Evolution***																																				
	5A Marshplain Accretion																																				
	Pre-Construction Monitoring Under Existing Grant/Other Funding																																				
	Purchase Equipment																																				
	Install/Set-up Equipment																						X	X													
	Monitoring Period (Bathymetry)																						X	X													
	Report Preparation																									X	X								X	X	X
	5B Breach Monitoring																																				
	Pre-Construction Monitoring Under Existing Grant/Other Funding																																				
	Purchase Equipment	X												X												X											
	Install/Set-up Equipment	X												X												X											
	Monitoring Period (each breach quarterly with staggered measurements)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Oblique Digital Photos	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

A.9-1 Work Schedule

TASK		2006												2007												2008											
NO.	NAME	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
	5C Slough Channel Development																																				
	Pre-Construction Monitoring Under Existing Grant/Other Funding									X	X																										
	Install/Set-up Equipment																																				
	Monitoring Period																																				
	Aerial Photography										X												X												X		
	Digital Photography									X	X											X	X											X	X		
	Breach Monitoring										X			X			X			X			X			X			X			X					
	Detailed Topographic Survey																															X	X				
	Slough Bathymetric Survey																																X	X			
	Pond Bathymetirc survey																															X	X				
	Survey Data QA/QC																																	X	X		
	Erosion Pin Monitoring										X						X						X						X						X		
	Report Preparation													X						X						X						X				X	X
6	***Restoration Project Primary Productivity***																																				
	Pre-Construction Monitoring Under Existing Grant/Other Funding																																				
	Purchase Equipment	X												X												X											
	Install/Set-up Equipment																																				
	Monitoring Period																																				
	Service Equipment/Download Data																																				
	Sample Collection		X			X			X			X			X			X			X			X			X			X			X				
	Laboratory Sample Analysis			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
	Laboratory Data QA/QC			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
	Report Preparation													X												X									X	X	X
7	***Restoration Project Vegetation***																																				
	Pre-Construction Monitoring Under Existing Grant/Other Funding																																				
	Purchase Equipment				X									X																							
	Install/Set-up Equipment																																				
	Monitoring Period								X	X	X							X	X	X	X																
	Service Equipment/Download Data																																				
	Sample Collection																																				
	Laboratory Sample Analysis																																				
	Laboratory Data QA/QC																																				
	Report Preparation														X																						

A.9-1 Work Schedule

TASK		2006												2007												2008											
NO.	**NAME**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
8	***Restoration Project Macroinvertebrates***																																				
	Pre-Construction Monitoring Under Existing Grant/Other Funding																																				
	Purchase Equipment	X												X												X											
	Install/Set-up Equipment																																				
	Monitoring Period																																				
	Service Equipment/Download Data																																				
	Sample Collection		X						X						X						X						X						X				
	Laboratory Sample Analysis			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
	Laboratory Data QA/QC			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
	Report Preparation																																		X	X	X
9	***Restoration Project Fish***																																				
	Pre-Construction Monitoring Under Existing Grant/Other Funding	X	X	X	X	X	X																														
	Post-Construction Monitoring Under Existing Grant/Other Funding						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X												
	Purchase Equipment	X	X	X	X	X	X																														
	Install/Set-up Equipment							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X												
	Monitoring Period																																				
	Service Equipment/Download Data																																				
	Sample Collection	X		X	X	X		X		X		X		X		X	X	X		X		X		X													
	Laboratory Sample Analysis																																				
	Laboratory Data QA/QC	X		X	X	X		X		X		X		X		X	X	X		X		X		X													
	Report Preparation											X	X											X	X	X	X	X	X	X	X	X	X	X	X	X	X

A.9-1 Work Schedule

TASK		2006												2007												2008											
NO.	**NAME**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
10	***Restoration Project Birds***																																				
	Pre-Construction Monitoring Under Existing Grant/Other Funding																																				
	Purchase Equipment										X												X												X		
	Install/Set-up Equipment																																				
	Monitoring Period	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Service Equipment/Download Data																																				
	Sample Collection																																				
	Laboratory Sample Analysis																																				
	Laboratory Data QA/QC																																				
	Report Preparation																																				X
11	***Restoration Project Special Status Species***																																				
	Pre-Construction Monitoring Under Existing Grant/Other Funding																																				
	Post-Construction Monitoring Under Existing Grant/Other Funding																																				
	Purchase Equipment																																				
	Install/Set-up Equipment										X							X																			
	Monitoring Period													X	X					X	X	X															
	Service Equipment/Download Data																																				
	Sample Collection																																				
	Laboratory Sample Analysis																																				
	Laboratory Data QA/QC																																				
	Report Preparation																										X										
12	***Napa River Estuary Water Quality***																																				
	Pre-Construction Monitoring Under Existing Grant/Other Funding	X	X	X	X	X	X	X																													
	Purchase Equipment			X					X																												
	Install/Set-up Equipment					X												X												X							
	Monitoring Period						X	X	X										X	X	X										X	X	X				
	Service Equipment/Download Data							X	X	X										X	X	X										X	X	X			
	Sample Collection						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Laboratory Sample Analysis									X		X	X			X			X			X		X	X			X			X			X		X	X
	Laboratory Data QA/QC											X												X												X	
	Report Preparation													X	X	X									X	X	X	X	X	X	X	X	X	X	X	X	X

A.9-1 Work Schedule

TASK		2006												2007												2008											
NO.	NAME	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
13	***Napa River Estuary Hydrology***																																				
	Pre-Construction Monitoring Under Existing Grant/Other Funding																																				
	Purchase Equipment			X	X																																
	Install/Set-up Equipment												X					X																			
	Monitoring Period												X	X					X	X	X										X	X					
	Service Equipment/Download Data													X					X	X	X	X										X					
	Sample Collection																																				
	Laboratory Sample Analysis																																				
	Data QA/QC														X						X												X				
	Report Preparation																			X						X	X	X	X	X	X	X	X	X	X	X	X
14	***Napa River Estuary Plants***																																				
	Pre-Construction Monitoring Under Existing Grant/Other Funding																																				
	Post-Construction Monitoring Under Existing Grant/Other Funding																																				
	Purchase Equipment													X																							
	Install/Set-up Equipment																																				
	Monitoring Period																	X	X	X	X																
	Service Equipment/Download Data																																				
	Sample Collection																																				
	Laboratory Sample Analysis																																				
	Laboratory Data QA/QC																																				
	Report Preparation																										X										
15	***Napa River Estuary Inverts***																																				
	Pre-Construction Monitoring Under Existing Grant/Other Funding																																				
	Post-Construction Monitoring Under Existing Grant/Other Funding																																				
	Purchase Equipment	X												X												X											
	Install/Set-up Equipment																																				
	Monitoring Period																																				
	Service Equipment/Download Data																																				
	Sample Collection		X						X						X						X						X						X				
	Laboratory Sample Analysis			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
	Laboratory Data QA/QC			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
	Report Preparation																																				

A.9-1 Work Schedule

TASK		2006												2007												2008											
NO.	**NAME**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
16	***Napa River Estuary Fish***																																		X	X	X
	Pre-Construction Monitoring Under Existing Grant/Other Funding											X	X											X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Purchase Equipment																																				
	Install/Set-up Equipment																																				
	Monitoring Period		X	X	X	X	X	X							X	X	X	X	X	X							X	X	X	X	X	X					
	Service Equipment/Download Data		X	X	X	X	X	X							X	X	X	X	X	X							X	X	X	X	X	X					
	Sample Collection		X	X	X	X	X	X							X	X	X	X	X	X							X	X	X	X	X	X					
	Laboratory Sample Analysis																																				
	Field Data QA/QC		X	X	X	X	X	X	X						X	X	X	X	X	X	X						X	X	X	X	X	X	X				
	Report Preparation																																				
17	***Napa River Estuary Birds***																																				
	Pre-Construction Monitoring Under Existing Grant/Other Funding	X	X	X	X	X	X	X																													
	Post-Construction Monitoring Under Existing Grant/Other Funding																																				
	Purchase Equipment										X												X												X		
	Survey -- South Wetlands Opportunity Area								X		X		X		X		X		X		X		X		X		X		X		X		X		X		X
	Monitoring Period	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Clapper Rail Call Survey																																				
	Report Preparation													X												X											X

FIGURES

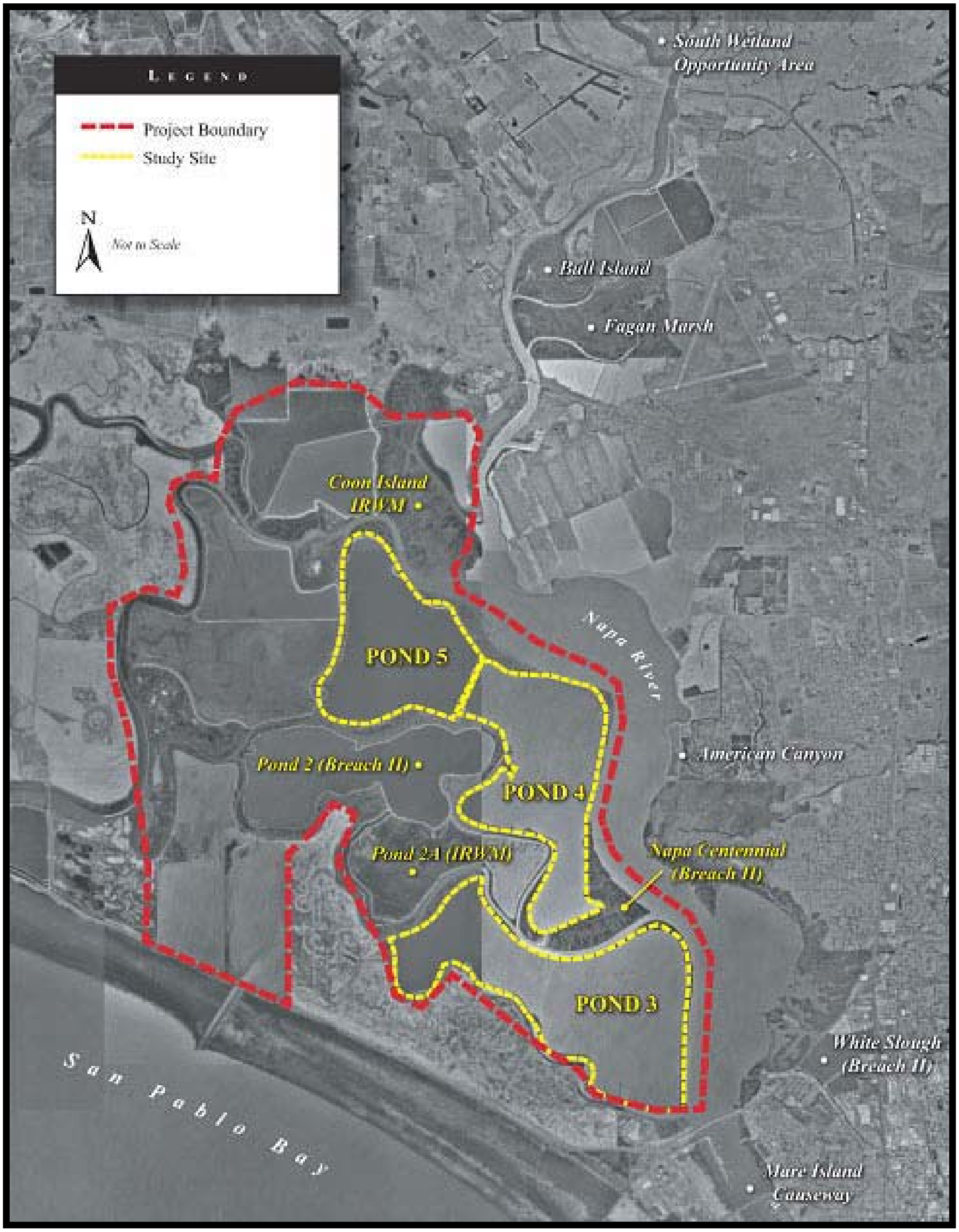

Figure 1. Proposed monitoring study area, extending from San Pablo Bay upstream to Napa, and from baylands east of the Napa River to Napa Slough in the west. Former salt evaporation ponds (Ponds 3, 4, and 5) will be opened to tidal flow along the river and in adjacent sloughs. We will sample four tidal marshes (labeled in white) from downstream (Mare Island Causeway), adjacent (White Slough, American Canyon), and upstream (Fagan Marsh, Bull Island, South Wetlands Opportunity Area) of the Restoration Project.

Figure 2. The Napa River watershed (1103 km^2) is fed by 47 tributaries and extends 89 km from Mt. St. Helena to San Pablo Bay at the Carquinez Strait. The 28 km lower section of the river corridor below the City of Napa (Trancas Street) is an estuarine system with seasonally and tidally varying salinity. The boundary extends from the hills east of the Napa River to the Napa Slough in the west.

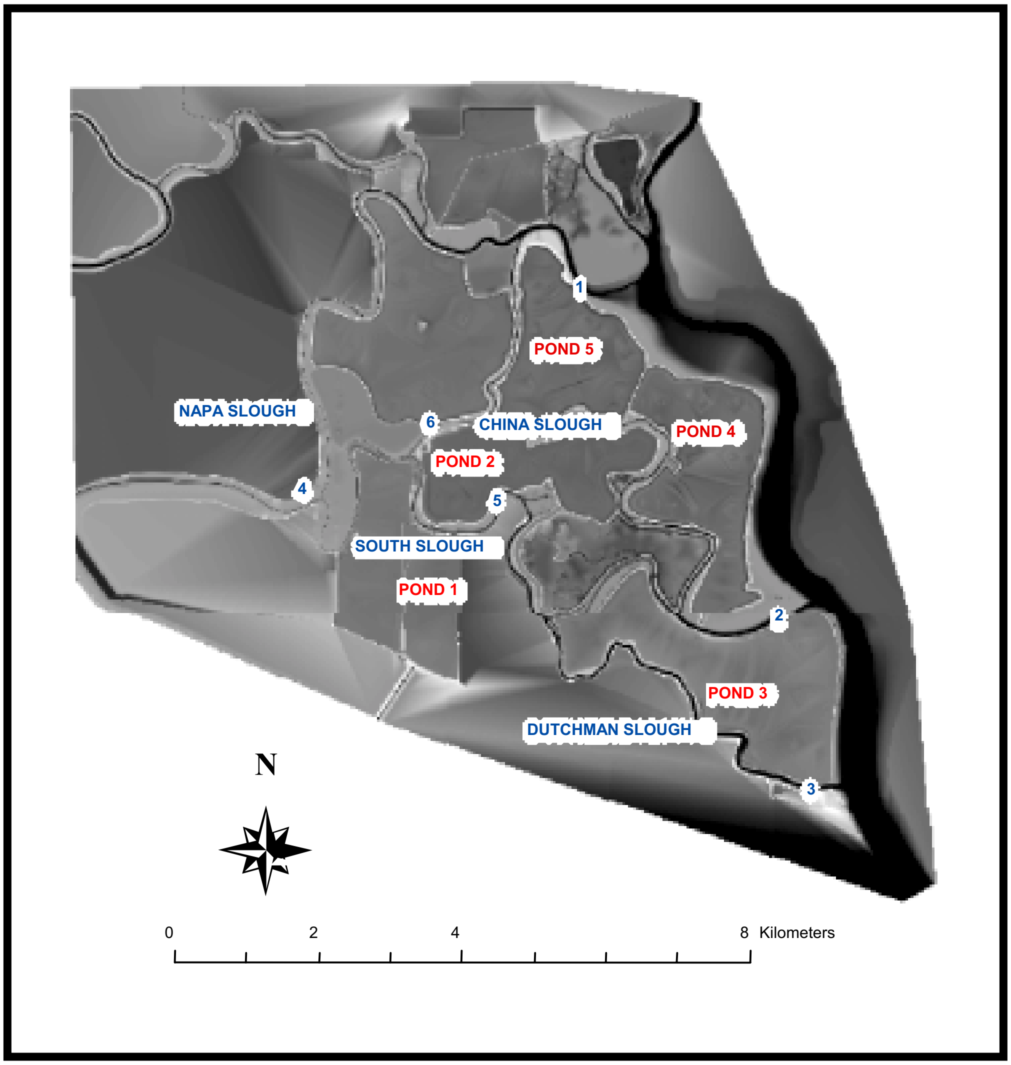

Figure 3. Digital elevation model (USACE 2003c) of the Napa Sonoma Marshes and proposed locations for fish sampling in adjacent sloughs. Major channels include the Napa River to the east, Napa Slough to the west, and Dutchman Slough to the south. Water in the salt evaporation ponds formerly traveled from San Pablo Bay into Pond 1, then pumped to Pond 2 into tidal restoration Ponds 3-5.

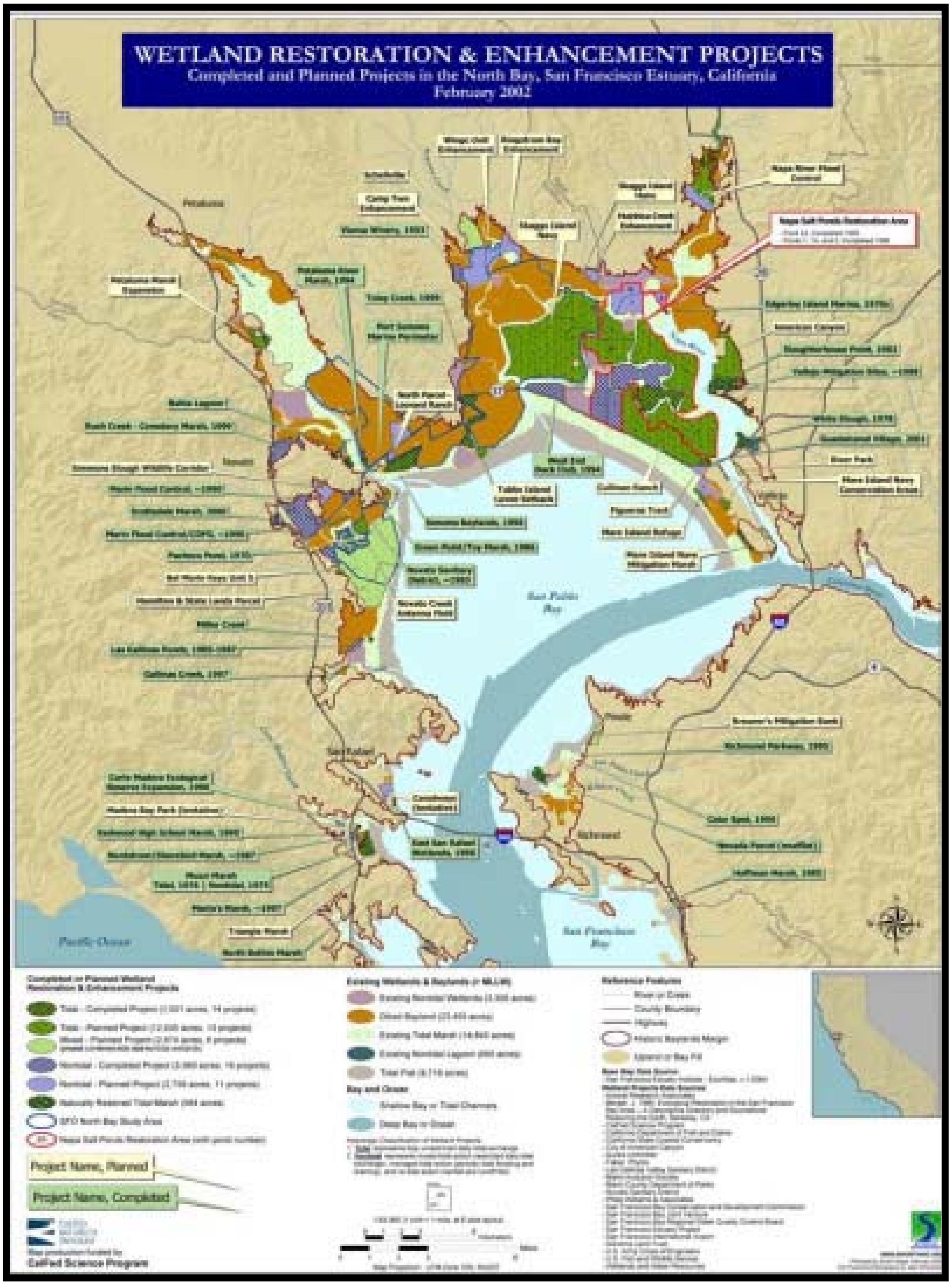

Figure 4. Tidal marsh wetland restoration projects in the North Bay (Wetlands and Water Resources 2002) including the Napa River Estuary. This region includes the largest contiguous block of tidal salt marsh habitat in the Bay area, and the Napa Salt Marsh Restoration Project is the largest of the restoration projects on diked baylands.

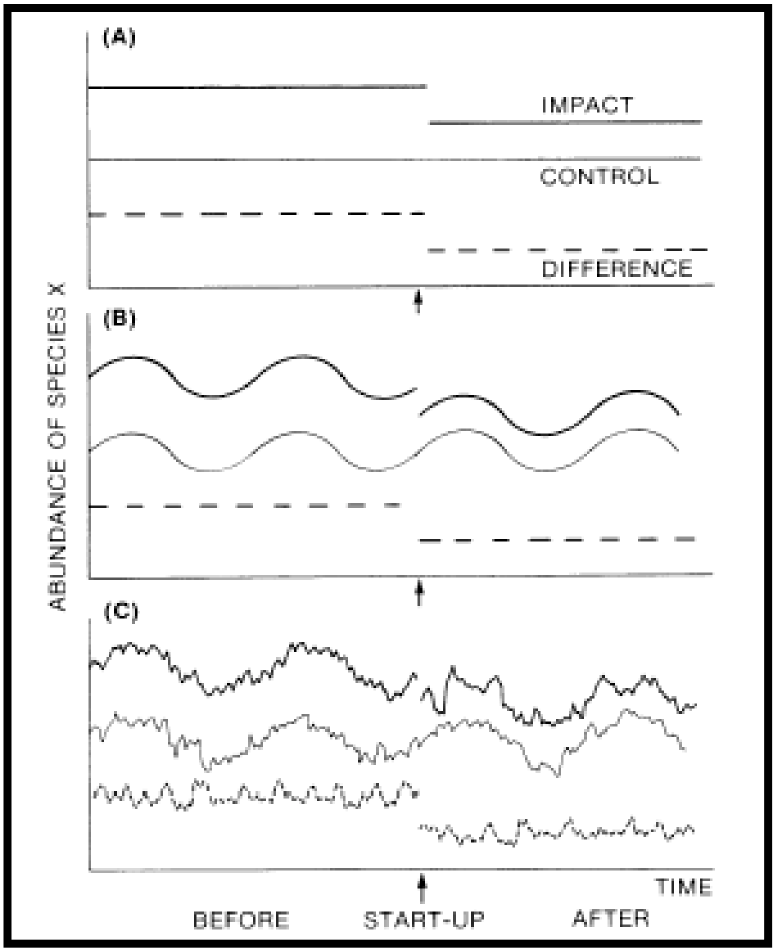

Figure 5. The BACI (Before-After, Control-Impact) statistical analysis framework (Stewart-Oaten et al. 1986). The BACI approach is based on comparing differences in "Control" and "Impact" site characteristics, "before" and "after" an action. The example shows abundances of "Species X" at the Impact and Control stations, and the difference of the abundances in three versions of impact assessment. (A) Each station's abundance is constant except for a drop in the Impact station's abundance after an action. (B) Abundances fluctuate (e.g., seasonally), but differences remain constant except when the action is initiated. (C) Abundances fluctuate partly in synchrony and partly separately; the former fluctuations disappear in the differences but the latter remain, and the action must be distinguished from them."

In our proposal, we will examine the application of BACI sampling by comparing characteristics of "control" unrestored, diked ponds and "impact" Restoration Project ponds, "before" and "after" breaching, as well as near-field to far-field effects between "control" Estuary wetlands, and "impact" breached ponds.

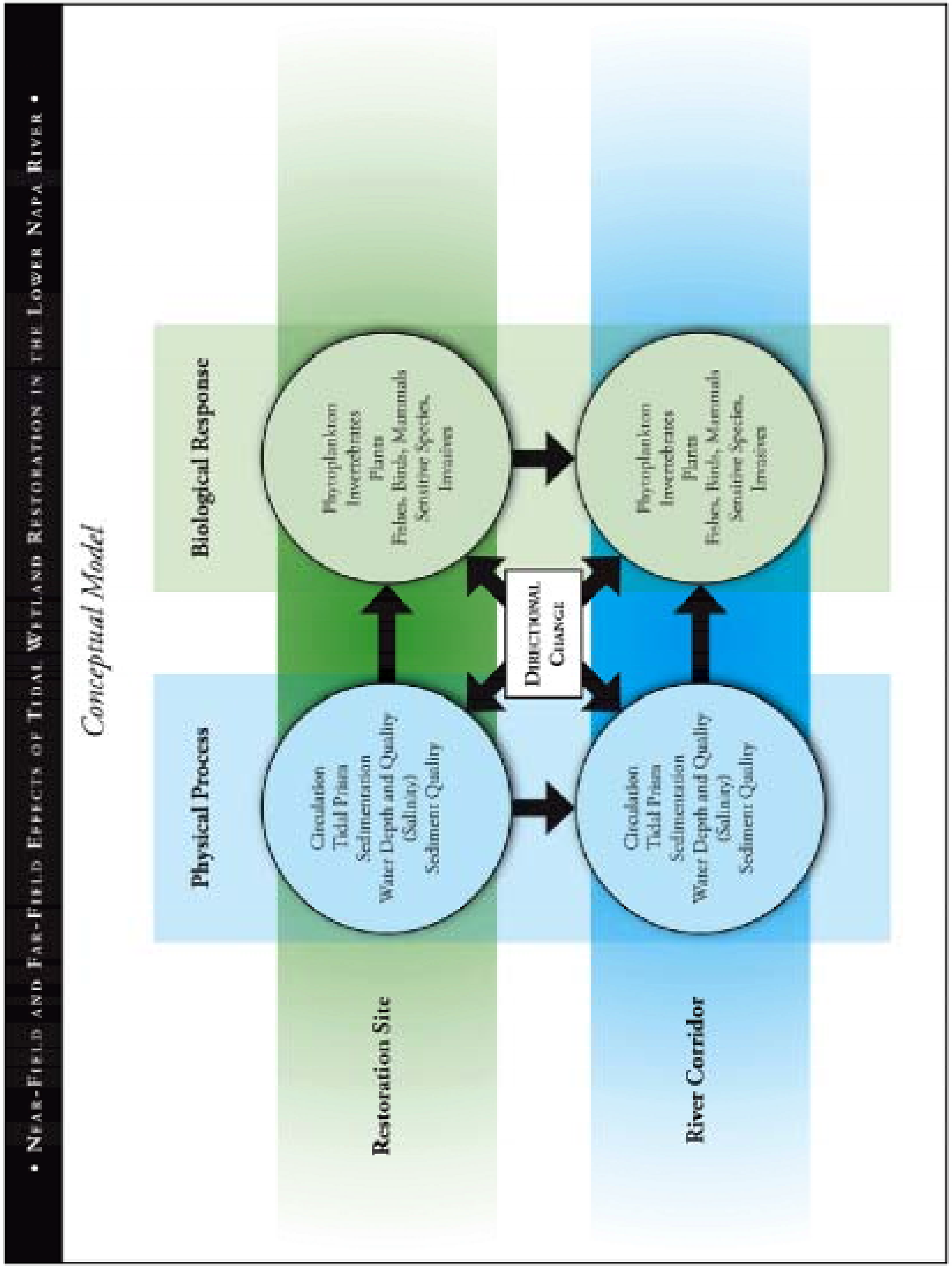

Figure 6. Contingency table conceptual model and linkages for the monitoring proposal entitled "Near-field and Far-field Effects of Tidal Wetland Restoration in the Lower NapaRiver." Tidal marsh restoration actions in the Restoration Project propagate into changes in the Napa River Estuary, with largest physical changes in early restoration that may elicit the greatest ecosystem response. We will examine changes in Physical Processes from the restoration actions and the resulting Biological Responses in both near-field and far-field areas.

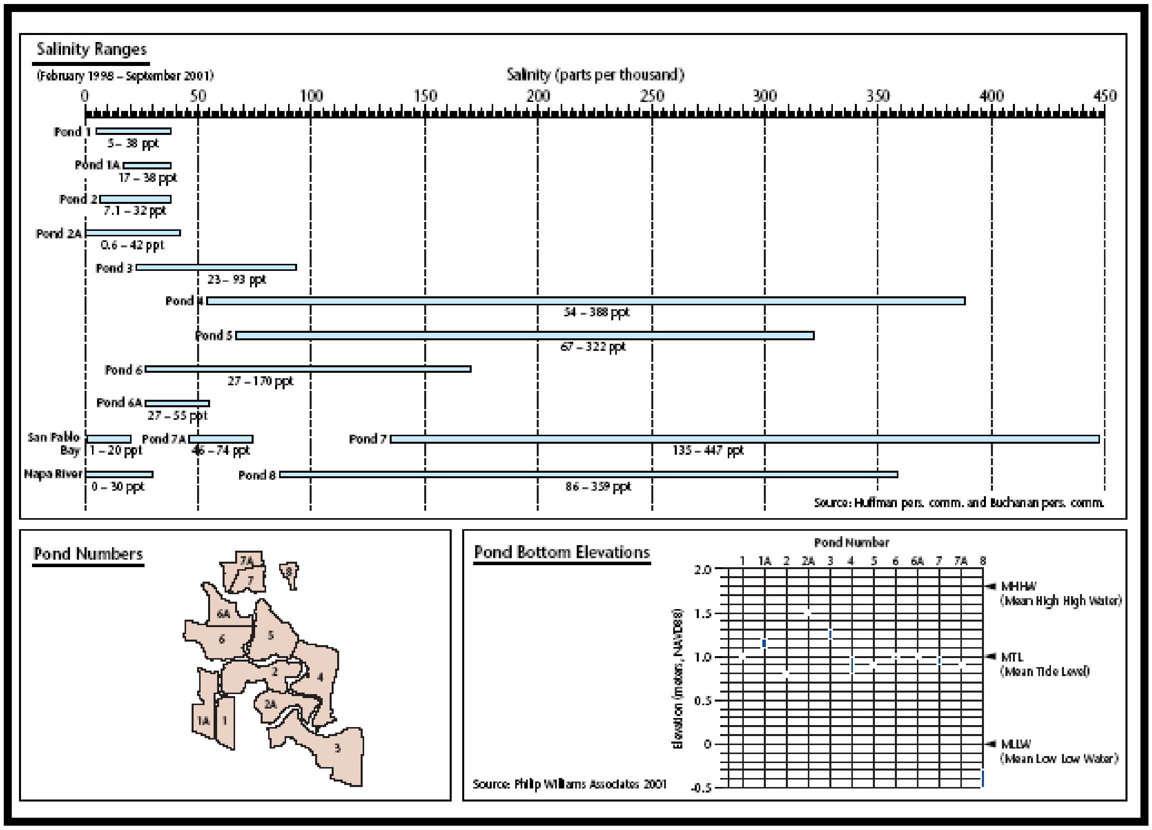

Figure 7. Salinity ranges in the Napa Salt Marsh Restoration Project, the Napa River Estuary, and San Pablo Bay (Phillip Williams and Associates 2001). Pond bottom elevations are indicated in NAVD88, and relative to mean lower low water (MLLW).

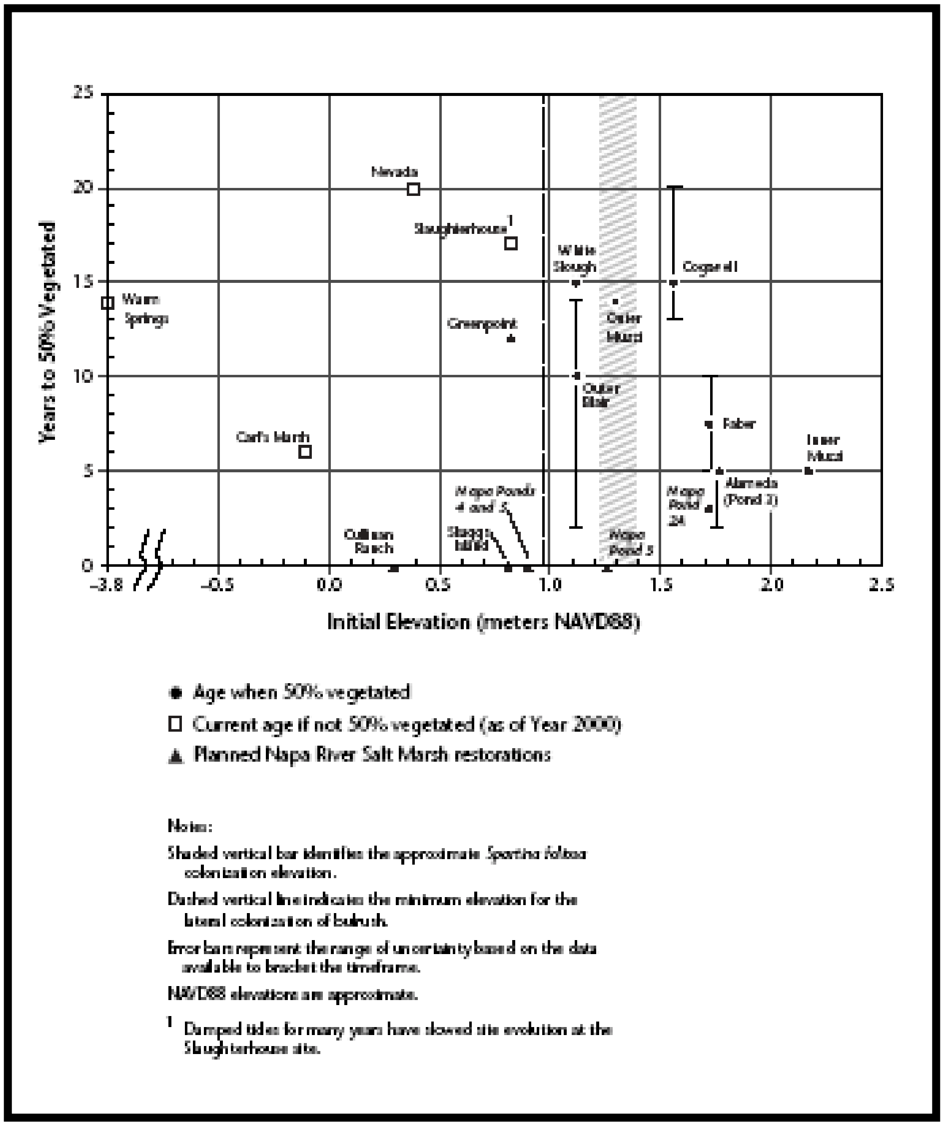

Figure 8. Site evolution -- predicted year of 50% vegetative cover for several restoration sites on the basis of initial pond elevations and expected sedimentation accretion rates (Phillip Williams and Associates 2002).

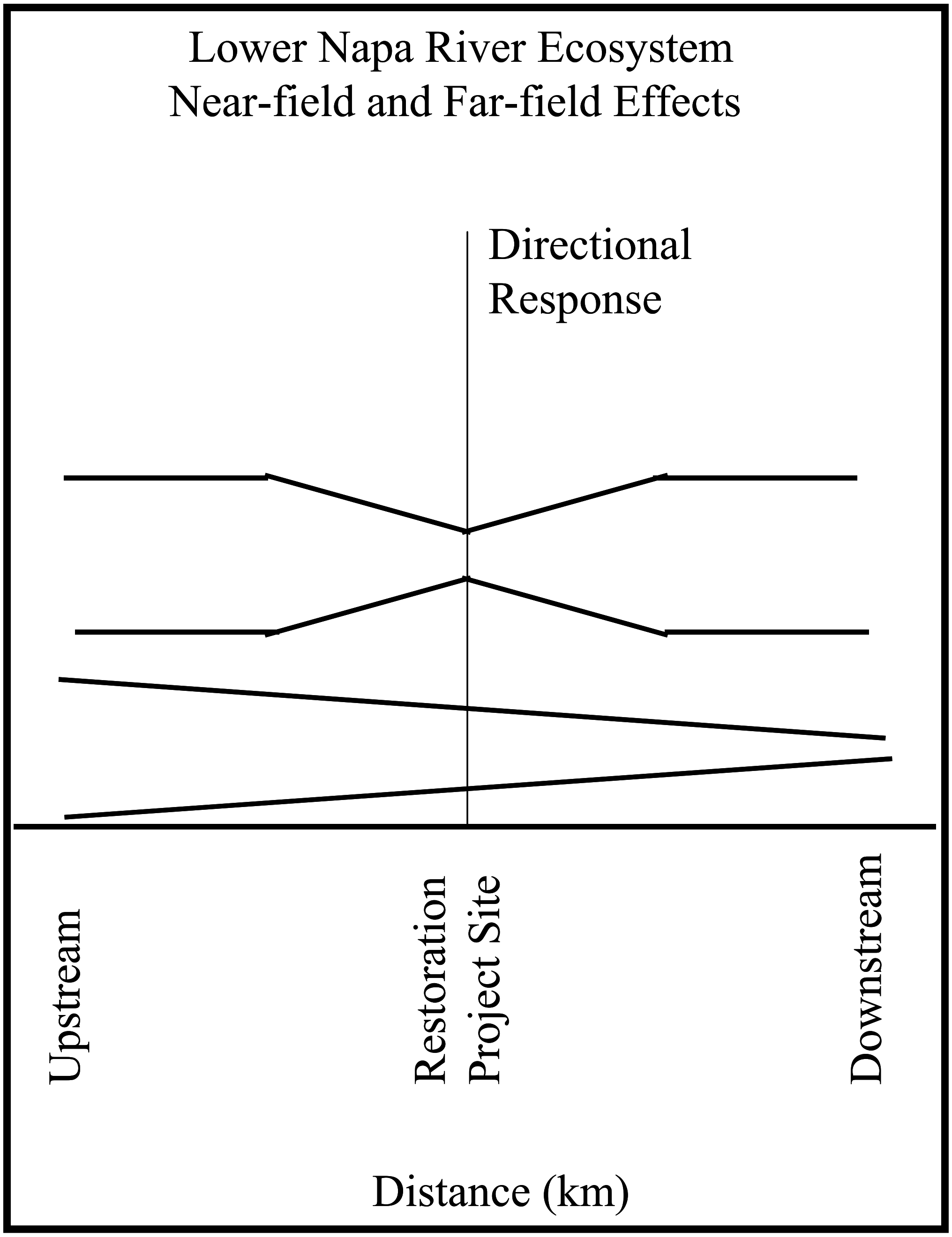

Figure 9. Conceptual model of directional changes for the monitoring proposal entitled “Near-field and Far-field Effects of Tidal Wetland Restoration in the Lower Napa River.” Greatest ecosystem responses are expected in the near-field areas adjacent to the restoration, with decreasing responses in far-field areas at the estuarine edge. Downstream-to-upstream directional responses may include linear responses, or opposite increasing and decreasing responses away from the restoration site.

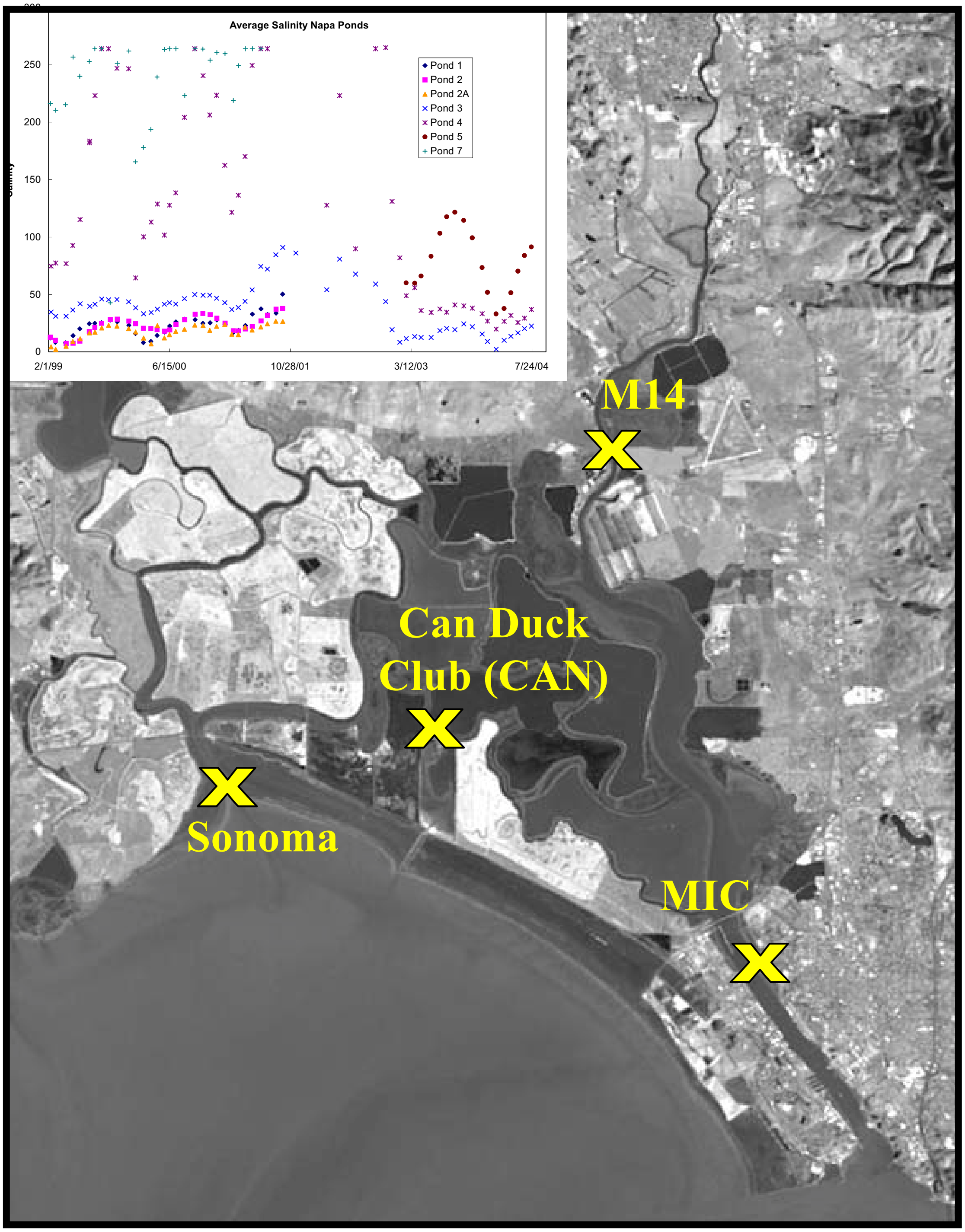

Figure 10. Location of the four USGS salinity sampling stations in the North Bay region. Sampling stations will be reoccupied to measure post-construction changes in salinity, suspended sediment, and flows. Inset chart shows example of seasonal variation in salinity in salt ponds of the Restoration Project (USGS, unpubl. data).

Figure 11. Barotropic Convergence Zone in baylands of the North Bay. Poor mixing in this region is due to tidal asymmetries between the east and west side of the interconnected tidal slough network during a part of the spring-neap tidal cycle on South Slough (Warner et al. 2003). This region can collect and concentrate salts and sediment.

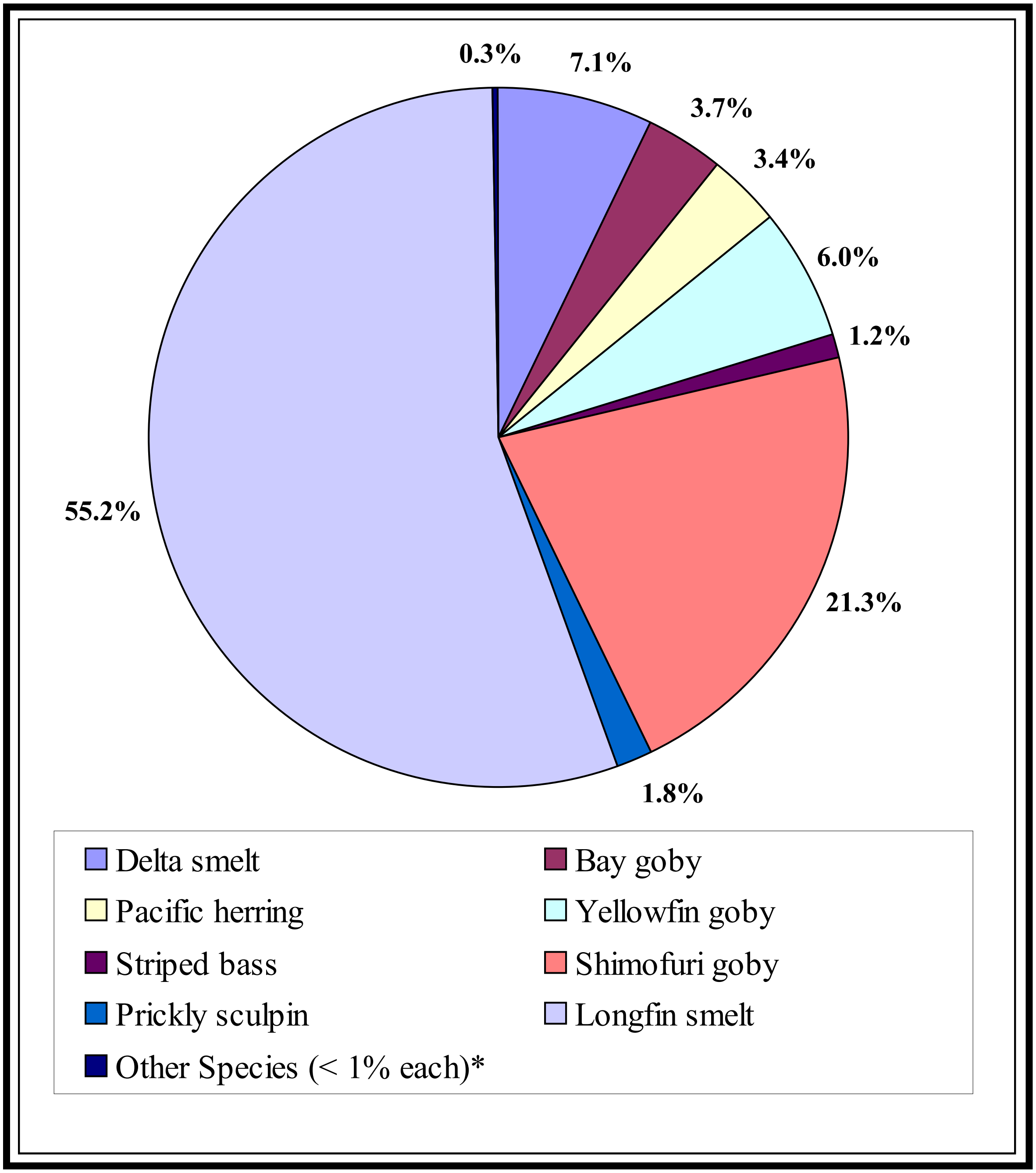

Figure 12. Composition of larval fish species (greater than 1%) in the USACOE Napa River Project area in 2001 (Jones and Stokes, Stillwater Sciences 2001). Other species (*) include Sacramento splittail, jack smelt, arrow goby, unidentified centrarchids, unidentified smelt, Sacramento sucker, threespine stickleback, inland silverside, long-jawed mudsucker, northern anchovy, and threadfin shad.

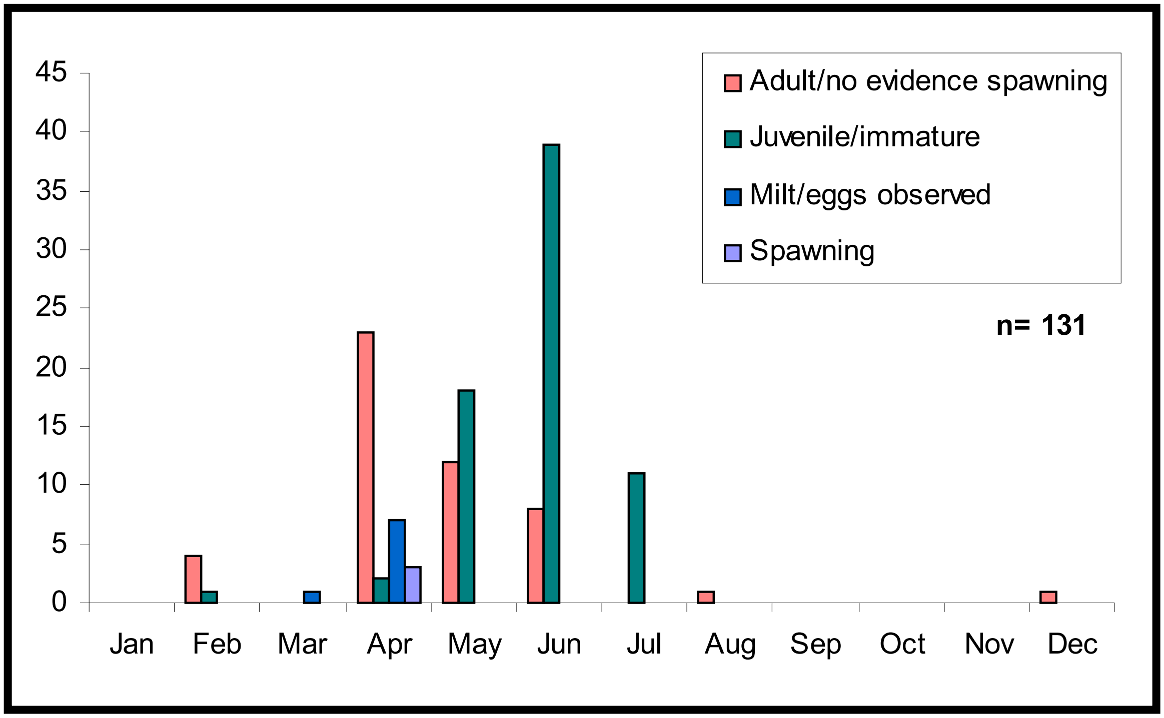

Figure 13. Summary graphic from USACOE Napa River Project fish study (Jones and Stokes, Stillwater Sciences 2003). Sacramento splittail spawning evidence showing juvenile presence on the Napa River from February through July, with spawning in April 2003.

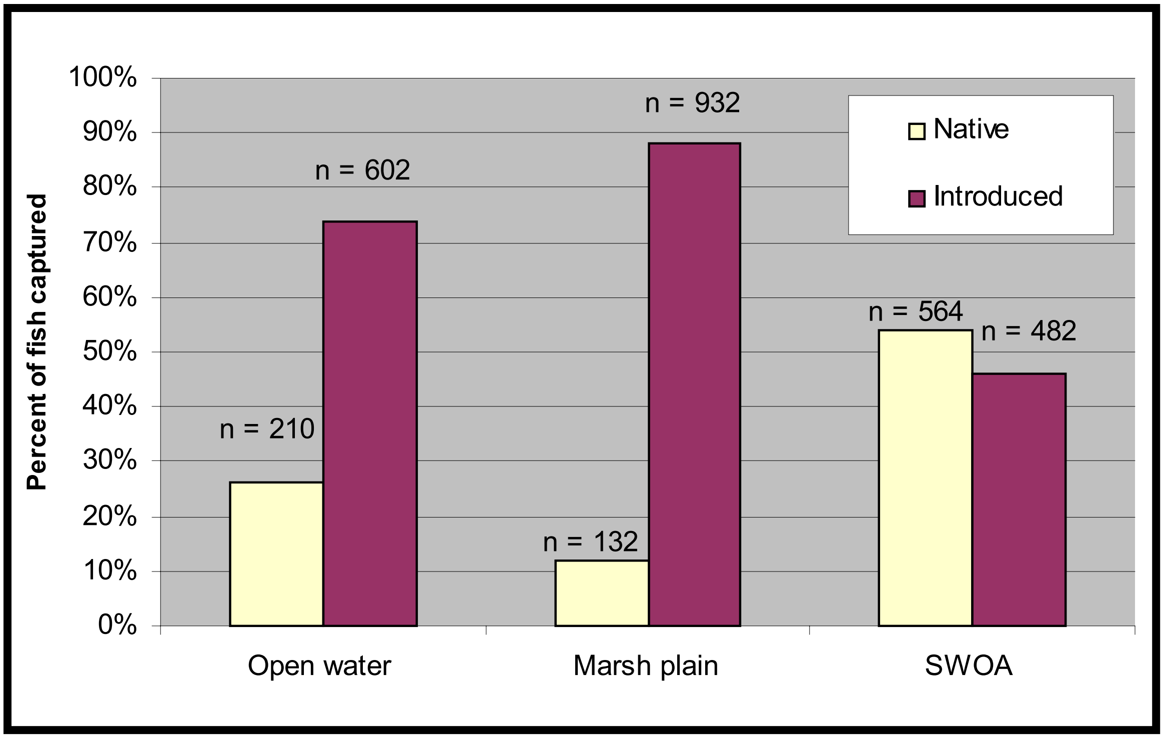

Figure 14. Summary graphic from USACOE Napa River Project fish study (Jones and Stokes, Stillwater Sciences 2003). Sample number and percent of native and introduced fish in captures are indicated in the open water, marsh plain, and South Wetlands Opportunity Area areas.

Figure 15. Mean monthly survey results for within-pond locations of lesser scaup diving ducks (red) and surface-feeding American avocets (yellow) in a 250 x 250-m survey grid system (USGS, unpubl. data) across the salinity gradient from Ponds 1-4 and 7. Each dot represents 100 individuals, and the value of habitats for birds is closely associated with water depth.

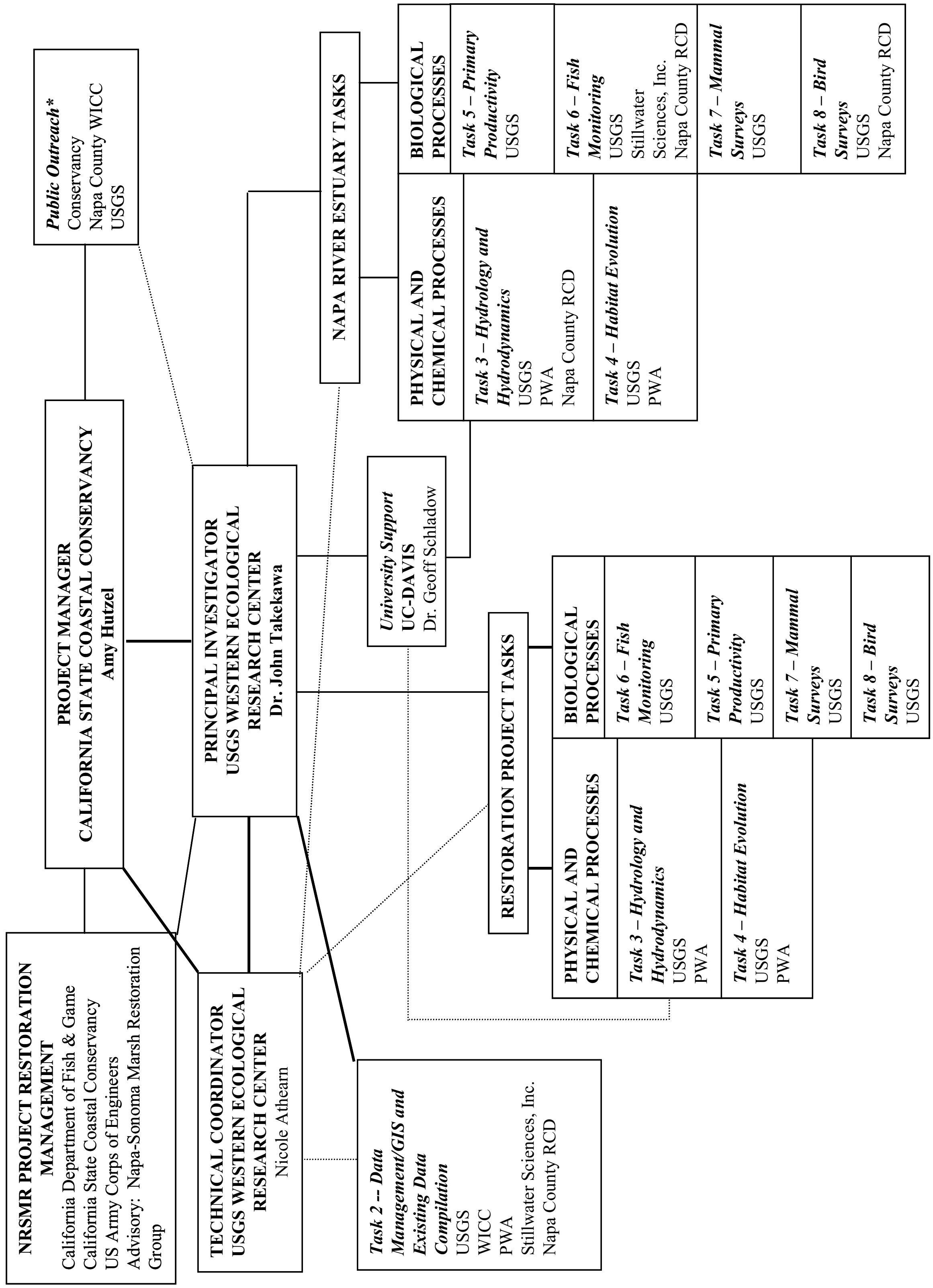

Figure 16. Organizational Chart for the monitoring proposal entitled "Near-field and Far-field Effects of Tidal Wetland Restoration in the Lower Napa River."

Figure 17.   Shallow water bathymetry sounding system (Takekawa et al. 2003). A sounding system is attached to a shallow draft boat that allows mapping bottom surface elevations relative to water depth. Water depths are adjusted to elevation (NAVD88) at staff gauges surveyed with kinematic global positioning system units, referenced to control elevation benchmarks.

ATTACHMENTS

ATTACHMENT 1

Status of the Previously Funded Restoration Actions Proposed for Monitoring and Evaluation

City of American Canyon Project (ERP-99-B11, continuation of ERP-98-F23).
This project will restore 453 acres of wetlands adjacent to North Slough and the Napa River, from the Port of Oakland (Phase 2). The property was acquired with funding from ERP-98-F23 (Phase 1). Restoration of tidal wetlands would contribute to the restoration of priority habitats, including wetlands. It would also provide habitat for many target species, including delta smelt, splittail, Chinook salmon, California clapper rail, California black rail, slat marsh harvest mouse, shorebirds, wading birds, and waterfowl.

Napa River Watershed Stewardship Year 2 (ERP-99-N20, continuation of ERP-98-E01)
This project represents the second year efforts to restore the Napa River watershed as begun under ERP-98-E01. This project is intended to address a broad range of ecological values in the watershed, including steelhead and salmon restoration.

South Napa River Wetlands Acquisition (ERP-98-B13) This project will acquire 115 acres of diked, historic wetlands along the Napa River for the purpose of restoring estuarine, riparian and aquatic habitat. The properties proposed for restoration comprise some of the most important potential restoration sites in the San Francisco Bay estuary and will, when restored, improve habitat quality for several federally listed species, inducing the Delta smelt and Sacramento splittail.

South Napa River Wetlands Acquisition and Restoration Program (ERP-98-F14)
This project will acquire and restore over 600 acres of historical wetlands adjacent to the Napa River from four different private property owners, representing a unique opportunity for restoration of native marshland habitat in the North Bay. Once these lands are acquired, proposed restoration will modify or remove levees and other structural interventions to restore and enhance natural wetland functions for the benefit of several important endangered and threatened species.

In addition, the **Cullinan Ranch Restoration project (ERP-97-N18)** is located to the south of the project area.

ATTACHMENT 2

Previously Funded Monitoring Project

Attachment provides additional information to Table A.3-1.

A.3.2 USGS Priority Ecosystem Science Program – Former Salt Ponds The U.S. Geological Survey has been monitoring six ponds of varying salinities (Ponds 1, 2, 2A, 3, 4, and 7) since 1999. This interdisciplinary study, involving biologists and hydrologists, has included avian, macroinvertebrate, and fish surveys, along with collection of salinity, nutrients, primary productivity, and other water quality data in the ponds and collection of hydrodynamic, salinity, and suspended sediment concentration data in the sloughs (Takekawa, *et al.* 2001). The interactions among trophic levels on salt ponds were examined through ANOVA, quadratic regression, and non-metric multidimensional scaling; results suggest salinity effects on abundance, taxa diversity, and taxa composition (Takekawa et al. *in press*). The ongoing nature of this monitoring effort will allow for before and after comparisons of wildlife use, water quality, and physical processes.

A.3.6 Napa/Sonoma Marsh Hydrodynamics and Sediment Transport – Napa-Sonoma Marsh slough system U.C. Davis, in collaboration with USGS, conducted an intensive hydrologic and water quality data collection project in the Napa-Sonoma Marsh tidal slough network and in the Napa River and Sonoma Creek to determine the physical processes controlling circulation patterns of water and suspended sediment. Velocity, water level, conductivity, temperature and suspended sediment concentration were measured at 17 sites from September 1997 to March 1998. Future monitoring of physical processes can be compared to this baseline data.

A.3.3 Baseline Monitoring of the Pond 2A Tidal Restoration Project, Final Report, July 1996 – July 2000, prepared for California Department of Fish and Gamen – Pond 2A Marsh evolution and wildlife use in the restored Pond 2A site was monitored first by Philip Williams and Associates (PWA) and then by MEC Analytical Systems, Inc. from 1996 to 2000 (PWA, 1997 and MEC, 2000), and funded by the California Department of Fish and Game. The physical and biological evolution of the 550-acre Pond 2A marsh was monitored through surveys of levee breach and natural slough channel width equilibrium, sediment chemistry and grain size, sedimentation rates, tidal range and response, fish usage, avian usage, and plant colonization. Although Pond 2A has different characteristics than the remaining ponds (Pond 2A was slightly less subsided and was never farmed prior to conversion to a salt pond), it can be used as one point of comparison. Comparisons can also be made to other restoration projects in the North Bay that are currently being monitored (such as Guadalcanal and Tolay Creek), and to the fringing marsh that exists along the slough channels within the salt pond complex.

A.3.4 Ground Control and Hydrographic Survey Report, Napa River Salt Marsh Restoration Project Phase II-Topographic and Hydrographic Surveys – Former Salt Ponds
A topographic and bathymetric survey of the salt ponds, slough channels, and associated marsh plain part of the Feasibility Study with the U.S. Army Corps of Engineers (Towill, 2001).

A.3.1 Napa River Salt Marsh Restoration Project, Water Quality and Sediment Characterization – Former Salt Ponds-Water and sediment samples from 40 sites within the pond complex, along with sites in the Napa River, Napa Slough, and San Pablo Bay were collected in October, 2001, by Hydroscience, after development of a Sampling and Analysis Plan and Quality Assurance Project Plan approved by the RWQCB (Hydroscience, 2001).

A.3.5 Desalinization, Erosion, and Tidal and Ecological Changes Following the Breaching of a Levee between a Salt Pond and a Tidal Slough

The changes in geomorphology, salinity, tide range, and ecologically relevant species were tracked by the USGS in Napa Pond 3 and South Slough following the breaching of the levee between the pond and slough. Erosion was significant near the breach in the pond and slough. Pond salinity decreased rapidly as winter storms contributed to enhanced breach erosion. Some of Pond 3 salinity was trapped in the barotropic convergence zone for just more than a week. Decreasing pond salinity drove a change in the invertebrates and fish in the pond. Changing water levels and prey items drove a change in bird use.

A.3.7. CISNet

The CISNet project was directed toward attaining an understanding of contaminant fluxes, contaminant distributions and ecological impacts in San Pablo Bay, the northern most basin of San Francisco Bay. Concentrations of trace elements (Ag, Cd, Cr, Cu, Ni, Pb, Zn), organophosphate pesticides (e.g., diazinon), organochlorine pesticides (e.g., DDT), polycyclic aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs) were monitored monthly in dissolved, suspended solid and surficial sediment compartments across the San Pablo Bay study area. The study was a collaboration between UC Davis, USGS, SFEI and PRBO. The results yielded a quantitative picture of the contaminant transport pathways and impacts under the pre-restoration conditions.

A.3.8 Napa River Fisheries Monitoring Program:

The Napa River/Napa Creek Flood Protection Project (Napa Project) was to provide flood protection and improve habitat in the vicinity of the City of Napa by reconnecting the Napa River to its floodplain, creating wetlands throughout the area, maintaining fish and wildlife habitats, and restoring the natural characteristics of the river. The Napa Project is being implemented along 6.9 miles of the Napa River and includes dike removal, channel modifications to create floodplain and marsh plain terraces, levees and floodwalls, bridge relocations, pump stations, and maintenance roads/recreation.

Stillwater and Jones and Stokes have teamed together for a five-year Napa River Fisheries Monitoring Program. This project involves sampling restored, created, and surrounding habitats to evaluate the use of the area by various fish species, with an emphasis on threatened and endangered species (particularly delta smelt and Sacramento splittail).

Fish surveys have documented that the restoration sites are providing habitat for native and non-native species. To date (July 2001–July 2002, January 2003–July 2003, and March 2004–July 2004), a total of 12,791 juvenile and adult fish have been captured, representing 37 species.

A.3.9 BREACH II

Earlier CALFED-sponsored Sacramento/San Joaquin Delta Breached Levee Wetland (BREACH) studies of historically-restored and remnant natural wetland sites suggested that restoration of emergent tidal-freshwater and brackish wetlands in the Delta is contingent upon the interaction of tidal and fluvial processes with vegetation communities that depend upon prior (e.g., subsidence) and initial (e.g., breach locations) conditions affecting the rate of emergent marsh colonization and expansion. However, many factors influencing the rate and pattern of shallow water habitat restoration are significantly different between the Delta and other regions under consideration for restoration actions by CALFED. In expanding these (BREACH II) studies further down the estuarine gradient, into Suisun and San Pablo bays, we are: (1) systematically addressing the present status, rates, and patterns of tidal ecosystem restoration in discrete ecosystems; (2) determining factors that promote rapid restoration of shallow-water habitat versus factors that potentially inhibit natural rates and patterns of functional development; (3) assessing the contribution of shallow water habitats to food webs supporting tidal marsh ecosystems; and (4) evaluating the overall outcome of breached-levee restoration in the different Bay-Delta regions. We are conducting the BREACH II studies in Suisun and San Pablo bays at ten new sites, including restoring wetlands and relatively "ancient" (~several thousand years old) and "centennial" (formed within last 100 yr) reference marshes. As in the BREACH studies in the Delta, we utilize the "natural experiment" of a diverse age distribution of the restoring breached-levee sites in a 'space-for-time substitution'. We are documenting fish, macroinvertebrate and avifauna responses to the restoring and natural marshes, and hydrology, geomorphology and vegetation structure as the primary driving variables. Our ultimate goal is to provide critical information necessary to predict whether breached-dike restoration strategies proposed under CALFED would provide natural wetland functions to support tidal (shallow-water) aquatic habitat for other aquatic and terrestrial species of concern and rehabilitate a robust Bay-Delta food web.

A.3.10 IRWM

The Integrated Regional Wetland Monitoring (IRWM) Pilot Project is a CALFED-funded interdisciplinary research effort examining wetland restoration in the North Bay and Delta. This proposal will coordinate its efforts with the IRWM.

Ten institutions under the IRWM Pilot Study will collect and analyze a variety of field-based ecological, physical, and geochemical data in restored and natural wetland sites in San Pablo Bay, Suisun Bay, and the Sacramento-San Joaquin River Delta. The complex interactions and feedback mechanisms between physical, biological, and ecological processes in wetland sites and identify variations in structure and function over time, researchers are gathering data on an array of biotic, a biotic, and spatial metrics will also be studied. Specific research teams are monitoring parameters relating to physical processes, landscape ecology, vegetation, avifauna, fish, invertebrates, primary production, and nutrient dynamics.

ATTACHMENT 3
Endorsement Letters

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, CORPS OF ENGINEERS
333 MARKET ST.
SAN FRANCISCO, CALIFORNIA 94105-2197

November 16, 2004

Programs and Project Management Division

SUBJECT: Support of Monitoring Proposal: Near-field and Far-field Effects of Tidal Wetland Restoration in Lower Napa River

Mr. Dan Ray
California Bay-Delta Authority
Ecosystem Restoration Program
650 Capitol Mall Parkway, 5th Floor
Sacramento, California 95814

Dear Mr. Ray:

The U.S. Army Corps of Engineers (Corps), California State Coastal Conservancy (Conservancy), and Department of Fish and Game (DFG) began the Napa Salt Marsh Restoration Feasibility Study in 1998 to analyze alternatives for salinity reduction and habitat restoration in the former Cargill salt ponds in the Napa River Unit of the Napa-Sonoma Marshes State Wildlife Area. This area, consisting of approximately 9,500 acres of former commercial salt ponds and remnant marsh, was purchased from Cargill, Inc. by the State of California in 1994 and is currently managed by DFG.

The Corps, Conservancy, and DFG have each contributed funding and staff time to the Napa Salt Marsh Restoration Feasibility Study, and the agencies released a final feasibility report and environmental impact statement/environmental impact report in June 2004. This report recommends that Congress authorize the Corps to construct a project that would consist of both tidal marsh restoration (in Ponds 4 and 5), and managed pond restoration (in Ponds 6, 6a, 7, 7a, and 8). This project would be cost-shared by the Corps and the state of California. The Conservancy and DFG would restore Ponds 1, 1a, 2, and 3 independently of the Corps. Design of features for Ponds 1, 1a, 2, 3, 4, and 5 is nearing completion. Construction of these features is expected to begin in mid-2005 and to be completed in 2006. Pending Congressional authorization, construction of the remaining ponds should commence as soon as 2007.

The Corps, Conservancy, and DFG have diligently involved a wide range of stakeholders, including public agencies, environmental organizations, researchers, and the interested public. The project has widespread support among regulatory and trustee agencies including the U.S. Fish and Wildlife Service, which issued a 2003 Biological Opinion (1-1-03-F-0044), and the NOAA-Fisheries, which issued a Letter of Concurrence (LOC; 151422SWR02SR6288: MEM, June 30, 2003).

The Corps understands that the Conservancy has submitted the subject grant application. The proposed monitoring effort centers on the Corps/Conservancy/DFG Napa Salt Marsh Restoration Project, and would significantly increase the likelihood of realizing the restoration benefits of the project. Adaptive management is an integral component of the project, and monitoring and adaptive management results will determine whether Ponds 6 and 6a are restored to tidal marsh 10 to 15 years after the start of construction.

The proposed monitoring program described in the Conservancy's grant application will enhance the overall understanding of the restoration process in the project area and the effect of this large-scale restoration project on other restoration projects and the Napa River in the vicinity to complement the existing baseline monitoring in the project area, and comprehensive post-construction monitoring of the entire area in 2007 and 2008.

CALFED funding of any portion of the Napa Salt Marsh Restoration Project is likely to help the Corps/Conservancy/DFG partnership successfully restore vital habitat in the San Francisco Bay region. Any state CALFED funds provided to the Conservancy or DFG for work directly applicable to the Napa Salt Marsh Restoration Project could be applied to the state's share of a Corps project authorized for implementation by Congress. If you have questions regarding this letter, please contact Lynne Galal, at (415) 977-8712, or by email at Lgalal@spd.usace.army.mil.

Sincerely,

Philip T. Feir
Lieutenant Colonel, U.S. Army
Commanding

SAN FRANCISCO BAY
JOINT VENTURE

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(415) 883-3854
(415) 883-3850 Fax
www.sfbayjv.org

MANAGEMENT BOARD:

Bay Area Audubon Council
Bay Area Open Space Council
Bay Planning Coalition
Citizens Committee to Complete the Refuge
Ducks Unlimited
National Audubon Society
Point Reyes Bird Observatory
PG&E Corporation
Save San Francisco Bay Association
Sierra Club
The Bay Institute
The Conservation Fund
Urban Creeks Council

Ex-Officio Members:

Bay Conservation & Development Commission
California Department of Fish and Game
California Resources Agency
Coastal Conservancy
Coastal Region, Mosquito & Vector Control District
National Fish and Wildlife Foundation
National Marine Fisheries Service
Natural Resources Conservation Service
Regional Water Quality Control Board, SF Bay Region
San Francisco Estuary Project
U.S. Army Corps of Engineers
U.S. Environmental Protection Agency
U.S. Fish & Wildlife Service
Wildlife Conservation Board

November 10, 2004

Mr. Dan Ray
California Bay-Delta Authority- Ecosystem Restoration Program
650 Capitol Mall Parkway, 5th Floor
Sacramento, California 95814

SUBJECT: **Endorsement of Monitoring Proposal**
Restoration of the Napa-Sonoma Salt Ponds and the Lower Napa River Ecosystem: Near-field and Far-field Effects of Tidal Wetland Restoration

Dear Mr. Ray:

I am writing on behalf of the San Francisco Bay Joint Venture in support of the grant application entitled *Restoration of the Napa-Sonoma Salt Ponds and the Lower Napa River Ecosystem: Near-field and Far-field Effects of Tidal Wetland Restoration* being submitted to CALFED by the California State Coastal Conservancy.

As you may be aware, the San Francisco Bay Joint Venture is a partnership of non-governmental organizations, utilities, landowners, and non-voting agencies working to acquire, restore, and enhance 200,000 acres of wetlands in San Francisco Bay. The San Francisco Bay Joint Venture is one of the twelve wetland habitat joint ventures operating under the certification of the North American Waterfowl Management Plan, a Congressional agreement between the United States, Canada, and Mexico.

In addition to the securing and restoring a targeted number of acres for each habitat type as specified in "*Restoring the Estuary, the Implementation Strategy of the San Francisco Bay Joint Venture*", joint ventures are now being requested by Congress and the Administration to monitor and document success of projects toward habitat restoration and ecosystem function.

Therefore, the proposed monitoring program centered on the Napa Sonoma Marshes will nor only provide information to CALFED, it will also be beneficial to demonstrating how the restoration of Napa Sonoma Marshes will provide functioning wetland habitats that also meet Joint Venture goals. Most importantly, the proposed monitoring program will enhance the overall understanding of the restoration process in the project area, and the effect of this large-scale restoration project on other restoration projects and the Napa River in the vicinity of the project area.

The proposed monitoring program will build on and integrate monitoring efforts that have occurred at a number of nearby projects such as White Slough, South Wetland Opportunity Area, Cullinan Ranch, Guadalcanal, the City of American Canyon wetlands restoration projects, and the Napa River Flood Control Project as well as related CALFED initiatives, such as the Integrated Regional Wetlands Monitoring Program (IRWM). The proposed monitoring effort will provide valuable baseline information for upcoming restoration projects, including the Napa Crystallizer Ponds (Phase I construction is scheduled to begin in Spring 2007), and the Cullinan Ranch projects, both of which are of high priority for the Joint Venture.

We appreciate your interest in this proposal and encourage CALFED to consider funding the proposed effort. If you have any further questions about the Joint Venture and our support of this project, please feel free to contact our Coordinator, Beth Huning, at the address on this letter.

Sincerely,

Ellie Cohen
Chair

COUNTY of NAPA
OFFICE OF CONSERVATION, DEVELOPMENT & PLANNING
CONSERVATION DIVISION

PATRICK LYNCH, *AICP*
Acting Director

R. PATRICK LOWE
Deputy Director

WILL SELLECK
Supervisor

MARY DOYLE
Principal Planner

BRIAN BORDONA
Planner

JEFF SHARP
Planner

CARLY AUBREY
Planner

DAN ZADOR
Planner

LYNSEY WICKMAN
GIS/ Planner

JEFF TANGEN
Graphic Specialist

C. RENEE' LEDERER
Planning Administrative
Specialist

November 16, 2004

Mr. Dan Ray
California Bay-Delta Authority
Ecosystem Restoration Program
650 Capitol Mall Parkway, 5th Floor
Sacramento, California 95814

SUBJECT: Support of Monitoring Proposal by State Coastal Conservancy

Restoration of the Napa-Sonoma Salt Ponds and the Lower Napa River Ecosystem: Near-field and Far-field Effects of Tidal Wetland Restoration

Dear Mr. Ray:

The Conservation, Development and Planning Department (CDPD) administers the County's planning and land use development program for the unincorporated areas of Napa County and serves as support staff for the Watershed Information Center & Conservancy (WICC) of Napa County. As part of our responsibilities, Department staff work closely with landowners regarding the management and assessment of their land, including the environmental restoration of those lands. We work in partnership with the Napa County Resource Conservation District, watershed stewardship groups, the scientific community, as well as other community and environmental groups to further advance health and function of Napa County's watershed lands.

The goals and objectives presented in the monitoring proposal submitted by the California State Coastal Conservancy (in response to the Ecosystem Restoration Program Proposal Solicitation) are supportive of our Department's watershed programs, as well as the mission of the Watershed Information Center & Conservancy (WICC) of Napa County. We consider the proposed work an integral part of fostering the County's watershed-based assessment efforts that will ultimately lead to improved land management practices and hopefully the de-listing of the Napa River as an impaired water body. The Department's Conservation Division, which directly supports the WICC, is positioned to become collaborating partners in the proposed work effort. The WICC Board is scheduled to consider this item at their next meeting on November 18, 2004 at which time we anticipate receiving their direction and expected endorsement of the proposed grant work plan.

1195 THIRD STREET
SUITE 210
NAPA, CALIFORNIA
94559
TELEPHONE:
707-253-4417
FAX:
707-253-4336
WWW.CO.NAPA.CA.US

Napa County has continually shown its dedication in matters addressing watershed health and management. Our staff is committed to work closely with the State Coastal Conservancy in support of the restoration measures and monitoring associated the Napa-Sonoma Salt Pond effort. The grant application submitted by the State Coastal Conservancy for your consideration is complementary to the ongoing and planned data compilation and assessment work already underway and funded by the County (countywide environmental Baseline Data Report (BDR)$1.5 million). The BDR work is intended to support the General Plan Update, as well as possible CEQA and Conservation Regulations updates.

The proposed monitoring program described in the Coastal Conservancy's grant application will enhance the overall understanding of the restoration process in the project area and the effect of a large-scale restoration project on other restoration projects, as well as the lower Napa River basin. The grant application proposes continued monitoring "after" construction, and will include pre- and post-construction monitoring of selected sites downstream, adjacent, and upstream of the restoration area, thereby examining near-field and far-field effects on hydrology, fish and avian communities in the ecosystem. The proposal includes a baseline-monitoring phase that complements existing information and a comprehensive post-construction monitoring element of the entire area in 2007 and 2008.

CALFED has previously recognized the value of this project by generously providing $4.5 million for design, construction, and monitoring for the 2002 tidal restoration component of the project. The proposal submitted by the California State Coastal Conservancy further leverages these funds and previous monitoring information conducted by USGS and others in the same area to gain a better understanding of the complexity and inherent environmental benefits of tidal wetland restoration. For these reasons and those motioned above, the CDPD is supportive of the proposed work plan and requests your favorable consideration of the Conservancy's submitted proposal.

Sincerely,

R. Patrick Lowe
Deputy Planning Director
CDPD, Conservation Division
Napa County

RESOURCES LEGACY FUND

555 Capitol Mall, Suite 1255 Sacramento, California 95814
916.442.5057 916.325-7541 (FAX) www.resourceslegacyfund.org

November 4, 2004

Mr. Dan Ray
California Bay-Delta Authority
Ecosystem Restoration Program
650 Capitol Mall Parkway, 5th Floor
Sacramento, California 95814

SUBJECT: Endorsement of Monitoring Proposal
Restoration of the Napa-Sonoma Salt Ponds and the Lower Napa River Ecosystem: Near-field and Far-field Effects of Tidal Wetland Restoration

Dear Mr. Ray:

The Resources Legacy Fund, a non-profit organization, has been very active in the preservation and enhancement of wildlife habitat in California, with recent planning and financial involvement in the acquisition of 16,000 acres of historic wetlands and upland habitat from Cargill, Inc. We continue to be involved in this project as a partner with the California Department of Fish and Game (DFG), the Coastal Conservancy and the U.S. Fish and Wildlife Service during the Initial Stewardship and Long Term Restoration Planning phases of this historic wetlands project. In fact, we are currently working with DFG and others to develop a Long Term Restoration plan for lands acquired from Cargill in the Napa Marsh (Napa Crystallizer Ponds).

We remain committed to wetland restoration in the San Francisco and strongly support the grant application entitled *Restoration of the Napa-Sonoma Salt Ponds and the Lower Napa River Ecosystem: Near-field and Far-field Effects of Tidal Wetland Restoration* being submitted by the California State Coastal Conservancy. We encourage CALFED to consider funding the proposed effort. The monitoring effort centers on the Napa Salt Marsh Restoration Project, an approximately 9,500-acre area that includes tidal marsh and managed pond restoration. Design of the tidal marsh restoration and a portion of the managed pond restoration is nearing completion. Construction is expected to begin in mid-2005 and be completed in 2006. Adaptive Management is an integral component of the project, and monitoring and adaptive management results will determine whether two additional ponds are restored to tidal marsh 10 to 15 years after the start of construction.

The proposed monitoring program described in the Conservancy's grant application (submitted in response to the Ecosystem Restoration Program Proposal Solicitation) will enhance the overall understanding of the restoration process in the project area, and the effect of this large-scale restoration project on other restoration projects and the Napa River in the vicinity of the project area. The grant application proposes to continue monitoring "after" construction, and will include pre- and post-construction monitoring of selected sites downstream, adjacent, and upstream of the restoration to examine near-field and far-field effects on hydrology and fish and avian communities in the ecosystem. The proposal consists of a baseline monitoring phase in the project vicinity to complement the existing baseline monitoring in the project area, and comprehensive post-construction monitoring of the entire area in 2007 and 2008.

CALFED recognized the value of this project by providing a $4.5 million grant for design, construction, and monitoring of the tidal restoration component of the project in 2002. As part of the existing grant, baseline monitoring of the entire pond complex is being conducted by USGS under contract to the Conservancy. Baseline monitoring began in November 2003, and built on previous monitoring conducted by USGS and others in the same area.

The proposed monitoring program will build on and integrate monitoring efforts that have occurred at a number of nearby projects (including the White Slough, South Wetland Opportunity Area, Cullinan Ranch, Guadalcanal, and City of American Canyon wetlands restoration projects and the Napa River Flood Control Project), as well as related CALFED initiatives, such as the Integrated Regional Wetlands Monitoring Program (IRWM). The proposed monitoring effort will provide valuable baseline information for upcoming restoration projects, including the Napa Crystallizer Ponds (Phase I construction is scheduled to begin in spring 2007), and the Cullinan Ranch project.

We urge your approval of this grant request. Thank you for your consideration.

Sincerely,

W. John Schmidt
Executive Director

Tasks And Deliverables

Near−field and Far−field Effects of Tidal Wetland Restoration in the Lower Napa River

Task ID	Task Name	Start Month	End Month	Deliverables
1	Project Management	1	36	Semiannual progress reports, annual reports reports. Annual presentations at NSMRG meet Periodic invoices.
2	Data Management and Storage	1	36	Hosting and showcasing of project informati results on WICC's web portal (http://www.napawatersheds.org); virtual we before and after mapping of the restoration linked monitoring results from mapped fielc (3−4 maps); and an accessible online docume for use by the public as well as project ir and researchers. Monitoring results and stu will also be made available USGS's web site (http://sfbay.wr.usgs.gov/access/saltponds/ through the San Francisco Bay Joint Venture (http://www.sfbayjv.org),on the Napa Salt Restoration web site, (http://www.Napa−Sonoma−Marsh.org), and thr South Bay Salt Pond Restoration Project (http://dev.sfei.org/SouthBaySaltPond/Bibli database.
3	Restoration Project Water Quality	1	36	Data reports, QC reports, task−specific cor overall Task 1 deliverables, annual present NSMRG, presentation at at least 2 conferenc scientific publication
4	Restoration Project Hydrology	3	36	Data reports, QC reports, task−specific cor overall Task 1 deliverables, annual present NSMRG, presentation at at least 2 conferenc scientific publication
5	Restoration Project Habitat Evolution	1	36	Data reports, QC reports, task−specific cor overall Task 1 deliverables, annual present NSMRG, presentation at at least 2 conferenc scientific publication
6	Restoration			Data reports, QC reports, task−specific cor

	Project Primary Productivity	1	36	overall Task 1 deliverables, annual present NSMRG, presentation at at least 2 conferenc scientific publication
7	Restoration Project Vegetation	5	26	Data reports, QC reports, task-specific con overall Task 1 deliverables, annual present NSMRG, presentation at at least 2 conferenc scientific publication
8	Restoration Project Invertebrates	1	36	Data reports, QC reports, task-specific con overall Task 1 deliverables, annual present NSMRG, presentation at at least 2 conferenc scientific publication
9	Restoration Project Fish	1	36	Data reports, QC reports, task-specific con overall Task 1 deliverables, annual present NSMRG, presentation at at least 2 conferenc scientific publication
10	Restoration Project Birds	1	36	Data reports, QC reports, task-specific con overall Task 1 deliverables, annual present NSMRG, presentation at at least 2 conferenc scientific publication
11	Restoration Project Special Status Species	10	26	Data reports, QC reports, task-specific con overall Task 1 deliverables, annual present NSMRG, presentation at at least 2 conferenc scientific publication
12	Napa River Estuary Water Quality	1	36	Data reports, QC reports, task-specific con overall Task 1 deliverables, annual present NSMRG, presentation at at least 2 conferenc scientific publication
13	Napa River Estuary Hydrology	3	36	Data reports, QC reports, task-specific con overall Task 1 deliverables, annual present NSMRG, presentation at at least 2 conferenc scientific publication
14	Napa River Estuary Vegetation	13	26	Data reports, QC reports, task-specific con overall Task 1 deliverables, annual present NSMRG, presentation at at least 2 conferenc scientific publication
15	Napa River Estuary Invertebrates	1	34	Data reports, QC reports, task-specific con overall Task 1 deliverables, annual present NSMRG, presentation at at least 2 conferenc scientific publication

16	Napa River Estuary Fish	2	36	Data reports, QC reports, task-specific cor overall Task 1 deliverables, annual present NSMRG, presentation at at least 2 conferenc scientific publication
17	Napa River Estuary Birds	1	36	Data reports, QC reports, task-specific cor overall Task 1 deliverables, annual present NSMRG, presentation at at least 2 conferenc scientific publication

Comments

If you have comments about budget justification that do not fit elsewhere, enter them here.

Note that individual task deliverables (e.g., presentations at conferences) may be combined (e.g., all information pertaining to Napa Sonoma Marsh Restoration Project and Napa River Estuary fish monitoring could be combined into one presentation on changes in the fish community). Data reports include both reports directly to CALFED as part of the annual report, and providing electronic data to the website manager for dissemination

Budget Summary

Project Totals

Labor	Benefits	Travel	Supplies And Expendables	Services And Consultants	Equipment	Lands And Rights Of Way	Other Direct Costs	Direct Total	Indirect Costs	Total
$928,213	**$266,130**	**$109,920**	**$72,790**	**$243,508**	**$29,300**	**$0**	**$82,045**	**$1,731,906**	**$999,470**	**$2,731,376**

Do you have cost share partners already identified?
No.

If yes, list partners and amount contributed by each:

Do you have potential cost share partners?
Yes.

If yes, list partners and amount contributed by each:

If congretional authorization is obtained for construction of the NSMR Project, monitoring funds will be included as part of overall project funding.

Are you specifically seeking non−federal cost share funds through this solicitation?
No.

Near−field and Far−field Effects of Tidal Wetland Restoration in the Lower Napa River

Near−field and Far−field Effects of Tidal Wetland Restoration in the Lower Napa River

Year 1 (Months 1 To 12)

Task	Labor	Benefits	Travel	Supplies And Expendables	Services And Consultants	Equipment	Lands And Rights Of Way	Other Direct Costs	Direct Total	Indirect Costs	Total
1: project management (12 months)	37282	12851	3000	0	0	0	0	0	$53,133	35769	$88,902
2: Data Management and Storage (12 months)	0	0	0	0	24000	0	0	0	$24,000	0	$24,000
3: Restoration Project Water Quality (12 months)	18446	3685	500	1050	0	0	0	4320	$28,001	11950	$39,951
4: Restoration Project Hydrology (10 months)	30516	18780	13600	1200	0	17500	0	0	$81,596	91641	$173,237
5: Restoration Project Habitat Evolution (12 months)	24518	9276	4600	800	15000	3500	0	0	$57,694	26311	$84,005
6: Restoration Project Primary Productivity (12 months)	14787	3155	500	850	0	0	0	2160	$21,452	9012	$30,464
	7839	1118	0	200	0	0	0	0	$9,157	3921	$13,078

7: Restoration Project Vegetation (8 months)											
8: Restoration Project Invertebrates (12 months)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	$0	**0**	$0
9: Restoration Project Fish (12 months)	**68203**	**18158**	**8750**	**5000**	**1000**	**0**	**0**	**0**	$101,111	**45005**	$146,116
10: Restoration Project Birds (12 months)	**11083**	**1347**	**0**	**500**	**0**	**0**	**0**	**0**	$12,930	**5389**	$18,319
11: Restoration Project Special Status Species (3 months)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	$0	**0**	$0
12: Napa River Estuary Water Quality (12 months)	**17889**	**4472**	**4212**	**13200**	**7276**	**0**	**0**	**1000**	$48,049	**41558**	$89,607
13: Napa River Estuary Hydrology (10 months)	**1988**	**4472**	**468**	**1400**	**0**	**0**	**0**	**0**	$8,328	**4618**	$12,946
15: Napa River Estuary Invertebrates (12 months)	**5755**	**889**	**0**	**200**	**0**	**0**	**0**	**0**	$6,844	**2957**	$9,801

16: Napa River Estuary Fish (11 months)	**29793**	**9236**	**7100**	**7670**	**38968**	**0**	**0**	**0**	$92,767	**55238**	$148,005
17: Napa River Estuary Birds (12 months)	**10977**	**1591**	**0**	**600**	**4976**	**0**	**0**	**0**	$18,144	**5489**	$23,633
Totals	**$279,076**	**$89,030**	**$42,730**	**$32,670**	**$91,220**	**$21,000**	**$0**	**$7,480**	**$563,206**	**$338,858**	**$902,064**

Year 2 (Months 13 To 24)

Task	Labor	Benefits	Travel	Supplies And Expendables	Services And Consultants	Equipment	Lands And Rights Of Way	Other Direct Costs	Direct Total	Indirect Costs	Total
1: project management (12 months)	**39000**	**13450**	**3000**	**0**	**0**	**0**	**0**	**0**	$55,450	**35228**	$90,678
2: Data Management and Storage (12 months)	**0**	**0**	**0**	**0**	**9000**	**0**	**0**	**0**	$9,000	**0**	$9,000
3: Restoration Project Water Quality (12 months)	**19186**	**3842**	**500**	**950**	**0**	**0**	**0**	**43200**	$67,678	**10207**	$77,885
4: Restoration Project Hydrology (12 months)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	$0	**0**	$0
5: Restoration Project Habitat	**4292**	**741**	**0**	**500**	**0**	**0**	**0**	**0**	$5,533	**2306**	$7,839

Evolution (12 months)											
6: Restoration Project Primary Productivity (12 months)	**15453**	**3297**	**500**	**700**	**0**	**0**	**0**	**2160**	$22,110	**9037**	$31,147
7: Restoration Project Vegetation (12 months)	**7993**	**1148**	**0**	**200**	**0**	**0**	**0**	**0**	$9,341	**3998**	$13,339
8: Restoration Project Invertebrates (12 months)	**2326**	**458**	**0**	**0**	**0**	**0**	**0**	**0**	$2,784	**1161**	$3,945
9: Restoration Project Fish (12 months)	**72924**	**19614**	**8750**	**5000**	**0**	**0**	**0**	**0**	$106,288	**47390**	$153,678
10: Restoration Project Birds (12 months)	**11267**	**1374**	**0**	**500**	**0**	**0**	**0**	**0**	$13,141	**5477**	$18,618
11: Restoration Project Special Status Species (12 months)	**6967**	**1169**	**0**	**0**	**0**	**0**	**0**	**0**	$8,136	**3391**	$11,527
12: Napa River Estuary Water Quality (12 months)	**42931**	**10733**	**5193**	**2400**	**6238**	**0**	**0**	**1000**	$68,495	**60935**	$129,430
13: Napa River Estuary	**37194**	**2725**	**3577**	**3200**	**0**	**0**	**0**	**9935**	$56,631	**17010**	$73,641

Hydrology (12 months)											
14: Napa River Estuary Vegetation (12 months)	**2327**	**458**	**0**	**0**	**0**	**0**	**0**	**0**	$2,785	**1161**	$3,946
15: Napa River Estuary Invertebrates (12 months)	**5878**	**915**	**0**	**200**	**0**	**0**	**0**	**0**	$6,993	**3019**	$10,012
16: Napa River Estuary Fish (12 months)	**27849**	**8632**	**7110**	**7335**	**38439**	**0**	**0**	**0**	$89,365	**51889**	$141,254
17: Napa River Estuary Birds (12 months)	**11198**	**1635**	**0**	**600**	**5158**	**0**	**0**	**0**	$18,591	**5599**	$24,190
Totals	**$306,785**	**$70,191**	**$28,630**	**$21,585**	**$58,835**	**$0**	**$0**	**$56,295**	**$542,321**	**$257,808**	**$800,129**

Year 3 (Months 25 To 36)

Task	Labor	Benefits	Travel	Supplies And Expendables	Services And Consultants	Equipment	Lands And Rights Of Way	Other Direct Costs	Direct Total	Indirect Costs	Total
1: project management (12 months)	**40696**	**14040**	**3000**	**0**	**0**	**0**	**0**	**0**	$57,736	**39566**	$97,302
2: Data Management and Storage (12 months)	**0**	**0**	**0**	**0**	**4000**	**0**	**0**	**0**	$4,000	**0**	$4,000

3: Restoration Project Water Quality (12 months)	**20504**	**4197**	**0**	**950**	**0**	**0**	**0**	**4320**	$29,971	**12979**	$42,950
4: Restoration Project Hydrology (12 months)	**11646**	**7167**	**5100**	**800**	**0**	**2400**	**0**	**0**	$27,113	**0**	$27,113
5: Restoration Project Habitat Evolution (12 months)	**51447**	**29722**	**14400**	**1100**	**32288**	**5900**	**0**	**0**	$134,857	**79236**	$214,093
6: Restoration Project Primary Productivity (12 months)	**16698**	**3638**	**500**	**750**	**0**	**0**	**0**	**2160**	$23,746	**9968**	$33,714
7: Restoration Project Vegetation (2 months)	**8149**	**1178**	**0**	**200**	**0**	**0**	**0**	**0**	$9,527	**4075**	$13,602
8: Restoration Project Invertebrates (12 months)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	$0	**0**	$0
9: Restoration Project Fish (12 months)	**44970**	**17846**	**500**	**500**	**1000**	**0**	**0**	**0**	$64,816	**95670**	$160,486
10: Restoration Project Birds (12 months)	**11546**	**1401**	**0**	**500**	**0**	**0**	**0**	**0**	$13,447	**5566**	$19,013

11: Restoration Project Special Status Species (2 months)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	$0	**0**	$0
12: Napa River Estuary Water Quality (12 months)	**43805**	**10951**	**4464**	**2400**	**6434**	**0**	**0**	**1000**	$69,054	**62088**	$131,142
13: Napa River Estuary Hydrology (12 months)	**38887**	**2808**	**3496**	**3200**	**0**	**0**	**0**	**10790**	$59,181	**17552**	$76,733
14: Napa River Estuary Vegetation (2 months)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	$0	**0**	$0
15: Napa River Estuary Invertebrates (10 months)	**6002**	**942**	**0**	**200**	**0**	**0**	**0**	**0**	$7,144	**3082**	$10,226
16: Napa River Estuary Fish (12 months)	**36583**	**11341**	**7100**	**7335**	**44337**	**0**	**0**	**0**	$106,696	**67313**	$174,009
17: Napa River Estuary Birds (12 months)	**11419**	**1678**	**0**	**600**	**5394**	**0**	**0**	**0**	$19,091	**5709**	$24,800
Totals	**$342,352**	**$106,909**	**$38,560**	**$18,535**	**$93,453**	**$8,300**	**$0**	**$18,270**	**$626,379**	**$402,804**	**$1,029,183**

Budget Justification

Near−field and Far−field Effects of Tidal Wetland Restoration in the Lower Napa River

Labor

Year 1, Months 1 − 12 Task Category Hours Rate 1 Lead Investigator, GS14 80 $49 1 Technical Coordinator, GS11 1250 $27

3 Biologist, GS11 20 $27 3 Biological Science Technician 1, GS7 96 $18 3 Biological Science Technician 2, GS5 96 $15 3 Field Tecnician 760 $13 3 Project coordinator 120 $25 3 PI 40 $42

4 Principal 38 $64 4 Associate / Project Manager 137 $37 4 Hydrologist 357 $30 4 Hydrographer 494 $23 4 Admin, Graphics, CAD Staff 28 $29

5 Principal 16 $64 5 Associate / Project Manager 63 $37 5 Hydrologist 131 $30 5 Hydrographer 210 $23 5 Admin, Graphics, CAD Staff 12 $29 5 Biologist Woo, GS11 40 $27 5 Biological Science Technician 1, GS7 336 $18 5 Biological Science Technician 2, GS5 336 $15

6 Field Tecnician 760 $13 6 Project coordinator 120 $25 6 PI 40 $42 7 Biologist Woo, GS11 40 $27 7 Biological Science Technician 1, GS7 208 $18 7 Biological Science Technician 2, GS5 208 $15

9 GS−7 Fishery Biologist 2080 $18 9 GS−5 Biological Technician 1040 $14 9 GS−5 Biological Technician 1040 $14

10 Biologist Woo, GS11 20 $27 10 Biological Science Technician 1, GS7 324 $18 10 Biological Science Technician 2, GS5 324 $15

12 Supervisory Hydrologic Tech 88 $33 12 Hydrologic Technichian−1 88 $25 12 Hydrologic Technichian−2 88 $28 12 Hydrologic Technician−3 44 $16 12 Hydrologist 18 $29 12 Research Hydrologist 175 $52

13 Supervisory Hydrologic Tech 10 $33 13 Hydrologic Technichian−1 10 $25 13 Hydrologic Technichian−2 10 $28 13 Hydrologic Technician−3 5 $16 13 Hydrologist 2 $29 13 Research Hydrologist 19 $52

15 Biologist, GS11 40 $27 15 Biological Science Technician 1, GS7 144 $18 15 Biological Science Technician 2, GS5 144 $15

16 Senior Scientist 1 85 $43 16 Senior Scientist 2 217 $29 16 Scientist 1 470 $20 16 Scientist 2 186 $22 16 Senior Scientist 3 108 $30 16 Assistant Scientist 1 65 $17 16 Scientist 3 32 $23 16 Senior Scientist 4 10 $40 16 Senior Scientist 5 4 $43 16 Project Assistant 1 24 $15 16 Project Assistant 2 20 $17

17 Biologist Woo, GS11 60 $27 17 Biological Science Technician 1, GS7 288 $18 17 Biological Science Technician 2, GS5 288 $15

Year 2, Months 13 − 24 Task Category Hours Rate 1 Lead Investigator, GS14 80 $50 1 Technical Coordinator, GS11 1250 $28

3 Biologist, GS11 20 $28 3 Biological Science Technician 1, GS7 96 $18 3 Biological Science Technician 2, GS5 96 $15 3 Field Tecnician 760 $14 3 Project coordinator 120 $26 3 PI 40 $44

5 Biologist, GS11 40 $28 5 Biological Science Technician 1, GS7 96 $18 5 Biological Science Technician 2, GS5 96 $15

6 Field Tecnician 760 $14 6 Project coordinator 120 $26 6 PI 40 $44

7 Biologist, GS11 40 $28 7 Biological Science Technician 1, GS7 208 $18 7 Biological Science Technician 2, GS5 208 $15

8 Biologist, GS11 30 $28 8 Biological Science Technician 1, GS7 45 $15

9 GS−7 Fishery Biologist 2080 $20 9 GS−5 Biological Technician 1040 $15 9 GS−5 Biological Technician 1040 $15

10 Biologist, GS11 20 $28 10 Biological Science Technician 1, GS7 324 $18 10 Biological Science Technician 2, GS5 324 $15 11 Biologist, GS11 60 $28 11 Biological Science Technician 1, GS7 160 $18 11 Biological Science Technician 2, GS5 160 $15

12 Supervisory Hydrologic Tech 122 $35 12 Hydrologic Technichian−1 122 $26 12 Hydrologic Technichian−2 122 $30 12 Hydrologic Technician−3 61 $17 12 Hydrologist 378 $30 12 Research Hydrologist 355 $55

13 Schladow 168 $58 13 GSR 3 1260 $18 13 Supervisory Hydrologic Tech 14 $35 13 Hydrologic Technichian−1 14 $26 13 Hydrologic Technichian−2 14 $30 13 Hydrologic Technician−3 7 $17 13 Hydrologist 42 $30 13 Research Hydrologist 39 $55

14 Biologist, GS11 30 $28 14 Biological Science Technician 1, GS7 45 $18 14 Biological Science Technician 2, GS5 45 $15

15 Biologist Woo, GS11 40 $28 15 Biological Science Technician 1, GS7 144 $18 15 Biological Science Technician 2, GS5 144 $15

16 Senior Scientist 1 81 $45 16 Senior Scientist 2 179 $31 16 Scientist 1 432 $21 16 Scientist 2 186 $23 16 Senior Scientist 3 68 $31 16 Assistant Scientist 1 65 $17 16 Scientist 3 32 $24 16 Senior Scientist 4 10 $42 16 Senior Scientist 5 4 $45 16 Project Assistant 1 24 $16 16 Project Assistant 2 20 $17

17 Biologist, GS11 60 $28 17 Biological Science Technician 1, GS7 288 $18 17 Biological Science Technician 2, GS5 288 $15

Year 3, Months 25 − 36 Task Category Hours Rate 1 Lead Investigator, GS14 80 $51 1 Technical Coordinator, GS11 1250 $29

3 Biologist Woo, GS11 20 $29 3 Biological Science Technician 1, GS7 96 $19 3 Biological Science Technician 2, GS5 96 $15 3 Field Tecnician 760 $15 3 Project coordinator 140 $27 3 PI 40 $45

4 Principal 12 $71 4 Associate / Project Manager 47 $41 4 Hydrologist 139 $33 4 Hydrographer 190 $25 4 Admin, Graphics,

CAD Staff 8 $32

5 Principal 56 $71 5 Associate / Project Manager 213 $41 5 Hydrologist 581 $33 5 Hydrographer 550 $25 5 Admin, Graphics, CAD Staff 32 $32 5 Biologist, GS11 40 $29 5 Biological Science Technician 1, GS7 96 $19 5 Biological Science Technician 2, GS5 96 $15

6 Field Tecnician 760 $15 6 Project coordinator 140 $27 6 PI 40 $45

7 Biologist, GS11 40 $29 7 Biological Science Technician 1, GS7 208 $19 7 Biological Science Technician 2, GS5 208 $15

9 GS−7 Fishery Biologist 2080 $22

10 Biologis, GS11 20 $29 10 Biological Science Technician 1, GS7 324 $19 10 Biological Science Technician 2, GS5 324 $15

12 Supervisory Hydrologic Tech 122 $37 12 Hydrologic Technichian−1 122 $28 12 Hydrologic Technichian−2 122 $31 12 Hydrologic Technician−3 61 $18 12 Hydrologist 365 $32 12 Research Hydrologist 339 $57

13 Schladow 168 $60 13 GSR 3 1260 $19 13 Supervisory Hydrologic Tech 14 $37 13 Hydrologic Technichian−1 14 $28 13 Hydrologic Technichian−2 14 $31 13 Hydrologic Technician−3 7 $18 13 Hydrologist 41 $32 13 Research Hydrologist 38 $57

15 Biologist, GS11 40 $29 15 Biological Science Technician 1, GS7 144 $19 15 Biological Science Technician 2, GS5 144 $15

16 Senior Scientist 1 137 $47 16 Senior Scientist 2 243 $32 16 Scientist 1 480 $22 16 Scientist 2 194 $24 16 Senior Scientist 3 68 $32 16 Assistant Scientist 1 65 $18 16 Scientist 3 32 $25 16 Senior Scientist 4 10 $43 16 Senior Scientist 5 16 $47 16 Project Assistant 1 24 $16 16 Project Assistant 2 80 $18

17 Biologist, GS11 60 $29 17 Biological Science Technician 1, GS7 288 $19 17 Biological Science Technician 2, GS5 288 $15

Benefits

Year 1, Months 1 − 12 USGS −− WERC Benefit Rate Lead Investigator Takekawa, GS14 0.30 Technical Coordinator Athearn, GS11 0.35 Biologist Woo, GS11 0.35 Biological Science Technician 1, GS7 0.11 Biological Science Technician 2, GS5 0.11 Field Technician 0.15 Project coordinator 0.35 PI 0.35

USGS −− WRD Benefit Rate Supervisory Hydrologic Tech 0.25 Hydrologic Technichian−1 0.25 Hydrologic Technichian−2 0.25 Hydrologic Technician−3 0.25 Hydrologist 0.25 Research Hydrologist 0.25 USGS −− WFRC Benefit Rate GS−7 Fishery Biologist 0.07 GS−5 Biological Technician 0.01 GS−5 Biological Technician 0.01

Philip Williams and Associates Benefit Rate Principal 0.62 Associate / Project Manager 0.62 Hydrologist 0.62 Hydrographer 0.62 Admin, Graphics, CAD Staff 0.62

Stillwater Sciences Benefit Rate Senior Scientist 1 0.31 Senior Scientist 2 0.31 Scientist 1 0.31 Scientist 2 0.31 Senior Scientist 3 0.31 Assistant Scientist 1 0.31 Scientist 3 0.31 Senior Scientist 4 0.31 Senior Scientist 5 0.31 Project Assistant 1 0.31 Project Assistant 2 0.31

Year 2, Months 13 − 24 USGS −− WERC Benefit Rate Lead Investigator Takekawa, GS14 0.30 Technical Coordinator Athearn, GS11 0.35 Biologist Woo, GS11 0.35 Biological Science Technician 1, GS7 0.11 Biological Science Technician 2, GS5 0.11 Field Technician 0.15 Project coordinator 0.35 PI 0.35

USGS −− WRD Benefit Rate Supervisory Hydrologic Tech 0.25 Hydrologic Technichian−1 0.25 Hydrologic Technichian−2 0.25 Hydrologic Technician−3 0.25 Hydrologist 0.25 Research Hydrologist 0.25 USGS −− WFRC Benefit Rate GS−7 Fishery Biologist 0.08 GS−5 Biological Technician 0.02 GS−5 Biological Technician 0.02

UC−Davis Benefit Rate Schladow 0.13 GSR 3 0.01 Stillwater Sciences Benefit Rate Senior Scientist 1 0.31 Senior Scientist 2 0.31 Scientist 1 0.31 Scientist 2 0.31 Senior Scientist 3

0.31 Assistant Scientist 1 0.31 Scientist 3 0.31 Senior Scientist 4 0.31 Senior Scientist 5 0.31 Project Assistant 1 0.31 Project Assistant 2 0.31

Year 3, Months 25 − 36 USGS −− WERC Benefit Rate Lead Investigator Takekawa, GS14 0.30 Technical Coordinator Athearn, GS11 0.35 Biologist Woo, GS11 0.35 Biological Science Technician 1, GS7 0.11 Biological Science Technician 2, GS5 0.11 Field Technician 0.15 Project coordinator 0.35 PI 0.35

USGS −− WRD Supervisory Hydrologic Tech 0.25 Hydrologic Technichian−1 0.25 Hydrologic Technichian−2 0.25 Hydrologic Technician−3 0.25 Hydrologist 0.25 Research Hydrologist 0.25

USGS −− WFRC Benefit Rate GS−7 Fishery Biologist 0.09

UC−Davis Schladow 0.13 GSR 3 0.01

Philip Williams and Associates Benefit Rate Principal 0.62 Associate / Project Manager 0.62 Hydrologist 0.62 Hydrographer 0.62 Admin, Graphics, CAD Staff 0.62

Stillwater Sciences Benefit Rate Senior Scientist 1 0.31 Senior Scientist 2 0.31 Scientist 1 0.31 Scientist 2 0.31 Senior Scientist 3 0.31 Assistant Scientist 1 0.31 Scientist 3 0.31 Senior Scientist 4 0.31 Senior Scientist 5 0.31 Project Assistant 1 0.31 Project Assistant 2 0.31

Travel

Travel costs are all associated with travel to the project site and travel to local meetings and conferences (for presentations included as part of the project deliverables). A breakdown of the travel costs per task per year is provided below.

Year Task Travel Cost 1 1 $3,000 1 2 $0 1 3 $500 1 4 $13,600 1 5 $4,600 1 6 $500 1 7 $0 1 8 $0 1 9 $8,750 1 10 $0 1 11 $0 1 12 $4,212 1 13 $468 1 14 $0 1 15 $0 1 16 $7,110 1 17 $0

Year Task Travel Cost 2 1 $3,000 2 2 $0 2 3 $500 2 4 $0 2 5 $0 2 6 $500 2 7 $0 2 8 $0 2 9 $8,750 2 10 $0 2 11 $0 2 12 $5,193 2 13 $3,577 2 14 $0 2 15 $0 2 16 $7,110 2 17 $0

Year Task Travel Cost 3 1 $3,000 3 2 $0 3 3 $0 3 4 $5,100 3 5 $14,400 3 6 $500 3 7 $0 3 8 $0 3 9 $500 3 10 $0 3 11 $0 3 12 $4,464 3 13 $3,496 3 14 $0 3 15 $0 3 16 $7,110 3 17 $0

Supplies And Expendables

Supplies and Expendables Year Task Office Lab Computing Field Supplies 1 1 $500 $0 $200 $0 1 2 $0 $0 $0 $0 1 3 $75 $575 $25 $1,050 1 4 $450 $0 $0 $1,200 1 5 $450 $0 $0 $800 1 6 $75 $75 $25 $850 1 7 $0 $250 $0 $200 1 8 $0 $0 $0 $0 1 9 $1,000 $1,000 $500 $5,000 1 10 $0 $0 $0 $500 1 11 $0 $0 $0 $0 1 12 $90 $0 $0 $13,200 1 13 $10 $0 $0 $1,400 1 14 $0 $0 $0 $0 1 15 $0 $250 $0 $200 1 16 $2,109 $0 $0 $7,670 1 17 $0 $0 $0 $600

Year Task Office Lab Computing Field Supplies 2 1 $500 $0 $200 $0 2 2 $0 $0 $0 $0 2 3 $75 $575 $25 $950 2 4 $0 $0 $0 $0 2 5 $0 $0 $0 $500 2 6 $75 $75 $25 $750 2 7 $0 $250 $0 $200 2 8 $0 $0 $0 $0 2 9 $1,000 $1,000 $500 $5,000 2 10 $0 $0 $0 $500 2 11 $0 $0 $0 $0 2 12 $90 $0 $0 $2,400 2 13 $510 $0 $500 $3,200 2 14 $0 $0 $0 $0 2 15 $0 $250 $0 $200 2 16 $1,899 $0 $0 $7,335 2 17 $0 $0 $0 $600

Year Task Office Lab Computing Field Supplies 3 1 $500 $0 $200 $0 3 2 $0 $0 $0 $0 3 3 $75 $575 $25 $950 3 4 $450 $0 $0 $800 3 5 $450 $0 $0 $1,100 3 6 $75 $75 $25 $750 3 7 $0 $250 $0 $200 3 8 $0 $0 $0 $0 3 9 $1,000 $0 $500 $500 3 10 $0 $0 $0 $500 3 11 $0 $0 $0 $0 3 12 $900 $0 $0 $2,400 3 13 $600 $0 $500 $3,200 3 14 $0 $0 $0 $0 3 15 $0 $250 $0 $200 3 16 $2,833 $0 $0 $7,335 3 17 $0 $0 $0 $600

Services And Consultants

YEAR 1, Months 1 − 12 Task Consultant/Services Rate/Categories Hourly Total Rate Hours 2 Watershed Information Center and Conservancy and MIG Web GIS $125 80 Web Data Management $125 80 Training $100 40 5 Aerial Photographs, Ortho−rectified Lump Sum (Lump Sum :$15000)

9 Statistician statistician $25 40

12 Napa County RCD biologist $59 55 technician $36 40 laboratory and supplies (Lump Sum $2600) 16 Jones &Stokes Associates Site Reconnassance $60 12 Field sampling (7 visits) $78 168 Field sampling (7 visits) $60 168 Larval Fish Sampling $78 12 Larval Fish Sampling $60 12 Data Entry $60 48 Report Preparation $78 1 Report Preparation $60 2 Project Management $78 24 Direct Expenses (Lump Sum $1478) 16 Napa County RCD biologist $59 75 technician $36 45 field supplies (lump sum $950)

17 Napa County RCD biologist $59 60 technician $36 30 YEAR 2, Months 13 − 24 Task Consultant/Services Rate/Categories Hourly Total Rate Hours 2 Watershed Information Center and Conservancy and MIG Web GIS $125 80 Info/Data Management $100 40

12 Napa County RCD biologist $62 55 technician $39 50 laboratory and supplies (Lump sum $880)

16 Jones &Stokes Associates Field sampling (7 visits) $81 168 Field sampling (7 visits) $63 168 Larval Fish Sampling $81 12 Larval Fish Sampling $63 12 Data Entry $63 48 Report Preparation $81 1 Report Preparation $63 2 Project Management $81 16 Direct Expenses (Lump Sum $1478)

16 Napa County RCD biologist $62 70 technician $39 45 field supplies (lump sum $450)

17 Napa County RCD biologist $62 60 technician $39 30 field supplies (lump sum $280)

YEAR 3, Months 25 − 36 Task Consultant/Services Rate/Categories Hourly Total Rate Hours 2 Watershed Information Center and Conservancy and MIG Info/Data Management $100 40

5 Aerial Photographs, Ortho−rectified Lump Sum (Lump Sum :$32,288)

9 Statistician Statistician $25 40

12 Napa County RCD biologist $64 55 technician $42 50 laboratory and supplies (Lump sum $800)

16 Jones &Stokes Associates Field sampling (7 visits) $85 168 Field sampling (7 visits) $66 168 Larval Fish Sampling $85 12 Larval Fish Sampling $66 12 Data Entry $66 48 Report Preparation $85 16 Report Preparation $66 45 Project Management $85 16 Direct Expenses (Lump Sum $1533) 16 Napa County RCD biologist $64 70 technician $42 45 laboratory and supplies (Lump sum $350)

17 Napa County RCD biologist $64 60 technician $42 30 laboratory and supplies (Lump sum $280)

Equipment

Year Task Equipment List Equipment Cost

1 4 5 water level recorders, $2500 each $17,500 1 5 Survey Equipment and ADCP $3,500

3 4 Survey Equipment $2,400 3 5 Survey Equipment and ADCP $5,900

Lands And Rights Of Way

No costs in this category for any tasks.

Other Direct Costs

Year Task Description of Costs Other Direct Costs

1 3 UCD DANR nutrient analysis $40/sample, 108 samples $4,320.0

1 6 Chlorophyll analysis $20/sample, 108 samples $2,160.0

1 12 Sediment lab, 100 samples $10/sample $1,000.0

2 3 UCD DANR nutrient analysis $40/sample,108 samples $4,320.0

2 6 Chlorophyll analysis $20/sample, 108 samples $2,160.0

2 12 Sediment lab, 100 samples $10/sample $1,000.0

2 13 Grad Student Fees $9,935.0

3 3 UCD DANR nutrient analysis $40/sample, 108 samples $4,320.0

3 6 Chlorophyll analysis $20/sample, 108 samples $2,160.0

3 12 Sediment lab, 100 samples $10/sample $1,000.0

3 13 Grad Student Fees $10,790.0

Indirect Costs/Overhead

Year 1, Months 1 – 12 Task Cost Covered Rate Indirect Cost

1 All direct expenses including consultants (labor, benefits, equipment); federally calculated rate 0.015 $13,331 1 All direct expenses (labor, benefits, equipment); federally calculated rate 0.42 $22,438

3 All direct expenses (labor, benefits, equipment); federally calculated rate 0.42 $11,950

4 Labor and benefits 1.63 $91,641

5 All direct expenses (labor, benefits, equipment); federally calculated rate/Labor and benefits 0.42/1.63 $26,311

6 All direct expenses (labor, benefits, equipment); federally calculated rate 0.42 $9,012

7 All direct expenses (labor, benefits, equipment); federally calculated rate 0.42 $3,921

9 All direct expenses (labor, benefits, equipment); federally calculated rate 0.42 $45,005

10 All direct expenses (labor, benefits, equipment); federally calculated rate 0.42 $5,389

12 All direct expenses (labor, benefits, equipment), except consultant; federally calculated rate 0.98 $41,558

13 All direct expenses (labor, benefits, equipment); federally calculated rate .98 $4,618

15 All direct expenses (labor, benefits, equipment); federally calculated rate 0.42 $2,957

16 Labor and benefits 1.42 $55,238

17 All direct expenses (labor, benefits, equipment), except consultant; federally calculated rate 0.42 $5,489

Year 2, Months 13 − 24 Task Cost Covered Rate Indirect Cost

1 All direct expenses including consultants (labor, benefits, equipment); federally calculated rate 0.015 $11,825

1 All direct expenses (labor, benefits, equipment), except consultant; federally calculated rate 0.42 $23,403

3 All direct expenses (labor, benefits, equipment), except consultant; federally calculated rate 0.42 $10,207

5 All direct expenses (labor, benefits, equipment), except consultant; federally calculated rate 0.42 $2,306

6 All direct expenses (labor, benefits, equipment), except consultant; federally calculated rate 0.42 $9,037

7 All direct expenses (labor, benefits, equipment), except consultant; federally calculated rate 0.42 $3,998

8 All direct expenses (labor, benefits, equipment), except

consultant; federally calculated rate 0.42 $1,161

9 All direct expenses (labor, benefits, equipment), except consultant; federally calculated rate 0.42 $47,390

10 All direct expenses (labor, benefits, equipment), except consultant; federally calculated rate 0.42 $5,477

11 All direct expenses (labor, benefits, equipment), except consultant; federally calculated rate 0.42 $3,391

12 All direct expenses (labor, benefits, equipment), except consultant; federally calculated rate 0.98 $60,935

13 All direct expenses (labor, benefits, equipment); federally calculated rate/university overhead rate .98/.25 $17,010

14 All direct expenses (labor, benefits, equipment); federally calculated rate 0.42 $1,161

15 All direct expenses (labor, benefits, equipment); federally calculated rate 0.42 $3,019

16 Labor and benefits 1.42 $51,889

17 All direct expenses (labor, benefits, equipment), except consultant; federally calculated rate 0.42 $5,599

Year 3, Months 25 − 36 Task Cost Covered Rate Indirect Cost

1 All direct expenses including consultants (labor, benefits, equipment); federally calculated rate 0.015 $15,210

1 All direct expenses (labor, benefits, equipment); federally calculated rate 0.42 $24,356

3 All direct expenses (labor, benefits, equipment); federally calculated rate 0.42 $12,979

4 Labor and benefits 1.63 $14,993

5 All direct expenses (labor, benefits, equipment); federally calculated rate/Labor and benefits 0.42/1.63 $79,236

6 All direct expenses (labor, benefits, equipment); federally calculated rate 0.42 $9,968

7 All direct expenses (labor, benefits, equipment); federally calculated rate 0.42 $4,075

9 All direct expenses (labor, benefits, equipment); federally calculated rate 0.42 $95,670

10 All direct expenses (labor, benefits, equipment); federally calculated rate 0.42 $5,566

12 All direct expenses (labor, benefits, equipment), except consultant; federally calculated rate 0.98 $62,088

13 All direct expenses (labor, benefits, equipment); federally calculated rate/university overhead rate 0.98/.25 $17,552

15 All direct expenses (labor, benefits, equipment); federally calculated rate 0.42 $3,082

16 Labor and benefits 1.4 $67,313

17 All direct expenses (labor, benefits, equipment), except consultant; federally calculated rate 0.42 $5,709

Comments

The Conservancy will be managing the project for an overhead charge of 1.5% on all subconsultant costs. Given the complexity of the project, there is considerable difficulty in projecting exact project management hours. The COnservancy expects that the management hours required for this project will exceed the funds provided by this charge, and will contribute the remaining hours. In the spirit of the overall solicitation package and information requested, the budget has been broken down to show the requested information for all of the major partners, because the major partners are doing such

a large percentage of the work. A portion of the work will overlap with the Conservancy's existing grant for design, monitoring, and construction (partial) of Ponds 3 − 5. The budget has been structured to reflect the work being done under the existing grant (as well as other construction−realted monitoring), resulting in a lower baseline monitoring cost for Year 1 of the proposed grant. There are no other overlapping monitoring activities.

Environmental Compliance

Near−field and Far−field Effects of Tidal Wetland Restoration in the Lower Napa River

CEQA Compliance

Which type of CEQA documentation do you anticipate?
X none
− negative declaration or mitigated negative declaration
− EIR
− categorical exemption

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

Is the CEQA environmental impact assessment complete?

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.

NEPA Compliance

Which type of NEPA documentation do you anticipate?
X none
– environmental assessment/FONSI
– EIS
– categorical exclusion

Identify the lead agency or agencies.

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.

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	X	004857
CESA Compliance: 2081	–	–	
CESA Complance: NCCP	–	–	
1602	–	–	
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	–	–	

other USGS/DFG MOU	–	X	

Federal Permits And Approvals	Required?	Obtained?	Permit Number (If Applicable)
ESA Compliance Section 7 Consultation	–	–	
ESA Compliance Section 10 Permit	–	X	
Rivers And Harbors Act	–	–	
CWA 404	–	–	
other Federal Endangered Species Recovery Permit	–	X	TE020548–5

Permission To Access Property	Required?	Obtained?	Permit Number (If Applicable)
permission To Access City, County Or Other Local Agency Land Agency Name City Of American Canyon,City Of Vallejo	–	X	
permission To Access State Land Agency Name DFG	–	X	
permission To Access Federal Land Agency Name	–	–	
permission To Access Private Land Landowner Name	–	–	

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

Coast Guard permit for sonde deployment on channel marker will take 3 weeks to be obtained and it is not aniticipated that there would be any problems based on past applications.

Land Use

Near−field and Far−field Effects of Tidal Wetland Restoration in the Lower Napa River

Does the project involve land acquisition, either in fee or through easements, to secure sites for monitoring?
X No.
– Yes.

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 provide operations and maintenance services.

Is there an existing plan describing how the land and water will be managed?
– No.
– Yes.

Will the applicant require access across public or private property that the applicant does not own to accomplish the activities in the proposal?
– No.
X Yes.

Describe briefly the provisions made to secure this access.

All monitoring sites are on public lands. The Restoration Project monitoring will continue the existing access to the Project site. Access to the Napa River Estuary monitoring sites will be coordinated with the land managers/owners (DFG and City of American Canyon). DFG and City of American Canyon staff are aware of the proposal, and will coordinate access as needed.USGS already has access to existing gaging stations.

Do the actions in the proposal involve physical changes in the current land use?
X No.
– Yes.

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?
X No.
− Yes.

Land Designation	Acres	Currently In Production?
Prime Farmland		−
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?
X No.
− Yes.

Is the land affected by the project currently under a Williamson Act contract?
− No.
− Yes.

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

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