



**U.S. Army Corps
of Engineers**
San Francisco District
South Pacific Division



**Coastal
Conservancy**

SAN PABLO BAY WATERSHED RESTORATION STUDY

PROJECT STUDY PLAN

JANUARY 1999

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ACRONYMS

ACL	Administrative Civil Liabilities
A/E	Architectural and Engineering
ALSP	Agricultural Land Stewardship Program
CALFED	CALFED Bay-Delta Program
CAP	Continuing Authorizes Program
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
CNPS	California Native Plants Society
EBRPD	East Bay Regional Park District
EEMP	Environmental Enhancement and Mitigation Program
Corps	U.S. Army Corps of Engineers
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
FCSA	Feasibility Cost Sharing Agreement
GIS	Geographic Information System
HQUSACE	Headquarters, U.S. Army Corps of Engineers
HTRW	Hazardous, Toxic, and Radioactive Waste
IRC	Issue Resolution Conference
LERDS	Land, Easements, Relocations, and Disposal Sites
LTMS	Long Term Management Strategy
LWCF	Land and Water Conservation Fund
MOSD	Marin Open Space District ACL - Administrative Civil Liabilities
NAWCA	North American Wetlands Conservation Act (a grant program)
NFWF	National Fish and Wildlife Foundation
NED	National Economic Development
NEPA	National Environmental Policy Act
PCA	Project Cooperation Agreement
PSP	Project Study Plan
QCP	Quality Control Plan
RCD	Resource Conservation District
SACCR	Schedule and Cost Change Request
SFBCDC	San Francisco Bay Conservation and Development Commission
SPBWSC	San Pablo Bay Watershed Scoping Committee
SPD	South Pacific Division

*San Pablo Bay Watershed Restoration Study
Project Study Plan (PSP)*

TPL	The Trust for Public Land
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
WBS	Work Breakdown Structure
WCB	Wildlife Conservation Board (acquires land for Fish and Game)
WRDA	Water Resource Development Act
WRP	Wetlands Reserve Program
WSA	Watershed Science Approach

Chapter 1

1.0 INTRODUCTION

The San Pablo Bay Watershed Restoration Study Project Study Plan (PSP) describes the scope, schedule, and costs associated with ecological restoration within San Pablo Bay watershed, California. The watershed study process will use collaborative partnerships that have developed throughout the region to identify near, mid, and long-term potential restoration opportunities and provide the technical, planning, and design analysis to foster project development. The U.S. Army Corps of Engineers (Corps) and the State of California Coastal Conservancy (Coastal Conservancy) developed this PSP with input from the San Pablo Bay Watershed Scoping Committee (SPBWSC) and other stakeholders and the information resources listed in Appendix C. SPBWSC will provide a forum for the Coastal Conservancy and the Corps to obtain input from watershed agencies and interested parties to evaluate the restoration opportunities in the San Pablo Bay watershed. The development of the extensive resources outlined in Appendix C relied on the involvement of a diverse group of scientists and policy makers. This information has been essential to the development of this PSP and will be critical to the implementation of this study.

The urgent need for this study is demonstrated by recent Federal action. The Federal Clean Water Action Plan requires the development of a Unified Watershed Assessment (UWA) to guide allocation of new federal resources for watershed protection. Using three criteria - high value, high risk, and high opportunity - watersheds are prioritized. The San Pablo Bay watershed (Reference Number 18050002) is grouped in the highest category, Priority I (Impaired), by the State of California, adding urgency to the development of this study. In addition, the San Pablo Bay watershed, specifically the Napa Sonoma Baylands, qualifies as a Globally Important Bird Area in *American Bird Conservancy's United States Important Bird Areas* program. This area provides habitat for globally significant numbers of wintering canvasback, ruddy duck and greater scaup, and globally significant numbers of breeding California clapper rail and California black rail. Also, the San Pablo Bay watershed is home to over ten (10) threatened or endangered species (see Appendix A). These listings add special significance to the environmental concerns in the San Pablo Bay watershed.

This PSP includes work task descriptions; a cost summary table; a work breakdown structure; and division of responsibilities for completion of the study by the Corps and the Coastal Conservancy, according to the 50% - 50% cost sharing requirements of the Water Resources Development Act of 1986 (WRDA, 1986) and other Federal policies and guidelines. The PSP is a living document that can be modified as necessary to reflect changes agreed upon by study participants. Any changes to the PSP will require the support and concurrence of the Executive Committee.

1.1 STUDY AREA

The San Pablo Bay watershed drains into the northern reaches of San Francisco Bay. San Pablo Bay watershed is a major drainage basin for Marin, Sonoma, Napa, Solano and Contra Costa Counties, California. For the purpose of this study, the San Pablo Bay watershed is defined as from the line

between Point San Pedro in Marin County and Point San Pablo in Contra Costa County to the Carquinez Bridge and all drainage within this area emptying into San Pablo Bay. The catchment area of San Pablo Bay is approximately 810 square miles (520,000 acres). The surface area of San Pablo Bay is approximately 90 square miles (60,000 acres).

An unique feature in the San Pablo Bay watershed is the large tracts of historical baylands – diked and tidal, particularly along the perimeter of the Bay and adjacent to the Sonoma Creek, and the Petaluma River and Napa Rivers. Some of these diked baylands include important seasonal wetlands. Approximately one half of the diked historic baylands are publicly owned, principally by wildlife agencies, military agencies, and special purpose districts such as flood control districts.

In Marin County, Las Gallinas, Miller, and Novato Creek drain into San Pablo Bay. In Sonoma County, the drainage basins of the Petaluma River, Sonoma Creek, and Tolay Creek drain into the tidal flats of San Pablo Bay. The Petaluma River and its tributaries drain a total area of about 143 square miles. Sonoma Creek drains a 153 square mile area. In Napa County, the Napa River, Carneros Creek and Huichica Creek flow into San Pablo Bay. Napa River's basin encompasses 417 square miles. The western portion of Solano County is characterized by large expanses of diked baylands, bordering San Pablo Bay and Mare Island at its eastern edge. The City of Vallejo, the largest city in Solano County, borders the Napa River on the west and the San Pablo Bay on the south. Contra Costa County bounds the eastern edge of San Pablo Bay with San Pablo, Wildcat, Pinole, and Rheem Creek draining into San Pablo Bay. A working knowledge of the relationship of San Pablo Bay to its contributing watersheds and its dependency on the quantities and types of inflow will be a part of study development. There are community-based groups monitoring many of the creeks in the San Pablo Bay. Where it is applicable, the community groups' research data will be analyzed to provide a framework for determining the geomorphic stability of the stream channels and fish and wildlife diversity.

1.1.1 Study Area Collaboration

The collaboration now taking place in the San Pablo Bay watershed by Federal, State, and local government, non-profit groups, academia, and the private sector is in large part due to the potentially globally significant ecological benefits that may result from restoration of this ecosystem. The study will build on past and present research and planning efforts by providing technical, planning, and design analysis to further the implementation of restoration opportunities in the watershed. Appendix C is a partial list of many of these research and planning efforts.

For example, the San Francisco Estuary Institute (affiliated with the University of California) is serving as scientific support for current research and planning efforts. The importance of scientifically based research emerged from the San Francisco Estuary Project in 1993. Subsequent collaboration provided an avenue to address the loss of wetlands in the baylands ecosystem. The Estuary Institute's work has culminated with the creation of the San Francisco Bay Area Wetlands Ecosystem Goals Project in 1998. The Goals Project presents a general vision and site-specific recommendations for restoration in the estuary. Also, Save San Francisco Bay Association working in partnership with the San Francisco Bay Regional Water Quality Control Board sponsored the formation of the Partnership for San Pablo Baylands that enlisted landowners and residents in an effort to plan for the future of the

region. This outreach effort and the subsequent report identify potential mutually beneficial uses for San Pablo Bay watershed, especially the San Pablo Baylands. Another on-going group, the North Bay Forum, begun in 1997 by the Environmental Protection Agency, (previously called North Bay Initiative sponsored by the San Francisco Bay Conservation and Development Commission, and the Environmental Protection Agency) facilitates discussions amongst agencies and landowners regarding restoration proposals and opportunities in the San Pablo Bay watershed. Additionally, the San Francisco Bay Joint Venture, a public-private partnership established in 1995, has been developing strategies for wetland acquisition, protection and restoration. These and other efforts have provided a wealth of information to foster the potential implementation of restoration in this unique watershed.

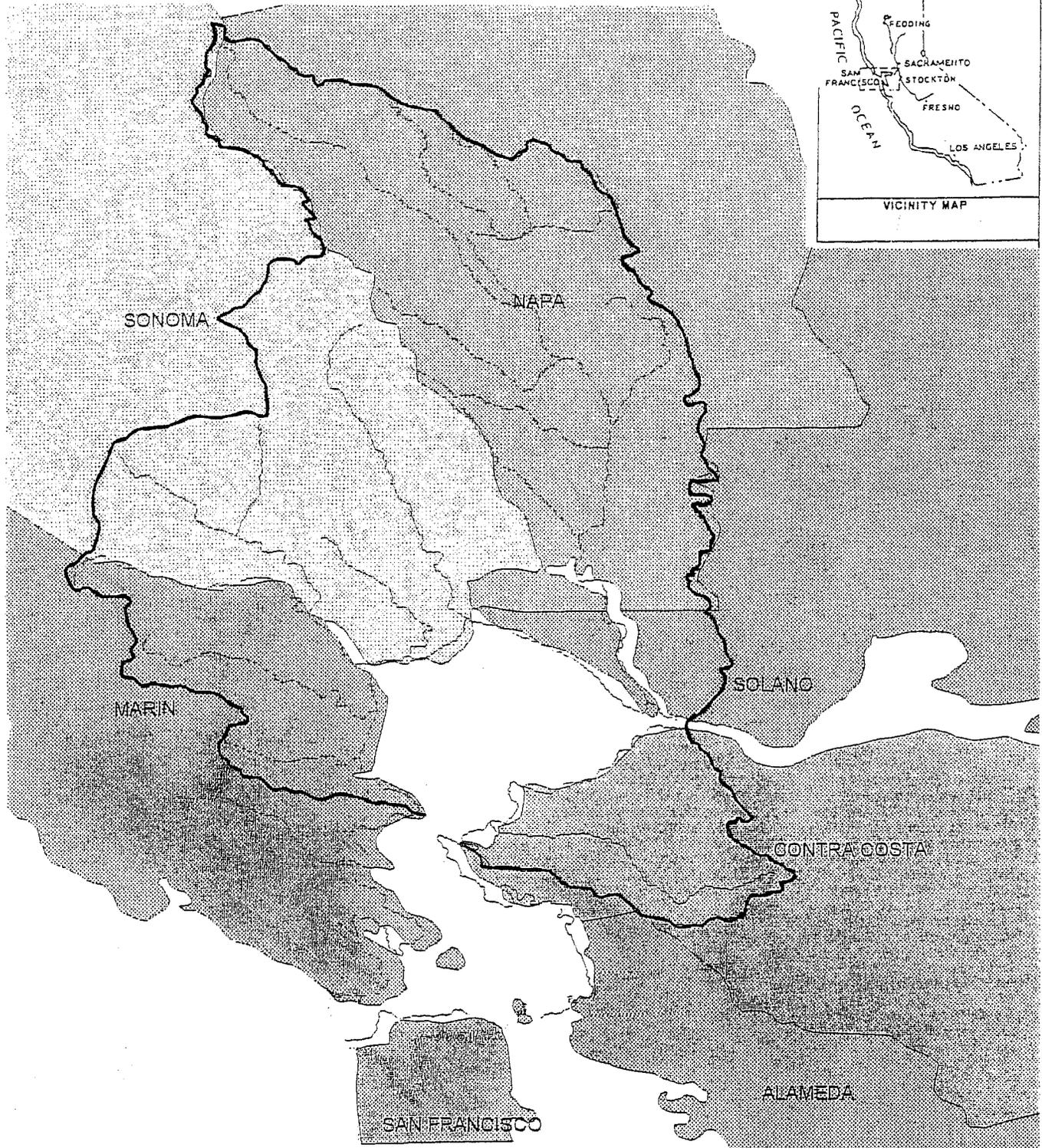
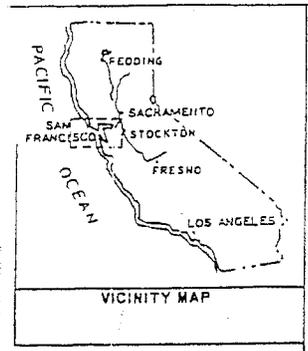
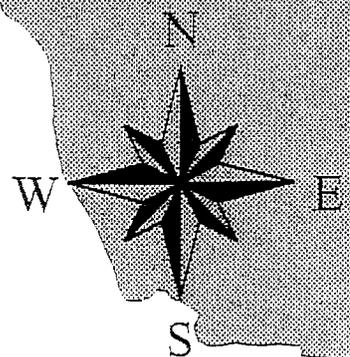


FIGURE 1
San Pablo Bay Watershed



1.2 BACKGROUND

1.2.1 Study Authority

Section 503 of WRDA 1996, Watershed Management, Restoration, and Development initiated the San Pablo Bay Watershed Reconnaissance Study and this PSP. Section 503 authorizes the Corps of Engineers “to provide technical, planning, and design assistance to non-Federal interests for carrying out watershed management, restoration, and development projects ...for the following purposes: 1) Management and restoration of water quality. 2) Control and remediation of toxic sediments. 3) Restoration of degraded streams, rivers, wetlands, and other waterbodies to their natural condition as a means to control flooding, excessive erosion, and sedimentation. 4) Protection and restoration of watersheds, including urban watersheds. 5) Demonstration of technologies for nonstructural measures to reduce destructive impacts of flooding.”

The feasibility study of the San Pablo Bay watershed will meet the objectives of Section 503 as identified in this PSP under the authority of the River and Harbor Act of 1962 (Northern California Streams Authority), Title 1, Sec 206, which states:

“The Secretary of the Army is hereby authorized and directed to cause surveys for flood control and allied purposes, including channel and major drainage improvements,..., in drainage areas of the United States and its territorial possessions, which include...: Sacramento River Basin and streams in northern California draining into the Pacific Ocean for the purpose of developing, where feasible, multi-purpose water resource projects...”

The Northern California Streams Authority is important to the development of this study because of the complexity of the issues and the multi-purpose needs in the San Pablo Bay watershed. The State of California Coastal Conservancy will work closely with the Corps and local co-sponsors to provide the local coordination for study development.

1.2.2 Problem Statement

San Pablo Bay watershed is a significant natural resource. The northern reaches of San Pablo Bay are characterized by large expanses of diked former tidal baylands and tidal baylands. Within this area, there are opportunities to increase the State’s wetland acreage by over five percent. Many of the threatened or endangered species in this watershed are found in this area (see Appendix A). These listed species add special significance to the unique opportunity for restoration in this watershed.

San Pablo Bay watershed has experienced increased soil erosion, stream channel degradation, loss of riparian and oak woodland habitat, and declining groundwater values. It is the general belief of researchers in the field that the ecological resources remaining in this area are declining in quantity and quality due to waterway modification, development of rural lands, and increased pollution. Napa, Sonoma, and northern Marin Counties’ converted wetland uses are predominately grazing and cultivated croplands such as oat hay and wheat. Urbanized pockets in each county are continuing to grow with Contra Costa having the highest concentration of commercial and industrial

use, including petroleum refiners and chemical companies. These urbanized pockets are adding to the ecological problems in the watershed. The SPBWSC identified the following issues as of highest concern to watershed health:

- 1. Loss of Wetland Habitat** - There has been a continuous loss in wetland habitat. An estimated 75% of the original tidal wetlands of San Pablo Bay have been converted to other uses. There have also been significant losses to seasonal wetland and adjacent upland habitats. Wetland and adjacent habitats in the watershed are critically important to migratory waterbirds on the Pacific Flyway and several endangered species. Urban and agricultural encroachment, pollution, and exotic species are on going threats to the wetland habitat. Where there were once numerous species of fish, insects, and benthic organisms within the freshwater channel and saltwater interface environments, there are fewer species, including the federally listed species in Appendix A.
- 2. Loss of Riparian Habitat** - Riparian habitat loss is related to channel degradation, urban and agricultural encroachment, and flood control and navigation channelization. Riparian habitat has not regenerated in the face of the channel problems. The channel reaches that exhibit the greatest losses in habitat are closely correlated with the percentage of the watershed upstream that is developed. The subwatersheds that are the most highly developed (urban and agricultural) exhibit the most degraded riparian habitat. Native species dependent on riparian corridors for their survival, including the federally listed species in Appendix A, have experienced a steady decline in abundance and diversity.
- 3. Impacts to Species Diversity and Abundance** – Migratory Birds of the Pacific Flyway, estuarine and anadromous fish and other wildlife that use the San Pablo Bay rely on a healthy ecosystem for their survival. Nearly 55 percent of threatened and endangered species and up to 90 percent of commercial and recreational fish species in San Pablo Bay depend on wetland and riparian habitat for their survival.
- 4. Dredging and Waterway Degradation** – Dredging and associated waterway modifications include navigation channels, flood control levees, and armored streambanks and shorelines. Waterway degradation may add to the frequency of dredging needs. Waterway degradation is defined as the downcutting of the channel beds (inverts) within the watershed. The degradation may impact infrastructure stability, groundwater levels, terrestrial and aquatic habitat, land loss, etc.
- 5. Flooding** - Flooding and the potential for flooding are related primarily to the existence of structures and infrastructure within flood-prone areas and the continued development in the hillsides. Flooding is part of the natural system and a critical component of channel geometry. However, an increase in grading, paving, and storm drain run-off throughout the watershed has increased the frequency and intensity of flooding in the lower watershed for a given amount of rainfall than was evident in the pre-development period.
- 6. Coordination of Water Quality and Reclaimed Wastewater Use** – Existing and newly adopted standards in water quality will continue to restrict wastewater discharge into San Pablo Bay. To meet these new standards and to improve the water quality in the San Pablo Bay watershed, the municipalities of the region are developing a regional focus to treated effluent disposal by identifying agricultural and managed wetland uses. The wastewater treatment plants in the project area include those operated by Las Gallinas Valley Sanitary District, Novato Sanitary District, City of Petaluma, Sonoma County Water Agency, Napa Sanitation District, City of American Canyon, Valley

Sanitation District, City of Richmond, City of Pinole, and Contra Costa West County Wastewater District.

7. **Erosion and Sedimentation**- Soil erosion degrades the land, stream channels, and riparian and rangeland vegetation. Surface and channel erosion is increased by adjacent land uses, which leads to the damage or destruction of infrastructure (roads, pipelines, bridges, and other features) and the necessity for maintenance dredging. In addition, it has the long-term, high cost effect of lost soil productivity.
8. **Invasive Species** - Invasive species, such as the Arundo donax, Spartina alterniflora, Lepidium latifolium, Centaurea solstitialis, Foeniculum vulgare, are displacing native vegetation throughout the San Pablo Bay watershed. Invasive plants alter the ecosystem's bio-diversity, leading to a decline in habitat suitable for native species, including the federally listed species in Appendix A. Currently, the USFWS is setting up a program to develop mapping of the invasive species in the region.
9. **Haphazard and Uncoordinated Land Use Policies** - Development pressures and damages caused by flooding, erosion, and other problems throughout the watershed frequently involve litigation and/or regulatory actions. These litigation and/or regulatory actions are costly and time-consuming. There is a need to have a clearer and more cooperative atmosphere in determining the wise use of the watershed's resources in the future.
10. **Lack of Recreational Opportunities** – Regional recreational opportunities may be needed because of a limited supply and a growing population base. There is a need to assess the existing recreational opportunities to determine their ecological impacts and, where appropriate, to create new opportunities for hiking, boating, birding, etc.

1.3 SCOPE AND OBJECTIVE

The San Pablo Bay watershed study will evaluate the extensive research information available to identify opportunities and constraints for the restoration and protection of the ecological resources within the watershed. This initial evaluation will enable the Coastal Conservancy and the Corps with the input of the SPBWSC and other interested parties to determine the technical, planning, and design analysis necessary for identifying and prioritizing the restoration opportunities in the San Pablo Bay watershed. The evaluation will result in a watershed restoration implementation evaluation report (evaluation report) that will address and recommend strategies to improve ecological conditions in the San Pablo Bay watershed and concurrently, provide low maintenance solutions for flooding, water quality concerns, and other water resource needs. The study will focus on actions that will improve ecological conditions primarily and also invest in ancillary benefits that may accrue from ecological enhancement, such as flood protection, erosion, sedimentation, and pollution abatement.

There is in the San Pablo Bay watershed an existing initiative for science support of watershed management. Through the Estuary Project of EPA, the multi-agency CalFed programs, and the Watershed Management Initiative of the State Water Resources Control Board and its San Francisco Bay Regional Board, a program has been initiated to coordinate basic watershed scientific assessment through the San Francisco Estuary Institute using the Bay Area Watershed Science Approach (WSA). The WSA integrates watershed science at all levels of government with local watershed interest groups. The WSA and other watershed efforts are opportunities for the Corps to contribute to watershed

science and restoration planning by working with the existing community of agencies and watershed scientists.

The magnitude of research and existing government programs that are ongoing in the San Pablo Bay will provide the Corps with the opportunity to assist in the identification and prioritization of potential restoration opportunities, which require assistance for potential implementation. Appendix C provides a partial list and a brief description of the numerous studies and plans that have been developed in the San Pablo Bay area. The evaluation will use these resources extensively to ensure that the study will not duplicate existing information and will provide assistance through a scientific process to account for the past and present natural and human controls on watershed form and ecological function. A timely evaluation will enable the study to set realistic goals and objectives for identifying watershed restoration opportunities.

The San Pablo Bay watershed evaluation will identify specific restoration projects that may be implemented using public and private funds. As this process develops, potential restoration projects may tier off during this study to be developed concurrently with the watershed evaluation. These potential restoration projects will meet the overall goals and objectives of the evaluation report. Potential projects may include the multi-objective projects at the following sites: 1) the Sonoma Creek wetland restoration and flood reduction opportunity; 2) the Las Gallinas/Miller Creek wetland restoration opportunity; 3) the American Canyon Creek wetland and riparian restoration opportunity; and 4) the Pinole Creek urban environmental enhancement and restoration opportunity. The Corps will work closely with Federal, State, and local agencies to determine the prioritization of watershed restoration potential.

These projects, as well as others to be identified through the study process, may be implemented through existing authorities such as the Civil Works Program of the Corps, the Watershed Protection and Flood Prevention Program of the Natural Resources Conservation Service, the Hazard Mitigation Grant Program of the Federal Emergency Management Agency, the Environmental Protection Agency and Water Quality Control Board Clean Water Act grant programs, as well as the Coastal Conservancy, the National Marine Fisheries Service, the Department of Fish and Game, and other public or private funding programs, and through new authorities where necessary.

There has been a recent flurry of planning efforts in the San Pablo Bay region, recognizing the great environmental enhancement potential inherent in the remaining block of diked historic baylands. This watershed study will integrate these efforts into the planning process, as well as recognize the importance of understanding the need for coordination and participation among the stakeholders. This study and other regional planning efforts have in common:

- ❑ A common focus of watershed restoration
- ❑ Coordination of key stakeholders to carry watershed restoration forward.
- ❑ Multi-party approach, involving a cooperative public-private, partnership style.

San Pablo Bay Watershed Restoration Study
Project Study Plan (PSP)

- Designed to fill gaps in existing wetland management or regulatory programs.
- Regional scope, beyond a single land entity, to restore ecological resources.

Chapter 2

2.0 STUDY MANAGEMENT AND EXECUTION

A number of public agencies and community groups have indicated strong support and a willingness to contribute resources (funding and in-kind services) for the development of this watershed evaluation. A Feasibility Cost Sharing Agreement (FCSA) will be executed between the Corps and the Coastal Conservancy. The Corps and the Coastal Conservancy have conducted scoping meetings to identify local interest in developing the evaluation further. Building on the information gathered during these scoping meetings, the Corps and the Coastal Conservancy will convene the SPBWSC as needed during the evaluation process to develop new information and discuss the evolving issues raised during evaluation. The Project Manager and the Coastal Conservancy with input from SPBWSC and other interested parties will meet to discuss the evaluation direction and progress, data collection, information needs, local community concerns, in-kind deliverables, Corps and A/E contractor deliverables, product acceptance, and financial commitments.

2.1 Executive Committee

An Executive Committee is required to provide project overview. The Executive Committee will be comprised of a representative from the Corps and the Coastal Conservancy. The Coastal Conservancy may provide co-sponsoring organization as advisers on the Executive Committee for any specific restoration or enhancement project, as such projects may arise. The Executive Committee will maintain a working knowledge of the progress of the study; provide oversight to changes in study scope, costs, and schedule; provide direction on resolution of policy issues; and provide guidance to ensure study results and policies are consistent and coordinated with the overall desired outputs and programs. They will meet on an as-needed basis, at a minimum of (4) times during the course of the three-year study (milestones F-1, 3, 4, 9).

An in-progress-review (IPR) conference will be convened with representatives from the Sponsor(s) and the Corps' Headquarters. The purpose of the IPR conference will be to review the study progress to date and to evaluate the study scope. Based on the in-progress-review, this PSP may be revised to better define the depth of analysis required, refine study constraints, and/or to refocus study efforts. The Executive Committee must approve all major deviations from the schedule, cost, and scope of the PSP.

Table 1. Executive Committee Co-Chairs

Organization	Name/Title	Address	Phone
Corps of Engineers CESPN-DE	Peter Grass, LTC District Engineer	333 Market Street San Francisco, CA 94105	(415) 977-8500
State of California Coastal Conservancy	William Ahern, Executive Officer	1330 Broadway, Ste. 1100 Oakland, CA 94612	(510) 286-1015

2.2 SCHEDULE AND COST CHANGES

The Coastal Conservancy and the Corps, with input from the SPBWSC, can request changes to the PSP’s scope, cost, and/or milestones by submitting a Schedule and Cost Change Request (SACCR) for PSP revisions. The Sponsor representatives will review and agree to changes proposed by the SACCR before subsequent action by the appropriate level of approval.

2.3 MILESTONES

The Corps is responsible for maintaining the following milestone schedule. The start date for this schedule and, therefore, all subsequent dates are contingent upon execution of the FCSA and receipt of local sponsor funds. The overall study duration is currently estimated to be three years (F1 to F9 milestones).

Table 2. Milestones

DATE	MILESTONE	MILESTONE ACTION
30Apr99		Execute Feasibility Cost Sharing Agreement (FCSA)
30May99	F1	Receive Funds/Begin Feasibility Phase
15Jun99	F2	Public Workshops (establish public/agency involvement and coordination; public workshops to be scheduled and locations identified)
01Oct99	F3	Formulation Analysis Conference (identify need for “spin-off” feasibility studies leading to determination of Federal, State, and local interest in implementable restoration projects.)
01Jan00	F4	Conference No.2 (provide a framework plan outlining watershed restoration parameters and criteria)
01Jan02	F5	Submit Draft Watershed Restoration Implementation Evaluation Report
01Apr02	F7	Final Public Hearing
30Jul02	F8	Submit Final Watershed Restoration Implementation Evaluation Report
15Oct02	F9	Division Engineering Certification/District Engineers Notice

2.4 QUALITY CONTROL

A quality control process will be used to ensure that the technical products are in compliance with applicable laws, regulations, and sound technical practices. The Corps is required to accomplish a series of technical reviews. The technical review will be conducted in accordance with procedures that have been established in the San Francisco District’s Quality Management Plan, CESPN OM 1110-1-120.

In addition, a quality assurance program being developed by Environmental Protection Agency (EPA) will benefit the development and quality of the evaluation report. The program will permit one sub-watershed to be compared with another to develop regional standard methods and approaches to watershed assessment. It is the expectation of SPBWSC that these watershed science and management efforts, used to assess watershed health, will be included into the evaluation process.

The Corps’ review team will support the regional network for science review of watershed assessment and restoration efforts. The members of the Corps’ technical review team will be assembled as needed. Materials will be submitted to the Corps’ review team at least two weeks before each milestone date and the Corps’ technical review will be completed at least one week before the milestone dates.

Table 3. Technical Review Team

NAME	SYMBOL	AREA OF EMPHASIS
Rod Chisholm	CESPN-PE-P	Planning Branch
Scott Miner	CESPN-PE-PF	Plan Formulation
Peter LaCivita	CESPN-PE-PS	Environmental Planning
Richard Stradford	CESPN-PE-PP	Environmental Studies
Ken Kuhn	CESPN-PE-E	Engineering
Carlos Hernandez	CESPN-PE-EH	Hydraulic/Coastal Engineering
George Dennis	CESPN-PE-ED	Civil Design
Kevin Knight	CESPN-PE-C	Economics
Susan Miller	CESPK-RE	Real Estate

Chapter 3

3.0 STUDY TASKS

Watershed restoration opportunities will be collaboratively developed by the Coastal Conservancy and the Corps, with input from the SPBWSC, and other watershed stakeholders. The Coastal Conservancy and the Corps will manage and implement the study and format the evaluation report. The evaluation will serve as a decision-making framework for local, state, and federal agencies, and other interested stakeholders to identify restoration opportunities and will provide the preliminary technical, planning, and design analysis for potential implementation of specific structural and non-structural projects. Interested local, state and federal agencies and non-profit groups can cooperatively or independently implement projects identified in the evaluation. If a specific project or projects can be identified for implementation under an existing Corps authority, then a study will be initiated that includes the appropriate level of planning and engineering detail. Cost sharing, as appropriate, would be explained to potential local sponsors. Non-Federal sponsor support would be secured.

These watershed restoration opportunities may be implemented by the Corps and/or by others through existing authorities where possible (such as the Civil Works Program of the Corps, the Watershed Protection and Flood Prevention Program of the Natural Resources Conservation Service, the Hazard Mitigation Grant Program of the Federal Emergency Management Agency, the Environmental Protection Agency and Water Quality Control Board Clean Water Act grant programs, as well as the Coastal Conservancy, the National Marine Fisheries Service, the Department of Fish and Game, local and private grant programs and others) and through new authorities where necessary.

The following is a description of the major tasks to be completed during this study. These tasks will support the activities and research of on-going efforts in the San Pablo Bay. The process will not duplicate existing research but provide a vehicle for using the existing information to identify and prioritize restoration opportunities. New scientific and technical research will be undertaken as necessary to ensure that the appropriate data is available to complete the restoration design.

3.1 DEVELOP WATERSHED RESTORATION IMPLEMENTATION EVALUATION REPORT

The evaluation report will identify the problems and opportunities for implementing environmentally beneficial restoration in the San Pablo Bay watershed. This evaluation study will include the identification, review, refinement, and prioritization of restoration opportunities with an emphasis on restoration of the watershed's ecosystem (e.g.: wetland endangered species, and estuarine and riparian habitats). The evaluation study will take into account secondary benefits associated with restoration, such as flood reduction, dredged material disposal, erosion, sedimentation, and pollution abatement. To ensure that the restoration opportunities are fully developed, the evaluation report will include the preliminary technical, planning, and design analysis, as well as the scientific research and data analysis necessary to support the prioritization of restoration opportunities. For example, the evaluation may include the preliminary hydrologic and hydraulic designs necessary to achieve channel

geomorphic stability, as well as designs to sustain a healthy riparian corridor at the prioritized restoration sites. A sediment source evaluation may be necessary to identify and evaluate alternative solutions for watershed stability. One of the evaluation objectives is to define the physical, economic, institutional and regulatory constraints in developing watershed restoration alternatives. The evaluation report will be a flexible document, written to allow for changes in priorities as concerns and problems arise over time. This will ensure that the evaluation report is a dynamic, flexible plan providing opportunities for active use.

The assistance provided during the development of the evaluation report will rely on a collaborative effort of watershed stakeholders. The evaluation will proceed at different levels to ensure that the restoration goals and objectives in the San Pablo Bay watershed are being met. The following tasks and sub-tasks identify the evaluations that will be followed to complete the study.

3.1.1 Public Involvement and Education

Public involvement is critical in the planning process and the NEPA/CEQA process requires public involvement. Stakeholders in the San Pablo Bay watershed are implementing broadly supported multi-jurisdictional regional programs. Some of public outreach efforts include: Save San Francisco Bay Association's Partnership for the San Pablo Baylands, San Francisco Estuary Institute's San Francisco Estuary Ecosystem Goals Project, the Bay Conservation and Development Commission's and the Environmental Protection Agency's information forum (the North Bay Forum), and the Bay Institute's information outreach.

3.1.1.1 Public Involvement

The public involvement and education task will include public meetings, workshops, and briefings as well as the preparation and distribution of fact sheets and information papers to interested parties and local news agencies. One of the goals of the public involvement task will be to work with other public outreach efforts to provide assistance to determine the restoration opportunities in the watershed and to coordinate with these efforts to ensure an efficient use of time and resources.

The total cost for task 3.1.1.1 is listed in Table 4.

3.1.1.2 Public Outreach Tools

This task will involve stakeholders to promote understanding of the restoration processes taking place in San Pablo Bay watershed and coordinate this San Pablo Bay watershed restoration effort with the efforts of other Federal, state, and local agencies, non-profits, and other stakeholders. The Friends of the San Francisco Estuary is planning to hire a regional coordinator to implement public outreach and educational efforts. As this study develops, the process will involve the Friends of the San Francisco Estuary to avoid duplication. In addition, the San Francisco Estuary Institute is developing the EcoAtlas, an on-line access tool with interactive mapping and other watershed information for the public. This cooperative effort

including the Resource Conservation Districts and other non-profits in the San Pablo Bay watershed. These efforts will use the Geographic Information System (GIS) mapping to promote watershed involvement in the San Pablo Bay watershed. GIS is a computer-based system that allows information including topographic, public policy, and land use issues to be mapped digitally for a quick comprehensive look at watershed conditions and functions.

Public information tools may include:

- mailing list/database – A master mailing list will be developed to inform the public about upcoming meeting and events involving study development. This process will include working closely with North Bay Forum to augment existing outreach efforts.
- web page – A Corps' San Pablo Bay watershed web site will be developed to provide interested parties access to information as it is being developed. The web site will be linked to other web sites that have information relevant to the San Pablo Bay (e.g.: San Francisco Estuary Institute, EPA, RWQCB)
- media packet and multimedia presentations – Packets and news conferences with presentations will be arranged as appropriate for regional and national recognition of the cooperative regional restoration effort taking place.

The total cost for sub-task 3.1.1.2 is listed in Table 4.

3.1.2 Technical, Planning, and Design Review and Analysis

The Corps will work collaboratively with the Coastal Conservancy, the SPBWSC, and other potential co-sponsors to provide assistance to determine the restoration potential in the San Pablo Bay watershed. The sites of potential restoration opportunities will be analyzed to determine if they meet the goals and objectives of restoration in the San Pablo Bay watershed.

Existing planning, scientific, and technical data will help quantify the future goals and objectives for watershed health. The goals and objectives of watershed management tend to change over time, and they vary among watersheds, in response to changes in scientific understanding and public concerns. The criteria for listing restoration opportunities will be the potential for improving habitats to sustain healthy populations of fish and wildlife and the geomorphic stability of the waterways. In addition, secondary criteria for listing will be flood protection, erosion, sedimentation, and pollution abatement, etc. Furthermore, increasing the performance of ecological restoration projects, increasing the understanding of local watersheds, and protecting the beneficial uses of water will be supported in the evaluation process. The evaluation will provide guidance for what type of restoration is wanted, what type of restoration is needed, what type of ecology exists, and what are the methods to achieve the preferred restoration. The evaluation will assist in establishing benchmark watersheds and their restoration opportunities. The overall goal of this task is to provide the technical, planning, and design analysis necessary to quickly and efficiently identify and prioritize restoration opportunities in the San Pablo Bay watershed.

The key to coordination is a shared understanding of watershed conditions. A watershed typology and GIS can help watershed scientists, managers, and the public organize their restoration goals. The WSA and its GIS partners are developing a public access, on-line source of maps, photos, data, and reports that can be used to visualize, analyze, and exchange information about watersheds. During the development of technical, planning, and design analysis for potential restoration projects, new and relevant data may be added to the existing WSA knowledge. The WSA will be an important component for assessing the restoration potential in the watershed.

Each restoration opportunity will be tailored to meet the local restoration goals and objectives. The following sub-tasks summarize areas where assistance will be provided, if it is determined to be appropriate and/or necessary.

3.1.2.1 Existing Data Gap Analysis and Development

Existing planning, scientific, and technical data will be used to identify and prioritize restoration opportunities. Where research information is not available and data is necessary to further the restoration opportunities in the San Pablo Bay watershed, data will be collected to augment the existing information. This process will include the identification of local efforts and provide the technical, planning, and design analysis for continuing the development of restoration opportunities. This will provide the avenue for local entities (regulatory and non-regulatory agencies, non-profit groups, and other stakeholders) to work together to develop a better understanding of the restoration potential in their watershed. To maximize support and the social value of this effort, the process will involve partnerships that engage different levels of government, scientific disciplines, and sectors of society. This effort and other efforts will be integrated into this planning process to better serve the restoration goals and objectives in the watershed.

The total cost for task 3.1.2.1 is listed in Table 4.

3.1.2.2 Surveying and Mapping

Surveying and mapping may include the preliminary review and update of existing aerial photographs, topographic and GIS mapping for use by the SPBWSC to define historical conditions. The SPBWSC may determine the need for new technical information, which may include general mapping of watershed attributes and surveying and aerial mapping of important features of the potential restoration projects.

The total cost for task 3.1.2.2 is listed in Table 4.

3.1.2.3 Hydrology and Hydraulic Studies

Hydrology and hydraulic investigations include identification of the baseline information on waterway dynamics required and necessary to complete the site analysis. The WSA framework and other appropriate technical support may be incorporated into this effort. This

may include an assessment and analysis of baseline conditions, rainfall and run-off discharge, erosion and sedimentation, structural and non-structural stream stability, etc.

The total cost for task 3.1.2.3 is listed in Table 4.

3.1.2.4 Geotechnical Studies

The geotechnical investigation may include problem evaluation and the preliminary field work necessary to determine potential design solutions. Sediment analysis will be used to determine the geomorphic stability of the site and the watershed.

The total cost for task 3.1.2.4 is listed in Table 4.

3.1.2.5 Environmental Studies

Environmental studies include describing and assessing existing and future ecological, biological, and aesthetic conditions; assessing adverse and beneficial impacts of proposed projects through the use of a habitat analysis study. The environmental studies will use acceptable scientific habitat evaluation methods. Technical data analysis developed by WSA may be incorporated into the study process. The environmental studies process will use existing information and new data (when necessary) to determine baseline conditions for wetland and riparian habitat, water quality, fish, wildlife, and endangered species habitat, etc.

The SPBWSC will work with the Fish and Wildlife Service to ensure that the proposed restoration opportunities meet the objectives of the Fish and Wildlife Coordination Act and identify information necessary to fulfill the requirements of the EIS/EIR process.

The total cost for task 3.1.2.5 is listed in Table 4.

3.1.2.6 Economic Studies

Economic analyses will reveal changes in costs for increasing levels of environmental outputs. This will ensure that a rational, supportable, focused, and traceable approach is used for considering and selecting restoration opportunities to produce environmental restoration. The economic examination will assess the without-project and with-project alternatives.

The total cost for task 3.1.2.6 is listed in Table 4.

3.1.2.7 Recreation Studies

Recreation studies will consider aesthetic and environmental constraints for all proposed recreational features. This effort will be coordinated with other recreational planning efforts at the restoration opportunity site.

The total cost for task 3.1.2.7 is listed in Table 4.

3.1.2.8 Cultural Studies

Cultural investigation will be completed, as necessary, to evaluate the potential impact of recommended restoration activities on sites eligible for the National Register of Historic Places, coordinated with the State Historic Preservation Office. All studies will be performed to meet NEPA and section 106 of the National Historic Preservation Act (1966) requirements.

The total cost for task 3.1.2.8 is listed in Table 4.

3.1.2.9 Engineering and Design Studies

The engineering and design effort will evaluate potential restoration project performance. Design efforts will coordinate various technical elements for determining the potential alternative designs for the proposed restoration features. This may include the compilation of topographic surveys, vegetation mapping, water quality analysis, estimates of soil, concrete, etc. removal or dredged material placement, habitat and wetland analysis, etc.

The total cost for task 3.1.2.9 is listed in Table 4.

3.1.2.10 Real Estate Studies

Real Estate will provide a preliminary accounting of the potential restoration opportunities, property ownership, property evaluation of possible easement rights or acquisition of impacted lands, and an assessment of Land, Easements, Relocations, and Disposal Sites (LERDS) requirements.

The total cost for task 3.1.2.10 is listed in Table 4.

3.1.3 Clarify Restoration Parameters

There are several important restoration parameters that need clarification. The following parameters will be investigated to ensure that the goals and objectives of this evaluation process are being met and the needs of the restoration opportunities are fulfilled.

3.1.3.1 Evaluate the beneficial use of dredged material for wetland restoration.

The Long Term Management Strategy (LTMS), see Appendix C, identified wetland restoration as a potential use for dredged material reuse. The evaluation report will further analyze and clarify dredged material reuse at wetland restoration opportunity sites. Some of the issues to be evaluated may include:

1. Determine habitat conversion impacts and benefits (e.g., existing seasonal wetland

- habitats) resulting from dredged material deposition.
2. Investigate and analyze the ranking of dredged material disposal sites. Some of the criteria in the grading of sites are ease of access, adjacent uses and impacts on existing conditions. Determine if the “grading” provides the highest achievable restoration potential for restoration opportunities.
 3. Identify the historic condition of the sites to ensure that restoration using dredged material is suitable and meets the goals and objectives of restoration in the San Pablo Bay watershed.
 4. Determine the water quality impacts of placing dredged material in wetlands.

The total cost for sub-task 3.1.3.1 is listed in Table 4.

3.1.3.2 Develop restoration enhancement standards for levee construction.

The SPBWSC has identified levee set backs as an important element for restoring riparian habitat and ensuring stream bank stability. To determine the maximum restoration potential of setback levees, an analysis of their environmental impacts and benefits will be conducted. Some of the issues to be investigated may include:

1. Determine the levee size necessary to provide flood protection and maximize the restoration potential.
2. Determine the level of protection necessary, depending on different uses – wildlife habitat, agricultural lands, railroad tracks, other infrastructure, etc.
3. Evaluate policy guidelines for levee construction for restoration.
4. Determine the appropriate levee setback for riparian enhancement.

The total cost for sub-task 3.1.3.2 is listed in Table 4.

3.1.3.3 Define Reclaimed Wastewater Use, Opportunities and Constraints

The SPBWSC is interested in the potential use of treated wastewater for wetland management and watershed restoration. An evaluation of the environmental and economic benefits and costs associated with using treated wastewater for such purposes will be conducted. Treated wastewater may have higher than normal levels of salinity, sodium, trace elements, residual chlorine, and nutrients. In addition, the use of treated wastewater for wetland and watershed restoration may alter the existing ecosystem. Before treated wastewater is used for environmental and/or agricultural purposes, a literature review and field research will be completed to determine the impacts to ecological restoration. Some of the issues to be investigated will include:

1. Identify the potential uses for treated wastewater including the seasonal fluctuation of uses and needs.
2. Clearly define and identify the purpose, timeframe, and carrying capacity for treated wastewater in the area.

3. Identify and compare the historic land uses and ecological conditions with the potential changes from the use of treated wastewater. Determine the environmental and economic benefits and costs associated with these changes.
4. Identify and secure landowner support for the long-term use of treated wastewater and the potential to reduce in-stream riparian diversions.
5. Develop and implement safeguards to prevent environmental damage from possible spillage of untreated wastewater.
6. Ensure that the potential accumulation of toxic substances in the soil and aquatic vegetation is environmentally safe.
7. Ensure that the residual chemicals in the wastewater are not harmful to the long-term viability of the fish and wildlife in San Pablo Bay watershed.
8. Determine the appropriate conditions and capacity for using treated wastewater in wetland and watershed restoration and the potential effect on resident and migratory fish and wildlife in the area.

The total cost for sub-task 3.1.3.3 is listed in Table 2.

3.1.4 Specific Restoration Opportunities

Specific restoration opportunities have potential non-federal sponsors interested in restoration if adequate technical, planning, and design analysis is provided to support project development. Restoration reports will be developed from these analyses to provide local communities with the preliminary information necessary to identify problems and opportunities in implementing multi-objective projects. The restoration reports will include discussions of potential habitat creation, wetland enhancement, riparian restoration, stream stabilization, flood protection, recreation, and education. The preliminary development and identification of these restoration opportunities will include defining project areas, collecting and reviewing preliminary technical data, conducting workshops, identifying problems and opportunities, completing preliminary design, identifying the preliminary environmental benefits associated with potential restoration opportunities, and defining the goals and objectives of feasible project alternatives. The potential restoration sites will be developed with input from the SPBWSC and other stakeholders. The assistance outlined under task 3.1.2 will be used to identify what restoration is necessary for this area.

The following potential sites have been tentatively identified as candidates for restoration based on site availability, interested non-federal sponsors, and the local support needed to carry the designs forward into restoration implementation. During the evaluation process of these sites, the SPBWSC may choose to provide assistance for alternate sites.

3.1.4.1 Sonoma Creek Restoration Development

Sonoma Creek drains the southeastern portion of Sonoma County into San Pablo Bay. The technical, planning, and design analysis for lower Sonoma Creek will identify conservation and restoration of natural habitats and the improvement of Sonoma Creek flood capacity by reconnecting the channel to its natural floodplain. Objectives of the analysis may include increased flood protection

for the neighboring community of Schellville and the enhancement of habitat for native fish, birds and mammals, including threatened and endangered species in the Sonoma Creek watershed. Restoration design may include redefining the low-flow channel, set-back levees to increase channel capacity, seasonal flooding to create seasonal wetlands habitat, and revegetation with native species. The potential benefits will be in the areas of flood reduction, erosion, deposition, and sedimentation abatement, invasive species eradication, and other channel improvements inherent in natural stream processes. This information will be presented in the form of a restoration report that will enable the local community and other interested parties to understand and support project development.

The total cost for task 3.1.4.1 is listed in Table 4.

3.1.4.1.1 Preliminary Technical, Planning, and Design Analysis

The assistance identified under task 3.1.2 will be used to determine what restoration is necessary for this site. This investigation may include technical analysis to complete the hydrologic, hydraulic and sedimentation analyses necessary to determine stream channel stability and the restoration characteristics that will maximize habitat restoration and related benefits, such as flood protection.

The total cost for task 3.1.4.1.1 is listed in Table 4.

3.1.4.2 Las Gallinas/Miller Creek Restoration Development

The Marin County Public Works Department and the Marin Conservation League are interested in initiating restoration in the Miller and Las Gallinas Creek watersheds. The EPA recognized the Miller Creek watershed, in Marin County, as a high priority watershed for protection and restoration. Miller Creek watershed's small size (8 square miles), involved community, homogeneous land use (primarily residential), native fisheries, and extensive riparian areas will provide a high value restoration opportunity. Las Gallinas Creek is adjacent to Miller Creek and flows into the same tidal marsh. This information will be presented in the form of a restoration report that will enable the local community and other interested parties to understand and support project development.

The total cost for task 3.1.4.2 is listed in Table 4.

3.1.4.2.1 Preliminary Technical, Planning, and Design Analysis

The assistance identified under task 3.1.2 will be used to determine what restoration is necessary for this site. This investigation may include technical analysis to complete the hydrologic, hydraulic, and sedimentation analyses necessary to determine stream channel stability and to identify potential point and non-point source pollutants that are entering the system. The technical, planning, and design analysis will evaluate alternatives for achieving a geomorphically stable channel. In addition, the evaluation will provide information in a form that will allow the local community to understand and be able to identify problems in its watershed.

The total cost for task 3.1.4.2.1 is listed in Table 4.

3.1.4.3 American Canyon Creek Restoration Development

The City of American Canyon is interested in restoring approximately 500 acres of diked former tidal wetlands adjacent to the Napa River. The City of American Canyon, the California Department of Fish and Game, the California State Lands Commission, and the Port of Oakland own the tidal wetlands, diked baylands, and uplands in this area. The City of American Canyon is currently negotiating with the Port of Oakland for the purchase of its land for restoration.

The potential restoration of the diked former tidal wetlands will provide habitat for federally listed species, including delta smelt, Sacramento splittail, Chinook salmon, California clapper rail, California black rail, salt marsh harvest mouse, and other shorebirds, wading birds, waterfowl, soft bottom invertebrates, crustaceans, striped bass, and other marine/estuarine fish. Technical, planning, and design analysis will define the appropriate wetland configuration to maximize recovery and minimize costs. This information will be presented in the form of a restoration report that will enable the local community and other interested parties to understand and support project development.

The total cost for task 3.1.4.3 is listed in Table 4.

3.1.4.3.1 Preliminary Technical, Planning, and Design Analysis

The assistance identified under task 3.1.2 will be used to determine what restoration is necessary for this site. The technical support will determine the need, size and location of a setback levee to protect the adjacent area from flooding and the potential restoration of the riparian corridor adjacent to American Canyon Creek. Coordination of the necessary environmental review will examine the potential restoration of this area.

The total cost for task 3.1.4.3.1 is listed in Table 4.

3.1.4.4 Pinole Creek Restoration Development

In 1996, Pinole Creek overtopped its banks and flooded downtown Pinole including the local library, commercial and residential buildings, and local roadways. Channel modifications on Pinole Creek were completed in the 1960's. The City of Pinole's Redevelopment Agency is interested in restoring the natural characteristics of Pinole Creek and in providing flood protection for the City of Pinole in conjunction with its effort to revitalize the downtown area. This study will provide the necessary technical, planning, and design analysis to identify the potential multi-objective restoration opportunities on Pinole Creek. This process will be coordinated with an active local community group to ensure that the community's needs, goals, and objectives are being identified and incorporated into the development of this restoration opportunity. This information will be presented in the form of a restoration report that will enable the local community and other interested parties to understand and support project development.

The total cost for task 3.1.4.4 is listed in Table 4.

3.1.4.4.1 Preliminary Engineering and Design Analysis

The assistance identified under task 3.1.2 will be used to determine what restoration is necessary for this site. A hydrologic, hydraulic and sedimentation analysis may be completed to determine the appropriate channel modification to achieve a geomorphically stable channel. In addition, bank stabilization techniques will be investigated to incorporate local aesthetic and environmental goals.

The total cost for task 3.1.4.4.1 is listed in Table 4.

3.1.5 Future Restoration Opportunities

The Corps, Coastal Conservancy, the SPBWSC, and other interested parties will use the information developed from the preceding tasks and the following tasks to identify future restoration opportunities in the San Pablo Bay watershed. In addition, potential restoration opportunities in the San Pablo Bay watershed have been identified in Appendix D. Appendix D was developed from a list of restoration sites provided by the San Francisco Bay Joint Venture. The selection of the restoration opportunities will use the information provided in Appendix D and other information developed by the SPBWSC and other stakeholders. Non-federal sponsors for these future restoration opportunities have not been identified at this time but the SPBWSC is confident that potential non-federal sponsors will be interested in restoration when the appropriate technical, planning, and design analysis is made available. The prioritization will rely on the extensive existing scientific and technical information, the interest and cooperation of the local community in identifying restoration opportunities, the environmental benefits associated with the restoration, the critical nature (urgency) of the restoration, and other factors as new issues arise during the evaluation process. To help define the restoration priorities and to ensure that no negative environmental impacts result from a proposed restoration, the following tasks will be addressed in the evaluation report.

3.1.5.1 Establish Restoration Partnerships

To ensure the environmental integrity of the San Pablo Bay watershed, a higher priority will be placed on protecting and enhancing natural resources when balanced with water use for domestic, industrial, municipal, and agricultural consumption, as well as recreation, aesthetic enjoyment, and navigation. The concern about local declines in watershed health needs to be clearly stated and understood by most of the watershed interests. To establish watershed partnerships, active participation in the development of the evaluation report will be sought.

Watershed residents may not understand their influence on their home watersheds. It is the purpose of this task to help residents understand the environmental history and changes that have taken place. One goal of partnerships will be to increase public awareness to help achieve the local and regional restoration goals and objectives. Through this iterative process, the potential for implementing near, mid, and long-term restoration opportunities is greatly increased. These partnerships will foster

participation in the identification of restoration opportunities and the local commitment to implement and monitor the environmental and economic values that the restoration will provide.

The total cost for task 3.1.5.1 is listed in Table 4.

3.1.5.2 Determine the Urgency of Future Restoration Opportunities

The San Pablo Bay watershed is under increased development pressure from urban uses (residential, commercial, and industrial) and more intensive agricultural uses (vineyards, orchards, and livestock). These uses need to be carefully planned to ensure the health of the San Pablo Bay watershed. The pressures of human activities warrant that a higher priority be given to restoration opportunities. Numerous factors will influence the identification and development of restoration sites. Therefore, these factors are expected to evolve over time, shifting priorities as unforeseen activities occur. Part of the evaluation process will determine the potential risks and benefits of different activities to the watershed's ecological stability.

Preferences should be placed on habitat types that are in greater need of restoration and protection. For example, intertidal wetlands should be given preference where conditions are suitable because of the extremely limited opportunities for creation. Preference should be given to the restoration of large sites, capable of providing the complexity of habitat, highest channel order, and ecosystem resilience. Also, a high priority will be placed on the benefits of potential restoration sites that have willing partners.

The total cost for task 3.1.5.2 is listed in Table 4.

3.1.5.3 Evaluate the Criteria Associated with Restoration Opportunities

Evaluation criteria will be established to eliminate potential restoration opportunities that are manifestly not technically feasible, do not meet established objectives, or which violate physical, economic, and institutional constraints. The screening process will evaluate the completeness, technical feasibility, ability to meet objectives of this study, and other evaluation criteria listed in Appendix C. The evaluation will ensure that study results are consistent and coordinated with appropriate policies and the overall desired outputs and programs

Environmental costs and beneficial outputs for each watershed restoration opportunity will be assessed. Costs may include a preliminary estimate of construction costs, land acquisition costs, and operation and maintenance costs. Environmental outputs will be measured in terms of habitat units using the U.S. Fish and Wildlife Service's Habitat Evaluation Procedures (HEP). A hydrogeomorphic classification of wetlands or other acceptable procedures will be considered as a supplemental method for evaluating the functional indices of wetland ecosystems.

The total cost for task 3.1.5.3 is listed in Table 4.

3.2 PLAN FORMULATION

3.2.1 Framework Plan Development

The framework plan will provide the clarification of restoration parameters and the preliminary analyses of the restoration opportunities criteria. This plan will be completed by the end of the first year of this study, January 2000. The framework plan will be further refined and incorporated into the evaluation report as the study proceeds.

The total cost for task 3.2.1 is listed in Table 4.

3.2.2 Draft Watershed Restoration Implementation Evaluation Report Development

The draft evaluation report will clearly justify the identification and prioritization of restoration opportunities, according to the established criteria. The report will include management practices and potential restoration projects. Responsibilities will be clearly defined. Individual components of the report will be separable to the maximum extent possible to permit their implementation according to a timetable dictated by the abilities and resources of the responsible agencies.

The evaluation report will analyze the tasks to define multi-objective restoration opportunities and evaluate the opportunities to ensure that they are consistent with the watershed goals and objectives. This is an iterative part of the planning process. Preliminary technical, planning, and design documents will be developed, refined, reviewed, and ordered for potential restoration opportunities. The evaluation process will define the most cost-effective and productive combination of restoration opportunities.

The evaluation will occur at two levels: the assessment level and the appraisal level. The assessment-level evaluation is the process of measuring or estimating the effects of restoration opportunities. It compares the difference between the without-project condition and with-project condition for each restoration opportunity. The appraisal-level evaluation is the process of assigning social values to the technical information gathered and the completed assessment-level evaluation. Values will be expressed in environmental output units. Cost effectiveness will ensure that the least cost solution will be identified for each possible level of environmental output.

The total cost for task 3.2.2 is listed in Table 4.

3.2.3 Final Watershed Restoration Implementation Evaluation Report Development

The results of the evaluation and prioritization of potential restoration opportunities will be presented in the final evaluation report. The report will prioritize restoration projects and alternatives and be structured to allow for changes in priorities as concerns and problems arise over time. This will ensure that the report is a dynamic, flexible document providing opportunities for active use. The report will include the appropriate appendices developed during report development including a quantification of the environmental outputs and the necessary environmental benefits to be achieved.

The total cost for task 3.5 is listed in Table 4.

3.3 PROGRAM AND PROJECT MANAGEMENT

Program Management will include budget preparation for current year and out years, monitoring costs and accounting allocations. Project Management will includes point of contact responsibilities, development and negotiation of the Project Cooperation Agreement (PCA), Memorandums of Agreement (MOA's) and other customer agreements. Periodic meetings will be held between the Corps and the Coastal Conservancy to report on the status of the study and responsible in-kind services and credits.

Project Management will provide monthly status reports covering selected financial and performance measurements. Responsibilities will include the finalizing of the study network based on resource availability, and the maintenance and management of the network during the course of the study.

The Project Manager will coordinate with the Coastal Conservancy for the management of negotiated in-kind services. In addition, the Project Manager will coordinate the Corps review process, the cost-sharing procedures, and the management of budgets and schedules for the study. The negotiation of tasks and costs, review of reports, and participation in meetings on study results and issues are included in this task.

The Project Manager will establish, manage and maintain a study network to facilitate cost accounting and scheduling.

The total cost for task 3.3 is listed in Table 4.

3.4 ENVIRONMENTAL CERTIFICATION PROCESS

The evaluation report will identify problems and potential solutions for improving the health of the watershed. These problems and any subsequent problem resolutions identified during the watershed planning process will be developed in accordance with the requirements of the NEPA and the CEQA, the Clean Water Act Section 404 (b)(1), California water quality certification, and the Clean Air Act Section 103. An EIS and EIR process will be used, as necessary, to assess the effects of any problem resolutions. During the development of the evaluation report there will be consideration given to preparing a programmatic EIS/EIR which can serve as a supporting document for individual actions.

The total cost for task 3.4 is listed in Table 4.

Chapter 4

4.0 COST SUMMARY, RESPONSIBILITY MATRIX, AND WORK BREAKDOWN STRUCTURE

The completion of the evaluation report will be cost-shared between the Corps of Engineers and the Coastal Conservancy (Sponsor), on a 50-50 basis. The Coastal Conservancy may provide a maximum of half of its total cost as in-kind services. The Coastal Conservancy will be responsible for conducting all in-kind services and for transmitting the information to the Corps at the required times. The Corps' project manager will be responsible for providing overall policy and general direction for the in-kind services, incorporating the Coastal Conservancy's work into other study elements and coordinating the in-house review of the Coastal Conservancy's work. Together, the respective managers will resolve any comments produced by the in-house review and will agree on the procedure for completing the in-kind work to the satisfaction of both parties. Tables 4, 5, and 6 present the study program by fiscal year, including responsibility, description, and cost for accomplishing tasks.

Table 4. San Pablo Bay Watershed Study Cost Estimate Summary with Funding Schedule (\$X1000)

Task No.	Task Description	Sponsor FY 1999 (10/98-09/99)		Corps FY 1999	Sponsor FY 2000 (10/99-09/00)		Corps FY 2000	Sponsor FY 2001 (10/00-09/01)		Corps FY 2001	Total	Total
		Cash	In Kind	Cash	Cash	In Kind	Cash	Cash	In Kind	Cash	Cash	In Kind
3.1	DEVELOP WATERSHED RESTORATION IMPLEMENTATION EVALUATION REPORT	0	0	0	0	0	0	0	0	0	0	0
3.1.1	Public Involvement and Education	0	0	0	0	0	0	0	0	0	0	0
3.1.1.1	Public Involvement		10	10	10	20	10	10	10	10	90	40
3.1.1.2	Public Outreach Tools		10	10	0	10	10	10	10	10	70	30
3.1.2	Technical, Planning, and Design Review and Analysis	0	0	0	0	0	0	0	0	0	0	0
3.1.2.1	Existing Data Gap Analysis and Development	0	10	10	10	20	20	0	0	0	70	30
3.1.2.2	Surveying and Mapping Studies	0	0	40	20	40	80	20	60	50	310	100

San Pablo Bay Watershed Restoration Study
Project Study Plan (PSP)

Task No.	Task Description	Sponsor FY 1999 (10/98-09/99)		Corps FY 1999	Sponsor FY 2000 (10/99-09/00)		Corps FY 2000	Sponsor FY 2001 (10/00-09/01)		Corps FY 2001	Total	Total
		Cash	In Kind	Cash	Cash	In Kind	Cash	Cash	In Kind	Cash	Cash	In Kind
3.1.2.3	Hydrology and Hydraulic Studies	0	10	50	70	50	150	100	130	200	760	190
3.1.2.4	Geotechnical Investigation	0	0	30	40	40	100	95	85	100	490	125
3.1.2.5	Environmental Studies	0	0	10	20	20	50	40	60	70	270	80
3.1.2.6	Economic Studies	0	0	10	0	0	50	20	30	80	190	30
3.1.2.7	Recreational Studies	0	0	0	0	40	0	10	20	0	70	60
3.1.2.8	Cultural	0	0	0	0	0	50	10	0	50	110	0
3.1.2.9	Engineering and Design	0	0	30	60	0	70	50	50	150	410	50
3.1.2.10	Real Estate Studies	0	0	0	0	0	50	0	0	50	100	0
3.1.3	Clarify Restoration Parameters	0	0	0	0	0	0	0	0	0	0	0
3.1.3.1	Evaluate the beneficial use of dredged material for wetland restoration	0	0	20	10	0	10	0	0	0	40	0
3.1.3.2	Develop restoration enhancement standards for levee construction	20	0	20	10	0	20	0	0	0	70	0
3.1.3.3	Define Reclaimed Wastewater Use, Opportunities And Constraints	100	100	10	100	200	10	80	0	0	600	300
3.1.4	Specific Restoration Opportunities	0	0	0	0	0	0	0	0	0	0	0
3.1.4.1	Sonoma Creek Restoration Development	0	5	5	0	0	0	0	0	0	10	5
3.1.4.1.1	Preliminary Technical, Planning, and Design Analysis	0	5	10	0	0	0	0	0	0	15	5
3.1.4.2	Las Gallinas/Miller Creek Restoration Development	0	5	0	0	5	10	0	0	0	20	10

San Pablo Bay Watershed Restoration Study
Project Study Plan (PSP)

Task No.	Task Description	Sponsor FY 1999 (10/98-09/99)		Corps FY 1999	Sponsor FY 2000 (10/99-09/00)		Corps FY 2000	Sponsor FY 2001 (10/00-09/01)		Corps FY 2001	Total	Total
		Cash	In Kind	Cash	Cash	In Kind	Cash	Cash	In Kind	Cash	Cash	In Kind
3.1.4.2.1	Preliminary Technical, Planning, and Design Analysis	0	5	0	10	5	0	0	0	0	20	10
3.1.4.3	American Canyon Creek Restoration Development	0	0	0	0	10	20	0	0	0	30	10
3.1.4.3.1	Preliminary Technical, Planning, and Design Analysis	0	0	0	0	10	0	0	0	0	10	10
3.1.4.4	Pinole Creek Restoration Development	0	0	5	0	5	5	0	0	0	15	5
3.1.4.4.1	Preliminary Technical, Planning, and Design Analysis	0	0	10	0	5	15	0	0	0	30	5
3.1.5	Future Restoration Opportunities	0	0	0	0	0	0	0	0	0	0	0
3.1.5.1	Establish restoration partnerships	0	20	10	30	20	50	20	10	50	190	50
3.1.5.2	Determine the urgency of future restoration opportunities	20	10	10	30	10	40	10	10	40	180	30
3.1.5.3	Evaluate the criteria associated with restoration opportunities	40	20	20	50	30	70	20	20	50	320	70
3.2	PLAN FORMULATION	0	0	0	0	0	0	0	0	0	0	0
3.2.1	Framework Plan Development	0	0	30	0	0	20	0	0	0	50	0
3.2.2	Draft Watershed Restoration Implementation Evaluation Report Development	0	0	10	0	0	50	30	0	30	120	0
3.2.3	Final Watershed Restoration Implementation Evaluation Report Development	0	0	0	0	0	0	20	20	80	120	20

San Pablo Bay Watershed Restoration Study
Project Study Plan (PSP)

Task No.	Task Description	Sponsor FY 1999 (10/98-09/99)		Corps FY 1999	Sponsor FY 2000 (10/99-09/00)		Corps FY 2000	Sponsor FY 2001 (10/00-09/01)		Corps FY 2001	Total	Total
		Cash	In Kind	Cash	Cash	In Kind	Cash	Cash	In Kind	Cash	Cash	In Kind
3.3	PROGRAMS AND PROJECT MANAGEMENT	30	0	30	50	0	80	20	30	80	320	30
3.4	ENVIRONMENTAL CERTIFICATION PROCESS	0	0	10	0	0	20	30	10	50	120	10
	SUBTOTAL	190	210	400	520	540	1060	595	555	1150	0	0
		400			1060			1150				
	TOTAL	800			2120			2300			5220	1305

¹All costs in thousands of dollars

Table 5. San Pablo Bay Watershed Study Responsibility Matrix (with percent estimates of responsibility)

TASK NO.	TASK DESCRIPTION	COASTAL CONSERVANCY	CORPS	A/E CONTRACTS
3.1	DEVELOP WATERSHED RESTORATION IMPLEMENTATION EVALUATION REPORT			
3.1.1	Public Involvement and Education			
3.1.1.1	Public Involvement	40%	20%	40%
3.1.1.2	Public Outreach Tools	20%	30%	50%
3.1.2	Technical, Planning, and Design Review and Anaysis			
3.1.2.1	Existing Data Gap Analysis and Development	20%	20%	60%
3.1.2.2	Surveying and Mapping Studies	20%	20%	60%
3.1.2.3	Hydrology and Hydraulic Studies	20%	20%	60%
3.1.2.4	Geotechnical Investigation	20%	20%	60%
3.1.2.5	Environmental studies	20%	20%	60%
3.1.2.6	Economic studies	20%	80%	
3.1.2.7	Recreational Studies	95%	5%	
3.1.2.8	Cultural	20%	80%	
3.1.2.9	Engineering and Design	20%	20%	60%
3.1.2.10	Real Estate Studies	20%	80%	
3.1.3	Clarify Restoration Parameters			
3.1.3.1	Evaluate the beneficial use of dredged material for wetland restoration	20%	40%	40%
3.1.3.2	Develop restoration enhancement standards for levee construction	30%	50%	20%
3.1.3.3	Define Reclaimed Wastewater Use, Opportunities And Constraints	40%	20%	60%
3.1.4	Specific Restoration Opportunities			
3.1.4.1	Sonoma Creek Restoration Development	60%	40%	
3.1.4.1.1	Preliminary Technical, Planning, and Design Analysis	30%	30%	40%
3.1.4.2	Las Gallinas/Miller Creek Restoration Development	60%	40%	
3.1.4.2.1	Preliminary Technical, Planning, and Design Analysis	30%	30%	40%
3.1.4.3	American Canyon Creek Restoration Development	50%	50%	

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3.1.4.3.1	Preliminary Technical, Planning, and Design Analysis	30%	30%	40%
3.1.4.4	Pinole Creek Restoration Development	30%	70%	
3.1.4.4.1	Preliminary Technical, Planning, and Design Analysis	30%	30%	40%
3.1.5	Future Restoration Opportunities			
3.1.5.1	Establish restoration partnerships	30%	20%	50%
3.1.5.2	Determine the urgency of future restoration opportunities	40%	20%	40%
3.5.3	Evaluate the criteria associated with restoration opportunities	50%	50%	
3.2	PLAN FORMULATION			
3.2.1	Framework Plan Development	10%	30%	60%
3.2.2	Draft Watershed Restoration Implementation Evaluation Report Development	20%	40%	40%
3.2.3	Final Watershed Restoration Implementation Evaluation Report Development	20%	50%	30%
3.3	PROGRAMS AND PROJECT MANAGEMENT	10%	90%	
3.4	ENVIRONMENTAL CERTIFICATION PROCESS	30%	30%	40%

Table 6. San Pablo Bay Watershed Study Work Breakdown Structure

Activity ID	Activity Desc.	Orig Dur	Early Start	Early Finish	Total Float	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
1 - RECONNAISSANCE															
00032M	Field Trip	3d	01Jul98	03Jul98	27d	W									
00032P	Hydrology and Hydraulics Analysis	10d	01Jul98	14Jul98	0	2M									
000343	Letter of Intent to Cost Share Feasibility Study	10d	01Jul98	14Jul98	30d	32P									
00034G	Program / Project Management (Recon)	218d	01Jul98	30Apr99	0	343									
000354	[MILESTONE #1] - Initiation of Study	0	01Jul98	01Jul98	0	4G									
36	Reconnaissance Phase	218d	01Jul98	30Apr99	0	354									
00032S	Preliminary Engineering and Design Analysis	110d	15Jul98	15Dec98	0	32S									
00032V	Economic Analysis	110d	15Jul98	15Dec98	0	32V									
000331	Real Estate Analysis	110d	15Jul98	15Dec98	0	331									
000335	Environmental Analysis	110d	15Jul98	15Dec98	0	335									
00033X	Study Scope Establishment	10d	12Aug98	25Aug98	0	33X									
00034W	QCR & Memorandum	61d	26Aug98	18Nov98	2d	34W									
00034Z	Draft Project Study Plan (DPSP) & Fact Sheet	61d	26Aug98	18Nov98	0	034Z									
00034B	Interim Milestone Conference - IMC [MILESTONE #2]	2d	19Nov98	20Nov98	0	00034B									
00034V	Final PSP & Final Sect. 905(b) Appraisal - [MILESTONE #3]	50d	23Nov98	29Jan99	0	00034V									
362	Final Reconnaissance Report/905(b) Analysis	50d	23Nov98	29Jan99	0	362									
00034A	Reconnaissance Review Conference - RRC [MILESTONE #4]	15d	01Feb99	19Feb99	0	00034A									
00034D	Reconnaissance Guidance Memorandum - RGM	1d	01Feb99	01Feb99	14d	00034D									
000349	Recon-Report Certification HQ Guidance/Approval Memorandum	9d	23Feb99	05Mar99	0	000349									
00034E	Feasibility Cost Sharing Agreement FCSA Negotiations	10d	08Mar99	19Mar99	0	00034E									
000352	Sponsor Processing of FCSA	20d	22Mar99	16Apr99	0	000352									
365	FCSA Signed/Executed [Milestone #5]	10d	19Apr99	30Apr99	0	365									

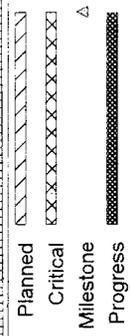


Table 6. San Pablo Bay Watershed Study Work Breakdown Structure

Activity ID	Activity Desc.	Orig Dur	Early Start	Early Finish	Total Float	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
2. TECHNICAL ASSISTANCE															
20	Technical Assistance	782d	03May99	30Apr02	0		20								
21	Non-Federal/Sponsor Involvement (Tech Assist)	782d	03May99	30Apr02	0		21								
355	Planning Branch Support	782d	03May99	30Apr02	0		355								
356	Engineering Branch Support	782d	03May99	30Apr02	0		356								
357	Environmental Branch Support	782d	03May99	30Apr02	0		357								
358	Programs / Project Mgmt Support	782d	03May99	30Apr02	0		358								
359	FY99 Carryover Funds (Unob)	370d	03May99	29Sep00	0		359								
368	Framework Plan	195d	03May99	28Jan00	0		368								
370	QC for M7 Pre-Meeting Info	22d	03May99	01Jun99	141d		370								
369	Conference #1 (M7)	32d	02Jun99	15Jul99	141d		369								
366	Draft Watershed Restor. Implementation Evaluation Report	416d	31Jan00	03Sep01	0		366								
371	QC for M8 Alt. Screening	10d	07Aug01	20Aug01	0				371						
372	Alt. Screening Conference (M8)	10d	21Aug01	03Sep01	0				372						
373	AFB Decision Conference	44d	04Sep01	02Nov01	0				373						
374	QC Draft Watershed Restor. Implementation Eval. Report	10d	04Sep01	17Sep01	0				374						
376	Draft WRIER to CESP	22d	18Sep01	17Oct01	0				376						
377	WRIER Review Conference	22d	18Oct01	16Nov01	0				377						
382	Final Public Meeting	22d	18Oct01	16Nov01	0				382						
375	AFB Conference #2	10d	05Nov01	16Nov01	0				375						
367	Final Watershed Restor. Implementation Evaluation Report	53d	19Nov01	30Jan02	0				367						
380	QC for Final WRIER	31d	31Jan02	14Mar02	0				380						
379	Final WRIER to CESP	11d	15Mar02	29Mar02	0				379						
378	Division Commanders Notice	22d	01Apr02	30Apr02	0				378						
381	Washington Level WRIER Approval	22d	01Apr02	30Apr02	0				381						



Coastal Conservancy

Bill Ahern
Executive Officer

January 22, 1999

Lieutenant Colonel Peter T. Grass
District Engineer, San Francisco
U.S. Army Corps of Engineers
333 Market Street
San Francisco, California 94105-2197

Subject: San Pablo Bay Watershed Restoration

Dear Lt. Colonel Grass:

The Coastal Conservancy agrees to work with the Corps of Engineers in addressing the problems and opportunities for restoring the watershed of San Pablo Bay.

Coastal Conservancy staff has reviewed the Corps' draft Project Study Plan (PSP), dated January 1999, for the San Pablo Bay Watershed Restoration study and believes the PSP accurately describes the issues and study activities that are necessary to design solutions to the San Pablo Bay watershed restoration problems. The Coastal Conservancy is prepared to serve as the local sponsor for the project, and will coordinate the activities of our many partner organizations that will contribute to the project.

Conservancy staff is aware of and understands the Conservancy's cost-sharing responsibilities with regard to the proposed \$5.22 million study. The Conservancy's effective participation in the study, however, will require some flexibility in the allowance for the Conservancy's required share: in particular, cash and in-kind services provided by the Conservancy's partners must be allowed to count toward the Conservancy's share. Notwithstanding this issue, I am prepared to seek authorization from the Conservancy's governing board to fund portions of the study, as funding is available and necessary for the study development, as specified in the PSP.

I understand that this letter constitutes an expression of intent and is not a contractual obligation, and that either the Corps or the Conservancy may discontinue the project development process, in accordance with any signed agreement.

I appreciate the Corps' participation in this important work.

Bill Ahern

1330 Broadway, 11th Floor
Oakland, California 94612-2530
510•286•4185 / Fax: 510•286•0470

APPENDIX A

LISTED SPECIES

Both the State of California and the Federal government maintain formal lists of endangered, threatened, and candidate species under the authorities of their respective Endangered Species Acts. In addition, both levels of government have informal lists to watch species, which are being reviewed for possible formal listing as threatened or endangered.

The California Department of Fish and Game (CDFG) also lists rare plants and tracks a number of “special animals” through the California Natural Diversity Data Base (CNDDB). In addition, the California Native Plants Society (CNPS), a non-governmental conservation organization, has developed lists of native California plants that it identifies as rare or endangered.

The species listed below indicate the category and the species type.

PLANT SPECIES

a. Formal

- ❑ Mason’s lilaeopsis (Lilaeopsis masonii) is a state rare species and a federal species of concern.
- ❑ Soft Bird’s-back (Cordylanthus mollis ssp sollis) is a state-listed as rare and is proposed for listing federally as an endangered species.
- ❑ Contra Costa goldfields (Lasthenia conjugens) is a federal proposed endangered species and on the CNPS list.

b. Informal

- ❑ Suisun Marsh aster (Aster lentus) is a federal species of concern and on the CNPS list.
- ❑ Alkali milk-vetch (Astragalus tener var. tener) is on the CNPS list.
- ❑ San Joaquin saltbush (Atriplex joaquiniana) is a federal species of concern and on the CNPS list.
- ❑ Point Reyes bird’s-beak (Cordylanthus maritimus ssp. Palustris) is a federal species of concern and on the CNPS list.
- ❑ Dwarf downingia (Downingia Pusilla) is in the CNPS list.
- ❑ Fragrant Fritillary (Fritillaria liliacea) is a federal species of concern and on the CNPS list.
- ❑ Delta tule pea (Lathyrus jepsonii var. jepsonii) is a federal species of concern and on the CNPS list.
- ❑ Legenere (Legenere limosa) is a federal species of concern and on the CNPS list.
- ❑ Marin knotweed (Polygonium marinense) is a federal species of concern and on the CNPS list.
- ❑ Rayless ragwort (Senecio aphanactis) is on the CNPS list.

ANIMAL SPECIES

a. Formal

- ❑ California Freshwater shrimp (*Syncaris pacifica*) is a federally and state-listed endangered species.
- ❑ Winter-run Chinook Salmon (*Oncorhynchus tshawytscha*) is a federally and state-listed endangered species.
- ❑ Delta Smelt (*Hypomesus transpacificus*) is a federally and state-listed threatened species.
- ❑ Tidewater Goby (*Eucyclogobius newberryi*) is a federally listed endangered species and a CDFG species of special concern.
- ❑ Sacramento Splittail (*Pgonichthys macrolepidotus*) is a proposed federal listing as threatened.
- ❑ Steelhead (*Salmo gairdnerii*) is federally listed as threatened.
- ❑ California Brown Pelican (*Pelecanus occidentalis*) is a federally and state-listed endangered species.
- ❑ California Black Rail (*Laterallus jamaicensis*) is state-listed as threatened and a federal species of concern.
- ❑ California Clapper Rail (*Rallus longirostris*) is a federally and state-listed endangered species.
- ❑ Western Snowy Plover (*Charadrius alexandrinus*) is a federally listed threatened species and a CDFG species of special concern.
- ❑ American Peregrine Falcon (*Falco Peregrinus*) is a federally and state-listed endangered species.
- ❑ Salt Marsh Harvest Mouse (*Reithrodontomys raviventris*) is a federally and state-listed endangered species.

b. Informally

- ❑ Double-crested Cormorant (*Phalacrocorax auritus*) is on the CDFG list of species of special concern.
- ❑ Great Blue Heron (*Ardea herodias*) is tracked by the CNDDFB.
- ❑ Black-crowned Night Heron (*Nycticorax nycticorax*) is tracked by the CNDDDB.
- ❑ Golden Eagle (*Aquila chrysaetos*) is a CDFG species of special concern and is specifically protected by the Bald Eagle Protection Act as amended.
- ❑ Northern Harrier (*Circus cyaneus*) is a CDFG species of special concern.
- ❑ White-tailed Kite (*Elanus leucurus*) is tracked by the CNDDDB.
- ❑ Osprey (*Pandion haliaetus*) is a CDFG species of special concern.
- ❑ Long-billed Curlew (*Numenius americanus*) is a CDFG species of special concern.
- ❑ Caspian Tern (*Hydroprogne caspia*) is a CDFG species of special concern.
- ❑ Foster's Tern (*Sterna forsteri*) nesting colonies are tracked by the CNDDDB.
- ❑ Short-eared Owl (*Asio flammeus*) is a CDFG species of special concern.
- ❑ Burrowing Owl (*Speotyto cunicularia*) is a federal species of concern and is a CDFG species of special concern.
- ❑ California Horned Lark (*Eremophila alpestris*) is a CDFG species of special concern.
- ❑ Loggerhead Shrike (*Lanius ludovicianus*) is a CDFG species of special concern.
- ❑ Tricolored Blackbird (*Agelaius tricolor*) is a federal species of concern and is a CDFG species of special concern. The CNDDDB reports nesting colonies in San Pablo Bay watershed.

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- ❑ Salt Marsh Common Yellowthroat (Geothlypis trichas) is a federal species of concern and is a CDFG species of special concern.
- ❑ Suisun Shrew (Sorex sinosus) is a CDFG species of special concern.
- ❑ Monarch butterflies (Danaus plexippus) winter roost is tracked by the CNDD.

APPENDIX B

REFERENCE LIST

References

- | | |
|---|--|
| CECG/ASA(CW)
dtd 31 March 1995 | Technical Review Process. |
| CECW-A Memorandum
dtd 14 April 1995 | Implementation of New Technical and Policy Procedures. |
| CESPD-ET-P Memorandum
dtd 1 September 1995 | Implementation of New Technical Review Procedures for Planning Products. |
| CESPD-ET-P, Memorandum
dtd 6 February 1996 | Implementation of New Technical Review Procedures for Planning Products. |
| CESPD-R 1110-1-8
dtd 30 June 1997 | Quality Management Plan |
| CECW-PW | Planning Guidance Letter 95-2 |
| ER 220-2-2
dtd 04 March 1988 | Procedures for Implementing NEPA
Department of Army regulation on environmental quality. |
| ER 405-1-12
dtd 01 may 1998 | Real Estate Handbook - Local Cooperation
Department of the Army regulation establishing guidelines for real estate activities for local cooperation agreements. |
| ER 1105-2-100 | Planning Guidance
Department of the Army regulation on policy and guidance for the conduct of civil works planning studies. |
| ER 1110-1-12 | Engineering and Design Quality Management. |
| ER 1110-2-401 | Operation, Maintenance, Repair, Replacement, and Rehabilitation manual for Projects and Separable Elements Managed by Project Sponsors |
| ER 1165-2-28 | Corps of Engineers participation in Improvements for Environmental Quality |

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- | | |
|------------------------------------|--|
| ER 1165-2-119 | Modifications to Completed Projects. |
| ER 1165-2-501 | Draft Ecosystem Restoration in the Civil Works Program |
| EC 1105-2-214 | Project Modifications for Improvement of the Environment and Aquatic Ecosystem Restoration |
| EI 01D010
dtd 01 September 1997 | Construction Cost Estimates |
| EM 1110-2-301 | Guidelines for landscape planting at floodwalls, levees, and embankment dam |

APPENDIX C

REGIONAL RESTORATION PLANNING DOCUMENTS

The following regional scientific and planning documentation will be integrated into the evaluation report, as appropriate. The integration of this documentation will allow this study to focus on completing the technical, planning, and design analysis critical for future implementation of restoration opportunities identified in the San Pablo Bay watershed. It is not the intent of this study to duplicate completed research but to build off of the data produced to provide the next level of analysis to restore the ecological health of the watershed.

a. Bay Area Watersheds Science Approach

This 1998 report defines the role of watershed science to support environmental planning and resource protection. Watershed science is the integral sum of individual scientific disciplines that contribute to a better understanding of the physical, biological, and social relations among terrestrial and aquatic environments.

b. California Salmonid Stream Habitat Restoration Manual

This manual formally synthesizes and describes the Department of Fish and Game's approach and technical methods for anadromous salmonid habitat restoration. The second and third edition expanded the manual to include stream habitat inventory and restoration practices, as well as monitoring and implementation.

c. California Wetlands Conservation Policy

This 1993 policy of the Governor of California establishes goals of no overall net loss of wetlands, reducing procedural complexity in administration of wetland conservation programs, and encouraging partnerships and landowner incentives to improve wetlands protection.

d. Comprehensive Conservation and Management Plan

This 1993 plan was prepared as part of the San Francisco Estuary Project. The plan establishes wetland ecosystem goals, a regional wetlands management plan, and geographically focused cooperative efforts to protect wetlands. The San Francisco Estuary Project developed a Comprehensive Conservation and Management Plan which presented strategies to protect and restore the health of the San Francisco Estuary. The plan found that the region's wetlands were subject to uneven protection efforts and called for a coordinated intergovernmental system to ensure maximum protection, restoration, and

management of wetlands.

e. Fremontia - Special Issue: Weeds

One of the greatest threats to California's native plants, both rare and common, is the increasing number of aggressive weedy plant species that may endanger and eliminate many native species. This special issue, October 1998, details some of California's problem with invasive exotic weeds in various habitats and in parks and reserves.

f. Goals and Objectives for a "Living" Napa River System

The report was created as part of the design review process for the Napa River flood management plan. The goal was to provide a working definition for a "living" Napa River system. The report provides information regarding the geomorphic, water quality and habitat elements for the Napa River management plan. The report is intended to serve as a "living" dynamic document.

g. Handbook on California and Federal Wetlands Regulation

The handbook was developed by the wetlands discussion group to give members of the public an overview of the wetland regulation process and a list of references and contacts for further information.

h. Long-term Management Strategy

A Long-term Management Strategy (LTMS) for Dredging and Dredged Material Disposal in the San Francisco Bay/Sacramento-San Joaquin Delta Estuary was initiated in 1991 by the Corps as the lead. SFBCDC, U.S. Environmental Protection Agency, State Water Resources Control Board, and the San Francisco Bay and Central Valley Regional Water Quality Control Boards are among the 30 other participating agencies in this multiple federal and state agency initiative. The purpose of the LTMS plan is to secure timely, technically feasible, cost-effective, and environmentally acceptable dredged material disposal options in an orderly, sequential process.

The long-term dredged material disposal plan, which is not yet finalized, has identified a number of disposal alternatives: in-bay, ocean, and upland disposal/reuse. A number of sites in the Baylands have been identified and evaluated for the latter alternative. The use of clean dredged material, suitable for aquatic disposal, for wetland restoration in formerly tidal, diked sites that have undergone subsidence has been recognized as a beneficial reuse of dredged material. Such use provides an opportunity to offset losses of historic habitat and substitutes for unconfined aquatic disposal and other less beneficial methods. Major dredging areas in the Baylands, which need disposal sites and could contribute to restoration projects, include the Petaluma River, Napa River, Mare Island Naval Ship Yard, and Mare Island Strait.

i. Marin Baylands Advocates

This ad hoc effort has been established with the support of other Marin environment organizations, to

assure the protection, restoration and biological enhancement of Marin County Baylands as part of the San Pablo Bay ecosystem. Marin Baylands Advocates are pursuing the acquisition of easements or fee title by entities with a purpose of protection Bayland resources, and to promote the enhancement and restoration of Bayland sites.

j. Napa River/Napa Creek Flood Reduction Project, Supplemental General Design Memorandum

This document presents the results of engineering, design, and environmental studies conducted for a flood reduction project along the Napa River and Napa Creek.

k. Napa River Watershed Owner's Manual

The manual is a collection of recommendations suggested by the Napa County Resource Conservation District listing specific practices that may be adopted by landowners and managers to help the citizens of the Napa River watershed maintain a healthy, sustainable natural resource ecosystem.

l. North Bay Corridor Study

The Metropolitan Transportation Commission recently initiated a multi-agency planning study to recommend strategies for improving transportation, fish and wildlife habitats, and recreational trail access in the North Bay Corridor. The corridor extends across the Baylands from I-80 in the east to Route 101 in the west, and includes Routes 37, 12, 116, and 121. A central goal is to increase significantly the amount and quality of fish and wildlife habitat in the corridor. A major focus will be to explore options for enhancing wetlands north of Highway 37 by opening them to tidal action. The project will be completed in 1997.

m. North Bay Forum

The U.S. Environmental Protection Agency sponsors the North Bay Forum to facilitate the cooperative efforts of 12 local, state, and federal agencies by integrating resource management with preservation of agriculture in the North Bay. The forum is designed to coordinate wetland and watershed resource management and regulation, while troubleshooting regulatory conflicts, streamlining wetland permit reviews and helping landowners and local governments solve problems. Since 1992, the forum has engaged in regular problem solving and information sharing and has conducted technical and stewardship workshops for landowners and government entities.

n. North Bay Wetlands Protection Program

The North Bay Wetlands Protection Program developed out of the San Francisco Estuary Project initiative with SFBCDC as the lead coordinating agency. The program is patterned after similar efforts such as the Suisun Marsh Protection Plan, the Richardson Bay Special Area Plan, and the Benicia Waterfront Special Area Plan.

The North Bay Wetlands Protection Program area includes portions of Marin, Sonoma, Napa, and

Solano counties from the north fork of Gallinas Creek to the Carquinez Strait. The North Bay Wetlands Protection Program identifies the Baylands planning area as the largest undeveloped assemblage of wetlands, diked historic baylands, and associated uplands remaining in the San Francisco Bay Estuary (SFBCDC 1995). This regional planning effort is a voluntary partnership with SFBCDC and includes the local governments of the four counties and the cities of Novato, San Rafael, American Canyon, and Vallejo. The planning effort is designed to coordinate the various city and county General Plan revisions, the San Francisco Estuary Project's North Bay Implementation Subcommittee, the U.S. Environmental Protection Agency's North Bay Forum, and the Regional Water Quality Control Board's Wetlands Planning Program. The partnership was initiated in 1994. The group is developing a North Bay Wetlands Protection Plan with land use, conservation, and open space elements and implementation recommendations.

o. Partnership for San Pablo Baylands

Beginning in 1995, Save San Francisco Bay Association has sponsored a program to preserve, restore, and enhance wildlife habitats and agriculture in the Baylands region. The Partnership seeks to build grassroots support for Baylands protection through public education and voluntary land stewardship. The Partnership will develop a non-regulatory wetland restoration, enhancement, and management plan for the North Bay, followed by a demonstration project(s). The plan will describe voluntary methods that private landowners can use to enhance wetlands, while maintaining the economic vitality of the region's agriculture.

p. San Francisco Bay Conservation and Development Commission Strategic Plan

The strategic plan outlines the three-year goals of BCDC and the short-term objectives for achieving those goals. The strategic plan serves as the foundation of BCDC's budget planning by identifying the specific initiatives and activities the Commission wants to undertake to improve the manner in which the Commission and its staff carry out their mandated responsibilities.

q. San Francisco Bay Joint Venture

This public-private partnership began in 1995 with a coalition of public agencies, environmental organizations, hunting and fishing groups, the business community, local governments, and landowners. Encompassing most of the San Francisco Bay Watershed west of the Suisun Marsh, the Joint Venture is developing an Implementation Strategy establishing specific goals and strategies for wetland acquisition, protection, and restoration. The approach is to leverage existing resources, develop new funding sources, and create unique partnerships for completing on-the-ground projects.

r. San Francisco Bay Plan

San Francisco Bay Conservation and Development Commission completed this report to emphasize the Bay as a single physical mechanism in which actions affecting one part may also affect other parts. The Bay Plan provides a formula for developing the Bay and shoreline to their highest potential, while protecting the Bay as an irreplaceable natural resource.

s. San Francisco Bay Water Quality Control Plan (Basin Plan)

The Basin Plan is the policy document of the San Francisco Regional Water Quality Control Board. The plan was updated in 1995 and provides legal, technical, and programmatic bases of water quality regulation in the region. The plan calls for a "no net loss" policy for wetlands.

t. San Francisco Estuary Baylands Ecosystem Goals

San Francisco Bay Area Wetlands Ecosystem Goals Project (June 1998) presents a long-term vision for the "baylands", a part of the San Francisco Bay-Delta estuary. The Goals Project is designed to be useful for those interested in enhancing and restoring wetlands. The project seeks to develop a shared vision of what is needed to ensure the health of the region's wetland ecosystems. Based on scientific input from a broad spectrum of experts, the project will identify the types, amounts, and distribution of wetlands and related habitats needed to sustain diverse and healthy wetland communities. These goals will provide biologically sound guidance for wetland restoration and management programs. This project began in 1994, encompassing the entire Bay Area, and is led by a multi-agency Resource Managers Group. The San Francisco Bay Regional Water Quality Control Board is the lead contact agency.

u. Watershed Management Initiative Integrated Plan

The San Francisco Regional Water Quality Control Board developed this work plan to effectively use staff and grant resources for the prevention and control of water pollution on a watershed scale while meeting regulatory program mandates. It outlines the goals and objectives over the next five years and builds upon the considerable local watershed efforts led by other entities.

v. Wetlands in the North Bay Planning Area

The San Francisco Bay Conservation and Development Commission produced this report in 1997 to inform the reader about the nature of the wetlands and related habitats found in the historic marshlands of the North Bay, why they are important, their relationship to other areas of habitat value, and their current status and location. The report also describes opportunities for wetlands enhancement and restoration in the North Bay.

APPENDIX D

SAN PABLO BAY WATERSHED FUTURE RESTORATION OPPORTUNITIES

The following table identifies potential restoration opportunities in the San Pablo Bay watershed. This table was developed from a list of restoration sites provided by San Francisco Joint Venture. The selection of the restoration opportunities will use this information, as one source, to identify and prioritize restoration opportunities in the San Pablo Bay watershed.

PROJECT NAME ACREAGE	RESTORATION OPPORTUNITIES	SAN PABLO BAY WATERSHED STUDY ROLE	SPECIES BENEFITED	POTENTIAL CO-CO- SPONSOR
MARIN COUNTY				
Rush Creek/Cemetary Marsh 280 acres	muted tidal restoration on property owned by DFG and MOSD	Restoration assistance	waterfowl and shorebirds	NAWCA
Bel Marin Keys Marin County 1,600 acres	acquisition and restoration to tidal marsh - seasonal wetlands could be enhanced - property is adjacent to Hamilton and could expand Hamilton restoration	Restoration and implementation assistance	provides nursery habitat for many native fish species	LWCF, State Park Bond, WCB, Coastal Conservancy, CALFED
Bahia 900 acres	acquisition for restoration back to tidal marsh and/or enhancement of seasonal marsh and protection of 300 acres of uplands	more environmental review is necessary before process can go forward	shorebirds, raptors, waterfowl and salt marsh harvest mouse - Delta smelt, longfin smelt, Sacramento splittail, steelhead, chinook salmon	LWCF, State Park Bond, WCB, Coastal Conservancy, CALFED
Black Point 238 acres	acquisition and restoration of wetlands - threatened with development	assistance with refuge expansion and LWCF	shorebirds, raptors, waterfowl and salt marsh harvest mouse - Delta smelt, longfin smelt, Sacramento splittail, steelhead, chinook salmon	LWCF
Parcels at Olive and Atherton Ave.	acquisition and restoration to tidal and seasonal wetlands	Restoration assistance		LWCF, MOSD, Coastal Conservancy, CALFED
Leveroni	partnership and restoration of lands currently in agriculture	Restoration and conservation assistance		ALSP, WRP, WCB
Silveira Ranch	partnership and restoration to	assistance with refuge	shorebirds, raptors, waterfowl and	LWCF, State Park Bond,

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PROJECT NAME ACREAGE	RESTORATION OPPORTUNITIES	SAN PABLO BAY WATERSHED STUDY ROLE	SPECIES BENEFITED	POTENTIAL CO-CO- SPONSOR
300 acres in the North, 358 in the South	tidal marsh and/or enhancement of seasonal marsh currently in agriculture	expansion and LWCF	salt marsh harvest mouse - Delta smelt, longfin smelt, Sacramento splittail, steelhead, chinook salmon	WCB, Coastal Conservancy, CALFED
St Vincent's 881 acres	partnership and restoration to tidal marsh and/or enhancement of seasonal marsh currently in agriculture	assistance with refuge expansion and LWCF	shorebirds, raptors, waterfowl and salt marsh harvest mouse - Delta smelt, longfin smelt, Sacramento splittail, steelhead, chinook salmon	LWCF, State Park Bond, WCB, Coastal Conservancy, CALFED
TPL Parcel 30 acres	partnership and restoration to tidal marsh and/or enhancement of seasonal marsh	Restoration and conservation assistance		
Tiscournia Marsh 20 acres	partnership and restoration to tidal marsh	Restoration and construction assistance	shorebirds, raptors, waterfowl and salt marsh harvest mouse - Delta smelt, longfin smelt, Sacramento splittail, steelhead, chinook salmon	MOSD, State Park Bond, WCB, Coastal Conservancy, CALFED
Canalways 85 acres	partnership and restoration to tidal marsh	Acquisition and restoration assistance	shorebirds, raptors, waterfowl, salt marsh harvest mouse, Delta smelt, longfin smelt, Sacramento splittail, steelhead, chinook salmon	LWCF, State Park Bond, WCB, Coastal Conservancy, CALFED
Triangle Marsh Corte Madera 25 acres	partnership and restoration to tidal marsh	Acquisition and restoration assistance	shorebirds, raptors, waterfowl and salt marsh harvest mouse - Delta smelt, longfin smelt, Sacramento splittail, steelhead, chinook salmon	MOSD, State Park Bond, WCB, Coastal Conservancy, CALFED
Golden Gate Bridge District 72 acres	tidal marsh restoration - District could continue ownership	Restoration as mitigation for erosion caused by ferry	shorebirds, raptors, waterfowl and salt marsh harvest mouse - Delta smelt, longfin smelt, Sacramento splittail, steelhead, chinook salmon	LWCF, State Park Bond, WCB, Coastal Conservancy, CALFED
Green Property Corte Madera 5 acres	partnership and restoration to tidal marsh	Acquisition and restoration assistance	shorebirds, raptors, waterfowl and salt marsh harvest mouse - Delta smelt, longfin smelt, Sacramento splittail, steelhead, chinook salmon	MOSD, State Park Bond, WCB, Coastal Conservancy, CALFED
Lower Petaluma River (Burdell Ranch)	maintain as managed freshwater & tidal marsh	none at this time	shorebirds and waterfowl	

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PROJECT NAME ACREAGE	RESTORATION OPPORTUNITIES	SAN PABLO BAY WATERSHED STUDY ROLE	SPECIES BENEFITED	POTENTIAL CO-CO- SPONSOR
900 acres				
Petaluma Marsh Expansion- Marin (Redwood) 180 acres	partnership and restoration tidal marsh	Acquisition and restoration assistance	shorebirds, raptors, waterfowl and salt marsh harvest mouse - Delta smelt, longfin smelt, Sacramento splittail, steelhead, chinook salmon	CALTRANS, SF Bay Program, ACL fines, State Park Bond, CALFED
Scottsdale Marsh (Novato) 41 acres	restoration of pond and freshwater marsh to emergent, seasonal, riparian, open water and upland transitional habitat	Acquisition and restoration assistance	waterfowl, shorebirds	ACL Fines, EPA, USFWS SF Bay Program, EEMP
Burdell Island Marin & Sonoma Counties 57 acres	partnership and restoration tidal marsh -	Restoration assistance	shorebirds, raptors, waterfowl and salt marsh harvest mouse - Delta smelt, longfin smelt, Sacramento splittail, steelhead, chinook salmon	State Parks, Marin County Open Space District
SONOMA COUNTY				
Camp Three 1,450 acres	partnership and restoration, tidal and seasonal wetlands	Planning and construction assistance	chinook salmon, Delta smelt, Sacramento splittail, longfin smelt and green sturgeon - numerous migratory birds	LWCF, Shell Fund, National Coastal Wetlands, NAWCA
Skaggs Island (GSA property) 3,237 acres	tidal and seasonal restoration on land to be transferred from Navy/GSA	Planning and construction assistance	chinook salmon, Delta smelt, Sacramento splittail, longfin smelt and green sturgeon - numerous migratory birds	NAWCA, CALFED, Coastal Conservancy
Detjen Duck Club 500 acres	partnership and restoration of a duck club	Acquisition and restoration assistance	waterfowl and shorebirds	LWCF, Coastal Conservancy, NAWCA, Coastal Wetlands
Lower Tubbs Island 72 acres	levee setback will allow for restoration to tidal marsh	monitoring assistance	chinook salmon, Delta smelt, Sacramento splittail, longfin smelt and green sturgeon - numerous migratory birds	
Camp Two	restoration of floodplain habitat	Restoration assistance	species benefitting depends on	WCB, Shell Fund, Coastal

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PROJECT NAME ACREAGE	RESTORATION OPPORTUNITIES	SAN PABLO BAY WATERSHED STUDY ROLE	SPECIES BENEFITED	POTENTIAL CO-CO- SPONSOR
528 acres	to tidal or seasonal marsh		whether restoration is tidal or seasonal	Conservancy, CALFED
Millerick 80 acres	partnership and restoration of floodplain habitat to tidal or seasonal marsh in conjunction with Camp Two	Restoration assistance	species benefitting depends on whether restoration is tidal or seasonal	WCB, Shell Fund, Coastal Conservancy, CALFED
Petaluma Marsh Enhancement Plan - Phase IV 200 acres	partnership and restoration of diked baylands & restoration of mosaic of tidal & seasonal marsh - approx. 100 acres will be beneficial re-use of tertiary treated wastewater	Acquisition and restoration assistance	shorebirds, clapper and black rail, spring runs of chinook salmon and steelhead	WCB Riparian Program, USFWS SF Bay Program, Coastal Conservancy
Petaluma River Access & Enhancement Plan 150 acres	riparian restoration and acquisition of approx. 150 acres - also aquatic habitat improvements - 7.5 miles of river frontage	Acquisition and restoration assistance	steelhead, chinook salmon, Sacramento splittail, clapper rail, saltmarsh harvest mice	WCB Riparian Program
Sonoma Baylands/North Parcel & Leonard Ranch 430 acres	seasonal wetland restoration of 130 acres with the remaining in agricultural production.	Acquisition and restoration assistance	shorebirds and waterfowl	Coastal Conservancy, NAWCA, ACL fines
NAPA COUNTY				
Napa/Sonoma Marshes (Cargill) 9000 acres	tidal and seasonal and open water - salinity reduction	Planning and restoration assistance	Delta smelt, longfin smelt, splittail, salmon, striped bass, green sturgeon	
<u>Spartina densiflora control in North Bay</u>		Assistance with study and implementation		CALFED, NFWF
SOLANO				
Dutchman Slough 44 acres	acquisition of tidal habitat on the Napa River	Assistance with assessment	Delta smelt, longfin smelt, Sacramento splittail	

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PROJECT NAME ACREAGE	RESTORATION OPPORTUNITIES	SAN PABLO BAY WATERSHED STUDY ROLE	SPECIES BENEFITED	POTENTIAL CO-CO- SPONSOR
Mare Island 162 acres	protection of tidal & nontidal marsh - total of 2,208 acres including State Lands Commission lands	endorsement & support establishment of North Bay Discovery Center	waterfowl, shorebirds	Coastal Conservancy, SF Bay Program,
River Park Vallejo 48 acres	restoration of 22 acres of tidal marsh and 26 acres of upland habitat on Napa River	Implementation assistance	chinook salmon, Delta smelt, Sacramento splittail, longfin smelt and green sturgeon - numerous migratory birds	USFWS Bay Program, NFWF, CALFED
Cullinan Ranch 1,496 acres	two-phased tidal restoration	monitoring and Phase II	chinook salmon, Delta smelt, Sacramento splittail, longfin smelt and green sturgeon - numerous migratory birds	CALFED, State Park Bond, NFWF, EPA
CONTRA COSTA COUNTY				
San Pablo Marsh 200 acres	partnership and restoration of tidal marsh	facilitate acquisition		EBRPD, Coastal Conservancy, TPL, WCB, Coastal Wetlands, NAWCA
Breuner Property 200 acres	acquisition and restoration of tidal and seasonal habitat	endorsement		EBRPD, Coastal Conservancy, TPL, WCB, Coastal Wetlands, NAWCA
Pacheco Marsh 230 acres	acquisition & restoration to tidal & seasonal marsh	providing project coordination	waterfowl, shorebirds, salt marsh harvest mouse, Delta smelt, longfin smelt, splittail, steelhead, salmon	CALFED, Coastal Conservancy, NFWF, BCDC fines, Caltrans
Shell Marsh 200 acres	installation of tide gates to improve tidal flushing	Acquisition and restoration assistance	waterfowl and shorebirds	Shell Fund, CALFED, Coastal Conservancy, WCB, EBRPD, NFWF
Big Break Acquisition and Restoration Project (Lauritzen)	acquisition of open water and tidal marsh	Acquisition and restoration assistance	waterfowl, shorebirds, salt marsh harvest mouse, Delta smelt, longfin smelt, splittail, steelhead, salmon	CALFED, Coastal Conservancy, WCB, EBRPD, NFWF

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PROJECT NAME ACREAGE	RESTORATION OPPORTUNITIES	SAN PABLO BAY WATERSHED STUDY ROLE	SPECIES BENEFITED	POTENTIAL CO-CO- SPONSOR
688 acres				
Delta Science Center 1,500 acres	major science center, wetland, bay/delta, shallow waters of the bay, etc.	endorse project and assist with funding restoration projects	waterfowl, shorebirds, salt marsh harvest mouse, Delta smelt, longfin smelt, splittail, steelhead, salmon	CALFED, Coastal Conservancy, WCB, EBRPD, NFWF
Point Edith 2,500 acres	restoration on lands held by Tosco, PG & E, etc	facilitate planning process	waterfowl, shorebirds, salt marsh harvest mouse, Delta smelt, longfin smelt, splittail, steelhead, salmon	CALFED, Coastal Conservancy, WCB, EBRPD, NFWF
Julia Cox Freeman Wetland Preserve (Antioch) 22 acres	tidal marsh restoration on property owned by Water Conservation District	Restoration and implementation assistance		CALFED, Coastal Conservancy, WCB, NFWF
Martinez Regional Shoreline Restoration approx. 100 acres	tidal marsh enhancement	Restoration and implementation assistance	waterfowl, shorebirds, salt marsh harvest mouse, Delta smelt, longfin smelt, splittail, steelhead, salmon	CALFED, EBRPD, Caltrans, Coastal Conservancy, NFWF
Bay Point Restoration Project 150 acres	tidal marsh restoration and upland enhancement	Construction plan	waterfowl, shorebirds, salt marsh harvest mouse, Delta smelt, longfin smelt, splittail, steelhead, salmon	CALFED, EBRPD, Coastal Conservancy, NFWF
Point Pinole Shoreline 400 acres	tidal marsh enhancement	enhancement plan	waterfowl, shorebirds, salt marsh harvest mouse, Delta smelt, longfin smelt, splittail, steelhead, salmon	CALFED, EBRPD, Coastal Conservancy, NFWF
San Pablo Bay Shoreline Marsh approx. 100 acres	restoration of tidal marsh	enhancement plan	waterfowl, shorebirds, salt marsh harvest mouse, Delta smelt, longfin smelt, splittail, steelhead, salmon	CALFED, EBRPD, Coastal Conservancy, NFWF
Miller/Knox 8 acres	acquisition and restoration of seasonal ponds	enhancement plan		