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**STATE OF CALIFORNIA
COASTAL IMPACT ASSISTANCE PLAN
CALIFORNIA APPROVED STATE PLAN
REGIONAL SEDIMENT MANAGEMENT**

PROJECT NARRATIVE ATTACHMENT

I. Designated State Agency

The San Francisco Bay Conservation and Development Commission (BCDC) will be the lead agency on this project. The California Resources Agency will use a reimbursable services agreement to sub-award the grant to BCDC.

II. Project Title

San Francisco Bay Regional Sediment Management Strategy

III. Project Contact

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A secondary contact was added for additional grant support.

IV. Project Summary

A. Location

San Francisco Bay Area and shoreline.

B. Duration

2009 – 2011 (3 years)

C. Approved Plan Cost

\$ 175,000.00

D. Project Costs per Project Year

| CIAP Spending Estimate Per Year | |
|--|-------------|
| 2011 | \$80,000.00 |
| 2012 | \$60,000.00 |
| 2013 | \$35,000.00 |

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E. Grant Costs

| TASK | 2011 | 2012 | 2013 |
|--|---------|-----------|-----------|
| Project Development | | | |
| Identifying Data Gaps and Research Needs | | | |
| Development of Science and Research Strategy | | | |
| Identifying and Developing Key Partnerships | | | |
| Development of Regional Sediment Management Plan | | | |
| TOTAL | 175,000 | 80,000.00 | 60,000.00 |

F. Project Summary

The purpose of the project is to prepare an integrated, regional sediment management strategy (RSM) for studying, understanding, and managing Bay sediment processes, in order to maximize the health of the Bay, minimize management costs, and help address climate change impacts and other system stressors. Secondary purposes are to coordinate and focus research efforts that address management goals, harmonize management policies by federal, state and local agencies affecting sediment processes, and educate managers regarding RSM.

Bay sediment dynamics control many estuarine processes, such as locations of tidal flats and marshes, habitat variability, and the productivity of Bay waters. The net flux of sediments into and out of discrete portions of the Bay determines whether erosion or accretion occurs, and creates features such as shoals and channels, and specific habitat environments such as fine-grained or sandy bottoms. High concentrations of suspended sediment can reduce light penetration and lower biological productivity, but can also help prevent harmful blooms of algae. An adequate supply of sediment is needed to maintain the dynamic equilibrium of wetlands and tidal flats within the Bay system, while excessive volumes of sediments can silt in channels and reduce open-water habitats.

An understanding of sediment dynamics is particularly important to predicting the impact of sea level rise and global climate change on the Bay. Sediments can feed tidal flats and wetlands to maintain their elevation in the tidal frame while minimizing erosion and inundation. Decreases in local or regional sediment supply can exacerbate erosion and inundation.

Regional sediment management is an approach to manage sediments within the context of the entire system, including sediment sources, movement and sinks within the system and exchange with the ocean. Application of RSM to the Bay will allow the Commission and other coastal managers to better understand both the impacts of individual permit decisions on the entire system (e.g., dredging and disposal), and also the impacts of systemic processes such as climate change and sea level rise on permitted projects (e.g., success of wetland restoration projects). In order to apply RSM, adequate data must be available on Bay sediment processes to understand how the system functions, and geomorphic or numerical models must be sufficiently accurate to predict how the system will react to changes in forcing processes, such as sea level rise or reduced sediment inflow from the Delta.

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Better information is needed on Bay sediment dynamics to develop a regional sediment management strategy. For example, while suspended sediment levels are being measured by the U.S. Geological Survey (USGS) at several Bay stations, the stations do not measure current flow and thus cannot be used to determine sediment flux. There is insufficient data on nearshore sediment processes to understand sediment exchange between tidal flats and wetlands. The impacts of wind-wave energy in tidal restoration projects are poorly understood and controversial. Adequate measurements are not available for the sediment supply from Bay tributaries. An up-to-date and accurate map of the stratigraphy of the Bay floor is not available. The exchange of sediment with the ocean has not been directly measured. While numerical models of water circulation and currents have become increasingly sophisticated and accurate, application of these models to make reliable and validated estimates of sediment transport within the Bay has not been accomplished.

The Commission will work collaboratively with other Bay management and research agencies, organizations and interested parties to prepare a RSM strategy for the Bay. This RSM strategy would have a strong focus on identifying sediment management needs and research needed to support RSM for the Bay. Potential partners who have expressed interest include the Coastal Conservancy, San Francisco Bay Regional Water Quality Control Board, San Francisco Estuary Institute (SFEI), and the U.S. Army Corps of Engineers (Corps). It is likely that additional funds and in-kind services will be available from these and other partners to expand the project. The project will also be closely coordinated with the California Coastal Sediment Management Workgroup (CCSMW). Much of the early focus of the strategy will be identifying research needs that are most directly related to Bay sediment management.

The first year of the project would consist of (1) identifying, gathering and cataloging existing data on sediment distribution and processes; (2) working with researchers and Bay managers to identify data gaps and key management questions. Past and ongoing research has provided important information on Bay sediment processes. However, this information has not been gathered and analyzed in any comprehensive fashion. Many of the data sets are not generally available. The predicate for a RSM strategy is to understand the research done to date, provide a synthesis of the known information and compare the information to the information needs identified by resource managers. Input by resource managers is a key component to focus on those aspects that are most critical to management of Bay resources, particularly for adaptation to sea level rise.

The second year would involve (1) preparing a research agenda that is coordinated with other Bay management and research entities; and (2) completing a framework document that outlines a regional sediment management strategy for the Commission. Staff would also coordinate and help identify funds for potential demonstration projects with the USGS, SFEI, and/or other research groups to gather key sediment dynamics data and work to refine and flesh out the framework. The third year would involve: (1) evaluating where serious erosion can be expected (particularly in light of climate change) and potential sediment sources and mitigating strategies to address it (focus will be given to assessing potential sources of sediment from Bay tributaries and to beneficial reuse of dredged material); and (2) analysis and synthesis of the data and lessons learned into a regional sediment management strategy. This work would be closely coordinated with and complementary to other work on Bay sediment dynamics, particularly the Coastal Conservancy's shoreline erosion study and the South Bay Salt Pond Restoration Project, and the Stanford Unstructured Non-hydrostatic Terrain-following Adaptive Navier-Stokes Simulator (SUNTANS) modeling initiative for the Bay. It also would be

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closely coordinated with and complementary to the Coastal Sediment Management Workgroup that is focusing on RSM for California's ocean coastline.

The project has a high level of feasibility. The Commission has conducted and participated in numerous collaborative regional planning processes, such as the Long Term Management Strategy for Dredging (LTMS) and the subtidal goals process. No regulatory approvals will be needed for this initiative.

Measurable Goals and Objectives

The goal of the project is to prepare a written strategy for implementing management of the Bay that addresses regional sediment dynamics.

- Objective 1:** Identify and gather existing information on Bay sediment dynamics for use in scoping and to inform development of RSM strategy.
- Objective 2:** Sponsor a workshop with scientists and technical experts to present and discuss the state of knowledge regarding sediment dynamics, existing research and field studies, and to identify potential research priorities.
- Objective 3:** Establish a workgroup of state and federal managers that will oversee preparation of the strategy and potentially oversee implementation of the completed strategy.
- Objective 4:** Based on guidance of the workgroup and input from other local, state and federal managers, identify management needs regarding RSM.
- Objective 5:** Use the management needs, and existing and proposed research to identify key data gaps needed for successful RSM in the region.
- Objective 6:** Prepare draft strategy that includes research priorities, potential management strategies and options for implementation, which is coordinated with related efforts, such as the Long Term Management Strategy for dredging in the San Francisco Bay Region, the CCSMW and state climate adaptation strategy.
- Objective 7:** Circulate the draft strategy for review and comment by key managers and technical experts.
- Objective 8:** Use the comments to revise and finalize the strategy.
- Objective 9:** Distribute the RSM strategy to interested parties and present to the BCDC and other applicable agencies.

V. Authorized Uses

The proposed project is consistent with several CIAP authorized uses:

Use 1. Projects and activities for the conservation, protection, or restoration of coastal areas, including wetlands. The RSM strategy will directly support the conservation, protection, or restoration of coastal areas, including wetlands because it will be used to better understand Bay sediment processes; inform management of the Bay, such as dredging and disposal pursuant to the Long Term Management Strategy for dredging; and support wetlands restoration efforts in the Bay, including the South Bay Salt Ponds Restoration Project and the Hamilton Bel Marin Keys Wetlands Project.

The impact of a sediment poor system is a threat to San Francisco Bay's natural resources and shoreline. Wetlands are particularly vulnerable to the inundation caused by climate change-induced sea level rise without sufficient sediment supply to keep up with rising seas.

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BCDC and other agencies and organizations that own, manage and restore these Bay habitats and resources recognize that providing sediment to support these systems is critical. Unfortunately, there is additional research needed to best understand how the reduced sediment supply will affect the coastal zone. The sediment budget and dynamics with the local tributaries and embayments are of particular interest. Key portions of this project will identify the critical data gaps and management questions that will lead to a new management regime, which will focus on the entire system and ways to manage the system as a whole unit taking into account dredging, sand mining, flood projection, habitat restoration projects and watershed management.

VI. Project Description

A. Phases to be funded with CIAP funds

This section describes only the portion of the San Francisco Bay regional sediment management plan funded by CIAP funds. Each major task to be funded is listed separately. Some tasks will be completed in parallel.

The Program consists of four main elements:

1. identifying, gathering and cataloging existing data on sediment distribution and processes;
2. working with researchers and Bay managers to identify data gaps and key management questions;
3. preparing a research agenda that is coordinated with other Bay management and research entities; and
4. completing a framework document that outlines a regional sediment management strategy for the Commission.

Please note that sediment managers refers to a wide variety of managers that work with sediment issues.

- Task 1:** Identify, gather and catalogue existing data on sediment distribution and processes.
- a. **Goal:** To understand the state of knowledge of sediment transport processes, sediment sources and sinks, and sediment budget for San Francisco Bay.
 - b. **Statement of Work:** Task 1 will entail gathering and analyzing existing sediment processes data and research papers describing the sediment transport system in San Francisco Bay. An annotated bibliography will be developed and the research papers will be collected, reviewed for applicability to the project and catalogued.
 - c. **Schedule:** The anticipated timeline for Task 1 is 6 months:
July 2011 to July 2012
 - d. **Project Management Plan:**
Milestone 1: Annotated bibliography complete. (July 31, 2011)
Milestone 2: Relevant research reviewed. (September 2011)
Milestone 3: Applicable research identified and catalogued. (November 2011)

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- e. **Deliverables:**
 - (1) Annotated bibliography
 - (2) Catalogue of relevant research.

Task 2: Work with researchers and Bay managers to identify data gaps and key management questions.

- a. **Goal:** To identify management questions and scientific data gaps to be answered in order to manage sediment on a regional basis.
- b. **Statement of Work:** Meet with sediment managers, sediment scientists and modelers to identify management questions and data gaps to gain the scientific insight needed to appropriately manage sediment resources on a regional basis.
- c. **Schedule:** The anticipated timeline for Task 2 is 10 months:
July 2011 – May 2012
- d. **Project Management Plan:**
 - Milestone 1: Meet with sediment resource managers to develop management questions. (August 2011 – February 2012)
 - Milestone 2: Hold workshop with sediment scientists and modelers to identify the state of knowledge for the Bay sediment science and potential research approaches to answer management questions. (September 2011)
 - Milestone 3: Complete workshop summary document and identified data gaps and research questions. (October 2011)
 - Milestone 4: Meet with sediment resource managers to review outcome of workshop, state of knowledge and revise/update management questions. (February 2011)

- e. **Deliverables:**
 - (1) Workshop summary
 - (2) Sediment Management Questions

Task 3: Prepare a research strategy that is coordinated with other Bay management and research entities to answer the management and scientific questions identified by Task 2.

- a. **Goal:** To prepare a RSM research strategy that will inform the development of the Bay regional sediment management plan.
- b. **Statement of Work:** Once the workshop and summary is complete, meet with a select group of managers and scientist to develop a research strategy including priority studies, modeling efforts, timeline, funding opportunities and feedback mechanisms into the RSM program development.
- c. **Schedule:** The anticipated timeline for Task 3 is 14 months:
September 2011 – November 2012
- d. **Project Management Plan:**
 - Milestone 1: Identify and solicit participation for RSM science strategy development work group. (August 2011)

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Milestone 2: Meet to identify and research topics that would answer management questions. (September/October 2011)

Milestone 3: Meet to prioritize research questions and potential institutions for undertaking the research efforts as part of the RSM research strategy. (February 2012)

Milestone 4: Meet to identify funding sources for prioritized research activities. (June 2012)

Milestone 5: Develop draft research strategy based on information developed in the previous workshop and meeting series. (January – July/August 2012)

Milestone 6: Meet with managers and scientists to review and receive comments on draft RSM research strategy. (October 2012)

Milestone 7: Finalize RSM research strategy (November 2012)

- e. **Deliverable:** Science strategy for San Francisco Bay Regional Sediment Management

Task 4: Develop an outline of the San Francisco Bay regional sediment management strategy for the BCDC Commission.

- a. **Goal:** To provide the Commission with the understanding of the state of sediment knowledge in the Bay, the research and modeling efforts that need to be undertaken and the basis for developing a regional sediment management plan for the Bay as well as an outline for the regional sediment management strategy for San Francisco Bay.
- b. **Statement of Work:** Task 4 includes a series of meetings with sediment managers to develop the outline for the San Francisco Bay RSM plan.
- c. **Schedule:** The anticipated timeline for Task 4 is 8 months: April 2012 to December 2012
- d. **Milestones:**
 - Milestone 1: Meet with sediment managers to discuss potential components of the regional sediment management plan. (May 2012)
 - Milestone 2: Develop draft outline of regional sediment management plan. (June-July 2012)
 - Milestone 3: Meet with sediment managers to review and revise the outline for the regional sediment management plan. (August/September 2012)
 - Milestone 4: Provide a briefing to the BCDC Commission on the science strategy and outline for the regional sediment management plan.
- e. **Deliverables:**
 - (1) RSM plan outline.
 - (2) BCDC Commission briefing document on the state of sediment science knowledge, the research strategy and the outline for the regional sediment management plan.

B. Scheduling Factors: Currently the State has implemented a one -day per month furlough program. In addition, the governor has instituted a hiring freeze. While it is anticipated that the above-described work can be completed within the estimated timeframe, if the State imposes further furloughs or if layoffs are implemented, then the timeframe to complete the project may need to be extended.

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- C. Compatibility/Synergy:** There are several projects that are compatible and synergistic with proposed project. Primarily, the Long Term Management Strategy for the Placement of Dredged Material in the Bay Region (LTMS) Management Plan in conjunction with the San Francisco Bay Plan policies on dredging require beneficial reuse of a minimum of 40% of maintenance dredged material by 2012. This program was implemented in 2000 and has continued to reduce in-Bay disposal of dredged material over time. The proposed regional sediment management plan will build on the success of the LTMS and expand it to include projects that influence sediment supply to the Bay and near shore coast.

The USGS recently developed a San Francisco Bay Program, which allows USGS scientists to focus geological research efforts on San Francisco Bay. This project along with the USGS Water Resources project that have provided much of the data that supports that the Bay sediment system is changing and may need a new or different management regime.

BCDC has also initiated a large climate change adaptation program. Regional sediment management will both inform and assist BCDC in this program and learn from it. Managing sediment resources regionally can in itself be an adaptation component in responding to sea level rise.

The San Francisco District of the US Army Corps of Engineers is currently completing a Dredged Material Management Plan for its projects. Information from this review will also be integrated into the overall regional sediment management program. As the largest dredging proponent in the Bay Area, the USACE projects represent the largest volume of sediment that can be used beneficially.

The in-Bay aggregate mining industry is undergoing the first complete California Environmental Quality Act (CEQA) review for the first time in the industry's history. In 2010, the environmental impact report will be published. It is anticipated that the CEQA document will provide further insight into the sandy sediment issue within the Bay. This information will be incorporated into the overall planning process and may result in changes in mining or management practices as the sand resources for the region are considered.

As discussed briefly above, there are also a number of modeling efforts that have been under development for a few years. These models will be complete within the project planning phase and will also inform the process both from the technical and management perspective.

- D. Controversy/Support.** Based on the current scientific research, San Francisco Bay scientists and managers recognize that the Bay sediment system has become more erosional over the last century. In addition, through efforts of many agencies, including BCDC, the community is also aware that sea level in the Bay is rising at a significant rate, further compounding the reduced sediment supply. Other effects of climate change such as increased numbers and surge of storms have raised flooding concerns. The Bay Area community is also well known for the wetland restoration efforts that have taken place over the last thirty years. Because of this awareness and commitment to a healthier Bay with functioning wetlands, this project has already received support from the scientific community, the environmental community and industry. The RSM Project has already received support from the scientific community, the environmental community and industry. It is anticipated that the finding associated with the RSM efforts will require changes in Bay management that will likely require changes in human

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practices, which will leave to some level of resistance or controversy. However, BCDC is a regional agency committed to partnering with stakeholders and other agency that has a strong likelihood of succeeding in the development of a RSM Plan that can be used as a tool in other sections of the nation. In fact, BCDC's success is nationally recognized through the LTMS program. Building on both the LTMS's governance structure and the success of the program we anticipate a high level of commitment from partnering agencies and stakeholders.

- E. Bundling.** Bundling of contracts is not anticipated as part of this project.
- F. Program Income.** There is no income anticipated as part of this project.

G. Project Area:

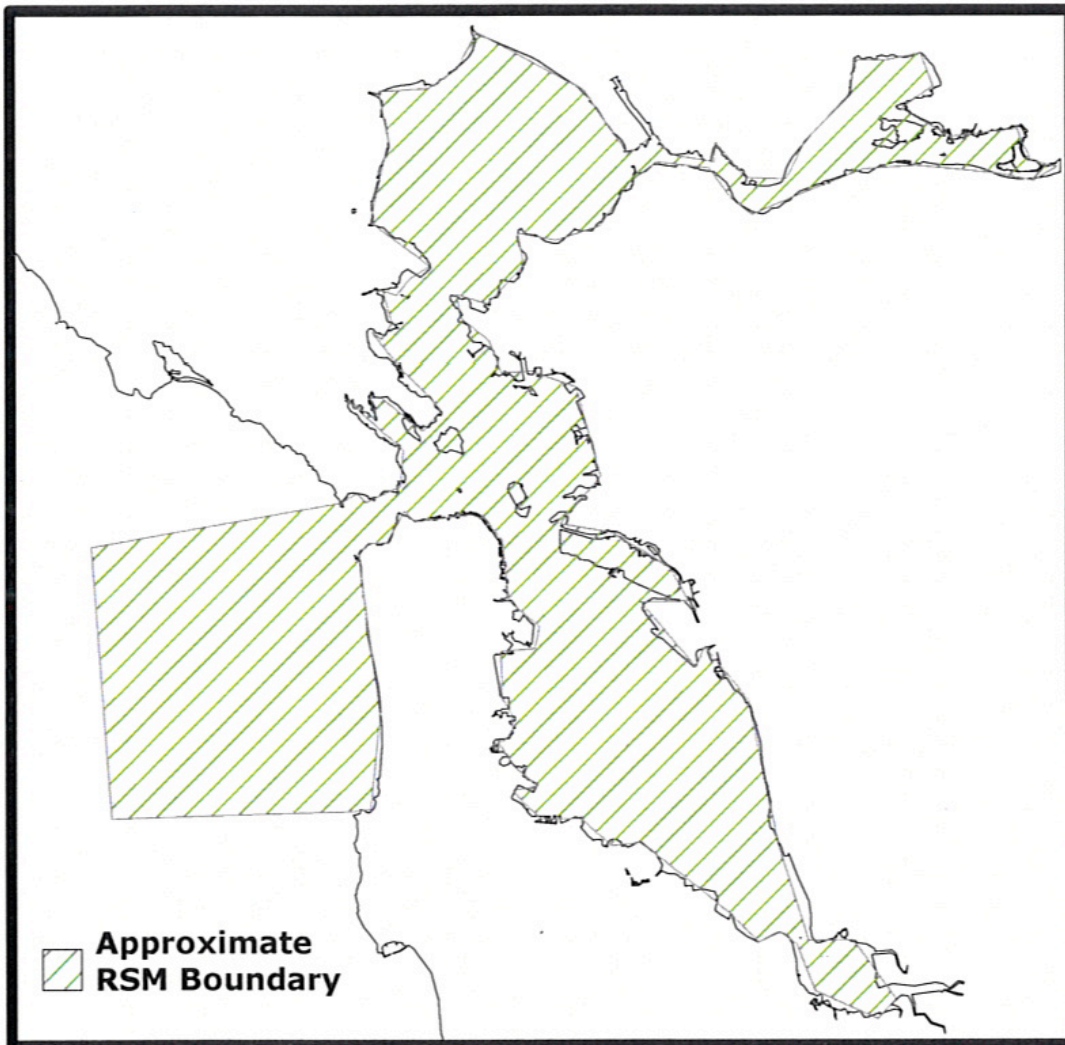


Figure 1. Regional Sediment Management (RSM) Plan Project Area

F. Project Management Plan: In anticipation of funding and in response to the changed sediment environment, work on this project is already underway under the supervision of the Project Manager, Brenda Goeden. In addition, the USEPA, the Water Board, and the USACE are collaborating on this effort. Once funds are awarded, Brenda Goeden will develop an outline of the tasks to be undertaken and a work flow diagram that incorporates both science and the management aspects of this project. In collaboration with our partner agencies a schedule will be developed that includes meetings for both the technical community and the management community. Agendas will be developed with specific goals for each meeting. In addition, research, documents and presentations will be developed for each of the meetings. The meetings are anticipated to take place on a quarterly basis throughout the development of the strategy. Ms. Goeden will also be responsible for assuring deadlines and reporting requirements are met.

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Carolynn Box has developed the annotated bibliography for the project and will be responsible for analyzing the applicable research, and developing the research catalogue under the direction of Brenda Goeden.

The development of the regional science strategy will be a collaborative effort with leading San Francisco Bay technical experts, with much of the writing completed under the direction of the project manager. Additionally, an annual in-person meeting will be held to review progress, assess deliverables and budgets, and update the schedule. Scientific review of all map products will assure quality products.

Responsible parties:

Brenda Goeden: RSM Program Manager—general oversight, review, and lead for development of formal strategy and RSM plan.

Carolynn Box: Coastal Program Analyst—research and analysis

Steve Goldbeck: Deputy Director—strategy development and oversight.

Reggie Abada: Administrative Assistant—logistics, coordination and document production.

VII. Description of Environmental Impacts

The development of the San Francisco Bay regional sediment management science strategy and research program is not expected to impact any natural resources.

VIII. Relationship to Other Federal Programs

Currently the U.S. Geological Survey (USGS) has completed a number of studies that both highlight the need for a regional sediment management approach in San Francisco Bay and provide insight into areas of concern. In addition, BCDC anticipates continue work with USGS in development of the science and research strategy. In addition, through various funding sources BCDC has provided funding for specific studies that will provide additional needed information for the overall program.

The US Environmental Protection Agency (EPA) and the US Army Corps of Engineers (USACE) are supporting the project through their staff involvement in the LTMS program and the Dredged Material Management Plan (DMMP). In addition, the San Francisco District of the USACE has recently provided funding to support a USGS study of two local tributaries and their sediment contribution to the Bay. This information will be used in conjunction with future studies to assist managers in understanding the increasing importance of local tributaries in an area where historic sediment loading from the Delta is decreasing and sea level is rising.

The Los Angeles District of the USACE is providing funding to support the development of the regional sediment management plan for the sandy sediments in the Bay (Central Bay to Outer Coast south to Pacifica, CA). This funding will be used in conjunction with the CIAP funding to support the overall regional sediment management plan for San Francisco Bay.

IX. Federal State and Local Agencies

The following agencies are involved in the San Francisco Bay Regional Sediment Management Science Strategy development tasks at this time. However, it is anticipated that through this grant and program development several additional state and local agencies will become involved, such as the State Lands Commission, Bay Area Flood Protection agencies and Watershed Councils.

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| Agency | Contact Name | Address | Telephone Number | Fax Number | Email Address |
|--|--|--|-------------------------------------|------------------------------|--|
| US Geological Survey | Dr. Patrick Barnard, Dr. Bruce Jaffee and Dr. Dave Schoelhammer | Pacific Science Center 400 Natural Bridges Drive Santa Cruz, California 95060 Placer Hall 6000 J Street Sacramento, CA 95819-6129 | 831.427.4756 916.278.3000 | 831.427.4748 916.278.3070 | pbarnard@usgs.gov bjaffee@usgs.gov dschoell@usgs.gov |
| US Environmental Protection Agency | Brian Ross | 75 Hawthorne Street, Suite 1135 San Francisco, California 94105 | 415.972.3475 | 415. 947.3537 | Ross.Brian@epamail.epa.gov |
| US Army Corps of Engineers | Al Paniccia <u>Megan Kaun</u> | 1455 Market Street San Francisco, CA 94105 | 415.503.6735 <u>415.503.6909</u> | | al.paniccia@usace.army.mil |
| San Francisco Bay Regional Water Quality Control Board | Naomi Feger | 1515 Clay Street Suite 1400 Oakland, CA 94612 | 510.622.2328 | 510.622.2458 | nfeger@waterboards.ca.gov |

A. Environmental Review

1. Does the project review require any Federal environmental review (e.g. environmental assessment, environmental impact statement, biological opinion)?
 Yes No
2. Does the project require any State environmental review (e.g. Consistency Determination, State Historic Preservation Office)?
 Yes No
3. Does the project require any local environmental review (e.g. zoning)?
 Yes No

If the answer to any of these questions is “yes” provide a copy of the environmental review(s) with the grant application.

B. Permits

1. Does the project require any Federal permits?
 Yes No
2. Does the project require any State permits?
 Yes No
3. Does the project require any local permits?
 Yes No

C. Legal Proceedings

Are there any pending legal proceedings that have been taken against any of the permits or related environmental analyses required for this project?

Yes No

If the answer is “yes” provide an explanation of the pending legal proceeding and the status of it as a separate document.

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X. Project Changes

The project schedule has been pushed back one year due to late availability of funds.