

**Pilot Study Statement of Interest
San Francisco Bay Region**

Submitted to

National Water Quality Monitoring Network for
US Coastal Waters and their Tributaries

Submitted by

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Executive Director
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on behalf of the
San Francisco Bay Regional Partnership

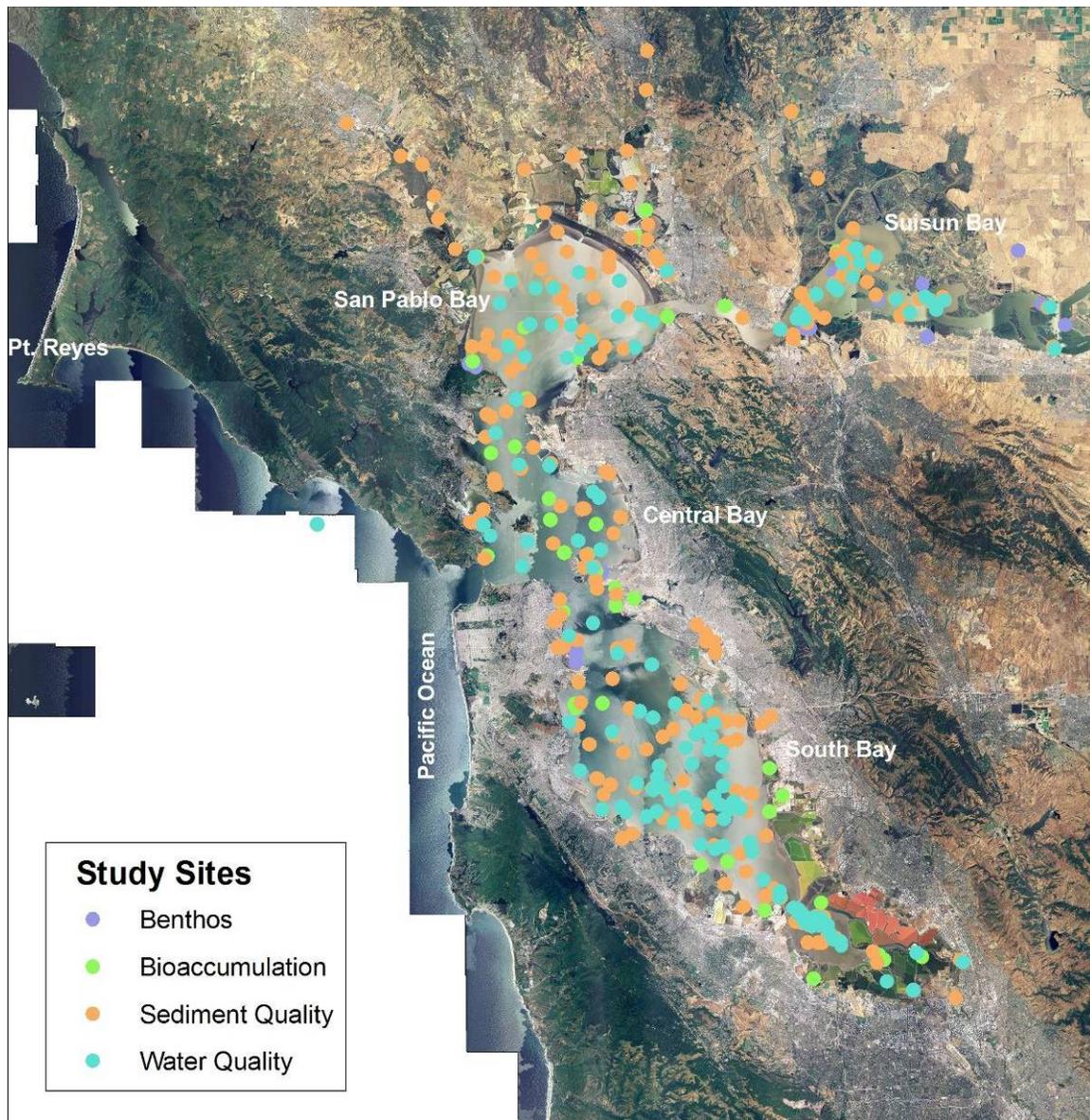
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Figure 1. Study Location with a preliminary display of estuarine and riverine monitoring sites.



Description of the Proposed Study Area

The proposed study area will encompass the San Francisco estuary, the largest estuary on the west coast, and will extend into the delta to the city of Sacramento to the north and the city of Stockton to the south (see Figure 1). The study area will include the delta and the two major tributaries to the Delta, the San Joaquin and Sacramento Rivers. The watersheds for these two tributaries drain approximately 75 percent of the state of California. At the western boundary, the study area will include those waters monitored by the Central and Northern California Ocean Observing System. The delta and the estuary are an important area of biological diversity and are a key transit point for migrating birds. Approximately 8 million people work and live around the San Francisco estuary. A preliminary map of the study area is shown on Figure 1 that includes sites from several of the studies mentioned in the “ongoing collaborations” section.

Key Study Partners

The following study partners representing the Federal, State, and non-profit sectors are committed to seeing the development of a regional pilot study. We have contacted all the following partners and included letters of interest from most of them in a separate file.

Federal Agencies

US Environmental Protection Agency (USEPA)

Karen Schwinn, Associate Director, Office of Water, USEPA Region 9

National Oceanic and Atmospheric Administration

Rebecca Smyth, California Regional Coordinator

US Geologic Survey

Dr. James Cloern, Senior Research Scientist

Dr. David Schoelhamer, Research Hydrologist

US Fish and Wildlife Service

Dr. Colin Eagle-Smith, Environmental Contaminants Division

State of California

Steve Ritchie, South Bay Salt Pond Restoration Project

Dr. Paul Siri, State Coastal Conservancy

Tom Mumley, San Francisco Regional Water Quality Control Board

Dr. Charles Armor, Interagency Ecological Program

Marcia Brockbank, San Francisco Estuary Program

Dr. Barbara Washburn, Office of Environmental Health Hazard Assessment

Dr. Terry Fleming, Surface Water Ambient Monitoring Program, (EPA on-loan)

Academia

Dr. Toby Garfield, San Francisco State University

Dr. John Largier, UC Davis, Bodega Bay

Non-profit Sector

Heather Kerkerring, Central and Northern California Ocean Observing System (CeNCOOS)

Dr. Francisco Chavez, Monterey Bay Aquarium Research Institute

Denise Greig, The Marine Mammal Center

Pilot Study Approach and Milestones

Pilot Study partners will establish a project team that will undertake the following:

1. Inventory current data and information collection in the study area at a scale similar to that proposed in the Network design. This inventory will build on two ongoing partners efforts:
 - a. SFEI is currently updating the California Monitoring, Assessment, and Research Program (CMARP) (<http://www.sfei.org/cmarpquery>). Over 600 monitoring and research related programs or projects have been identified as part of CMARP. Those programs include a wide range of federal, state, municipal, and local volunteer programs that encompass most of the CALFED program areas. CMARP will include an update of information now underway for the Central Valley.
 - b. The Central and Northern California Ocean Observing System (CeNCOOS) has a similar data collection effort (OceanObs) underway for the California coastal waters (http://www.cencoos.org/act_lst_0.htm).
2. Identify gaps between existing monitoring and those indicated by the Network design. Estimate costs of on-going monitoring and costs to fill identified gaps. The State Coastal Conservancy organized a workshop in January, 2007 to begin this assessment in conjunction with determining how to begin to implement a modeling framework for the Bay and nearshore waters.
3. Investigate data comparability and data sharing issues in the study area and recommend procedures for their resolution. This task will build on three ongoing efforts to evaluate data comparability, QA/QC, and data-sharing protocols:
 - a. In cooperation with the CalFed Science Program, SFEI has coordinated a series of data comparability studies with all the organizations conducting mercury research in the Bay.
 - b. California has been developing a data-sharing strategy in which SFEI has been a lead participant (see the SWAMP/CEDEN-Data Centers below).

- c. CeNCOOS is leading the regional effort on data standards for ocean observing data available through their website.
4. Identify management issues in the study area that would be better addressed if the monitoring gaps noted in item 2 above were filled and data were more comparable and accessible. Management questions have been developed in depth for several of the monitoring programs(http://www.sfei.org/rmp/reports/Management_Synthesis_Final_83006.pdf).
 5. Prepare a report that documents activities and accomplishments of the Pilot Study and participate in preparing reports that refine Network observational requirements. SFEI in conjunction with its partners will prepare a report that will include: current data inventory and monitoring programs; gaps between the current monitoring programs and that specified in the Network design; a cost estimate of on-going monitoring and additional data needs; a description of data comparability and sharing issues within the study area as well as recommendations for resolution of any issues identified and a discussion of management issues in the study area that would be better addressed if the monitoring gaps were addressed.

Table 1. Task Schedule 2007

	A	M	J	J	A	S	O	N	D	J
Task 1 - Inventory	█	█	█	█	█	█				
Task 2 - Gaps			█	█	█	█	█	█		
Task 3 - Data Sharing		█	█	█	█	█	█	█	█	
Task 4 - Mgmt Issues						█	█	█	█	█
Task 5 - Report										█

Major SF Bay Area Federal/Non-Federal Monitoring Programs

Table 2 identifies the major monitoring programs in the study region using the classification recommended by the Advisory Committee on Water Information (ACWI) to develop the Network Water Quality Monitoring Design. The table shows that the San Francisco region has significant coverage of all the monitoring categories within all the ACWI resource components (i.e., River, Estuary, Nearshore, Groundwater, and Atmosphere).

Table 2. San Francisco Estuary Pilot Study Partner Data Sets

Monitoring Category	Examples of Data Sets	Partner Agency	ACWI Design Component
Physical			
Flow magnitude and direction	streamflow, ground water flow, tide height, water currents, wind direction	SWAMP, CeNCOOS, USGS,	E, NC, EEZ, R, GW, A
Physical habitat	channel slope, width, bottom materials, depth	SWAMP, USGS, SBSP	E, R
Sediments	suspended and bottom sediment concentration, (% sand/silt/clay). trace metals, carbon, pesticides, PCBs, and PAHs.	SWAMP, RMP, IEP, USGS, SBSP	E,R
Chemical—inorganic			
Water-quality characteristics	temperature, pH, dissolved oxygen, conductance, turbidity, color, alkalinity	SWAMP, USGS, IEP, RMP, CeNCOOS	E, NC, EEZ, R, GW
Major ions	calcium, magnesium, potassium, sodium, chloride, sulfate	SWAMP, NAWQA	R, GW
Nutrients	nitrate, nitrite, ammonium, organic nitrogen, phosphorus, silica	SWAMP, NAWQA, USGS, IEP, NERR, RMP, CeNCOOS	E, NC, EEZ, R, GW, A
Metals and metalloids	aluminum, arsenic, cadmium, chromium, copper, iron, lead, mercury, selenium, zinc	SWAMP, NAWQA, RMP, USFWS, NERR, CeNCOOS	E, NC, R, GW, A
Chemical—organic			
Carbon, total and dissolved	organic, inorganic	SWAMP, USGS, IEP, RMP	E, NC, EEZ, R, GW
Bulk organics	oil and grease, humic and fulvic acids	SWAMP	?
Volatile organic compounds (VOCs)	TCE, PCE, carbon tetrachloride, benzene, toluene	SWAMP, NAWQA, RMP	E, R
Pesticides	Aldrin, dieldrin, DDT, DDD, DDE, chlordane, hexachloro-benzene, mirex, atrazine, simzine, alachlor, aldicarb	SWAMP, NAWQA, RMP	E, R, GW
Halogenated hydrocarbons	Polychlorinated biphenyls (PCBs), dioxins, furans	RMP, SWAMP	E, R

Polycyclic aromatic hydrocarbons (PAHs)	naphthalene, phenanthrene, pyrene, benzo(A) pyrene (BaP),	RMP, SWAMP	E, R
New and emerging contaminants	Pharmaceuticals and personal care products (PPCPs), antibiotics, flame retardants, stain repellents, lubricants, industrial detergents	RMP, SWAMP	E, R
Biological			
Biological assessments	chlorophyll A, algae, bacteria, viruses, macro-invertebrates, fish	SWAMP, RMP. USGS. IEP, SBSP, USFWS, OEHHA, TMMC	E, NC, R

RMP- Regional Monitoring Program http://www.sfei.org/rmp/rmp_data_access.html

IEP – Interagency Ecological Program <http://www.iep.ca.gov/>

USGS – Water Quality of SF Bay <http://sfbay.wr.usgs.gov/access/wqdata>

CeNCOOS – Central and Northern California OOS http://www.cencoos.org/act_lst.htm

SBSP – South Bay Salt Pond Restoration Project <http://www.southbayrestoration.org/>

USFWS – US Fish & Wildlife Service Bird Monitoring

NERR – National Estuarine Research Reserve <http://sfbaynerr.org/research/swmp.php>

OEHHA- Office of Environmental Health Hazard Assessment

TMMC – The Marine Mammal Center

On-going Collaborations within the San Francisco Bay Region

Table 2 gives a hint of the necessity and extent of ongoing collaborations. This Statement of Interest is too limited by space to fully explore this issue, but we have highlighted several of the current collaborations below to give a flavor of the regional efforts. It is important to note the unique national role of The Regional Monitoring Program for Water Quality in the San Francisco Bay (RMP), which sets the tone for collaboration in the Bay Area. Approximately 100 NPDES dischargers to the Bay contribute financially to the program. Each industry category (e.g., dredgers, wastewater treatment facilities, stormwater dischargers, etc.) has representatives that meet quarterly with area scientists, environmentalists, and regulators to discuss technical and management issues within the San Francisco Bay area. Other collaborative efforts include:

- Data Centers SWAMP/CEDEN and CeNCOOS. Using the State’s Surface Water Ambient Monitoring Program (SWAMP) data standards, several Data Centers are under development around the state that will receive SWAMP, and other state funded ambient monitoring data, and transfer it to the California Environmental Data Exchange Network (CEDEN), where data are available to the public through the web in standard formats (<http://bdat.ca.gov/index.html>). SFEI will serve as

the Data Center node for the Bay Area. For ocean observations, CeNCOOS is leading the coordination efforts (see below)

- CeNCOOS – CeNCOOS is a regional association that coordinates ocean observing activities in Central and Northern California. CeNCOOS partners include city, state and federal agencies, local academic institutions, non-profit organizations, and for-profit companies. The CeNCOOS Board includes pilot partners from NOAA, MBARI, UCD, SFSU, SCC, and SFEI. CeNCOOS and SCC are developing a strategy for a community supported operational model of San Francisco Bay. A one-day workshop in January 2007 brought potential collaborators together to discuss individual needs and desires. Participants included regional water quality managers, local academics, ports operators, and local non-profit organizations.
- SFEI, USGS, SBSP - The State of California and the Federal government have embarked on the restoration of 15,100 acres of Cargill's former salt ponds in South San Francisco Bay—the South Bay Salt Ponds Restoration Project (SBSP). SFEI in conjunction with 11 public agencies, 4 private foundations, and 16 nonprofit organizations is conducting scientific studies on the restoration of salt ponds. See the attached web site for a complete list of partners and a description of the project <http://www.southbayrestoration.org/Links.html>.
- RMP, USGS (water quality). The RMP helps to sponsor the USGS's collection of water quality parameters at 36 stations along the spine of the bay (<http://sfbay.wr.usgs.gov/access/wqdata/overview/index.html>). Basic information such as dissolved oxygen and chlorophyll concentrations are collected. Recently, a pronounced change in the estuary dynamics was noted by the USGS (see the 2006 Pulse of the Estuary report, "What is causing the phytoplankton increase in San Francisco Bay" (<http://www.sfei.org/rmp/pulse/2006/index.html>)).
- RMP, USGS (suspended sediment concentrations). The RMP helps to sponsor the USGS's continuous collection of suspended sediments at 6 stations within the Bay (http://sfbay.wr.usgs.gov/sediment/cont_monitoring/index.html). This information is critical for estimating sediment budgets and contaminant loading (see the 2005 Pulse of the Estuary report, "Bay Sediment Budget: Accounting 101" http://www.sfei.org/rmp/rmp_docs.html).
- RMP, TMMC. The RMP is currently collaborating with The Marine Mammal Center (TMMC) to evaluate contaminants in harbor seals. This is a two-year study examining the concentration of emerging contaminants in seal blood. This is part of a larger study examining the long-term health and well being of seals in the estuary.
- RMP, USFWS, SBSP. The RMP is currently collaborating with the USFWS to determine mercury threshold effect levels for reproduction, hatchability, and viability in terns. The San Francisco estuary is home to the least terns, an

endangered species. This study will be instrumental in understanding threshold levels in blood and feathers at which deleterious effects occur.

- RMP, USFWS, IEP. In 2007, the RMP will complete its third year of a four year study examining mercury and organics in small fish to determine the uptake of these contaminants in food webs and to assess the impacts of wetland restoration on biota. This work is being conducted in collaboration with the USFWS and IEP. For a short summary of this work, see http://www.sfei.org/inthenews/jan%20_2007_monitor.pdf.
- RMP, OEHHA, USFWS, SWAMP Fish monitoring. Every three years, the RMP collects sportfish from five estuary locations and analyzes the fish for contaminants. This information is used by the Office of Environmental Health Hazard Assessment (OEHHA) to evaluate fish consumption advisories. The RMP in consultation with this agency and the Regional Water Quality Control Board to develop a sampling and analysis plan that meets the agencies needs. For a report summarizing the 2003 sampling event, see Contaminant Concentrations in Fish report (2006) at http://www.sfei.org/rmp/rmp_docs.html. In addition, the California Bay-Delta Authority (CBDA) approved a \$4.5 million proposal to examine mercury and other chemicals in fish in the Bay-Delta watershed, to increase public awareness of fish contamination issues and to monitor potential changes in mercury concentrations from marsh restoration projects in the Delta. Partners in this project include the San Francisco Estuary Institute, University of California at Davis, the California Department of Fish and Game, Moss Landing Marine Lab, the California Department of Health Services, and the California Office of Environmental Health Hazard Assessment. For further information on this project, see <http://www.sfei.org/cmr/fishmercury>.
- SFEI-State Water Board Sediment Quality Objectives development. SFEI is working with the Southern California Coastal Water Resources Program (SCCWRP) in developing state-wide sediment quality objectives for coastal regions and estuaries. SFEI assisted in the compilation, verification, and standardization of data from the RMP, EPA-WEMAP, Bay Planning (dredging studies), IEP-DWR (benthos) and other smaller San Francisco Bay studies to provide data to develop the multi-metric assessment methods proposed for coastal regions of the state.

Regional Meetings to Coordinate Pilot Study Activities

- RMP Annual Meeting at the Oakland Museum of Natural History. The RMP hosts an annual meeting for RMP participants, regulators, scientists, and vested stakeholders at which RMP results from the year's monitoring events are presented. Over 200 individuals attend these meeting to hear presentations on diverse topics such as emerging contaminants, mercury in small fish, and the status of regulations. This year's meeting will be held on October 2, 2007.

- RMP Annual Mercury Coordination Conference. The RMP hosts an annual meeting for scientists, regulators, and vested stakeholders to foster communication and collaboration on mercury projects that are being conducted in the Bay area. This year will be our 4th year hosting this event and approximately 90 people from academia, agencies (federal and state), nonprofits, laboratories, and the regulated community (e.g., wastewater treatment facilities and ports) will be attending. For more information on this conference, see http://www.sfei.org/rmp/mercurymeeting/2007_4thAnnual/index.html. This year's meeting will be held on February 22nd.
- SFEI and the State of the Estuary. The SFEI is a key partner in facilitating the State of the Estuary conference that occurs biennially. This three-day conference has moderated sessions and poster presentations on the health of estuary and watersheds. This year's meeting will be held on October 16th, 17th, and 18th. For more information on this year's conference, please see <http://sfep.abag.ca.gov/soe>.
- SFEI and the Fish Mercury Program (CalFed). Annual Meeting June 5-8, 2007.
- SWAMP Data Management Meetings. These are quarterly meetings lead by the SWAMP Data Management Team at Moss Landing Marine Laboratory. Data comparability, standardization, and Data Center development are discussed by SWAMP stakeholders and other participating agencies (SFEI, SCCWRP, SJSU, UC-Davis).
- CeNCOOS Executive Council Meetings. Approximately quarterly.
- IEP Coordination Committee meetings. Monthly

Special Characteristics of Proposed Partnership

We believe the proposed pilot offers several unique benefits to the Monitoring Network:

- i. Our proposal builds on existing cooperation between the study partners.
- ii. Because we are building on efforts and collaborations already in place, we can meet the January 2008 deadline for the report.
- iii. Our proposal builds on four very large existing monitoring programs (>\$20 million in annual effort), many of which are using the same data storage network. This extremely large data set has not previously been evaluated using the criteria selected by the Monitoring Network. The sheer size of this endeavor would provide an important test of the ability to organize and integrate existing monitoring projects into a cohesive program that could demonstrate the benefits of a fully implemented Network.
- iv. We have already begun the process of identifying the water quality-related resource management issues in the region that could be addressed more

- effectively if monitoring gaps were filled and data were more comparable and accessible through a January 2007 workshop and the development of the CMARP plan for CalFed Science Program.
- v. We have demonstrated our ability to communicate the progress of pilot studies to the monitoring community nationally by the large number of presentations at the 5th National Water Quality Monitoring Council meeting in San Jose, California, May 2006. SFEI staff prepared eight posters and gave seven presentations at NWQMC meeting.
 - vi. We are uniquely positioned to address a future ACWI interest in wetlands assessment. SFEI is the lead in the development of the California Regional Rapid Assessment Method (CRAM) in collaboration with USEPA (see <http://www.cramwetlands.org/>).