



2010 Program Plan

First Quarter Edition

December 11, 2009

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Although California voters approved several billion dollars in water quality and conservation bonds prior to the current financial crisis that have not yet been fully exhausted, the state’s structural budgetary problems have introduced considerable uncertainty to the Institute’s long-term planning horizon. In 2009, we managed to become considerably less reliant on bond-funded projects, taking advantage of federal funding opportunities, and strengthening partnerships with local agencies asking for our assistance. However, much work is still needed to clearly articulate what SFEI is all about and what its unique niche is to attract projects with strategic value to the four essential elements that comprise the Institute’s expertise and future directions – science-based goal-setting, monitoring, performance assessment, and reporting.

Depending on staff and Board capacity, 2010 may be a good year to revisit the Institute’s outdated strategic plan, which then will guide the development of future annual planning documents. Until that time, the 2010 Plan format follows, with a few exceptions, previous planning documents. It includes descriptions of activities for each of the major “focus areas” despite the slowly dissolving program boundaries.

Our projects are increasingly becoming multi-disciplinary and cover multiple “functional areas” of integrated watershed management designed to reduce conflicts among ecosystem services. We have, therefore, slightly modified the traditional seven “Program Areas” of previous Plans by merging projects separated by Wetlands and Watershed Programs. We grouped projects designed to facilitate the display and accessibility of information and improve

data analysis through the use of conceptual and quantitative models under the new focus area of “Environmental Informatics.” The Regional Monitoring Program for Water Quality is now listed under the larger umbrella of the Contaminant Research and Monitoring Program. We also added a general description of planned design and communication activities funded by dedicated project allocations and overhead charges incorporated into our labor multiplier. We are continuing to collaborate closely with Andy Cohen and the Center for Research of Aquatic Bioinvasions (CRAB) and have still one fairly large Conservancy-funded project on the SFEI books. However, we are not including a Bioinvasions Program in this Plan until we know more about the outcomes of developments in Sacramento, following an external review of the existing ballast water monitoring program.

SFEI’s and ASC’s mix of projects has shifted considerably since early 2009, with many previously suspended grant-funded projects winding down in the first quarter of 2010 (See Figure 1).

Estimated revenue for 2010 is \$7.5 million, contributed by both SFEI and ASC projects. The proportion of revenue allocated to the internal labor budget is considerably greater in 2010 than in previous years (i.e., we are subcontracting less work). These projects are consistent with SFEI’s mission and the emerging thinking of what kind of work we do and do not take on as general guidance. The RMP continues to be SFEI’s largest single program and accounts for about 45% of total revenue and 35% of labor revenue (see Table 1).

Table 1. 2010 Summary of Projected Revenues and Expenses

	RMP	SFEI	ASC	Admin/IT	Total
Revenue					
Billed Labor	\$ 1,687,630	\$ 2,498,911	\$ 800,000	\$0	\$4,986,541
Subcontracts	\$1,550,000	\$500,000	\$125,000	\$0	\$2,175,000
Other Reimb Revenue	\$153,550	\$165,000	\$10,000	\$0	\$328,550
Total Revenue	\$ 3,391,180	\$ 3,163,911	\$ 935,000	\$ -	\$7,490,091
Expenses					
Salaries	\$983,843	\$1,456,799	\$466,379		\$2,907,021
Benefits	\$236,122	\$349,632	\$111,931		\$697,685
Salaries & Benefits for 3.9 Staff					\$289,284
Subcontracts	\$1,550,000	\$500,000	\$125,000	\$0	\$2,175,000
Other Reimb Expense	\$153,550	\$165,000	\$10,000	\$0	\$328,550
Adm Exp & IT Cap	-	-	-	\$910,080	\$910,080
Program Discretionary	\$10,000	\$19,250	\$6,750	\$0	\$36,000
Capital/Contingency	\$0	\$0	\$0	\$0	\$0
Total Expenses	\$2,933,516	\$2,490,681	\$720,060	\$910,080	\$7,343,620
Surplus (Deficit)	\$457,664	\$673,231	\$214,940	(\$910,080)	\$146,471

● For reference purposes, the summaries of individual projects or activities are described under the broad descriptions of the re-configured focus areas. They correspond to the staff hours allocated to billable projects in the budget summary above.

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Design & Communication

LINDA WANCZYK

OVERVIEW

Each year SFEI has consistently increased its reach, information and collaboration with an audience of scientists, public agency staff, educators, and other stakeholders. Given the impressive amount of data and content generated by SFEI, it is the responsibility of the Design and Communication Department to ensure that the communication design approach not only protects SFEI's message but also conveys the information in an accurate and aesthetic way to a variety of audiences.

The materials and products developed by the Design and Communication Department have been recognized for their high quality design and have garnered a lot of attention from a wide variety of media sources, publications, government agencies and private organizations, including the EPA, the State Water Board, the San Francisco Chronicle, the San Jose Mercury News, and the Bay Planning Coalition. Feedback for the RMP's Pulse of the Estuary Annual Report has been especially positive. Comments, such as "I was blown away about how well the 2009 Pulse turned out" and that "...the design is superb," were frequent.

OBJECTIVES

- Oversee visualization and implementation for the look/feel/voice of SFEI materials and projects
- Conceive, create and design successful materials and tools considering budgets and time frames
- Support executive director, program managers and Board in strategic thinking for SFEI brand integrity
- Be involved in pitch-work regarding future strategy and projects
- Manage and implement solutions for reports, publications and communication activities
- Distill science information into small meaningful bites that can be better understood to a wide audience

2009 MEDIA NOTABLES

Media coverage was consistent throughout the year with website hits peaking in the months of March (Historical Ecology Program profile), and May (articles following the release of the RMP/SWAMP report). The largest number of hits occurred after the the San Francisco Chronicle featured a cover story on sediments and the Pulse of the Estuary Report prior to the RMP Annual Meeting in October.

- Alameda Magazine—Dumping Grounds: Mount Trashmore and Kindred Bayside Landfills are the Parks of the Future
- The San Francisco Chronicle—S.F. Bay's Slide in Mud Worries Scientists
- The San Francisco Chronicle and the Contra Costa Times—It's clear: The Bay isn't as Murky (Pulse of the Estuary report featured on the front page above the fold)
- American Association for the Advancement of Science—Researchers Detail Mounting Perils for San Francisco Bay
- KQED radio interview with Jay Davis—Health Dialogues: Food Safety
- Stockton Record—Golden State's Dirty Water Study: Just 15% of Lakes 'Clean'
- The San Francisco Chronicle—Study: Most Key Fishing Spots in State Polluted (this article generated roughly 30 more related articles coinciding with the release of the SWAMP report)
- Terrain Magazine—Mercury Rising
- Bay Nature Connections—From the Field: Connecting with Robin Grossinger
- The San Francisco Chronicle—Historical Ecologists Map a Changing Landscape
- The San Francisco Chronicle—Napa's 'Intensely Modified' Past
- The Press Democrat—Petaluma River 'Impaired' by Too Much Trash
- News from Native California—The Collaborative Research Program at Quiroste Valley
- Bay Nature Magazine—Taking the Heat Bay Area Ecosystems in the Age of Climate Change



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2009 WEB PROJECTS

- SFEI rolled out the first “internal” staging phase of the corporate site in the fall of 2009. The new site uses a CMS-based website management software with optional, flexible modules such as web pages, forums, calendars, and newsletters that can be easily added, subtracted, moved around within the site, or held for later publishing. A single administrative interface is used to manage all components and to assign “permissions” to various individuals and groups to include editing rights, administering other users accessing only certain parts of the website
- SFEI current website: the department will continue to make updates and any necessary changes to SFEI’s current main website in the interim before the new website is launched to the public in 2010
- Ongoing updates were made to CRAM Wetlands, WRMP, SBSP and other miscellaneous partner sites
- Creation of numerous registration/sign up pages for RMP Annual Meeting, The Annual Mercury Meeting, CRAM Training Programs and Workshops, and the Green Sturgeon Symposium

2009 PRINTED PROJECTS

(abbreviated list):

- The RMP 2009 Pulse of the Estuary Report
- The 2009 State of the Estuary Conference posters
- Wetland Science Program Fact Sheet introducing lay people to Wetland Tracker concepts—provides background information for Wetland Tracker, Level 1: Landscape Assessment and has been given to the local and state board for posting to their web sites
- Wetland Science program and GIS Department Fact Sheets—wetland and riparian base map, WRMP.org. These series of fact sheets has been generated to educate stakeholders and interested parties about the work. SFEI has begun outreach to flood protection, planning, and public works agencies, water and mosquito abatement districts, parks managers and RCDs. The most recent fact sheet introduces the new base maps to this community
- Poster for the 11th Annual Workshop on Brominated Flame Retardants Conference
- CRAM training and workshop print materials and letterhead
- RMP Annual Meeting and support materials—posters, presentation materials and inserts
- SETAC New Orleans, 30th Anniversary conference

2010 ANTICIPATED LIST OF PROJECTS

SFEI-SPECIFIC

- SFEI main website—new content and graphic development (launch date to be determined)
- SFEI Quarterly Newsletter – redesign of Score Card to communicate more effectively with Board and staff. Implementation of a quarterly newsletter, focusing on notables, impact and publications, project and staff updates
- Redesign of the SFEI brand and identity—project scope and timeline to be determined
- SFEI brochure (fold out brochure of general SFEI information, long term content)
- SFEI postcards/cards and Thank You Cards
- Report Cover templates and inside page template design in WORD for in-house staff
- Website Notables, Media and Meeting updates
- Booth design and signage for conferences

FOCUSED AREAS SPECIFIC (ABBREVIATED LIST, MORE PROJECTS TO BE ANNOUNCED IN 2010)

- Environmental Informatics regional data portals design and graphics
- RMP information dissemination—miscellaneous web support, newsletters, fact sheets and presentation materials
- RMP—Pulse of the Estuary Report
- Wetlands Science Program—Napa Valley website graphics and report design
- Delta RMP website interface design, graphics and supplemental materials
- Historical Ecology Program—Southern California T-Sheets website design and graphics
- Wetlands Science Program—WRAMP website
- Central Valley Monitoring website design
- Grasslands Annual Report (in progress)
- Conservation Biology Program—South Bay broadsheet design and graphics
- Conference presentations and posters design

Contaminants

JAY DAVIS
MEG SEDLAK
JENNIFER HUNT

PROGRAM OVERVIEW

SFEI/ASC's Contaminants Program includes the Regional Monitoring Program for Water Quality in the San Francisco Estuary (RMP) and other smaller programs and projects with similar aims as the RMP. The overarching goal of the Contaminants Program is to collect data and communicate information about the biological, physical, and chemical integrity of water (aka "water quality") in the San Francisco Estuary and other California water bodies to support management decisions. These efforts support the mission of management agencies mandated to restore and preserve the quality of California's water resources. Studies performed in the Contaminants Program provide the information needed to guide effective and efficient remediation of beneficial use impairments due to pollution, and to prevent future impairments through early detection of risks and potential problems.

Primarily due to its role in managing the RMP, one of the premier water quality monitoring programs in the world, SFEI has long been a leader in water quality monitoring. SFEI's demonstrated expertise in water quality monitoring has led to the Institute's involvement in a variety of other water quality monitoring projects in the Estuary and throughout California. Projects related to bioaccumulation, water quality program management, sediment quality, and biogeochemistry have been particular strengths of the Contaminants Program. More recently, in recognition of the interconnected and multiple stressors affecting aquatic resources, the Contaminant Program has increasingly linked its efforts with those that are attempting to identify the role of other stressors on aquatic ecosystems and their relative importance (e.g., habitat loss and simplification, climate change effects, resource extraction, including water diversions).

PROGRAM OBJECTIVES

The RMP is the flagship of the Contaminants Program, and has developed a framework of management questions that also describes the focus of the Contaminants Program as a whole.

The overarching goal of the RMP is to collect data and communicate information about water quality in the San Francisco Estuary to support management decisions. The RMP in consultation with its stakeholders has refined the management questions as part of the five-year external program reviews and the periodic re-evaluation and redesign of the program. The most recent version of the management questions were developed in 2007 as part of a redesign of the Status and Trends element. These were reviewed and approved by the Technical Review Committee and the Steering Committee in 2008.

The RMP, augmented by projects funded by other sources and formerly grouped in the Contaminants Monitoring and Research Program, is guided by a series of tiered management questions. The five Level I questions are presented below – these also apply to Contaminants Program studies as a whole. Within the RMP, Level II and III questions have been developed that provide a more targeted focus.

1. Are chemical concentrations potentially at levels of concern and are associated impacts likely?
2. What are the concentrations and masses of contaminants?
3. What are the sources, pathways, loadings, and processes leading to contaminant-related impacts?
4. Have the concentrations, masses, and associated impacts of contaminants increased or decreased?
5. What are the projected concentrations, masses, and associated impacts of contaminants?



2010 PROJECTS

**PROJECT TITLE:
THE REGIONAL MONITORING PROGRAM FOR
WATER QUALITY IN THE SAN FRANCISCO
ESTUARY**

PROJECT CODE: 3010

START DATE: 1993

ANTICIPATED COMPLETION: ONGOING

TOTAL FUNDING: \$3,400,000 per year

FUNDS FOR 2010: \$3,400,000

PROGRAM FUNDER:

NPDES permit holders for San Francisco Bay

PROGRAM MANAGER:

Meg Sedlak

LEAD SCIENTIST:

Jay Davis

PROGRAM DESCRIPTION

The RMP is an innovative partnership that combines shared financial support, direction, and participation by regulatory agencies and the regulated community in a model of collective responsibility. The RMP has established a climate of cooperation and a commitment to participation among a wide range of regulators, dischargers, industry representatives, non-governmental agencies, and scientists. The RMP provides an open forum for interested parties to discuss contaminant issues facing the Bay.

Stable funding has enabled the RMP to develop long-term plans through the core annual monitoring program, Status and Trends. In addition, pilot and special studies provide an opportunity to adapt to changing management priorities and advances in scientific understanding. RMP committees and workgroups meet regularly to keep the Program efficient, focused on the highest priority issues, and to ensure that the RMP is based on sound science. The RMP has continually improved since its inception in 1993.

The RMP has produced a world-class dataset on estuarine contaminants. Monitoring performed in the RMP determines spatial patterns and long-term trends in contamination through sampling of water, sediment, bivalves, bird eggs, and fish, and evaluates toxic effects on sensitive organisms and chemical loading to the Bay. The Program combines RMP data with data from other sources to provide for comprehensive assessment of chemical contamination in the Bay.

The RMP provides information targeted at the highest priority questions faced by managers of the Bay. The RMP produces an Annual Monitoring Report that summarizes the current state of the Estuary with regard to contamination, a summary report (Pulse of The Estuary), technical reports that document specific

studies and synthesize information from diverse sources, and journal publications that disseminate RMP results to the world's scientific community. The RMP website provides access to RMP products and links to other sources of information about water quality in San Francisco Bay.

The RMP budget for 2010 is projected to be \$3.4 million dollars with approximately \$500,000 of that budget dedicated to pilot and special studies. These studies are described in more detail below.

PLANS FOR 2010

The Level I priority management questions articulated above and the Level II and III questions will be addressed through pilot and special studies and the Status and Trends program.

In 2009, the Sources Pathways and Loading Workgroup and the Small Tributary Loading Strategy (STLS) Team were very active in developing the STLS strategy and assuring that the strategy was integrated with the requirements in the Municipal Regional Stormwater Permit (MRP). The STLS identifies four key questions:

- Which are the “high-leverage” small tributaries that contribute or potentially contribute most to Bay impairment by pollutants of concern?
- What are the loads or concentrations of pollutants of concern from small tributaries to the Bay?
- How are the loads or concentrations of pollutants of concern from small tributaries changing on a decadal scale?
- What are the projected impacts of management actions on loads or concentrations of pollutants of concern from the high-leverage small tributaries and where should management actions be implemented in the region to have the greatest impact?

In 2010, we will address these questions through monitoring of two small tributaries in Hayward (Zone 4 Line A) and San Jose (Guadalupe River). Both tributaries are specifically identified as tributaries to be monitored as part of the MRP. In addition, we will continue to build our understanding of large river fluxes into the Estuary from the Delta through monitoring at the confluence of the Sacramento and San Joaquin rivers. All of these studies will be overseen by the Sources Pathways and Loading workgroup and STLS team.

In 2009, the Modeling Strategy Team and the Contaminant Fate Workgroup identified the following priority questions.

- What is the contribution of contaminated Bay margins to Bay impairment and what are the

projected impacts of management actions to Bay recovery?

- What patterns of exposure are forecast for major segments of the Bay under various management scenarios?
- What are the projected impacts of management action on loads or concentrations of pollutants of concern from high-leverage small tributaries?

We will begin to address the first question through the Bay Margins conceptual model that will be completed in last quarter of 2009. In 2010, we will begin to address the second and third questions through the development of a three-dimensional model referred to as SUNTANS. This open-source model was developed by researchers at UC-Berkeley and Stanford to address circulation and sediment movement in the South Bay as part of the South Bay Salt Ponds restoration project. It represents a great opportunity to collaborate with some of the best modelers in the country. One of the first aspects that the RMP will work on in 2010 is modeling the hydrodynamics of the Bay margins. The modeling team is currently working on developing a workplan for the modeling efforts over the next five years. The Modeling Strategy Team and the Contaminant Fate Workgroup will provide technical oversight for the modeling effort.

The first strategy implemented was the Mercury Strategy and we are beginning to see significant results from the targeted studies that were designed to address the following questions:

- Where is mercury entering the food web?
- Which processes, sources, and pathways contribute disproportionately to food web accumulation?

The first question is being addressed through an expanded small fish monitoring program that commenced in 2008 and built upon a smaller pilot effort conducted under the Exposure and Effects Workgroup (2005 through 2007). This year, 2010, represents the last year of the larger three-year effort. The second question is being addressed through two two-year studies that began in 2008 and are being closely coordinated with the small fish project. The first, led by researchers at University of Michigan, is evaluating the suitability of mercury isotopes as a means for identifying sources of mercury to the aquatic food web. The second, led by researchers at Trent University in Canada, is evaluating the use of thin films to serve as proxies for biotic methylmercury uptake. The small fish project is reviewed jointly by the

Exposure and Effects workgroup and the Contaminant Fate Workgroup. The remaining two projects will be reviewed by Contaminant Fate Workgroup. All three studies will be discussed at the Contaminant Fate Workgroup meeting and the Annual Mercury Meeting which are being held on January 26th and 27th, respectively.

The RMP has observed persistent sediment toxicity in the Estuary, particularly in the wet season. In recent years, the RMP has made a number of changes to improve our ability to assess sediment quality and identify the causes of toxicity. In 2008, the Program began monitoring benthos to facilitate sediment triad assessments of the ecological health of the Bay (i.e., sediment chemistry, sediment toxicity, and benthos). In 2010, we will add back into the Program the collection of wet weather sediment samples after a hiatus of eight years. Also in 2010, we will evaluate additional tools to identify causes of toxicity. Researchers at the University of California at Berkeley and the Southern California Coastal Water Research Project will evaluate changes in the gene expression of test species as a result of exposure to contaminants (referred to as a molecular TIE). The RMP will continue to develop benthic assessment methods for the mesohaline and oligohaline portions of the Estuary as part of the SQO and to convene workshops to provide expert guidance and communicate new findings.

Understanding which emerging chemicals have the greatest potential to adversely impact beneficial uses in the Bay remains the priority question for the Emerging Contaminant workgroup. In 2010, we will address this question through the use of powerful new analytical techniques to conduct non-specific scans of contaminants in Bay Area biota. The National Institute for Standards and Technology has recently developed several screening methods to do broad screens to identify previously unknown contaminants in tissue samples. We will use these methods to evaluate bivalve and seal samples from Bay Area and reference locations to determine which previously unidentified contaminants are accumulating in Bay area food webs.

Through the RMP Status and Trends monitoring, we know that several chemicals of emerging concern such as the perfluorinated compounds and the flame retardants are accumulating in biota. One of the key questions is whether these detected concentrations are having adverse impacts. Preliminary work by the USGS Pauxtent Research Center has shown that concentrations of polybrominated diphenyl ethers (PBDEs) in the upper range of those observed in Bay Area terns have adverse effects on the hatching success for kestrels. A pilot study evaluating effects on PBDEs



on terns has been proposed for 2010 to assess the sensitivity of terns to these ubiquitous contaminants and to provide a context for interpreting the tern data collected as part of Status and Trends monitoring.

RECENT FINDINGS AND PUBLICATIONS

- SFEI. 2009. *The Pulse of the Estuary: Monitoring and Managing Water Quality in the San Francisco Estuary*. SFEI Contribution 583. San Francisco Estuary Institute, Oakland, CA.
- Klosterhaus, S, Sedlak, M. et al. 2009. *Managing Contaminants of Emerging Concern*. September, 2009. Workshop Report. SFEI staff members in collaboration with the California Ocean Protection Council, the California Ocean Science Trust, the National Water Research Institute, Southern California Coastal Water Research Project and the Urban Water Research Center (UC-Irvine) convened a two-day workshop to develop strategies for the State to prioritize Contaminants of Emerging Concern.
- Yee, D. 2009. *Analysis of Sediment Cores: Uncovering the Past*. Pulse of the Estuary 2009. Analysis of sediment cores advanced in 17 locations throughout the Bay suggests that Bay sediments are relatively well mixed and that surface sediment concentrations are similar to deeper sediment concentrations. Wetland cores reflect a depositional history that tend to peak in the 1960s for most contaminants. These decreasing loads are also reflected in concentrations of contaminants observed in biota and sediments.
- Lent, M., J. Oram, and L. McKee. 2009. *Guadalupe Model Year One Report*. The objective of the Guadalupe Watershed Model project is to increase our understanding of the source, release, and transport of sediment and contaminants to San Francisco Bay from a large mixed land-use, highly urbanized watershed in the South Bay. To reach this objective, a numerical model was developed to simulate the movement of constituents through the Guadalupe River Watershed, chosen primarily because of the richness of existing data and secondarily because of complex and imminent management towards reaching loads targets imposed by the Guadalupe River Hg TMDL. The first phase in this project is developing the hydrologic portion of the model, which provides the basis for modeling sediment, Hg and PCBs in later phases. The Guadalupe Watershed Model is a prototype for what is likely to be a family of watershed models for improving estimates of Pollutants of Concern loads to the whole Bay or major compartments of the Bay.
- Greenfield, B. and A. Jahn. 2009. *Mercury in Biosentinel Forage Fish in San Francisco Bay*. Tidal marsh restoration and other management actions have the potential to change mercury (Hg) concentrations in fish from the San Francisco Estuary and elsewhere. Small forage fish are a useful biomonitoring tool to identify spatial and interannual variation in biotic methylmercury (MeHg) exposure. From 2005 through 2007, six nearshore locations in San Francisco Bay were sampled annually, and 26 additional locations were also sampled. For 458 composite samples representing 13 fish species, the average whole body Hg concentration of the samples was 0.052 $\mu\text{g g}^{-1}$ (wet weight) and the average total length was 59.5 mm. Most (64%) of the samples had total Hg concentrations higher than a proposed 0.03 $\mu\text{g g}^{-1}$ TMDL target threshold for forage fish. Split sample analysis of 39 samples indicated that MeHg comprised 94% of total Hg in these fish. At a given length, concentrations were relatively high for arrow goby (*Clevelandia ios*), cheekspot goby (*Ilypnus gilberti*), and Mississippi silverside (*Menidia audens*), species that associate with wetlands, mudflats, or backwater sloughs. Concentrations were relatively low for topsmelt (*Atherinops affinis*), which exhibits offshore movement, and bay goby (*Lepidogobius lepidus*), which inhabits benthic locations in the open waters of the Bay. Topsmelt and nearshore goby species were well correlated among years and collection locations, but poorly correlated with Mississippi silverside, despite apparent similarity in diets between topsmelt and silverside. Topsmelt, silverside, and nearshore gobies all exhibited increased concentrations in more southern locations. Results indicate that different biosentinel species at the same collection location indicate separate habitat- and life-history-specific exposure patterns. To represent the full range of potential impacts of management activities, multiple species should be targeted.

PROGRAM STATUS

The RMP is entering its 18th year in 2010 and is still going strong.

**PROJECT TITLE:
SWAMP BIOACCUMULATION MONITORING**

PROJECT CODE: 1066

START DATE: 2006

ANTICIPATED COMPLETION: ONGOING

TOTAL FUNDING: \$542,000

FUNDS FOR 2010: \$85,380

PROGRAM FUNDER: SWRCB

LEAD SCIENTIST: Jay Davis

PROJECT MANAGER: Jennifer Hunt

PROJECT DESCRIPTION

The Surface Water Ambient Monitoring Program (SWAMP) Roundtable has formed a subcommittee, the Bioaccumulation Oversight Group (BOG) that develops plans for and guides implementation of SWAMP bioaccumulation monitoring. The BOG is composed of State Water Resources Control Board and Regional Water Quality Control Board staff and representatives from other agencies and organizations including USEPA, the Office of Environmental Health Hazard Assessment (OEHHA), the Department of Fish and Game (CDFG), and the San Francisco Estuary Institute (SFEI). The BOG has also convened a Bioaccumulation Peer Review Panel that is providing evaluation and peer review of the bioaccumulation program. The members of the Panel are internationally-recognized authorities on bioaccumulation monitoring. SFEI coordinates the BOG and is the technical lead for SWAMP bioaccumulation monitoring.

BOG ACTIVITIES/PRODUCTS

The first major task undertaken by the BOG was to perform a thorough review of past bioaccumulation monitoring in California. This review assessed the status of bioaccumulation in waters of the state and set the stage for improved monitoring in the future. The report found that concentrations of some bioaccumulative pollutants (e.g., PCBs and DDTs) declined greatly since the 1970s in response to management actions. However, present concentrations of pollutants in fish collected from many California water bodies remain high enough to cause concern for possible effects on human health. Consumption advisories exist for only a fraction of the water bodies likely to need them.

The BOG has developed and begun implementing a plan to evaluate bioaccumulation impacts on the fishing beneficial use in all California water bodies.

Sampling of lakes and reservoirs was conducted in the first two years (2007 and 2008). In 2009 and 2010, the California coast, including bays and estuaries, is being sampled. Rivers and streams will be sampled in 2011. In 2012 the plan is to again begin a two year effort on lakes and begin another five-year cycle of sampling all of these water body types.

CONTAMINANTS IN FISH FROM CALIFORNIA LAKES AND RESERVOIRS

In the first year of this screening study (2007), over 6000 fish from 18 species were collected from 152 lakes and reservoirs in California. Targeted sampling of "popular" lakes comprised the bulk of the year 1 effort (102 of 152), with the remainder comprising a random sampling to provide for an unbiased statewide assessment. Another 131 targeted lakes were sampled in 2008 (results to come in early 2010). Approximately 26% of the 152 lakes surveyed had a species with an average mercury concentration high enough that OEHHA would consider recommending no consumption of the contaminated species (greater than 0.44 ppm). Although mercury concentrations were generally not as high in southern California, the mercury problem is not confined to northern California and its well-known mining regions. PCBs reached concentrations posing the second greatest potential known health risks to consumers of fish caught from California lakes, with 12% of lakes above ATLS. In 2010, a final report on the Lakes Survey will be released that will cover both years of sampling and a more detailed exploration of factors influencing patterns in bioaccumulation, including sources.

CONTAMINANTS IN FISH FROM CALIFORNIA COASTAL WATERS

A two-year screening study of contaminants in fish from California coastal waters began in 2009. The first year of sampling focused on the Southern California Bight and the area near San Francisco Bay. The effort will be closely coordinated with Bight '08, the Regional Monitoring Program for San Francisco Bay, and additional monitoring by the Los Angeles Regional Board. Overall, these collaborations represent \$575,000 in matching funds to provide for a thorough assessment of bioaccumulation on the coast.

PLANS FOR 2010

- Publish draft and final technical report on the two-year dataset from the lakes survey.
- Conduct second year of sampling on the coast.



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RECENT FINDINGS AND PUBLICATIONS

Product	Title	Release Date	Link
Review of Past Monitoring			
Technical Report	Bioaccumulation Of Pollutants In California Waters: A Review Of Historic Data And Assessment Of Impacts On Fishing And Aquatic Life	September 2008	http://www.waterboards.ca.gov/water_issues/programs/swamp/bop.shtml
Fact Sheet	Long-Term Monitoring of Pollutants in Fish and Mussels Documents Major Improvements and Persistent Problems	September 2008	http://www.waterboards.ca.gov/water_issues/programs/swamp/bop.shtml
Lakes Survey: Year 1			
Technical Report	Technical Report on Year One of a Two-Year Screening Study of Contaminants in Fish from California Lakes and Reservoirs	May 2009	http://www.swrcb.ca.gov/water_issues/programs/swamp/lakes_study.shtml
Fact Sheet	Contaminants in Fish from California Lakes and Reservoirs	May 2009	http://www.swrcb.ca.gov/water_issues/programs/swamp/docs/lakes_study/lfs_print_r2.pdf

PROGRAM STATUS

Continuing

**PROJECT TITLE:
DELTA REGIONAL MONITORING PROGRAM**

PROJECT CODE: 1066

START DATE: 2008

ANTICIPATED COMPLETION: 2010

TOTAL FUNDING: \$200,000

FUNDS FOR 2010: \$100,000

PROGRAM FUNDER: Central Valley Water Board

LEAD SCIENTIST: Thomas Jabusch

PROJECT MANAGER: Thomas Jabusch

PROJECT DESCRIPTION

Many agencies and groups monitor water quality, water flows, and ecological conditions in the Bay-Delta, but there is no comprehensive contaminants monitoring and assessment program. The Interagency Ecological Program (IEP), CALFED, and other organizations, including the Water Boards, conduct some of these analyses, but due to their specific mandates, information gaps may exist. Emerging concerns with contaminants related to the decline of pelagic organisms in the Delta, wastewater treatment plant discharges, agricultural discharges, pesticides, blue-green algae toxicity, and unknown toxicity events all highlight the need for well-coordinated contaminants monitoring. A system is needed for coordinating among monitoring programs and integrating contaminants monitoring

into existing monitoring efforts whereby all data are synthesized and assessed on a regular basis. The Strategic Workplan for Activities in the San Francisco Bay/Sacramento-San Joaquin Delta Estuary, which was adopted by the State Water Board, Central Valley Regional Water Board, and San Francisco Bay Regional Water Board, identifies the development of a comprehensive monitoring program for the Delta as a priority action.

The short-term (1-2 years) goal for this action is to establish a framework for regularly gathering, compiling, assessing, and reporting readily available data currently being collected under Water Board programs and external programs, such as the IEP and the Department of Water Resources' Municipal Water Quality Investigations (MWQI) program. The long-term (3-5 years) goal is to develop a Regional Monitoring Program (RMP) for the Delta. Inherent in both the short and long term efforts is the need to develop a framework for coordinating monitoring and assessment efforts in and around the Delta. In partnership with Brock Bernstein, SFEI/ASC staff are assisting the Regional Board in developing a Regional Monitoring Program for the Delta and its tributaries.

The goal of the project is to implement an integrated monitoring framework that will address the need for comprehensive regional assessment, while meeting the following objectives:

- use the pilot phase (Phase I) as a proof of concept that sets the stage for a long-term program
- compile, synthesize, and report data regularly
- answer important questions that require a comprehensive, regional view.

THE DELTA RMP WEBSITE

http://www.waterboards.ca.gov/centralvalley/water_issues/delta_water_quality/comprehensive_monitoring_program/index.shtml

PLANS FOR 2010

A work group meeting to discuss funding for the Delta RMP is planned for early 2010.

The next stakeholder meeting(s) will be scheduled following the release of the contaminants synthesis report by UC Davis researchers. Topics for upcoming meeting(s) will include the results of these two reports and their relevance to the Delta RMP planning process, further discussion concerning governance, and the initiation of discussions concerning monitoring questions, funding options, data integration and other issues.

The Delta RMP Planning team is planning to prepare a draft program plan by April 2010. Additional strawman proposals that have been prepared previously and address Governance and Monitoring Objectives are available on the Delta RMP website.

RECENT FINDINGS AND PUBLICATIONS

- Summary of Current Water Quality Monitoring Programs in the Delta: The Aquatic Science Center has produced a report describing current water quality monitoring efforts in the Delta. It includes discussions of monitoring drivers, sites, approaches, parameters, and data availability. The report is intended primarily as an important background for stakeholders involved in the Delta RMP planning effort. The draft report has been posted for review on the Regional Board's Delta RMP website at http://www.waterboards.ca.gov/centralvalley/water_issues/delta_water_quality/comprehensive_monitoring_program/index.shtml
- Revised Governance Straw-man Proposal (26 November 2008) http://www.waterboards.ca.gov/centralvalley/water_issues/delta_water_quality/comprehensive_monitoring_program/26nov08_govrnce_strawman_draft.pdf
- Draft Data Integration Straw-man Proposal (20 November 2008) http://www.waterboards.ca.gov/centralvalley/water_issues/delta_water_quality/comprehensive_monitoring_program/draft_datainteg_25nov09.pdf
- Draft Funding Straw-man Proposal (23 November 2008) http://www.waterboards.ca.gov/centralvalley/water_issues/delta_water_quality/comprehensive_monitoring_program/draft_rmp_funding_23nov09.pdf
- Draft Monitoring Questions Straw-man Proposal (26 November 2008) http://www.waterboards.ca.gov/centralvalley/water_issues/delta_water_quality/comprehensive_monitoring_program/26nov08_strawman_monitoring_questns_draft.pdf
- Delta RMP: Developing a Delta Regional Monitoring Program for Contaminants (poster presented at the State of the San Francisco Estuary Conference, 29 September - 1 October 2009) http://www.waterboards.ca.gov/centralvalley/water_issues/delta_water_quality/comprehensive_monitoring_program/delta_rmp_poster.pdf

PROJECT STATUS

Continuing. Funds were frozen for much of 2009, but the project is now active again.



**PROJECT TITLE:
SEDIMENT QUALITY OBJECTIVES: INDIRECT
EFFECTS****PROJECT CODE: 1064****START DATE: 2007****ANTICIPATED COMPLETION: 2010****TOTAL FUNDING: \$200,000****FUNDS FOR 2010: \$50,000****PROGRAM FUNDER: State Water Board****LEAD SCIENTIST: Ben Greenfield****PROJECT MANAGER: Jennifer Hunt****PROJECT DESCRIPTION**

Indirect effects act on organisms that do not reside permanently within sediments, but are exposed to sediment contaminants through the food chain. Key receptor organisms are marine birds, fish, and humans. It is important to assess both the indirect and direct effects of sediment contamination at a site because the nature of the effects and the contaminants that cause them may differ. The assessment of indirect effects due to sediment contamination is more complex and requires a different conceptual approach than that used to assess direct effects. The potential for indirect effects on a particular organism is influenced by several factors. These include: the portion of sediment contaminants biologically available to prey species, the complexity of the food web, movements of the receptor organisms, food consumption rate, and species-specific variations in chemical sensitivity. The goal of this research program is to develop measurement tools and an assessment framework to evaluate the indirect effects of sediment contaminants on humans

and wildlife. This assessment framework will integrate information on sediment contaminant concentration, bioavailability of sediment contaminants, and prey tissue contaminant concentration. The initial focus of this research is to develop a human health assessment framework for PCBs and chlorinated pesticides, chemicals that are widespread in California bays and estuaries and are bioconcentrated many fold in species at the top of the food web.

PLANS FOR 2010

SFEI's contribution to the assessment framework will be completed in 2010.

RECENT FINDINGS AND PUBLICATIONS

- Sediment Quality Objectives: A New Tool for Protecting California's Bays and Estuaries Article in the 2009 Pulse of the Estuary.

PROJECT STATUS

This is an ongoing study with anticipated completion in 2011.

Waterlands

JOSHUA N COLLINS
LESTER J MCKEE
MEREDITH WILLIAMS

PROGRAM OVERVIEW

The Waterlands Program conducts regional and watershed-based scientific research and monitoring on the physical, chemical, and biological aspects of aquatic resources. The Program helps organize environmental management questions into monitoring objectives; develops assessment tools; collaboratively performs monitoring and assessment; and delivers scientific information to managers, the science community and the interested public. Tools and information developed through consensus allow comparison of aquatic resource condition and functions over time and across regions. This enables responsible agencies and the public to track the progress of projects, measure the effects of projects on ambient condition, troubleshoot problems, assess the efficacy of management decisions, and otherwise account for the public investment in aquatic resources.

Over the past 15 years, waterlands science at SFEI has been largely carried out under the two broad program areas of wetland science and watershed science. This reflected the prevailing framework for environmental planning, regulation, and management. However, more integration of these program areas at SFEI is needed to efficiently support a new generation of governmental policies and initiatives, including implementing Total Maximum Daily Load reports, guidelines for environmental mitigation under Section 404 of the Clean Water Act, the proposed regional Wetland and Riparian Area Protection Policy, the emerging State Wetland and Riparian Area Protection Policy, the Regional Municipal Permit, and an increasing number of regional efforts to adapt to climate change such as Low Impact Development, Uplands Goals Project, Living Shoreline Project, Integrated Regional Water Management Plans, Landscape Conservation Cooperatives, and Bay Plan amendments. The wetlands science and watershed science programs are becoming more integrated through shared staff, shared projects, and strategic planning. The waterlands program leaders have begun to develop a framework for further coordination of SFEI science in the watershed context to meet the following waterlands program objectives.

PROGRAM OBJECTIVES

- Assess the effects of management actions on the status and trends of aquatic resources in the watershed context and for the region.
- Support aquatic resource conservation by applying the best science available to set conservation targets or goals, assess progress and risk relative to the goals, and by making assessments broadly available to responsible agencies and the public.
- Create and maintain a regional, public-access, information management and delivery system about aquatic resources.
- Support CCMP goals by coordinating the design and implementation of a Regional Monitoring Program to monitor the status and trends of aquatic resources of the San Francisco Estuary and its watersheds.
- Be aware of, and adapt to, changing management needs for science support.
- Communicate scientific findings to many audiences through technical reports, presentations, workgroups, newspaper and magazine articles, scientific journals, conferences, and web sites.

RECENT FINDINGS AND PUBLICATIONS

2009 marked the conclusion of the project entitled "Development of Decision-Support for Management Measure Implementation Project for the Napa Watershed" (Prop 40 Agricultural Water Quality Grant Program). The project represents the first major collaboration across the Watersheds, Wetlands, and Historical Ecology programs, i.e., the Waterlands Group. The final report documents the past and present condition of the system as a function of land use changes in terms of the complex interactions of water, sediment, and channel profile in the watershed. A series of management actions was assessed in terms of their potential to affect the river's attributes and overall complexity.

SFEI has been funded to provide technical support for the San Francisco Estuary Partnership's Estuary 2100 project (funded through the EPA's San Francisco Bay Area Water Quality Improvement Fund). Through this work, we have strengthened a number of key partnerships. We have worked closely with SFEP to provide technical oversight; we have collaborated



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with Save the Bay on a new vegetation monitoring protocol; we have strengthened our ties to the Santa Clara County Parks Department; we are developing standardized protocols to be used by all the creek restoration partners for the project. Ultimate this work also is critical to our relationship with EPA Region 9.

The Natural Resources Agency published a State of the State's wetlands report. The report documents 10 years of challenges and progress of efforts to monitor and protect California's wetlands. The report was largely based on the final report of the Wetlands Demonstration Project - Status of perennial estuarine wetlands in the state of California. Southern California Coastal Water Research Project led the effort in partnership with SFEI, teams of wetlands experts from the Central Coast and North Coast.

A new release of Wetland Tracker was launched in May. The new version of Wetland Tracker (which now covers coastal areas of the state) brings improvements to map performance, better integration of the map with the rest of the site, and a more open layout for the project information page. Most of the changes, however, are behind the scenes, where the code was given a thorough clean-up and modernization. Following the re-start of the regional storm water monitoring and urban BMP evaluation project, analysis and report preparation will conclude in early 2010.

2010 PROJECTS

PROJECT TITLE: CRITICAL COASTAL AREAS PILOT, PHASE II

PROJECT: 5054

START DATE: May 2007 – suspended since Dec 2008

ANTICIPATED COMPLETION: October 2011

TOTAL FUNDING: \$900,000 (\$320,000 for SFEI)

SFEI FUNDS FOR 2010: \$100,000

STATUS: FROZEN 35 % remaining as of 11/30/09

PROJECT FUNDER: SWRCB

LEAD SCIENTIST: Rainer Hoenicke

PROJECT COORDINATOR: Meredith Williams/Kat Ridolfi

COLLABORATORS: Kathleen Van Velsor, ABAG, Becca Lawton, Sonoma Ecology Center, Lea Haratani, Santa Cruz County RCD, Kellyx Nelson, San Mateo County RCD, Susan Haydon, Southern Sonoma County RCD, William Lettis and Associates (may change following re-start of project)

PROJECT DESCRIPTION

Phase II of the CCA Program is designed to build on the preliminary assessment conducted under Phase I, which was completed in 2007. A key goal is to demonstrate

the validity and applicability of various predictive tools to local government and other implementers of Best Management Practices (BMPs) under each set of applicable Management Measures. Predictive models require validation and calibration with empirical data and user experience. Implementation success and cost-effectiveness will depend on knowing how drainage systems and land use have changed since the large-scale alteration of natural processes and conditions in each of the three CCAs. In addition, if "adaptive management" principles are to become standard practice, local government and other land managers need to know the relative importance of pollutants, as well as other physical and biological alterations of the integrity of water. The objectives of this proposed project fall into three categories:

- (1) Apply the methodology developed in the initial 319(h) and other, related work efforts to evaluate alternative development and associated management scenarios and develop the necessary data to calibrate appropriate models for scenario-planning.
- (2) Select a minimum of three specific pollutant control, prevention, and mitigation measures in each of the three CCAs, prepare design specifications and assist local government in preparing bid documents, and develop an evaluation plan for intermediate and long-term effectiveness monitoring by local government under multiple environmental conditions.
- (3) Enable local government agencies and other stakeholders to use and maintain management and land use scenario planning tools to test and implement additional MMs and BMPs as funding becomes available.

2010 WORK PRODUCTS

2010 work products are uncertain given the unknown timing of re-start anticipated some time in the first quarter of 2010, anticipated scope modifications, and partner availability.

PROJECT TITLE: SF BAY AREA WETLANDS REGIONAL MONITORING PROGRAM

PROJECT: 4066

START DATE: September 2009

ANTICIPATED COMPLETION: December 2010

TOTAL FUNDING: \$1,250,000

SFEI FUNDS FOR 2010: \$500,000

PROJECT FUNDER: SWRCB

LEAD SCIENTIST: Joshua N. Collins

PROJECT COORDINATOR: Meredith Williams

COLLABORATORS: Eric Stein, Southern California Coastal Water Research Project, Shawna Dark, CSU Northridge, Richard Sumner and Paul Jones, USEPA Andree Greenberg and Shin-Roei Lee, Bay Area Water Board, Prison Industries Authority, Letitia Grenier, Sarah Pearce, Meredith Williams, Kristen Cayce, Mike May, Cristina Grosso, Patty Frontiera, SFEI.

PROJECT DESCRIPTION

2010 will be the final year of a three year project to complete the Bay Area inventory of wetlands and riparian areas, implement Tracker throughout the Bay Area watersheds, assess watershed condition using CRAM, develop riparian bio-sentinel species protocols and tools and a geomorphic monitoring protocol set for use in the Bay Area. The need for these protocols became more apparent during SFEI's technical oversight work for creek restoration projects associated with Estuary 2100. The project will conclude by, and outlining a long-term funding strategy for regional wetlands and riparian monitoring. Project ends December 2010.

2010 WORK PRODUCTS:

Delivery of maps to local agencies through Wetland Tracker. CRAM assessments for a reference network, perform a riverine-riparian CRAM assessments along stressor gradients, published geomorphic monitoring guidance document.

PROJECT TITLE: CIAP WETLANDS MONITORING TOOLKIT

PROJECT: TBD

START DATE: February 2010

ANTICIPATED COMPLETION: January 2013

TOTAL FUNDING: \$795,000

SFEI FUNDS FOR 2010: \$170,279

PROJECT FUNDER: Dept. of Interior (Minerals Management Service),

LEAD SCIENTIST: Mike May/Joshua N. Collins

PROJECT COORDINATOR: Meredith Williams

COLLABORATORS: Southern California Coastal Water Research Project, Moss Landing Marine Laboratories, California Coastal Commission, Humboldt Bay Harbor, Recreation and Conservation District

PROJECT DESCRIPTION

This project will begin in February 2010. This project will fund significant improvements in both Wetland Tracker and CRAM/eCRAM. The improvements will address end user needs, improve data management

and analysis tools, and .The project will also include development and calibration of the depressional wetlands module for CRAM and will include a North Coast Demonstration of the 1-2-3 toolkit in a selected watershed. This project is intended to enable Wetland Tracker to be the common data management system for the State's primary wetland protection policies and programs, including the 401 Certification and WDR Programs, the proposed Wetland and Riparian Area Protection Policy, and the State's No-Net-Loss Policy.

2010 WORK PRODUCTS

- Revised eCRAM interface with improved GUI and tools for CRAM practitioners
- Tracker project input, flow, and habitat info

PROJECT TITLE: DEVELOPMENT AND IMPLEMENTATION OF CALIFORNIA'S 401 CERTIFICATION IN TRACKER

PROJECT: 8400

START DATE: October 2008

ANTICIPATED COMPLETION: December 2010

TOTAL FUNDING: \$313,890

SFEI FUNDS FOR 2010: \$234,000

PROJECT FUNDER: USEPA

LEAD SCIENTIST: Mike May/Joshua N. Collins

PROJECT COORDINATOR: Mike May

COLLABORATORS: Southern California Coastal Water Research Project, Moss Landing Marine Laboratories, California Coastal Commission, Humboldt Bay Harbor, Recreation and Conservation District

PROJECT DESCRIPTION

This project is intended to enable Wetland Tracker to be the common data management system for the State's primary wetland protection policies and programs, including the 401 Certification and WDR Programs, the proposed Wetland and Riparian Area Protection Policy, and the State's No-Net-Loss Policy. The main product will be a new version of Wetland Tracker that streamlines 401 Certification, provides access to historical 401 cases, and enables standardized reports on the status and trends of 401 projects and ambient conditions for watersheds, regions, and Statewide.

Among the project deliverables are

- A queryable dataset of past 401 and WDR project information



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- An online 401 Certification application
- An automated status and trends reports for 401 projects and wetland habitats

The completed online form will be incorporated into Wetland Tracker more fully through the CIAP Wetlands Monitoring Toolkit project

2010 WORK PRODUCTS

tbd

PROJECT TITLE: SUPPORT FOR STATE AND FEDERAL CRAM DEVELOPMENT: CRAM REFERENCE NETWORK

CA S&T WL EXTENT ASSESSMENT & INTENSIFICATION FOR 2011 NWCA

NATIONAL WETLANDS ASSESSMENT

PROJECT: 4072, TBD, TBD

START DATE: Multiple

ANTICIPATED COMPLETION: 2011

TOTAL FUNDING: \$250,000

SFEI FUNDS FOR 2010: \$100,000

PROJECT FUNDER: USEPA, SCCWRP

LEAD SCIENTIST: Josh Collins

PROJECT COORDINATOR: Meredith Williams

COLLABORATORS: SCCWRP, USEPA, MLML

PROJECT DESCRIPTION

A national assessment of wetland extent and condition will be conducted in 2011. These projects will provide the infrastructure and tools needed for the survey. A reference network is being established to ensure consistency of CRAM assessments across the state. Reference sites and audit teams are being identified for CRAM quality assurance. In addition

2010 WORK PRODUCTS:

PROJECT TITLE: PETALUMA AND TOMALES BAY CONCEPTUAL MODEL AND IMPAIRMENT ASSESSMENT REPORTS

PROJECT: 8500

START DATE: May 2008

ANTICIPATED COMPLETION: March 2010

TOTAL FUNDING: \$214,000, - 32% remaining (\$61,301 for SFEI, \$39,433 for expenses and subs)

SFEI FUNDS FOR 2010: \$50,000

PROJECT FUNDER: SWRCB

LEAD SCIENTIST: Lester McKee/Kat Ridolfi

PROJECT COORDINATOR: Kat Ridolfi

COLLABORATORS: SSCRC, Friends of Petaluma River

PROJECT DESCRIPTION

This project provides technical support for development of Petaluma River nutrients, pathogens, and sedimentation/ siltation Total Maximum Daily Loads (TMDLs), and development of the Tomales Bay nutrients, mercury, and sedimentation/siltation TMDLs. The contract will result in the production of conceptual model/impairment assessment (CMIA) reports on these pollutants that will provide the technical foundation of these TMDLs. A CMIA is a report that provides analysis and interpretation of existing monitoring data to describe the nature and status of water quality impairment, describes the magnitude and nature of sources, and defines indicators of impairment and the status of those impairment indicators. The CMIA's will also describe additional data needs for the future refinement of the conceptual model or impairment determination.

2010 WORK PRODUCTS

Final impairment assessment for mercury; Sampling plan and QAPP for nutrients and pathogens in the Petaluma River watershed.

PROJECT TITLE: TECHNICAL ASSISTANCE FOR DEVELOPMENT OF ESTUARINE NUTRIENT NUMERIC ENDPOINTS

PROJECT: 5062

START DATE: March 2009

ANTICIPATED COMPLETION: June 30, 2010

TOTAL FUNDING: \$75,222 total, (\$64,922 for SFEI, \$10,300 for subs)

SFEI FUNDS FOR 2010: \$45,000

PROJECT FUNDER: SWRCB via SCCWRP

LEAD SCIENTIST: Lester McKee

COLLABORATORS: SCCWRP, BASMAA, Water Board

PROJECT DESCRIPTION

US EPA Region IX and the California State Water Board have previously developed a technical approach and framework for developing numeric nutrient endpoints (NNEs) for California estuaries EPA 2007a. The stated goal of this effort is to develop a set of NNEs and to support the Total Maximum Daily Load (TMDL) Program and to develop TMDL tools that can be used to address

impacts from eutrophication through the water quality programs of the State Water Board, Regional Water Quality Control Boards (Region Water Boards) and the regulated community. EPA 2007a presented a scientific framework to support the development of numeric endpoints for a suite of biological response indicators (e.g. algal biomass, dissolved oxygen, water clarity, etc.) that are directly linked with estuarine beneficial uses. The purpose of this project is to initiate NNE development in California estuaries. The Institute is a partner of SCCWRP in this effort and will contribute the following aspects to the project: (1) Outreach with the California State Regional Technical Advisory Group (STRTAG). (2) Identification of technical, stakeholder, and scientific advisory board members. (3) Preparation of technical documents to support the initiation of NNE development. (4) Statewide outreach on NNE development to be initiated after stakeholder and science advisory board review of draft documents. (5) Technical support to facilitate the process of numeric endpoint selection for dissolved oxygen. (6) Preparation of a summary report describing the results of the project and recommendations for the next steps.

2010 WORK PRODUCTS

Work products will include the development of and meetings with the SF Bay Stakeholder Advisory Group (SAG) and the SF Bay Technical Advisory Team (TAT), a draft report for review that describes the status of indicators in San Francisco Bay and outlines a recommended work plan.

PROJECT TITLE: REGIONAL STORMWATER MONITORING AND URBAN BMP EVALUATION: A STAKEHOLDER-DRIVEN PARTNERSHIP TO REDUCE CONTAMINANT LOADINGS.

PROJECT: 5031

START DATE: July 2005

ANTICIPATED COMPLETION: March 2010

TOTAL FUNDING: \$1,320,000 (\$440,000 for SFEI \$ for others)

SFEI FUNDS FOR 2010: \$35,000

PROJECT FUNDER: SWRCB

LEAD SCIENTIST: Lester McKee

COLLABORATORS: PWA, Oakland Museum of California, William Lettis and Associates, GeoSyntec, MLML, EBMUD, AXYS, and Brooks Rand.

PROJECT DESCRIPTION

Nonpoint source pollution has been identified nationally, in the State of California, and in the Bay Area as the leading source of degradation of natural waters. The magnitude of nonpoint source pollution is accentuated in coastal areas where human population is high and where pressures from urban development, industrial and commercial activities, and recreational use are the greatest. San Francisco Bay is listed as an impaired water body for PCBs and mercury under Section 303(d) of the federal Clean Water Act. The RWQCB has recently developed Total Maximum Daily Load (TMDL) reports for the Bay for mercury and PCBs. Both TMDLs assert the significance of urban runoff, call for load reductions of greater than 50% over the current estimates and call for improved and expanded implementation of best management practices (BMPs). However, there is presently no consensus on how this can be done. Some important, unanswered questions are: 1) Where are the contaminated sites?, 2) What about sources such as atmospheric deposition?, 3) Will conventional source control, treatment control, or maintenance control BMPs work?, 4) If so – which BMPs, and when, and under what circumstances?, 5) How much will it cost?

This project aims to assist BASMAA implement the mercury and PCB TMDLs through the development of specific information on drainage systems, sediment loads, distribution of Hg and PCB contamination, urban runoff loads, BMP function in relation to trapping or removing Hg and PCBs.

2010 WORK PRODUCTS

Finalize the project webpage and upload all work products. Finalize the draft and final BMP toolbox (draft report for review and final report).

PROJECT TITLE:

TECHNICAL SUPPORT FOR STATE WETLAND AND RIPARIAN AREA PROTECTION POLICY

SWRCB 104(B)(3) POLICY DEVELOPMENT

ARRA TECHNICAL ADVISORY TEAM SUPPORT

COASTAL PROGRAM WORKSHOP

PROJECT: 8401, TBD, 4075

START DATE: OCTOBER, 2008

ANTICIPATED COMPLETION: AUGUST, 2010



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TOTAL FUNDING: \$371,000

SFEI FUNDS FOR 2010: \$220,000

PROJECT FUNDER: EPA, ARRA Stimulus Funds, USFWS

LEAD SCIENTIST: Josh Collins

PROJECT COORDINATOR: Meredith Williams

COLLABORATORS: SWRCB, US ACE, SFBRWQCB, Humboldt Bay Harbor, Recreation and Conservation District, SCCWRP

PROJECT DESCRIPTION

SFEI has been funded to assemble a team of Technical Advisors to provide technical oversight for the new Wetland and Riparian Area Protection Policy. The team has been charged with recommending a wetland definition and standardized methods of wetland delineation, mapping, and classification that are applicable statewide.

BACKGROUND

The State Water Resources Control Board passed Resolution 2008-0026 for "development of a policy to protect wetlands and riparian areas in order to restore and maintain the water quality and beneficial uses of the waters of the State." to foster greater efficiency, effectiveness, and consistency among State Water Board programs, to reverse the trend in wetland loss revealed by recent scientific studies, and to counter a series of U.S. Supreme Court decisions that have destabilized Federal wetland jurisdiction, resulting in less protection for California wetlands.

The resolution calls for a Policy Development Team (Policy Team) to coordinate with other State and federal agencies and interested stakeholders. The Wetland and Riparian Area Protection Policy is being developed in three Phases.

Phase 1 establishes a policy to protect wetlands from dredge and fill activities by establishing the intent of the California Water Boards to protect all waters of the State in coordination with other local, State, and federal agencies and local watershed interests; provide a statewide wetland definition; develop a framework for protecting water quality and beneficial uses at watershed scales; and, provide guidance on tracking wetland condition and function.

Phase 2 will expand the scope of the policy to protect wetlands from all other activities, other than dredge and fill activities.

Phase 3 will extend the policy's protection to riparian areas.

The TAT works by writing Technical Memoranda recommending a definition of wetlands as well as methods of wetland delineation, mapping, and classification that are applicable statewide. These memoranda are submitted for review by the California

Wetlands Monitoring Workgroup, The Policy Development Team, and the Interagency Coordinating Committee comprised of executive managers from State and federal agencies with regulatory authority over wetlands. In 2009 four memos were developed.

Technical Memorandum No. 1 – Role of the TAT

Technical Memorandum No. 2 – Definition of wetlands

Technical Memorandum No. 3 – Landscape Context

Technical Memorandum No. 4 – Wetland Identification and Delineation

2010 WORK PRODUCTS

Technical Memorandum No. 5 – Wetland classification

Technical Memorandum No. 6 – Watershed context

Technical Memorandum No. 7 – Monitoring and Assessment

Coastal Program Workshop – A workshop with regional watershed managers to consider implications of federal and state watershed-scale regulatory requirements for management of Bay Area Watersheds.

PROJECT TITLE: ESTUARY 2100 - ROUND 1

PROJECT: 5065

START DATE: APRIL 2009

ANTICIPATED COMPLETION: MARCH 2012

TOTAL FUNDING: \$246,250

SFEI FUNDS FOR 2010: \$54,000

PROJECT FUNDER: SFEP/ABAG subcontract for EPA San Francisco Bay Area Water Quality Improvement Fund funds

LEAD SCIENTIST: Lester McKee/Josh Collins

PROJECT COORDINATOR: Meredith Williams/Jen Hunt

COLLABORATORS: 13 project partners

Bahia Restoration Project (Marin Audubon Society), Yosemite Slough Restoration (California State Parks Foundation), Littorina Eradication (CRAB), Stream Management Program for Landowners (Urban Creeks Council), Shoreline Habitat Restoration (Save the Bay), Invasive Spartina Project, Wetland Adaptation Techniques in the Lower Corte Madera Creek Watershed (BCDC), Habitat Evolution Monitoring and Pond A8 Mercury Monitoring (South Bay Salt Ponds), Stream Channel Restoration Design Curves (Waterways Restoration Institute), Green Solutions (Community Conservancy International), Bayview Model Block (City and County of San Francisco/SFPUC), Santa Clara County Senador Mines (Santa Clara County)

2010 WORK PRODUCTS

- Completion of remaining 6 QAPPs
- Completion of geomorphic protocols for restoration projects. This will be primarily funded through the Wetlands Regional Monitoring Project (4066). Protocol will be provided to current and Round 2 Estuary 2100 partners.

PROJECT TITLE: ESTUARY 2100 - ROUND 2**PROJECT: 5065****START DATE: FEBRUARY 2010****ANTICIPATED COMPLETION: JANUARY 2013****TOTAL FUNDING: \$540,632****SFEI FUNDS FOR 2010: \$230,000****PROJECT FUNDER: SFEP/ABAG subcontract for EPA San Francisco Bay Area Water Quality Improvement Fund funds****LEAD SCIENTIST: Lester McKee/Josh Collins****PROJECT COORDINATOR: Meredith Williams/Jen Hunt****COLLABORATORS: 13 project partners**

Napa/Sonoma TMDL support North Bay Watershed Association, Yosemite Slough Restoration (California State Parks Foundation), North Richmond Dry Weather Flow Treatment Bypass (Contra Costa County Flood Control District), Living Shoreline subtidal restoration at Corte Madera Creek and Eden Landing (CA Coastal Conservancy, Marin Open Space District, San Francisco State University)

PROJECT DESCRIPTION

In November 2009, the Estuary Partnership was awarded a \$4.8 million grant from the U.S. Environmental Protection Agency's San Francisco Water Quality Improvement Fund to improve the health of the Estuary. The Institute is again providing technical and monitoring support to project partners, by reviewing project design, and developing monitoring protocols and Quality Assurance Project Plans (QAPPs), managing data, and preparing technical reports. In addition, The Watershed Program will provide monitoring support of the Richmond stormwater diversion. The Institute was funded to promote local stewardship of watershed-scale maps to assist TMDL implementation. Lastly, we will adapt and refine methodologies from the USGS to characterize anticipated shoreline changes due to project results and climate change in the North Bay.

2010 WORK PRODUCTS:

- Map stewardship protocols and methodology to transfer map data to partners. This will be coordinated with our WRMP and State Wetland and Riparian Area Protection Policy projects.
- Develop partnerships for shoreline change to begin densification of existing shoreline characterization work. Development of Head of Tide mapping protocols will be funded separately through the Mineral management Service's CIAP program (\$171,200). This work will be coordinated with shoreline change efforts.
- Complete North Richmond Pumping Station QAPP and dry and wet season sampling plans.



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Historical Ecology

ROBIN GROSSINGER

PROGRAM OVERVIEW

Historical Ecology synthesizes diverse historical records to learn how ecological functions were distributed and maintained within the native California landscape. Understanding how streams, wetlands, and woodlands were organized along physical gradients helps scientists and managers develop new strategies for more integrated and sustainable landscape management.

Given the dramatic changes to California landscapes during the past two centuries, we often have only rudimentary understanding of the systems we seek to protect and restore. In fact, there is a growing recognition that restoration efforts have often misinterpreted earlier conditions, resulting in missed opportunities and, in some cases, failed projects. However, the development of accurate, reliable, and broadly-supported pictures of historical condition and change can help correctly identify the causes of current challenges, and reveal previously unrecognized management options. Historical reconstructions also educate and engage the public imagination, increasing public will for local and regional landscape stewardship.

HISTORY AND RESTORATION IN A CHANGING CLIMATE

Researchers are increasingly recognizing that restoration and conservation strategies have often been misguided (and unsuccessful) because of a lack of understanding of historical conditions (e.g. Hamilton 1997, Kondolf et al. 2001, Foster and Motzkin 2003, Merritts and Walter 2008). This is particularly true in California, where our cultural memory is short and we have tended to impose temperate-climate concepts to a semiarid, Mediterranean climate (which will become only more so).

In fact, the natural climatic diversity of the region provides a framework for understanding the adaptation of local ecosystems across a broad climatic gradient. Historical ecology reveals a landscape well-designed for extreme seasonal and interannual climatic variability and controlled by fundamental geologic controls that remain intact -- the "dry side of the ecological palette" that has been largely overlooked in conservation planning.

History shows how human efforts have tended to ignore these Mediterranean characteristics and reshaped the landscape according to different, imported conceptions. But it also reveals successful early adaptations (e.g., native land management, towns in the shade of oak groves, early dry farming and oyster

farming, creeks as "sediment hoses") that can inspire creative, locally-calibrated management strategies. Climate change increases the need to understand and manage ecosystem functions adaptively along broad topographic, hydrological, and climatic gradients, within the context of evolving cultural landscapes, rather than focusing on narrow, project-specific targets.

APPLYING HISTORICAL ECOLOGY

SFEI's historical ecology studies have contributed to numerous restoration projects in the Bay Area and coastal California. Projects are carried out in collaboration with local partners and with a team of regional and local science advisers, with results made broadly available through website, publication, and presentation. SFEI's innovative approaches have been featured in *New Scientist Magazine*, *Landscape Journal*, *The Living Landscape: An Ecological Approach to Landscape Planning*, the *McGraw-Hill Encyclopedia of Science and Technology*, and the *Historical Ecology Handbook*, as well as general audience science programs such as KQED's *QUEST* and the *Saving the Bay* documentary.

PROGRAM OBJECTIVES:

Develop information about historical landscape change as needed for local and regional environmental restoration and management.

Develop and disseminate new methods for the synthesis and analysis of historical data into reliable technical information.

Coordinate technically consistent and comparable historical ecology studies of California coastal watersheds to guide long term strategic planning for habitat restoration, endangered species recovery, and response to climate change.

Contribute SFEI research about landscape history and its implications for the future to the larger public arena through art and education.

RECENT FINDINGS AND PUBLICATIONS:

- Erin Beller, Robin Grossinger, and Alison Whipple, draft. *Historical Ecology Reconnaissance for the Lower Salinas River*. Prepared for The Nature Conservancy. SFEI Contribution 581. 30 pages
- Robin Grossinger, Eric Stein, Kristen Cayce, Shawna Dark, Alison Whipple, and Ruth Askevold, draft. *Historical Wetlands of the Southern California Coast: An Atlas of US Coast Survey T-Sheets, 1851-1889*. Produced for the State Coastal Conservancy. SFEI Contribution 586. 57 pages.

- Whipple, A., Grossinger, R.M. and F. Davis, In Press. Shifting baselines in a California Oak Savanna: Nineteenth century data to inform restoration scenarios. *Restoration Ecology*.

2010 PROJECTS

PROJECT TITLE: SAN FRANCISCO-SAN JOAQUIN DELTA HISTORICAL ECOLOGY STUDY

PROJECT: 8700

START DATE: September 2009

ANTICIPATED COMPLETION: October 2011

TOTAL FUNDING: \$350,000

FUNDS FOR 2010: \$150,000

PROJECT FUNDER: California Department of Fish and Game

LEAD SCIENTIST: Robin Grossinger

PROJECT COORDINATOR: Alison Whipple

PROJECT DESCRIPTION

This project is intended to document the ecological and hydrogeomorphic characteristics of Sacramento-San Joaquin Delta prior to significant Euro-American modification. This historical reconstruction will illustrate, to the extent possible, patterns of variation and extent of habitats throughout the Delta to better understand species support functions and controlling physical processes within the native landscape. Such information will provide a basis for identifying target locations and physical conditions necessary to restore functional habitat mosaics within the projected future Delta landscape, and will inform the ERP Conservation Strategy and other restoration efforts.

PROJECT STATUS

Initial data collection reconnaissance and technical guidance to CDFG was completed in 2008. The project funding was restarted in November 2009, and we have initiated full data collection and interpretation. Robin Grossinger and Alison Whipple recently presented initial findings at a CALFED Science Program Workshop (Ecosystem Restoration of the Landscape Scale) on Historical Ecology of the California Delta: Emerging Concepts of a Complex and Dynamic System.

PROJECT TITLE: VENTURA COUNTY AND SOUTH COAST WETLANDS HISTORICAL ECOLOGY STUDY

PROJECT: 7053

START DATE: Summer 2007

ANTICIPATED COMPLETION: Nov 2010

TOTAL FUNDING: \$525,000 (including subcontractors);
\$355,000 (SFEI portion only)

SFEI FUNDS FOR 2010: \$125,000

PROJECT FUNDER: State California Coastal Conservancy

LEAD SCIENTIST: Robin Grossinger

PROJECT COORDINATOR: Erin Beller

COLLABORATORS: CSU-Northridge, SCCWRP, Stillwater Sciences, WRA, UCSB, USC

PROJECT DESCRIPTION

This project includes two major components designed to advance the understanding and conservation of coastal and riverine systems of Southern California. The first component, Historical Mapping of Southern California Coastal Wetlands, uses high-resolution, color scans of 25 U.S. Coast (and Geodetic) Survey Topographic Maps ("t-sheets") to conduct preliminary analysis and interpretation of historical wetlands along the Southern California coast. The second component, the Ventura Historical Ecology Study, concentrates on the historical ecology of major riverine and wetland habitats in Ventura County. The geographic scope includes the lower Ventura River (downstream of Matilija Dam), the lower Santa Clara River (downstream of Highway 5), and the Oxnard Plain.

PROJECT STATUS

The project's funding was suspended in December 2008, but most of the project's funding was reinstated in November 2009. Progress through 2009 included development of the draft of an atlas on coastal wetlands. The second component, The Ventura Historical Ecology Study, will be completed by the end of 2010, pending full funding.



**PROJECT TITLE:
HISTORICAL ECOLOGY: CONSERVATION AND
RESTORATION PLANNING IN CONTRA COSTA
COUNTY****PROJECT:** 7055**START DATE:** June 2007**ANTICIPATED COMPLETION:** March 2010**TOTAL FUNDING:** \$310,000**FUNDS FOR 2010:** \$60,000**PROJECT FUNDER:** Contra Costa County, California Coastal Conservancy, California Department of Fish and Game**LEAD SCIENTIST:** Robin Grossinger**PROJECT COORDINATOR:** Ruth Askevold**COLLABORATORS:** Contra Costa County, Contra Costa Watershed Forum**PROJECT DESCRIPTION**

SFEI is conducting a historical ecology assessment of natural resources in eastern Contra Costa County. The project will collect and synthesize data sources to develop an understanding of terrestrial, fluvial, riparian, and wetland habitats prior to significant Euro-American modification. New methods are being developed for assessing uplands, including use of Wieslander Vegetation Type Maps, compiled in the 1920s and 30s. The data developed through the project will help identify valuable habitat remnants, prioritize restoration opportunities and strategies for the HCP, and recognize landscape trends.

PROJECT STATUS

The project report will be completed in March 2010. Initial reports and findings have been applied to restoration of project areas in the East Contra Costa County's Habitat Conservation Plan. Project funding from the State Coastal Commission was temporarily suspended but has been reinstated in full.

**PROJECT TITLE:
SANTA CLARA VALLEY HISTORICAL ECOLOGY
PROJECT****PROJECT:** 7027**START DATE:** April 2004**ANTICIPATED COMPLETION:** December 2010**TOTAL FUNDING:** \$212,000**FUNDS FOR 2010:** \$75,000**PROJECT FUNDER:** Silicon Valley Pollution Prevention Center**LEAD SCIENTIST:** Robin Grossinger**PROJECT COORDINATOR:** Erin Beller**COLLABORATORS:** SCVWD Staff**PROJECT DESCRIPTION**

This study will provide GIS layers of historical habitats in the Guadalupe, West Valley, and Lower Peninsula Watershed Management Areas of Santa Clara County (the valley floor from Palo Alto to San Jose). A wide range of valley floor habitats will be mapped, such as seasonal and perennial wetlands, valley oak savanna, and riparian forest.

This is a coordinated project to build a consistent, standardized set of data, analyses, technical reports, and publicly available data about historical landscape change in the Santa Clara County watersheds draining to San Francisco Bay. This foundation effort for local restoration and planning is supported by a grant from the Silicon Valley Pollution Prevention Center. The project is designed to expand upon the preliminary historical ecology studies carried out through the SCVWD Watershed Stewardship Project in 2004-5 and the recently completed Coyote Creek Historical Ecology Study. The SCVHEP is strategically supplementing these projects to provide seamless geographic coverage of georectified historical imagery and GIS, a supporting database. There is also interest in a set of technical synthesis reports covering the Guadalupe, West Valley, and Lower Peninsula watersheds.

PROJECT STATUS

Substantial historical data collection and bibliographic database, and georectification of historical aerial photography and maps has been completed. Data and analysis developed by the project has already contributed significantly to the Watershed Stewardship Project for the Guadalupe, West Valley, and Lower Peninsula Watersheds, to the SFEI-Oakland Museum map publication Baylands and Creeks of South San Francisco Bay, and concurrent watershed planning and assessment efforts.

**PROJECT TITLE:
NAPA VALLEY HISTORICAL ECOLOGY
ATLAS**

PROJECT: 7063, 7058, 7059, 7060, 7064

START DATE: April 2008

ANTICIPATED COMPLETION: December 2010

TOTAL FUNDING: \$50,000

FUNDS FOR 2010: \$30,000

PROJECT FUNDER: California Coastal Conservancy, Friends of the Napa River, Napa County, Napa County Wildlife Conservation Commission, Napa Valley Vintners

LEAD SCIENTIST: Robin Grossinger

COLLABORATORS: Napa County Resource Conservation District, Friends of the Napa River

PROJECT DESCRIPTION

SFEI has worked with a number of organizations and local experts over the past decade to develop a new picture of the Napa Valley through time. As a result of substantial local interest in the technical products developing through the Napa Agricultural Water Quality Project, SFEI is working with local partners to develop the Napa Valley Historical Ecology Atlas. The Atlas will be a highly visual exploration of the native Napa landscape and its physical transformation over the past two centuries. Using rarely seen historical maps, photographs, and paintings, the Atlas will investigate the historical landscape and its contemporary remnants, establishing a new perspective on the iconic region we know today. University of California Press editorial committee has approved the development of the Napa Valley Historical Ecology Atlas as a book in their Science Series and contracting is in process.

The Atlas is based upon the innovative “forensic” landscape research of the San Francisco Estuary Institute, which uses hundreds of independent pieces of evidence to reconstruct the patterns of rivers, wetlands, and woodlands at the time of European contact. The Atlas will provide one of the few publicly accessible illustrations of a detailed historical landscape reconstruction, focusing on one of the most popular regions in the world. It will also provide a basis for the high-profile ecological restoration efforts currently taking place in the region. Several publishers have expressed interest in developing the Atlas as a general audience book.

PROJECT STATUS

Substantial portions of the book have been researched and several chapters have been drafted. The book format has been designed and design details have been approved by UC Press. Two sample chapters have been laid out. Research, writing, and book layout will be completed during 2010.

START & END DATES

April 2008-December 2010

**PROJECT TITLE:
ALAMEDA CREEK HISTORICAL ECOLOGY STUDY**

PROJECT: 7062

START DATE: December 2008

ANTICIPATED COMPLETION: December 2010

TOTAL FUNDING: \$425,000

FUNDS FOR 2010: \$200,000

PROJECT FUNDER: San Francisco Public Utilities Commission; Alameda Flood Control and Water Conservation District

LEAD SCIENTIST: Robin Grossinger

PROJECT COORDINATOR: Ruth Askevold

COLLABORATORS: Alameda County Resource Conservation District, Laurel Collins (Watershed Sciences), Rob Leidy (EPA)

PROJECT DESCRIPTION:

The Alameda Creek Historical Ecology Study will assess watershed conditions prior to significant Euro-American modification, as a basis for understanding subsequent changes in watershed structure and function, and potential options for future environmental management. The geographic focus is the floodplains, valleys, and alluvial plains adjacent to Alameda Creek (to the diversion dam) and its tributaries. This includes the Livermore and Amador valleys, Sunol Valley and Niles Canyon, and the Niles cone and adjoining baylands. A pilot portion of the project will also focus on documenting landscape changes in the uplands of the San Antonio Creek watershed.

The project is designed to support several current planning efforts, including the Alameda Watershed Habitat Conservation Plan, Alameda County flood control planning, the South Bay Salt Pond Restoration Project, the Alameda Creek Watershed Council, and to advance public engagement in the watershed.



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PROJECT STATUS

Data collection, compilation, and preliminary GIS synthesis are in progress. In October, the team presented the results of work in progress at the Alameda Creek Watershed Council Meeting ("Alameda Creek historical ecology: recent findings and their implications").

START & END DATES

December 2008-December 2010

**PROJECT TITLE:
BALLONA CREEK**

PROJECT: 7070

START DATE: November 2009

ANTICIPATED COMPLETION: June 2010

TOTAL FUNDING: \$21,000

FUNDS FOR 2010: \$14,000

PROJECT FUNDER: Santa Monica Bay Restoration Conservancy (SBMRC); Southern California Coastal Water Research Project (SCCWRP)

LEAD SCIENTIST: Robin Grossinger

PROJECT COORDINATOR: Erin Beller

COLLABORATORS: CSU-Northridge, SCCWRP, USC

PROJECT DESCRIPTION

The Ballona Creek project supports historical research conducted by the Southern California Coastal Water Research Project and CSU-Northridge on the historical ecology of the Ballona Creek watershed. The project uses historical research to provide enhanced understanding about baseline conditions of streams and wetlands in the watershed. Data collection and compilation will be completed during this first phase; synthesis and reporting will be completed under a subsequent phase of the project.

PROJECT STATUS

The project kick-off meeting was held in September. SFEI held a data collection training session in October in Southern California to train project researchers. Initial data collection is in progress, and should be completed by the end of the first quarter 2010.

**PROJECT TITLE:
UPPER PENITENCIA**

PROJECT: 7072

START DATE: September 2009

ANTICIPATED COMPLETION: December 2010

TOTAL FUNDING: \$40,000

FUNDS FOR 2010: \$40,000

PROJECT FUNDER: Waste Management Inc.

LEAD SCIENTIST: Robin Grossinger

COLLABORATORS: SCVWD

PROJECT DESCRIPTION

This project addresses a number of questions about Upper Penitencia Creek to assist resource managers in designing appropriate projects to improve stream conditions. Upper Penitencia Creek, on the eastern side of Santa Clara Valley, has locally significant potential for stream restoration and anadromous fish recovery. Some of the issues the project will address include identifying perennial vs. intermittent reaches; classification of riparian habitat type; development of understanding of creek/channel modification.

PROJECT STATUS

tbd

Environmental Informatics

JOHN ORAM

PROGRAM OVERVIEW

SFEI has become a leader in providing information technology resources for local and regional projects. Recently, much interest has surrounded the development of web-based information portals for quick and easy dissemination of environmental information. In 2009, SFEI founded an Environmental Informatics Program to meet this growing need. In its first year, the Program has had much success developing web applications and/or strategies for the Water Quality Monitoring Council, the Regional Monitoring Program, the Surface Water Ambient Monitoring Program, and the California Environmental Data Exchange Network.

PROGRAM OBJECTIVES

- Improve data analysis through conceptual and quantitative model development
- Improve and accelerate information dissemination to local and regional environmental stakeholders and the general public through development of user-friendly web applications
- Develop and disseminate new methods for data integration and information synthesis
- Improve internal coordination and information exchange through strategic data storage and handling
- Improve external coordination and information exchange through strategic data storage and handling

RECENT ACCOMPLISHMENTS

- Development of the Safe-To-Eat Portal for the State Water Board and the Water Quality Monitoring Council
- Development of the Wetlands Information Portal for the State Water Board and the Water Quality Monitoring Council
- Development and promulgation of strategy documents for CEDEN Regional Data Centers

- Development of a detailed Modeling Strategy to guide quantitative model development for the Regional Monitoring Program over the next five years
- Refinement of the Guadalupe River Watershed Model for the Sources, Pathways, and Loadings Workgroup of the Regional Monitoring Program
- Invited participation in the Pelagic Organism Decline Urban Runoff Workgroup (Funded by the National Center for Environmental Analysis and Synthesis)
- Invited participation in the UC Berkeley Water Data Repository Program (Water DRoP)

2010 PROJECTS

PROJECT TITLE: SWAMP - WETLANDS DATA PORTAL

PROJECT CODE: 1066.20

START DATE: 1/1/2010

ANTICIPATED COMPLETION: 3/31/2010

TOTAL FUNDING: \$35,000

FUNDS FOR 2010: \$35,000

PROJECT FUNDER: State Water Resources Control Board

LEAD SCIENTIST: John Oram

PROJECT MANAGER: Cristina Grosso, Meredith Williams

PROJECT DESCRIPTION

This project aims to transform the Wetlands Tracker into the Wetland Data Portal. To achieve this transformation, the Wetland Tracker will be redesigned so that site navigation is based on a series of management questions. Users will be able to locate wetlands near a location of interest, query the status of wetland mapping throughout the state, query wetland acreage, and find general information on wetlands in California.

PROJECT STATUS

Funding for 2010 is provided by SWAMP. The Wetland Data Portal is to be reviewed by the Monitoring Council during December 2009 and January 2010. The California Wetlands Monitoring Workgroup will provide general oversight for the Portal.



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**PROJECT TITLE:
SWAMP PHASE II – TASK 2: CONTINUATION
OF SERVICES OF NEWLY ESTABLISHED SWAMP
DATA CENTER****PROJECT CODE:** 1066.20**START DATE:** 5/31/2007**ANTICIPATED COMPLETION:** 3/31/2011**TOTAL FUNDING:** \$193,000**FUNDS FOR 2010:** \$90,000**PROJECT FUNDER:** State Water Resources Control Board**LEAD SCIENTIST:** John Oram**PROJECT MANAGER:** Cristina Grosso**PROJECT DESCRIPTION**

Establishing SFEI's Regional Data Center (RDC) began in May 2007. The main services that SFEI's RDC will provide to the Bay Area region is to upload and check data, store and manage data, exchange data with the California Environmental Data Exchange Network (CEDEN), provide access to data, coordinate and transfer technology to other RDCs, and integrate and aggregate different datasets to transform data into information. The objective for Phase I of this project was to standardize various datasets into the SWAMP v.2.5 database format. The focus for Phase II is to develop web applications for uploading, reviewing, and accessing data and to exchange data with CEDEN. SFEI maintains a modified SWAMP v2.5 database stored on a SQL server and provides access to the data via a web-based data retrieval tool at eis.sfei.org/wqt/.

PROJECT STATUS

Funding for 2010 is provided through Amendment 3 of a Master Contract between the State Water Board and San Jose State University Foundation that contains task orders for SFEI as one of the four Regional Data Centers. This agreement also contains bioaccumulation tasks. The main deliverables for task 2 of this project are (1) the development of web applications that can be shared with other RDCs for improved, on-line dataset loading and review, and (2) the addition of new monitoring data from the Coastal Fish Monitoring Project (1993-2003) to SFEI's SWAMP database (v.2.5). Both of these tasks will be worked on during 2010, although the deliverables are not due until March 2011.

**PROJECT TITLE:
TRASH CAPTURE DEMONSTRATION PROJECT****PROJECT CODE:** NA**START DATE:** 1/1/2010**ANTICIPATED COMPLETION:** 12/31/2012**TOTAL FUNDING:** TBD (~\$35,000)**FUNDS FOR 2010:** TBD (\$10,000)**PROJECT FUNDER:** ABAG (ARRA Funds)**LEAD SCIENTIST:** John Oram**PROJECT MANAGER:** Cristina Grosso**PROJECT DESCRIPTION**

The Bay Area-Wide Trash Capture Demonstration Project will retrofit and/or improve storm drainage infrastructure in order to address impairment of San Francisco Bay and local creeks by trash. Trash capture devices will be installed in municipal storm drain systems throughout the Bay Area, in a range of scales and designs appropriate to different locations and conditions, to screen and capture trash and prevent the discharge of thousands of pounds of trash to the Estuary. The project will demonstrate to cities and the public that trash can be managed, and that reductions in the volume of trash enhance the Estuary and its water quality. It will also facilitate early compliance with the San Francisco Bay Regional Water Quality Control Board's Municipal Regional Stormwater Permit affecting Phase I communities, and anticipated requirements for operators of small municipal separate storm sewer systems (Phase II).

SFEI's role is to aid in monitoring design and development of overall project information technology.

PROJECT STATUS

The project is funded. Distribution of funds to partner agencies is in negotiations.

**PROJECT TITLE:
SFEI WEBSITE REDESIGN****PROJECT CODE:** 0069**START DATE:** 1/1/2009**ANTICIPATED COMPLETION:** Ongoing**TOTAL FUNDING:** \$10,000**PROJECT FUNDER:** SFEI Overhead**LEAD:** John Oram, Linda Wanczyk, Micha Solomon**PROJECT DESCRIPTION**

Transformation of the SFEI website into a dynamic, content-rich site.

PROJECT STATUS

The redesign project was started in earnest during the first quarter of 2009 and focused on development of the underlying technology and general design. Technology and design are mostly complete. The current focus is on content creation and integration between the various SFEI programs.

INFORMATION TECHNOLOGY

MICHAEL MAY

PROGRAM OVERVIEW

The IT Program is unique among the programs and departments at SFEI, in that it has a dual role. The first role is to provide the basic computing infrastructure and technical support necessary for efficient functioning of the other Programs at SFEI; the second is to seek opportunities to apply information technology to promote informed stewardship of the aquatic resources of California, both at SFEI and with our partners at the state and regional levels.

PROGRAM OBJECTIVES

SUPPORT SFEI STAFF

- Maintain a high level of staff satisfaction with internal computing infrastructure and technical support

Support informed stewardship of the Estuary and other California environments

- Provide excellent execution of technology projects and technological portions of science projects
- Provide technical guidance and leadership to California management and regulatory entities through the development of information protocols and systems
- Provide clear, understandable, relevant displays of environmental information to a variety of audiences
- Continue to increase SFEI's stature as the place to go for Bay region environmental data, evidenced by:
 - Increase in the number of funded projects to manage and/or host regional and California environmental data
 - Growth in traffic to SFEI-managed websites
 - Growth in the number of external requests for information

CAPABILITIES

- Custom web-programming for environmental data management and dissemination
- Environmental data management for long-term monitoring and special projects
- GIS data creation, modeling, analysis and coding
- Spatial and tabular database server configuration and deployment
- Software specification authoring
- Web server deployment and management
- Web content creation and management
- Email and fileserver configuration and deployment
- Numerical modeling of contaminant fate & transport
- Database design and programming (MS Access, SQL, SQL Server)
- Field data form design and deployment (MS Access, HTML)

TECHNOLOGY INFRASTRUCTURE

ANNUAL PURCHASING

2010 hardware/software budget: \$125,000

STAFF WORKSTATIONS

35 desktops
15 laptops

SERVERS AND STORAGE

16 physical servers hosting
over 10 terabytes of RAID storage

DATABASE TECHNOLOGIES IN USE

Microsoft SQL Server
PostgreSQL/PostGIS
MySQL

WEB SERVERS, APPLICATION FRAMEWORKS AND LIBRARIES IN USE

Apache
MS IIS
Tomcat
Grails
jQuery

WEB GIS TECHNOLOGIES

ArcIMS
Mapserver
Openlayers
Google Maps API



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DESKTOP GIS

ArcGIS
ArcGIS Server w/ GeoPortal
ArcSDE
Leica Photogrammetry Suite
ERDAS Imagine

BACKUP AND POWER

LTO-3 tape autoloader
LTO-4 tape autoloader
Offsite tape storage
3 x 2400W server UPS
KOHLER industrial generator (diesel-fueled) for all servers and desktops

PRINTING

6 networked printers and printer-copiers
1 42" large format poster & map printer

INTERNET AND NETWORK

3Mbps point-to-point wireless internet
Gigabit ethernet and 802.11n wireless ethernet

COLOCATION

Co-located email and web server in Sacramento for disaster resilience

2010 PROJECTS**PROJECT TITLE: 2010 INFORMATION TECHNOLOGY PURCHASING**

START DATE: 1/1/2010

ANTICIPATED COMPLETION: 12/31/2010

FUNDS FOR 2010: ~\$120,000

PROJECT FUNDER: SFEI

PROJECT MANAGER: Michael May

PROJECT DESCRIPTION

The 2010 IT purchasing budget includes hardware and software for 5 new staff; a new dedicated web server to support increased activity on web-based information access and display; statistics and GIS software renewals; a new set of tapes for offsite backup storage; maintenance of a Sacramento-based redundant server; microwave-based internet connection; discretionary funds for repairs, upgrades, and new software purchases; a training stipend for all technology-related staff; and maintenance for SFEI's new accounting and time tracking software, Deltek Vision.

**PROJECT TITLE:
2010 SPATIAL DATA ORGANIZATION**

START DATE: 1/1/2010

ANTICIPATED COMPLETION: 12/31/2010

FUNDS FOR 2010: ~\$20,000 (SFEI overhead)

PROJECT FUNDER: SFEI

PROJECT MANAGER: Kristen Cayce

PROJECT DESCRIPTION

Frequent use of a wide array of datasets is a hallmark of SFEI GIS work, and improvements in the storage and organization of its spatial data holdings has been a long-term project at SFEI with potentially big benefits. Unique progress was made in 2009, when a web-based spatial data search tool, the Geoportal extension to ESRI's ArcGIS Server, was chosen, installed, and a preliminary set of about 100 entries created. Data entry, documentation, and Geoportal refinements will continue in 2010 to support efficient discovery and access for all staff, and eventually, with selected data, for the public. Related work establishing and populating a carefully planned array of ArcSDE-based geodatabases will also continue.

**PROJECT TITLE:
ONLINE 401 APPLICATION
(funded through the Aquatic Science Center)**

(Developing California Capacity to Assess the Performance of Wetland Protection Policies, Programs, and Projects in the Watershed Context)

PROJECT CODE: 8400

START DATE: 10/1/2008

ANTICIPATED COMPLETION: 12/31/2010

TOTAL FUNDING: \$313,890

FUNDS FOR 2010: \$200,000

PROJECT FUNDER: USEPA

LEAD SCIENTIST: Josh Collins

PROJECT MANAGER: Michael May

PROJECT DESCRIPTION

The goal of this project is to enable the Wetland Tracker to be the common data management system for the State's primary wetland protection policies and programs, including the 401 Certification and WDR Programs, the proposed Wetland and Riparian Protection Policy, and the State's No-Net-Loss Policy.

The key deliverable is a web-based application for section 401 water quality certification, integrated

into the Wetland Tracker. This will replace the current paper-based system. This pilot project will be conducted in Regions 2 and 4, and at the state board.

This project includes a February 2009 addition of \$13,900 to develop a vernal pool module for eCRAM wetlands assessments.

PROJECT STATUS

The start of this project was delayed several months, but is now well underway. As of November 2009, multiple coordination and information gathering meetings with state and regional board staff have been held, producing a narrative review of the existing 401 process and a draft common 401 application; the main software specification has been drafted and is under review by State Water Board staff; and a working prototype of the browser-based mapping tool has been developed.

PROJECT TITLE: SOUTH BAY SALT POND RESTORATION PROJECT: GIS & WEB SUPPORT

PROJECT CODE: 6509

START DATE: 8/1/2004

ANTICIPATED COMPLETION: 6/30/2010 (RENEWED IN 2-YR INCREMENTS)

TOTAL FUNDING: \$434,000

FUNDS FOR 2010: \$50,000

PROJECT FUNDER: Coastal Conservancy

PROJECT MANAGER: Michael May

PROJECT DESCRIPTION

For 2010, the SBSP-sponsored monitoring inventory, data standards, and data access pages will be completed and implemented in coordination with the SBSP Lead scientist. SBSP and Shoreline websites, electronic bulk mailing lists, and the SBSP online photo archive will continue to be maintained and improved. Creation, editing and production of new project maps as requested by SBSP staff is also anticipated.

PROJECT STATUS

This project saw a near-complete hiatus with the state financial crisis and bond fund freeze. In June the project was restarted with a partial restoration of funds. SFEI kept the site online and provided minimal maintenance during the freeze. Complete restoration of the original funds is anticipated in 2010.

