



San Francisco Estuary Institute

**Commission's Technical Advisory Group (CTAG) of the
Southern California Coastal Water Research Project (SCCWRP)
&
Technical Review Committee (TRC) for the Regional Monitoring
Program for Water Quality in San Francisco Bay**

Joint Meeting

March 28th, 2012

**San Francisco Estuary Institute
4911 Central Ave, Richmond**

Draft Meeting Summary

CTAG Representatives Present

Tim Stebbins (Chair), City of San Diego Public Utilities Department
Wanda Cross (Vice-chair), Santa Ana Regional Water Quality Control Board
Chris Beegan, California State Water Resources Control Board
Chris Crompton, Orange County Public Works
Terry Fleming, U.S. EPA, Region 9
Angela George, Los Angeles County Flood Control District
Joe Gully, Los Angeles County Sanitation Districts
Mike Lyons, Los Angeles Regional Water Quality Control Board
Skyli McAfee, California Ocean Science Trust
Gerry McGowen, City of Los Angeles, Bureau of Sanitation, Environmental Monitoring
Division
Dean Pasko, Orange County Sanitation District
Hoan Tang, Los Angeles County Flood Control District
Liz Whiteman, OST MPA Monitoring Enterprise

TRC Representatives Present

Bridgette DeShields (Chair), Refineries (Arcadis/ WSPA)
Nirmela Arsem, East Bay Municipal Utilities District
Barbara Baginska, San Francisco Bay Regional Water Quality Control Board

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Mike Connor, East Bay Dischargers Authority
Eric Dunlavey, City of San Jose
Naomi Feger, San Francisco Bay Regional Water Quality Control Board
Tom Hall, South Bay Dischargers (EOA)
Tom Mumley, San Francisco Bay Regional Water Quality Control Board
Karin North, City of Palo Alto
Chris Sommers, Stormwater (BASMAA/ EOA)
Karen Taberski, San Francisco Bay Regional Water Quality Control Board

SCCWRP Staff Present

Steve Bay
Ken Schiff
Eric Stein
Steve Steinberg
Martha Sutula
Steve Weisberg

SFEI Staff Present

Rachel Allen
Josh Collins
Jay Davis
Cristina Grosso
Susan Klosterhaus
Meg Sedlak
David Senn
Meredith Williams

Other Participants

Chris Foe, Central Valley Regional Water Quality Control Board

Via telephone

Bruce Posthumus, CTAG, San Diego Regional Water Quality Control Board
Bram Sercu, CTAG, County of Ventura
Joanne Weber, CTAG, County of San Diego

1) Introductions and Goals

Karen Taberski (filling in as TRC chair for Bridgette DeShields) called the meeting to order. Meg Sedlak gave context for the meeting, and initiated introductions. Karen Taberski and Tim Stebbins discussed the impetus behind this meeting, and outlined the goals. The meeting focus was on topics of specific interest to the two organizations: regional monitoring and nutrient science. The goal of these meetings is to identify areas of collaboration.

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2) **Introduction to Regional Monitoring: Lessons Learned and Future Needs**

Tim Stebbins introduced the topic of regional monitoring in the context of the Bight program – the interagency five-year monitoring program for the Southern California Bight. The next round of sampling will begin in 2013, and planning for this effort will occur over the next 6 months. It is therefore an opportune time to coordinate with the RMP on the design and implementation of the monitoring.

3) **Overview of the Regional Monitoring Program and Multi-Year Plan**

Jay Davis outlined the history of the RMP, describing its growth from a \$1M program in 1993 focused solely on status and trends (S&T) monitoring to the \$3M program today that covers an expanded S&T design as well as targeted, question-based studies in a broad range of areas. Nearly 20 years of running this program have revealed that over time, a static program becomes less and less valuable, because it does not allow for adaptation to changing management, pollution, and ecology, and each additional time point provides diminishing returns on the investment, especially in the absence of trends. While in some cases, contaminant loadings to the Bay have largely decreased, RMP monitoring has not shown many trends in Bay-wide ambient contamination levels. The RMP has therefore just completed a revision to its S&T scheme that includes a reduction of the water and sediment monitoring, while continuing to generate valuable time series data in water chemistry, aquatic toxicity, sediment chemistry *, sediment toxicity *, benthos *, bivalve chemistry *, sport fish chemistry *, bird egg chemistry, suspended sediments (continuous), and basic water quality (monthly) *. Areas of future growth for the monitoring program will include contaminants of emerging concern*, bioanalytical screening for CECs *, optimizing monitoring for nutrient numeric endpoints *, applying new technologies (e.g., sensors) *, monitoring to support fate modeling, expanding our sampling frame into shallower waters, and other currently unforeseen areas *. The special studies component of the RMP is currently investing about \$1M in 2012 in research projects related to some of these areas.

(indicates areas of current collaboration with SCCWRP)*

Skyli McAfee asked if the RMP was coordinating with the organizers of the America's Cup on the sensors they will deploy for the event. She indicated that there was a possibility that some of these sensors would become permanent monitoring stations. Jay Davis and David Senn indicated that they were not aware of this. In response to questions about the operation of the RMP and the S&T monitoring, Jay Davis clarified that the RMP generally samples from the base of watersheds out to just beyond the Golden Gate. The program does not include demersal fish monitoring; however this work is conducted regularly by the Interagency Ecological Program (IEP).

Action Items:

- Investigate the plans for monitoring in San Francisco Bay as part of the America's Cup event, and the potential for collaboration.

4) **Overview of Bight Monitoring**

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Ken Schiff gave an overview of the Bight monitoring program, noting that the program evolves with each implementation, and that the organizers are very open to new ideas and starting with a “clean slate”. The Bight '08 design included six elements: coastal ecology, water quality, wetlands and estuaries, shoreline, water quality in protected areas, and rocky reefs. Each element was designed to address specific questions, such as “what is the extent of eutrophication in Southern California estuaries?” and “what is natural water quality in protected areas?”. Results to date indicate that the percent of area within embayments where sediments are “impacted” has decreased since 1998. While the Bight and RMP are similar in many ways, such as the similarity of questions, the study design, the indicators measured, the focus on special studies, and the demand for high quality data to deliver to managers and decision-makers, there are also a number of differences in the implementation approach, some technical details, and the specific topics for special studies. The next steps in the implementation of Bight '13 include defining the questions, developing the design, and selecting indicators and special studies within the next 6 months, developing the methods, intercalibration exercises and information management in January 2013, and commencing sampling in July 2013.

Tom Mumley noted that in contrast with the Bight agencies, dischargers to the Bay do not conduct independent monitoring of the Bay – all of it is done by the RMP. The City and County of San Francisco is an exception to this, because as a result of outfalls that discharge to the Bay and open ocean, the utility contributes to the RMP as well as monitors ocean discharges west of Golden Gate park. Chris Foe noted that the Bight seems to be concluding that conditions are improving, while data from the RMP are indicating that ambient pollution is static. Ken Schiff and Tom Mumley suggested that this may be due to regional differences, such as increased dredging and filling in the Bight during the 90's causing unusually poor sediment conditions, which now appear to be a trend. In addition, it was noted that the late 1990s were particularly wet years in Southern California which may have resulted in increased contaminant loads to the Bight. In San Francisco Bay, the high degree of mixing of sediments slows the impact of decreases in loadings. Chris Beegan noted that the mussel monitoring shows strong downward trends in contaminants.

5) Discussion of Regional Monitoring

Tim Stebbins outlined discussion topics for potential collaboration on regional monitoring efforts, including synchronization, special studies, and standardization. He noted that the CTAG will hold a meeting in April devoted to the regional monitoring effort.

Sportfish monitoring

Jay Davis indicated that the RMP is moving to a 5-year timeframe for sportfish sampling (with the next survey in 2014), in part to line up with the Bight sportfish monitoring. Tim Stebbins indicated that the Bight '13 plan could easily delay sportfish monitoring to 2014 to be synchronized with the RMP. Karen Taberski suggested that every 10 years, a statewide program could be designed to align with this regional effort. Steve Weisberg indicated that the impetus behind sportfish monitoring should be closely tied to the audience and decisions that may be based upon the results. Thus, the coalition would be more supportive of continued sportfish monitoring if the use of the data by OEHHA or the Department of Fish and Game were clear from the get-go. Skyli McAfee noted that the Ocean Protection Council is gearing up for a seafood initiative, and would be interested in this information. Terry Fleming also indicated that

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TMDL listings are based on fish tissue concentrations, and this data would be needed for TMDL management decisions. Jay Davis indicated that he would communicate with Bob Brodberg at OEHHA regarding what data would be needed to broaden a sportfish consumption advisory from specific locations to statewide. Steve Weisberg agreed that with a clear need for sportfish tissue data to support management decisions, the Bight program would likely be highly in favor of including sportfish in the 2013 monitoring design.

Framework for identifying Environmental Problems

Terry Fleming suggested that a common framework for identifying problems and determining what information is needed to address the problems is needed for SFEI, SCCWRP, SWAMP, the EPA, and other similar organizations. This will enable agencies and regulators to make decisions based on relevant data.

Contaminants of Emerging Concern

Steve Weisberg mentioned the recently completed draft report from the state Contaminants of Emerging Concern (CEC) Blue Ribbon panel, which includes a list of CECs that should be monitored. However, this list does not include contaminants for which there was not enough existing evidence of toxicity and occurrence data. Therefore, it falls to regional monitoring programs such as the RMP and SoCal Bight monitoring to look for some of these contaminants, in particular those that are demonstrated to be toxic, but are for which there is limited or no occurrence data. Regional monitoring to fill these data gaps will be an essential part of the “on-ramp” for CECs to the list of contaminants to monitor. The other “non-listed” contaminants to monitor are those for which evidence of high use exists. Dr. Weisberg therefore suggested that the programs commence with the list of contaminants recommended by the state panel, and supplement it with contaminants that fit one of these criteria. Logistically, he suggested that some of these CEC analyses could be funded by having SCCWRP member agencies perform some of the traditional analyses that the RMP pays commercial labs to conduct on Bay samples, and the savings could be put towards CEC analyses on both Bay and Bight samples.

Jay Davis asked about the future of mussel monitoring in Southern California. Steve Weisberg noted that the NOAA mussel watch budget is uncertain for 2012 and beyond, and Mike Lyons indicated that the state mussel watch funding is nearly depleted. Meg Sedlak noted that other organisms, such as water birds and marine mammals, are occasionally more sensitive to bioaccumulation of emerging contaminants. Steve Weisberg noted that the Southern California groups have monitored other matrices for CECs, such as effluent, water column, sediment, and fish, but have done little work with marine mammals or birds.

Terry Fleming mentioned bioanalytical screening tools, noting that these techniques are largely still in development with academic labs, but that they show good promise. Steve Weisberg and Meg Sedlak agreed that bioanalytical tools may be a good opportunity for regional monitoring programs to collaborate with academic researchers, getting cutting edge analyses of local samples for minimal investment or cost. Steve Weisberg suggested that SCCWRP and SFEI staff brainstorm, and develop a proposal for utilizing bioanalytical tools in RMP and Bight monitoring. This idea can be pitched to the RMP workgroups (at the ECWG and EEWG meeting in May) and Bight planning committee (at the CTAG meeting in August). The

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organizations can then run the proposal through their respective project evaluation protocols before committing.

Sediment Toxicity

Jay Davis mentioned that the RMP is planning on holding a workshop to discuss the widespread moderate toxicity seen in Bay sediments, bringing in local and possibly national experts. Steve Bay indicated that he would support the RMP in this work, and that the Bight has a similar situation. Because of this moderate toxicity, toxicity identification evaluations (TIEs) are very difficult to perform. Jay Davis will develop a timeline for the moderate toxicity workshop, and discuss with Steve Bay how it could feed into the Bight '13 plan.

Methods Standardization

Terry Fleming and Steve Weisberg noted that the State Water Board will be adopting standardized analytical methods as part of the upcoming Ocean Plan amendment. SCCWRP is planning to submit their standardized methods from the Bight monitoring for the Ocean Plan. Chris Beegan indicated that these standardized methods will not be enforced within San Francisco Bay, but that the process and methods selected may be of interest to the RMP. Tom Mumley indicated that the RMP generally supports standardized methods, but that consistency in all circumstances may be too strict of a requirement, depending on the state of the analytical technology.

Atmospheric Deposition

Chris Foe asked about atmospheric deposition. Jay Davis asked if the Bight program was considering monitoring atmospheric deposition. He noted that atmospheric deposition may be supplying enough mercury to account for the mercury seen in sport fish throughout the coast, although the sources of mercury in the fish, whether from land, atmosphere, or ocean upwelling, are unclear. Steve Weisberg indicated that research in southern California has looked at atmospheric deposition of other contaminants, but not mercury. Chris Foe noted that while atmospheric deposition is not a controllable source of mercury, knowing the amount of mercury from atmospheric deposition will enable regulators and permit holders to set reasonable goals for reductions in ambient mercury. For example, if atmospheric deposition accounts for 10 times the amount of mercury loading as legacy mine sites, the resources invested in reductions of mining mercury should correspond with the expected impact of this management action. Terry Fleming indicated that other contaminants, such as reactive nitrogen, should be considered. CTAG indicated that they would determine whether they have the capacity and the desire to perform these analyses at their April 23rd meeting. The TRC will weigh this idea with other recommendations from the San Francisco Bay mercury synthesis report.

Action Items:

- Jay Davis will ask Bob Brodberg at OEHHA what data would be needed to broaden a sportfish consumption advisory from specific locations to statewide, to inform the design of 2014 sportfish monitoring in the Bay and the Bight.
- Continue communications between SFEI and SCCWRP on CEC monitoring.
 - Susan Klosterhaus and Keith Maruya will brainstorm a list of high priority CECs for statewide monitoring (keeping in mind that each region may have different needs). They will continue to keep each other informed of current research.

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- SCCWRP will inform SFEI about the current research on microarrays and bioanalytical tools.
- SCCWRP and SFEI staff will consider designing a proposal for using and comparing multiple assessment methods for CECs in Bight and Bay monitoring. The proposal will then be vetted by the Bight '13 and RMP planning committees.
- Jay Davis will develop a timeline for the moderate toxicity workshop, and discuss with Steve Bay how it could augment the Bight '13 plan.
- SFEI staff and Mike Kellogg of the City and County of San Francisco will be invited to participate in discussions regarding statewide methods standardization as part of the Ocean Plan.
- The CTAG indicated that they would determine whether they have the capacity and the desire to perform analyses of mercury loading (and other contaminants such as reactive nitrogen) from atmospheric deposition at their meeting in April. The TRC will weigh this idea with other recommendations from the San Francisco Bay mercury synthesis report, and re-evaluate the RMP atmospheric deposition strategy.

6) **Nutrients**

Karen Taberski gave a presentation on the context for initiating a discussion of nutrients in San Francisco Bay. Scientists currently believe that while nutrients do not seem to be a problem in the Bay, changes occurring now could lead to impairment due to nutrients in the future. Therefore, there are efforts underway to develop management frameworks and monitoring schemes in anticipation of a potential nutrients problem.

7) **Research to Support Nutrient Objectives**

Martha Sutula gave a presentation on on-going and potential research by SFEI and SCCWRP in support of nutrient objectives. She outlined existing research and some of its conclusions, including which indicators are appropriate for nutrients monitoring. Results from dissolved oxygen (DO) monitoring in the Southern California Bight show that DO concentrations have declined 8-45% over the last decade. Moving forward, she suggested that Northern and Southern California research teams could collaborate on continuing to develop assessment frameworks, investigating factors controlling harmful algal blooms, and developing nutrient load response models.

8) **Science to Support Nutrient Management in San Francisco Bay**

David Senn reviewed the current understanding of nutrient dynamics in San Francisco Bay, and outlined how its traditionally high resilience to high nutrient loads may be changing. Given the potential future changes, SFEI is diving into nutrient initiatives; including synthesizing nutrient science to inform management decisions, developing a monitoring scheme, quantifying nutrient loads, and load-response modeling. He suggested that SFEI and SCCWRP should continue to collaborate on developing guidelines and assessment frameworks, and that future collaborations could work on developing load-response models, investigating factors controlling harmful algal blooms, and developing monitoring schemes.

9) **Nutrients Discussion**

Building off of the areas of collaboration suggested by Martha Sutula and David Senn, the group discussed nutrient endpoints for monitoring, developing models and calculating loads,

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possibilities for additional sensors, and improving coordination between the programs and communication with the broader community.

Endpoints

Mike Connor and Steve Weisberg indicated that the monitoring programs and the larger scientific and regulatory communities need to come to agreement on the assessment endpoints to monitor. Martha Sutula agreed, indicating that these standard endpoints will be needed before modeling can begin. It was suggested that a forum be set up to come to agreement on common endpoints to monitor in San Francisco Bay and the Bight.

Modeling and Loads

Martha Sutula indicated that the set of agreed upon endpoints will be needed before beginning to model, as they will provide a transparent way to determine whether there is a problem. Dave Senn suggested that once standard endpoints are agreed upon, different levels of model (e.g. conceptual models, simple numeric models, and more detailed numeric models) could be developed in parallel, and need not necessarily be developed in sequence. However, Martha Sutula noted that the model that is developed should be chosen carefully based on the definition of the problem. Josh Collins suggested that a joint modeling forum, with experts and interested parties from San Francisco Bay and Southern California, could work together to work through these questions together. Martha Sutula also noted that Southern California lacks the strong community of open source modelers that the San Francisco Bay region has. This informal modeling forum could help SFEI and SCCWRP collaborate to develop spatially explicit mass balance models. This would also help direct the academic modelers towards the management questions at hand.

Terry Fleming indicated that load response models should distinguish sources from the model. This will aid in creating a consistent manner of measuring output from various sources in different locations. Martha Sutula noted that existing load-response models have data gaps pertaining to agricultural runoff, but that there are large datasets from the Central Coast that include agricultural runoff. She suggested developing a proposal to work jointly between San Francisco Bay Area and Southern California on spreadsheet models and watershed loading models, compile land use specific runoff data (including the large amounts of data from the Central Coast on agriculture runoff) and validate the models, and collaborate with USGS to compare data and output between the HSPF model and the SPARROW model.

Sensors

Mike Connor noted that while SFEI and SCCWRP seem to be working well together, and specifically David Senn and Martha Sutula, there are possibilities for future collaboration in the development and application of new sensor technologies, such as aerial monitoring, remote sensing, and LiDAR. He noted that the Monterey Bay Aquarium Research Institute (MBARI) has many new sensors, including gliders, and the programs could benefit from collaborations with them. Mike Lyons noted that Southern California agencies perform quarterly aerial flights over kelp beds, and that they will hold their annual joint meeting between the agencies that conduct the flights in June 2012. He suggested that SFEI staff attend this meeting to initiate discussions about joint planning between Southern California and the San Francisco Bay region on sensor platforms.

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Communications

Building off of the discussion on how to agree upon common endpoints to monitor, Mike Connor suggested that a good way to get agreement on these endpoints, beyond the scientists, would be to create maps and graphics comparing the regions of California on these indicators. Steve Weisberg noted that this would be useful to convey a sense of urgency regarding nutrients to managers, but that Martha Sutula, in developing and selecting indicators, is focused on defending these choices to an external panel of scientists. Thus, communication with the public is not an issue of current importance, especially given that there is generally no widespread evidence of an existing problem.

Steve Weisberg suggested that it would be useful to bring together data from across the state on nutrient levels, dissolved oxygen, and other parameters of interest to nutrient science, and offered to develop a proposal to create a database that accomplishes this.

Better Coordination

Steve Weisberg noted that the future of the existing nutrients monitoring program in San Francisco Bay is uncertain. He asked how Southern California and the San Francisco Bay region can work together to continue this program and set up a similar program in Southern California.

Mike Connor noted that Southern California is better at coordinating with the Southern California Ocean Observing System (SCOOS) than the San Francisco Bay region is with the Central and Northern California Ocean Observing System (CeNCOOS). Dean Pasko suggested modeling communication between SFEI and CeNCOOS on the existing communication between SCCWRP and SCOOS.

Chris Sommers noted that the RMP workgroups, such as the Sources Pathways and Loadings workgroup, could benefit from additional input from SCCWRP staff. He suggested that the organizations rely on each other more for expertise. Additionally, Steve Weisberg suggested that SFEI staff could review the document on stormwater monitoring from the Bight '08 sampling effort. Chris Crompton noted that the Southern California counties that monitor stormwater will hold a meeting in May to discuss, on a detailed level, how to collect data for the next monitoring round, and that SFEI staff would be welcome to attend this workshop.

Action Items:

Modeling and Loads

- Martha Sutula will head the development of a project proposal to work jointly between San Francisco Bay Area and Southern California on spreadsheet models and watershed loading models, compile land use specific runoff data (including the large amounts of data from the Central Coast on agriculture runoff) and validate the models, and collaborate with USGS to compare data and output between the HSPF model and the SPARROW model.

Sensors

- Initiate discussions between Southern California and SFEI about joint planning and pilot research on sensor platforms (including coordination of aerial flights over kelp beds).

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SFEI staff will attend the Southern California Joint Annual Meeting on aerial monitoring to be held in June 2012.

- Initiate discussions with MBARI and other sensor experts about using new technology and remote sensors (such as gliders) as part of nutrients monitoring.

Better Coordination

- SFEI staff will attend the Southern California workshop on May 15th on stormwater data collection methods.
- Increase SCCWRP presence in RMP workgroups, such as the Sources, Pathways, and Loadings workgroup and the Modeling workgroup, and vice versa.

Ideas and Other Discussion Points:

Endpoints

- Set up a forum for coming to agreement on common endpoints to monitor in San Francisco Bay and the Bight.

Modeling and Loads

- Form an informal modeling forum for helping to get SCCWRP and SFEI modeling efforts off the ground, discuss potential platforms, and develop complementary resources and areas of expertise.

Better Coordination

- Improve coordination between the RMP and CeNCOOS, similar to the communication currently occurring between SCCWRP and SCOOS.

Communications

- Evaluate proposal to create a database to bring together nutrients data, as well as data on secondary indicators (chl a, DO etc.), from across the state.
- Evaluate proposal to create graphics/ maps to compare the current status of various endpoints for nutrient indicators (chl a, DO etc.) across the state.

10) SCCWRP Director's Report and SFEI Overview

Josh Collins gave a brief description of the recently completed SFEI strategic plan. He noted that the Aquatic Science Center (ASC) and SFEI boards are in the process of being combined. He indicated that the organization is moving towards watershed hydrology in an effort to link management on the watershed scale with impacts to the Bay, and has identified a need for a watershed hydrologist. Dr. Collins also outlined the revised departmental structure for SFEI, which now consists of Clean Water (which includes the RMP), Landscape Design, Environmental Data and Information Technology (EDIT), and Operations.

Steve Weisberg noted that as similar organizations, it is useful to make comparisons between SFEI and SCCWRP. One area in which SCCWRP stands to learn from SFEI is communication, and the organization is therefore implementing initiatives to improve communication. One current initiative is aimed at synthesizing the effectiveness of the Clean Water Act. The document will assess, in language designed for managers, whether contaminant inputs to the oceans have changed, whether it is safe to swim, if fish are safe to eat, and if the ecosystem is being protected. It concludes by noting that while the benefits and the costs of the Clean Water Act have been substantial, most of the easy fixes have been performed, and further

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improvements will likely come at a much higher cost. Tom Mumley noted that the State of the Bay document reached a similar conclusion.