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Delta Regional Monitoring Program



Prepared for
Central Valley Regional and State Water Boards
May 2010

Thomas Jabusch
Brock Bernstein

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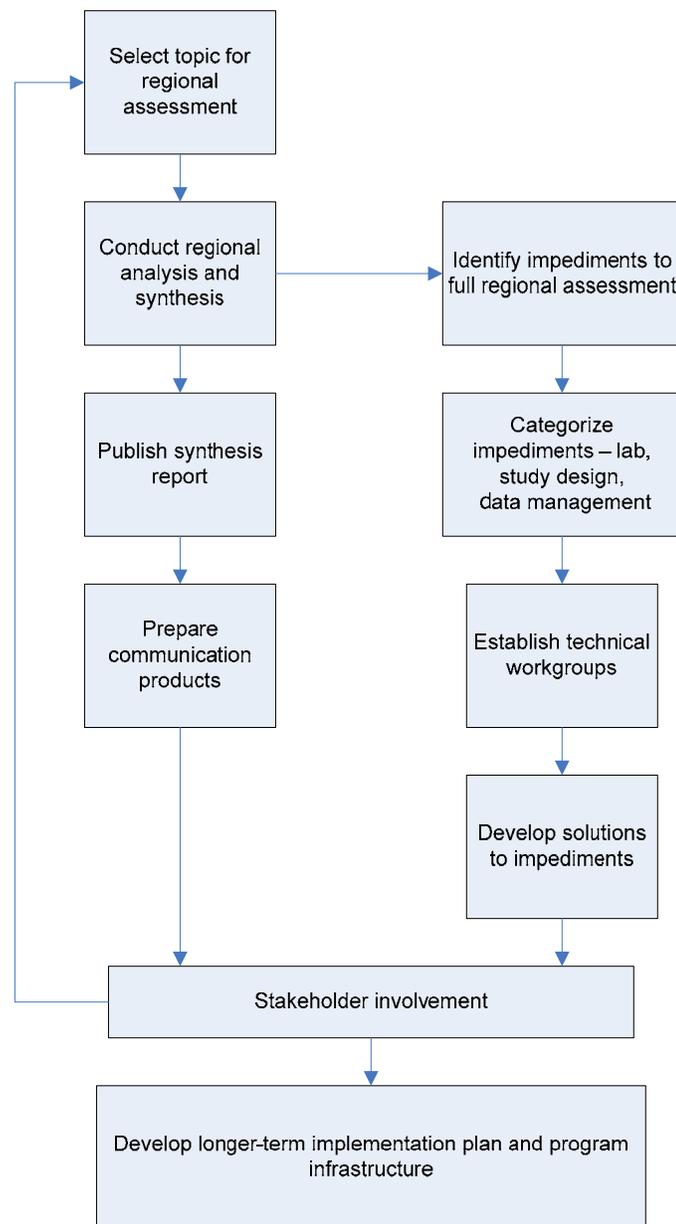
Executive Summary

This document is intended to provide guidance for developing an integrated monitoring framework, the Delta Regional Monitoring Program (Delta RMP) for the San Francisco – San Joaquin Delta that will support improved regional beneficial use assessments. The proposed program will use a pilot project as proof of concept for setting the stage for a longer-term program that will address the biological, chemical, and physical integrity of both water and aquatic ecosystems in the Delta. Key goals of this effort include facilitating improved capabilities for data access and integration, as well as regularly compiling, synthesizing, and reporting on data and assessment results related to key management information needs at the regional scale. The project is intended to accomplish a number of subsidiary objectives, including:

- Establish a climate of cooperation and committed participation among a wide range of stakeholders (e.g. regulators, dischargers, scientists, community activists)
- Improve the overall efficiency and coordination of monitoring and beneficial use assessment in and around the Delta
- Increase the usefulness of monitoring efforts by addressing important management questions concerning water quality, water supply, and ecosystem status
- Provide resource managers, decision makers, and the public with timely, high quality information to evaluate the condition of the Delta's waters

The Delta RMP is one of the priority actions of the Bay-Delta Strategic Workplan, which responds to a joint resolution of the State Water Board and the Central Valley and San Francisco Bay Regional Water Boards. The primary focus and goals of the Delta RMP derive from a stakeholder meeting held in September 2008 to explore impediments to broader regional assessments and solicit suggestions from stakeholders about how such impediments should be prioritized and addressed. Further work with interested stakeholders resulted in a definition of the beneficial uses the Delta RMP should target, the spatial and temporal scale of needed assessments, and the management questions and monitoring objectives that could help to structure monitoring and assessment at the regional scale. In addition, stakeholders and project staff described and evaluated a number of alternatives for program governance and funding, although a choice cannot be made among these until later in the program development process. Work to date has also helped to identify a number of key data management issues and alternatives for addressing them.

The program development process proposed in this document involves two phases, a pilot project phase intended to provide proof-of-concept and build stakeholder involvement, followed by an implementation phase designed to more fully develop the long-term program. The pilot project will focus on developing one or more regional synthesis reports. The purpose of these reports will be to demonstrate the feasibility of using such regional assessment efforts to answer key management questions to the best of our current ability and, through this process, also identify existing impediments in monitoring and data management systems that hinder the success of such assessments. The pilot project will then use this information as the basis for establishing one or more technical workgroups to examine the sources of these impediments and develop solutions. Experience gained through these pilot project efforts can provide needed guidance for developing a longer-term implementation plan and program infrastructure that will address governance, funding, and coordinated data management. The project team envisions this basic template, illustrated in the following figure, as the program's core structure that can be repeated and expanded to address multiple issues over time.



1. Introduction

Some twenty-plus entities maintain 17 long-term water quality monitoring programs in the Delta, collecting data at more than 200 different sampling locations at an estimated annual cost of \$8 to \$12M. Collectively, these monitoring activities are gathering a large volume of information on water quality constituents, flows, and biological conditions. However, the current approach to monitoring water quality in the Delta has two main drawbacks. First, individual programs are too tightly focused—on specific mandates or permit compliance—to address broader issues, such as the Pelagic Organism Decline (POD). Second, the existing programs are not organized to facilitate integration of data across different programs. There is general agreement that coordinated regional monitoring and data integration are prerequisites for

conducting the types of analyses that would allow for a more comprehensive view of water quality conditions in the Delta.

The State and Central Valley Regional Water Boards is initiating an effort to establish and develop a collaborative Delta Regional Monitoring Program (RMP) that would address these challenges. The program development will proceed in a phased approach, with a pilot phase followed by a more intensive and longer-term implementation phase. Goals of the pilot phase include:

- (1) Build interest, involvement, and momentum by synthesizing available data and information to focus on important questions of management interest that require a comprehensive, regional view
- (2) Use these synthesis efforts to identify strengths and weaknesses in the current monitoring and assessment system
- (3) Identify needed capabilities for regularly compiling, synthesizing, and reporting data from existing, ongoing monitoring efforts
- (4) Use this proof of concept effort to develop more detailed plans for a broader implementation effort

The pilot phase will thus create a foundation for a longer-term product-oriented and participatory process for meeting the overall goals of improved monitoring coordination and comprehensive regional assessment. The remainder of this report describes the background for this project and then describes a proposed program plan that will serve as a roadmap for developing and implementing the Delta RMP.

The need for comprehensive monitoring is widely recognized. Participants at the kick-off stakeholder workshop for the Delta RMP were nearly unanimous in calling out the benefits of a more regionally coordinated approach to monitoring and assessment. One of the main expectations is that the Delta RMP will help the State and Regional Water Boards set priorities for specific locations for implementing actions to protect beneficial uses of water in the Delta. It is also expected that the Delta RMP will establish clear links to management decisions and opens the potential for cost savings. Opportunities for leveraging Delta RMP resources can be realized by integration with the Federal Action Plan for the Bay-Delta and coordination with ongoing and emerging efforts, such as for example the planned adaptive management and monitoring program for the Bay-Delta Conservation Plan (BDGP). Early success of the Delta RMP could then attract additional funding sources.

2. Water Quality and Monitoring in the Delta

The Sacramento-San Joaquin Delta collects water from an enormous watershed of nearly 61,000 square miles, or 45% of California's land area. Once a vast, tidal marshland, the Delta today is a patchwork of highly modified channels and reclaimed islands that is maintained as a homogeneous freshwater system. It is now characterized by huge tracts of flat, prosperous farmland intersected by narrow channels that are populated by recreational boaters and interspersed with remnant habitats in pockets of marshlands and along the banks of rivers.

The pre-Gold Rush Delta (pre-1850s) has been described by early explorers as a "sea of tules": about 87% or 502 square miles of the Delta consisted of intertidal wetlands. Nearly 60 percent of the Delta was submerged by daily tides, and spring tides could submerge it entirely. Large areas were also subject to seasonal river flooding. Although most of the Delta was a tidal wetland, the water within the interior remained primarily fresh. Massive change began almost simultaneously with the Gold Rush, once the interest of many miners turned from mining to the diking and draining of flooded Delta lands. By the time reclamation of Delta lands was nearly complete in the 1920s, attention began to focus on the development of water supplies from the Sacramento and San Joaquin Rivers. For the past 70 years, the state's policy

has been to maintain the Delta as a freshwater system through a program of water flow regulation, supported by maintenance of agricultural levees.

The Delta is California's water crossroads. It provides two-thirds of Californians – an estimated 25 million people – with some of their water, supports more than 80% of the state's commercial salmon fisheries and is home to more than 750 plants and animals--including 31 species that are listed as threatened or endangered--that, in some cases, are unique to the Delta. It is the heart of California's water system. And it is in crisis.

Problems have developed on a number of fronts to result in the current crisis and are well described in a recent report of the Public Policy Institute of California titled *Envisioning Futures for the Sacramento-San Joaquin Delta*. The most alarming are perhaps the collapse of fisheries over the past decade and the looming risk of chronic or catastrophic failure of the Delta levee system. The former is manifested in the precipitous drop in pelagic (open-water) fish populations recorded in the early 2000s and the complete closure of the two most recent salmon seasons. Loss of habitat, contaminants, invasive species, overfishing, overpumping, and lack of food all may have played a part in the demise of the Delta's fish, but the exact causes and what might be done to fully address them have yet to be determined. With regards to the latter, a complete failure of the levee system seems to be more a matter of when than if it will happen and could have potentially devastating consequences for the State's water supply, the ecosystem, and local communities all at the same time. Both problems highlight the complexity of issues in the Delta and the need for comprehensive solutions. This need was legally acknowledged on November 16, 2009 when Governor Schwarzenegger signed the Delta Protection and Water Supply Bill into law, which establishes the two co-equal goals of providing a more reliable water supply and protecting and restoring the Delta ecosystem.

To a great extent, achieving these goals depends on finding a sustainable solution for managing water quality. Delta waters provide for diverse beneficial uses—including drinking water, habitat, recreation, and irrigation—yet at the same time, water quality problems are ever-present and significant. Protecting and enhancing all beneficial uses is challenging and may require trade-offs, for example, between the desire to withdraw high quality water for drinking from the Delta and maintaining its function as an estuarine ecosystem. For instance, increasing wetland habitat is essential for restoring the ecosystem and will result in more variable salinity and higher carbon production. Both are natural characteristics of the estuarine system but they may also increase the expense and technical difficulty of using the current Delta conveyance and intake locations for drinking water supply. The presence of pathogens, excess nutrients, toxic metals, pesticides, noxious algae, and other pollutants pose significant challenges. Agricultural and urban discharges are the main sources of these pollutants but the natural flow regime and the management of Delta inflow, outflow, and diversions play an extremely important role in determining water quality. In general, increasing Delta outflow improves water quality and wet years have generally better water quality than dry years. However, the relationship of Delta flows to water quality is complex. Much depends on the pollutant, the source of the flow, the quality of each source, the volume relative to other flows, and how water mixes and moves through the Delta. Looking ahead, climate change and population growth may compound existing water quality challenges. Rising sea levels will increase the forces driving seawater intrusion and changing runoff patterns will reduce freshwater flows through the Delta in the spring and summer, which will permit more saltwater from the Bay to enter the Delta. At the same time, the population of the Delta watershed is growing rapidly. The population of the Sacramento Valley is projected to increase by 53 percent between 2000 and 2020, and the population of the San Joaquin Valley is projected to increase by 118 percent during this period. More people and development means more urban runoff and wastewater discharges, which will lead to increased loads of pollutants, unless we do a better job of managing water quality in the future.

As mentioned before, Delta waters provide for diverse beneficial uses. Accordingly, a broad range of entities depend on information about water quality conditions in the Delta. This is reflected in the breadth and intensity of monitoring efforts: 17 long-term monitoring programs are collecting water quality data at more than 200 different sampling locations at an estimated annual cost of \$8 to \$12M. Goals and objectives of many of these long-term monitoring efforts are focused on regulatory compliance with water quality standards and flow requirements. By design, compliance-based monitoring will not be adequate to meet all information needs for water resources management and planning in the Delta. Comprehensive management approaches require integrated assessments of water quality conditions but it is widely recognized that under the current monitoring framework, our ability to develop an integrated assessment of water quality in the Delta is limited by a number of factors, including variability in the level of assessment, reporting, and access to the data among monitoring programs.

The present is marked by an intense, renewed focus on finding comprehensive solutions for the Delta's problems. The State legislature made a significant step by passing the Delta Protection and Water Supply Bill, a legislative package with the goal to implement a "Delta Fix" to protect and improve the Delta ecosystem and ensure a more reliable water supply for Californians. Since 2006, the California Department of Water Resources (DWR), U.S. Bureau of Reclamation (Reclamation), local water agencies, environmental and conservation organizations, and the California Farm Bureau have been collaboratively developing the Bay-Delta Conservation Plan (BDCP). The BDCP effort is expected to result in a set of water flow and habitat restoration actions that contribute to the recovery of endangered and sensitive species and their habitats in a way that will also protect and restore water supplies. On September 29, 2009, six federal agencies (U.S. Departments of the Interior [DOI], U.S. Environmental Protection Agency [USEPA], U.S. Department of U.S. Department of the Army, U.S. Department of Agriculture [USDA], and the Council on Environmental Quality [CEQ]) signed a Memorandum of Understanding (MOU) that establishes a federal Bay-Delta Leadership Committee. The purpose of the Leadership Committee will be to reestablish a federal role in Bay-Delta matters and to build partnerships with the State and interested stakeholders focused on identifying long-term solutions for Delta resource management problems. As a participant, the U.S. EPA has committed to fund several cooperative agreements that will contribute to better water quality protection.

With the heightened attention on the Delta and its watershed, there is a renewed interest in defining and addressing comprehensive, system-wide needs for monitoring and assessment. The new Delta Science Program (formerly known as CALFED) will have the responsibility to articulate the scientific framework and establish monitoring and research priorities. The Interagency Ecological Program (IEP) and other monitoring programs already perform some of the required analyses but are limited by their specific mandates to address all existing information gaps. State Water Board and Central Valley Regional Water Board have committed to sponsoring a Delta Regional Monitoring Program (RMP) focused on water quality that will be coordinated with the existing monitoring programs in the Delta and with existing and planned RMPs in neighboring regions. Upstream to the north, the Sacramento River Watershed Program (SRWP) and the Central Valley Clean Water Agencies (CVCWA) have partnered to develop a pilot RMP for the lower Sacramento River. For the San Joaquin River Basin, USEPA has funded the development of a future monitoring strategy, with the ultimate goal to establish a RMP. Downstream, the San Francisco Bay RMP is a prospective partner that has been operating for 17 years and provides a successful example for a comprehensive, regional water quality monitoring program.

A sustainable approach for managing water quality will depend on integrated assessments that attempt to recognize and model the complexities and interdependencies that characterize the Delta ecosystem and possible consequences of human activity. The Delta RMP is expected to help address this need through coordination and collaborations with other programs. However, based on the experience of previous efforts that failed to develop a comprehensive monitoring system because the planned program was too

ambitious, the Delta RMP development will proceed in a phased, more focused approach based on funding availability and feasibility.

The initial focus of the Delta RMP effort will be to achieve more comprehensive monitoring of contaminants, which will address several needs that are presently unmet, including

- **Fill existing data gaps on contaminants** - such as missing baseline data, potential population effects of toxic chemicals present in the Delta, and monitoring data needed to support modeling efforts for pollutant source identification.
- **Comprehensive assessment and regular reporting** - some data are assessed only for specific needs and are not readily accessible for other purposes. An example is the receiving water monitoring that is required for regulatory permit compliance under the National Pollutant Discharge Elimination Program (NPDES). These data are reported to the Regional Board to demonstrate permit compliance but are not used for other assessment purposes and are often not readily accessible. Other data are assessed, reported, and readily accessible but may not be integrated or comprehensively assessed with available data from other sources. For example, the monitoring data collected by the Irrigated Lands Regulatory Program (ILRP) are reported to and made available by the Regional Board, and a synthesis report has been produced that provides a general overview of the baseline water quality conditions in agricultural areas. However, the data are not comprehensively assessed with data from other sources, for example, to assess the relative contributions of urban and agricultural discharges to pollutant loads in the Delta. Comprehensive assessment and reporting is also hampered by issues related to data quality, integration and interoperability. This became apparent in a recent review of water quality data, undertaken by a research team from the University of California at Davis (UC Davis) to support investigations of the POD. The study revealed that the majority of the contaminant data collected in the Delta was not useable for any analyses, because methods were either not documented or not standardized.
- **Comprehensive assessment to support performance measures** – most of the current monitoring efforts measure performance simply as a compliance metric set forth by regulatory permit conditions. These performance measures do not require comprehensive assessment and on the same token also do not provide any information on the overall condition of aquatic resources. Currently missing are performance measures that are more closely tied to the actual beneficial uses of the receiving waters the regulations are intended to protect.
- **Coordinated monitoring** – the widely recognized lack of coordination between the various water quality monitoring programs makes it all but certain that there are significant opportunities to identify efficiencies. The primary benefits anticipated from more coordination are the potential reduction in duplication of effort and the cost savings this could provide.

At the Delta RMP kick-off workshop in September 2008, stakeholders overwhelmingly agreed with these issues. To be successful, the Delta RMP will need to address these problems head-on, starting with small steps that can be implemented, such as identifying monitoring efficiencies. Building on a successful start and stakeholder support, the long-term Delta RMP can aim to support an integrated view of beneficial use conditions in the Delta.

3. Groundwork for the Delta RMP

In the early 2000s, a collapse in the abundance of four Delta fish species, Delta smelt, longfin smelt, striped bass, and threadfin shad, captured the attention of resource managers, scientists, politicians, and the general public. This apparent fish population crash became known as the POD. Pesticides and other potential contaminants were suspected as one of the possible causes. However, investigations of the role of contaminants in the POD were hindered because data were either missing, unavailable, scattered among various data owners, or not in a format that would allow the types of analyses need for such an

assessment. The inability to respond more adequately to this public concern highlighted the need for regularly compiling, assessing, and reporting data that is currently being collected and the need to better coordinate monitoring efforts. This provided the impetus for developing the Delta RMP.

Data integration and interoperability is a pivotal issue for the development of the [Delta Regional Monitoring Program](#) (RMP). The above mentioned issues were once again confirmed by the first comprehensive review of water quality data to support POD investigations, performed during the early planning stages of the Delta RMP. The study concluded that a lack of documentation and standardization of data collection and handling procedures disqualified the majority of the existing data from any analyses (M. Johnson, pers. comm.). Data collection and handling protocols were either lacking or different to the extent that the interoperability of data could either not be established or data from different programs were not compatible for key analyses (M. Johnson, pers. comm.).

The development of the Delta RMP is one of the priority actions of the Bay-Delta Strategic Workplan, which responds to a joint resolution of the State Water Board and the Central Valley and San Francisco Bay Regional Water Boards. The Strategic Workplan describes and prioritizes actions of the Water Boards to protect beneficial uses of Bay-Delta water and provides timelines and resource needs for implementing the actions.

In a joint statement at the stakeholder kick-off meeting on September 30, 2008, the Executive Officer of the Regional Water Board, Pamela Creedon, and the Executive Director of the State Water Board, Dorothy Rice, reaffirmed that their agencies are fully supportive and committed to this effort. Further, they assured that the Water Boards are willing to negotiate regulatory requirements to achieve integrated monitoring and that the limitations and shortcomings of previous efforts to develop a comprehensive monitoring program are recognized.

It is widely understood that previous attempts at developing a comprehensive monitoring program for the Delta failed mainly because they were too ambitious. The proposed monitoring was too expensive to implement and was planned with too little consideration on feasibility, implementation planning, and the interests of stakeholders outside of the IEP-implementing agencies. Lessons learned from these previous efforts and from the successful implementation of RMPs in different regions (San Francisco Bay, Southern California Bight) are expected to help avoid these and other potential pitfalls. The following principles will be followed to develop a Delta RMP that is feasible, sustainable, and widely supported:

- Start small and focused
- Strive for cost neutrality
- Approach planning and implementation in several consecutive phases that build on each other
- Institutionalize periodic external program review and provide mechanisms for the continuous adaptation of the Delta RMP based on information generated
- Pursue an inclusive, tiered stakeholder approach (not just agencies) and develop a manageable governance structure for obtaining stakeholder input

The process of developing the Delta RMP started officially with the kick-off stakeholder panel meeting on September 30, 2008. At the first follow-up meeting of a stakeholder working group on November 19, 2008, participants felt their input would be better informed once the contaminants synthesis report by UC Davis and another report summarizing the existing monitoring in the Delta were available for review. A final draft of the Summary of Current Water Quality Monitoring in the Delta was distributed in November 2009. The next stakeholder meeting(s) will be scheduled upon the release of the contaminants synthesis report by UC Davis researchers. Results from the early development phase to the present stage include:

Monitoring Directory and summary report: Supported by a USEPA planning grant, a prototype online directory was developed to facilitate monitoring coordination and integration in the San Joaquin River basin. Recognizing the value of a web-based directory to organize and coordinate monitoring programs, the Central Valley Regional Water Board provided funding to expand the monitoring directory to cover the entire Central Valley. The beta version of the Central Valley Monitoring Directory is viewable at www.centralvalleymonitoring.org. The Central Valley Water Board has committed to maintain the directory for three years and provide outreach and support for Central Valley groups interested in adding their monitoring efforts to the directory. Future enhancements to the directory and long-term maintenance will be discussed in a feasibility study to be released with the final product. Discussions have begun to evaluate the feasibility of using the concept statewide and connecting the directory with California Water Quality Monitoring Council (Monitoring Council) web portals.

In connection with the Delta RMP, the Central Valley Monitoring Directory was used as the main tool to identify, compile, and inventory information on existing monitoring. Based on this information, Aquatic Science Center has prepared a draft report summarizing current monitoring activities in the Delta. The report features summary tables and maps and is available online from the Delta RMP webpage (http://www.waterboards.ca.gov/centralvalley/water_issues/delta_water_quality/comprehensive_monitoring_program/index.shtml).

Contaminants Synthesis Report: The purpose of the initial phase (pilot phase) of the Delta RMP is to establish a framework for regularly compiling, synthesizing, and reporting water quality data from existing, ongoing monitoring efforts. A report prepared by UC Davis to evaluate the role of contaminants in the POD provides a first attempt to look at an issue at a regional scale. The major goal of the study was to determine if sufficient data are available to conclude that contaminants are involved in the POD. The researchers compiled and review chemical, toxicological, and histopathological data relevant to the four POD species from public databases and published as well as unpublished reports. The data were evaluated for their use to detect patterns between pre-POD (prior to 2000), POD decline years (2000-2002), and post POD years (2003-2008). The results of the study were summarized in a report that is slated for release in April. Although over 1 million data records were originally assembled, the majority of these data was removed from the analyses because of Quality Assurance/Quality Control (QA/QC) issues. For example, data needed to be removed because they didn't include detection or reporting limits, lacked an identifiable analyte name, were not identified with an identifiable sample site location, or associated with incomplete reported units of measures (for example analyte concentrations expressed in seconds or cubic meters). The most significant finding was that there were insufficient data to draw conclusions about the role of contaminants in the POD.

Stakeholder involvement: The Delta RMP development was kicked off with a stakeholder meeting on September 30, 2008. During the morning session of the meeting, several presentations provided an overview of the impetus for the Delta RMP planning effort, elements of a successful RMP, Delta monitoring programs, and RMPs that could serve as potential models. The presentations were followed by a facilitated discussion regarding potential constraints that may impede development of the RMP and potential benefits that could be realized should the RMP be successfully implemented. The afternoon session consisted of a summary and further discussion of the issues identified during the first session. One outcome of the meeting was the identification of five key issues that will need to be resolved as the RMP planning effort proceeds forward:

1. Governance
2. Monitoring questions
3. Coordination with other programs
4. Data integration, and
5. Funding.

Another outcome was the formation of stakeholder working groups to assist the Water Boards in addressing these issues.

At the first governance working group meeting on November 19, 2008, stakeholders reviewed a strawman proposal describing Governance Options that was developed by the planning team (comprised of staff from the Water Boards and Aquatic Science Center, and Dr. Brock Bernstein). The purpose of this first meeting was to obtain stakeholder input on the governance structure for the pilot phase of the Delta RMP, which focuses on ensuring that available water quality data are regularly compiled, assessed and reported to the public. The meeting participants felt their input would be better informed once the Summary of Current Monitoring Programs in the Delta and the Contaminants Synthesis Report were available for review. There was general consensus among the stakeholders present that the first phase of the Delta RMP should be led by the Central Valley Regional Water Board, provided stakeholders would be given opportunities to provide input.

In the meantime, the planning team produced additional strawman proposals addressing Monitoring Objectives, Funding, and Data Integration and distributed them for review. At the same time, Regional Water Board staff conducted interviews with individual interests to obtain more in-depth input on the Delta RMP framework in an effort to maximize its utility for a wide range of stakeholders. A draft version of the Summary of Current Monitoring Programs in the Delta was distributed for stakeholder comment in July 2009 and the final draft was distributed in November 2009. A fact sheet describing the proposed stakeholder process, including who should participate, what will be asked of participating stakeholders, how the process is expected to work, and sources for additional information, has been posted on the Regional Board's [Delta RMP website](#). Meeting summaries, presentations, and strawman proposals are also available on the website.

As of to date, one of the main outcomes of the initial development work is a more clearly defined picture of some of the biggest problems (for example data management, integration, and access) that need to be addressed for a successful long-term RMP. To demonstrate the value of a regular, accessible communication product, the planning team decided that it will prepare an initial report for the Delta for a scheduled release in November 2010. The report would be modeled after the Pulse of the Estuary produced by the San Francisco Bay RMP.

A new technical support contract with the Aquatic Science Center will allow the Water Boards to resume a robust, product-oriented participatory process in May 2010. Topics for upcoming meeting(s) will include the results of the Monitoring Summary Report and the Contaminants Synthesis Report 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. Opportunities will be evaluated for enhancing the Delta RMP development process, for example, by integrating with activities supported by the federal Bay-Delta Plan.

The draft program plan describes a proposed strategy and alternatives for the long-term program that is based on previously distributed series of strawman proposals and feedback provided by stakeholders. It also provides a detailed plan for how the pilot phase would be implemented. Stakeholders are encouraged to provide comments on this program plan that may help to guide the pilot phase.

Section 6 describes proposed activities for the pilot phase in detail. In the short-term until November 2010, the Delta RMP planning team will focus the pilot phase on publishing the first prototype communication product and reinvigorating the stakeholder process. Tentatively, a second stakeholder panel is planned for May 2010 to re-initiate the planning process. Following the second panel meeting, workgroups that were formed at the Delta RMP kick-off stakeholder panel meeting would be re-engaged.

Initially, workgroups would be convened to develop specific suggestions for how to improve the most important issues based on current results. For example, the Contaminants Synthesis Report would provide the starting material for discussing issues of data integration and what should be done as next steps to solve the QA/QC problems. Another possible workgroup may be asked to work out efficiencies in funding. Dependent upon timing, availability, and level of effort, this work could also be supported or done by Aquatic Science Center staff, as directed by the stakeholder working group.

After November 2010, the pilot phase efforts would move towards working out the nuts and bolts of the long-term program implementation. As planned, Water Board and ASC staff will develop products for review and coordinate with issue-oriented stakeholder workgroups to schedule meetings at appropriate intervals and provide opportunities for input. Workgroup meetings would have the purpose to arrive at agreements on key decisions and resolve specific implementation issues. A “roll-out” workshop, similar in format to the kick-off meeting, will be scheduled to coincide with the release of the first Delta RMP annual report. At this point, there should be a reevaluation of whether the proposed approach to the stakeholder process is still preferred or if a different path should be taken for reviewing, completing, and implementing the program plan. To some extent, the style of this review process will depend on the rate of progress and future decisions how to allocate future funding for the project. For example, decision will have to be made if available resources should be used to continue staff support for coordinating and facilitating workgroup meetings; build, refine, and implement specific elements of the framework; or develop and assess existing data and prepare an up-to-date analysis of water quality conditions in the Delta.

Communications will be fostered through Regional Board staff by emailing periodic status updates and distributing draft products with requests to review (where appropriate, with a list of specific review questions). At appropriate junctures, workgroup meetings will be convened to allow for facilitated discussions. Because facilitated discussions are resource-intensive and require considerable investments in time and funding, the level of effort needed for in-person meetings will be continuously reassessed.

4. Long-term Program Framework

The purpose of this section is to describe a proposed framework for the long-term implementation of the Delta RMP. The framework describes in very broad terms the elements of the long-term structure of the Delta RMP. Some aspects of the framework represent a series of options, while others are more readily defined. The proposed long-term structure described here is based on a series of previously distributed strawman proposals and feedback provided by stakeholders.

The proposed framework of the Delta RMP consists of four elements that are adapted from existing monitoring planning frameworks that include the National Research Council’s Managing Troubled Waters: The Role of Marine Environmental Monitoring (1990), the U.S. Environmental Protection Agency (USEPA)’s Elements of a State Water Monitoring and Assessment Program (2003) and the Monitoring Council’s Maximizing the Efficiency and Effectiveness of Water Quality Data Collection and Dissemination. They also correspond to the 10 elements of SWAMP’s Comprehensive Monitoring and Assessment Strategy to protect and restore California’s Water quality but are slightly rearranged.

The four elements of the Delta RMP are:

1. Program scope
2. Program infrastructure
3. Monitoring objectives framework
4. Data access and integration

The following subsections describe a series of initial proposals that describe reasonable possibilities for fulfilling the four main elements of the Delta RMP. These will be revised and refined based on the results of the pilot phase and on involvement with program participants and partners as these relationships develop.

4.1. Program scope

The proposed goal of the Delta RMP is to collect, coordinate, integrate, and synthesize data and communicate information about water quality in the Delta to support management decisions. Water quality is the biological, chemical, and physical characteristics of water. Results from the Delta RMP will be used to evaluate the beneficial uses of waterbodies in the Delta in order to assess the impacts of pollution. This includes coordination of continuous observations to establish important baseline data, assessing potential population effects of toxic chemicals present in the Delta, and generating data needed to support modeling efforts for pollutant source identification. The information generated by the Delta RMP will help to define water quality problems, advance public debate about them, and support consensus-based solutions that improve environmental planning, management, and policy development. The envisioned outcome is sustainable, better protected beneficial uses of Delta water.

Desired uses of water depend on water quality conditions, yet these are a complex subject that are often tied to natural conditions and activities outside the scope of beneficial use assessments, mitigation practices, and protection policies. Examples are water diversions, wildlife and fisheries management practices, and land use patterns and changes. The Delta RMP is expected to help addressing the need for a broader, integrated view through coordination and collaborations with other programs. The envisioned result is the implementation of a comprehensive, coordinated, and integrated long-term monitoring and assessment system for the Delta ecosystem.

The proposed framework represents an ideal alternative at this time. It may be subject to change based upon funding, input from the Water Boards, and/or results of the implementation of the pilot phase.

4.1.1 Priority beneficial uses

The Delta RMP will examine the beneficial uses of waterbodies in the Delta that are impaired by water pollution. Beneficial uses impaired by contaminants and other forms of water pollution in the Delta include wildlife and aquatic life habitat, preservation of rare and endangered fish and wildlife species, drinking water, sport fishing, swimming, aesthetics, hydropower, and irrigation and livestock watering. All Delta waterways are listed as impaired for one reason or another. Pollutants for which all Delta waterways are listed include mercury, exotic species, toxicity of unknown origin, and a number of pesticides, mainly chlorpyrifos, diazinon, and other organophosphates. Salinity is a problem in the southern and western portions of the Delta. Middle River, Old River, several sloughs in the Stockton urban area, and the Lower Calaveras River are impaired by low dissolved oxygen (DO) situations. Pathogens impair several major waterways and small waterbodies in the Stockton urban area. Polychlorinated biphenyls (PCBs) impair waterways in the northern Delta and the Stockton Ship Channel. The latter is listed for two additional groups of industrial chemicals, dioxin and furans. The Lower Mokelumne River is listed for copper (Cu) and zinc (Zn).

Table 1 lists nine strawman criteria for prioritizing beneficial uses and impairments. These or similar criteria can be used to prioritize impairments to be examined in regional assessments. A scoring system of high-medium-low (H-M-L) could be used for all criteria to rank each beneficial use. Beneficial uses with the highest total score would be the highest priority for the Delta RMP. These criteria should be considered as a place to start. Professional judgment should be exercised in assigning actual scores and

rankings, based on existing beneficial use information. The final process and criteria would be decided by a stakeholder workgroup.

Table 1. Suggested criteria for prioritizing beneficial uses and impairments.

Prioritization criteria	Basis for scoring
(1) Stakeholder interest – qualitative, subjective evaluation by participants. How important are issues relating to this beneficial use to participating stakeholder groups? Will an assessment of these issues help to inform emerging policies affecting you?	Urgency - are there urgent regulatory and management needs that will benefit from the assessments?
(2) Established priority – Delta Vision, BDCP, Clean Water Act, Water Quality Standards	Alignment – how closely is beneficial use support aligned with widely supported regional goals and priorities?
(3) Political concerns – relationship to regulatory mandates, regulatory benefits, public will, and incentives to solving the problem	Productivity – will prioritization advance public debate and improve regional cooperation?
(4) Monetary effects – based on cost of solving issues	Cost savings – is there a potential of cost savings by addressing the issues based on shared information?
(5) Data quantity and certainty – are data complete and current? Are available data sufficient to assess beneficial use support?	Increase in confidence – will regional monitoring help to increase certainty in beneficial use assessment?
(6) Attainability – is there a feasible solution for achieving beneficial use support?	Feasibility – are there feasible solutions and do stakeholders expect them to be implemented?
(7) Impact – Would restoring a particular beneficial use solve more than one problem?	Efficiency – Will attainment create efficiencies by helping to solve other problems
(8) Complexity – is regional cooperation warranted given the level of regulatory complexity, expected costs, the level of effort, the number of stakeholders involved, number of responsible parties, who controls the problem, and who controls the solutions	Need for cooperation – are cooperative solutions needed to restore beneficial uses?
(9) Regional vs. local – is the beneficial use and its impairments a regional or localized issue?	Regional extent – are beneficial use designations and impairments an issue throughout the Delta?

4.2. Program infrastructure

Organizing, managing, and maintaining the program elements described above will require a program infrastructure tasked to fulfill a number of functions. Specifically, this entails funding and organizational structure, coordination with other programs, and the peer program review process. While it is premature to define a specific management structure, it is possible to describe the functions that must be performed and present alternative options to accomplish these.

4.2.1. Governance

Some of the main questions to be resolved regarding program governance are:

1. Who will be involved?
2. Who will operate the program?
3. Who participates at what level of organizational and/or program management?
4. How will the program be organized?
5. How will decisions be made?

A strawman proposal discussing alternative governance options has been distributed to stakeholders (Attachment 2)

4.2.2. Funding

Reliable, stable funding is a critical component of a sustainable regional monitoring program. Based on existing models, there are five basic funding options:

1. Creating efficiencies
2. Negotiated fee structure
3. Pay-to-play
4. Auction process
5. Negotiated budget based on an interagency Memorandum of Agreement (MOA)

These funding models are described in detail in a strawman proposal that was previously distributed to stakeholders and is appended as Attachment 3. They are described as separate options to make the different funding mechanisms clear, but several or all of them can be combined in a funding model for the Delta RMP. All options are flexible and can combine mandatory and voluntary participation. Objectives that apply to all 5 options are to find efficiencies, increase cost-effectiveness, and flexible funding arrangements.

4.2.3. Coordination with other programs

Participants of the kick-off workshop identified coordination with other programs as one of the five key topics that must be addressed during the planning of the Delta RMP. There are already dozens of programs monitoring intensively in the Delta and some of these efforts are already coordinating with each other. On the other hand, participants felt that there is also a lack of coordination between existing monitoring programs, which may result in inefficiencies and duplication of effort. It became clear from these discussions that efforts to identify efficiencies in individual monitoring programs and efforts to improve coordination among monitoring programs should go hand in hand. A central question to guide these efforts would be “If we took the funds currently being spent on water quality monitoring and prioritized information needs on which to spend it, would monitoring look the same as it does today?”

The Delta RMP may need to host discussions over an extended period with a variety of regulators, including the Central Valley Water Board, the State Water Board, the San Francisco Bay Water Board, and various federal regulators, about possible steps to improve coordination of the monitoring requirements of various regulatory and permitting programs. Possible improvements include better coordination among monitoring and reporting plans. The Delta RMP will also need to support steps by the Water Boards to eliminate overlaps in monitoring requirements of regulatory programs (i.e. ILRP, NPDES), especially where various dischargers are required to monitor the same receiving water. The Delta RMP should also foster discussions with regulators about improving coordination of permitting conditions related to water quality, water rights, and restoration. Both the regulators and stakeholders have a common interest in ensuring that regulatory and compliance resources are expended efficiently. In this regard, coordination can help regulators to continue their work of shifting more monitoring resources from demonstrating regulatory compliance of individual permit holders to assessing clean water outcomes.

The Delta RMP is expected to provide leadership and coordination for water quality monitoring related to beneficial use evaluations. To assist in this effort, a steering committee would identify and prioritize the water quality management questions of program participants as they relate to beneficial use attainment and use the shared priority objectives to coordinate their monitoring and assessment efforts. Additional coordination with existing multi-agency programs (IEP) or other agencies (for example, DWR Municipal Water Quality Investigations) could be accomplished through shared sampling, expanded data sharing, and standardizing methods.

The Delta RMP will need to work with the Delta Science Program (formerly CALFED Science Program) to tie Delta RMP activities into understanding the larger scientific context of understanding the Bay-Delta ecosystem. The Delta Science Program could also serve as the conduit for tying Delta RMP assessment activities to the comprehensive Delta Plan, overseen by the Delta Stewardship Council. Stakeholders also specifically pointed out the need for coordination of the Delta RMP with the BDCP process. This could be achieved by mutual participation in steering committees, working groups, and technical teams. Coordination will become especially relevant regarding the planned adaptive management and monitoring program for the BDCP.

The Coordinated Federal-State Work Plan on California water issues may provide opportunities to augment Delta RMP resources with Federal actions and investments. The Work Plan formally commits EPA to work with other State and Federal agencies to establish a comprehensive water quality monitoring and assessment program in the Delta. The Work Plan also commits EPA and DOI to work with other Federal and State agencies to better integrate existing and planned monitoring programs and to develop long-term funding and governance agreements.

Coordination efforts should also investigate opportunities for leveraged partnerships with programs in other regions, specifically “neighbor” RMPs operating along the periphery of the Delta (i.e. the San Francisco Bay RMP and the Sacramento Coordinated Monitoring Program [CMP]). Cooperative relationships could be established to share and exchange resources (for example, training, facilities and equipment; technical and administrative support; and data access and management tools). An “inter-regional” workgroup could investigate and prioritize water quality issues that would benefit from comprehensive assessments at the scale of the entire Bay-Delta and its watersheds. Based on the shared questions, common indicators could be identified and sampling activities coordinated. SWAMP would provide the framework for standardization of sampling, analysis methods, and QA benchmarks.

4.3. Monitoring objectives framework

With the backdrop described in the Introduction in mind, the following sections describe the proposed program goals (4.3.1.), a proposed monitoring objectives framework (4.3.2), criteria for selecting monitoring questions (4.3.3), and straw monitoring questions (4.3.4.). The content of Section 4.3. is based on a strawman proposal that has been distributed previously to stakeholders

4.3.1. Program goals

To address the need for comprehensive regional assessment, while meeting the following goals:

- Compile, synthesize, and report data regularly
- Answer important questions that require a comprehensive, regional view.

4.3.2. Monitoring objectives framework

The proposed approach for developing monitoring questions is to develop an *objectives framework* for ensuring that the RMP will address the most important *long-term* information needs. The proposed objectives framework consists of broader, core questions and the more detailed questions that convert these into specific monitoring designs. Core questions identify fundamental management concerns of existing programs that can be expressed in broad, readily understood terms. These core management questions are then connected to specific assessments or study elements by more detailed tiers of questions that can serve as the basis of explicit monitoring designs and assessment designs. Core management questions can be reviewed after a length of time and revised as necessary. Core questions express general topics of interest, for example:

1. Are contaminants in the Delta potentially at levels of concern and are associated impacts likely?

2. Are water quality conditions and associated impacts in the Delta getting better or worse?

The core questions will need to be determined in a deliberate working group process that ensures adequate input by stakeholders and the Water Boards. The working group will be tasked to articulate the highest-priority management core questions, which will then be used to identify a series of specific monitoring questions. The specific monitoring questions would then need to be prioritized.

4.3.3. Criteria for prioritizing monitoring questions

Prioritization criteria for selecting monitoring questions may be as follows:

1. *Has the question already been answered, or is it being answered?* If the answer is “yes”, then the question is rejected. In these cases, the RMP should work to communicate the existing answer and to improve communication among water quality managers and scientists across multiple program areas.
2. *Can the question be translated into a specific monitoring or study design?* The question needs to have “practical value” for planning and designing monitoring approaches, special studies, or assessments.
3. *Is the question directly related to the priority management concerns of multiple stakeholder groups?* If the answer is “yes”, and the question has passed the other criteria, then it is given a high priority.

4.3.4. Straw monitoring objectives

The following table contains the proposed core questions and associated monitoring questions and relates them to existing water quality monitoring programs in the Delta. Existing water quality monitoring needs relating to the proposed core questions are gleaned from regional planning efforts in the Delta, such as the Delta Vision process or the State Water Resources Control Board’s Bay-Delta Strategic Workplan. Existing monitoring goals and objectives relating to more specific monitoring questions under these core questions were compiled from continuing, long-term monitoring programs in the Delta.

STRAW QUESTIONS

Core Questions

Associated Monitoring Questions

STRAW CORE QUESTION 1: *Are contaminants in the Delta potentially at levels of concern and are associated impacts likely?*

Relates to:

- ERP Conservation Strategy Goal 6. Water and Sediment Quality (ERP Conservation Strategy 2008)
 - Water Quality: known stressors that are a focus for ecosystem-based species recovery strategy: pesticides (e.g. pyrethroids), toxicity, DO, mercury and methylmercury, ammonium. Sediment Quality: concentration of contaminants in sediment cores, sediment toxicity
- Emerging contaminants (ISB 2007):
 - Pharmaceuticals and personal care products. Residues of powerful drugs and personal care products – and their metabolites – that are apparently entering rivers with municipal or industrial wastewater
 - Endocrine disruptors. Compounds known to be endocrine disruptors that have been shown to affect reproductive outcomes and, in some cases to cause sex changes in test species such as fish
 - DBPs and DBP precursor levels. Some DBPs are members of chemical classes - such as brominated and iodinated acetic acids and acetonitriles, and nitrosoamines - known to have significant health effects on test species.

Associated Monitoring Question 1-1.

What is the potential for impacts due to contamination?

- Selenium Verification Study (DFG): a continuation of a state wide investigation of selenium in fish and wildlife which began in 1985 and conducted under interagency agreement with the SWRCB. Continuation of a USBR program investigating selenium in agroforestry habitats. Participates in a nationwide program conducted by EPA using newly developed protocols for stream assessment.
- SWP Water Quality Monitoring (DWR): Compare SWP water quality to drinking water standards, Article 19 contractual requirements, or other criteria.
- Municipal Water Quality Investigations (DWR): provide monitoring data to MWQI Program participants and other identified stakeholders, such as CALFED, on key constituents of concern
- Irrigated Lands Regulatory Program (CVRWQCB): evaluate the presence of cumulative impacts from multiple stressors that may result in water or sediment toxicity
- Raw Water Regulatory Compliance (City of Antioch): comply with regulations. Tested water is used as a raw water supply for a municipal water treatment plant.
- Stockton Stormwater Monitoring (City of Stockton): evaluate water quality of discharges as it relates to baseline or benchmark conditions in receiving waters.
- Delta Mendota Canal (City of Tracy): comply with standards for drinking water
- SDWA (City of Vacaville and City of Fairfield): comply with the federal and State regulations as mandated by SDWA. Sampling takes place the first month of each quarter of the calendar year. The cities of Benicia, American Canyon, Fairfield, Napa, Vacaville, and Vallejo have established a user's agreement to share the data collected at Barker Slough.
- City of Vallejo – Water Quality (City of Vallejo): perform Title 22 and source water monitoring and process control.
- Source Water Monitoring (Contra Costa Water District): monitor source water for treated water supply
- SRWP Monitoring Program (SRWP): identify the effects of constituents of concern that affect the overall health of the Sacramento River watershed.

Associated Monitoring Question 1-2.

What are appropriate water quality guidelines?

- 1995 Bay-Delta Plan (SWRCB): Development of numeric objectives for salmon protection
- Central Valley Drinking Water Policy (CVRWQCB): Long-term goal of developing new water quality objectives for priority drinking water constituents

STRAW CORE QUESTION 2: *What are the sources, pathways, loadings, and processes leading to water quality impacts in the Delta?*

Relates to:

Associated Monitoring Question 2-1.

Which sources, pathways, loadings, and processes contribute most to impacts?

- Methylmercury cycling and export from agricultural and natural wetlands (USGS): monitor methylmercury in water, sediment, and invertebrates and monitor water chemistry and plant metrics in rice, fallow fields, and seasonal and permanent wetlands
- Hot Spot Monitoring (DFG): multiple water quality monitoring activities; sinks (e.g., photo-demethylation) & fluxes (e.g., sediments) as function of environmental conditions
- Groundwater Protection Program (DPR): determine how pesticides are contaminating ground water, identifies areas sensitive to pesticide contamination
- Surface Water Protection Program (DPR): identify the sources of pesticide residues, determine the mechanisms of off-site movement of pesticides
- Surface Water Ambient Monitoring Program (SWAMP) - San Joaquin Unit (CVRWQCB): help identify sources of potential impairment
- SRWP Monitoring Program (SRWP): Develop a cost-efficient and well-coordinated long term monitoring program to assess conditions within the watershed. Identify the causes of constituents of concern that affect the overall health of the watershed.

Associated Monitoring Question 2-2.

What are the effects of management actions on loads?

- Irrigated Lands Regulatory Program (CVRWQCB): -Determine the effectiveness of management practices and strategies to reduce discharges of wastes that impact water quality.
- Subsurface Agricultural Drainage Monitoring Program (CVRWQCB): data is used to support the Salt and Boron and Selenium TMDL programs
- SWAMP - San Joaquin Unit (CVRWQCB): data collected is also used to support the Salt & Boron and Selenium TMDL programs.
- SRWP Monitoring Program (Sacramento River Watershed Program): measure progress as control strategies are implemented.

STRAW CORE QUESTION 3: Are water quality conditions and associated impacts in the Delta getting better or worse?

Alternative question:

How are conditions of streams, rivers, and ground water in the Delta changing over time? (NAWQA - USGS)
 How do natural features and human activities affect these conditions, and where are those effects most pronounced? (NAWQA – USGS)

Relates to:

Associated Monitoring Question 3-1.

What are the effects of management actions on water quality conditions?

- D-1641 continuous recorder sites (USBR, DWR): compliance with Bay-Delta Standards contained in D-1641
- Continuous Monitoring in the Delta (USGS): continuously monitor suspended-solids concentrations, temperature, salinity, and water level at Delta sites
- SWP Water Quality Monitoring (DWR): document spatial and temporal changes in SWP water quality
- DWR Operations & Maintenance - Water Quality Section (DWR): record the physical and chemical composition of water in the Sacramento-San Joaquin Delta region to document impacts of the State Water Project in compliance with State Water Resources Control Board decision 1485
- IEP Environmental Monitoring Program (DWR): provide necessary information for compliance with flow-related water quality standards specified in the water right permits.
- DWR San Joaquin District Surface Water Monitoring Sites (DWR): The DWR San Joaquin District samples water quality at several local stream and river locations in the San Joaquin basin and Delta. Water quality parameters analyzed include EC, various standard minerals and nutrients.

	<ul style="list-style-type: none">- <u>ILRP (CVRWQCB):</u><ol style="list-style-type: none">1. Assess the effects of irrigated agriculture on water quality and associated beneficial uses2. Determine the effectiveness of management practices and strategies shown to reduce discharges of wastes that degrade water quality3. Determine the magnitude of waste discharged to waters of the State through concentration, flow and load information.- <u>NPDES Self Monitoring Program (CVRWQCB):</u> Monitoring activities of waste dischargers required by NPDES permits- <u>SWAMP - San Joaquin Unit (CVRWQCB):</u> determine, over time, if implementation efforts are improving water quality.- <u>Sacramento Coordinated Monitoring Program (SCRSD):</u> Develop high-quality data to aid in the implementation of water quality policy and regulations in the Sacramento area.
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STRAW CORE QUESTION 4: *What is the chemical and physical composition of Delta water?*

Alternative question:

What is the condition of streams, rivers, and ground water? (NAWQA - USGS)

Relates to:

- DOC as a key management issue (Delta Vision Process 2008)
- Salinity as a key parameter affecting designated uses (ISB 2007)

Associated Monitoring Question 4-1.

Are there particular regions of concern?

- NWIS (USGS):
 1. Surface-water data describe stream levels, streamflow (discharge), reservoir and lake levels, surface-water quality, and rainfall. The data are collected by automatic recorders and manual measurements at field installations.
 2. Ground-water level data are collected and stored as either discrete field-water-level measurements or as continuous time-series data from automated recorders.
 3. Water Quality: At selected surface-water and ground-water sites, the USGS maintains instruments that continuously record physical and chemical characteristics of the water including pH, specific conductance, temperature, dissolved oxygen, and percent dissolved-oxygen saturation. Supporting data such as air temperature and barometric pressure are also available at some sites. USGS also collects discrete sample data and analyzes chemical, physical, and biological properties of water, sediment and tissue samples.
- Methylmercury Assessments (DFG): conducting additional methylmercury assessments in Yolo Bypass Wildlife Refuge wetlands
- Groundwater Protection Program (DPR): determines where pesticides are contaminating ground water, identifies areas sensitive to pesticide contamination.

	<ul style="list-style-type: none"> - <u>Surface Water Protection Program (DPR)</u>: characterize pesticide residues. - <u>Surface Water Ambient Monitoring Program (SWAMP) - San Joaquin Unit (CVRWQCB)</u>: evaluate whether the most limiting beneficial uses in a specific water body are being protected - <u>SRWP Monitoring Program (SRWP)</u>: identify the extent of constituents of concern that affect the overall health of the Sacramento River watershed.
<p>STRAW CORE QUESTION 5: What are the projected water quality conditions and associated impacts in the Delta?</p>	
<p>Relates to:</p>	
<p>Associated Monitoring Question 5-1.</p> <p><i>What is the water quality forecast under various management scenarios?</i></p>	<ul style="list-style-type: none"> - <u>San Joaquin River Real-time Water Quality Management Program (USBW)</u>: simulate and forecast water quality conditions along the lower SJR

4.4. Data access and integration

This section is based on a previously distributed strawman proposal and presents an approach for how the Delta RMP effort can facilitate better data access and integration in the region. The approach is consistent with recommendations of the Monitoring Council, which includes representatives from the [California Environmental Protection Agency](#) (Cal/EPA), the [Resources Agency](#), the [Department of Public Health](#), the public, regulated publicly owned treatment works, regulated stormwater interests, agriculture, water supply interests, citizen monitoring groups, and the scientific community.

4.4.1 Data collection and management

The basic objective of this aspect of the Delta RMP is to ensure the collection and handling of data using documented and standardized and/or coordinated procedures. Use of such procedures will allow for integrating data to develop a more comprehensive view of the Delta. This in turn will help answer questions of interest to managers and other parties as well as make data more readily usable for other studies and assessments.

In terms of collaboration with the Monitoring Council, the Delta RMP would likely be expected to either work within the context of an already-established framework for organizing and assessing information or to participate in the development of such a framework at the statewide scale. This would include the following elements:

- Data collection and management as part of the Delta RMP can and should play a role in fostering and maintaining the integration of local and regional monitoring and assessment efforts by promulgating data standards and monitoring protocols such as those used by SWAMP
- Data management of the Delta RMP can build on existing resources and tools, including database templates, trained staff at regional data centers and analytical labs, a data checker tool, and a web-based data submission tool
- A database will be required for loading and storing data that are generated and/or processed by the Delta RMP. The database will be SWAMP comparable. Templates such as SFEI's San Francisco Bay RMP database are available
- Trained staff from the organization appointed as the organizational lead will be needed to upload and process data according to standardized data reporting formats. Depending on the volume of data to be processed, this may require from 0.5 to 3 Personnel Years (PYs)
- Existing regional data center data review procedures requiring multiple checks will be implemented to insure data quality meets intended uses, before data are made available via the web access/query tool. The SWAMP data checker can be used by participating monitoring groups and/or contracting labs for ensuring standardized formatting criteria are met. Regional data center staff (both Aquatic Science Center and UC Davis Aquatic Ecosystems Analysis Laboratory [AEAL]) continues to train analytical staff to use standardized data reporting formats.
- A web-based data submission tool should be implemented for labs to use when submitting their data. This will minimize the time required to upload data to the database

4.4.2. Analysis and assessment

The purpose of this program element is to support the goals of the Delta RMP through data analyses and assessments that are responsive and effective and widely available to stakeholders. It is the program element that integrates other elements related to identify management questions and establishing monitoring objectives and depends on functional data management tools and procedures. Successful regional assessments will require accepted protocols for data analysis and assessment that ideally would be scalable to support assessments at both more localized (e.g., site-specific) and a range of regional (e.g., watershed, basinwide, statewide) scales. The goal of this program element is therefore to establish

processes for compiling, analyzing, and assessing monitoring data.

On the regional scale, the Delta RMP data analysis framework will be integrated with the proposed Strategic Plan for Monitoring and Assessment in the Bay-Delta and its Watershed (“Strategic Plan”), which is currently being developed by a team convened by the [CALFED Science Program](#) (led by [Dr. Samuel Luoma](#)). The purpose of the Strategic Plan is to provide a means of better integrating data from widely distributed programs (water quality, supply, biological resources, habitat characteristics), identify gaps in existing programs and assure ongoing integrative, interpretive assessments of the data. The framework will define core monitoring questions (see Section 4.3.2) to explicitly track environmental changes expected to stem from major water management decisions. At the Delta RMP kick-off meeting, stakeholders recognized the current lack of data integration across different programs and identified it as a key challenge to a better understanding of Delta water quality and aquatic life use issues. Data integration and interoperability across different programs is a prerequisite for conducting the types of analyses that allow for a more comprehensive view of some of the cross-cutting major challenges faced in the Delta.

Assessment goals

- Comprehensive regional assessment of beneficial uses
- Develop measures of progress towards regional environmental targets
- Provide technical assistance to stakeholders in evaluating the effectiveness of their programs and activities in protecting and restoring beneficial uses

Functions

- Synthesize findings with other regional data for issues requiring data integration
- Conduct assessments of priority issues and summarize the results
- Providing baseline monitoring data at multiple spatial and time scales that are useful to multiple entities and programs
- Fostering and maintaining the integration of local and regional assessment efforts
- Support performance measures for pollution control and prevention programs
- Needs assessment in the development of new study areas and projects
- Survey stakeholders on an annual basis to obtain information that is useful in evaluating the effectiveness of the Delta RMP in meeting their information needs

Approach

To be useful to specific management applications, regional monitoring will be focused on well-defined monitoring questions that are associated with defined, quantitative measures of success or performance targets. The designated governance group will have the lead role in the interpretation and assessment of the data against the specific monitoring questions and making statements about the core questions by evaluating the data against the performance target. Trained staff (0.25 to 1 PY) would conduct the relevant analyses.

4.4.3. Information access and dissemination

It is anticipated that the Delta RMP will build on the Monitoring Council’s approach to information access and dissemination. The Monitoring Council’s web portals will use CEDEN, the distributed system with a number of data centers around the state, as the intended central access point for most data, with CEDEN providing an efficient route to other databases where data actually reside.

In addition, processes for regular reporting of results and the products (types of reporting) and distribution (reporting) frequency will need to be defined.

Information access and dissemination goals

- Produce and distribute Delta RMP products in a reliable and efficient manner
- Provide high-quality information products to update stakeholders on program activities and findings
- Publish measures of progress towards regional environmental targets

Information access and dissemination functions

- Publish studies on important water quality issues
- Produce an annual results report that can be accessed on-line
- Provide data for state and federal assessments
- Respond to data requests from external organizations

Approach

The State Water Board, in conjunction with the Monitoring Council, is promoting a distributed system of regional data centers around the State — the California Environmental Data Exchange Network (CEDEN). CEDEN is intended to provide important support to the Monitoring Council's question-driven web portals, which are being designed to provide access to statewide assessment products as well as the underlying monitoring data on which they are based. Working directly with either or both of these resources to standardize data management around key monitoring activities or issues could be a priority next step in the Delta RMP development.

Building on the Monitoring Council vision of a statewide water quality data access solution, Delta RMP would organize data integration around themes phrased as easily understood questions, coordinated by issue-specific workgroups.

In the interim, web access/query tools will be needed to retrieve Delta RMP data. SFEI has developed a web access tool for the SF Bay RMP and is currently developing a map-based data query tool. These tools are part of the SFEI regional data center, which is part of CEDEN. The existing tools could be customized and provided to the Delta RMP. They would entail the following components to meet highest-priority needs of data users:

- Map-based interface
- Data and assessment information at a variety of spatial and temporal scales
- Ad-hoc query and analysis results
- Ability to download raw data
- Ability to create graphic summaries based on assessment questions (e.g., location of sampling stations with exceedances of fish consumption guidelines, cellular abnormalities in aquatic organisms, etc.)

Delta RMP data would be managed and made available by one of the existing regional data centers. Options include Aquatic Science Center/SFEI, UC Davis AEAL, MLML, and SCCWRP. If Aquatic Science Center/SFEI and/or UCD AEAL were to become the designated data steward for the Delta RMP, the technical infrastructure for data management and access would already be in place, although the availability of specific tools differs between them. MLML also maintains a data portal, and SCCWRP has data mapping and query tools in place. Existing tools could be customized for the Delta RMP. In the

long-term, data access would also be available through the theme-based web portals under development by the Monitoring Council.

Attachment 1 depicts the proposed phasing of the data integration functions.

Technical reports/studies as well as easily digestible documents that provide an overview – like the “Pulse”—will be produced and available on a website. The website would provide access to documents as well as provide an easy link into whatever database/portal is used and/or developed.

5. Long-term Program Implementation

Implementation of the Delta RMP will require support from affected interest groups because it is based primarily on a collaborative approach to achieving its core goals. The program implementation plan is based on a two-phase structure:

- Pilot project
 - Validate underlying assumptions
 - Increase buy-in for the program
 - Begin developing data access, integration, and reporting capabilities
 - Demonstrate proof-of-concept
 - Produce long-term implementation plan
- Long-term implementation
 - Revise approach based on experience
 - Implement long-term plan, based on lessons learned and strategies developed in the pilot phase

This two-phase implementation strategy is modeled on that currently being implemented by the California Water Quality Monitoring Council, which has used a series of prototype assessments to demonstrate proof-of-concept, build support, and attract additional participants for the program.

The RMP’s pilot phase will thus produce one or more tangible products such as a “Pulse of the Delta” synthesis report based on one or more selected topics. This is a key aspect of the program’s proposed strategy, which is to use a product-oriented participatory process to demonstrate the program’s value and encourage participation as early as possible. During the pilot phase, the Water Boards (in a leadership role) and ASC (in a support role) will work with a stakeholder workgroup that represents a range of key perspectives and interest areas. The workgroup’s role will be to help shape a technically sound long-term implementation plan that meets regional monitoring and assessment priorities and needs. This implementation plan will focus on refining the program’s goals, objectives, and strategy, and defining solutions to specific implementation issues determined during the pilot phase. The transition from the pilot phase to long-term implementation will be marked by a gradual delegation of project coordination and implementation to one or more workgroups.

Throughout the pilot phase, the planning team will organize and manage the stakeholder workgroup, maintain communication with the workgroup about project progress, solicit stakeholders’ input and feedback about key project elements and project deliverables, and secure support for the approach to developing the Delta RMP.

5.1. Pilot project

A recent study sponsored by the State Water Resources Control Board and the Central Valley Regional Water Quality Control Board demonstrated the value of focusing Delta RMP efforts around developing

comprehensive assessments of specific management questions. The report, prepared by Dr. Michael Johnson and several coauthors, examined the role of toxicants in the Pelagic Organism Decline. In attempting to answer this question, the effort accomplished two important outcomes. First, it synthesized currently available information to address this question to the maximum extent possible at present. Second, it clearly identified those aspects of existing data, monitoring designs, and information management systems that prevent a full assessment of this question. It thus provided not only a relevant and real-world illustration of the shortcomings in monitoring systems that originally motivated the Delta RMP but also specific guidance for correcting those shortcomings. This report, and others like it that the Delta RMP envisions developing, can thus act as starting points for technical workgroups that will address issue-specific shortcomings in the monitoring system. Synthesis reports such as this also provide valuable material for communication products targeted at broader audiences.

5.1.1. Scope of the pilot project

The proposed pilot project will have three main elements, all of which are intended to provide proof-of-concept for the longer-term program plan. These include:

- A communication product to a broader audience, scheduled for release by November 2010
- Creation of one or more technical workgroups targeted specifically at addressing the monitoring system shortcomings identified in the Johnson et al. report on the Pelagic Organism Decline
- Development of an initial program management infrastructure to coordinate elements (e.g., data integration and access, sampling and analysis, reporting) that cut across multiple management questions

5.1.2. Communication product

The project team has discussed a range of options for a November 2010 deliverable and agreed that it would be feasible to produce a four to eight page communication product, for a cost of approximately \$30,000, to be distributed online to save publication and printing costs. For this budget, the project team envisions producing something similar in level of detail to the FMP factsheet (http://www.sfei.org/cmrfishmercury/FMP07_FactSheet_screen.pdf). The project team also agreed that the Johnson et al. report is an ideal centerpiece for this product. This report would be presented as the RMP's initial attempt to address an important problem in a comprehensive way at the regional scale. Additional items in the communication product could describe the RMP, briefly summarize findings from other assessment efforts, and explain how the Johnson et al. report sets the stage for implementing improvements to the monitoring system.

This product would also begin to accomplish the RMP's goals related to stakeholder outreach and involvement. augment

5.1.3. Additional synthesis report(s)

The pilot project will identify one or more management questions, similar to the one addressed by the Johnson et al. report, as the focus for additional regional data integration and assessment efforts. This will help to establish the RMP's identity as a program whose main goal is to improve the capacity for comprehensive regional assessment. In addition, one or more new synthesis reports will provide additional insights into constraints and shortcomings of the monitoring and data access and integration infrastructure in the region. These insights will then provide the basis for creating one or more technical workgroups charged with directly addressing these constraints (see next subsection).

Topics for additional synthesis reports will be identified and prioritized by the project team, the Regional Water Board, and other stakeholders. This process will provide an opportunity to begin building the

coordinated program management infrastructure that will be needed to guide the program over the long term.

5.1.4. Technical, issue-specific workgroup(s)

Insights from synthesis reports about shortcomings in the monitoring and data management systems in the Delta (such as those identified in the Johnson et al. report) provide tangible starting points for workgroups to begin address these problems. The project team will use each synthesis report to categorize issues as follows, beginning with the Johnson et al. report:

- Laboratory analysis issues (e.g.)
 - Inadequate detection limits
 - Procedural inconsistencies that reduce the comparability of data from different laboratories
 - Analysis methods that are poorly suited to constituents being analyzed
- Study design issues (e.g.)
 - Missing datatypes needed to assess cause-effect relationships
 - Inadequate spatial and/or temporal coverage
 - Mismatch between the spatial / temporal resolution of data to be combined in analyses
 - Low statistical power of key analyses / comparisons
 - Duplication of sampling effort and other inefficiencies
- Data management issues (e.g.).
 - Difficulty finding and/or accessing data
 - Incompatible formats
 - Inadequate documentation needed for data integration

Resolving issues in each category requires a different type of expertise. For each type of issue, the project team will then solicit participation in appropriately staffed technical workgroup(s) and facilitate their efforts, with the goal of identifying specific adjustments to monitoring design and/or policy and detailed steps for implementing these adjustments. For example, some adjustments can be implemented by individual programs or project managers, others will require adjustments to regulatory permits or other formal program definitions, and still others may depend on negotiations among multiple programs. The project will then work with workgroup participants and sponsoring programs to determine what management and/or technical mechanisms are available for ensuring these adjustments are implemented.

The workgroup approach will demonstrate whether and how shortcomings in the monitoring and data managements system can be addressed. They will also build participation and interest in the program by demonstrating that the program has a strategy for creating improvements in the monitoring system.

5.1.5. Program-level infrastructure

Synthesis efforts and technical workgroups can operate effectively in many respects independently of each other. However, there are aspects of their operation that will require higher-level coordination. Overall, there are several types of coordination that will be needed to ensure the program's implementation proceeds successfully. These include:

- Prioritizing and implementing new synthesis efforts
- Establishing issue-specific workgroups
- Coordinating sampling and lab analysis methods for those monitoring elements that cut across multiple issues
- Coordinating data access and management approaches and resources to ensure the capability for efficient data input, sharing, access, and integration
- Managing communication to program participants and outside partners

This is related directly to the governance issue discussed above in Section 4.2.1. During the pilot phase, such issues can be handled by the project team and more explicit and formal procedures can evolve as needed. An important goal of the pilot phase is to provide the information and experience needed to choose among the range of potential governance options for overall program direction and management.

5.1.6. Stakeholder outreach

As for the technical aspects of the program, the pilot phase will provide ample opportunity to evaluate a range of options for stakeholder outreach and communication, in addition to the communication product described in Section 5.1.2. Stakeholder outreach will fulfill important functions, both short- and long-term, for the program, including:

- Obtaining input on and review of products
- Obtaining help on identifying topics for future synthesis efforts
- Identifying participants in technical workgroups
- Coordinating with other programs
- Ensuring that products of the program's efforts are communicate to the appropriate audiences
- Continued development of the program's governance and management infrastructure

The project team will conduct needed stakeholder outreach through a number of mechanisms, depending on the information to be communicated and the type of feedback or input required. The stakeholder process developed to date, based on a broadly representative group of participants, will serve to inform agencies and other interested parties about the status of the program and as a vehicle for two-way communication. Periodic information updates on the project webpage will provide a means of keeping a much broader, but less directly involved, community informed. In addition, program staff and participants may meet with key managers to inform them of findings, request their greater involvement, or explain the implications of the technical workgroups' findings for their individual programs.

5.2. Long-term program implementation

Long-term program implementation will essentially follow the template established in the initial pilot phase. This will involve replicating each of the steps described in Sections 5.1.1 – 5.1.4 and further developing and formalizing the program elements described in Sections 5.1.4 and 5.1.5. Thus, the program over the long term will develop into a broader and more structured version of what is envisioned for the pilot project. It is difficult to describe in detail how this process will proceed, because collaborative programs such as this are somewhat evolutionary by nature. However, it is clear that the program over the long term will include, at a minimum, structures and procedures focused on:

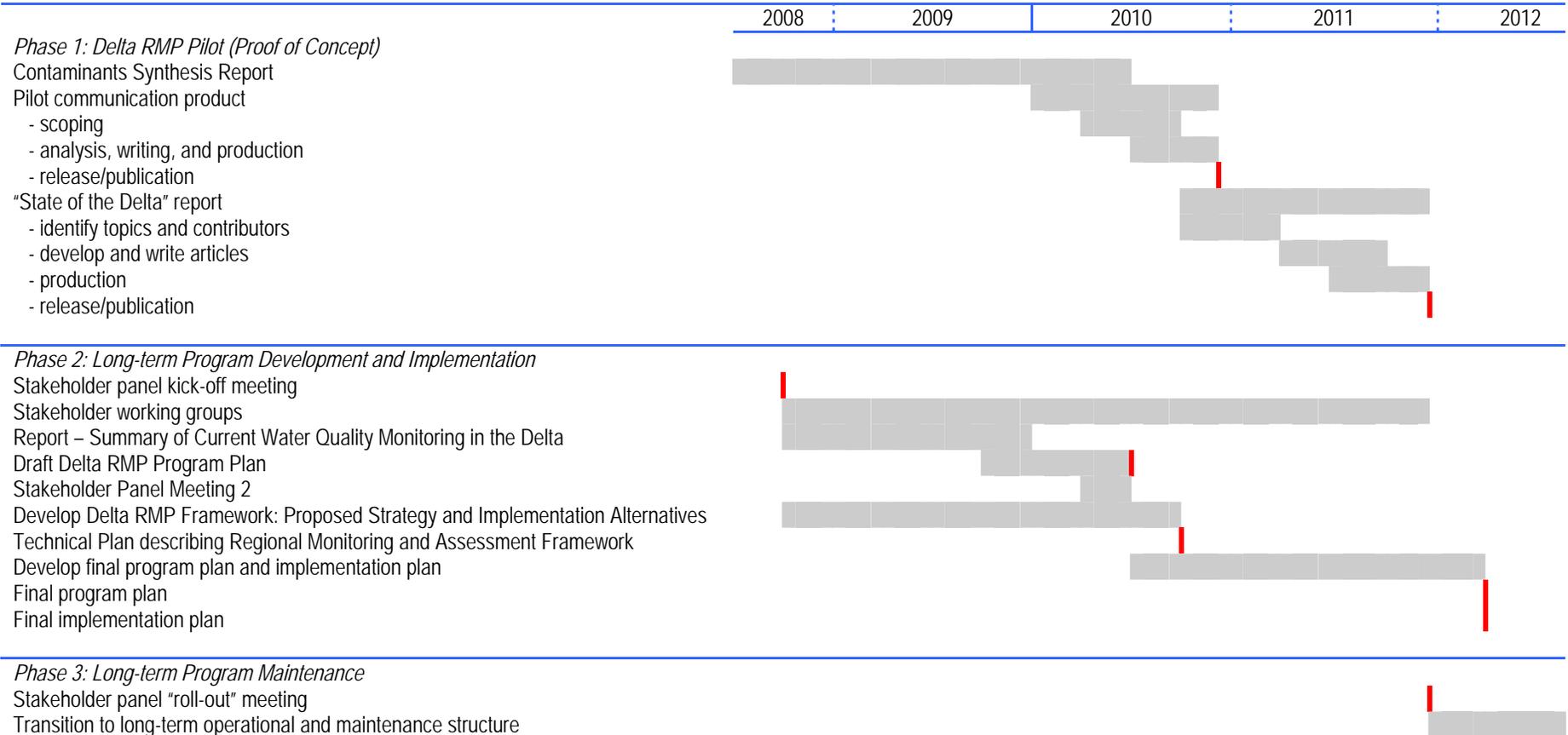
- Prioritizing issues for synthesis efforts
- Communicating results of synthesis efforts to wider audiences
- Providing oversight to the efforts of issue-specific workgroups
- Ensuring that monitoring elements that cut across multiple issues are adequately coordinated
- Ensuring that data management procedures and infrastructure needed to support data access, sharing, and integration are developed and implemented

The specific sequence and timing of such efforts, and their relative levels of effort, will become clearer as the pilot phase proceeds.

7. Timeline

The following figure presents a proposed timeline for implementing the Delta RMP.

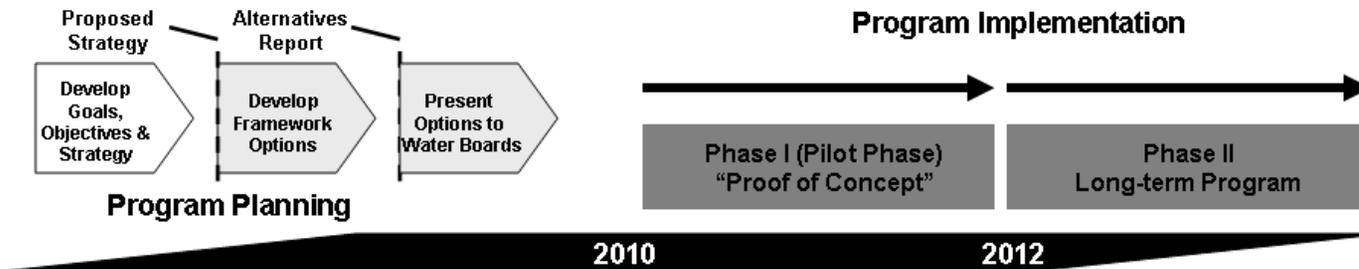
Tasks and Milestones



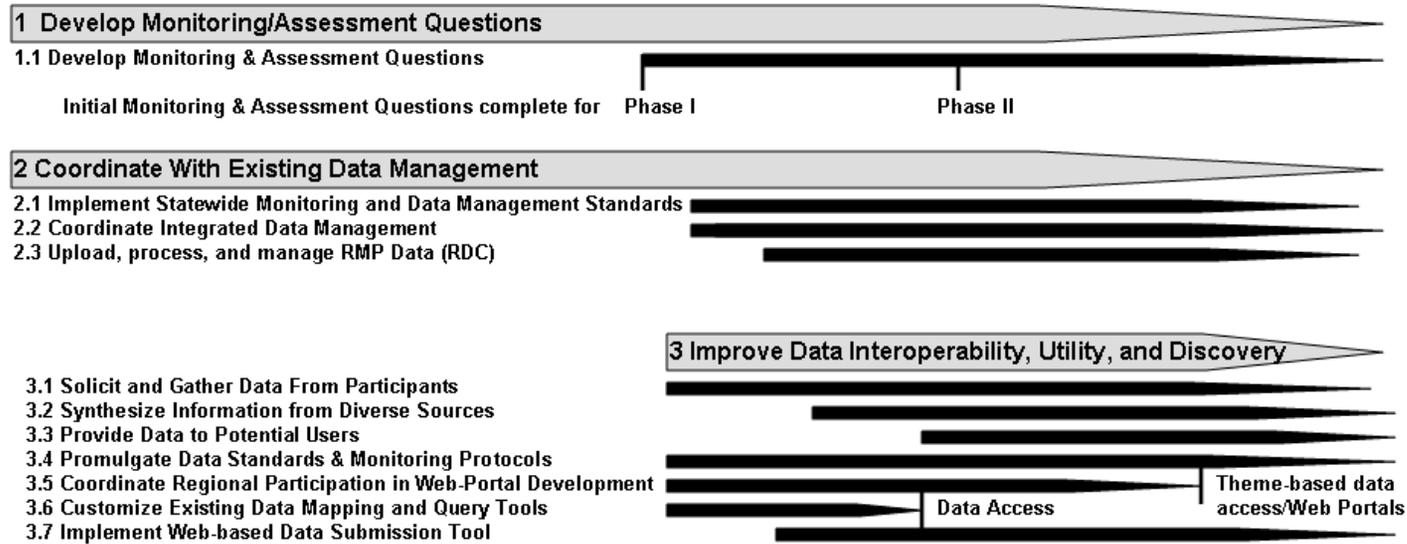
Attachment 1

Proposed phasing of the data integration functions.

Delta RMP Development Steps



Proposed Phasing of Delta RMP Data Integration Functions



Delta RMP Governance

This strawman proposal describes governance options for the Delta RMP. Its purpose is to serve as a raw material for work group discussions. It was developed by a planning team that includes staff from the Central Valley and State Water Boards, the Aquatic Science Center (ASC)¹, and Dr. Brock Bernstein. Although specific options are being proposed, different options are not necessarily excluded.

Development of the Delta RMP is expected to proceed in a phased approach. The first phase of the program development will focus on mechanisms for regularly compiling, assessing and reporting data from existing, ongoing monitoring efforts. The goal is to complete Phase I with a visible, tangible product such as a "Pulse of the Delta" type of synthesis report that addresses an initial set of program questions. The second phase is expected to define the long-term structure and goals of a Delta RMP that is fully integrated and coordinated among all programs.

This working draft outlines options for the governance structure of the Delta Regional Monitoring Program (RMP) for consideration by the stakeholder panel. The options are drawn from existing regional monitoring models. Detailed descriptions of four existing models (San Francisco Bay RMP, Southern California Bight Program, Los Angeles & San Gabriel Rivers Watershed Programs, and Lake Tahoe RMP) can be found in Appendix A.

The focus of this working draft is on defining interim governance options for the first phase of the Delta RMP's development. That is: there may be interim solutions for governance of the new Delta RMP in the development phase, for the main purpose of getting the program off the ground and defining its long-term purpose and goals. The interim governance structure would at some point be replaced or augmented by a long-term RMP governance structure. In the long run, the chosen structure of governance will need to "fit" with the program's purpose and goals.

Some of the main questions regarding program governance are:

1. Who is involved?
2. How do things currently function?
3. Who will operate the program?
4. Who participates at what level of organizational and/or program management?
5. How will the program be organized?
6. How will decisions be made?
7. How formal will the governance structure be?
8. How will the program review work?

¹ The ASC is a Joint Powers Agency with representation from the State, San Francisco Bay, and Central Valley Water Board, the Bay Area Clean Water Agencies, and the U.S. Environmental Protection Agency. It was created to promote and deliver science support functions and information management for governmental and non-governmental organizations with roles in water quality protection, policy development, and assessment. ASC is staffed and managed by the San Francisco Estuary Institute (SFEI).

Operational Lead

One of the main questions to resolve is: who should be in charge of coordinating and/or operating the Delta RMP? A number of institutional arrangements are possible. The four highlighted RMP models (refer to Appendix A) all involve an independent, non-governmental entity as the organizational lead. But there are also other options for an organizational lead—either interim or long-term—including the Regional Water Board, any of the other major agencies with monitoring programs in the Delta (DWR, USGS, IEP, etc), discharger associations (e.g., CVCWA, ag coalitions), consultants, or universities. The stakeholder workgroup will need to evaluate what type of organization is best suited to operate or coordinate the Delta RMP. Related to that, the stakeholder workgroup will also need to decide whether any existing organization would be suited—either as is or by adapting its mission, and capacities--or if there is a need to form a new entity.

Regardless of what the preferred long-term solution may be, it is likely that an existing entity will need to be appointed as an interim lead for various reasons: 1. it is probably too early in the process for making a decision on what works best in the long run; 2. there may be no immediate agreement on a preferred option; and 3. if a new non-governmental organization (NGO) or joint powers authority (JPA) will be identified as the preferred option, the process of establishing such an organization would most likely require several years of development.

In any scenario, the operational lead of the Delta RMP will need clearly stated objectives to be effective. This may be challenging to achieve considering the existing range of water quality management objectives in the Delta.

Stakeholder Participation

Successful models for regional monitoring programs are generally based on stakeholder participation in governance. Decisions to be made for the Delta RMP governance include: who should be represented? How do different interest groups participate? How should regulators; dischargers; local, State, and federal agencies; and environmental groups work together? Should everybody “have a say” proportional to the amount by which they contribute to a problem or solution? Should the Regional Water Board have the final decision?

Program Organization

One fundamental question is whether the Delta RMP will be operated by a single entity or a coordinated effort of all participants. This fundamental decision may drive the program organization to some extent. The San Francisco Bay RMP, operated by the San Francisco Estuary Institute (SFEI), is an example for the former; the Southern California Bight and the San Gabriel River RMPs are examples for the latter. All models involve at least one steering committee or work group. There could be a single stakeholder group working on all aspects of program development. Or there could be a tiered structure involving, for example, a steering committee guiding institutional and funding structure development, and workgroups to develop various technical aspects of the program.

Formality

Another fundamental question is whether and to what extent stakeholder participation in the development and management of the Delta RMP should be formalized. For example, should steering committee or work group members be selected or can anybody participate on an ad-hoc basis? What should be the selection process? Should there be a vote?

In the following discussion, these questions are addressed with options in terms of what is feasible to recommend for the Delta RMP, taking both potential benefits and concerns into account. Although specific options for the governance structure during Phases I and II are provided below, different options are not necessarily excluded.

PILOT PHASE – DEVELOP MECHANISMS FOR REGULARLY COMPILING, ASSESSING AND REPORTING DATA FROM EXISTING, ONGOING MONITORING EFFORTS

Operational Lead: The Water Boards, assisted by the Aquatic Science Center, would be responsible for coordinating this phase

Focus on coordination and standardization. A program (development) plan is needed that is supported by all affected interest groups. In addition, it will be important to complete Phase I with a visible, tangible product such as a “Pulse of the Delta” type of synthesis report. The transition from Phase I to Phase II would be marked by turning over project coordination to a workgroup for all next steps. The workgroup should be comprised of potential participants and coordinators. The desired outcome could be achieved through a Memorandum of Agreement (MOA), permit requirements, or other binding arrangement that would hold key stakeholders accountable for the development and implementation of the Delta RMP. The Water Boards would be included in the workgroup, but the workgroup would proceed with minimal top-down direction. Similar processes seem to be working well for the San Gabriel and Los Angeles Rivers RMPs.

Program Organization / Stakeholder Participation: Product-oriented participatory process

A product-oriented participatory process will be utilized to help prepare products and encourage participation in the RMP development. The Water Boards and ASC will coordinate with a stakeholder workgroup that involves designated representatives from stakeholders. The workgroup will be charged with shaping a long-term RMP that meets regional monitoring priorities and needs, is technically sound, and can be implemented with existing resources. The overall scope will focus on refining initial goals, objectives and strategy and resolving specific implementation issues. In the process, the Delta RMP planning team² will make drafts of the proposals available for review and comment.

Designees from agencies, dischargers, and other stakeholder volunteer to participate in workgroups. At the kick-off meeting (30 September 2008), it was determined that stakeholder workgroups will be formed to assist the Water Boards.

² Water Boards project staff, Aquatic Science Center, and Dr. Brock Bernstein

Stakeholder workgroup. The stakeholder workgroup(s) will assist the Water Boards in addressing the following initial topics:

- Hypotheses/Questions
- Data Integration/Access/Quality Assurance
- Governance
- Cost Savings
- Coordination With Other Programs

These initial topics should be integrated into a broader approach for addressing the overall scope of developing the goals, objectives and strategy for the Delta RMP, and

The workgroup(s), aided by the Delta RMP planning team, will need to address, at least:

- a. Interim and long-term scope of the program, including priority beneficial uses, parameters and benchmarks for assessing the priority beneficial uses, the geographic and temporal scope;
- b. Viable mechanisms for compiling, assessing, and regular reporting of results; and
- c. Products (e.g., reports, recommendations, program reviews, etc.) and distribution frequency.

There are already dozens of programs monitoring intensively in the Delta³ and some of these efforts are already coordinating with each other. Developing the Phase II RMP may involve a different set of participants than the Phase I workgroup.

Formality: as informal as possible

The proposed structure for Phase I would work on an ad-hoc basis: workgroup participation by key stakeholders is strongly suggested but not mandated. The San Gabriel River RMP provides a good example where a multi-stakeholder group was convened and decided to continue working together on an ad hoc basis to develop and adapt the program based on new information generated.

³ Major water quality monitoring efforts in the Delta include IEP, MWQI, D-1641 Continuous Recorder Sites, National Pollution Discharge Elimination System (NPDES) Self-Monitoring Program, Irrigated Lands Regulatory Program (ILRP), U.S. Geological Survey (USGS) Basic and Fixed Site Network, DWR Operation & Maintenance, State Water Project, Sacramento Regional Wastewater Treatment Plant Priority Pollutant Prevention Program, and Stockton Stormwater Monitoring.

PHASE II – DEFINE THE LONG-TERM STRUCTURE AND GOALS OF A DELTA RMP THAT IS FULLY INTEGRATED AND COORDINATED AMONG ALL PROGRAMS.

Operational Lead

Proposed option: ASC or new independent NGO or JPA

Independent “third party” to manage Delta RMP. Based on existing models (see Appendix A), an independent entity should be one of the key elements for the planned Delta RMP. It may require the foundation of a new NGO or JPA. Alternatively, it could be done by putting an existing organization in charge. An independent “third party” provides political neutrality, which is critical to establishing the Delta RMP, as a source of objective scientific information.

Key stakeholders to govern independent “third party”. The “third party” in charge of managing the RMP would require oversight by an executive stakeholder board composed of high-level management representatives from each participating group. Appointing an executive stakeholder board provides a mechanism for “power sharing” and ensures ownership of the monitoring information by various interests. Reporting monitoring information to the Board then ensures that the questions addressed by the Delta RMP are relevant to the most salient management issues. It also maximizes the likelihood that program results will be incorporated into the decision-making process, since an executive stakeholder board would have the authority to implement management actions in response to the monitoring results.⁴

Founding a new NGO vs. appointing an existing one. The ideal solution may be to found a new NGO or JPA for the purpose of overseeing the Delta RMP. A Watershed Council-style 501(c)(3) California corporation may be a suitable business model. Typically, watershed councils are locally organized, voluntary, non-regulatory groups and have a mission to improve the condition of watersheds in their local area. They are usually required to represent the interests in the basin and be balanced in their makeup. The Los Angeles & San Gabriel Rivers Watershed Council (described in Appendix A under the LA & SG Watershed Programs) is such an organization and may provide an existing model that could be emulated.

⁴ Examples of management actions that SFEI Board members initiated or helped implement based on results from the San Francisco Bay RMP include several listing decisions for the 303(d) list of impaired waters, improvements to loading reduction strategies for TMDLs (mercury and PCBs), fish advisory issuances by the California Environmental Protection Agency’s Office of Environmental Health Hazard Assessment (CalEPA/OEHHA), and state legislature banning polybrominated diethylethers (PBDEs).

On the other hand, it will require time, money, and staff effort to develop the institutional and legal framework and move the governance proposal through all the bureaucratic hoops. Thus, appointing an existing institution may be a practical solution requiring less bureaucracy and resources. At the current time, the only regional private organization with the capability of governing and, at the same time, operating the Delta RMP is the ASC. The ASC is a JPA that is staffed and managed by SFEI, the NGO in charge of the San Francisco Bay RMP. A major advantage would be that the new Delta RMP would build on an existing institutional framework, resources and facilities, and staff expertise⁵. ASC staff would be available to help coordinate and operate the RMP, including data compilation and synthesis, report preparation, statistical design, database management, sampling, and other activities. This solution would require a review of the existing by-laws and ASC program plan by groups participating in the Delta RMP. Most importantly for this solution to work, the ASC Board would need to be significantly expanded to include adequate Delta-specific representation by program stakeholders. This means that additional representatives for the water agencies, regulated dischargers, and other Delta stakeholder groups would need to be included.

Alternative option: state agency

If stakeholders cannot reach consensus regarding the operational lead, the Central Valley Water Board, supported by the State Water Board, may be required to oversee the Delta RMP. One option might be to operate the Delta RMP under the larger umbrella of the Surface Water Ambient Monitoring Program (SWAMP). Alternatively, a new group could be formed specifically for the purpose of managing the Delta RMP.

The advantage would be that of a clear leadership charge. However, a scenario where the Water Boards are managing the Delta RMP may mean that there is a lack of buy-in or downright resistance to the program by key stakeholder groups. It could also mean that there is buy-in to the concept but too many parties and governance options to agree on. The Regional Board might be the easiest solution in some circumstances. However, the resulting governance would then need to rely heavily on regulatory pressure to make the program work. In addition, the Regional Board's regulatory mandate and its staffing and funding constraints may limit the kinds of options it could pursue.

The Department of Water Resources (DWR) is another potential lead for the Delta RMP. DWR manages more water quality monitoring than any other agency in the Central Valley. DWR programs include the Interagency Ecological Program (IEP)—Environmental Monitoring Program (EMP) and Municipal Water Quality Investigations (MWQI). Although DWR is the biggest player in terms of monitoring and has the institutional and technical

⁵The described option with ASC as the operational lead assumes that there will be no direct institutional role of SFEI (although this would also be an option). There is some overlap between the SFEI and ASC Boards of Directors but they are not identical. The Delta RMP and its steering committee would both be independent of SFEI's Board of Directors. It follows that planning decisions for the Delta RMP, including staffing and budget, could be handled through mechanisms that do not depend on SFEI's existing decision-making body, even though there would be shared resources with SFEI. However, as with the ASC, SFEI's decision-making body could also integrate Central Valley stakeholders—if that is desired—and has done so in the past. Stronger participation by Central Valley stakeholders on the SFEI Board is welcomed but has traditionally been difficult to achieve due to logistic issues (Oakland location) and the limited number of SFEI projects that are of direct interest to stakeholders outside the Bay Area.

capabilities for taking the lead, more likely than not, a Delta RMP run by the agency would lack the buy-in of many non-governmental stakeholders. This also applies to governmental oversight groups such as the Delta Protection Commission or the CALFED Science Program. The latter two also don't have the combination of institutional substance, staff resources, and/or technical capabilities required for managing a Delta RMP.

Alternative option: contractor

Another option would be to hire a contractor for operating the program and/or coordinating the participants. There are a number of research institutions and universities as well as private consulting firms in the region with the required technical and managerial capabilities. However, if a consultant were to be selected to operate or coordinate the program, there would still be a need for an independent oversight group. As an alternative to a formal organization, this could be a Delta Water Quality "Management Group", similar to the San Joaquin River Water Quality Management Group (SJRWQMG). The SJRWQMG was formed per a Memorandum of Understanding (MOU) between the various interests involved in salinity management in the San Joaquin River (SJR), including dischargers, reservoir operators, and water projects operators. The group was formed with a clear objective in mind: to develop an action plan for achieving salinity and boron objectives in the SJR basin. The action plan is being developed as an alternative to the more regulatory approach of implementing Total Maximum Daily Loads (TMDL).

Program Operation

Proposed option: Delta RMP operated as a coordinated monitoring effort of all participants.

Delta RMP operated as a coordinated effort of all participants. This seems to be the most logical option, given the large number and great variety of monitoring efforts in the Delta.

Alternative option: Delta RMP is operated by a single entity

Depending on the program objectives, it may be more efficient and cheaper to assign a single entity—directed by a stakeholder steering committee—with operating the entire RMP or specific program elements (an example for this operational model is the San Francisco Bay RMP, described in Appendix A). Existing programs may not have all the capabilities for meeting RMP objectives. Specialized organizations such as SFEI or other contractors with certain types of expertise (e.g., clean techniques for trace analysis sampling) may be able to meet monitoring needs that are outside the scope of routine monitoring efforts. University research groups could be used for an "RMP-on-a-shoestring" effort by monitoring a basic network of regional monitoring sites.

Stakeholder Participation

Proposed option: Program participants are represented on steering committee; other stakeholders have the opportunity to participate in meetings, coordination activities, and review of RMP documents.

Participatory management structure is essential. Program participants will be directly involved in the steering committee and technical workgroups. The Steering Committee will provide administrative and technical direction to the program. The steering committee members are designated by each participating group. All Steering Committee members will have equal say in decisions and will direct the program through a consensus-building process. Decisions will be made based on consensus.

It will be supported by technical workgroups recommending technical approaches to achieve program objectives. In addition to a Steering Committee (SC), the San Francisco Bay RMP also has a separate Technical Review Committee (TRC) that provides technical direction to the program and the activities of the workgroups. Whether there will be a need to further divide responsibilities and add additional committees will depend on the final program objectives and organization. Although easier to coordinate, a single workgroup would probably mean that individual participants would need to commit more time and progress would be slower (i.e., in series rather than in parallel).

SC/TRC composed of scientifically-trained, mid-level managers from each participating group. The SC/TRC will provide overall direction to the program. It will establish objectives, determine the overall budget, allocate program funds, and track progress. Technical direction will include developing the monitoring and assessment designs and selecting indicators to be measured. The SC/TRC will also provide review for all RMP products.

The Steering Committee will be supported by technical workgroups recommending technical approaches to accomplish the objectives. The members of the technical workgroups will be experts in their specialized field. They will provide technical input into the monitoring plans and prepare detailed plans for all program elements.

All other stakeholders will have the opportunity to weigh in by participating in annual meetings and providing additional project review. Rather than being directly involved in program management, environmental advocacy groups should be adequately represented on the Board (or equivalent oversight group). The Board will also advise on additional project review.

The proposed participatory management structure for this option is illustrated in **Figure 1**.

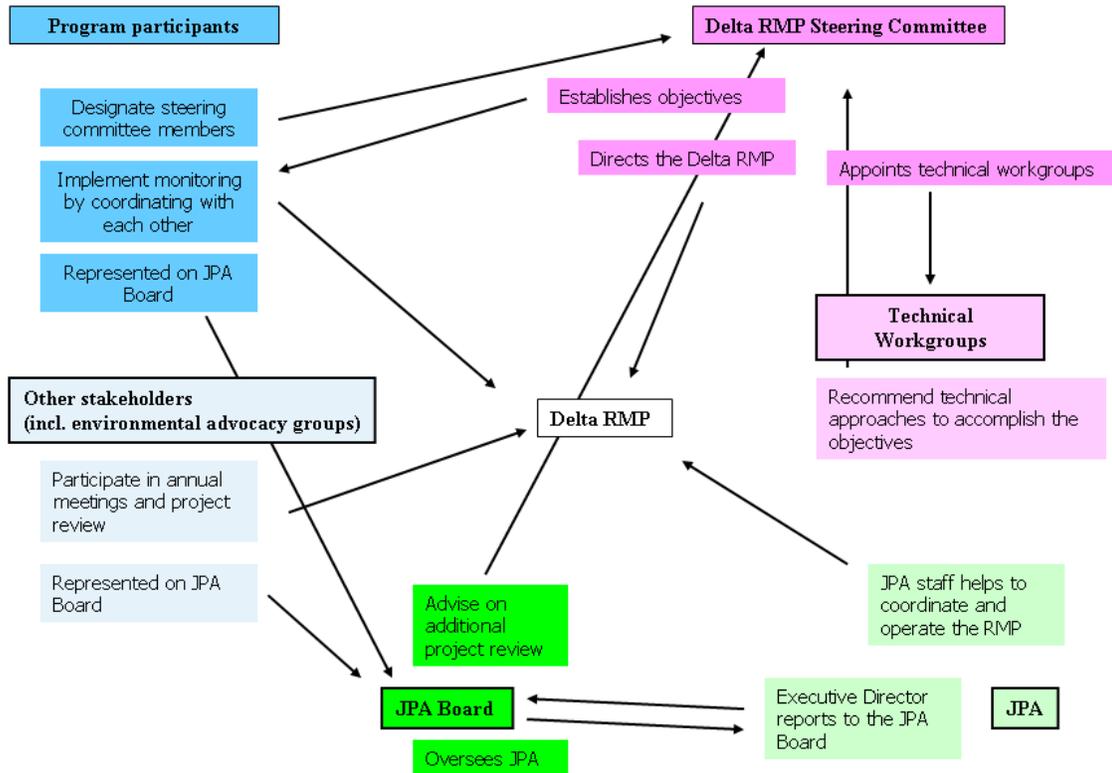


Figure 1. Proposed operational chart for the Delta RMP (Phase II).

*There should be some reciprocity between investment in the RMP and management participation. Having committees of designated representatives from different participating stakeholder groups (one from each group, see **Table 1** for an example) has proven effective for the San Francisco Bay RMP. A much larger committee with a seat for each individual agency or permitted discharger would probably be less efficient.*

Table 1. Straw example of stakeholder grouping for the Delta RMP steering committee

- Regional Water Board
- State Water Board
- IEP
- State Water Contractors (incl. MWQI)
- DWR (non-IEP)
- U.S. Bureau of Reclamation (non-IEP)
- U.S. Geological Survey (non-IEP)
- large POTWs/CVCWA
- small POTWs/local public works departments

- Agricultural coalitions
- Stormwater agencies
- U.S. Army Corps of Engineers

Alternative option: Delta RMP is operated by an open council

Although possible, an open council is unlikely to provide effective management to the Delta RMP. Without any reciprocity between investment in the RMP and ownership, there is no incentive to participate for those who could potentially contribute resources.

Appendix A: Regional Monitoring Models

Here are four examples from RMP models of other regions provided as additional background to the discussion:

1. San Francisco Bay RMP
2. So Cal Bight Program
3. LA & SG Watershed Programs
4. Lake Tahoe RMP

Table 1 provides a comparison of key program elements of these models.

Model 1: San Francisco Bay RMP

The impetus for the program development was a resolution by the San Francisco Bay Regional Water Board to require dischargers in the Bay Area regulated under the National Pollution Discharge Elimination System (NPDES) program to participate in regional monitoring. Contribution to the program constitutes compliance with the requirement to participate. The requirement for continued participation is offset by eliminating certain permit requirements for individual permits.

Operational Lead

Monitoring, assessment, and reporting are coordinated by the San Francisco Estuary Institute, a private (non-governmental), non-profit institute. The arrangement was established through a Memorandum of Understanding (MOU) between SFEI and the San Francisco Bay Regional Water Board⁶.

Program Size

Annual Budget (existing San Francisco Bay RMP) 2008: ~ \$3M for sampling ~75 sites, including data management, assessment, and reporting. The San Francisco Bay RMP samples once a year in the summer for 60+ parameters, including trace metals, organic chemicals, conventional water quality parameters, and toxicity.

Governance Structure

In this model, program governance is independent of existing programs in the San Francisco Estuary, such as the NPDES program or the Long-Term Management Strategy (LTMS) for dredged sediments. However, existing monitoring efforts participate on all levels of governance by appointing representatives to the SFEI Board of Directors.

Program staff and activities are overseen by two designated leads: the program manager provides leadership on the administrative side and the lead scientist on the technical side.

⁶ The ASC is not involved in SFEI decision-making or the San Francisco Bay RMP.

SFEI staff is responsible for selecting the program manager and lead scientist. The selection is made based on senior management consensus. Both report to the SFEI's Executive Director, who in turn reports to an independent Board of Directors that includes Bay Area scientists, environmentalists, local governments, and industries as voting members and representatives from the Water Boards and the U.S. Environmental Protection Agency (USEPA) as non-voting government liaisons. The Board of Directors oversees program budgets and performance and approves annual program plans.

All stakeholders have the opportunity to weigh in by participating in annual meetings and providing project review. Project scopes and results can be reviewed on the SFEI website. Overall, program governance balances funder's views with scientific review. Dischargers are directly involved in program governance, by participating in committees and project design. For controversial project scopes, stakeholders who are not members of the various committees and work groups may be asked to provide comments.

The program is overseen by the Steering Committee, the Technical Review Committee, and designated Workgroups consisting of invited experts (see **Figure 2**). The four current workgroups are: Sources, Pathways and Loadings; Exposure and Effects; Contaminant Fate; and Emerging Contaminants.

The Steering Committee determines the overall budget, allocation of program funds, tracks progress, and provides direction to the program from a manager's perspective. It is comprised of representatives of discharger groups (municipal dischargers, industrial dischargers, dredgers, and stormwater agencies) and the Regional Water Board. The Committee makes decisions by consensus and all members, including the Regional Water Board, have equal say in Committee decisions.

The Technical Review Committee (TRC) provides oversight of the technical content and quality of the program as a whole and the activities of the Workgroups. It consists of technical representatives from the same groups represented, on the Steering Committee, with technical support from SFEI staff.

The Workgroups address the main technical subject areas covered by the program. Workgroups consist of local scientists, regional board members, discharger representatives, and invited scientists recognized as leaders in their field. The Workgroups directly guide planning and implementation of pilot and special studies.

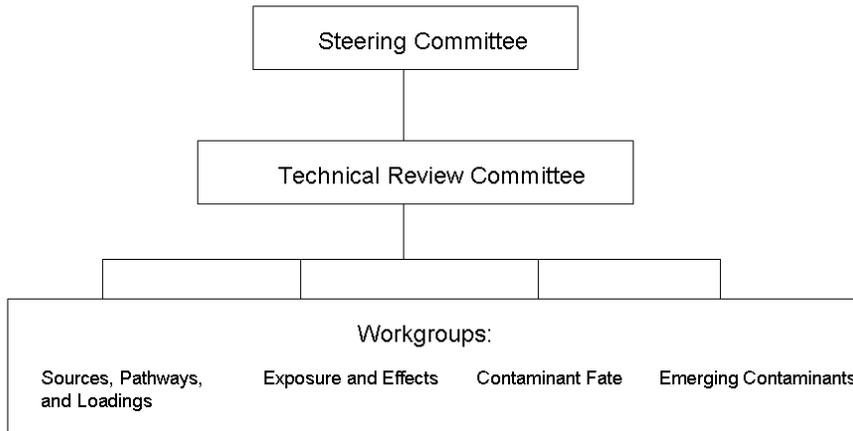


Figure 2. RMP committee organization chart (San Francisco Bay RMP model).

Model 2: Southern California Bight Program

Operational Lead

The program is coordinated by the Southern California Coastal Water Research Project (SCCWRP), a JPA with local, state, and federal government support. SCCWRP is a non-profit, local, marine research agency that is jointly administered by regulating agencies, water agencies, dischargers, and environmental groups.

Program Size

Bight '08: ~ \$8-9M for sampling ~375 sites, including data management, assessment, and reporting.

Governance Structure

The Southern California Bight Program was developed jointly by participating agencies and discharger groups in a collaborative effort. The infrastructure of the collaborative effort has two key elements 1) a participatory management structure, and 2) the presence of a neutral local, scientific organization—the JPA (SCCWRP)--to serve as a facilitator.

SCCWRP staff is available to serve as coordinators for the program and provide the technical expertise and manpower to undertake data compilation and synthesis, report preparation, statistical design, database management, and other pilot program activities that

are outside of what participating agencies can do within their available resources. Since SCCWRP is jointly administered by regulators, dischargers, water agencies, and environmental groups, staff provides non-partisan credibility in project development and interpretation of results.

Participatory management is accomplished with a three-tier management structure; the three tiers have distinct roles and provide the opportunity for participation by different levels of personnel from within each participating organization. The three tiers are: 1) JPA Board of Directors, 2) Steering Committee, and 3) Technical Subcommittees.

Cooperation of the regulators, water agencies, and discharger communities are fostered through mutual participation in the JPA. The JPA Board (Commission) is the formal organizational body to receive, review, and respond to the results of the monitoring program and serve as the primary audience for the products of this program. The JPA Board is composed of highest-level management representatives from each participating agency. The need for regional monitoring was discussed before the JPA Board. As shown in the S Cal Bight example, a major strength of appointing a JPA Board in this role is that the recipients of the monitoring information have the authority to implement management actions in response to the project results. Reporting to the JPA Board ensures that the questions addressed by the Bight Program are relevant to current management issues. It also maximizes the likelihood that the program results will be incorporated into the environmental management decision-making process in Southern California. For example, results of the Bight program have helped participating resource managers focusing on stormwater pollutants and clearly identified hot spots of toxicity, such as revealing the extent of contamination in Newport Bay.

The second tier management level is the Steering Committee, which is composed of scientifically-trained, mid-level managers from each of the participating agencies. The Steering Committee is responsible for overall planning of the program, including establishing program objectives, developing the sampling design, and selecting the indicators to be measured. Steering Committee members are also responsible for defining the resources their organization bring to the project: the “pay to play” arrangement of the program means that the scale of contributions is reciprocated by the scale of access to program resources and data. Another role for the Steering Committee is to ensure that the objectives set forth for the project are consistent with the cumulative set of resources available. The Steering Committee also serves as a point of technical review for all documents that are produced by the project. Participation on the Steering Committee ensures each participating organization the opportunity to direct the program through a consensus-building process.

The Steering Committee is supported by technical subcommittees, which are responsible for recommending technical approaches to accomplish the objectives set forth by the Steering Committee. The members of the technical committees are bench scientists who conduct the day-to-day work in their specialized field. They prepare the detailed plans for all the monitoring elements (including methods manuals, QA plans and database structure), conduct intercalibration exercises, and provide the technical input into the monitoring plans. Both the Steering Committee and the Technical Committees report to the JPA Board, bridging the gap between the scientific experts, technical staff, and management. The

Technical and Steering Committee's collective scientific ideas and plans are brought before the JPA Board for discussion at the senior management level. This structure facilitates management decision-making based on strong technical input and recommendations. This outcome is possible because the RMP was developed through consensus and input by participants at all management levels. Regional Water Board staff participate in all committees. The Committee makes decisions by consensus and all members, including the Regional Water Board, have equal say in Committee decisions⁷.

Model 3: LA & SG Watershed Programs:

- 1. San Gabriel River Regional Monitoring Program (SGRRMP) – implemented**
- 2. Los Angeles River Regional Monitoring Program (LARRMP) – being developed**

Operational Lead

The program is directed by a stakeholder workgroup and managed by a watershed council-type NGO, the Los Angeles and San Gabriel Rivers Watershed Council (LASGRWC). Typically, watershed councils are 501(c)(3) non-profit organizations composed of interested governmental and non-governmental stakeholders that form to collaboratively manage water and other natural resources at the scale of a watershed. Their purpose is to provide a governance structure and forum for community groups, government agencies, business, and academia for working cooperatively to solve problems in the watershed.

Program Size

Year 1 (San Gabriel River Regional Monitoring Program = SGRRMP): ~ \$1.7M for sampling 54 sites.

Governance Structure

The program impetus was a permit requirement by the Los Angeles Regional Water Board to submit a RMP. A stakeholder process was facilitated by an independent facilitator in collaboration with affected dischargers, a local, preexisting JPA (SCCWRP), and the institutional lead of the process (NGO). The stakeholder process brought permittees (either all—SG-- or major players--LA), resource and management agencies, and conservation groups together to brainstorm how to make it happen. For the SGRRMP effort, this broadly representative stakeholder group continued working together on an ad-hoc basis to direct program development in the pilot phase⁸. The work group continues to meet quarterly, still on an ad hoc basis, to review progress. A representative of the Regional Water Board participates in work group meetings of both efforts. Although the Regional Water Board has no formal lead role in the stakeholder workgroup, it may set boundaries to the planning

⁷ The Regional Board may use its authority by writing permit conditions that assure monitoring efforts are consistent with regional monitoring needs.

⁸ The LARRMP work group has recently completed the RMP design and is currently not meeting.

effort and has formal authority in the final program design step, at the point when permittees are requesting regulatory offsets in exchange for RMP participation and also determines how to allocate required contributions.

Model 4: Lake Tahoe RMP

Operational Lead

Conceptual development of the pilot program (Phase I) is led by the Tahoe Science Consortium, a private (non-governmental), non-profit research institute.

Program Size

Budget for Phase 2: ~236K for designing RMP

Governance Structure

Impetus for the program was the need to develop information to respond to basin-wide TMDLs. Planning is being conducted by a core stakeholder working group consisting of affected dischargers, planning agencies, regulators, management agencies, and scientists. A representative of the Regional Water Board participates in working group meetings.

Table 1. Comparison summary of four RMP models.

	San Francisco Bay RMP	S Cal Bight Program	LA & SG Watershed Programs	Lake Tahoe RMP
Operational Lead	NGO	JPA	NGO	NGO
Operational Model	Third-party	Coordinated	Coordinated	Not yet decided
Budget (approximate)	\$3M	\$8-9M	\$1.7M (SGRRMP only)	\$236K
Oversight Group	NGO Board of Directors (SFEI)	JPA Commission (SCCWRP)	NGO Board of Directors (LASGRWC)	Outside Interagency Executive Group
Management Structure	Three-tiered committee organization	Three-tiered committee organization	Stakeholder work group	Core Working Group
Committee selection	Designated seats	Appointees of participating organizations	Ad-hoc	Appointees of participating organizations
Participants				
Oversight Group	<u>Voting members:</u> Dischargers Regulators <u>Non-voting members:</u> Scientists Environmental groups	Regulators Environmental groups Dischargers	Regulators Environmental groups Dischargers	Regulators Resource managers
Committees/Work Groups	<u>Steering Committee, Technical Review Committee:</u> Dischargers	<u>Steering Committee, Technical Subcommittees:</u> Dischargers Regulators Scientists	<u>Stakeholder Workgroup:</u> Dischargers Regulators Environmental groups	<u>Core Working Group:</u> Dischargers Regulators Funding groups Planning agencies

Regulators

Environmental groups

Workgroups (Sources,
Pathways, and Loadings;
Exposure and Effects,
Contaminant Fate,
Emerging Contaminants):
Dischargers
Regulators
Scientists
Environmental groups



Delta Regional Monitoring Program

Funding

Strawman Proposal

November 20, 2009

List of Acronyms

ASC	Aquatic Science Center
CMP	Coordinated Monitoring Program
DFG	California Department of Fish and Game
DWR	California Department of Water Resources
IEP	Interagency Ecological Program
ILRP	Irrigated Lands Regulatory Program
LACSD	Los Angeles County Sanitation District
LARWQCB	Los Angeles Regional Water Quality Control Board
MOA	Memorandum of Agreement
NAWQA	National Water Quality Assessment Program
NPDES	National Pollution Discharge Elimination System
P4	Priority Pollutant Prevention Program
POD	pelagic organism decline
POM	receiving water stations at Pomona
POTW	publicly owned treatment work
PY	personnel year
R9E	receiving water station 9 east
RMP	regional monitoring program
SFEI	San Francisco Estuary Institute
SGRRMP	San Gabriel River Regional Monitoring Program
SJC	San Jose Creek
SWAMP	Surface Water Ambient Monitoring Program
UC	University of California
U.S.	United States (of America)
USGS	U.S. Geological Survey
WRP	water reclamation plant
WWTP	wastewater treatment plant

STRAWMAN PROPOSAL TO FUND THE DELTA REGIONAL MONITORING PROGRAM

This strawman proposal describes funding options for the Delta RMP. Its purpose is to serve as raw material for work group discussions. It was developed by a planning team that includes staff from the Central Valley and State Water Boards, the Aquatic Science Center (ASC)⁹, and Dr. Brock Bernstein. Although specific options are proposed, different options are not necessarily excluded.

Development of the [Delta RMP](#) will proceed in a phased approach. The first phase of program development will focus on mechanisms for regularly compiling, assessing and reporting data from existing, ongoing monitoring efforts. The goal is to complete Phase I with a visible, tangible product such as a "Pulse of the Delta" type of synthesis report that addresses an initial set of program questions. The second phase will serve to define and implement the long-term structure and goals of a Delta RMP that is fully integrated and coordinated among all programs. Funding options for Phases I and II are described separately.

The following three objectives for funding the Delta RMP apply to all funding options described below:

- 1. Find efficiencies that could fund new, regional-scale efforts.* Opportunities to create efficiencies and achieve cost-neutrality will be examined in each of the possible funding arrangements. They would apply to all types of current monitoring and every attempt will be made to do this first. For example, the exchange of a portion of individual, end-of-pipe/ditch/storm drain or diversion point requirements for participation in regional monitoring may serve as one means of attaining cost-neutrality for participating permit holders. Existing data will be reviewed to assess whether and where there are opportunities for cost-savings that could be achieved by eliminating monitoring redundancies or reducing the sampling frequency or number of parameters analyzed. Another approach for achieving cost neutrality is for the Water Boards (and other regulatory agencies) to allow for required local monitoring to be shifted periodically to support regional efforts.
- 2. Make monitoring more cost-effective for all participants.* The Delta RMP has the goal to focus existing resources on answering important management questions. This goal could be achieved by combining monitoring, special studies, and coordinated assessment/reporting. A more complete picture of current conditions in Delta waterways will help track the success of regional programs and policies and identify where available resources, including monitoring, are best spent for addressing the greatest surface water management challenges in the Delta. It will also make local efforts more cost-effective, for example, by informing the priorities for focused local monitoring and special cause-effect studies. The underlying assumption is that a more complete picture of current conditions in Delta waterways will also inform priorities for focused local monitoring and special studies to investigate cause-and-effect relationships.
- 3. Develop flexible funding arrangements that combine cash and/or in-kind support.* All agencies could make in-kind contributions.

PROPOSED APPROACH FOR FUNDING AND SUPPORTING PHASE I (SHORT-TERM)

⁹ The ASC is a Joint Powers Agency with representation from the State, San Francisco Bay, and Central Valley Water Board, the Bay Area Clean Water Agencies, and the U.S. Environmental Protection Agency. It was created to promote and deliver science support functions and information management for governmental and non-governmental organizations with roles in water quality protection, policy development, and assessment. ASC is staffed and managed by the San Francisco Estuary Institute (SFEI).

During the initial Governance Working Group meeting (20 November 2008), there was general consensus among the stakeholders present that the first phase of the Delta RMP should be led by the Central Valley Regional Water Board, provided stakeholders were given the opportunity to provide input. Serving as the lead, the Central Valley Regional Water Board, in cooperation with the San Francisco Bay Regional Water Board and State Water Board (collectively Water Boards), would be responsible for coordinating and funding this phase. The ASC and researchers at UC Davis would provide technical and administrative support during this effort, through existing and future contracts, provided sufficient contract funds are available. At present, the Water Boards have dedicated approximately 0.5 PY of Regional Board staff time to the regional monitoring program (RMP) planning process.

In the absence of supplemental funding from outside sources (e.g., permitted dischargers, other State/federal agencies), the level of effort directed towards compiling, analyzing, and reporting on water quality data would be constrained by the availability of resources within the Water Boards and would likely require redirecting or augmenting existing resources.

One means of supporting the Delta RMP during this phase, on the part of those entities currently monitoring in the Delta, would be to provide, or make available through a publicly accessible database, copies of their data to the Water Boards in an electronic format (e.g., Access, Excel). This type of in-kind support would result in a reduction in Water Board resources that would need to be directed towards compiling the existing data. Data provided in a standardized format would considerably reduce the amount of additional resources needed for data management. If possible at all, data should therefore be provided in a [SWAMP comparable format](#).

PHASE II (LONG-TERM)

Based on existing models, there are five basic funding options:

1. Creating efficiencies
2. Negotiated fee structure
3. Pay-to-play
4. Auction process
5. Negotiated budget based on an interagency Memorandum of Agreement (MOA)

They are described here as separate options to make the different funding mechanisms clear, but several or all of them can be combined in a funding model for the Delta RMP. All options are flexible and can combine mandatory and voluntary participation:

- (1) Permit conditions could require National Pollution Discharge Elimination System (NPDES) permittees, agricultural coalitions and commodity groups, and entities complying with water rights decisions to participate. Wherever efficiencies are found, certain monitoring requirements that are currently written into permits could be waived in lieu of contributions to the RMP. Monitoring and Reporting Plans of groups monitoring under permits could be required to be integrated with regional monitoring, as appropriate.
 - (a) All regulated dischargers in the Delta region.
 - Wastewater and stormwater dischargers that are regulated under the NPDES
 - 401 and 404 permittees (e.g., dredging operations)
 - Agricultural groups monitoring under the [Irrigated Lands Regulatory Program](#)

(ILRP)

- (b) Water supply agencies regulated by water rights decisions:
- Department of Water Resources (DWR) and U.S. Bureau of Reclamation (Reclamation) maintain large regional monitoring efforts in the Delta with annual expenditures exceeding \$5M for water right permits and water supply related monitoring alone.
- (2) Others agencies and groups that either generate or depend on data related to water quality or water rights decisions can opt to participate by means of a self-organizing process. This group of prospective participants includes
- Other state and federal agencies, e.g., Department of Public Health, Department of Pesticide Regulation, U.S. Geological Survey;
 - Water contractors, e.g., California Urban Water Agencies, Metropolitan Water District of Southern California, Santa Clara Valley Water District;
 - Reclamation districts, e.g., Reclamation District 2064; and
 - Overlapping regional monitoring program efforts (existing [RMP for San Francisco Bay](#) and planned [RMP for the Sacramento River Watershed](#)).

OPTION 1

Create efficiencies: use cost-savings from existing monitoring to fund regional monitoring

Regional monitoring will be funded through cost-savings that are achieved by eliminating stations and parameters or reducing sampling frequencies from existing monitoring requirements or overlapping monitoring efforts. The basis will be a comprehensive review of existing long-term monitoring efforts and a fairly detailed analysis of sampling locations, parameters, and monitoring data. The funding level of the Delta RMP would depend entirely on creating efficiencies. At a minimum, the following monitoring programs should be invited to participate in the review:

- (1) Regulated dischargers
- Wastewater and stormwater dischargers regulated under NPDES permits
 - 401 and 404 permittees
 - Agricultural groups monitoring under the Irrigated Lands Regulatory Program (ILRP)
 - Dredging operations
- (2) Water supply monitoring
- [Municipal Water Quality Investigations](#) (implemented by DWR)
 - State Water Project Water Quality Monitoring (implemented by DWR)
 - Contra Costa Water District Source Water Monitoring
- (3) Regional programs
- [Interagency Ecological Program \(IEP\)](#)
 - San Francisco Bay RMP

- [Sacramento Coordinated Monitoring Program \(CMP\)](#)
- Sacramento Regional Wastewater Treatment Plant Priority Pollutant Prevention Program (Sacramento Regional WWTP P4)

(4) State programs

- Surface Water Ambient Monitoring Program (SWAMP)
- Agricultural Subsurface Drainage Program

(5) Federal monitoring programs

- [National Water Quality Assessment Program \(NAWQA\)](#)

Once opportunities for cost-savings have been identified, there will need to be a decision for how the freed resources will contribute to regional monitoring. Options should be flexible and include

- a. Cash contributions
- b. In-kind contributions

As stated before, opportunities to create efficiencies will be examined in each of the possible long-term funding arrangements, but are also a stand-alone option for funding the Delta RMP

Example for Option 1: San Gabriel River RMP

The development of the [San Gabriel River RMP](#) is a direct response to a NPDES permit requirement established by the Los Angeles Regional Water Quality Control Board (LARWQCB) for the Los Angeles County Sanitation District (LACSD). A diverse multi-stakeholder workgroup was convened to develop the program plan with funding by LACSD. The final plan describes three specific adjustments to LACSD's compliance monitoring that would improve efficiency and free up funds to support the regional monitoring program. These include

- Shifting from weekly to monthly monitoring at 24 receiving water stations based on a review of parameter trends: the workgroup agreed unanimously that monthly data provided just as much insight into patterns in receiving water chemistry as did weekly monitoring data.
- Removing one station from the monitoring program: the workgroup unanimously agreed that continued monitoring at the eliminated station does not provide any additional information not already provided by a neighboring station.
- Removing a parameter (chlorophyll a) from the list of monitored constituents: the workgroup agreed that this parameter provides no useful management or scientific information.

Despite the presence of some unavoidable costing assumptions, LACSD, LARWQCB, and the other members of the workgroup all agreed that projected cost savings from each of these actions would form the basis for calculating the resource exchange to the San Gabriel River Watershed Council (the institution who is in charge of managing the SGRMP). The projected cost savings are provided below as examples.

The actual transfer of funds from LACSD to the Watershed Council would be accomplished under the terms of a cooperative agreement between the Watershed Council and LACSD, subject to approval by the Board of Directors for both agencies.

Moving to monthly sampling
 (estimated costs vary with constituent monitoring frequencies)

Station Type	Monthly Analysis Cost		Monthly Staging Cost		Monthly Station Total		Monthly Savings
	Weekly	Monthly	Weekly	Monthly	Weekly	Monthly	
WRP (11)	3053	1726	613	141	3666	1867	19789
Estuary/R9E (5)	2245	1209	613	141	2858	1350	7540
POM (3)	2135	2135	613	141	2748	2276	1416
SJC (6)	1153	1153	613	141	1766	1294	2832
Total (25)							31577

Removing a parameter (chlorophyll a)

Chlorophyll a costs \$54.68 per sample. Cost savings from removing chlorophyll a from all the stations was estimated as follows, assuming a monthly monitoring frequency:
 $\$54.68 \times 19 \text{ stations sampled} \times 12 \text{ months} = \$12,467$

Deleting a redundant station

The cost savings from removing s receiving water station, assuming a monthly sampling frequency and that chlorophyll a has been removed from the parameter list, are estimated as:
 $[\$1,154 \text{ (analysis cost)} + \$141 \text{ (staging cost)}] \times 12 = \$15,540$

10.3.4 Total annual cost savings

The total annual cost savings from implementing these three adjustments thus are:
 $\$378,924 + \$12,467 + \$15,540 = \$406,931$

This amount is more than adequate to cover the estimated costs (about \$349,165) of the SGRRMP. These include the random and targeted watershed monitoring, along with bacteria monitoring at key swimming and sentinel sites, and the pilot program for fish tissue monitoring.

Given that the actual scope and cost of these four program elements may change as they are implemented on a routine basis, all stakeholders agree that the original cost estimate may increase.

In addition to estimated monitoring costs, the SGRRMP budget includes routine administrative and other program costs, and some funds to support additional periodic intensive watershed assessments.

OPTION 2

A negotiated fee structure similar to that of the San Francisco Bay RMP

Funding for the Delta RMP could be done as a fixed relative contribution for each participant or stakeholder group. There are different means of assessing the contributions for each participant, but the basic model is a negotiated fixed fee structure similar to that of the San Francisco Bay RMP.

Example for Option 2: San Francisco Estuary RMP

(from 2008 Target RMP Budget Year)

Each participating stakeholder group contributes a fixed fraction of the total budget:

Participant Percent of Allocation:
 Municipal 44%

Industrial	11%
Stormwater	23.5%
Cooling Water	4%
Dredgers	17.5%
TOTAL	100%

Each group determines how to allocate the fees within their group. For example, the municipal dischargers determine their contributions using a formula based on annual measured loads of metals. The breakdown for Publicly Owned Treatment Works (POTWs) for 2005 was as follows (from Draft 2005 POTW Fee Allocation):

Total of 2005 Fees:	\$2,990,241
Total Number of Program Participants:	67
Number of Municipal Participants (POTWs):	34
2005 Fees for Municipal Participants:	\$1,315,706 (44% of total)
<hr/>	
Contributions of individual participants:	
Base Charge	\$4,463 ¹⁾
Additional Fee for Load Factor	²⁾
<hr/>	
Total Fee = Base Charge + Additional Fee for Load Factor	

¹⁾BASE CHARGE = [10% of total program costs / total number of RMP Program participants]

²⁾ADDITIONAL FEE FOR LOAD FACTOR = [(total municipal costs - base charges) / total load of POTWs] * individual POTW's metals load

OPTION 3

“Pay to play” arrangement similar to that used by the Southern California Bight program.

Agencies and groups that either generate or depend on data related to water quality or water rights decisions can opt to participate by means of a “pay-to-play” arrangement that would combine financial and in-kind contributions. The financial contributions could be a negotiated fee structure, or any of a number of other approaches. The scale of contributions will be reciprocal to the various incentives of different stakeholders to participate. For this funding arrangement to work, one may have to expect that stakeholders with the largest existing monitoring programs will also want to be the biggest contributors. In terms of supporting the program through offsets or tradeoffs with compliance monitoring, those discussions would be between the permittee and the regulator and the regional program would not get involved.

The funding principle of the [Southern California Bight Program](#) combines “pay-to-play”, where programs come in at different levels of support (Option 3), with an auction process (Option 4).

Example for Option 3: Southern California Bight Program

There are not really any strict financial requirements for participation, but a general rule of thumb is that participants have to at least buy one site, which is considered the minimum level of meaningful interest. For example, funding the sampling of a coastal ecology site is about \$10K. The threshold for participation is low by design, to encourage as many interests as possible to participate.

Based on the level of interest and commitments (either financial or more frequently in-kind),

participation is tiered at three levels:

- (1) Technical Working Groups: hands-on folks based on discipline;
- (2) Planning Committees: includes all participating agencies in a specific Bight Element (e.g., water column, sediment chemistry, there are six in total). Overall, program planning is a self organizing process, based on interest and the willingness to provide funding (see Option 4).
- (3) Steering Committee: integrates Planning Committee designs and results. The threshold for membership on this committee is involvement in more than one planning committee. The mission of the Steering Committee is to integrate the different parts of the program.

Tiering based on commitments is only loosely applied and serves as a mechanism to streamline meetings at the highest levels of authority (i.e., Steering Committee). Contributions are reciprocated by the scale of access to program resources, in that the level of interest and commitments weigh in to the types of assessments that will be done. In addition, access to data is restricted to active participants prior to publishing the assessment results to the public in the form of the final report.

OPTION 4 **Auction process**

The allocation of resources to issues and questions will be based on a combination of how much parties are contributing and how much they can influence others.

Example for Option 4: Funding principle for Southern California Bight Program

To explain how the funding principle for the Southern California Bight Program works, program manager Ken Schiff provided the following example: "Let's say one entity wants to target sites around stormwater outfalls, while another wants to target sites in marinas. Both parties are interested in sampling 50 sites. Those interested in monitoring stormwater are capable and willing to finance all of the outfall sites; however, the marinas are unable to cover all of their sites (e.g., insufficient funds). Therefore, the marinas will either have to locate additional funding or reduce the number of marina sites. With respect to the former, one option is to convince the stormwater party of the merits of monitoring additional marina sites, such that they are willing to provide funding for marina samples. For example, during the last survey, there was interest in monitoring the ports, but the ports did not want to participate, so ports, bays, and marinas were lumped into one stratum, which meant that we would not be able to say something separate about ports. The results were bad enough (in terms of levels of contamination/impact) that now there's more funding to do the ports separately. And that's the way it should be. People who care will pay for data and if they aren't interested in funding an assessment, then we will not have data on that separate issue."

OPTION 5 **Negotiated budget based on interagency MOA**

Similar to the IEP, agencies would enter a MOA and negotiate/determine self-funding levels and funding transfers each year based on their program commitments and agency budgets. There may be an option to build on the existing IEP funding structure.

Example for Option 5: IEP Organizational and Funding Structure

The Interagency Ecological Program (IEP) for the San Francisco Estuary is a cooperative effort on the part of its nine member agencies, which include DWR, Department of Fish and Game (DFG), State Water Resources Control Board (State Water Board), Reclamation, U.S. Fish and Wildlife Service, USGS, U.S. Army Corps of Engineers, National Marine Fisheries Service, and the U.S. Environmental Protection Agency. One of the goals of IEP is to provide an organizational structure and program resources to assist in planning, coordination, and integration of estuarine studies by other units of member agencies or by other agencies. Monitoring activities are supported through a combination of financial and in-kind contributions (e.g., laboratory, research vessels) from member agencies, with DWR and Reclamation being responsible for the most significant contributions.

The IEP monitoring program currently allocates funds from two budgets, the Core budget and the Pelagic Organism Decline (POD) and Coordinated budget, both of which are approved on an annual basis by the IEP Directors. The Core budget represents long-term funding primarily for mandated monitoring (e.g., requirements set forth in Water Right Decision 1641 and the Operating Criteria and Plan biological opinions), information dissemination, and administrative support. The POD and Coordinated budget represents short-term funding provided for POD investigations, most of which are special studies, and funding provided by other programs to supplement IEP monitoring activities and special studies, or for which IEP is providing substantial technical oversight. The annual POD and Coordinated budget varies by year based on available funds, and research needs and priorities. Research (e.g., special studies) conducted under this budget is driven by work teams who submit recommendations to the IEP Coordinators, who in-turn seek final approval from the IEP Directors.