

DRAFT

California Bay-Delta Program

Science Program Multi-Year Program Plan (Years 5 – 8)

Implementing Agencies:

California Bay-Delta Authority

April 2004



Goals, Objectives and Targets

Goals and Objectives:

The collaborative process that characterizes the CALFED Bay-Delta Program requires transparency, open recognition of scientific uncertainties, and open discussion and publication of scientific findings. As described in the Record of Decision (ROD), it is expected that the Science Program will develop and provide the best scientific information possible to guide decisions regarding CALFED actions and to evaluate the results of the implemented actions. However, unlike other CALFED programs, the ROD establishes only broad policy objectives for Science, with few discrete tasks or milestones. Guided by the ROD, the Lead Scientist designed an organizational strategy for implementing program objectives that included identification of priority issue areas and discrete element tasks.

- **Water Operations and Environmental Resources:** There are a number of key technical uncertainties associated with the balance between ecosystem protection and water supply reliability for which the Delta is a focal point. The interactions between water management activities and sensitive species recovery provide much of the impetus for many planned CALFED actions and occur at scales ranging from specific sites like salmon spawning grounds below reservoirs and improving the efficacy of salvage at diversion facilities to systemwide operations that cover the net timing and movement of water from upstream areas into rivers and statewide diversion systems.
- **Cross-Program Integration:** Documenting what works at a regional or watershed scale where multiple CALFED activities occur requires more than routine monitoring. Necessary ingredients include interdisciplinary study of existing efforts, creative retrospective approaches, development of new knowledge about how projects affect ecosystems at multiple levels, and a high degree of collaboration with local and regional partners. Integrated, cross-program approaches for strategic adaptive management projects have already been initiated in Battle Creek, the Yolo Bypass/ Lower Consumnes, the Tuolumne, the Merced, and Suisun Marsh. The Science Program's priority for the next three years will be to focus on cross-program interactions in the Delta area and at the system-wide scale.
- **Performance Assessment:** Understanding the integrated influences of all actions on systemwide response measures (e.g. populations of key species or water supply network flexibility) is a unique responsibility of the CALFED-wide Science Program. Core objectives for years 5-8 include: facilitating program reviews including systemwide salmonid monitoring, funding studies and monitoring that fills key information gaps needed to help the CBDA understand how the net effect of program activities are influencing the accomplishment of program goals, and providing ongoing technical assistance to individual programs to help evaluate the impacts of individual projects and classes of projects.

The above priority issue areas have been identified through a significant amount of input from the CALFED agencies, staff, and the stakeholder community. These were strategically designed to provide information on the major decisions that the California Bay-Delta Authority (CBDA) must make in the near future on water operations, conveyance, flow management, restoration and storage. The Science Program staff has used these priority issue areas not only as a programmatic guide to effectively address the main ROD objectives, but also to articulate the breadth of the CALFED-wide Science Program where tasks description alone would be inadequate. These priorities were adopted by the Authority in 2003 as part of the Science Program's Multi-Year Program Plan. Since the plan's adoption, however, the program has received numerous suggestions for clarification of program goals and priorities, and has subsequently modified the priorities issue areas in description, though not in substance.

The following on-going tasks supporting these objectives include the following discrete element tasks:

- Oversight and coordination of program-wide science to respond to emerging questions relevant to the four interconnected CALFED goals.
- Investment in data analysis and identification of critical unknowns and knowledge gaps.
- Integrate use of best available scientific understandings and practices throughout CALFED by organizing Science Boards, Expert Panels, and facilitating collaborative efforts.
- Provide authoritative and unbiased descriptions of the state of scientific knowledge by convening issue workshops and preparing white papers.
- Evaluate the technical performance of CALFED Programs and help craft program specific performance measures.
- Establish and improve communication pathways between science, management, and public communities.

Targets

The ROD established the Science Program to “provide a comprehensive framework and develop new information and scientific interpretations necessary to implement, monitor, and evaluate the success of the CALFED Program (including all program components), and to communicate to managers and the public the state of knowledge of issues critical to achieving CALFED goals”. These objectives are broad and long-term in nature, and as such, require continuous efforts as identified in the priority issue areas and the supporting ongoing tasks listed above (see Goals and Objectives). Because these priorities were recently established through an open and technically credible process and because they are just beginning to be implemented, the Science Program does not intend to review/revise its targets for the next two to four years.

Accomplishments

The first 4 years of the CALFED Science Program have been marked by significant progress toward meeting ROD objectives, with focus on large-scale issues that cut across multiple program goals and regions, including:

- An intensive effort to clarify and improve the state of knowledge on a number of specific and central issues with an emphasis on water operations and environmental resources, critical fish species, water operations modeling, and restoration science.
- Establish a practice of seeking external peer review and advice and conducted external reviews of major proposals on Delta smelt salvage and south Delta diversion facility hydrodynamics.
- Initiate the use of public workshops as forums to publicly discuss complex technical issues.
- Develop a common methodology for assessing performance at different scales.
- Develop a strategy for monitoring program design and implementing a pilot monitoring program for wetlands restoration.
- Provide ongoing advice to individual CALFED programs regarding independent panels, performance assessment programs, science strategies, and peer review as part of proposal solicitation processes.
- Develop and implement a basic organizational design for integrating science throughout CALFED, including the establishment of a standing CALFED Science Board, Environmental Water Account review panel, and other ad hoc review panels such as the in-Delta Storage.

It should be noted that although significant progress was made during the first 4 years, some delays and institutional obstacles have hampered full implementation of the Science Program. The most significant delay has been caused by contracting and fiscal issues. In most cases, the time taken to process contracts with other state agencies and public entities has ranged from 16 to over 24 months. As a result, many program activities related to performance assessment, data analyses, and work conducted by standing Science Boards were delayed by approximately 1 ½ years. While work is progressing, outstanding systemic issues such as 3-year time limits to spend appropriated funds, the lack of master agreements with public entities, and the inability to fund service contracts across fiscal years will continue to hamper progress and are likely to cause additional delays in the future.

WATER OPERATIONS AND ENVIRONMENTAL RESOURCES

Investment in Data Analysis and New Scientific Information

Prepared program's first Proposal Solicitation Package (PSP) designed to fill critical information gaps in support of program-wide management (to be released July 2004).

Continued support of multidisciplinary hydrodynamic, fish, and water quality studies in the Delta, focusing on impacts related to the Delta Cross Channel.

Collaboratively, with Interagency Ecological Program (IEP), co-funded projects that addressed current information gaps and management concerns (*See Appendix for complete IEP Program Plan*).

Made recommendation to IEP on dedication of resources to monitoring program reviews and using a water quality monitoring program review as prototype for such efforts. Funded two efforts to analyze existing IEP data on benthic communities and fish distribution and trends and recommended adoption of multi-year fiscal and project plans.

Supported work that aim to increase the understanding of Delta smelt life cycle in support of actions taken in protection and recovery. Studies included a focus on the types of stressors affecting the populations, understanding the relationship between spawning and rearing habitat and the seasonal geographic population distributions, and developing population models to assess population status and trends.

Formed a team of investigators to conduct a pilot monitoring effort of tidal wetland restoration in the Bay and Delta aimed at describing the effects of restoration on ecosystem processes.

Funded a comprehensive review of Mercury that resulted in a Mercury Strategy for Bay-Delta Ecosystem. The final strategy has been peer reviewed and is available on the Science Program website: <http://science.calwater.ca.gov/>

Science Boards, Expert Panels, and Collaboration

Established an Independent Science Board to make recommendations on science issues to the Authority and Bay-Delta Public Advisory Committee. The board will help ensure that CALFED programs meet their goals by evaluating the science underlying the programs as well as the application of that science.

Continued to provide guidance on ways to build technical basis for Environmental Water Account (EWA) asset use by appointing an independent science panel and conducted three annual technical reviews of the EWA program.

Convened technical panel to review CALSIM II, the simulation model used for the planning and management of the State Water Project and the federal Central Valley Project.

Continued to provide support for the San Francisco Bay-Delta Science Consortium and its collaborative efforts.

Performance Measures and Assessment

Conducted external peer review of several program elements including In-Delta storage water quality assessment, San Joaquin dissolved oxygen problem identification and solution studies, and provided guidance to programs on peer review.

Conducted a Delta Cross Channel Project Review.

Recommended an organized review of systemwide salmon monitoring facilitated by IEP.

Conduct Issue Workshops and Prepare Whitepapers

Organizing series of workshops and symposia on water project operations and their impacts on critical fish species.

Conducted series of workshops on impacts EWA related activities on Salmonids and Delta smelt.

Completed White Papers on pertinent program-wide issues such as splittail, open water processes, and tidal wetlands.

In collaboration with the San Francisco Bay-Delta Science Consortium, convened workshops on Suisun Marsh Levee breach and salinity responses.

Communication

Continued effort to communicate the new knowledge and uncertainties associated with the balance between ecosystem protection and water supply reliability for which the Delta is a focal point, via Science Program website, Science News newsletter, and the E-journal. Additional efforts included briefings to the Bay Delta Public Advisory Committee, the Authority for the Bay Delta Program, Management Team, Tribal Forum, Water Education Foundation annual meeting, and numerous scientific conferences and workshops.

Publishing of White Papers in on-line E-journal.

Prepared comprehensive summaries of all Science Program workshops, conferences and symposia and disseminated via website, newsletters, and email reflectors.

To translate management questions into focused study topics, staff prepared science agendas for such key issues as Salmonids, Delta smelt, climate change, water ops and biology, and water operations modeling (part of PSP process).

Prepared management focused topical summaries, Management Cues, that describe new scientific information presented at recent conferences and workshops and highlight the relevance of this information to management needs. Management Cues from the State of the Estuary conference 2001 and 2002, and a Floodplain cue are available on the Science Program website under Management Resources: <http://science.calwater.ca.gov/management.shtml>

Co-sponsored the biennial State of the Estuary Conference (October 2002), and sponsored and organized the two biennial CALFED Science Conferences (October 2001 and January 2003). Both events provided an open forum for communicating most recent scientific information relevant to Bay-Delta Estuary and the CALFED program.

CROSS-PROGRAM INTEGRATION

Investment in Data Analysis and Identification of Critical Unknowns

Cost-shared major activities with individual programs such as targeting of critical unknowns identified by advisory panels and seeking proposals to investigate the use of Delta shallow water habitat by native fish species

Science Boards, Expert Panels, and Collaboration

Established an Independent Science Board to make recommendations on science issues to the Authority and Bay-Delta Public Advisory Committee. The board will help ensure that CALFED programs meet their goals by evaluating the science underlying the programs as well as the application of that science.

Supported efforts led by the Bay Delta Science Consortium in development of multi-institutional collaborations in many of the Signature Adaptive Project areas, including a Suisun Marsh pilot study and Yolo Bypass/Lower Consumnes riparian area and floodplain restoration.

In collaboration with ERP, supported team proposals for Merced restoration activities by the Adaptive Management Forum.

Conduct Issue Workshops and Prepare Whitepapers

Convened workshop focused on Battle Creek restoration and relationship of Coleman National Fish Hatchery to these efforts.

Organized workshop on Suisun Marsh to examine the convergence of restoration and water management, and focus on the needs for restoration success.

Performance Measures and Assessment

Provided guidance on existing monitoring programs and in design of new monitoring efforts and help define gaps and indicators based on specific management questions.

Assisted in design of data management strategy by continuously working with Delta region coordinators to better articulate expected environmental conditions resulting from planned CALFED actions (examples: Suisun marsh conceptual models, Delta fish facility evaluation conceptual models).

Communication

Established the Science Program website to clearly articulate program objectives and assist in reaching a broad audience with new information and upcoming events.

In collaboration with the Bay Delta Science Consortium, launched a new electronic journal serving as a forum for discussing science of interest to the CALFED community and publishing peer reviewed information.

Continued communication of new scientific information and its relevance to managers and policymakers by publication of periodic fact sheets on specific issues, preparation of white papers, and synthesis of management cues from new information presented at workshops and conferences.

PERFORMANCE ASSESSMENT

Performance Measures and Assessment

Developed a template for choosing indicators and performance measures to assess how projects and programs are meeting their objectives.

Collaboratively developed a draft set of prototype performance measures for Ecosystem Restoration, Levee, Drinking Water Quality, and Water Management programs, as well as helped define gaps in program-wide assessment.

Continued supporting development of workplans for individual programs.

Established peer review process for selection of indicators and written explanations.

Collaborated with the ERP to support enhanced external scientific review of proposals, provided external review of watershed program draft performance measure plan, and made resources available to Levee Program to support development of performance assessment workplan.

Science Boards, Expert Panels, and Collaboration

Facilitated the first technical review of the CALSIM II model, the general-purpose water management simulation model used for the planning and management of the State Water Project and the federal Central Valley Project.

Supported the establishment of Drinking Water Science Advisory panel and assisted in development of the panel's charge.

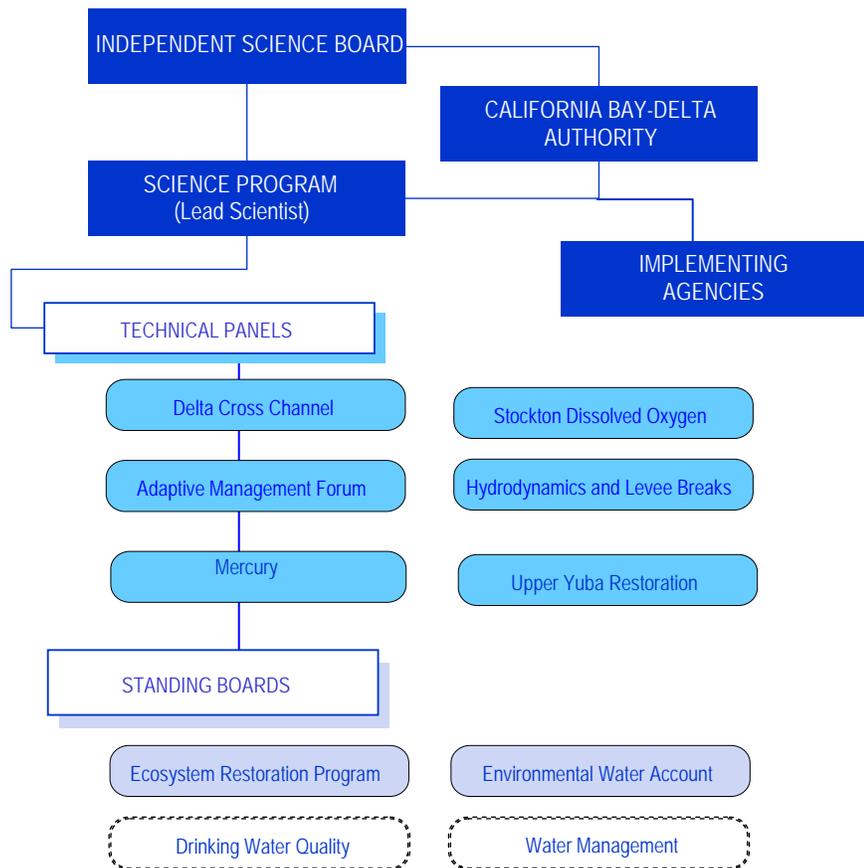
Provided input on the establishment of the Water Use Efficiency (WUE) Science Panel and advised on establishing peer review as part of their proposal solicitation process (PSP).

Communication

Conducted a workshop to present and provide the tools to CALFED program staff necessary for each program to develop and implement performance assessment as part of the science effort within each program area.

Program Structure

CALFED Science Program Organization



Agency	Roles and Responsibilities
California Bay-Delta Authority	<ul style="list-style-type: none"> • Oversight and coordination. • CALFED wide Science Board, expert panels examining cross-program issues and studies. • Conduct reviews of programs, large-scale activities cutting across program areas, advise on peer review in PSPs, and facilitate inclusion of outside experts. • Develop science agendas for cross-cutting issues, implement agendas by funding regional and large-scale monitoring gaps, signature projects, intensive multidisciplinary studies, and research aimed at building knowledge. • Support multiple communication tools and arenas, including online journal, science conferences and forums. • Invest in information needed to understand the integrated influences of all actions on system-wide response measures.
All Implementing Agencies	<ul style="list-style-type: none"> • Support Program-specific science advisors. • Conduct peer review of specific studies and tools, include peer review in PSP selection process. • Develop strategic science agendas specific to program assessment, fund studies and monitoring to implement agendas. • Invest in monitoring and performance assessment of classes of projects and cost-share studies of effects on a large-scale.

Major Activities

Needs for scientific information to support decision making and independent review and assessment for the CALFED Program are exceptionally broad and deep. Building new knowledge through ongoing investments and developing processes and practices to facilitate its use in decision making systems across the entire Program will take many years. The Science Program's strategy has been to focus intensively on specific areas of CALFED, designing and implementing practices that will support science integration over the long-term. There are three topics areas that cut across all program elements which have been the implicit priority for the Science Program since its inception in 2000: Water Operations and Environmental Resources, Cross-Program Integration efforts, and Performance Assessment. Specific tasks within these priority issue areas aim to enhance and sustain scientific practices through CALFED program, such as external peer review and scheduled assessments of program accomplishments, and promote the growth of new knowledge and synthesis of existing information through communication and collaboration.

The table below describes the major projects and activities planned by the Science Program for next five years to address program goals and attempt to meet ROD objectives. Under condition of reduced funding, the program would attempt to continue the identified activities, however, the level of effort or support would decrease dramatically. In addition to funding constraints, the program is also greatly affected by administrative issues that continue to hamper the process of bringing new information and better scientific practices to CALFED as a whole, including time limits placed on appropriations, fiscal year limitations on service contracts, and the lack of master agreements with collaborating state entities.

WATER OPERATIONS AND BIOLOGY

Investment in Data Analysis and Identification of Critical Unknowns

Conduct the first Proposal Solicitation Package (PSP) process and fund studies that will address critical information gaps and invest in analysis of existing data needed in support of program-wide management.

Schedule: Planned release of PSP July 2004 and begin funding projects in early 2005 with expected completion of multi-year studies by 2009

Continue support of multidisciplinary hydrodynamic, fish, and water quality studies in the Delta, focusing on impacts related to the Delta Cross Channel, Franks tract, South Delta channels and water diversion projects.

Schedule: Ongoing

Continue support of IEP monitoring efforts and collaboratively work to expand multidisciplinary studies, monitoring program reviews, and turning monitoring program information into knowledge (*See Appendix for complete IEP Program Plan*).

Schedule: Ongoing

Continue development of new information critical for water operations and biology.

Schedule: Ongoing with PSP release planned in 2006

Coordinate and advise the process of designing a long-term Environmental Water Account program, building on the past 4 years of programmatic and technical reviews.

Schedule: 2004-2005

Support a pilot monitoring effort of tidal wetland restoration effects, the Integrated Regional Wetland Monitoring (IRWM) Pilot Project, an interdisciplinary research effort examining wetland restoration in the North Bay and Delta regions of the San Francisco Estuary. For more information: www.irwm.org

Schedule: Ongoing

Science Boards, Expert Panels, and Collaboration

Provide support and assistance to the newly established Independent Science Board which makes recommendations on science issues to the Authority and Bay-Delta Public Advisory Committee. The board will help ensure that CALFED programs meet their goals by evaluating the science underlying the programs as well as the application of that science.

Schedule: Ongoing

Coordinate the transition of the *ad hoc* independent science panel for the Environmental Water Account (EWA) into a standing advisory science board for the EWA program.

Schedule: 2005

Provide advice through the Independent Science Board on the charge, structure, and coordination functions of two new advisory science boards for Water Management and Drinking Water Quality.

Schedule: 2004-2005

Provide support and guidance to individual program elements on programmatic review and assist in peer review efforts.

Schedule: Ongoing

Conduct Issue Workshops and Prepare Whitepapers

Organizing issue-specific workshops and symposia on water project operations and their impacts on critical fish species. Information gained will help prioritize future research.

Schedule: Ongoing

Continue discussion on impacts of EWA related activities on salmonids and Delta smelt in series of workshops. Upcoming workshop will focus on development of tools to help guide species management and water operation activities, such as building of lifecycle models for each species.

Schedule: Ongoing, with next workshop scheduled for September 2004

Complete series of White Papers on pertinent program-wide issues including Delta smelt, Central Valley salmonids, contaminants, riparian habitat, and sediment budgets.

Schedule: Expect Delta smelt and CV salmonid White Papers in 2004

Communication

Continue efforts to communicate the new knowledge and uncertainties associated with the balance between ecosystem protection and water supply reliability and the relevance of this information to managers and policymakers by publication of periodic fact sheets on specific issues, preparation of white papers, and synthesis of management cues.

Schedule: Ongoing

Prepare management focused summaries of Science Program workshops, conferences and symposia and disseminated via program website, Science News newsletter, and email reflectors.

Schedule: Ongoing

Continue to translate management questions into focused topic-specific science agendas and integrate these into a comprehensive CALFED-wide Science Agenda.

Schedule: Ongoing

In collaboration with the Bay Delta Science Consortium, continue support of the electronic journal, San Francisco Estuary and Watershed Science, which serves as a forum for discussion of science of interest and relevance to the CALFED community. The journal website information is: <http://repositories.cdlib.org/jmie/sfews/>

Schedule: Ongoing

Support and organize the 3rd biennial CALFED Science Conference for the public presentation of new and relevant scientific findings to the Bay-Delta community. The conference aims to not only communicate most recent information, but also highlight findings that are relevant to managers and decision makers.

Schedule: October 2004

Co-sponsor the biennial State of the Estuary Conference. Organized by the San Francisco Estuary Project, the biennial conference features new and relevant scientific information regarding the Bay-Delta Estuary.

Schedule: October 2005

Continue to improve and enhance existing channels of communicating scientific and programmatic information to a broad and diverse audience by developing a communication strategy for the program and implementing its recommendations.

Schedule: Ongoing, with draft strategy developed in 2004

PERFORMANCE ASSESSMENT

Performance Measures and Assessment

Assist and advise in defining gaps in program-wide assessment and collaboratively work with program managers in designing and improving existing performance measures for individual programs and projects.

Schedule: Ongoing

Provide support and advice in development of workplans for individual programs.

Schedule: Ongoing

Foster development and application of peer review processes for selection of performance indicators and written programmatic documentation.

Schedule: Ongoing.

Provide guidance on existing monitoring programs and in design of new monitoring efforts and help define gaps and indicators based on specific management questions.

Schedule: Ongoing

Continue to coordinate with IEP to support and enhance data analyses and periodic subprogram reviews.

Schedule: Ongoing

Science Boards, Expert Panels, and Collaboration

Provide support and assistance to the Independent Science Board as it begins to review many of the ongoing CALFED programs and evaluates the science underlying those programs, the application of that science, and the technical aspects of those programs, including performance assessment.

Schedule: Ongoing

Assist standing boards and expert panels in technical and programmatic review efforts, such as the annual review of the EWA by the EWA Review Science Panel, and the continuing technical review of CALSIM II model by an *ad hoc* expert panel.

Schedule: Ongoing

CROSS-PROGRAM INTEGRATION

Investment in Data Analysis and Identification of Critical Unknowns

Fund the California Bay-Delta Authority (Authority) Science Fellows Program that will be administered by the California Sea Grant Program (Sea Grant), to further collaborative data analysis and research projects relevant to ecosystem management and water supply reliability.

Schedule: Begin 2004 with annual solicitations for proposals

Continue to fund studies that fill systemwide information gaps and support efforts to develop integrated monitoring plans for species such as salmon.

Schedule: Ongoing

Continue to cost-share major activities with individual programs to develop new information on critical unknowns as identified by advisory panels.

Schedule: Ongoing

Science Boards, Expert Panels, and Collaboration

Support collaborative efforts such as the San Francisco Bay Delta Science Consortium, in an effort to develop multi-institutional collaborations that would effectively address some of the multi-disciplinary, cross-program and multi-regional information needs.

Schedule: Ongoing

Provide support and assistance to the Independent Science Board as it begins to review the implementation of the CALFED program towards achieving the fundamental Program goals.

Schedule: Ongoing

Conduct Issue Workshops and Prepare Whitepapers

Support and organize series of workshops to address issues and questions on floodplain habitat restoration.

Schedule: First workshop to be held May 2004

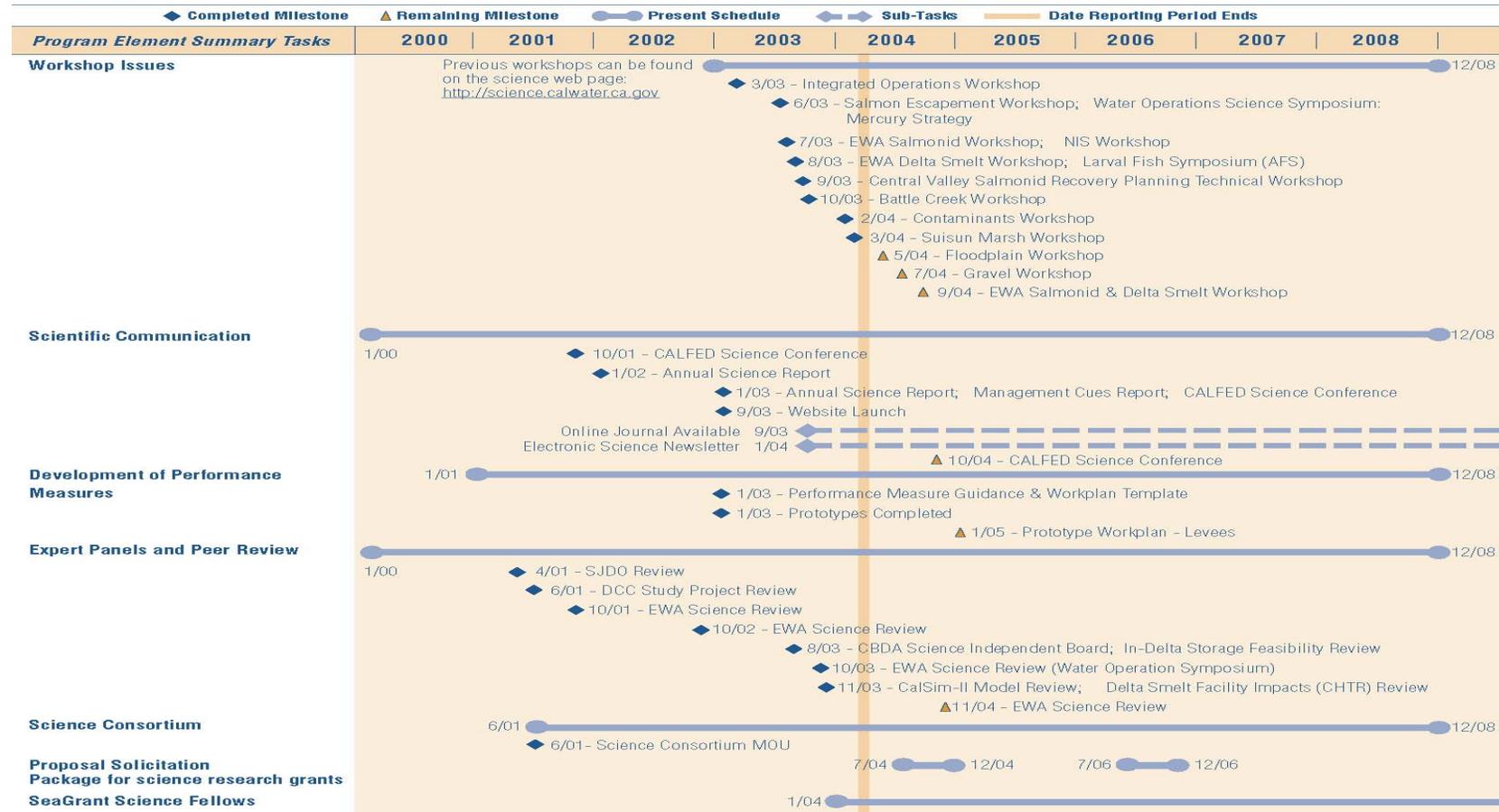
Organize a workshop that aims to bring together scientists and managers working river restoration to address gravel related issues.

Schedule: Ongoing

Continue discussions on Suisun Marsh to examine the convergence of restoration and water management, and focus on the needs for restoration success by organizing follow-up workshops and workgroups.

Schedule: Ongoing

Schedule



Integrating Environmental Justice and Tribal Relations

Environmental Justice:

The Science Program is working with the Environmental Justice Coordinator and members of the subcommittee to assist in the development of performance measures, communicating environmental justice specific issues to the scientific community via conference sessions, and continue efforts to incorporate science-based processes and peer review into the EJ workplan. In addition, Science Program is engaged in a dialogue with the Environmental Justice subcommittee to assist in the process of development of environmental justice-focused management needs that can then be integrated into broader science agendas and addressed in future funding solicitations.

Tribal Relations:

As with Environmental Justice program, Science will work with Tribal Relations to help identify tools for performance assessment, support potential research collaborations, and establish a strong education/information transfer element.

Cross-Program Relationships

There are three distinct organizational approaches used to integrate science activities across the CALFED program. The first organizational structure explains the distinction between the roles and responsibilities of the CALFED-wide Science Program and the responsibilities of each individual program for science. The second structure explains the system of external reviewers and advisors that the Science Program has established. The third structure outlines how the roles of the Authority, the Science Program staff, individual program staff, external panels, and the Executive Science Board work together on a specific issue.

The CBDA Science Program is focusing on large-scale issues that cut across multiple program elements and regions. Within each program area, however, there are also specific science and project technical needs including:

- Peer review of specific study designs, proposals submitted through proposal solicitations (PSPs), and final technical products
- Balanced and unbiased descriptions of the state of science relative to a specific issue
- Identifying critical unknowns needed to assess program performance or define classes of activities needed to reach program goals
- Specific data analyses and monitoring needed to support performance assessment

For example, the storage program is applying these scientific approaches to ensure its feasibility and environmental impact studies use the best available scientific information and to identify the strengths and weaknesses of one of its core tools (Department of Water Resources' CALSIM II model). The drinking water program is applying these approaches to develop a monitoring strategy that will feed into an overall assessment of program performance.

The immense scale of the CALFED program requires that a consistent protocol and a series of methodologies be developed to analyze the cumulative effects of its various actions such as restoration projects and water management actions. To address this need, the Science Program leads efforts to develop guides and indicators of performance assessment that can be used to evaluate and communicate the progress of every CALFED program. The development of performance assessment measures is an iterative process, where initial and prototype performance measures are evaluated for effectiveness. As knowledge of each program increases and more data becomes available, the Science Program will continue to provide advice, guidance, and review to agencies and program elements designing new performance measures. A complete "tool kit" to help guide development of performance measures and indicators for each program element is available on the Science Program website: http://science.calwater.ca.gov/sci_tools/performance_measures.shtml

Funding

Science (\$ in millions)	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Subtotal	Yr 8	Grand Total
State	\$15.5	\$3.7	\$3.5	\$22.1	\$16.2	\$1.4	\$1.4	\$63.8	\$1.4	\$65.2
Federal	\$6.1	\$9.2	\$8.0	\$5.3	\$3.0			\$31.7		\$31.7
Local	\$0.2	\$0.2	\$0.2	\$0.2	\$0.2	\$0.2	\$0.2	\$1.4	0.2	\$1.6
Water User	\$1.1	\$2.5	\$5.9	\$6.9	\$6.9	\$6.2	\$6.2	\$35.7	6.2	\$41.9
Program Funding Total	\$22.9	\$15.6	\$17.6	\$34.5	\$26.3	\$7.8	\$7.8	\$132.5	\$7.8	\$140.3
Projected Needs Estimate					\$42.3	\$42.3	\$42.9	\$127.6	\$42.9	\$170.5
Original ROD Estimate (Aug, 2000)	\$25.0	\$30.0	\$45.0	\$50.0	\$50.0	\$50.0	\$50.0	\$300.0		\$300.0
NOTES:										
1. Original ROD Estimate represents the original Stage 1 funding estimates from the Record of Decision (Aug 2000). Cost estimates for the Interagency Ecological Program (IEP) were not included in the original ROD estimates, but are included in the funding totals and projected needs estimates.										
2. Funding for Years 1 - 3 reflect actual State, Federal and Local obligations, commitments, encumbrances and expenditures updated to reflect actual fund amounts for each task. State funds for Years 4 & 5 reflect the April 1st Governor's budget. Federal funds are the Year 4 enacted and President's FY 2005 proposed budget. Projected funding shown in Years 6 - 8 includes remaining state bond funds that have been scheduled for future years and ongoing State base funding, plus estimates for local matching to grants for years where bond funding is available. Federal appropriations beyond Year 5 are unknown.										
3. The State budget includes funding for the California Bay-Delta Authority (CBDA), Department of Water Resources (DWR), and the Department of Fish and Game (DFG).										
4. The Federal budget includes funding for the U.S. Bureau of Reclamation (Reclamation), U.S. Army Corps of Engineers (USACE), U.S. Fish & Wildlife Service (USFW), U.S. Geological Survey (USGS), U.S. Environmental Protection Agency (USEPA), and the National Marine Fisheries Service (NMFS).										
5. Water User/Local funding includes State Water Project Funds and CVPIA Restoration Funds that are collected from state water contractors and Central Valley Project water users, but are budgeted and appropriated through the federal and state governments. Local grant matching funds are estimated and updated as information becomes available.										

Funding by Task

Science (\$ in millions)	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Subtotal	Yr 8	Grand Total
1) Oversight and Coordination	\$1.5	\$2.1	\$0.9	\$2.1	\$1.1			\$7.7		\$7.7
2) Data Analysis and Critical Unknowns	\$4.5	\$1.6	\$1.8	\$11.6	\$8.3			\$27.8		\$27.8
3) Science Boards, Expert Panels, and Collaboration	\$1.7	\$0.2	\$0.1	\$4.5	\$1.7			\$8.3		\$8.3
4) Workshops and White Papers	\$4.4			\$2.0	\$2.0			\$8.3		\$8.3
5) Performance Measures and Assessment	\$1.5	\$0.3		\$0.9	\$0.9			\$3.5		\$3.5
6) Communication	\$1.3			\$0.8	\$1.2	\$0.3	\$0.3	\$3.8	\$0.3	\$4.1
7) Interagency Ecological Program	\$8.0	\$11.4	\$14.8	\$12.7	\$11.2	\$7.5	\$7.5	\$73.1	\$7.5	\$80.6
Program Funding Total	\$22.9	\$15.6	\$17.6	\$34.5	\$26.3	\$7.8	\$7.8	\$132.5	\$7.8	\$140.3
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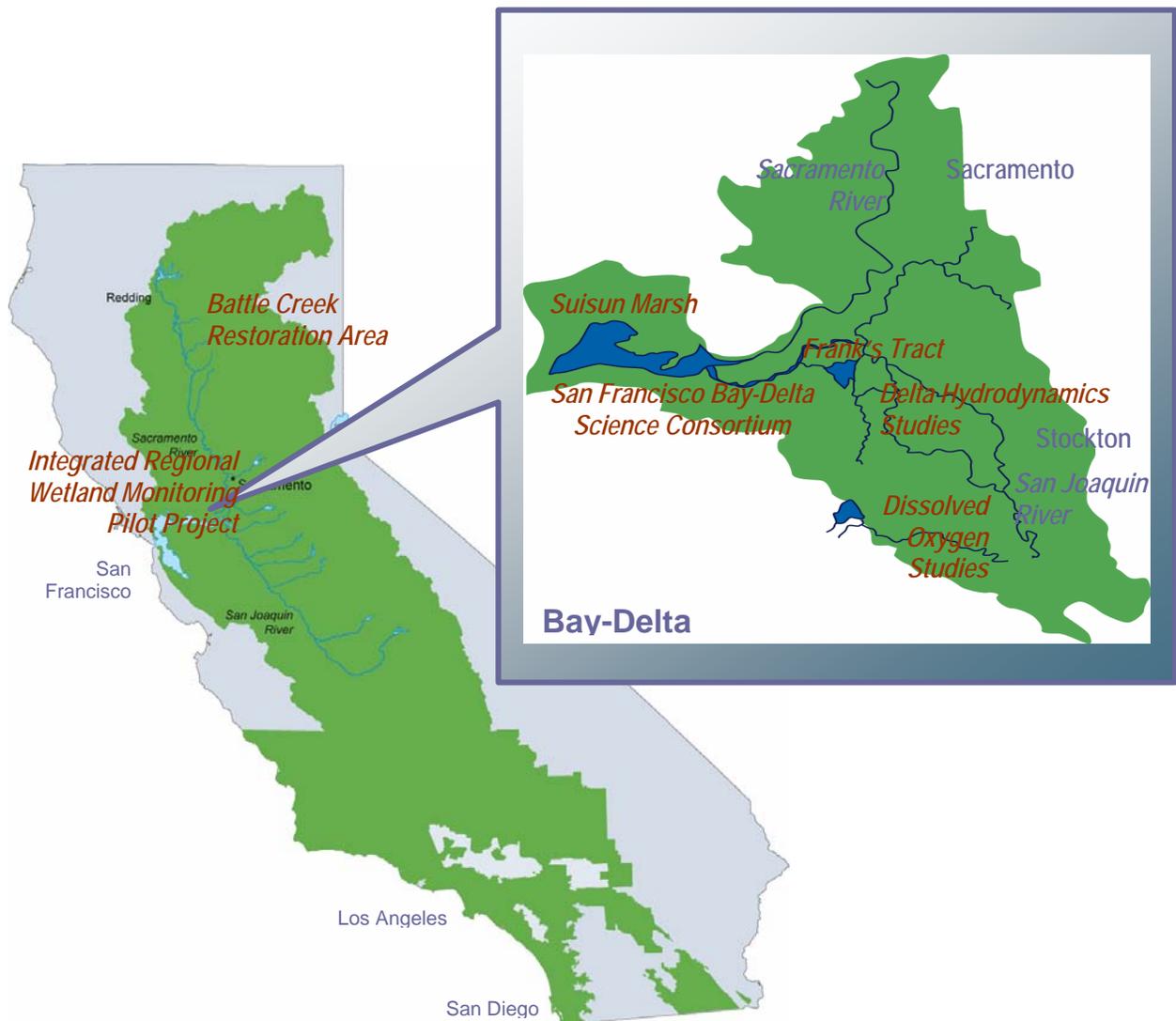
2. Funding for Years 1 - 3 reflect actual State, Federal and Local obligations, commitments, encumbrances and expenditures updated to reflect actual fund amounts for each task. State funds for Years 4 & 5 reflect the April 1st Governor's budget. Federal funds are the Year 4 enacted and President's FY 2005 proposed budget. Projected funding shown in Years 6 - 8 includes remaining state bond funds that have been scheduled for future years and ongoing State base funding, plus estimates for local matching to grants for years where bond funding is available. Federal appropriations beyond Year 5 are unknown.

3. The State budget includes funding for the California Bay-Delta Authority (CBDA), Department of Water Resources (DWR), and the Department of Fish and Game (DFG).

4. The Federal budget includes funding for the U.S. Bureau of Reclamation (Reclamation), U.S. Army Corps of Engineers (USACE), U.S. Fish & Wildlife Service (USFW), U.S. Geological Survey (USGS), U.S. Environmental Protection Agency (USEPA), and the National Marine Fisheries Service (NMFS).

5. Water User/Local funding includes State Water Project Funds and CVPIA Restoration Funds that are collected from state water contractors and Central Valley Project water users, but are budgeted and appropriated through the federal and state governments. Local grant matching funds are estimated and updated as information becomes available.

Geographical Distribution of Activities



Map of California with an expanded view of Sacramento-San Joaquin Bay-Delta region, highlighting recent and on-going projects supported by the Science Program efforts (in red).