Chapter 2. INITIATING THE CMARP EFFORT

IDENTIFICATION OF CALFED GOALS AND OBJECTIVES AND AGENCY GOALS AND OBJECTIVES

The CMARP steering committee began design of the monitoring and research program by identifying CALFED and agency goals and objectives that would direct the scope and content of monitoring and research activities. The ultimate goal of monitoring and research must be to produce information that is useful in making management decisions. Thus, it was important to base the monitoring and research program on management objectives. Communication between scientists responsible for designing monitoring programs and the users of the information is essential (National Research Council, 1990). It must be clear to both scientists and managers what purposes the monitoring and research data are intended to support. The first step of this effort was, therefore, to define the goals and objectives of CALFED and member agencies, as specifically and quantitatively as possible.

The CMARP steering committee began with an evaluation of existing goals and objectives from CALFED programs and agency programs. Goals and objectives from the following programs are compiled in Appendix *IV*:

CALFED Common Programs

- Long-Term Levee Protection Plan
- Water Quality Program
- Ecosystem Restoration Program
- Water Use Efficiency
- Water Transfer Policy
- Watershed Management Coordination

CALFED Variable Programs

- Storage
- Conveyance

Interagency Programs

- Comprehensive Assessment and Monitoring Program (CAMP)
- Interagency Ecological Program
- Sacramento River Watershed Program
- San Francisco Estuary Institute

The six CALFED common programs are in varying stages of development; thus, designation of program goals and objectives is more specific for some programs than for others, depending on the progress made within each common program. The goals and objectives for all programs are also still in flux. The Long-Term Levee Protection and Water Quality Common Programs have defined fairly specific targets for certain implementation objectives. We have identified 11 specific targets for the Long-Term Levee Protection Plan program and 25 specific targets for the Water Quality program. The Ecosystem Restoration Program has four main implementation objectives and 64 specific sub-programs; each has accompanying implementation objectives. The Water Use Efficiency, Water Transfer, and Watershed Management Coordination Common Programs have less-developed objectives and actions.

There is overlap among some independent agency program goals and objectives with CALFED program goals and objectives. For example, an implementation objective of the Ecosystem Restoration Program is to "Restore riparian scrub, woodland, and forest habitat along largely nonvegetated, riprapped banks of Delta island levees, the Sacramento and San Joaquin Rivers, and their major tributaries." (CALFED Program Goals and Objectives, p. 8). The Department of Fish and Game Riparian Habitat Joint Venture program has a similar goal "to conserve, increase and improve riparian habitat to protect and enhance California's native resident bird and neotropical migratory birds." Both programs require field monitoring and focused research as part of accomplishing their

respective goals. These areas of overlap provide opportunities for CALFED (and CMARP in particular) to collaborate with such existing programs that are active, independent of CALFED. Attention to these opportunities, through active partnerships between participating scientists, will enable a contribution from cooperating agencies to targeted CALFED actions.

At the agency and program levels, the goals and objectives are of necessity very broad. In addition, CALFED goals and objectives are changing, as the programs become more refined. The CMARP program presented here is designed to address CALFED actions at a more conceptual level. However, in order to implement the proposed monitoring, assessment and research program, details of CALFED actions, such as time, place, and magnitude of the actions must be specified. Specification and prioritization of monitoring and research actions are the next steps for CMARP.

REFINEMENT OF CALFED PROPOSED ACTIONS

The CMARP is designed to meet likely CALFED implementation actions. The following documents were reviewed to provide information on CALFED objectives and likely implementation actions.

- CALFED Revised Phase II Report
- Developing a Draft Preferred Alternative
- Ecosystem Restoration Program Plan. Volume 1. Ecological Attributes of the San Francisco Bay-Delta Watershed
- Ecosystem Restoration Program Plan. Volume 2. Ecological Zone Visions
- Long-Term Levee Protection Plan
- Species and Habitats Conservation Strategy
- Storage and Conveyance Refinement Process Overview
- Strategic Plan for the Ecosystem Restoration Program
- Water Quality Program Plan
- Water Transfer Program Technical Appendix
- Water Use Efficiency Program Plan
- Watershed Program Plan

The CALFED Water Quality Program Plan went beyond listing goals and objectives and possible implementation actions to recommending specific monitoring and research studies. For the problem area of low dissolved-oxygen levels observed in the Stockton Ship Channel, for example, the following monitoring and research recommendations were made:

- Document sources of unpermitted discharge of waste from concentrated animal feedlots and other less-specific industrial sources in the Central Valley and beyond, which result in oxygen demand in the San Joaquin River each fall.
- Develop accurate models to determine substances introduced to the San Joaquin River near Stockton that will produce dissolved oxygen sags downstream and where the sags will be produced.
- Monitor to determine the current biological oxygen demand (BOD) and chemical oxygen demand loads in Stockton tributaries, the associated dissolved oxygen concentrations, and the potential impact of current BOD levels on the ecosystem.
- Conduct special studies in Five-Mile Slough, Mosher Slough, and the Calaveras River to determine if urban storm-water runoff is the cause of low dissolved oxygen concentrations.

As CALFED program actions become more defined, it will be possible to design a monitoring program to this level of specificity. However, even the Water Quality Program retains a Water Quality Technical Group charged with refining the Water Quality Program and recommended actions as the CALFED program changes. The proposed CMARP must be flexible enough to adapt to these changes. Example programmatic actions given in the CALFED Revised Phase II Report are presented in Table 2-1.

Table 2-1. Programmatic actions given in CALFED Revised Phase II report.

Program	Actions
Water Quality	Agricultural Drainage and Runoff - Reduce selenium (agricultural subsurface drainage), salinity, pesticides, sediment, TOC (discharges from Delta islands), nutrients and ammonia, and pathogens (controlling inputs from rangelands, dairies, and confined-animal facilities).
	Human Health – Water-quality efforts focus on reducing constituents contributing toxicity to the ecosystem and affecting water users (including BOD) and on reducing reducing total organic carbon loading, salinity, and pathogens that degrade drinking water quality.
Ecosystem Restoration Program	Restore, protect, and manage important habitat types, including tidally influenced fresh and brackish-water marsh habitat; seasonal, fresh emergent, and nontidal perennial aquatic habitat; perennial grasslands; agricultural lands managed using "wildlife friendly" techniques; stream meander corridor and riparian land along the Sacramento River; and riparian woodland and shaded riverine aquatic habitat.
	Develop floodways along the lower Cosumnes and San Joaquin Rivers.
Water Use Efficiency	Work with the California Urban Water Conservation Council and the Agricultural Water Management Council to identify appropriate urban and agricultural water conservation measures, set appropriate levels of effort, and certify or endorse water suppliers that are implementing cost-effective feasible measures.
	Expand state and federal recycling programs to provide sharply increased levels of planning, technical, and financing assistance, and to develop new ways of providing assistance in the most effective manner.

INVENTORY OF CURRENT MONITORING AND RESEARCH PROGRAMS

The proposed CMARP program is based on utilizing existing monitoring and research programs where possible. In addition to taxpayer cost savings from elimination of duplicative efforts, existing monitoring and research programs have much of the necessary scientific expertise, years of historical data, and established connections with local groups and landowners.

The initial inventory of existing monitoring activities, conducted by CMARP, identifies existing environmental-monitoring programs in the CALFED regions. Information in the inventory includes program objectives, questions addressed through monitoring, spatial coverage, parameters monitored, and the primary person to contact. The database is searchable by CALFED common program or region. The inventory (Appendix *VI*) may be accessed on the World Wide Web at: http://www.sfei.org/cmarpinv. When completed, the inventory will reside on the CALFED server (http://calfed.ca.gov) and be linked with California Environmental Resources Evaluation System (CERES, http://ceres.ca.gov).

The inventory was prepared to give CMARP a point-of-reference regarding what data are currently being collected. We are keenly aware that an enormous volume of information is already being collected and clearly, to be successful, CMARP must find ways to incorporate these data collection efforts. Just as clear is the fact that these existing data collection efforts are not going to cover all the monitoring and research data needs that CMARP ultimately must

serve. Subsequent efforts of CMARP, addressed in part in later sections of this report, must identify the gaps in current data collection with respect to overall goals and objectives of CALFED. Upon identification of these gaps, CMARP will be responsible for determining how to fill these gaps with supplementary monitoring and research data-collection efforts.

The inventory includes information from several existing inventories, which are linked from the CMARP inventory site:

- UC Davis' Information Center for the Environment (ICE).
- Watershed Programs Inventory
- Ecosystem Restoration Programs Inventory
- Noxious Weeds Survey
- SFEI's inventory of water-quality-monitoring programs in the Bay-Delta, recently completed for the State Water Quality Control Board.
- DWR's Compendium of Water Quality Investigations (not yet linked to the inventory).

Many other monitoring and research programs have been added, and more are being added as additional request forms are returned. As of mid-January 1999, there are 622 monitoring and research programs in the inventory. These programs include a wide range of Federal, State, municipal, local, and volunteer programs and encompass most of the CALFED program areas.

More than 184 ecosystem restoration programs have been identified in the Sacramento River Watershed (Table 2-2), and more than 125 Water-Quality monitoring programs were identified in San Francisco Bay.

Examples of WWW site information for nine of the largest programs are listed in Appendix *VI* and summarized in Table 2-3. Annual expenditures on monitoring and research in the CALFED regions by those programs is almost $27 million of the approximately $33 million currently spent. This is likely to be an underestimate of the total of all existing programs, and does not include Category III costs.

The WWW site uses database-search procedures to list information about each existing monitoring program. The inventory may be searched by CALFED Common Program and by general geographic area. Information about programs in the inventory includes program objectives, questions addressed through monitoring, spatial coverage, parameters monitored, and primary contact. Currently one can search using any string of words. More sophisticated search capabilities are being designed to allow keyword searching. Sampling-site maps are included for programs if they were made available.

Table 2-2. Number of existing monitoring programs* compiled in the Inventory and sorted by CALFED Common Program and geographic region.

	Ecosystem Restoration	Delta Levees	Watershed Management	Water Quality	Water Transfers/ Use Efficiency**	Totals
San Joaquin River	76	0	37	21	0	134
Sacramento River	184	0	12	39	0	235
Bay	15	0	1	128	0	144
Delta	53	2	3	51	2	111
Totals	328	2	53	239	2	624

- Several levee monitoring programs and sources of water transfer monitoring information have been identified but are not yet included in the inventory.

** Some water transfer monitoring information on ground- and surface-water levels is categorized under "Watershed Management"

Table 2-3. Summary of information about the largest existing monitoring and research programs in the CALFED Region. Costs are annual estimates.

Organization	Areas	Time Frame	Monitoring	Applied Research	Management & Administration	Total
San Francisco Estuary Institute (SFEI)	Bay Region	1993 - present	$2.5 M	$1.5 M	$0.4 M	$4.4 M
Interagency Ecological Program (IEP)	Bay and Delta Region	1996 - present	$4.9 M	$6.3 M	$1.5 M	$12.7 M
Comprehensive Assessment and Monitoring Program (CAMP), CVPIA-FWS	Sacramento and San Joaquin River Regions	1997 - present (1952 earliest subprogram begun)	$2.4 M	$0	$132,000	$2.5 M
Sacramento River Watershed Program (SRWP)	Sacramento River Region	1996 - present	$0.9 M	$0.1	$0.5 M	$1.5 M
Municipal Water Quality Investigations Program (MWQIP)	Delta Region	1982 - present	$0.4 M	$1.2 M	$0.3 M	$1.9 M
Sacramento Coordinated Monitoring Program (SCMP)	Sacramento and San Joaquin River Regions	1992 - present	$0.4 M	not reported	$0.1 M	$0.5 M
USGS San Francisco Bay and Delta Ecosystem Program	San Francisco Bay and Delta Regions	1995	$0	$1+ M	$0	$1+ M
USGS National Water Quality Assessment Program	Sacramento and San Joaquin River Regions	1991 - present	$2.2 M	$0	$0	$2.2 M
East Bay Municipal Utility District (EBMUD) Mokelumne River	Central Valley; Mokelumne River	1990 - present	$1.0 M	Active; amount not reported	$0	$1.0 M
DWR-SB 1086 Program	Sacramento River Region	1993 – present	$0.15 M	$0	$0.15 M	$0.3 M
DWR-Northern California Water Management Program	Sacramento River Region	1950 – present	$0.4 M	$0	$0	$0.4 M
DWR-Water and Environmental Monitoring Program	Sacramento and San Joaquin Rivers	1950 – present	$3.0 M	$0	$0	$3.0 M
Grasslands Bypass Program	San Joaquin River Basin	1996 - present	$0.75 M	$0.5 M	$0	$0
Total	---	---	$19 M	$10.6 M	$3.05 M	$32.65 M