

California Bay-Delta Authority  
Drinking Water Quality Program  
Multi-Year Plan (Years 4-7)  
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**California Bay-Delta Authority  
Drinking Water Quality Program  
Multi-Year Plan (Years 4-7)**

**1. Goals and Objectives**

Safe drinking water is important to all Californians - and to the state and federal agencies that comprise the CALFED Bay-Delta Program, now referred to as the California Bay-Delta Authority (CBDA). One of the objectives of the CBDA agencies is to ensure continuous improvement in the water quality of the Bay-Delta for all beneficial uses.

The Drinking Water Quality Program (DWQP) goal is to provide safe, reliable, and affordable drinking water to the 22 million Californians who rely on the Delta for all or part of their drinking water. To reach this goal, DWQP actions combine cost-effective improvements in source water quality, advancements in treatment technology, and innovations in water management. Overall, DWQP will strive to effectively integrate drinking water source protection, treatment, and distribution in order to improve public health protection. Furthermore, DWQP will support health effects research of Delta drinking water, and will perform comprehensive monitoring and assessment of Delta drinking water quality.

CBDA DWQP studies and actions fall into four broad categories that are intended to:

- Enable users to capture higher quality Delta water for drinking water purposes (timing vs. quantity),
- Reduce contaminants that impair Delta water quality,
- Evaluate alternative approaches to drinking water treatment and distribution, to address growing concerns about pathogens, disinfection by-products, and salinity, and
- Promote voluntary exchanges or purchases of high-quality source waters for drinking water uses.

An important complementary action to the DWQP studies and actions is the study of changes to the configuration of the Delta's channels and islands, some of these changes could have large potential benefits for Delta water quality.

All of these studies and actions must be pursued in conjunction with other CBDA actions to generate significant improvements in drinking water at the tap. The information generated by the drinking water quality studies and actions will serve as the basis for reviews of program effectiveness in 2003 and 2007. These reviews will look at the results of drinking water studies, to assess the continued appropriateness of the water quality targets, advances in treatment technology, and to make recommendations on future actions to improve drinking water quality. Water quality studies and actions must be conducted with monitoring and assessment, and will be coordinated with the appropriate agencies and existing programs.

The August 18, 2000 CALFED Programmatic Record of Decision (ROD) adopted general goals and objectives of (1) continuously improving the quality of the waters of the Bay-Delta system, (2) providing good quality water for all beneficial uses, including in-Delta environmental and agricultural uses, and (3) safe, reliable, and affordable drinking water. For the DWQP, the target for providing safe, reliable and affordable drinking water was expressed as either (1) average concentrations at Clifton Court Forebay and other southern and central Delta drinking water

intakes of 50 µg/L bromide and 3.0 mg/L total organic carbon, or (b) an equivalent level of public health protection using a cost effective combination of alternative source waters, source control and treatment technologies.

The adopted goals and targets were based upon predicted changes in drinking water standards set by the federal Environmental Protection Agency, best-available disinfection techniques, and the best available knowledge of the Delta in 1998 – as opposed to a comprehensive risk assessment or watershed management plan that considered the ability to achieve the targets. The statement of a target and alternative in the ROD gives the DWQP flexibility to consider cost-effectiveness/practicability, changing standards, improved technology, and the exchange of water supplies to better match quality with use. Thus, the ROD drinking water quality improvement targets are a commitment to achieving improved public health protection and reflect the importance of developing and implementing a diversified strategy for achieving water quality goals.

Work has progressed on all of the Record of Decision commitments since its adoption in August of 2000 with emphasis on source water improvement and treatment technologies. The Drinking Water Subcommittee (DWS) of the Bay-Delta Public Advisory Committee, successor to the Delta Drinking Water Council, provides stakeholder input. The DWS has developed a framework for drinking water quality management stemming from discussion of the ROD water quality targets. This framework is captured in the “Equivalent Level of Public Health Protection Draft Decision Tree” (ELPH, ELPH diagram, shown in Figure 1) named for the language in the ROD. Management actions available at the CBDA programmatic scale and at the regional level are shown on the ELPH diagram and described in more detail in a companion document. The next step for the DWS is to develop recommendations for strategic actions and spending.



identifying sources, quantifying loads, and working with the implementing agencies to establish management practices or improved wastewater treatment where necessary. Individual drinking water suppliers could also look at local/regional water exchanges, local source water quality improvement, water use efficiency, and improved treatment to improve their water quality. The DWQP is also funding studies on drinking water treatment technology.

**San Joaquin Valley** – Drinking water suppliers in the San Joaquin Valley rely on a mixture of ground water supplies and surface water flows from the San Joaquin River and its tributaries as well as surface water flows imported from the Delta. The San Joaquin River is considerably more degraded than the Sacramento River when it reaches the Delta, so the DWQP is working to improve this region's source water quality through actions along rivers and along the large conveyances that import Delta water to the San Joaquin Valley. Irrigated agriculture, animal feeding operations, managed wetlands, and urban areas are the most likely land uses contributing pollutants to the system. Like the Sacramento, identification, quantification, and implementation of source reduction measures are important objectives. Individual drinking water suppliers in this region could also look at local conveyance improvements, local/regional water exchanges, local source water quality improvement, water use efficiency and improved treatment to improve their water quality.

**Delta** – The Delta receives water from both the San Joaquin and Sacramento Rivers, which help repulse seawater intrusion from the San Francisco Bay. In addition to the water quality impairment (mostly total organic carbon) from the rivers and their tributaries, this seawater intrusion moves bromide into the Delta. Delta island peat soils and tidal wetlands also contribute significant total organic carbon loads to the Delta. Delta salinity is managed through the operation of upstream reservoirs, downstream export pumps, and the Delta Cross Channel, while competing with water supply and fishery protection objectives. As a result of these factors, the Delta has highly variable water quality. DWQP actions in Source Improvement, and CBDA actions in Conveyance and Storage can improve Delta water quality. Delta waters are generally used to provide drinking water to the San Francisco Bay Area, the San Joaquin Valley, and Southern California.

**San Francisco Bay Area** – The San Francisco Bay Area (Bay Area) is a major urban area that uses Delta water, surface water captured in the high Sierra mountains, local rainfall, and groundwater replenished with Delta water and Sierra water. Actions that improve Delta waters will contribute to improved water quality for the region. In addition, the DWQP is financing the study of regional blending and exchange opportunities and advanced treatment technology for this region. Individual drinking water suppliers in this region could also look at actions like local water exchanges, local source water quality improvement, water use efficiency and improved treatment to improve their water quality.

**Southern California** – Southern California is a major urban area that uses Delta water, Colorado River water, surface water captured in the high Sierra mountains, local rainfall, and groundwater replenished with local and imported water supplies, Delta water, Sierra water and Colorado River water. DWQP efforts to improve this region's water quality are focused on improving Southern California's Imported Water supply through Improving Delta Water, facilitating regional Source Water Exchanges, improving CVP/SWP Ops, Conveyance, and Storage, and the study of advanced treatment technology. Individual drinking water suppliers in this region could

also look at actions like local water exchanges, local source water quality improvement, water use efficiency and improved treatment to improve their water quality.

These conceptual regional ELPH strategies have many similar elements, like source water quality improvement and the study of advanced treatment, which have been the focus of DWQP efforts because they benefit multiple drinking water suppliers. Referring back to Figure 1, the next several sections will focus on activities broken into their respective ELPH categories (boxes) – starting with actions which improve Delta water (Source Improvement, Conveyance/Delta Operations, and Storage), expanding those to improve Imported water (Source Water Exchanges, CVP/SWP Operations and Storage) and Local Sources (all of the previously mentioned categories applied to local situations, and bringing them altogether at the treatment plant (Treatment Options, Distribution System) – all to achieve a level of public health protection for the drinking water consumer equivalent to achieving the ROD water quality targets for bromide and organic carbon.

### **3. Improving Delta Water**

Delta water quality is affected by and can be improved to some degree through three groups of actions: Source Improvement, Conveyance/Delta Operations, and Storage. Of these three, the CALFED DWQP focuses on Source Improvement. The DWQP also engages in Conveyance/Delta Operations and Storage actions by other CALFED programs to ensure that they identify and evaluate appropriate drinking water quality criteria, including the cost-effectiveness of conveyance, operations, and storage actions to improve Delta water quality.

#### **3.1. Source Improvement**

Source improvement refers in general to improving the water quality of the source waters to the Delta through the implementation of management practices and other water quality control measures to reduce pollutant loads. Implementation of source improvement projects in the Bay-Delta watershed could reduce the discharge of pollutants from point and non-point sources in urban and rural areas and minimize the water quality impacts of increased development and changes in land use on Delta water quality.

#### ROD Commitments

The CALFED Record of Decision (ROD) includes the following projects and actions related to source improvement:

##### **Drinking Water Quality Program**

- Address drainage problems in the San Joaquin Valley to improve downstream water quality
- Implement source controls in the Delta and its tributaries including establishing a comprehensive state drinking water policy for the Delta and upstream tributaries
- Address water quality problems at the North Bay Aqueduct, including implementation of BMPs to improve watershed runoff water quality

##### **Ecosystem Restoration Program**

- Assist existing agency programs to reduce turbidity and sedimentation; reduce the impairment caused by low dissolved oxygen conditions; reduce the impacts of pesticides including organochlorine pesticides; reduce the impacts of trace metals; mercury; and

selenium; reduce salt sources to protect water supplies; and increase understanding of toxicity of unknown origin

- Improve dissolved oxygen conditions in the San Joaquin River near Stockton

#### **Conveyance Program**

- Reduce agricultural drainage in the Delta, including the Old River and Rock Slough Drainage Management Project

#### Looking Back

The DWQP has had a strong emphasis on source assessment and improvement. Prior to adoption of the ROD, three source improvement projects were funded with US EPA early implementation funding for the DWQP. In Years 1-3 the DWQP funded 12 source improvement projects. These projects focused on nonpoint sources of drinking water pollutants in the San Joaquin Valley, the North Bay Aqueduct watershed, and the Delta. The DWQP also initiated work on development of a Drinking Water Policy for Delta waters and tributaries. The Drinking Water Policy will be critical for protecting source water quality and maintaining progress made in other source improvement efforts. In years 1-3, the DWS, successor to the Delta Drinking Water Council, was established. Notable achievements of the DWS are development of the ELPH framework and recommendations to the BDPAC on agricultural waivers.

#### **Federal Funding for the DWQP 1999-2000**

1. Old River/Rock Slough Drainage Management Project (\$450k)
2. Knightsen Flood Management District and Community Services (\$50k)
3. Salinity and Selenium Project (\$450k)

#### **2001 DWQP PSP (finalized February 2002)**

1. Improving Delta Drinking Water Quality: Managing Sources of Disinfection Byproduct-Forming Material in the State Water Project (\$1,369k)
2. Adaptive Real-Time Monitoring and Management of Seasonal Wetlands and the San Luis National Wildlife Refuge to Quantify Contaminant Sources and Improve Water Quality in the San Joaquin River (\$320k)
3. Agricultural Drainage Treatment: Intermediate-Scale Experiments (\$750k)
4. Rock Slough and Old River Drainage Management (\$1,300k)

#### **2002 SWRCB RFP (finalized September 2002)**

1. Control of Ag Runoff (\$742k)
2. Dairy Nutrient Management Program (\$272k)
3. Determining Mitigation Strategies to Prevent Contaminants from Animal Feeding Operations from Entering Drinking Water Sources (\$568k)
4. Orestimba Creek Watershed-Agricultural Water Quality Pilot Program (\$275k)
5. Reducing Non-point DOC and Nitrogen Exports from Rice Fields: A Pilot Study and Quantitative Survey to Determine the Effects of Different Hydrologic and Straw Management BMPs (\$870k)
6. San Luis Drain Algae and TOC Control Project (\$145k)
7. County of Tuolumne Water Quality Plan (\$183k)
8. Salt and Martinez Creeks Watershed Assessments (\$200k)
9. The Water You Play In Is The Water You Drink (\$983k)
10. Steelhead Creek Drinking Water Quality Study and Watershed Assessment (\$595k)
11. North Bay Aqueduct Watershed BMPs (\$400k)
12. North Bay Aqueduct Alternative Intake Study (\$1,062)

#### **2002 DWQP**

1. Investigating in situ Low Intensity Chemical Dosing to decrease Delta waters DOC concentrations and DBP precursors (\$1,535k split with ERP)
2. Full-Scale Demonstration of Agricultural Drainage Water Recycling Processes Using Membrane Technology (\$216k split with ERP)

**Other Funding Sources (Agency)**

1. DWR Agricultural Drainage Program (DWR)
2. Sacramento River Watershed Program (USEPA)
3. Grassland Bypass Project (Grassland Bypass Authority and RWQCB)
4. CVRWQCB Basin Plan Amendment (BPA) for Salinity and Boron (RWQCB)
5. Drinking Water Policy for the Delta and its Tributaries (CBDA, CUWA, and SRCSD, \$300k+CBDA)
6. Real Time Monitoring and Management of Salinity in the San Joaquin River
7. San Luis Drainage Feature Re-evaluation (USBR)

Looking Forward

Source Improvement projects will continue to be a high priority for the DWQP in Years 4-7. Nearly all of the projects funded by the DWQP in Years 1-3 are in progress and will be completed in Years 4-7. Projects will be assessed for progress towards programmatic goals. Funding available for full implementation of source improvement projects anticipated in years 4-7 is \$12.7 million from Prop 13 and up to \$91.5 million from Prop 50, Chapter 5. \$31.5 million is available for grants in the current RFP which was initiated in Year 3 but will be completed in year 4. The remaining funds will be distributed as grants in years 4-7. Additional grant funding is possible from other Prop 50 chapters for source improvement projects. The DWQP will focus on three types of source improvement projects: agricultural drainage and runoff improvement, urban source improvement, and development of the Central Valley drinking water policy. The DWQP will continue to support monitoring of sources in the Bay-Delta watershed, and studies of organic carbon, bromide and other pollutants of concern to identify the most cost effective means of source improvement.

**2003 SWRCB RFP**

\$31.5 for CALFED drinking water quality source improvement projects. Priorities are development and assessment of best management practices to address discharges from Delta islands, irrigated agricultural, and urban sources.

**SWRCB. Years 4-7**

Prop 50, Chapter 5 funding for water quality improvement will be available as follows:

Bay –Delta Program Year	4	5	6	7
State FY	2003-04	2004-05	2005-06	2006-07
Amount (\$ in thousands)	36,338	11,555	11,554	11,553

**Other Programs Funding Water Quality Improvement Projects (Agency)**

1. Clean Water Act Section 319 (USEPA)
2. CBDA Watershed Program
3. CBDA Ecosystem Restoration Program

Cross-linking and Integration

Source improvement is closely linked to several other CALFED programs. The Ecosystem Restoration Program (ERP) is in the process of identifying and implementing all scales of habitat restoration. It has been known for some time that organic carbon concentrations increase as water moves across the Delta. Wetlands and shallow water habitat have also been identified as a potentially major source of organic carbon in the Delta. The DWQP is closely coordinating with the ERP to include organic carbon monitoring in habitat restoration to better understand the issue. The ERP and DWQP also need to form cooperative monitoring

programs and source control activities because ERP and DWQP water quality problems are frequently associated with the same sources.

The Watershed Program and DWQP work cooperatively on grant funding processes and have overlapping program objectives, such as improved water quality. Building local capacity for watershed management activities provides the mechanism for identifying, guiding, and implementing drinking water quality improvement projects. For the past two years, the Watershed and Drinking Water Quality Programs, working with the SWRCB, have coordinated their grant funding processes. As an implementing agency for both programs, the SWRCB will continue to be the focus of coordination for these two programs.

### **3.2 Conveyance/Delta Operations**

Improving the quality of the source waters of the Delta is only one aspect of improving Delta water quality. Source waters move through a complex network of natural and manmade channels to both repel seawater intrusion from the San Francisco Bay and supply drinking water intakes in the Delta. The Delta Cross Channel, for example, is operated to route additional high quality Sacramento River flows to central Delta channels and the export pumps, helping to flush out accumulated salinity in the central and southern Delta. To protect fisheries and to keep water levels adequate for Delta agricultural use, temporary barriers are constructed in Delta channels, causing additional changes to delivered water quality. Ways to improve drinking water quality through Conveyance include transporting more water when drinking water quality is good (during high flows) to reservoirs south of the Delta; transporting more Sacramento River water through the Delta Cross Channel or similar screened facility (the Through Delta Facility or TDF); transporting more water to repel seawater intrusion; or through changes to the channels themselves to reduce the Delta's ability to accumulate salt, such as through the reclamation of flooded islands in the Delta.

Assessment of water quality effects of Conveyance actions requires the use of sophisticated models and extensive water quality monitoring. The DWQP has contributed resources to these modeling efforts and helps to identify water quality issues as planning studies proceed. The DWQP supports Conveyance actions through coordination with the CALFED Conveyance Program and through supplemental funding of its activities to augment water quality investigations. Evaluation of the water quality benefits of conveyance actions is needed to understand the role of conveyance in achieving ELPH.

#### **ROD Commitments**

The ROD includes the following projects and actions related to conveyance and Delta operations for water quality improvement:

#### **Drinking Water Quality Program**

- Address water quality problems at the North Bay Aqueduct, including studying the feasibility of relocating the North Bay Aqueduct intake
- Study recirculation of export water to reduce salinity and improve dissolved oxygen in the San Joaquin River
- Develop and implement a plan to meet all existing water quality standards and objectives for which the SWP and CVP have responsibility

### **Conveyance Program**

- Evaluate and implement improved operational procedures for the Delta Cross Channel to address fishery and water quality concerns
- Evaluate a screened through-Delta facility on the Sacramento River of up to 4,000 cfs
- Intertie between SWP and CVP facilities at or near Tracy

### **Ecosystem Restoration Program**

- Restore habitat and hydraulic needs on Franks Tract in the Delta to optimize improvements in ecosystem restoration, levee stability, and Delta water quality

### Looking Back

In Years 1-3 the DWQP funded a position in the Department of Water Resources Delta Modeling Section to look at the water quality effects of operational changes to the Delta Cross Channel and other actions the Conveyance Program is studying. The Drinking Water Subcommittee received a number of updates on Conveyance Program studies as well. Studies to evaluate the feasibility of relocating the NBA intake were also initiated.

### **2001 DWQP PSP (finalized September 2002)**

1. North Bay Aqueduct Alternative Intake Study (\$1,062)

### **Other Funding Sources (Agency)**

1. Funding of 1 PY in the DWR Delta Modeling Section (CALFED)

### Looking Forward

The DWQP has identified a number of Conveyance actions that potentially affect Delta water quality. In Years 4-7, the DWQP will continue to coordinate with the Conveyance Program in order to fully understand potential water quality benefits and the cost-effectiveness of potential conveyance and operations projects. The DWQP has identified a number of specific projects on which it needs to coordinate:

- 1) South Delta Program (Conveyance)
- 2) Through-Delta Facility/Delta Cross Channel Operations (Conveyance)
- 3) Flooded Island Study (Ecosystem Restoration Program)
- 4) Shallow habitat and tidal marsh habitat creation (Ecosystem Restoration Program)

### Cross-linking and Integration

The DWQP will rely on cross-linking and integration with the Conveyance Program and the Ecosystem Restoration Program to evaluate the potential water quality affects of Conveyance actions in the Delta.

## **3.3 Storage**

Another important tool for improving Delta water quality is Storage. Storage captures upstream precipitation and snow melt and stores this high quality water for times of need. The CALFED Program includes several Storage alternatives: Upstream Surface Storage, South of the Delta Surface Storage, In-Delta Surface Storage, Local Surface Storage, Groundwater Storage, and Conjunctive Use. Each of these types can provide water quality benefits in different ways. Existing and New Upstream (of the Delta) storage can provide additional water flows to reduce seawater intrusion or can be coordinated with other types of storage to recapture water quality flows, although their use is restricted by flood storage

regimes and they lose volume to trapped sediment. South of the Delta Storage can move high quality high volume flows south of the Delta during less sensitive times for Delta fisheries without the problems of upstream storage. In-Delta Surface Storage would store water in the Delta and could provide immediate water flows for water quality. Local storage can be used to store good quality water conveyed from the Delta during less sensitive times for Delta fisheries. Conjunctive use of groundwater and surface water provides opportunities to optimize the joint use of all water resources in the Delta, and it also can be an effective tool to prevent potential seawater intrusion along the coast and improve water quality as a result of the net increase in groundwater levels over time.

Storage actions are identified as complementary actions in the CALFED ROD (i.e. they were not evaluated programmatically in the EIR/EIS), yet they are an important component of the ELPH diagram. The goal of the DWQP is to ensure the CALFED storage investigations include a complete evaluation of the potential water quality benefits and impacts of storage alternatives and an evaluation of the cost-effectiveness of these actions for water quality improvement. This is needed to understand the role of Storage in achieving the ELPH objective and provide an evaluation of the water quality/cost-effectiveness of storage actions that stakeholders can use to make their water quality investment decisions.

#### ROD Commitments

The CALFED ROD includes the following projects related to Storage and water quality improvement:

##### **Storage Program**

- Expand CVP storage in Shasta Lake by approximately 300 TAF
- Expand Los Vaqueros Reservoir by up to 400 TAF with local partners as part of a Bay Area water quality and water supply reliability initiative
- In-Delta storage project – approximately 250 TAF
- Evaluation of Sites Reservoir and additional storage in the upper San Joaquin River watershed
- Groundwater storage and management (conjunctive use)

#### Looking Back

The DWQP has supported water quality evaluations of storage alternatives through the position funded with the Department of Water Resources (DWR) Delta Modeling Section and through coordination with the CALFED Storage Program.

#### Looking Forward

The DWQP will continue to coordinate with storage projects in Years 4-7 in order to fully understand water quality benefits and cost-effectiveness of potential Storage actions. The DWQP has identified a number of specific projects on which it needs to coordinate, which appear to have the greatest potential to affect water quality:

1. North of Delta Off-Stream Storage (Sites Reservoir, Storage)
2. Los Vaqueros Reservoir Expansion (Storage)
3. In-Delta Storage Project (Storage)

### Cross-Linking and Integration

The DWQP is needs to coordinate with the Storage Program to achieve its Delta water quality goals.

## **4. Improving Imported Water**

A number of regions depend on source waters which are transported great distances for their drinking water supply. Delta water is transported south via open canals and surface reservoirs, all of which have watersheds and operations that contribute to water quality impairment. The SWP and CVP infrastructure connect with a great number of the state's local water supply systems offering opportunities for regional water exchanges to improve drinking water quality.

### **4.1. CVP/SWP Ops and Storage (South of the Delta)**

The SWP and CVP have extensive infrastructure, both separate and combined, south of the Delta. This infrastructure, which supplies drinking water to a large portion of California, is susceptible to water quality impairment. Two examples of impairment are the canals which receive surface runoff and groundwater pump-ins, and the blending of poorer quality CVP supplies with SWP supplies at O'Neill Forebay. The DWQP is focused on source improvement actions to minimize the impairment of drinking water as it is transported hundreds of miles to the consumer. This ELPH category includes physical infrastructure changes or operational changes that improve water quality.

#### ROD Commitments

The ROD includes the following projects related to CVP/SWP Operations and Storage and water quality improvement:

##### **Drinking Water Quality Program**

- Control runoff into the California Aqueduct and other similar conveyances

##### **Conveyance Program**

- Intertie between SWP and CVP facilities at or near Tracy
- A bypass canal to the San Felipe Unit at the San Luis Reservoir

#### Looking Back

In Years 1-3 the DWQP funded two projects to address surface runoff into the SWP aqueduct, and two projects to assess sources of pollutants in SWP terminal reservoirs in southern California. The DWQP coordinated with the Santa Clara Valley Water District on the evaluation of project alternatives to address the San Luis Reservoir low point issue and the associated water quality problems.

##### **2001 DWQP PSP (finalized February 2002)**

1. Little Panoche and Cantua Creek Watersheds (\$200k)

##### **2002 SWRCB RFP (finalized September 2002)**

1. Lake Perris Pollution Prevention and Source Water Protection Program (\$1,480k)
2. Assessing the Occurrences and Sources of E. Coli and EC 0157 Contamination in Castaic Lake (\$609k)
3. Salt and Martinez Creeks Watershed Assessments (\$200k)

##### **Other Funding Source (Agency)**

1. Control run-off into the California Aqueduct (DWR)

2. Investigate operational improvements/recirculation in the San Joaquin River (BOR)
3. San Luis Reservoir Low Point Improvement Project (Proposition 13 grant)

### Looking Forward

In Years 4-7 the DWQP will continue to fund projects addressing runoff and other sources of water quality degradation into the California Aqueduct and similar conveyances and will assess results of these projects in order to fully understand their potential water quality benefits and cost-effectiveness. The DWQP will continue to coordinate with the Santa Clara Valley Water District on the evaluation of project alternatives to address the San Luis Reservoir low point issue and the associated water quality problems.

### **2003 SWRCB RFP**

DWQP Funding Available for projects which focus on CA aqueduct conveyance.

### **Other Funding Source (Agency)**

State Water Project Watershed Sanitary Survey (DWR)

### Cross-linkages and Integration

The DWQP will coordinate with the BOR, DWR, the State Water Contractors, and the SWRCB, Central Valley Project Water Authority on actions in this category. These organizations represent owners, operators, and beneficiaries of the CVP and SWP facilities. The DWQP will look for opportunities to leverage funding to expand existing efforts of these organizations to improve imported water supplies. The DWQP will also coordinate with the Conveyance Program to evaluate the water quality affects of CVP and SWP improvements south of the Delta.

## **4.2. Source Water Exchanges out of Delta**

Another way to improve imported water quality is through Source Water Exchanges. Imported Delta waters currently used for drinking water may be exchanged for higher quality source waters (i.e. Sierra-fed rivers in the southern San Joaquin Valley) currently going to uses with lower water quality requirements. Source water exchanges are meant to allow water supply agencies to take advantage of high quality water from other sources to improve water quality and reliability. These “other sources” are currently applied to uses with lower water quality requirements (usually agricultural) than drinking water, so these exchanges are essentially optimizing the use of water quality in California. While exchanges may alter the timing of flows in the system, they are not operated to increase withdrawals. Indirect impacts of Source Water Exchanges must also be carefully determined to avoid degradation of Delta water quality and avoid un-redressed third party impacts.

### ROD Commitments

The CALFED ROD includes the following projects related to Source Water Exchanges for water quality improvement:

#### **Drinking Water Quality Program Complementary Actions**

- Establish a Bay Area Blending/Exchange Project
- Facilitate water quality exchanges and similar programs (San Joaquin Valley/Southern California Water Quality Exchange Partnerships)

### Looking Back

There are currently two programs underway to explore source water exchange opportunities—the Bay Area Water Quality and Supply Reliability Program and the San Joaquin Valley/Southern California Water Quality Exchange Partnerships. Prior to the adoption of the ROD, the Bay Area Water Quality and Supply Reliability Program was initiated with USEPA early implementation funding for the DWQP. In 2000, the Metropolitan Water District of Southern California initiated the San Joaquin Valley/Southern California Water Quality Exchange Partnerships. In Years 1-3, the DWQP focused on coordination with project proponents who are studying potential source water exchanges in order to better understand their potential water quality benefits and cost-effectiveness. The DWQP did not directly fund any Source Water Exchange studies, but is coordinating with the following studies:

#### **Federal Funding for the DWQP 1999-2000**

1. Bay Area Water Quality and Supply Reliability Program (USEPA \$100k)

#### **CBDA 2002**

1. Bay Area Water Quality and Supply Reliability Program (CBDA \$1.2 million)

#### **Other Sources of Funding (Agency)**

1. San Joaquin Valley/Southern California Water Quality Exchange Partnerships (Proposition 13 Grant to MWD, \$20 million; FWUA, \$3 million)

### Looking Forward

In Years 4-5, work funded by CBDA on the Bay Area Water Quality and Supply Reliability Program will continue. The DWQP will also coordinate with local project proponents of source water exchanges and agencies' investigations of Source Water Exchanges in Years 4-7 in order to fully understand their potential water quality benefits and cost-effectiveness, and the role of source water exchanges in achieving ELPH.

#### **DWR**

Prop 50, Chapter 5 funding for integrated regional water management will be available as follows:

Bay –Delta Program Year	4	5	6	7
State FY	2003-04	2004-05	2005-06	2006-07
Amount (\$ in thousands)	59,500	56,890	56,020	53,520

### Cross-Integration and Linkages

## **5. Improving Local Sources**

Few water supply agencies are entirely dependent on the Delta for their source water needs. Most have some combination of alternative surface water, groundwater and Delta water supplies. The ELPH diagram defines Other Local Sources as non-Delta waters, or those waters that will not be improved through Improving Delta Water or Improving Imported Water actions. Local sources often face different water quality challenges. Some of the lessons learned through Improving Delta Water and Improving Imported Water actions will be usable to improve Local Sources.

Alternative Local Sources can also improve water quality through supply flexibility and blending with Delta water supplies.

#### Looking Forward

Local water supply agencies have been studying and implementing improvements to local sources long before the CALFED program and continue to do so. The DWQP is not currently focused on specific actions to Improve Local Sources. The DWQP and DWS will develop a Strategic Plan and Regional Conceptual Models of ELPH in order to provide local water supply agencies with the information they need make the most cost-effective investments in water quality improvements.

#### Cross-Linking and Integration

The CBDA Watershed Program supports establishment of local watershed programs. Although the highest priority objectives are building local capacity, water quality improvement is an important program goal. Statewide source improvement and source water protection provide water quality benefits in virtually every watershed of the state. For example, the stormwater NPDES permit program regulates a variety of commercial, industrial, and municipal sources of runoff.

### **6. Treatment Options**

Commonly employed treatment technologies for Delta water users are ozone, chloramines, and conventional chlorine disinfection. Advanced treatment studies, tailored to Delta waters and blends of Delta water would add significantly to this portfolio. The use of multiple disinfectants and advanced treatment technologies has the potential to significantly control disinfection byproducts formed during the treatment process. It is important to note, however, that the removal of salts from water remains an extremely costly process.

#### ROD Commitments

The CALFED ROD includes the following projects related to drinking water treatment for water quality improvement:

##### **Drinking Water Quality Program**

- Invest in treatment technology demonstration.
  - Initiate UV disinfection demonstration project by end of 2002
  - Initiate regional desalination demonstration project by end of 2002
  - Evaluate practicability for full-scale implementation by 2007
- Support the Delta Drinking Water Council or successor
  - Evaluate progress towards meeting water quality and treatment technology objectives by the end of 2003

#### Looking Back

In Years 1-3, the DWQP and USEPA funded 5 drinking water treatment projects to evaluate alternative treatment technologies to reduce formation of DBPs and to continue work on desalination technology development. In Year 2, the DWS presented recommendations to BDPAC on the need to study advanced treatment technologies. The DRIP program has already resulted in the development of advanced reverse osmosis (RO) membranes and other improvements in desalinization.

**2001 DWQP PSP (finalized February 2002)**

1. Bromate Control with Carbon Dioxide Addition (\$120k)
2. Integrating Ultraviolet Light to Achieve Multiple Treatment Objectives (\$610k)
3. Advanced Pretreatment Using Ion Exchange for Organic Carbon Removal from Delta Water (\$495K)

**Other Funding Source (Agency)**

1. CCWD Advanced Treatment - Multiple Barrier Study (EPA, \$700k)
2. Desalination Research and Innovation Partnership (DRIP) (EPA)

Looking Forward

Working with the Department of Health Services (DHS) and DWR, the DWQP will continue to support funding of treatment technology studies and pilot projects in Years 4-7. The DWS will also conduct an initial assessment of progress toward meeting water quality targets and alternative treatment technologies by the end of 2003. Funding available for treatment technology projects anticipated in years 4-7 is up to \$100 million from chapters 4 with additional funding also possible from chapter 6 of Prop 50. The exact amount that will be to treatment technology development within the CALFED solution area is yet to be determined.

**Other Funding Source (Agency)**

1. Agricultural drainage water recycling using membrane technology (CBDA, \$316k)

**7. Water Use Efficiency**

Water use efficiency is a crucial component of the CALFED program in general. The DWQP is coordinating with the Water Use Efficiency (WUE) program to determine the best way to implement WUE throughout California and to identify opportunities through the ELPH strategy for the multiple benefits of WUE to both water supply and water quality. Water use efficiency measures should be thought of in conjunction with local and system wide water management as ways to stretch or modify the availability of higher quality sources both among agencies sources and when employed in concert with an exchange or transfer strategy to obtain higher water quality from other sources. Water use efficiency gains may also offset the need for some portion of existing storage capacity that could then be dedicated to increase Delta outflow during periods of water quality concern.

ROD Commitments

The CALFED ROD includes the following projects related to water use efficiency and water quality improvement:

**Water Use Efficiency Program**

- Incentive-based programs for water use efficiency in the agricultural and urban sector
- Water measurement and transfer incentive actions

## **8. Program Management**

The CBDA Drinking Water Quality Program integrates Delta drinking water quality improvement from source to tap. It seeks to reduce drinking water pollutants of concern working from the upper watersheds to the taps of consumers in all areas of the State where Delta water is used. This distinguishes it from existing State agencies with water quality management responsibilities that deal with drinking water supply systems and ambient water quality separately.

Under the Bay-Delta Authority Act of 2003, the DWQP has three implementing agencies, USEPA, DHS, and the SWRCB. One of the major challenges is making the transition from a program where the majority of program responsibilities were assumed by CALFED staff to a program largely implemented by the agencies named in the Act. Along with this change in implementation is a change in program funding. Unlike most other CBDA program elements, the DWQP is not allocated any funding directly from Prop 50. DHS, SWRCB and DWR are the agencies with funding from Prop 50 for water quality actions.

As management of the DWQP and funding shift to the implementing agencies, roles, responsibilities, and available resources need to be identified. Agency roles and responsibilities should fit the existing missions and responsibilities as closely as possible. Currently, DHS implements the federal Safe Drinking Water Act (SDWA) in California. DHS responsibilities include regulation of drinking water suppliers, adoption of State drinking water standards, and distribution of grants and loans for drinking water infrastructure improvements and related actions. The primary focus of DHS programs is from the water treatment plant intake to the tap. The SWRCB and RWQCBs are responsible for implementing the federal Clean Water Act (CWA), the State clean water act (Porter-Cologne), and administration of water rights in California. The SWRCB and regional boards are responsible for protecting surface water and ground water quality throughout the State. USEPA is responsible for overseeing State implementation of the CWA and SDWA and other federal environmental laws and regulations.

For many program tasks, current responsibilities and available funding clearly indicate which agency should have responsibility. For example, since DHS is currently responsible for permitting of water treatment processes, it will be responsible for the treatment technology goals and commitments of the program. Likewise, SWRCB/RWQCB will be responsible for source improvement goals and commitments. The CBDA will be responsible for DWQP oversight and coordination including incorporating ROD commitments into program actions at the implementing agencies. These include the environmental justice, science, stakeholder consultation, local leadership, and other implementation commitments listed in the ROD. Table 1 summarizes the DWQP roles and responsibilities of the CBDA, implementing, and participating agencies. Some ROD commitments and elements of the ELPH diagram are not clearly associated with any of the three implementing agencies and may require additional agreements with the participating agencies.

Some program tasks also apply to the DWQP in general and cross program boundaries. Support for the BDPAC Drinking Water Subcommittee, general CBDA Science Program support, establishing expert panels, and performance measures are a few examples. Finding the budget for these critical program activities given the current resources and sources of funding will be a

challenge. There is a desperate need for adequate and flexible funding to implement the intent of the strategy outlined in the ELPH diagram.

**8.1. Administration**

Looking Back

In Years 1-3, CALFED provided management, coordination and oversight for the DWQP, although the DWQP has never been adequately staffed. As of April 2003, dedicated CALFED resources at the various agencies consist of an interim program manager (at CALFED), and 1.5 PYs at DHS. The SWRCB/CVRWQCB assigns staff resources as needed to carry out their responsibilities. USEPA has made a staff person available part time on a priority basis.

DHS is currently providing 1.5 PYs of staff resources to CALFED through an Interagency Agreement (IA). The IA, currently undergoing amendment, will expire on June 30, 2004. However, the status of funding for these positions after June 30, 2003 is unknown. One additional position for the DWQP is budgeted for the SWRCB. A number of potential actions and studies have not received funding because of staffing resource limitations.

Looking Ahead

Program management and most staffing will transition from CALFED to DHS and SWRCB/CVRWQCB as state co-leads and US EPA as federal lead in accordance with the Bay-Delta Authority Act. The following table outlines agency roles and responsibilities.

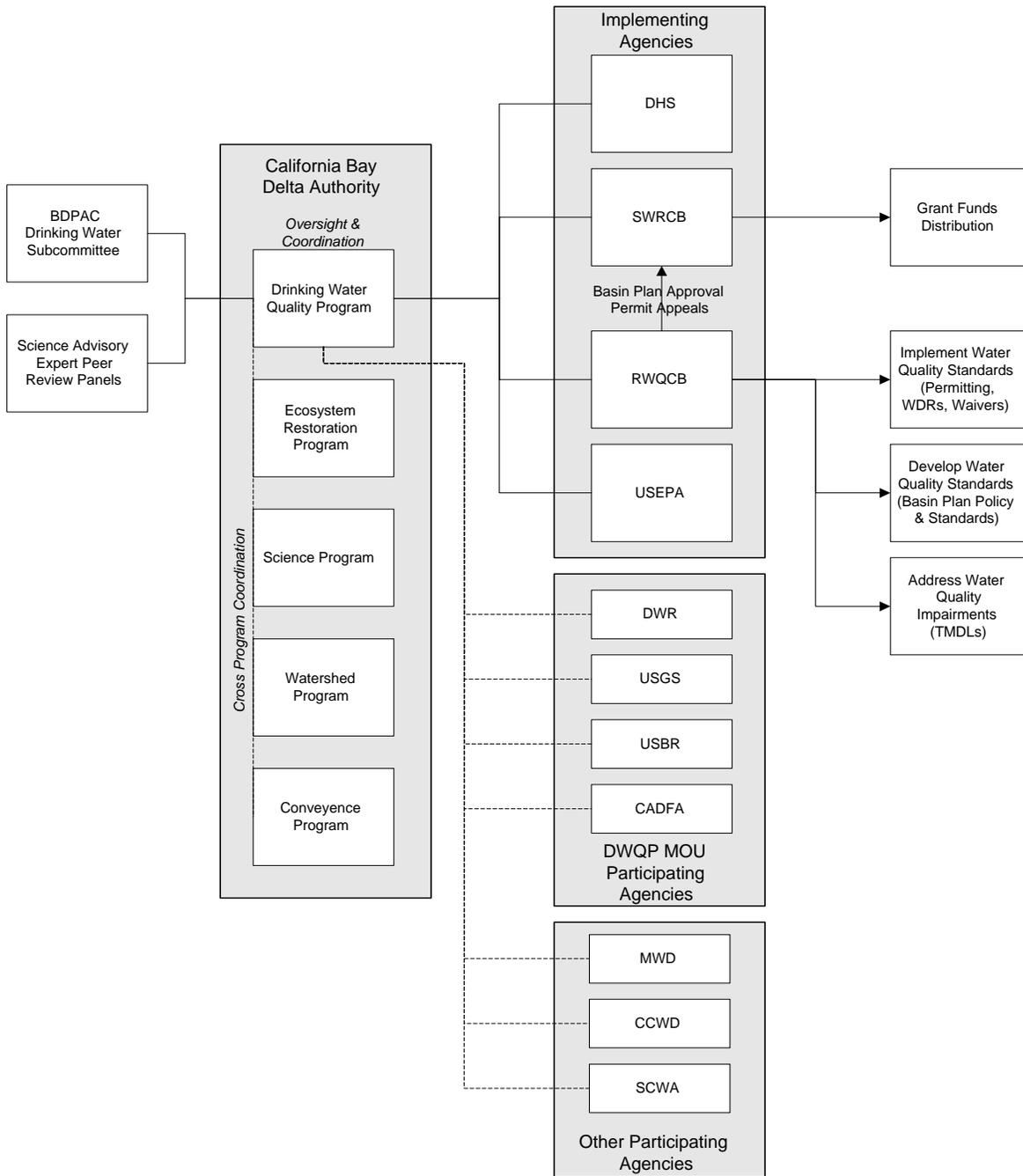
**Table 1. Agency Roles and Responsibilities**

Category	Agency	Role
	CALFED DWQP	Program coordination and oversight, cross-program integration.
Implementing Agencies		
	DHS	State co-lead. Management of treatment technology development efforts, health effects studies. Administration of Prop 50 Chapter 4 and Chapter 6 funds.
	SWRCB	State co-lead. Management of grant funds distribution (Prop 50 Chapter 5 funds).
	CVRWQCB	State co-lead. Management of source protection efforts. Responsible for specific ROD commitments.
	US EPA	Federal lead. Administration of Clean Water Act and Safe Drinking Water Act via state agencies.
Participating Agencies		
	DWR	Administration of Prop 50 Chapter 6 funds. Implement Municipal Water Quality Investigations program. SWP water quality monitoring, Implementing conveyance program.

Deleted: .

	USGS	Provide data and science assessments of water quality. Contract research and advice on scientific questions.
	USBR	SJV ag drainage program, recirculation study, CVP water quality monitoring.
	CDFA	Conservation programs for agriculture
BDPAC		
	DW Subcommittee	Review program progress and advise policy directions.
	Science Advisory Expert Panel(s)	Provide advice on management questions posed by the DWS and agencies (the “charge” of the panel).

**Figure 2: CALFED Drinking Water Quality Program Organizational Chart** *(Need to add Storage Program to chart under CBDA)*



## **8.2. Drinking Water Subcommittee (DWS)**

The Drinking Water Subcommittee was formed by the CALFED Bay Delta Public Advisory Committee (BDPAC) in January 2002 and held its first meeting in February 2002. It is a public forum under the FACA Act, and meets monthly to assess, discuss and advise the DWQP through recommendations to the BDPAC.

### Looking Back

Much of the first year of DWS meetings was devoted to development of the concepts illustrated in the ELPH diagram and the companion write-up. This is a major step in identifying and describing the complex set of factors that govern the public health risk and costs supplying drinking water from the Delta. The DWS has also submitted a recommendation to BDPAC regarding proposed changes to the RWQCB program for permit waivers of discharges from irrigated lands. It also presented an information item outlining a proposed policy framework for addressing drinking water impacts of Bay-Delta Program actions. The DWS established broad stakeholder representation in its first year and half and is working to increase its agricultural stakeholder base.

### Looking Forward

In Years 4, the DWS will focus on three areas:

- Development of a Draft Drinking Water Quality Policy Framework: The DWS has proposed a policy framework to guide mitigation for drinking water quality impacts of CALFED program actions. The DWS will continue its coordination with other BDPAC subcommittees to refine and recommend a policy to the BDPAC and to the CBDA.
- Development of a Strategic Plan for the Drinking Water Quality Program: The DWS has been charged with making recommendations to BDPAC on how best to achieve program goals and objectives. The DWS plans to put these recommendations in the form of a strategic plan.
- Resources to carry out the CALFED Drinking Water Quality Program

The DWS will also conduct an initial assessment of progress toward meeting water quality targets and alternative treatment technologies by the end of 2003.

## **8.3. Implementation Commitments**

### Looking back

The DWQP has incorporated CALFED Science, Environmental Justice, and Public Involvement principles into all major program elements. Current activities include:

- Environmental Justice and Tribal interests are important selection criteria in the grant funding processes.
- Environmental justice representatives on the BDPAC Drinking Water Subcommittee.

- CBDA Science Program advice on important DWQP tasks including Delta Drinking Water Policy development, the DWQP Monitoring and Assessment Program, establishing a drinking water expert panel, and developing performance indicators.
- Public participation and information are provided through the Drinking Water Subcommittee, the DWQP web site and project specific public information and outreach activities.

#### **8.4. Monitoring and Assessment**

Monitoring and Assessment actions enable the DWQP to establish an understanding of existing water quality, to develop conceptual models of improvement actions, to monitor water quality improvement, and to maintain a transparent process towards DWQP goals. There are four primary action areas for the DWQP Monitoring and Assessment program:

- 1) Monitor and assess trends to determine if drinking water quality is changing over time, identify where changes are taking place, and develop and assess program performance indicators.
- 2) Develop studies, conceptual models, numerical models, workshops, and reports to answer questions about sources, fate, transport, and management of contaminants of concern.
- 3) Develop and use performance measures to guide DWQP actions and to assess the progress of the DWQP.
- 4) Improve access to information related to drinking water quality in the CALFED solution area.

As part of these actions, the DWQP will facilitate the monitoring and reporting of drinking water quality through existing monitoring programs, such as the SWRCB's existing Surface Water Ambient Monitoring Program.

#### ROD Commitments

The CALFED ROD includes the following actions related to monitoring and assessment for drinking water quality:

##### **Drinking Water Quality Program**

- Implement source controls in the Delta and its tributaries
  - Develop a comprehensive monitoring and assessment program by 2003
  - Evaluate and determine whether additional protective measures are necessary to protect beneficial uses by end of 2004
- Support the ongoing efforts of the Delta Drinking Water Council or its successor
  - Complete an initial assessment of progress toward meeting CALFED water quality targets and alternative treatment technologies by end of 2003
  - Complete final assessment and submit final recommendations on progress toward meeting CALFED water quality targets and alternative treatment technologies by end of 2007

#### Looking Back

The DWQP has had a strong emphasis on monitoring and assessment activities since the start of the program. Prior to the adoption of the ROD, four monitoring and assessment projects were funded with USEPA early implementation funding for the DWQP. In Years 1-3, the DWQP identified existing drinking water quality monitoring programs and funded 6 projects addressing

monitoring and assessment needs in the Delta, San Joaquin River and SWP system. The DWQP also developed a list of candidate indicators for performance measures.

**Federal Funding for the DWQP 1999-2000**

1. Real-time Water Quality Monitoring Project (\$220k)
2. TOC High Frequency High Variability Study (\$300k)
3. Delta Contaminant Load Study (\$45k)
4. Database Management for Drinking Water Quality (\$100k)

In Years 1-3, the DWQP identified existing drinking water quality monitoring programs and funded 4 projects for \$xx million . The DWQP also developed a list of candidate indicators for performance measures.

**2001 DWQP PSP (finalized February 2002)**

1. Resolution of Outstanding Issues in Delta Hydrodynamics and Water Quality Models (\$155k)
2. Determining the Contribution of Riverine, In-Delta, and Aqueduct Sources of Organic Carbon to Loads in the State Water Project using AMS Carbon Dating and Stable Isotope Characteristics (\$396k)
3. Vernalis Real-Time Water Quality Monitoring Station (\$515k)
4. Assessing the Occurrence and Sources of Microbial Contamination in the Sacramento-San Joaquin Delta Region (\$973k)
5. Improving Delta Drinking Water Quality: Managing Sources of Disinfection Byproduct-Forming Material in the State Water Project (\$1,369k)
6. Adaptive Real-Time Monitoring and Management of Seasonal Wetlands and the San Luis National Wildlife Refuge to Quantify Contaminant Sources and Improve Water Quality in the San Joaquin River (\$320k)
7. Assessing the Occurrence and Sources of Microbial Contamination in the Sacramento-San Joaquin Delta Region (\$973k)

**Other Funding Sources (Agency)**

1. Sacramento River Watershed Program (USEPA)

Looking Forward

In Years 4-7, the DWQP will coordinate with the Science Program to achieve the following:

Year 4: Establish a DWQ Science advisory panel. Complete conceptual models for the primary contaminants of concern, white papers on selected contaminants, and selection of analytical tools (computer models).

Year 5: Complete data collection and monitoring to supply information needed by the selected model or models and conduct initial model runs.

Year 6: Complete the basic network of trends monitoring stations.

Years 6 and 7: Apply the selected models and report results.

Year 7: Evaluate source improvement and program progress.

In Years 4-7, the DWQP will also coordinate with the Science Program to develop Performance Measures. Program is committed to developing water quality performance measures and relevant measures of program success. In 2002, the Program developed candidate indicators for TOC and bromide in exported water. In 2004, the Program, with assistance from a consultant, will begin to expand these indicators to reflect the overall goals of the Program, as well as the commitments in the ROD. At the project level, performance measures are currently included in requests for proposal. Finally, performance measures have been established to track administrative goals. Currently, the Program tracks the number of projects initiated, projects by region and the dollar amounts distributed.

The DWQP will complete the development of indicators for TOC and bromide in exported water, and develop additional indicators as warranted. The DWQP will also coordinate with the Science Program to establish an expert panel to advise the DWS on the following issues:

1. The TOC and bromide targets in the ROD are intended to protect public health by reducing disinfection byproduct formation. Is TOC the most appropriate measure of disinfection byproduct formation potential?
2. How can source control, water management, and treatment be used most effectively in to reduce risk from disinfection byproducts, pathogens, and other pollutants of concern?
3. What are the long-term trends in ambient concentrations and loads of the drinking water program pollutants of concern (organic carbon, bromide, pathogens, turbidity, salinity, and nutrients)?
4. How will large scale and long term changes to the system affect source water quality? For example: How will increasing population and urbanization of the Central Valley impact source water quality?

#### Cross-Integration and Linkages

The DWQP will coordinate closely with the Science Program when developing and implementing its Monitoring and Assessment actions. The Science Program is establishing protocols for integrating science into CBDA program elements.

### **8.5. Funding**

#### Looking Forward

The primary source of funding for drinking water quality actions in years 4-7 will be the Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002 (Prop 50). None of the Prop 50 funds for water quality are designated for the CBDA. As has been the case in years 2 and 3, it is anticipated that the primary mechanism for implementation of the program will be through competitive grants. The SWRCB, DHS, and DWR all plan to conduct grant funding processes in Years 4-7 using Prop 50 funds. Since these funds are available statewide and may address other water quality issues, and none of the remaining Prop 50 funding has been specifically designated for the DWQP, the amounts for the program are unknown.

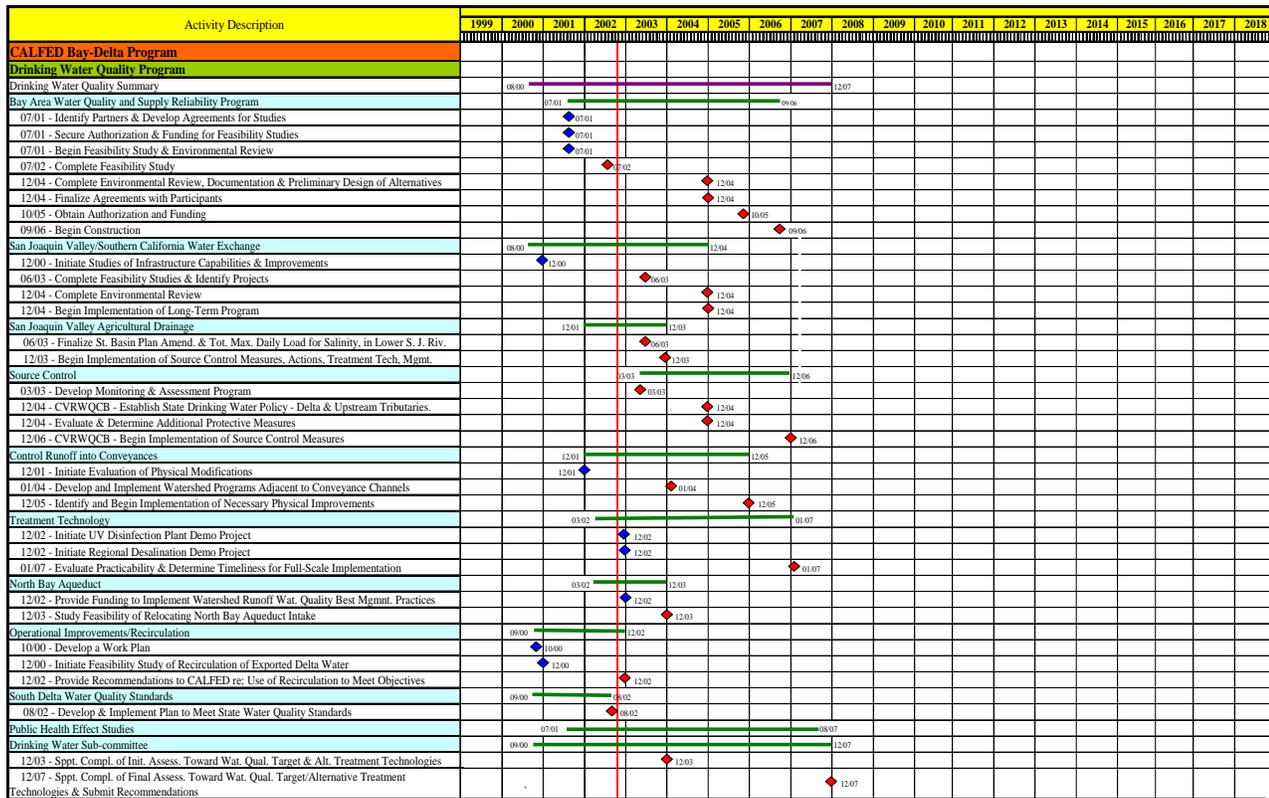
**2003 State Water Resources Control Board RFP:** The SWRCB released a consolidated RFP which includes \$31.5 in Year 3 funds for the DWQP. The selection process will begin in Year 3 with final project selection in Year 4.

As the attached Prop 50 expenditure plan indicates, specific sections of the bond are designated for treatment technology and water quality improvements. These correspond to the Source Improvement and Treatment Options boxes in the ELPH diagram. The DWQP will work with the implementing agencies to develop program priorities and selection criteria for these funds.

The proposed Year 4 budget for the DWQP is \$3.1 million. Additional funding for DWQP goals and commitments is expected from Prop 50 but the amount is unknown.

### **8.6. Schedule**

See the attached diagram from the January 2003 tracking report shows ROD milestones for years 4-7.



CALFED Revised December 18, 2002  
 Report Date: January 2003  
 Schedule Prepared by: CAS  
 California Department of Water Resources  
 Division of Engineering  
 Contract Administration Section  
 Sheet 1 of 1

**CALFED Bay-Delta Program  
 Schedule Summary**

